Victorian Network Performance and Insights Report

A review of the Victorian declared shared network

September 2026

VicGrid

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We acknowledge and respect Victoria's Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partnering and meaningfully engaging with Victoria's Traditional Owners and First Peoples to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

Contents

List of Tables

List of Figures

Acronyms

Term	Definition
AEMO	Australian Energy Market Operator
APD	Alcoa Portland
BESS	battery energy storage system
CER	consumer energy resources
DER	distributed energy resources
DSN	declared shared network
GW	gigawatt/s
GWh	gigawatt hours
IBR	inverter based resource/s
kV	kilovolt/s
kW	kilowatt/s
LOR	Lack of Reserve
MSL	minimum system load
MVA	megavolt ampere/s
MVAr	megavolt ampere/s reactive
MW	megawatt/s
NEM	National Electricity Market
NER	National Electricity Rules
NSW	New South Wales
PV	photovoltaic
RERT	Reliability and Emergency Reserve Trader
SA	South Australia
Tas	Tasmania
VAPR	Victorian Annual Planning Report
Vic	Victoria
VFRB	very fast run back
VNI	Victoria – New South Wales Interconnector
VNPIR	Victorian Network Performance and Insights Report
VRE	variable renewable energy
VTP	Victorian Transmission Plan
WRL	Western Renewables Link
YWPS	Yallourn West Power Station

1. Introduction

1. Introduction

This section outlines the purpose of this report including the operational context in which the report has been prepared.

The Victorian Network Performance and Insights Report (VNPIR) analyses the key performance indicators of Victoria's declared shared network (DSN) over the previous 12 months. It assesses adequacy of the DSN based on its performance under various operating conditions identified during the reporting period.

Reviewing the historical performance of the network can offer valuable insights by offering a data-driven foundation for informed decision-making that benefits Victorian energy consumers and planning outcomes. As such, the VNPIR is a fact-focused historical report which:

- provides insights into the performance and capability of the DSN,
- identifies the constraints in the present day DSN, and
- provides inputs for undertaking the annual planning review of the DSN.

1.1 Purpose

The purpose of this report is to review and provide useful information to key stakeholders about the present-day network, to understand the DSN's effectiveness in supplying electricity to Victorian energy consumers reliably and securely. Analysing past performance and trends helps identify future trends, predict future challenges and opportunities, and guide informed investment decisions, minimising risk and increasing the likelihood of successful network operations.

The insights contained in this report provide context and groundwork as key planning inputs and assumptions to undertake the planning studies as part of the annual planning review under National Electricity Rules (NER) 5.12.1.

The review has been carried out in accordance with the NER, so the scope is limited to any requirements stipulated specifically for the DSN (such as network performance criteria in NER S5.1) or any other existing issues in the DSN that are relevant to the annual planning review.

1.2 Scope and structure

The scope of the analysis and the content presented in this report is based on the operational context of the DSN over the 12-month period between 1 April 2025 and 31 March 2026, primarily focused on existing network constraints and analysis of network operation during stressed operating conditions.

In evaluating the adequacy of the Victorian DSN, three broad areas have been considered, with indicators listed under each:

- Operational observations (section 2) – provides key observations on managing the DSN within the technical envelope under system normal conditions and post-contingent situations.
  - Power system reviewable incidents – reviewable operating incidents[1] or other significant incidents which resulted in system security violations or loss of customer load or generation (section 2.1).

1 "Reviewable operating incident" is defined in NER 4.8.15. AEMO's published reports about operating incidents are at https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-events-and-reports/power-system-operating-incident-reports

  - Supply adequacy – the ability of the DSN power system to meet consumer demand (section 2.2).
  - Operational management – how network operation was impacted by the changing technical characteristics and geography of supply, particularly where such changes increased operational complexity (section 2.3).
- Review of network constraints (section 3) – an analysis of the most critical network constraints and the performance of the interconnectors and a comparison against years.
  - Impact of top binding constraint equations – the severity of network constraints (section 3.2).
  - Interconnector capability – the extent to which the operational and design limits of interconnectors restricted the import and export of generation (section 3.3).
- Network behaviour assessment under stress (section 4) – an analysis of the network behaviour at times of high network stress.
  - An overview of network performance at observed minimum and maximum demand times
  - Analysis of DSN flows and voltages if a contingency were to occur under several high stress scenarios

1.3 Definitions

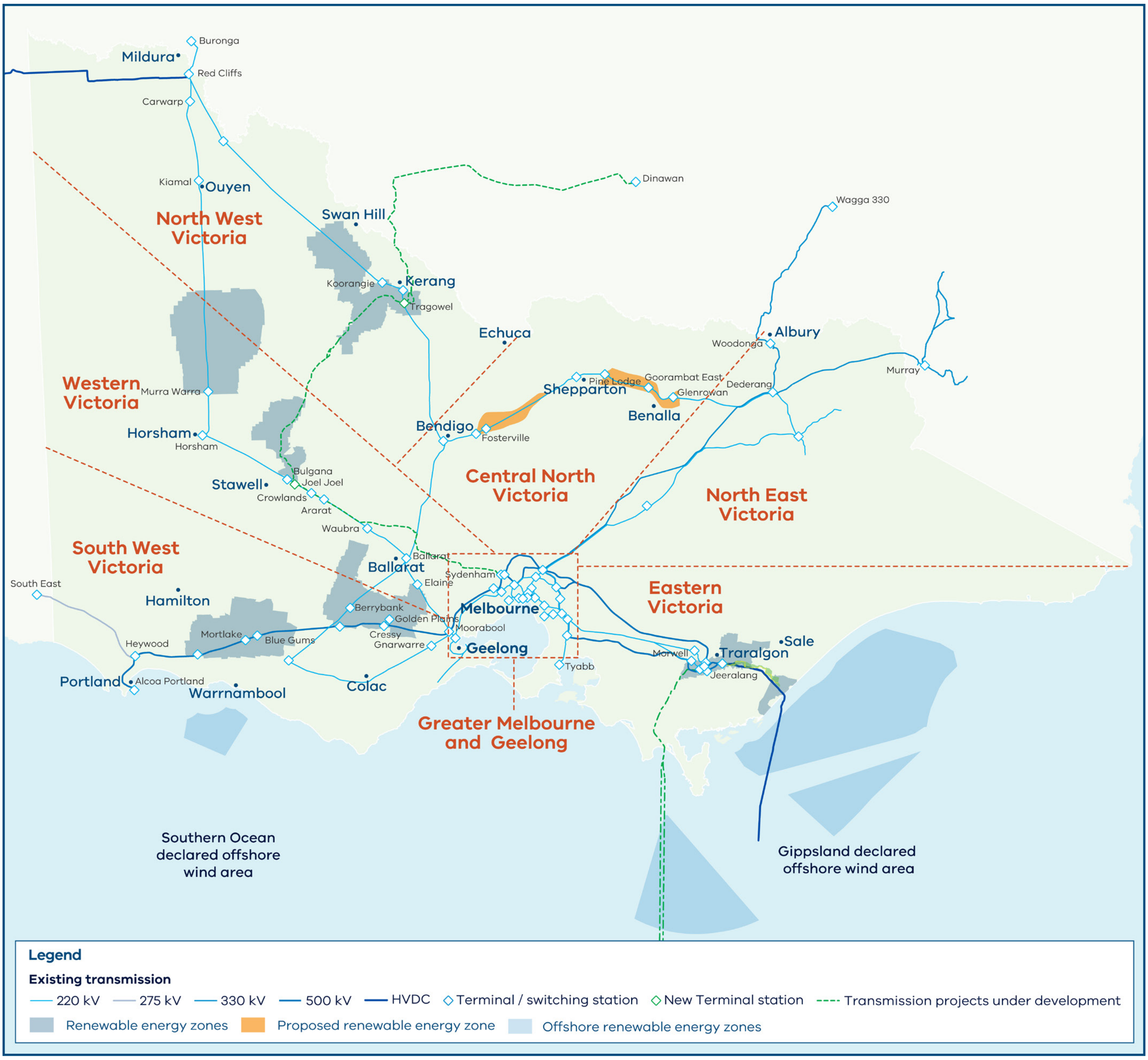
Unless otherwise stated:

- Generation is defined as all scheduled, semi-scheduled, and non-scheduled generation greater than 5 megawatts (MW) and does not include distributed photovoltaic (PV) systems.
- Operational demand[2] in a region is demand that is met by local scheduled generating units, semi-scheduled generating units, non-scheduled intermittent generating units of aggregate capacity ≥ 30 MW, and by generation imports to the region and wholesale demand response. It excludes the demand met by non-scheduled, non-intermittent generating units, non-scheduled intermittent generating units of aggregate capacity < 30 MW, exempt generation (such as rooftop solar, gas tri-generation, and very small wind farms), and demand of local scheduled loads.
- Underlying demand[3] in a region is the estimated total of electricity consumption defined as operational demand plus rooftop PV generation.
- Distributed PV refers to PV systems up to 100 kilowatts (kW) capacity.
- The reporting period for this report refers to the 12 months of data from 1 April 2025 to 31 March 2026. The reporting period has changed compared to previous VNPIR reports which were 1 July to 30 June each year. The reporting period has changed due to a change in publication cycle of this report.
- Corridors refer to areas of Victorian DSN infrastructure shown in Figure 1 used to group and report data in this report.

2 See https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/data-nem/operational-demand-data.

3 See https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/operational-demand-data

Figure 1 The Victorian DSN corridors and interconnectors



1.4 Context

Victoria continues to attract investment in both distributed and large-scale variable renewable energy (VRE) resources, which is changing the supply-demand pattern across the state. Traditional load centres are now developing into supply hubs, while consumer energy resources (CER) are shifting the consumer load profile. With forecast increases in distributed PV storage, electric heating, electric vehicles and data centres, this trend is expected to gather pace and require greater operational management and DSN investment to maintain reliability and system security. To adapt to these ongoing changes in the energy landscape, we are proactively engaging with distribution network service providers and undertaking joint planning to develop holistic solutions.

1.4.1 Maintaining system strength in Victoria

With the growth of inverter-based resources (IBR) and the upcoming retirement of conventional generation units, network outage management requires more planning to ensure supportable demand and system strength are adequate. Managing power system security during high renewable generation periods and planned and unplanned outages is currently causing network congestion, particularly in the North West Victoria corridor. Under prior outage conditions, and during forced outages, a minimum number of synchronous generators are required to be online in both Victoria and South Australia (SA) to maintain system strength in this part of the network.

As the System Strength Service Provider for Victoria, we have commenced the procurement of the preferred option portfolio identified in the Victorian System Strength Regulatory Investment Test for Transmission Project Assessment Conclusions Report,[4] which is reported in further detail in section 3 of the 2026 Victorian Annual Planning Report (VAPR).[5]

1.4.2 Growing consumer energy resources

Increasing CER, including distributed PV penetration, is impacting the load available for load shedding and system restart. Voltage and frequency control also become increasingly difficult with increasing magnitude and duration of reverse power flows.

The national CER Roadmap sets a range of initiatives that will support integration and help ensure all consumers can continue to benefit from their investments.[6] Both short-term and long-term actions are needed, particularly to address periods when high distributed PV relative to underlying demand results in minimum operational demand levels, where action may be required to maintain power system security.

4 See https://www.vicgrid.com.au/__data/assets/pdf_file/0033/772377/victorian-system-strength-requirement-rit-t-pacr.pdf

5 See https://www.vicgrid.com.au/transmission-planning/victorian-annual-planning-report

6 See https://www.energy.gov.au/sites/default/files/2024-07/national-consumer-energy-resources-roadmap.pdf

Increasing maximum and reducing minimum operational demand

VRE resources are mostly located in regional and remote areas in Victoria. Transmission lines supporting the generation flow towards load centres are not currently capable of meeting the projected growth. Victoria is observing an increasing trend in maximum operational demand, while continued uptake of generation (distributed PV) often offsets the daytime underlying demand, creating a trend in decreasing minimum demand.

Victoria experienced forecasted and actual minimum system load (MSL) events during the reporting period. Historically, voltage control during low demand periods required frequent operator interventions in both the 500 kilovolts (kV) and 220 kW networks. However, there has recently been less need for intervention due to preparation for MSL and improved reactive power control. The reduction in voltage control interventions results in lower market costs, increased system resilience, and improved system security.

To navigate the network changes that enable the growth in VRE and to keep managing the operational challenges discussed above, coordinated timely investment is required. The VAPR provides more information about VicGrid's transmission augmentation projects.[7]

7 See https://www.vicgrid.com.au/transmission-planning/victorian-annual-planning-report

2. Operational observations

2. Operational observations

This section examines the key operational aspects of the Victorian DSN during the reporting period, including:

- Reviewable incidents in the DSN
- The DSN's ability to meet customer demand
- The DSN's operational management measures

Notable operational observations:

- Peak demand – Victoria recorded its all-time highest maximum operational demand of 10,736 MW on Tuesday 27 January 2026 at 6 pm compared to a peak of 9,851 MW in 2024-25. The main contributor to the increase in maximum operational demand was the higher temperatures experienced.
- Minimum demand – Victoria recorded its all-time lowest minimum operational demand of 1,287 MW at 1 pm on Saturday 27 December 2025. This was 217 MW lower than the previous record set on New Year's Day 2025. The relatively low underlying demand and high distributed PV output contributed to this new all-time minimum operational demand.
- Victoria experienced actual and forecast MSL events. Actual MSL1 events occurred three times in Victoria (25 December 2025, 27 December 2025, and 1 January 2026). The MSL case on the minimum operational demand day (27 December 2025) breached the MSL1 threshold by 418 MW and was 82 MW away from the MSL2 level to trigger intervention. On 1 January 2026, there was a forecast MSL2, which was managed using a Type 1 transitional contract.
- Reverse power flows were observed from 18 terminal stations. The total hours of reverse power flows across all stations increased by 3% compared to 2024-25.
- 28 terminal stations (out of 32 terminal stations assessed) were found to be injecting reactive power for more than 10% of the year. This included 10 terminal stations that experienced reactive power injection of above 30 megavolt amperes reactive (MVAr) for more than 15% of the year.
- There was a continued trend of increasing wind and solar generation flow towards Melbourne from Western Victoria, while brown coal generation transmitted from the Latrobe Valley area slightly increased compared to 2024-25.

2.1 Power system reviewable incidents

VicGrid analyses reviewable incidents and other significant incidents which result in system security violations or loss of customer load or generation in the DSN to identify where future investment needs may develop.

Table 1 summarises notable power system incidents in Victoria during the reporting period and highlights issues in the Victorian DSN which may, in future, develop into investment needs. This section does not consider events which occurred primarily within the distribution network.

Table 1 Summary of notable power system incidents in Victoria during the reporting period

Date	Incident	Consequence
16 October 2025	Trip of Yallourn unit 3 and unit 4[A]	Following this non-credible contingency, the combination of generating units online in Victoria was below the minimum combination threshold as specified in the Australian Energy Market Operator's (AEMO) Victorian system strength limit advice. This event triggered a review and update of Victorian system strength limit advice.
15 April 2026	Trip of Tyabb-John Lysaght 220 kV No.1 and No.2 lines.	The trip of Tyabb-John Lysaght No.1 and No.2 220 kV lines tripped at 3:06 pm disconnecting 16 MW of bulk load at John Lysaght Australia (JLA) substation.

A: for more information, see https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2025/trip-of-yallourn-w-power-station-unit-3-and-unit-4.pdf

2.1.1 16 October 2025 – trip of Yallourn Unit 3 and 4

On 16 October 2025, Yallourn W Power Station (YWPS) unit 3 and unit 4 tripped due to a malfunction of their cooling system. Prior to the incident, YWPS unit 3 was generating 299 MW and unit 4 was generating 298 MW.

Following this non-credible contingency, the combination of generating units online in Victoria was below the minimum combination threshold specified in the Victorian system strength limit advice. Based on the availability of fast-start units at the time and accounting for the cost of direction(s), AEMO determined that three Jeeralang A or B units were required online to manage system strength in Victoria. Jeeralang units A2 and A3 were synchronised 27 minutes after the non-credible contingency, and Jeeralang unit B3 was synchronised 31 minutes after the non-credible contingency.

AEMO's post-incident power system security assessments determined that with the directed-on Jeeralang units the power system was operating in a secure state within 30 minutes following the incident. VicGrid has since reviewed and updated its system strength limit advice with new combinations of system strength units to provide additional operational flexibility for similar situations.

2.1.2 15 April 2026 – trip of Tyabb-John Lysaght No.1 and No.2 220 kV lines

At 3:06 pm on 15 April 2026 the Tyabb-John Lysaght No.1 and No.2 220 kV lines tripped. AEMO did not instruct load shedding and was advised of the disconnection of 16 MWs of bulk electrical load.

Further details on this event will be provided in the 2027 VNPIR.

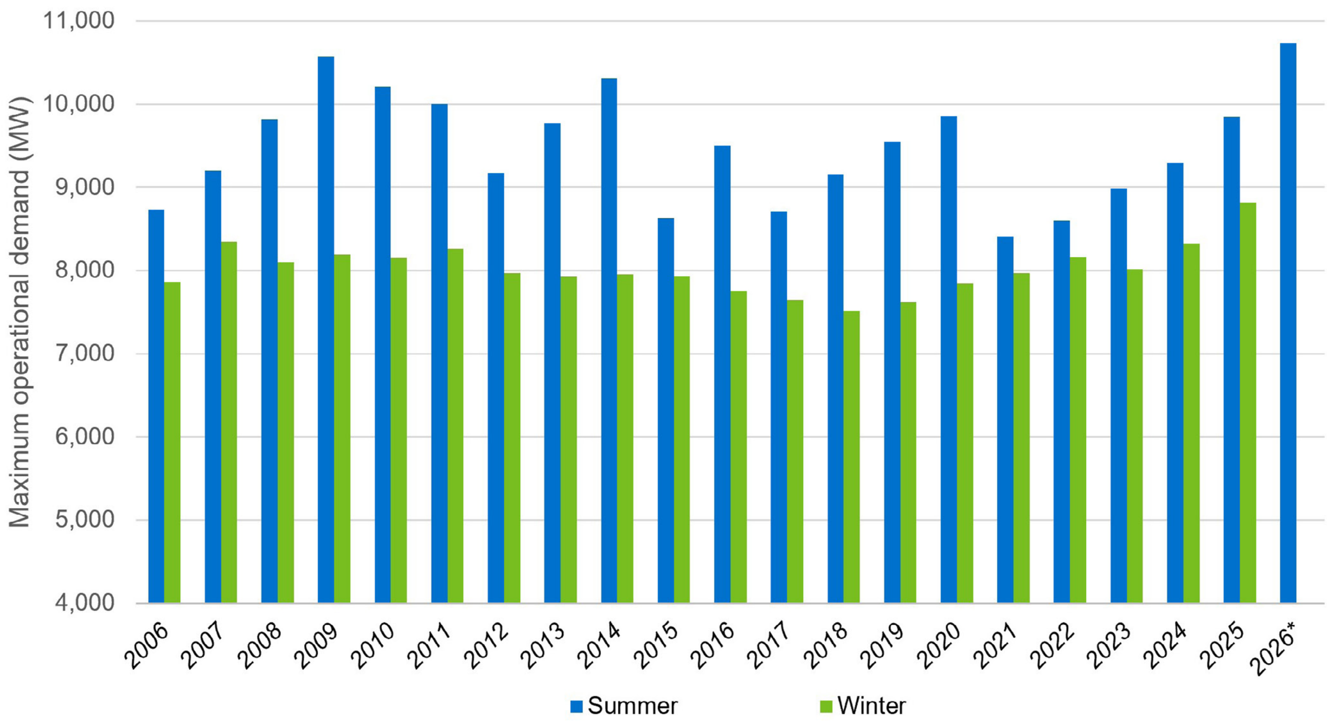
2.2 Supply adequacy

In Victoria, no actual Lack of Reserve (LOR) days or Reliability and Emergency Reserve Trader (RERT) activity was observed during the reporting period. Victoria's strong interconnection with neighbouring regions is important in both Victoria's own supply adequacy and that of other regions.

2.2.1 Victoria's maximum operational demand

Victoria reached its annual maximum operational demand of 10,736 MW at 6 pm on Tuesday 27 January 2026, compared to a peak of 9,851 MW in 2024-25. This record was set during a period of extreme heat, with temperatures exceeding 43°C in parts of Melbourne, contributing to elevated cooling demand. Similar to 2024-25, the maximum operational demand occurred in the late hours of the day, reflecting the increasing trend for distributed PV generation to meet a growing proportion of underlying demand during the day. Additionally, Victoria set a new Q3 record for maximum operational demand, reaching 8,623 MW in the half-hour ending at 6 pm on 25 July 2025, which was 11 MW (+0.1%) above the previous record set in Q3 last year. Figure 2 shows Victoria's maximum demand levels since 2005-06, Victoria's winter 2026 operational demand has been omitted as this data range is outside the reporting period.

Figure 2 Actual maximum summer (1 November-31 March) and winter (1 April-31 October) Victorian operational demand from 2005-2006 to summer 2026 (MW)



Note: * Winter 2026 data was not available at the time of publishing this report.

2.2.2 Victoria's minimum operational demand

Victoria recorded its all-time lowest minimum operational demand of 1,287 MW at 1 pm on Saturday 27 December 2025. This was 217 MW lower than the previous record set on New Year's Day 2025.

The relatively low underlying demand on 27 December 2025 with mild temperatures (20°C maximum), and high distributed PV output due to clear sunny conditions, contributed to this new all-time minimum operational demand.

The impacts of distributed PV on this day are shown in Figure 3. Distributed PV generation met 76% of Victoria's estimated underlying demand at 1 pm, the highest record and an increase of 6% compared to 2024-25. Without the effect of distributed PV generation, minimum demand on this day would have occurred at 4 am at 3,897 MW.

Figure 4 shows that minimum operational demand continued its downward trend, as the eighth consecutive year to record its annual minimum demand during the daytime.

Figure 3 Victorian demand profile and impact of distributed PV on the day of minimum operational demand, 27 December 2025 (MW)

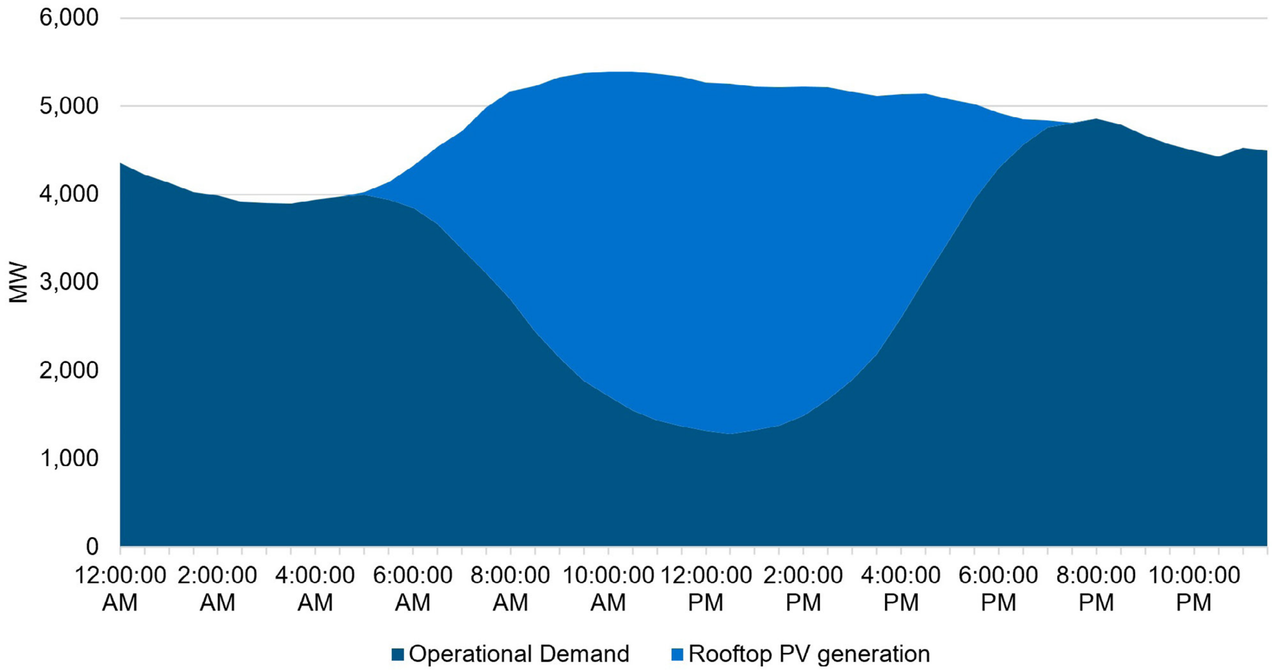
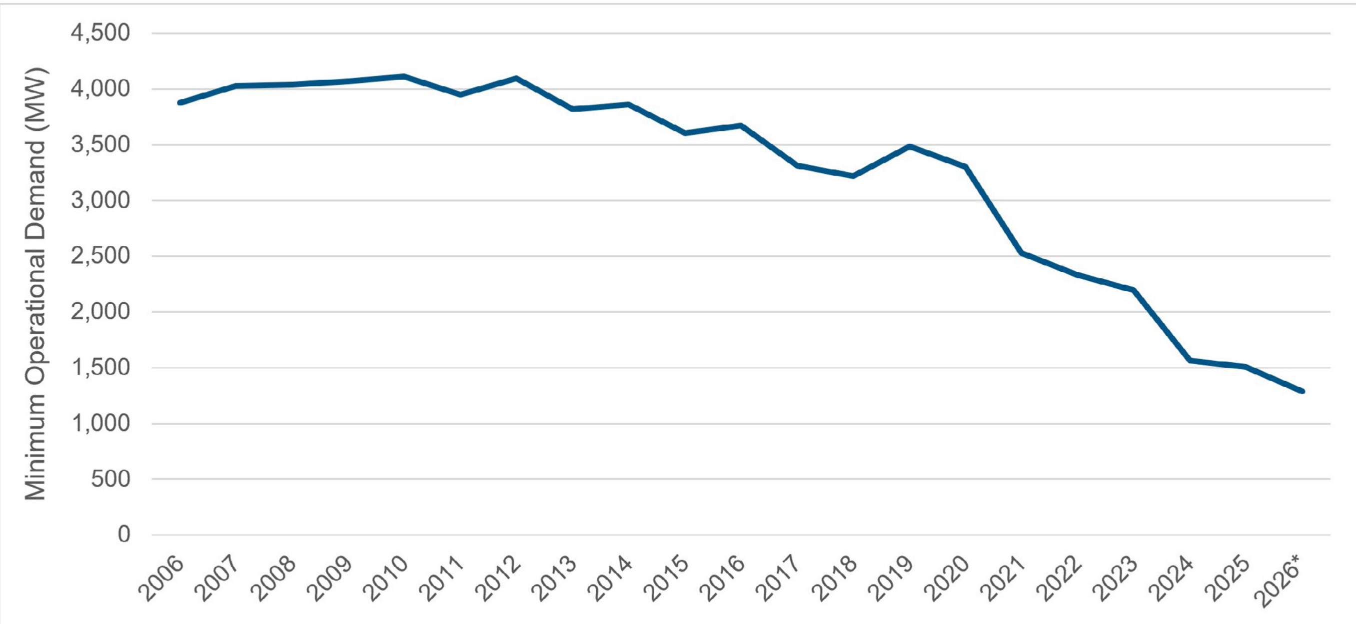


Figure 4 Actual minimum Victorian operational demand, 2005-06 to March 2026 (MW)

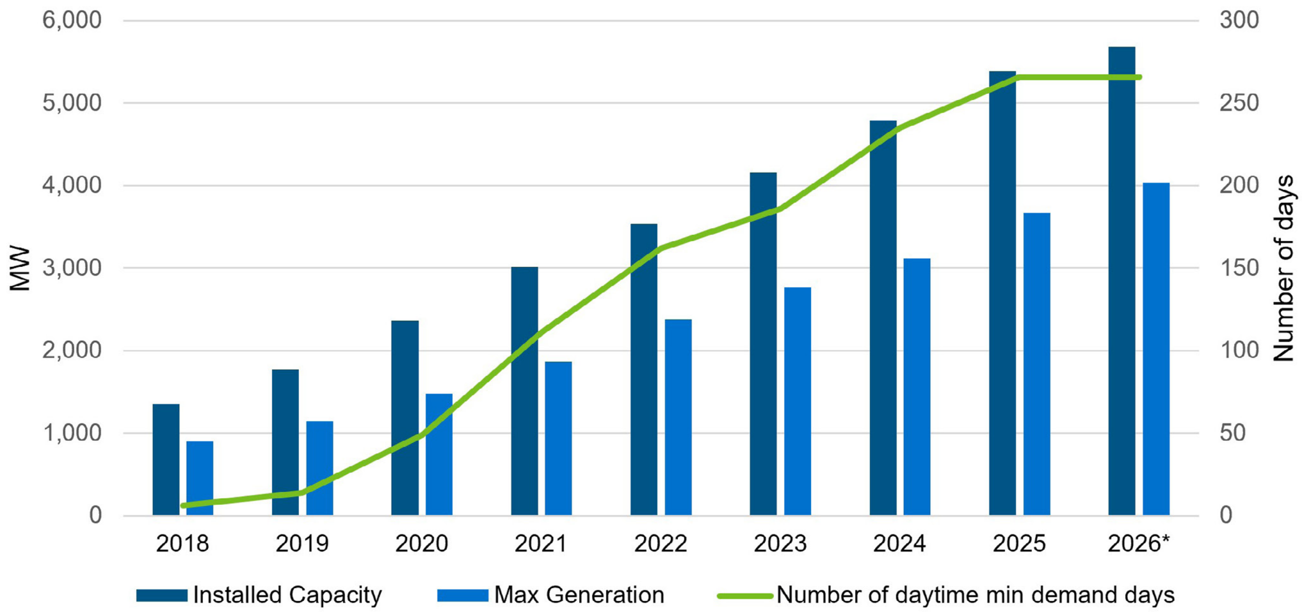


Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

When high output from distributed PV combines with low underlying demand, operational demand on the transmission system can be significantly reduced, creating MSL conditions.[8] Victoria experienced actual and forecast MSL events during the reporting period. The actual MSL1 events occurred three times in Victoria (25 December 2025, 27 December 2025, and 1 January 2026). The MSL case on 27 December 2025, with recorded all-time minimum operational demand, saw the MSL1 threshold breached by 418 MW and was 82 MW away from the MSL2 level to trigger intervention. There were 3 forecast MSL2 events in Victoria during the reporting period. Among these 3 events, 2 MSL2 events were cancelled prior to the day in question, while the forecast MSL2 on 1 January 2026 was managed using a Type 1 transitional contract.

With increasing levels of committed utility-scale Battery Energy Storage System (BESS) and timely delivery of the transition point actions as described in the Transition Plan for System Security,[9] Victoria is forecast to have fewer MSL events in the future. These changes will also enable the lowering of MSL thresholds in the near future. Figure 5 shows the continued growth of distributed PV in Victoria, in terms of capacity and maximum generation.

Figure 5 Distributed PV capacity and maximum generation by financial year and number of daytime minimum demand days, from 2017-18 to March 2026 (MW)



Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

Close to 300 MW of distributed PV was installed in Victoria during the reporting period. As the installed capacity of, and maximum generation from, distributed PV continue to grow, daily minimum demand is occurring during daylight hours (8 am-5 pm). There were 266 minimum demand days in both 2025-26 and 2024-25 compared to 235 days in 2023-24, and 186 days in 2022-23.

8 MSL events are forecast when forecast regional demand is less than the relevant MSL threshold. For more information, see https://www.aemo.com.au/learn/energy-explained/fact-sheets/minimum-system-load

9 See https://www.aemo.com.au/-/media/files/major-publications/tpss/2025-tpss-appendix-a3-msl-regional-assessments.pdf

With this trend of frequent minimum demand during daylight hours, VicGrid anticipates the need for greater voltage management of high voltages, primarily driven by lightly loaded transmission lines during high distributed energy resources (DER)[10] conditions. VicGrid plans for these conditions and greater voltage management requirements as part of the annual planning review.

2.2.3 Victorian supply

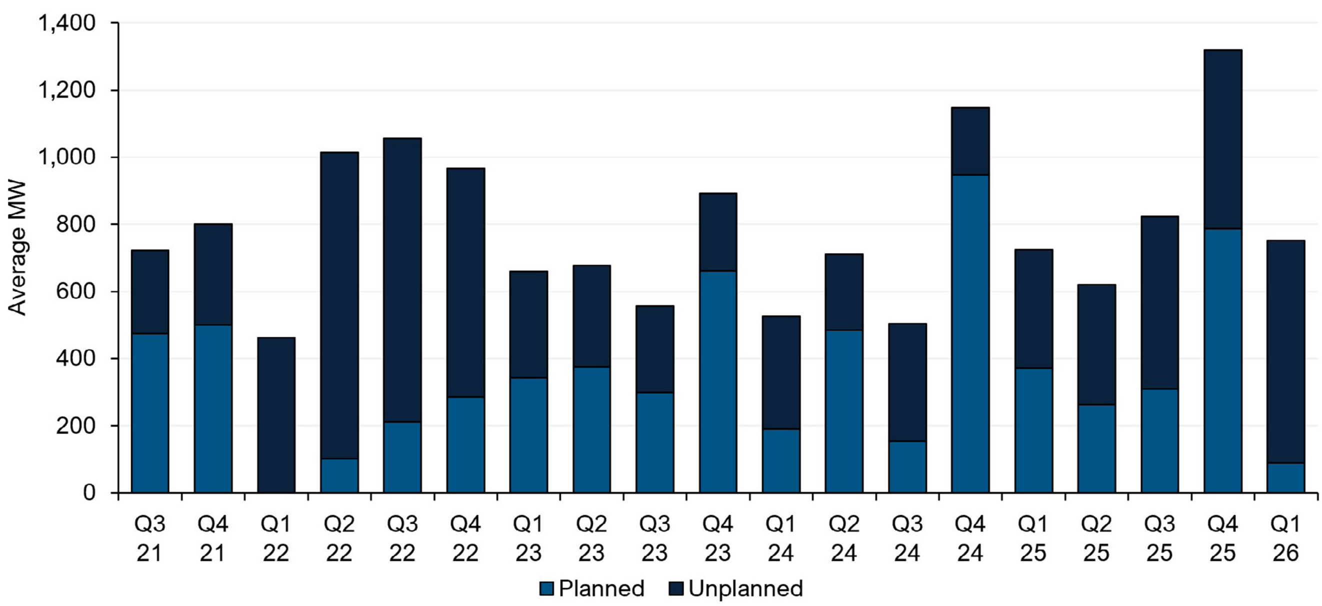
As generation sources change in Victoria, it is important to monitor the changing operating patterns and plan ahead for future changes. This section will cover key observations about Victorian generators over the reporting period.

2.2.3.1 Coal generation

In Victoria, coal generators have historically provided a large component of the base energy supply to consumers. Outages of these plants (both planned and unplanned) can have a significant impact on the Victorian system. The average brown coal generation decreased by 2% during the reporting period compared to the 2024-25 year.

Figure 6 compares full unit planned and unplanned outages at Victorian coal generators since 2021-22. The average capacity of full unit outages at Victorian brown coal-fired stations increased by 17% from 2024-25 levels, and unplanned outages made up 59% of the total average outage capacity in this reporting period. During Q4 of 2025 there was 786 MW of planned outages, mainly from planned outages in Loy Yang A Power Station. YWPS had its unplanned partial outage from August 2025 until February 2026. The overall capacity during the partial outage of YWPS averaged around 500 MW during the reporting period.

Figure 6 Victorian coal generation planned and unplanned full unit outages, Q3 2021 to Q1 2026 (MW)



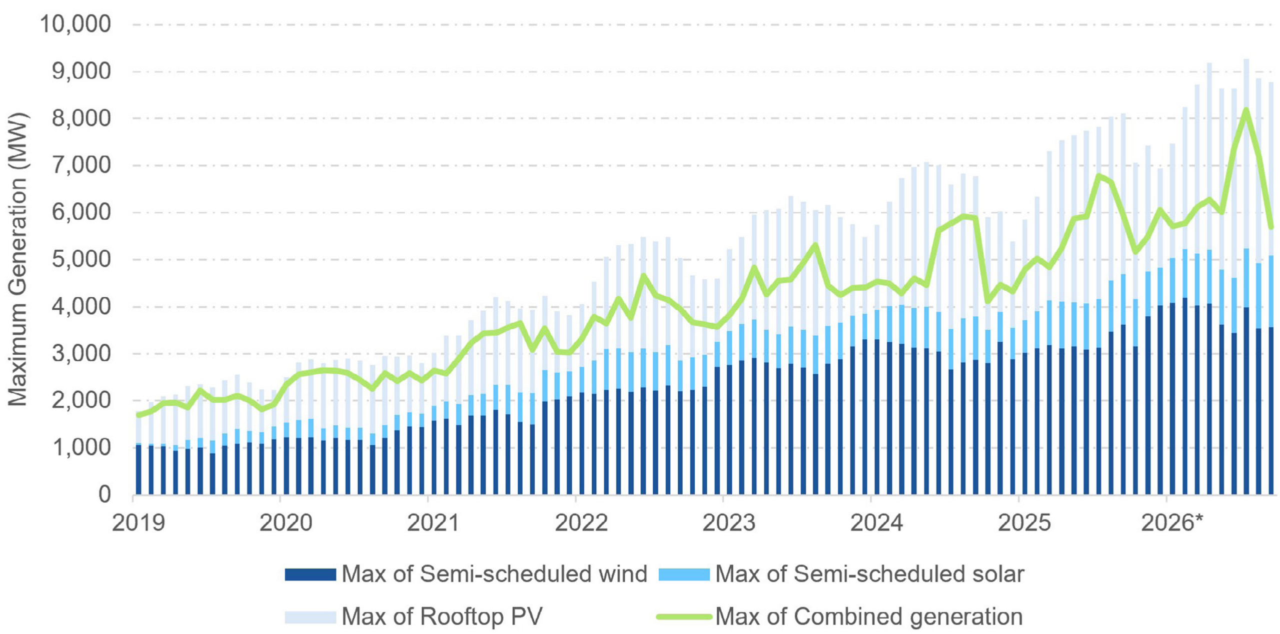
10 DER include all distribution connected generation and stand-alone BESS, not just the CER which is typically rooftop PV systems. CER is the primary driver for reduced transmission network demand, but the other elements of DER can exacerbate the situation.

2.2.3.2 Renewable resources

Semi-scheduled wind and solar generation continued to grow in this reporting period as shown in Figure 7. The figure does not include non-scheduled renewable generation. The maximum combined generation[11] achieved 8,190 MW in January 2026.

In early 2026, the newly connected Golden Plains West Wind Farm contributed partially to network generation capacity, when it is fully commissioned it will provide an additional maximum capacity of over 550 MW. Additionally, two new grid-connected solar farms (Goorambat East Solar Farm and Carwarp Solar Farm) provided over 330 MW of maximum capacity this year. In Victoria, network curtailment in the reporting period (see section 2.3.4) reduced compared to last year. Victoria also recorded high distributed PV output, which aligned with the new Victorian all-time minimum operational demand records mentioned in section 2.2.

Figure 7 Victorian maximum generation from renewable resources, 2018-2019 to March 2026 (MW)



Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

2.2.3.3 Other sources of generation

Due to higher output from solar and wind and slightly lower average demand during the reporting period compared to 2024-25, Victoria had decreased generation for both hydro and gas during the reporting period. The average gas generation decreased by 7%, led by Somerton Power Station and Newport Power Station. Hydro generation decreased by around 5% during the reporting period, mainly from Murray Power Station and Dartmouth Hydro Station.

11 Combined generation is the total output from semi-scheduled wind and solar generation occurring simultaneously in the same dispatch interval

2.3 Operational management

This section discusses the changing landscape of the Victorian network with increasing operational complexity in the network. Factors such as shifts in power system dynamics and supply impact system resilience, resulting in the need to plan for different operating conditions and the use of additional network constraints to manage the network.

2.3.1 Transformer reverse power flows

An increasing number of distributed generators (including distributed PV) connecting at the distribution level has led to reverse power flows at many terminal stations, which were originally established to supply customer loads. During periods of low local demand and/or high local generation where consumers are self-reliant on distributed PV, combined with utility-scale distribution generation, power can flow from the distribution network into the DSN, reversing the traditional flow in which the distribution network typically draws power from the DSN. These reverse power flow conditions, together with lightly loaded transmission lines, can lead to increased need for operational management (including voltage management) in the DSN, due to limitations in reactive support and/or onload tap ranges available at the connection points. Reverse power flow also affects the transformers' cyclic ratings, as transformers are typically derated to their nameplate rating during reverse power flow.

Reverse power flows were observed at 18 terminal stations during the reporting period. While no new terminal station was found with reverse power flow, the total hours of all stations' reverse power flows increased by 3% compared to 2024-25. Table 2 outlines the number of hours when reverse flows occurred at the listed terminal stations since 2020-21 and the associated primary cause of reverse flows. Glenrowan Terminal Station, Wemen Terminal Station, and Kerang Terminal Station experienced an increase of around 400 hours in reverse flows compared to last year, while the reverse power flows decreased over 300 hours in Terang Terminal Station and Ballarat Terminal Station.

Table 2 Yearly statistics of reverse flows at identified locations

Terminal station	Hours with reversed flows						Primary cause
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26#	
Wemen 220/66 kV	3,546	3,053	3,610	3,082	3,096	3,564	Distribution network connected generation
Terang 220/66 kV	2,343	2,626	2,350	1,805	1,854	1,489	Distribution network connected generation
Kerang 220/66/22 kV	2,657	2,606	2,999	2,974	2,738	3,168	Distribution network connected generation
Horsham 220/66 kV	290	680	426	319	375	121	Distribution network connected generation
Red Cliffs 220/66/22 kV	1,933	2,192	2,636	2,121	2,381	2,533	Distribution network connected generation
Shepparton 220/66 kV	1,534	1,551	1,445	1,369	2,424	2,549	Distribution network connected generation
Ballarat 220/66 kV	1,912	1,659	1,589	1,395	1,568	959	Distribution network connected generation
Glenrowan 220/66 kV	592	2,582	2,617	2,739	2,707	3,104	Distribution network connected generation
South Morang 220/66 kV	14	56	84	266	423	440	Distribution network connected generation
Mount Beauty 220/66 kV	12	1,632	1,343	1,767	1,364	1,559	Distribution network connected generation
Bendigo 220/66 kV	4	24	39	144	205	245	Distributed PV
Cranbourne 220/66 kV	0	4	15	254	429	446	Distributed PV
Deer Park 220/66 kV	0	18	35	203	382	443	Distributed PV
Morwell 220/66 kV	2	38	66	137	174	109	Distribution network connected generation
Wodonga 330/22 kV	NA*	201	279	542	635	667	Distributed PV
Geelong 220/66 kV	0	0	0	0.5	2	2	Distributed PV
Tyabb 220/66 kV	0	0	0	0	443	420	Distributed PV
Ringwood 220/66/22 kV	0	0	0	0	3	8	Distributed PV
Total	**14,839**	**18,922**	**19,533**	**19,114**	**21,203**	**21,826**	

Note: *Data quality issues prevented determination of reverse flow hours for this terminal station over this period.
Note: # 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

2.3.2 Voltage management at the time of low demand

The continued decline in minimum demand in Victoria, and reactive power consumption during minimum demand led to the installation of four additional 100 MVAr shunt reactors at Keilor 220 kV and Moorabool 220 kV in 2021 and 2022 to maintain voltage levels within operational and design limits. These new reactors have significantly reduced the risk of overvoltages but have not eliminated this operational challenge, primarily due to further reductions in minimum demand. In October 2024, the Keilor overvoltage protection scheme was completed as an additional risk mitigation to help address this challenge.

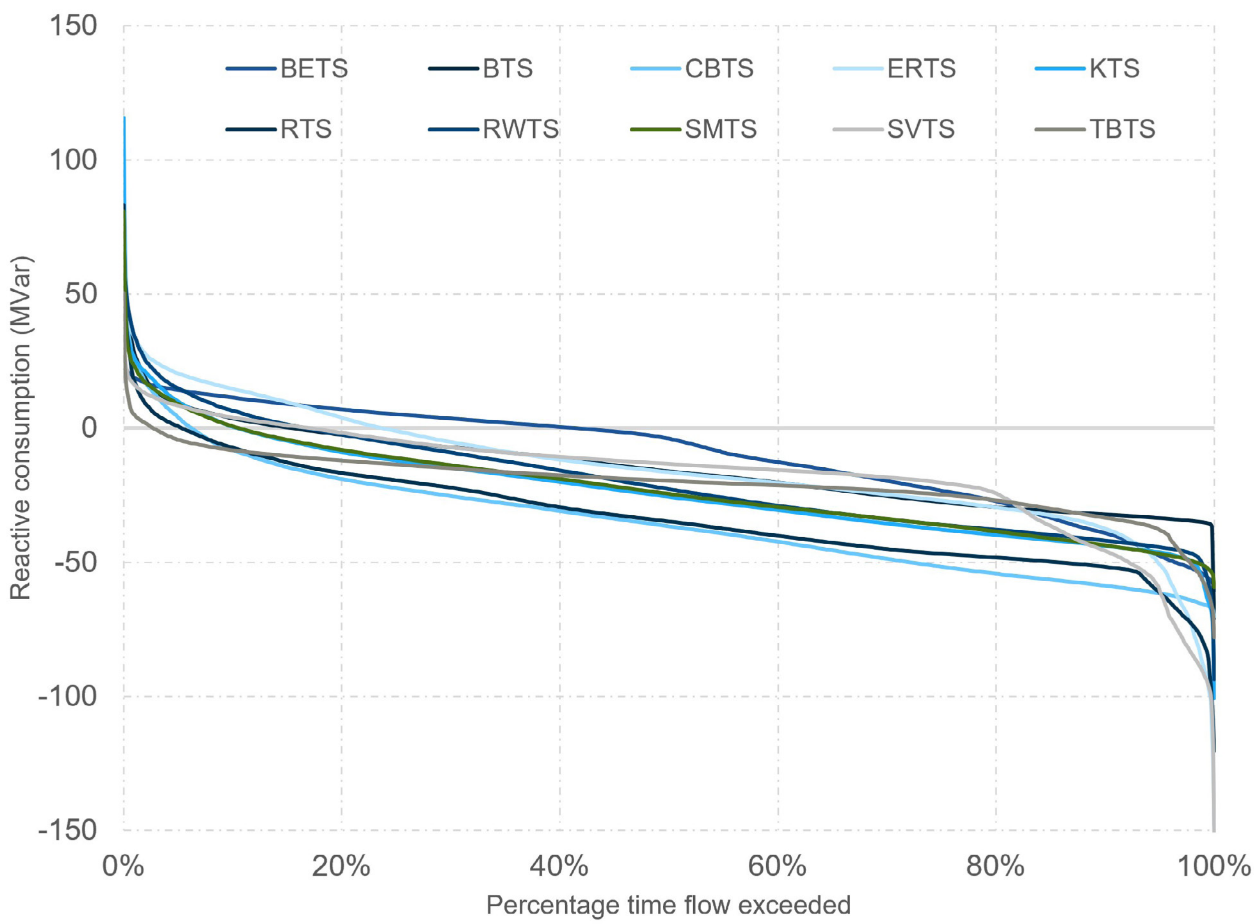
Reactive power injection from the distribution networks to the DSN also contributed to the challenges of managing high DSN voltages. Out of 32 terminal stations assessed for the reporting period, 28 terminal stations were found to have been injecting reactive power for more than 10% of the year. Among these terminal stations, 10 were found to be injecting above 30 MVAr for more than 15% of the year.

Increased integration of BESS into the grid is expected to alleviate the voltage control issues in the DSN. VicGrid is seeking a coordinated approach with distribution network service providers and declared transmission system operators to determine additional cost-effective solutions, such as:

- transformer tap changers with a wider voltage range, and
- installing dynamic or static reactive power plants to absorb excessive reactive power

Figure 8 shows the yearly net reactive consumption (a negative value indicates injection into the DSN) at those 10 terminal stations that were found to be injecting above 30 MVAr for more than 15% of the year.

Figure 8 Net reactive power flow duration curve at 10 terminal stations (MVAr)



BETS: Bendigo Terminal Station. BTS: Brunswick Terminal Station. CBTS: Cranbourne Terminal Station. ERTS: East Rowville Terminal Station. KTS: Keilor Terminal Station. RTS: Richmond Terminal Station. RWTS: Ringwood Terminal Station. SMTS: South Morang Terminal Station. SVTS: Springvale Terminal Station. TBTS: Tyabb Terminal Station.

2.3.3 Maintaining system strength

Traditionally provided by synchronous generation, system strength refers to the power system's ability to maintain a stable voltage waveform at any given location, both during steady state operation and following a disturbance.[12] Victoria's energy transition, which includes more IBR like renewable energy generation and batteries, introduces challenges due to their lower system strength compared to traditional sources.

To maintain system stability and ensure protection devices operate correctly, it is essential that the minimum system strength is maintained. This involves controlling the voltage waveform and ensuring the system can manage fault currents during disturbances. Increased displacement of synchronous generation units due to unfavourable market conditions is expected to reduce fault levels at most system strength nodes in Victoria.

To manage system strength, VicGrid, via its limit advice, has specified a list of combinations of synchronous generating units that would provide sufficient system strength in Victoria. When a combination is selected in real time, all synchronous generating units in that combination are required to be online to provide sufficient system strength in Victoria, to withstand a credible fault and loss of a synchronous unit (the most critical contingency for these combinations is loss of a Loy Yang A unit).[13]

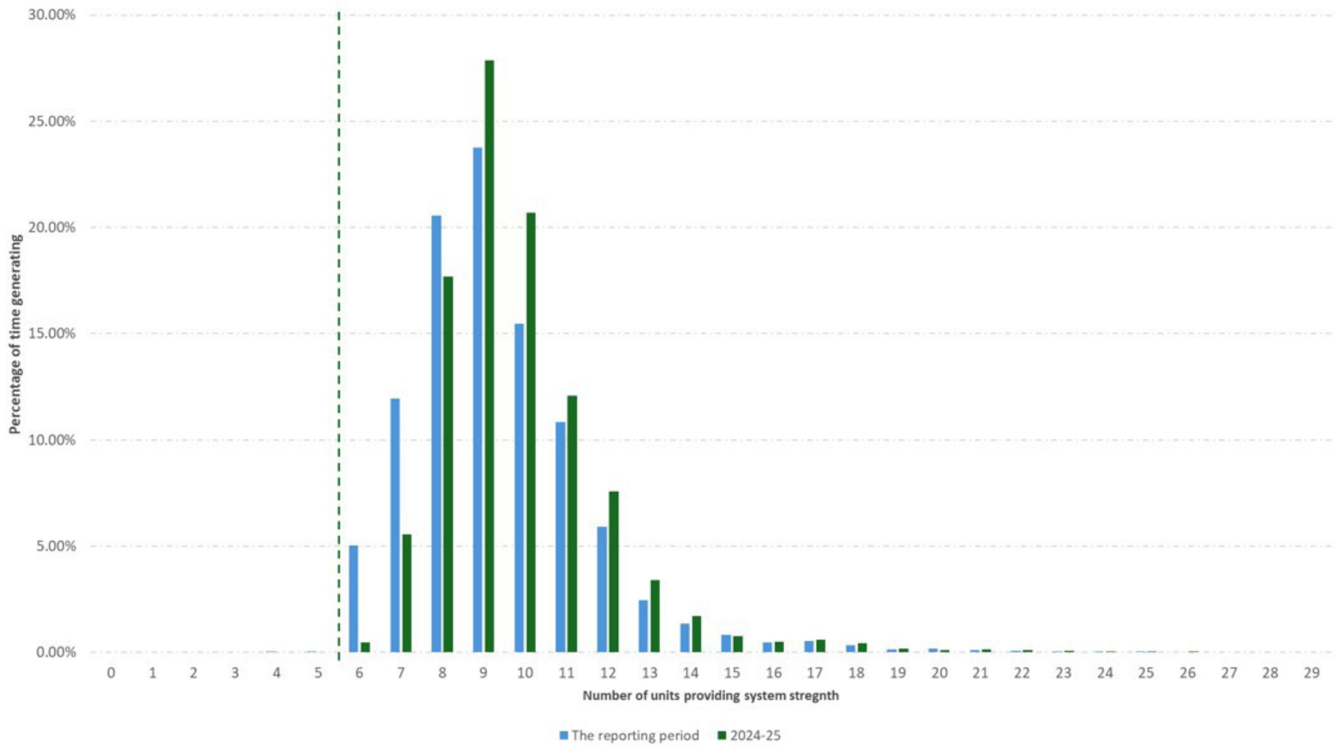
Compared to 2024-25, there were fewer synchronous generators online, as shown in Figure 9, due to an increase in the number of coal-fired generators offline in Victoria in Q4 2025. The lack of synchronous generators online meant that AEMO might have required directions to resecure the network if a major generator tripped, for example, as occurred on 16 October 2025 (see section 2.1).

During the reporting period, there were three 5-minute intervals when none of the combinations specified at those points in time was available. All these intervals were on 16 October 2025 during a resecuring period after the trip of YWPS unit 3 and unit 4 as described in section 2.1. This resulted in AEMO issuing directions to gas units to synchronise and follow dispatch targets in Victoria to provide system strength. To address this operational challenge, VicGrid has since reviewed and updated its system strength limit advice with new combinations of system strength units to provide additional operational flexibility in similar situations.

12 See https://www.vicgrid.com.au/__data/assets/pdf_file/0033/772377/victorian-system-strength-requirement-rit-t-pacr.pdf

13 See https://www.vicgrid.com.au/__data/assets/pdf_file/0027/766152/Victorian-Transfer-Limit-Advice-System-Normal.pdf

Figure 9 Available synchronous generating units in 2024-25 and the reporting period



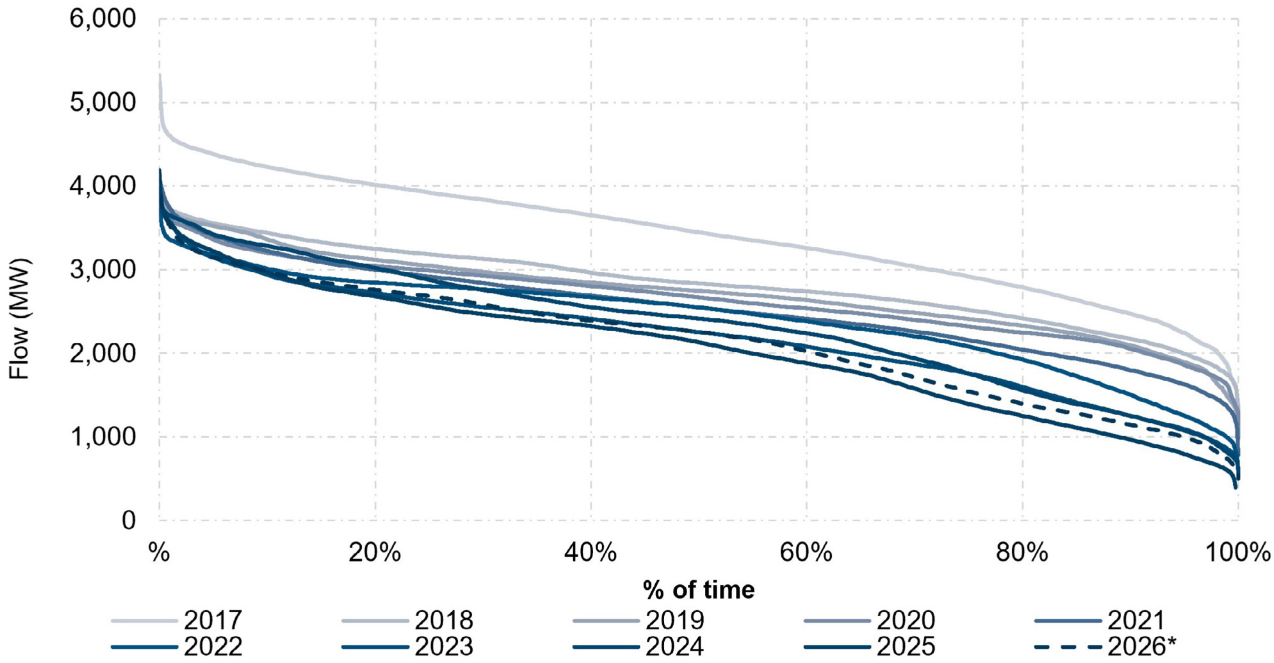
Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

2.3.4 Geographical shift in Victorian generation

While the Latrobe Valley continues to be Victoria's dominant supply source, increased investment in renewable energy has led to a shift towards the west, especially in regions rich in wind and solar resources.

Figure 10 below shows network load duration curves for the 500 kV flow from the Latrobe Valley. It illustrates the flow of these lines, which decrease with longer periods at the lower end of the range since the retirement of Hazelwood Power Station in 2017. The 500 kV flow increased slightly in the reporting period compared to the previous period, partly due to changes in Basslink bidding behaviour that limited export flow from Victoria to Tasmania (Tas), as described in section 3.3. In addition, generation from the Latrobe Valley must be online to maintain Victorian system strength. With the change in Basslink's behaviour, generation is more likely to flow towards Melbourne compared to last year.

Figure 10 Actual network load duration curves from Latrobe Valley to Melbourne 500 kV lines (MW)



Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

Westbound flow from the Latrobe Valley is expected to decrease again, particularly after the retirement of YWPS in 2028, although most power flow from YWPS to metropolitan Melbourne is via the 220 kV network. The 500 kV flow from the Latrobe Valley is dependent on future generation (size and location) in the Latrobe Valley and the operational configuration of the local DSN.

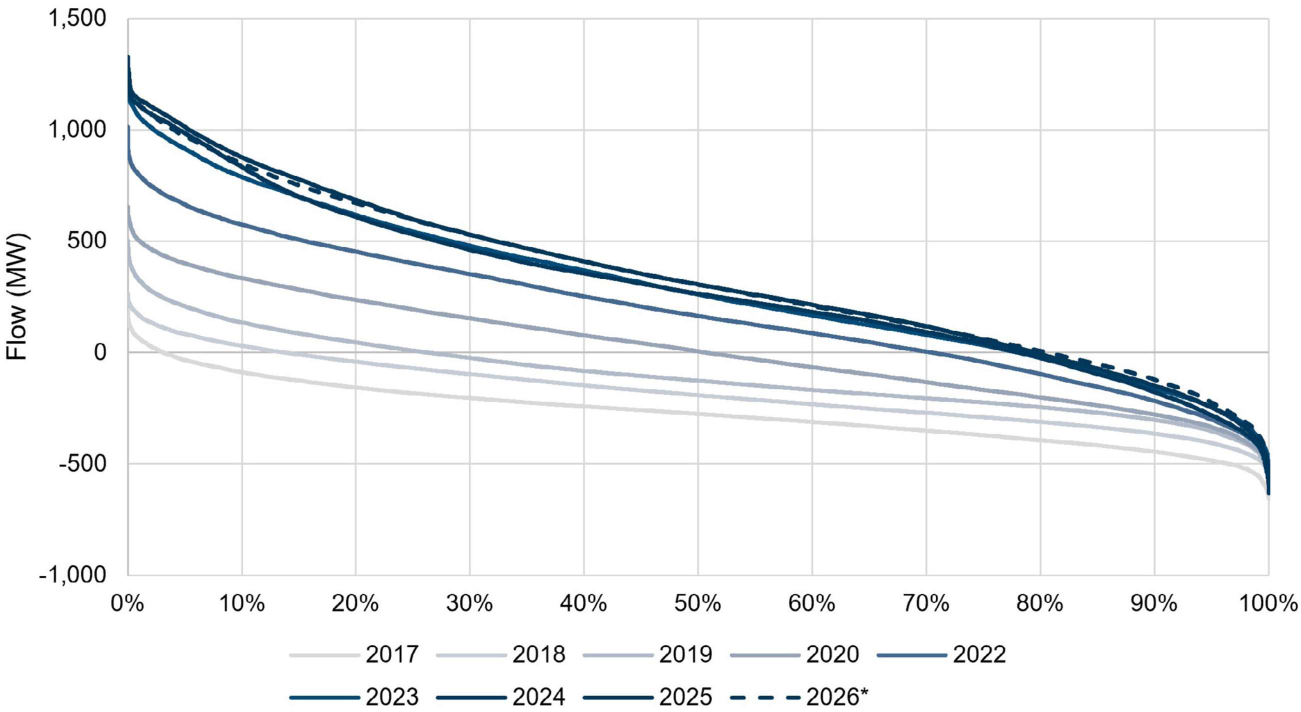
VicGrid is currently reviewing the operational configuration of the Latrobe Valley DSN to account for the expected retirement of YWPS. This will optimise the flow distribution on both the 500 kV and 220 kV lines and, in turn, reduce reliability risks after the retirement of YWPS as identified in the 2024 VAPR.

Figure 11 and Figure 12 shows the network load duration curves from the Western and South West Victoria corridors into the Greater Melbourne and Geelong areas.

In recent years, more renewable generators have connected in Western Victoria, increasing the flows towards metropolitan areas from both Western and South West Victorian generation. This trend is expected to continue as the projects expected to be delivered from the 2025 Victorian Transmission Plan (VTP)[14] unlock more network capacity in the Western and South West Victoria corridors. Some generation-driven limitations in Western and South West Victoria have already begun to emerge, which has contributed to a reduction in the high flow end compared to last year in Figure 11. Projects in the VTP are anticipated to reduce the impact of those generation-driven limitations.

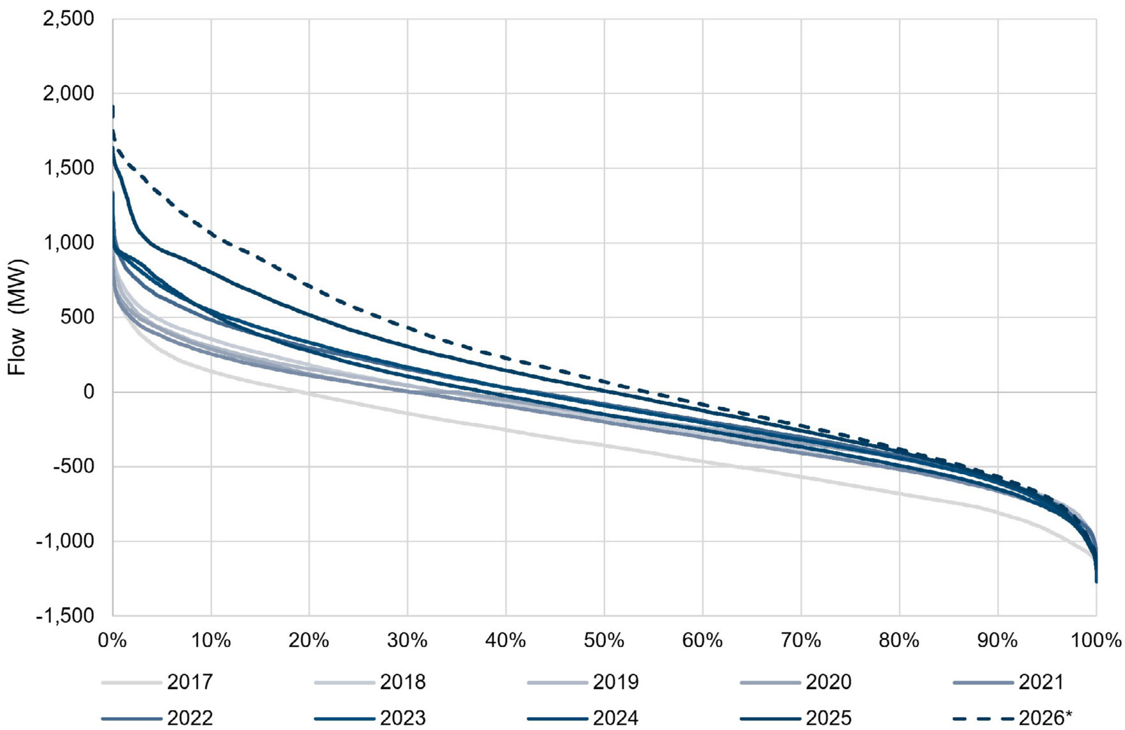
14 See https://www.vicgrid.com.au/transmission-planning/victorian-transmission-plan

Figure 11 Actual network load duration curves from Western Victoria towards Geelong and Melbourne through Moorabool 220 kV (MW)



Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

Figure 12 Actual network load duration curves from South West Victoria towards Geelong and Melbourne through Moorabool 500 kV (MW)



Note: * 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

2.3.4.1 Curtailment in renewable generation

Curtailment in renewable energy refers to the forced or voluntary reduction of electricity output, which can be categorised as either network[15] or economic curtailment.[16] Network curtailment is driven by the capability of the power system and is required to prevent potentially unsafe or unstable situations, while economic curtailment is driven by market forces.

Table 3 summarises the network curtailment of Victoria's VRE (solar and wind) generation in different Victorian corridors. The curtailment (%) was calculated using the network curtailment amount divided by the generators' availability.

The North West Victoria corridor experienced the highest level of curtailment due to network constraints in the reporting period, at 9.8%, which is a 3.6% decrease on the 2024-25 period. Voltage stability constraints are the most significant cause of curtailment in this corridor. Existing VRE generators connected to the North West 220 kV Victoria 220 kV corridor are also being curtailed due to network thermal constraints. Section 3.2 provides further discussion of these constraints.

The Western Renewable Link (WRL) and Victoria to New South Wales (NSW) Interconnector West (VNI West) projects represent transformative investments poised to unlock substantial renewable energy generation. The WRL is anticipated to alleviate many congestion-related constraints in the Ballarat-Horsham-Murra Warra 220 kV network, while both WRL and VNI West will facilitate future expansion. Although interest in connecting to these areas may still exceed capacity, by alleviating network congestion and reducing network curtailment, these projects will make it possible to integrate more renewable energy than would otherwise be achievable.

The South West Victoria corridor has mostly wind generation and also experiences VRE network curtailment, which follows the trend from last year.

Table 3 Summary of total VRE transmission network curtailment in Victoria in April 2025 to March 2026

Solar	North West	9.8%	141,749	1,446,418
	Central North	1.4%	18,754	1,339,571
Wind	Western	4.4%	201,666	4,583,318
	South West	0.6%	52,785	8,797,500

15 Network curtailment occurs when there are physical limitations or constraints on the transmission network. This curtailment is necessary to ensure safe and reliable operation of the transmission network.

16 Economic curtailment occurs when generation is reduced due to economic reasons, such as low market prices. Renewable energy often has lower marginal costs, however, if the prices are very low, generation may be curtailed due to competition in the market.

3. Review of Network Congestion

3. Review of network congestion

Assessing the Victorian DSN capacity and performance and identifying limitations or bottlenecks that may impact operations is crucial for determining its capability to meet current and future demands. This review aims to offer insights into the network's efficiency and readiness to support Victoria's transition as it heads towards a decarbonised electricity grid. This section assesses the capability of the Victorian DSN through analysis of its network limits and interconnector capabilities.

Key network congestion insights:

- Of the top 10 Victorian high-impact constraints in the reporting period, six are from the Western and North West Victoria corridors.
- Victoria is a net energy exporter with a high level of flow export duration. The net flow of interconnector exports from Victoria decreased compared to last year, driven by the drop in flow export via Basslink with Basslink's higher-priced offers since July 2025.[17]

3.1 Maximum contingency limit

The Victorian transmission DSN has a maximum allowable load contingency size limit of 600 MW and a maximum generation contingency size limit of 750 MW applied to the network for a credible contingency which could trip a single generator or load, or a group of generators or multiple loads (including BESS or high voltage direct current lines or associated plant). These limits have been set based on the size of contingency the network can withstand while remaining stable; a review is currently underway to reassess the load contingency limit to determine if larger limits can be set in the future.

3.2 Top binding constraints

Transmission network constraints are formulated to model specific system limits (thermal, voltage and stability) for system configurations, as necessary, to ensure the safe, reliable, and secure operation of the power system.[18]

This section summarises the Victorian transmission network constraints that resulted in the highest dispatch impacts during the reporting period. The ranking of each constraint (or group of constraints) was determined by the calculated 'binding impact' of the constraints. The binding impact of a constraint is derived by combining the marginal value for each dispatch interval over the period considered. It is used to distinguish between the severity of different binding constraint equations and represents the relative financial impact associated with that constraint equation. That is, the change in dispatch cost for a marginal change in the network limit. It does not represent the market benefit of investment to remove the constraint in absolute terms.

There were 17 high-impact constraints meeting the conditions of a minimum of 20 binding hours and a minimum binding market impact of $60,000 during the reporting period.

Figure 13 summarises the highest impact constraints during the reporting period in the Victorian transmission network by type and region, as well as the binding hours and relative financial impact in dollars.

17 On 1 July 2026, Basslink transitioned from a market network service provider to a regulated transmission network service provider.

18 See https://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Congestion-Information/2016/Constraint-Frequently-Asked-Questions.pdf.

While the constraints summarised in this section are those with the most significant market impact, investment to remove any specific constraint would also require consideration of limitations that may bind immediately behind these limits and reduce the benefits unless those constraints are also alleviated.

Figure 13 Map of the most significant Victorian transmission constraints

Rank	Constraint name	Binding hours	Binding impacts ($)
1	North-west Victoria voltage oscillation (prior outage)	**4,428**	**40,462k**
2	V^^V_NIL_KGTS V^^V_NIL_KGTS_2	**738**	**3,771k**
3	V>NIL_WETEX_NIL	**365**	**3,454k**
4	V>>NIL_WBBA_RCWEKG V>>NIL_WBBA_KGBE V>>NIL_WBBA_BESH V>>NIL_WBBA_RCBSS V>NIL_WBBA_KMRC V>>BDBU_WBBA_RCWEKG V>>BDBU_WBBA_BESH V>>BDBU_WBBA_KGBE	**215**	**2,088k**
5	V^^SML_NIL_3 V^^SML_NSWRB_2	**93**	**943k**
6	V>>NIL_ELML_BAML2	**128**	**711k**
7	V>>NIL_MLGT_MLGT_R5 V>>NIL_MLGT_MLGT_R2	**84**	**657k**
8	V^^N_xxx	**302**	**535k**
9	V^SML_HORC_3 V^SML_KGRC_4 V^^SML_ARWBBA_1 V^SML_BUDP_3 V^SML_BESH_2 V^SML_HOMR_3 V^SML_BEKG_4	**355**	**487k**
10	V^^N_NIL_1	**570**	**398k**
11	V^^V_MLNK_KGTS	**40**	**396k**
12	V::N_xxx	**672**	**342k**
13	V^^V_NIL_SWVIC	**326**	**212k**
14	V>>NIL_WEKG_HOMRKM, V>>NIL_RCWE_HOMRKM	**40**	**167k**
15	V_SH_DD_MAC_FLT_965	**23**	**149k**
16	V>>N_NIL_65_66, V>>N_NIL_65, V>>N_NIL_65_051	**222**	**136k**
17	V^^V_BDBU_KGTS, V^^V_BDBU_KGTS_2	**59**	**90k**

3.2.1 Western and North West Victoria corridors

The Western and North West Victoria corridors are characterised by significant investment in new renewable generation (wind and solar) and this part of the Victorian network is experiencing outages to facilitate connection and commissioning of these projects. It is a relatively weak part of the Victorian network, subject to thermal, voltage oscillation and voltage collapse constraints. Of Victoria's 17 high-impact constraints in the reporting period, nine are from this region (see Table 4 below for more information).

The North West Victoria corridor has attracted a large number of investments in solar generation. Both voltage oscillation and thermal limit constraints are currently restricting the output of generators within this corridor.

The binding hours and market impact of the voltage oscillation constraints increased this reporting period and ranked first among all the constraint types. These constraints aim to manage post-contingent voltage oscillation during prior outages. Compared to last year, these constraints had increased binding hours and market impact due to more prior outages. The binding hours and market impact are expected to reduce as augmentation and connection projects are completed, reducing the need for planned outages.

The binding hours and impact decreased this reporting period for the Kerang voltage collapse constraints and the Wemen to Kerang voltage collapse constraint, following the delivery of the Koorangie Energy Storage System and other projects that provided additional reactive power support to the North West Victoria corridor, including EnergyConnect stage 1 and new generation connection. The upcoming completion of major future augmentation projects, such as WRL and VNI West, are expected to further alleviate these constraints.

The existing and committed renewable generation within the Western Victoria corridor exceeds 1 gigawatt (GW), all of which is wind generation. Voltage stability, maximum generation contingency size and thermal limits are constraining the outputs of renewable generation in this area under certain conditions. VicGrid has recently upgraded the line ratings of this corridor which relieved the thermal limits.

Table 4 Constraint equations with significant binding durations or impact – Western Victoria and North West Victoria corridors

Rank	Equation	Binding hours			Binding impact			Description of constraint
		2023-24	2024-25	2025-26	2023-24	2024-25	2025-26*	
1	North West Victoria voltage oscillation (prior outage)	1,482[A]	3,064[A]	4,428[A]	$14,379k[A]	$27,018k[A]	$40,462k [A]	This represents a set of the network constraint equations associated with voltage oscillation during a range of prior outage conditions. VicGrid is continuously reviewing these constraints as revised models are obtained and based on upcoming outage schedules.
2	Kerang voltage collapse V^^V_NIL_KGTS V^^V_NIL_KGTS_2	919	1,233	738	$6,590k	$9,158k	$3,771k	To avoid voltage collapse at Kerang due to the loss of Horsham-Murra Warra-Kiamal 220 kV line considering Murraylink VFRB scheme enabled and disabled.
3	Wemen transformer thermal[B] V>NIL_WETEX_NIL	104	207	365	$294k	$1,476k	$3,454k	To prevent pre-contingent overload of Wemen 220/66 kV transformer in the 66 kV to 220 kV direction (not part of DSN).
4	Waubra to Ballarat thermal V>>NIL_WBBA_RCWEKG, V>>NIL_WBBA_KGBE, V>>NIL_WBBA_BESH, V>>NIL_WBBA_RCBSS, V>NIL_WBBA_KMRC, V>>BDBU_WBBA_RCWEKG, V>>BDBU_WBBA_BESH, V>>BDBU_WBBA_KGBE	355	330	215	$2,184k	$2,109k	$2,088k	To avoid overloading Waubra-Ballarat 220 kV line on trip of the Red Cliffs-Wemen-Kerang 220 kV line or Kiamal-Red Cliffs 220 kV line or Kerang-Bendigo 220 kV line or Red Cliffs-Buronga 220 kV line. The V V>>BDBU_WBBA_RCWEKG and V>>BDBU_WBBA_BESH is to avoid overloading Waubra-Ballarat 220 kV line during the outage of the Bundey-Buronga (6F) 330 kV lines.

Rank	Equation	Binding hours			Binding impact			Description of constraint
		2023-24	2024-25	2025-26	2023-24	2024-25	2025-26*	
5	Red Cliffs voltage stability V^^SML_NIL_3 V^^SML_NSWRB_2	51	48	93	$769k	$452k	$943k	To avoid voltage collapse at Red Cliffs for the loss of Bendigo-Kerang 220 kV line, Darlington Point-Balranald (X5) or Balranald-Buronga (X3) 220 kV lines when the NSW Murraylink runback scheme is unavailable.
9	Red Cliffs voltage stability (outage) V^SML_HORC_3, V^SML_KGRC_4, V^^SML_ARWBBA_1, V^SML_BUDP_3, V^SML_BESH_2, V^SML_HOMR_3, V^SML_BEKG_4_	96	345	355	$333k	$554k	$487k	These are the outage constraints to avoid voltage collapse at Red Cliffs. Outages are of Horsham-Murra Warra-Red Cliffs 220 kV, Kerang-Wemen-Red Cliffs 220 kV, Ararat-Waubra 220 kV lines. V^SML_BUDP_3 is to avoid voltage collapse for loss of Bendigo-Kerang 220 kV line and V^SML_BESH_2 is to avoid voltage collapse for loss of Darlington Point-Buronga (X5) 220 kV line. This is also an outage constraint at the time of Buronga-Balranald (X3) or Balranald-Darlington Point (X5) outage.
11	Wemen-Kerang voltage collapse V^^V_MLNK_KGTS	253	149	40	$2,969k	$1,858k	$396k	To avoid voltage collapse at Kerang due to the loss of Horsham-Murra Warra-Kiamal 220 kV line during an outage of Murraylink.
14	Red Cliffs–Wemen–Kerang thermal V>>NIL_WEKG_HOMRKM V>>NIL_RCWE_HOMRKM	15	51	40	$74k	$249k	$167k	To avoid overloading the Red Cliffs-Wemen–Kerang 220 kV line for the loss of Horsham-Bulgana-Crowlands 220 kV line or Horsham-Murra Warra-Kiamal 220 kV line.
17	Kerang voltage collapse V^^V_BDBU_KGTS V^^V_BDBU_KGTS_2	-	27	59	-	$201k	$90k	To avoid voltage collapse at Kerang due to the loss of Horsham-Murra Warra-Kiamal 220 kV line during an outage of the Bundey-Buronga line.

* 2026 data range aligns with the reporting period, whereas previous years' data range align with the financial year.
A. This is the sum of the binding hours and binding impacts for multiple constraint equations during prior outage and system normal conditions. Many of these individual constraints bound concurrently.
B. These transformers are not DSN assets but have been included for completeness.

3.2.2 South West Victoria corridor and the Heywood interconnector

This area encompasses some of the bigger wind farms in Victoria (such as Golden Plains, Stockyard Hill, Dundonnell, Ryan Corner, and Macarthur), and the alternating current interconnection to SA through Heywood Terminal Station. The existing constraints have more binding impacts than the previous reporting period. This is mainly due to higher wind generation connecting in this corridor. Table 5 presents further details on each of these limitations.

The Mortlake turn-in project and the newly built Mortlake BESS are expected to improve voltage stability in the South West Victoria corridor. VicGrid has recently reviewed the limit advice associated with the Haunted Gully to Moorabool and Mortlake to Moorabool Voltage collapse constraint (ranked #13) and decided to remove this limit.

Table 5 Equations with significant binding durations or impact – South West Victoria corridor

Rank	Equation	Binding hours			Binding impact			Description
		2022-23	2023-24	2025-26	2022-23	2023-24	2025-26*	
6	Elaine-Moorabool thermal V>>NIL_ELML_BAML2	186	230	128	$114k	$688k	$711k	To avoid overloading Elaine-Moorabool 220 kV line on trip of Ballarat-Moorabool No.2 220 kV line.
7	Moorabool-Geelong thermal V>>NIL_MLGT_MLGT_R5 V>>NIL_MLGT_MLGT_R2	10	43	84	$309k	$266k	$657k	To avoid Moorabool-Geelong offline on trip of other Moorabool-Geelong line
13	Haunted Gully-Moorabool and Mortlake-Moorabool voltage collapse V^^V_NIL_SWVIC_	171	305	326	$156k	$273k	$212k	To manage flow towards Moorabool across Haunted Gully-Moorabool and Mortlake-Moorabool 500 kV lines due to the loss of Haunted Gully-Moorabool 500 kV line and both Alcoa Portland (APD) potlines.
15	System Strength V_SH_DD_MAC_FLT_965	1	5	23	$1k	$24k	$149k	To manage voltage oscillation. Limit Stockyard Hill, Dundonnell, Macarthur, Hawkesdale, and Ryan Corner wind farms total output to 965 MW if Heywood flow is above 500 MW (SA to VIC direction).

* 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

3.2.3 Eastern Victoria, Victoria to New South Wales Interconnector and Latrobe Valley

Constraints in the east of Victoria are primarily dominated by the limitations between South Morang and Murray and in the Victoria to NSW border region. There are several thermal constraints limiting flows between South Morang and Murray, while voltage collapse, transient stability and thermal constraints limit flow across the Victoria to NSW border region. Table 6 provides further details on these limitations. The VNI export voltage collapse and transient stability constraints during prior outages remain the top binding constraints, with decreased binding hours and binding impact compared to last year. The VNI voltage collapse constraint, the VNI export transient stability constraint, and the VNI thermal constraint also remain top constraints, with increased binding hours and binding impact. Completion of VNI West, EnergyConnect stage 2 and WRL is expected to reduce the impact of these constraints.

Table 6 Equations with significant binding durations or impact – Eastern Victoria, Victoria to New South Wales Interconnector and Latrobe Valley

Rank	Equation	Binding hours			Binding impact			Description
		2022-23	2023-24	2025-26	2022-23	2023-24	2025-26*	
8	VNI export voltage collapse during outages V^^N_xxx	171	713	302	$655k	$1,915k	$535k	To avoid voltage collapse around Murray for loss of all APD potlines during planned transmission equipment outages. These constraints are invoked during outages of any line in, or connecting to, the 330 kV corridor between Victorian and NSW capital city load centres. Outages of other significant lines including 500 kV Latrobe Valley lines in Victoria and 220 kV lines in south-west NSW also may require such constraints to be invoked.
10	VNI voltage collapse V^^N_NIL_1	540	396	570	$342k	$324k	$398k	To avoid voltage collapse in northern Victoria and southern NSW for loss of APD potlines following fault on one of the 500 kV lines in South West Victoria.
12	VNI export transient stability during outages V::N_xxx	78	332	672	$37k	$212k	$342k	To prevent transient instability for fault and trip of Hazelwood-South Morang line during planned transmission equipment outages.

Rank	Equation	Binding hours			Binding impact			Description
		2022-23	2023-24	2025-26	2022-23	2023-24	2025-26*	
16	VNI thermal overload V>>N_NIL_65_66 V>>N_NIL_65 V>>N_NIL_65_051	72	107	222	$90k	$116k	$136k	To prevent overloading of VNI, Murray to Upper or Lower Tumut line both pre-contingent and post-contingent for loss of Murray to Lower Tumut or Upper Tumut line.

* 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

3.3 Interconnector capability

An interconnector's capability depends on conditions within the network, which vary throughout the year. AEMO publishes notional interconnector limits in its Inputs, Assumptions and Scenarios Report[19] and a detailed summary of the capability and limits of interconnectors in its Interconnector Capability report,[20] as well as its Monthly and Annual National Electricity Market (NEM) Constraint Reports.[21]

3.3.1 Analysis of interconnector performance

Victoria's net energy exports to neighbouring regions declined significantly following the closure of the Hazelwood Power Station in 2017. Interconnector exports started to increase again from 2020-21 to 2023-24 when both net energy exports and net export duration from Victoria steadily increased, primarily due to the increase in Victorian renewable generation and reduction in regional demand. From 2024-25, Victorian exports trend downward mainly due to an increase in Victorian generation outages and the transmission outage in NSW that limited generation within NSW and imports from Victoria.[22] Additionally, Basslink shifted from offering most capacity at low prices to higher-priced volumes, resulting in reduced power flow transfers between Victoria and Tasmania (Tas).

Table 7 and Table 8 summarise the trends in Victoria's export to other regions across the interconnectors. Victoria was a net exporter 77% of the time during the reporting period, as shown in Table 7. However, Victorian interconnectors were often not exporting simultaneously. This diversity accounts for Victoria's higher net flow percentage when comparing with the interconnectors separately.

19 See https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2026-integrated-system-plan-isp/2025-26-inputs-assumptions-and-scenarios.

20 See https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/2024/interconnector-capabilities.pdf.

21 See https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/congestion-information-resource/statistical-reporting-streams.

22 See https://www.aemo.com.au/-/media/files/major-publications/qed/2025/qed-q4-2025.pdf

Table 7 Percentage (%) of time interconnector is exporting energy from Victoria.

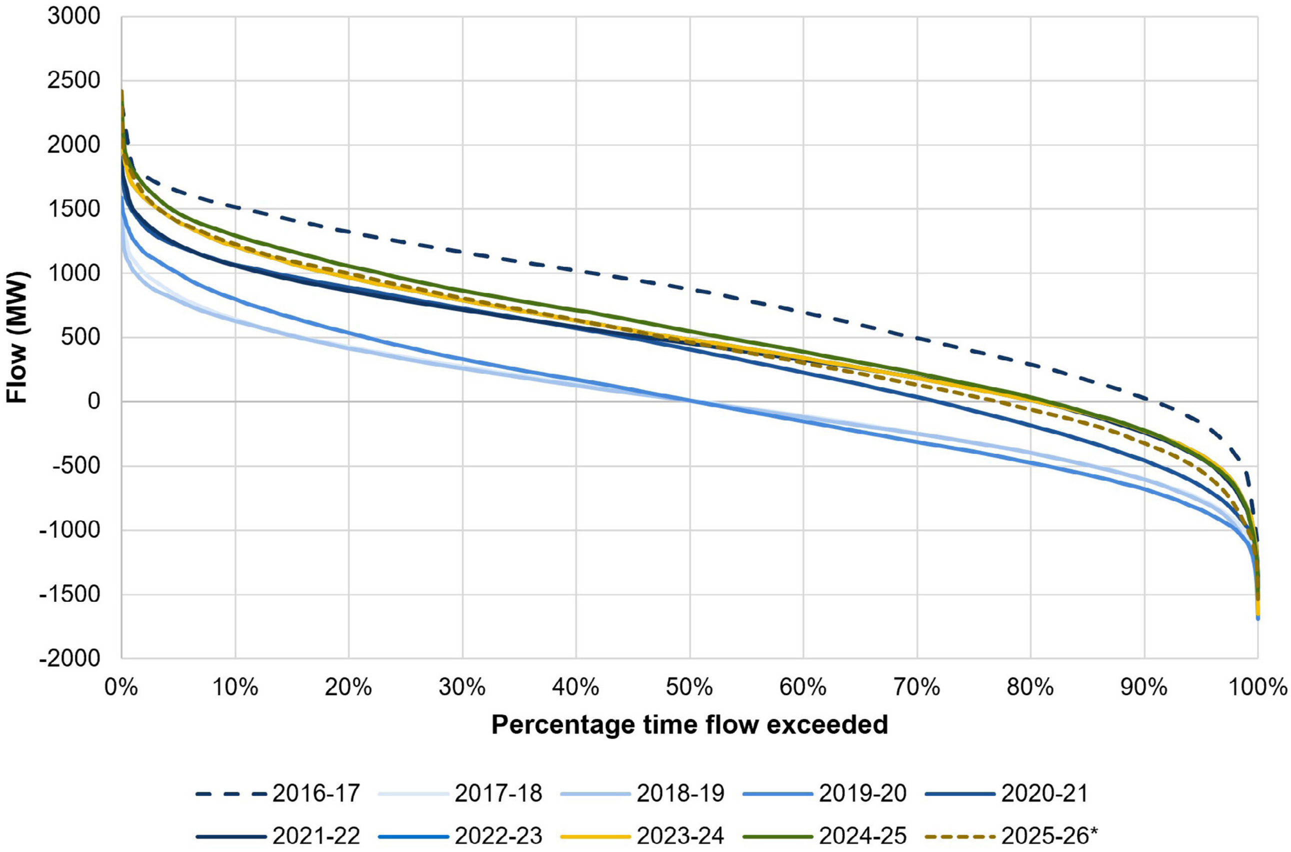
Interconnector	5-year average before Hazelwood closure	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26*
VNI	84%	50%	56%	71%	80%	71%	66%	62%	64%
Heywood	82%	42%	36%	47%	52%	51%	57%	53%	58%
Murraylink	45%	50%	62%	63%	67%	68%	68%	74%	64%
Basslink	44%	43%	45%	59%	49%	67%	68%	78%	78%
Victoria (net)	87%	51%	51%	72%	81%	81%	81%	82%	77%

Table 8 Net energy exported from Victoria (gigawatt hours [GWh])

Interconnector	5-year average before Hazelwood closure	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26*
VNI	4,032	953	1,174	2,338	3,361	2,787	2,615	2,059	2,284
Heywood	1,824	-388	-534	-117	232	99	461	285	607
Murraylink	48	-36	152	289	468	432	484	418	317
Basslink	-533	-496	-512	611	-279	929	1,250	1,962	808
Victoria (net)	5,371	33	279	3,122	3,782	4,247	4,810	4,724	4,017

Figure 14 represents the Victorian net energy flows for all interconnectors since 2016-17. Net energy flows in Victorian interconnectors have continued to increase since the closure of Hazelwood until 2024-25 and dropped in 2025-26. The Victorian net energy flows decreased over 700 MW in 2025-26 compared to last year mainly from flow export drop via Basslink but still remain high level with over 50% net energy exported to NSW as shown above in Table 8.

Figure 14 Victoria net interconnector flow duration curve (all interconnectors) since 2016-17 (MW)



* 2026 data range aligns with the reporting period, whereas previous years' data ranges align with the financial year.

Victoria to South Australia interconnection

There are two interconnectors between Victoria and SA - one located in south-west Victoria near Heywood and a direct current link located near Mildura called Murraylink. The Heywood[23] interconnector is defined as the flow through the 275 kV lines between Heywood Terminal Station in Victoria and South East substation in SA.[24]

The Victoria to South Australia interconnector's net energy exports into SA increased by 322 GWh in the reporting period compared to 2024-25, to 607 GWh. It is worth noting that the energy exported via EnergyConnect Stage 1 has been added to the Heywood interconnector as an interim arrangement, not an actual increase in energy exported via the Heywood interconnector. Due to this arrangement, net exports into SA via the Heywood interconnector in the reporting period is unavailable for this report.

23 The Heywood interconnector can be referred to as the Victoria to South Australia interconnector in publications. To avoid confusion with the aggregate of Murralink and the Heywood interconnector also being referred to the Victoria-South Australia interconnectors, only the term Heywood interconnector is used in this document to refer to the interconnector located near Heywood.

24 See https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/2024/interconnector-capabilities.pdf.

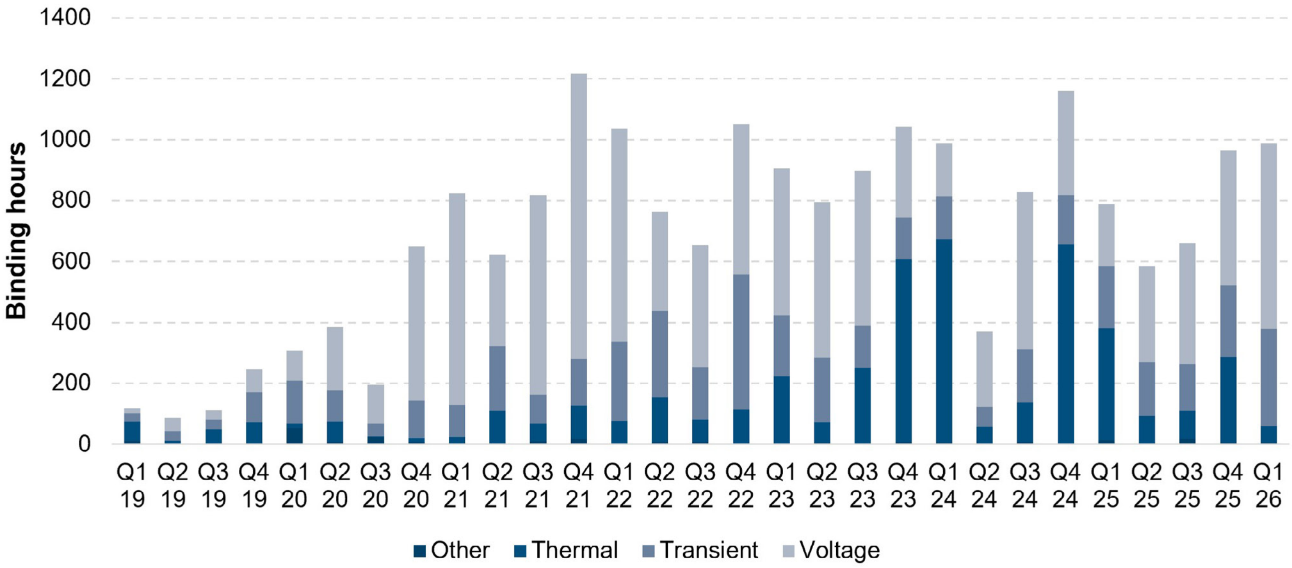
The Victorian net energy export level for the Murraylink interconnector in the reporting period dropped by 24% compared to 2024-25. In Q4 2025, net eastward transfers were limited by constraints in NSW and Victoria that drive westward energy flows on EnergyConnect stage 1 and the Murraylink interconnector at times of high solar and wind generation in south-west NSW and north-west Victoria, even when SA prices are lower than Victoria's.[25]

Victoria to New South Wales Interconnector (VNI)

Victoria experienced a slightly lower level of transmission congestion binding hours across the reporting period compared to 2024-25. However, this did vary substantially when comparing each quarter. The net exports to NSW through VNI increased slightly compared to 2024-25.

Figure 15 shows the historical binding hours in VNI export for different constraint types. Voltage-related constraints resulted in the largest number of binding hours over the last year. In Q4 2025 binding hours due to thermal constraints increased.

Figure 15 Historical binding hours for export constraints along VNI by constraint type from Q1 2019 to Q1 2026



25 See https://www.aemo.com.au/-/media/files/major-publications/qed/2025/qed-q4-2025.pdf

Basslink Interconnector

Victorian net energy exports to Tas via Basslink decreased by 59% in the 2024-25 reporting period. Net export from Victoria via Basslink occurred 78% of the time.

Basslink operated as a Market Network Service Provider during the reporting period, offering its capacity to transfer power between Tas and Victoria through market offers, analogous to market supply and demand offers made by scheduled generators and loads. The prices offered by Basslink for a particular flow level and direction represented the minimum price difference between importing and exporting regions at which the interconnector would transfer that inter-regional flow. Higher-priced Market Network Service Provider offers mean that larger inter-regional spot price differentials are required before a given level of flow on the link will be scheduled .

From 1 July 2025 Basslink shifted from offering most capacity at low prices (usually $1/MWh or less in Q4 2024) to higher-priced volumes,[26] resulting in the reduced net energy exported from Victoria into Tas in the reporting period. Basslink transitioned to be a regulated transmission network service provider starting 1 July 2026.[27]

26 See https://www.aemo.com.au/-/media/files/major-publications/qed/2025/qed-q4-2025.pdf

27 See https://www.aemo.com.au/initiatives/major-programs/nem-reform-program/nem-reform-program-initiatives/basslink-determination-participant-support-arrangements

4. Network Behaviour Assessment Under Stress

4. Network behaviour assessment under stress

Network performance under high-stress operating conditions can pose significant challenges to both reliability and security. Assessing the network's response under such conditions provides important input for planning reviews, supports improvements in reliability, and reduces the risk of disruption during periods of peak demand or critical system events.

This chapter examines the impacts of a range of high-stress operating scenarios on the DSN, including maximum demand, daytime and night-time minimum demand, high wind generation, and high import and export conditions from Victoria.

All transmission line loading levels were assessed against the applicable system ratings in effect at the time of each snapshot, reflecting the prevailing operating conditions. Assessment of DSN component performance under system normal conditions 'N' is based on the continuous ratings of plant and equipment, whereas post-contingency 'N-1' assessment considers short term ratings.

Key observations:

- During the time of maximum demand, all DSN components remained within their system normal 'N' ratings. Analysis shows that at the time of maximum demand, the Deer Park-Geelong and Deer Park-Keilor lines would exceed their ratings post-contingency 'N-1'. In such events, these lines would be managed through the System Overload Control Scheme.
- During minimum demand cases, there were no voltages in excess of limits identified under system normal condition.
- During high wind generation, no DSN elements were loaded above system normal 'N' or post-contingency 'N-1' ratings.
- During the times of maximum export and import cases, no DSN elements were loaded above system normal 'N' or post-contingency 'N-1' ratings.

4.1 DSN condition under different operational demand

The DSN conditions in Victoria under maximum operational demand, daytime minimum operational demand, and nighttime minimum operational demand were identified and analysed. Table 9 compares the overarching DSN conditions during each operational demand snapshot.

Table 9 Summary of operating conditions for maximum and minimum demand in Victoria in 2025-26

Characteristic	Maximum demand	Daytime minimum demand	Nighttime minimum demand
Date and time	27/01/2026 6 pm	27/12/2025 1 pm	26/12/2025 3:30 am
Victoria operational demand	10,736 MW	1,287 MW	3,757 MW
Distributed PV	792 MW	3,967 MW	0 MW
Net power flow from Victoria via interconnectors[A]	-71 MW • 218 MW from NSW • 310 MW to SA (307 MW export on Heywood and 0 MW on Murraylink) • 163 MW from Tas	279 MW • 68 MW from NSW • 156 MW was exported to SA (5 MW from Heywood and 151 MW from Murraylink) • 191 MW to Tas	-636 MW • 1,018 MW to NSW • 382 MW from SA (236 MW import from Heywood and 154 MW from Murraylink) • 0 MW between Victoria and Tas.
Victorian wind and solar generation	1,981 MW, representing 18% of Victorian generation, consisting of: • 1,430 MW of wind • 551 MW of solar	106 MW, consisting of: • 7 MW of wind. • 99 MW of solar	1,575 MW, consisting of: • 1,575 MW of wind • 0 MW of solar
Victorian synchronous generation	7,609 MW, consisting of: • 4,327 MW of coal • 1,527 MW of gas • 1,755 MW of Hydro	1,941 MW, consisting of: • 1,941 MW of coal • 0 MW of gas • 0 MW of Hydro	2,777 MW, consisting of: • 2,731 MW of coal • 0 MW of gas • 46 MW of Hydro
Temperature at Melbourne airport	42.3°C	21.3°C	11.3°C

A. These are the measured flows during each snapshot and may differ from the interconnector's dispatch target.

4.2 Maximum demand condition

The maximum demand snapshot represents operating conditions during which multiple network elements are subject to their highest loading levels. The snapshot is based on power system conditions observed at 6 pm on 27 January 2026, when system demand reached an annual peak of 10,736 MW. The maximum ambient temperature recorded on this day was 42.3°C.

During the maximum demand period, demand was predominantly supplied by Victorian generation, with imports of 163 MW from Tas (Basslink) and approximately 218 MW from NSW, while 310 MW was exported to SA mostly via Heywood.

Due to network constraints, flow on the Murraylink interconnector was limited to 0 MW. In addition, constraints restricted the output of several wind and solar farms in Western and North West Victoria, as well as imports into Victoria from both the NSW and SA interconnectors.

During the maximum demand period, all DSN elements operated within their system-normal ('N') ratings. Under these conditions, the Rowville A1 500/200 kV transformer experienced the highest loading at 96%, followed by the Sydenham-Plumpton 500 kV line at 91% rating. The South Morang H3 330/220 kV transformer was the third most heavily loaded asset, operating at 84% rating.

Modelled N-1 contingency overloads were observed for the loss of the Deer Park-Keilor 220 kV line overloaded the Deer Park-Geelong 220 kV line to ~116% rating, while loss of the Deer Park-Geelong 220 kV line overloaded the Deer Park-Keilor 220 kV line to ~105% rating.

There were no bus voltage issues identified under system normal ('N') conditions. Under the N-1 condition, a potential low voltage risk was observed at Deer Park following the outage of the Deer Park-Keilor 220 kV line, with the voltage dropping to 0.896 per unit, which is below but close to the 0.9 per unit minimum limit. This issue was subsequently managed.

The 'N' and 'N-1' ratings and corresponding loadings for each DSN element under the maximum demand snapshot are provided in the historical DSN ratings and loadings workbook.[28]

Figure 16 below illustrates the direction and magnitude of power flows through key DSN corridors during maximum demand, with Melbourne's demand being supplied via the Eastern, Central Northern and South West Victoria corridors.

28 See the historic DSN ratings and loadings workbook at https://www.vicgrid.com.au/transmission-planning/victorian-annual-planning-report

Figure 16 Map of power flows along significant corridors during maximum demand (6 pm on 27 January 2026)

4.3 Minimum demand condition

4.3.1 Daytime minimum demand snapshot

The daytime minimum demand snapshot highlights conditions under which voltages need to be carefully controlled, as lightly loaded lines push voltages towards the high end of their operating limits. Both distributed and large-scale solar generators are typically generating at high levels. With the continuous increase in distributed PV generation, the daytime minimum demand has consistently decreased each year (see section 2.2.2).

The minimum demand of 1,287 MW was recorded at 1pm on 27 December 2025:

- Approximately 4 GW of distributed PV generation was observed at this time.
- The S>NIL_MHNW1_MHNW2 which aims to avoid Monash-North West Bend 132 kV line 2 overloading on trip of Monash-North West Bend 132 kV line 1 was binding. This bound constraint set the export limit of Murraylink as 151 MW from Victoria towards SA.
- Victoria to NSW export limit was set as 71 MW by the bound constraint N^^N_NIL_WGLT aiming to limit Wagga-Lower Tumut 330 kV line flow to avoid voltage collapse post contingency trip of this line.

During periods of low demand in Victoria, operators historically needed to take special intervention measures to manage high voltages (see section 2.3.2). The absence of conventional generators to absorb the excess reactive power during these low demand times can result in elevated voltages across the 500 kV and 220 kV networks in metropolitan Melbourne (including areas like Keilor) and some of the 220 kV regional network in Victoria.

During the minimum daytime operational demand scenario that occurred on 27 December 2025 at 1pm the reactors at Keilor and Moorabool managed the 500 kV network voltage by absorbing VARs reactive power to maintain volts within limits. Moorabool was absorbing approximately 105 MVAr at each 500 kV reactor and around a 100 MVAr at each 200 kV reactor. Keilor 220 kV reactors were also in service, absorbing around 103 MVAr each. These reactive power supports were sufficient and thus no special operational intervention measures were required to manage voltage within normal limits on the day.

Figure 17 illustrates the post-contingent voltages across Victorian 500 kV terminal stations for a critical contingency, in this case the loss of Loy Yang Generator B2 or an associated unplanned trip of this feed. The post-contingent voltages across the 500 kV network and the rest of the DSN remained within limits as observed during the annual minimum demand snapshot.

Figure 17 Post Contingency (Loy Yang outage) voltages at 500 kV terminal stations during daytime minimum demand

4.3.2 Nighttime minimum demand snapshot

The nighttime minimum demand scenario is characterised by no solar, which is quite different to the overall lowest minimum demand, which occurred in the middle of the day.

In 2025-26, the lowest nighttime operational demand was 3,757 MW, occurring on 26 December 2025 at 3:30 am. This was 2,470 MW higher than the annual minimum demand observed during the daytime. The gap between daytime and nighttime minimum demand is widening each year, as nighttime minimum demand remains relatively stable while daytime minimum demand continues to decline due to the increasing installation of distributed PV.

Under the minimum nighttime operational demand scenario, the Rowville static voltage and reactive compensators together with other dynamic reactive power plants managed the voltage by controlling reactive power flow and providing dynamic reactive power reserve for contingencies. In this case, these static voltage and reactive compensators were absorbing around 10 MVAr. Additionally, all Keilor and Moorabool reactors were in service, absorbing around 103 MVArs each. No special operational intervention measures were required to manage voltage as they remained within their set limits.

Figure 18 illustrates the post-contingent voltages across Victorian 500 kV terminal stations for a critical contingency (Loy Yang unit outage). The post-contingent voltages across the 500 kV network are equal to or slightly higher than those as observed during the annual minimum demand snapshot. However, no violation of the voltage limit in the DSN was observed.

Figure 18 Post-contingency (Loy Yang unit outage) voltages at 500 kV terminal stations during nighttime minimum demand

The snapshot is based on power system characteristics observed at 3:30 am on 26 December 2025. At this time:

- The constraint V^^N_NIL_1, which aims to avoid voltage collapse around Murray for loss of APD potlines, was binding. This binding constraint set the export limit of the VIC1-NSW1 interconnector to be 1,074 MW from Victoria towards NSW, and the export limit of the Murraylink interconnector to be 143 MW from SA to Victoria.
- No export or import of power occurred between Victoria and Tas via Basslink.

4.4 High wind snapshot

Wind generation in Victoria is primarily located in the Western and South West Victoria corridors. Typically, wind generation from these two corridors is coincidental due to their geographical proximity. Maximum wind generation for 2025-26 in Victoria occurred at 7:30 am on 15 August 2025.

Table 10 Summary of operating conditions for maximum wind generation snapshot

Characteristic	Peak Victorian wind generation output
Date and time	15 August 2025 7:30 am
Victorian operational demand	6,970 MW
Distributed PV	8 MW
Net power flow from Victoria via interconnectors*	939 MW net flow consisting of: • 829 MW to NSW • 60 MW to SA • 50 MW to Tas
Victorian wind and solar generation	4,528 MW, representing 56% of Victorian generation, consisting of: • 4,508 MW of wind • 36 MW of solar
Victorian synchronous generation	3,460 MW, representing 43% of Victorian generation, consisting of: • 3,350 MW of coal • 0 MW of gas • 110 MW of hydro
Temperature at Melbourne Airport	9°C

*These are the measured flows during each snapshot and may differ from the interconnector's dispatch target.

Victorian maximum wind generation was 179 MW higher compared to 2024-25. At the time of maximum wind generation of 4,508 MW, 2,817 MW (62%) of the Victorian wind generation was supplied from South West Victoria corridor, and 1,540 MW (34%) of Victorian wind generation was supplied from the Western Victoria corridor. The remaining ~150 MW was supplied from South East and Central Northern Victoria.

Figure 19 illustrates the pre- and post-contingency loadings and power flows on the West Murray 220 kV network following the loss of critical contingencies (Horsham-Murra Warra-Kiamal and Red Cliffs-Wemen-Koorangie-Kerang). During periods of maximum wind generation, all lines operate within their post-contingency thermal ratings.

Figure 19 West Murray flows and loading, pre-contingent (left), post-contingent for loss of Red Cliffs-Wemen-Koorangie-Kerang (middle), post-contingent for loss of Horsham-Murra Warra-Kiamal (right)

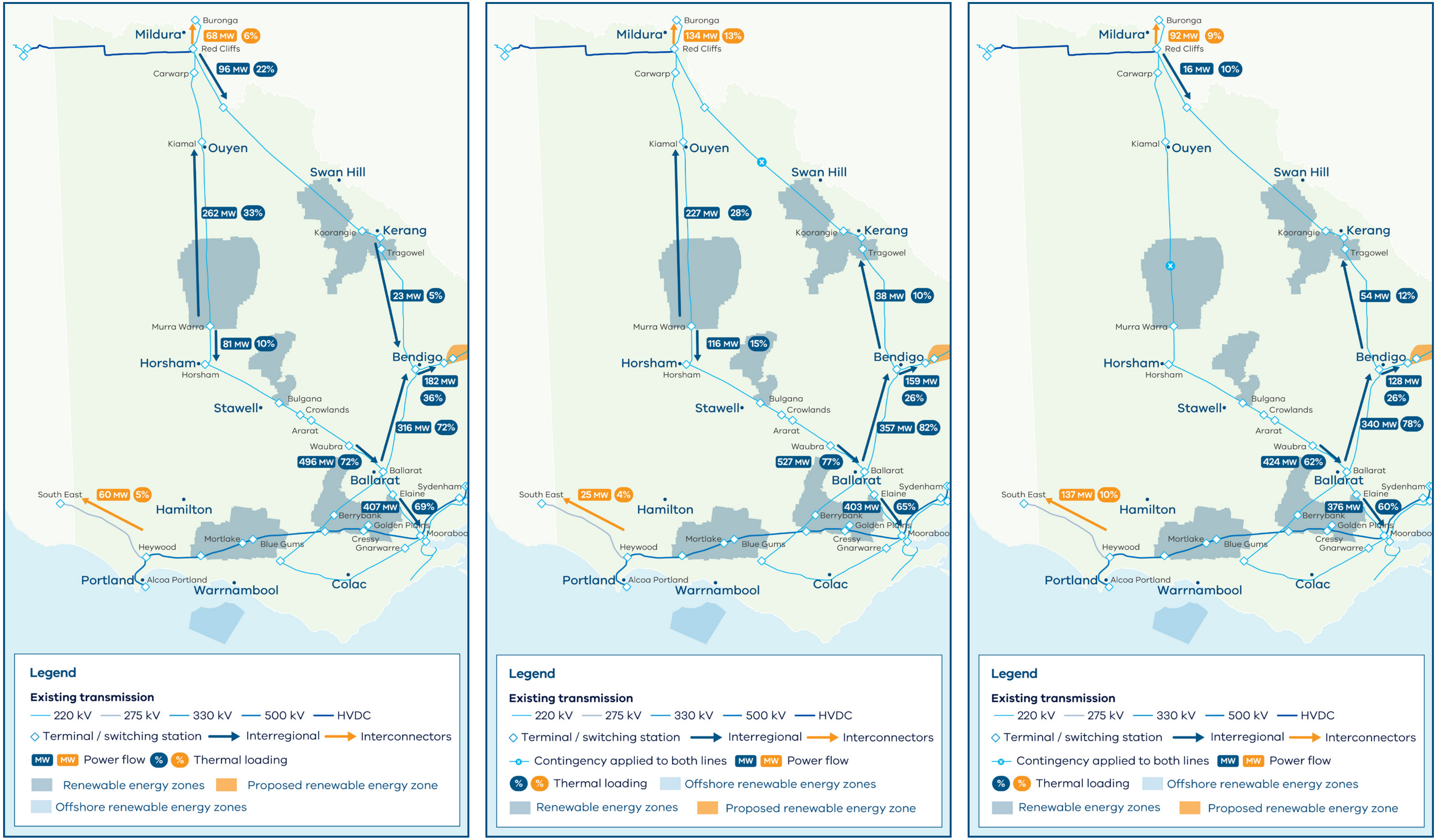


Table 11 presents the post-contingency loading and power flows from the Western and North West Victoria corridors following the Ballarat-Moorabool 220 kV line 2 contingency, which was identified as a top binding constraint with biggest market impact in South West Victoria during 2025-26 (see section 3.2.2). The study reveals that, even at the scenario of the maximum wind generation, none of the lines exceeded their post-contingent thermal limits in Victoria. However, after the loss of the Ballarat-Moorabool 220 kV line 2, the Ballarat-Bendigo line and the Elaine-Moorabool line reached 77% and 84% post-contingent 'N-1' rating, respectively. In the same scenario in 2024-25, the lines were loaded to 77% and 88% post-contingent 'N-1' rating, but the Ararat-Waubra-Ballarat line was the second most heavily loaded at 81% post-contingent 'N-1' rating. This demonstrates that the existing constraint equations are effective in enabling wind generators to operate at high output levels without exceeding thermal limits.

Table 11 Post-contingent flows from Western Victoria and North West Victoria corridors for the loss of Ballarat-Moorabool 220 kV Line 2

Limiting constraint	220 kV lines of interest	% Percentage of rating	Power flow (MW)
V>>NIL_ELML_BAML2	Waubra-Ballarat	71%	499
	Ararat-Waubra	37%	374
	Murra Warra-Kiamal	31%	272
	Red Cliffs-Buronga	7%	40
	Red Cliffs-Wemen	21%	119
	Ballarat-Bendigo	77%	338
	Elaine-Moorabool	84%	534
	Ballarat-Moorabool Line 1	59%	299

Figure 20 and Figure 21 show that wind generation in the South West Victoria 500 kV network operated within the network thermal rating during the high wind snapshot.

Figure 20 500 kV flows and loadings in South West Victoria pre-contingent for Cressy-Moorabool

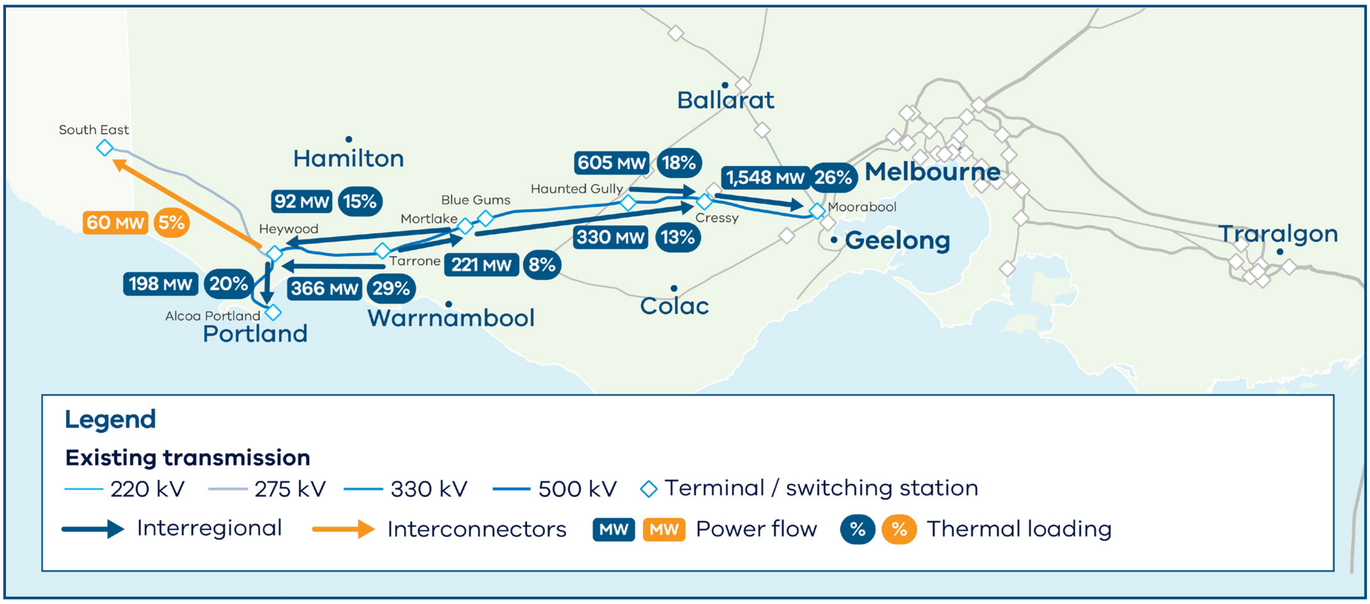
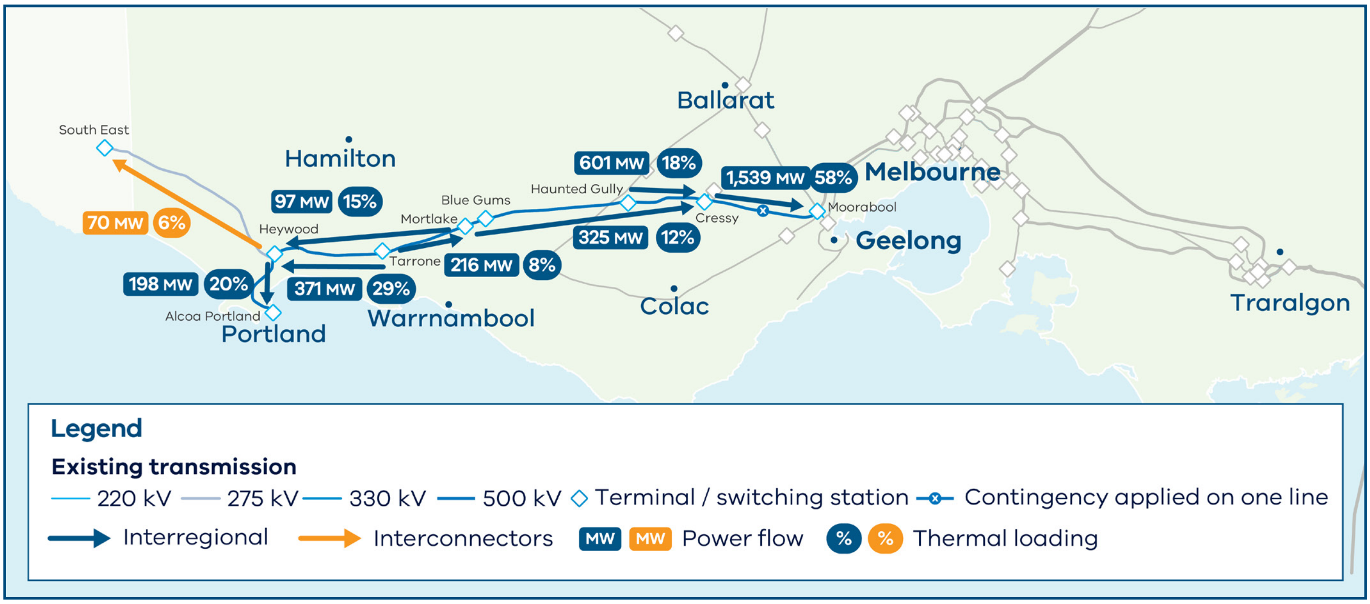


Figure 21 **500 kV flows and loadings in South West Victoria post-contingent for Cressy-Moorabool line 1**



4.5 High export and imports snapshots

Victoria alternates between importing and exporting electricity depending on demand conditions, generation availability and network constraints. Overall, Victoria has been a net power exporter to its neighbouring regions as mentioned in section 3.3. The rapid growth of wind and solar generation in Western Victoria has resulted in more frequent exports to neighbouring regions, particularly NSW and SA, during periods of high renewable output. Conversely, Victoria continues to import electricity during periods of low renewable generation, high demand (such as hot summer evenings), or generation outages, with imports primarily sourced from NSW and Tas via Basslink.

4.5.1 Maximum Victoria export snapshot

The high-export snapshot for Victoria occurred at 5 am on 17 June 2025, when the net export from Victoria was 2,299 MW. At that time, NSW had a reduced level of generation output and Victoria had a high level of generation availability with low prices. Additionally, power exports to NSW and SA were restricted by thermal constraints related to other states(receiving-end networks) limits. In addition, a transient stability constraint was also in place to prevent instability following a fault and trip of the Hazelwood-South Morang 500 kV line.

Table 12 summarises the network operating conditions during periods when Victoria is exporting.

Table 12 Summary of operating conditions for maximum Victoria net flow export snapshot

Characteristic	Maximum Victoria net flow export
Date and time	17 June 2025 5 am
Victorian operational demand	5,036 MW
Distributed PV	0 MW
Net power flow from Victoria via interconnectors*	2,299 MW net flow consisting of: • 1,062 MW to NSW • 751 MW to SA • 486 MW to Tas
Victorian wind and solar generation	3,770 MW, representing 49% of Victorian generation, consisting of: • 3,770 MW of wind • 0 MW of solar
Victorian synchronous generation	3,817 MW, representing 51% of Victorian generation, consisting of: • 3,578 MW of coal • 108 MW of gas • 131.3 MW of hydro
Temperature at Melbourne Airport	6°C

* These are the measured flows during each snapshot and may differ from the interconnector's dispatch target.

Figure 22 illustrates Victoria's electricity export patterns during periods of high export, showing power flows, network loading, and voltage profiles across the Northern Victoria (VIC-NSW), Western Victoria (VIC-SA) and southern (VIC-Tas) corridors and their associated interconnectors. During the time of maximum export, all DSN elements were loaded below their system normal ('N') ratings and within their post-contingency ('N-1') ratings. The primary limitations on Victoria's exports during this high-export snapshot were thermal capacity in SA and transient stability in internal transmission corridors.

Figure 22 Maximum export flows of the Victorian Interconnectors

4.5.2 Maximum Victoria import snapshot

Victoria's net power flow import scenarios typically occur during periods of high operational demand in Victoria and low local-regional renewable generation, particularly during evening peaks, extreme weather conditions or when wind and solar output is low. The maximum Victoria import snapshot occurred at 11:30 am on 25 October 2025, which was not driven by high demand. At this interval, Victoria is net importing 1,100 MW power flow from both NSW and SA, which was mostly driven by a lack of renewable resources being available in Victoria (due to weather) and an abundance of renewable resources available in NSW and SA. The power flow from NSW into Victoria was not limited by constraints; however, the import flow from SA to Victoria was limited by the constraint on the Victoria-South Australia interconnectors to prevent an overload within SA under a contingency. The power flow on Basslink was 0 MW.

Table 13 summarises the network operating conditions during periods when Victoria is importing.

Table 13 Summary of operating conditions for maximum Victoria net flow import snapshot

Characteristic	Maximum Victoria net flow import
Date and time	25 October 2025 11:30 am
Victorian operational demand	4,189 MW
Distributed PV	1,489 MW
Net power flow from Victoria via interconnectors*	-1,100 MW net flow consisting of: • 586 MW from NSW • 514 MW from SA • 0 MW to Tas
Victorian wind and solar generation	777 MW, representing 20% of Victorian generation, consisting of: • 250 MW of wind • 527 MW of solar
Victorian synchronous generation	2,377.2 MW, representing 55% of Victorian generation, consisting of: • 2,373.2 MW of coal • 0 MW of gas • 4 MW of hydro
Temperature at Melbourne Airport	12°C

* These are the measured flows during each snapshot and may differ from the interconnector's dispatch target.

Figure 23 shows flow patterns, load distribution, and voltage levels across Victoria's interconnectors during high import snapshot. During the time of maximum import, all DSN elements were loaded below their system normal ('N') ratings and within their post-contingency ('N-1') ratings.

Figure 23 Maximum import flows of the Victorian Interconnectors

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