Distribution demand forecast assessment

Review of Powercor’s 2026-31 regulatory proposal

Australian Energy Regulator

July 2025 – Final Report

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1. Executive summary

We've assessed the reasonableness of Powercor's 2026-2031 demand forecasts and provided recommendations for improvements.

Our scope

Baringa Partners (Baringa) was engaged by the Australian Energy Regulator (AER) to review the methodologies and assumptions driving the Victorian distribution network services providers' (DNSPs') demand forecasts for the 2026-2031 distribution determinations to help inform their assessment of capital and operating expenditure (capex and opex) forecasts. Our scope of work focuses on two key elements:

Demand methodology review

- The approach each DNSP has taken to derive their forecasts for maximum demand, minimum demand, customer number and energy consumption. This includes reviewing their approach to technology-induced demand like EVs and block loads such as data centres.

Demand input assumptions review

- Reviewing the source, recency, and adjustments to key input assumptions such as consumer energy resources (CER) uptake and profiles.

Our approach

We undertook a 3-phase approach to assessing the demand forecasts:

1. **Discovery**
   - We developed an overarching understanding of the DNSPs' demand inputs, assumptions and methodologies gained via reviewing the proposals, workshops with each DNSP and an initial set of information requests.
2. **Initial Findings**
   - Using our assessment process and the information gathered in Phase 1 plus further information requests, we identified areas of potential concern that required further assessment, clarification or validation.
3. **Final Report**
   - Following a further set of information requests based on the findings in Phase 2, we've landed on the findings set out in the report.

Assessment process

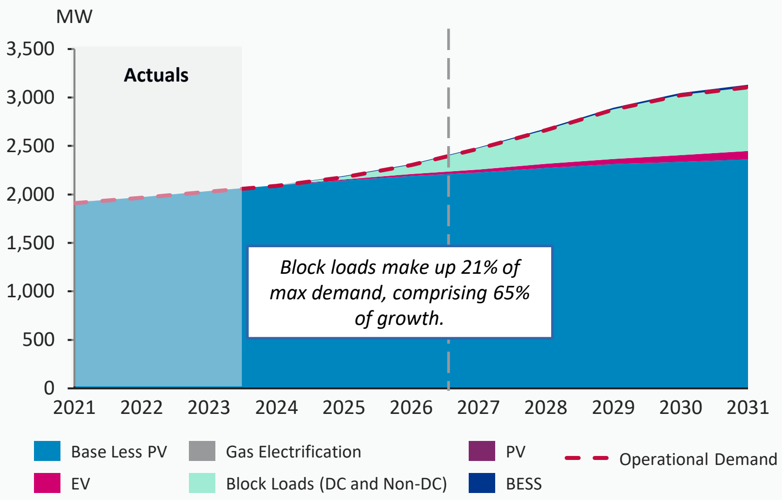
1. Identify key methodology elements and input assumptions
2. Materiality & reasonableness assessment
3. Aggregate element findings and determine level of concern
4. Directional assessment of forecasts
5. Key recommended changes

Key timeline

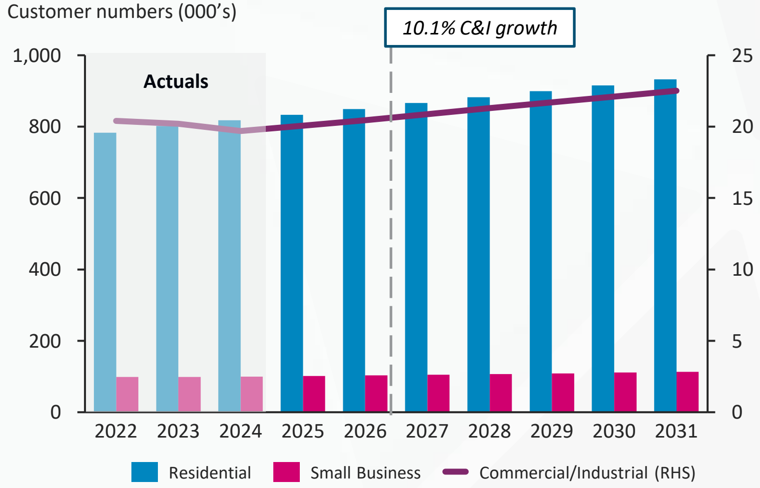
- Phase 1 - Discovery: Early-Mid April 2025
- Phase 2 – Initial Findings: Late April - Early May 2025
- Phase 3 – Final Report: Baringa Final Report, July 2025

Powercor is forecasting high overall maximum demand growth at an annual rate of 5.8% compounding from 2024.

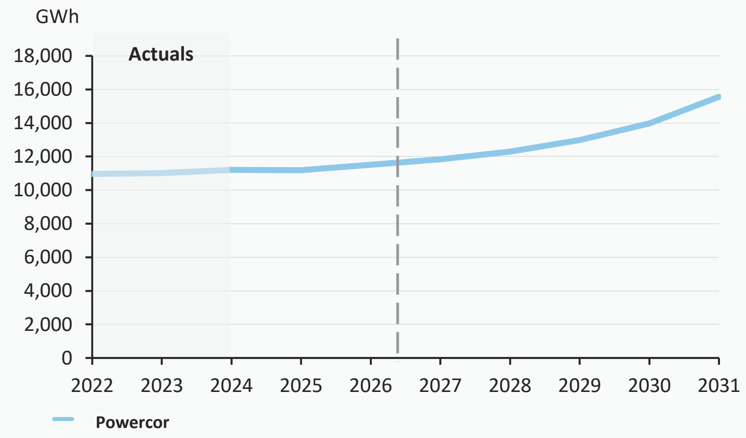
Maximum demand[1]



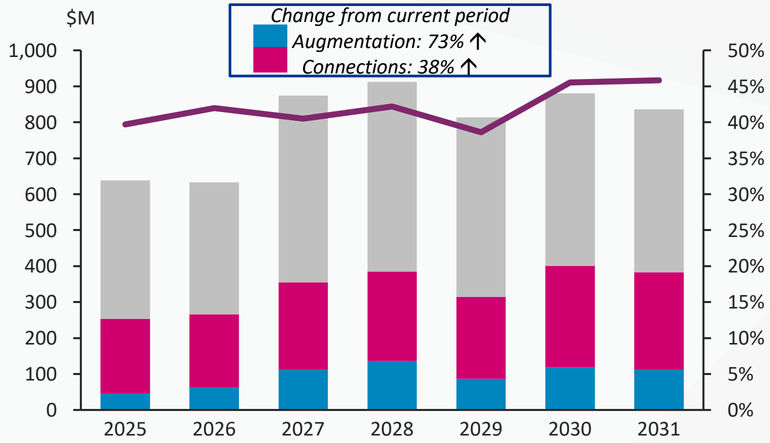
Customer numbers



Energy consumption



Forecast demand-related expenditure[2]



Summary of methodology

Maximum/minimum demand:

- Powercor (along with CitiPower and United Energy) use third-party provider Blunomy to produce their maximum demand forecasts.
- Powercor provides historical data, inputs and assumptions to Blunomy, who then produce forecasts for each network at system and spatial levels.
- Powercor does not play a direct role in the development of the proprietary demand forecasting methodology, and the outputs are a product of Blunomy's model.

Energy consumption:

- Energy consumption forecasts are derived in-house separately from demand forecasts to account for the impact of exports at the asset level using AEMO's Step Change scenarios for energy efficiency, EV, electrification and PV.

Customer numbers:

- Produced in-house and starts with total customers, as forecast in the 2024-25 pricing proposals. This is grown by Vic Government population and household projections for residential customers. Non-residential customers are grown with AEMO's gross state product forecasts.

Notes: (1) This is the summer peaking maximum demand forecast POE50, system-level, coincident; (2) Highlights augmentation and gross connections capex growth as primarily demand driven expenditure, though we acknowledge that not all augmentation is demand driven; (3) We have not produced minimum demand forecast charts for assessment.

Powercor’s approach is generally well-documented across key outputs, but there is inconsistency in the block load treatment for energy and other moderate concerns.

<table>
<tr><th>Key output</th><th>Assessment</th><th>Level of concern</th><th>Impact</th></tr>
<tr><td>Maximum demand</td><td rowspan="2">• Powercor has provided their inputs and assumptions and uses the latest AEMO information where available. While Powercor’s approach is generally well-documented, using Blunomy leads to challenges for validating the forecasts.
• Electrification of gas excluded from the output due to an error, which is expected to reduce the forecasts by a non-negligible amount for Powercor.
• PV contribution at the spatial level is potentially double-counted in the net demand calculation as identified from a material business case, which would also understate maximum demand but an opposite effect on minimum demand.
• An offsetting factor is the significant investment of DCs, which is a new phenomenon, and we recognise the challenges in trying to forecast uptake of this new major technology for 5+ years. We consider the approach to DC demand is somewhat reasonable, given only committed projects are included – though we have not received information allowing us to validate the specific sites/contracts. While opportunity has been provided, it is possible that further information could allay some of these concerns.
• Given the materiality of DCs to Powercor’s max demand forecast, our overall assessment is moderate concern.</td><td>Moderate</td><td>-</td></tr>
<tr><td>Minimum demand</td><td>Moderate</td><td>- or ↘</td></tr>
<tr><td>Customer numbers</td><td>• The stated methodology is inconsistent with data provided in the RIN. The methodology provides that residential customer numbers should follow population growth and business customer numbers should follow GSP. However, we note small, medium, and large business customer numbers appear to follow residential customer number growth. Powercor states their demand forecasts do not use customer numbers as an input and that these are only used for forecasting connections.</td><td>Some</td><td>↘</td></tr>
<tr><td>Energy consumption</td><td>• The methodology for energy consumption is inconsistent with the maximum demand forecast. The energy consumption methodology includes additional forecast data centre load using an approach from L.E.K. and we consider this is additive given this forecast is based on potential future DC connections. Non-DC block loads also appear to be excluded, and this provides support for tightening the approach to blockload adjustment to demand forecasts. Overall, there are inconsistencies regarding Powercor’s description of the methodology for energy consumption.</td><td>Moderate</td><td>↗</td></tr>
</table>

Key:

Level of concern	
Scale	**Rating**
	No or limited concern
	Some concern
	Moderate concern
	Significant concern

Impact on expenditure forecast				
Highly Overstated	Overstated	Neutral	Understated	**Highly** Understated
↑	↗	-	↘	↓

Footnote: Expenditure forecast impacts on minimum demand are in reverse. I.e. An overstated maximum demand leads to higher demand-driven augex while an understated minimum demand suggests higher expenditure on CER enablement programs.

Areas of concern include transparency, approach to native demand, spatial disaggregation and omission of gas electrification in forecasts.

	Key theme	CPU
1	**Model architecture** Integration of internal and external methodologies	Full integration of Blunomy model.
2	**Transparency** Clarity on model assumptions and methodologies	Third party algorithms difficult to validate. While the approach is described, more data and transparency is needed for validation.
3	**AEMO scenarios use** Adoption of latest inputs and assumptions across coherent scenario	Current, coherent set.
4	**Native demand** Approach to demographic and economic driven demand growth	Native demand approach (first and second logistic functions) not well documented. Population grown at SA2 level. Full validation of the approach requires more data.
5	**CER spatial disaggregation** Approach to distributing technology-driven growth at the ZSS/Feeder level	Spatial level uptake incorporates historical trend and spatial saturation points. Validation of the approach requires more data.
6	**Block load treatment** Approach to large, known load connections	Only committed connections.
7	**Data centres (DC)** Approach to DC connections	Only committed connections.
8	**Gas electrification** Approach to the transition away from gas	Excluded from forecast in error.
9	**Post-modelling** Manual adjustment to forecast after the core modelling process	None.

Key: *Area of concern*

Our assessment on locational business case reveals that Powercor is likely understating demand and the related expenditure. DC demand forecasts are somewhat reasonable.

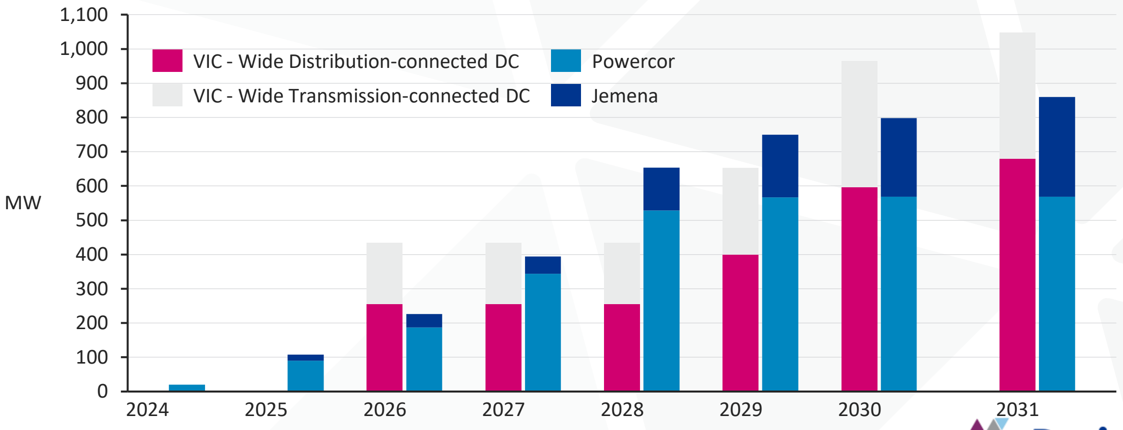
In addition to assessing Powercor's overall demand methodology, we have also selected and assessed the locational demand forecasts for a material locational demand-driven augex business case.

Greater Western Melbourne Supply Area Business Case

- The business case for the Greater Western Melbourne Supply Area augmentation has a significant number of transfers between substations, making the spatial calculations more difficult to validate. We are unable to validate the specific calculations feeding into the transfers in and out.
- Within the forecast, the following factors are broadly conservative, contributing to a lower maximum demand than would be expected:
  - Lack of electrification is generally conservative
  - PV contribution is potentially double-counted in the net demand calculation. In Powercor's data, native demand already equals underlying demand - PV, because net demand includes native demand – PV, either the PV contribution is double-counted or the underlying demand is being misreported as Native Demand + PV.
- Three of the substations see jumps in 2026 MD from 2025 historicals. The drivers behind these increases are not clear from data provided:
  - Laverton increases from 88 to 99 MW
  - Melton increases from 82 to 96 MW
  - Truganina increases from 109 to 123 MW
- Demand transferred in appears to be double-counted for the Truganina ZSS.

Assessment of data centre forecast

- Powercor states it only includes committed and contracted DCs in its max demand forecast. In principle, this is a reasonable approach which only includes high probability DCs. However, we are unable to verify this is what Powercor has done because - absent a compulsory info notice from the AER - Powercor is unable to provide evidence these DCs are contracted because of the non-disclosure agreements it has with the DCs. The materiality of this DC forecast means this impasse is not ideal, and we note the AER might consider issuing a formal RIN request to gain this information and validate PC's forecasts
- Baringa has developed a preliminary view on a potential pipeline for DC demand growth in Victoria, as of June 2025. **This bottom-up estimate is based on public information and limited market testing**. Our analysis indicates that the total DNSP DC demand forecast is broadly similar to our forecast for **the entirety of Victoria** which includes both transmission and distribution connections, whereas their forecast is distribution only. Because our forecast is based on publicly available information, we recognise it may potentially understate DCs because it may not capture planned DCs for which there is currently no public information.



Cumulative data centre impact

*SA2 are areas comparable to postcodes

We recommend that Powercor update its block load and data centre treatment for consistency across its forecast and include electrification of gas in its Revised Proposal.

Key recommendations

1

Evidence that data centre approach is implemented as documented
Powercor explains that their committed data centre contracts are subject to non-disclosure agreements. We recommend the AER engage on this matter regarding appropriate documentation from Powercor that aligns with the connection point, connection date and maximum load of the committed data centres as those provided in the maximum demand forecast, and this could be via a formal RIN obligation request.

2

Consistency in treatment of block loads (including data centres)
The maximum demand forecasts include block loads in the forecast only if the connection is committed and contracted, while the connections and consumption forecast includes some block loads and data centres that are yet to be contracted. The implied project probability of those not yet committed or contracted for demand forecasting purpose is zero and for consistency, these should also be excluded from Powercor's connection and consumption forecasts.

3

Include electrification of gas
We consider the exclusion of gas electrification from the maximum and minimum demand forecasts to be an oversight and should be incorporated in the final forecast. Excluding gas electrification from the max/min demand forecast fails to account for one of the significant drivers of future electricity demand growth, particularly as gas is phased out in favour of electric systems. Incorporating this would improve the accuracy of long-term demand projections.

4

Underlying net demand calculations
The approach toward native demand is not well documented and uses algorithms that require further data and justification to be validated. Our assessment of the Greater Western Melbourne supply area business case indicated potential double counting in the underlying demand forecasts. Powercor's native demand and spatial forecast are particularly difficult to validate due to the complexity involved in demand transfers. Despite the outputs being broadly in line with population data, we consider that removing obscurities in the process would improve the robustness and clarity of the demand forecast.

2. Regulatory context and our approach

Note: This section is identical across all reports.

DNSPs' expenditure forecasts must reflect a realistic expectation of demand. Demand forecasts impact capex, opex and tariff calculations.

AER expenditure criteria

1. The efficient costs of achieving the capex and opex objectives

2. The costs that a prudent operator would require to achieve the capex and opex objectives

3. A realistic expectation of the **demand forecast**, cost inputs, and other relevant inputs required to achieve the capex and opex objectives

Spatial maximum demand

Drives demand driven augex

- Spatial level maximum demand forecasts input into the calculation of unserved energy at the asset level which drives the net benefit calculation to support augmentation.
- These forecasts are used to identify emerging network limitations and risks that need to be addressed by either network or non-network solutions.
- **Spatial demand forecasts are therefore used as an input to determine the timing and scope of capital expenditure, primarily augmentation capex.**

Minimum demand

Drives CER integration capex and opex

- Minimum demand forecasts help in planning and managing the integration of CER into the network. Minimum demand forecasts highlight challenges regarding power system security and network operating limits particularly during periods of high solar generation.
- The AER may assess the impact of how minimum demand forecasts affect distribution networks as a result of CER uptake and operation. These forecasts will be required to support any CER integration business cases or related expenditure uplift from DNSPs.

Customer numbers

Drives connections capex and opex output growth changes

- Provides data for network planning and expenditure for new connections.
- For assessing connections and customer driven works expenditure, the AER requires information on both forecast customer volumes and costs for several standardised categories of works.
- In addition to driving new connections capex, customer number forecasts are also an input into the opex output growth trend under the AER's base-step-trend approach to forecasting opex.

Energy consumption

Drives tariff calculations

Also impacts opex forecast

- DNSPs forecast energy consumption (GWh) feeds into tariff setting so that tariff rates are set in a manner that reflects the DNSP's revenue cap for that year. Any differences in actual and forecast volume delivered will have a *perceived* impact on consumers. If DNSPs over-forecast consumption in their revenue proposal, this would result in lower *expected* network tariffs. Though the difference in actual and forecast consumption is adjusted for at the annual tariff setting stage.
- Consumption forecasts also feed into opex forecasts.

Source: National Electricity Rules (NER), clauses 6.5.6 (c) and 6.5.7 (c).

 |

Baringa has been engaged to review the Victorian DNSPs’ demand forecasts for the 2026-2031 regulatory control period, with a focus on maximum demand.

Baringa’s scope focuses on two key elements for demand forecasts

Demand methodology: The approach that DNSPs have taken to demand forecasts, such as how they have incorporated technology-induced demand like EVs, or considered block loads.

Demand assumptions: Inputs, assumptions and drivers of demand forecasts such as the impact of consumer energy resources, energy efficiency, blocks loads and more.

- We are performing a bottom-up qualitative review of the methodologies, inputs and assumptions for Victorian DNSPs’ demand forecasts.
- We are considering the reasonableness of the approaches taken by the DNSPs in order to inform the AER’s Draft Determinations.
- Our primary focus is on reviewing the methodologies and input assumptions informing maximum demand forecasts, however, we have also considered minimum demand, customer number and energy consumption forecasts.

Baringa’s scope excludes forecasts and reviewing expenditure

Alternative demand forecasts: Baringa is not performing modelling to prepare alternative forecasts for demand, consumption and customer numbers, as we do not have the ability to directly re-run the DNSPs’ back-end models.

Expenditure review: Baringa is not undertaking a review of the expenditure forecasts.

- As we do not have the ability to directly re-run the back-end models used by the DNSPs, this review focuses on a qualitative assessment, rather than preparing alternative forecasts for demand that could be numerically compared against the DNSPs outputs. The exception to this is for data centre load we’re we have our own Baringa forecast and have compared that forecast to the DNSPs’ as part of our assessment.
- We are focused on the demand forecasts, and in effect their implications for expenditure, rather than reviewing prudency and efficiency of the expenditure forecasts.

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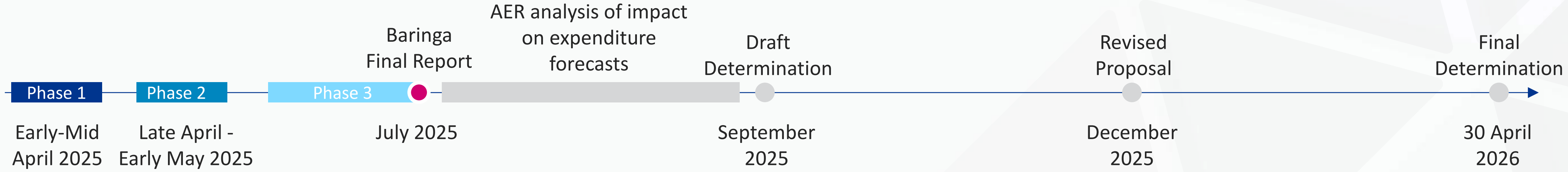
We adopted a 3-phase approach to assessing the demand forecasts for each of the Victorian DNSPs. Our findings are outlined in separate reports for each DNSP.

	Key activities	Key outcomes
Phase 1: Discovery	▶ Undertake documentation review ▶ Submit first general IRs ▶ Participate in DNSP on-site sessions ▶ Submit second targeted IRs	▶ Broad understanding of the DNSPs inputs, assumptions and methodologies ▶ View on areas to hone our focus
Phase 2: Initial findings	▶ Undertake initial evaluation ▶ Perform initial validations, where feasible ▶ Draw on our market insights ▶ Undertake an initial evaluation	▶ Form an initial view of areas of potential concerns with the approaches taken across the DNSPs ▶ Identify areas where more clarification or validation is required to make an assessment
Phase 3: Final report	▶ Submit final clarification IRs ▶ Perform further validations and refine the evaluation ▶ Prepare our Draft Reports for AER review and Final Reports for publication	▶ Greater validation of areas of concerns ▶ Form a firm view of our concerns with the forecasting approaches taken by the DNSPs, where we have sufficient information



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Our assessment approach involves a rigorous five-step process to test the DNSPs' demand methodology and key input assumptions.

1. **Identify key methodology elements and input assumptions** — Identification of key methodology elements and input assumptions for review.
2. **Materiality & reasonableness assessment** — Materiality and reasonableness assessment which leads to level of concern assessment of each element.
3. **Aggregate element findings and determine level of concern** — Grouping of findings to form overall view on level of concern at max demand, min demand, customer number and energy consumption level.
4. **Directional assessment of forecasts** — Qualitative assessment on directional impact of our concerns on max demand, min demand, customer number and energy consumption.
5. **Key recommended changes** — Key methodology and input/assumption areas where we recommend the DNSP improves its demand forecast for Dec 2025 Revised Proposal.

Expected materiality of impact on output × **Reasonableness of approach** = **Level of concern**

Expected materiality of impact on output	
Scale	**Rating**
○	Immaterial
◔	Low materiality
◑	Somewhat material
●	Material

Reasonableness of approach	
Scale	**Rating**
Green	Reasonable
Yellow	Somewhat reasonable
Orange	Somewhat unreasonable
Red	Unreasonable

Level of concern	
Scale	**Rating**
Green	No or limited concern
Yellow	Some concern
Orange	Moderate concern
Red	Significant concern

Impact of assumption on demand forecasts	
Scale	**Rating**
↑	Highly overstated
↗	Overstated
-	Neutral
↘	Understated
↓	Highly understated

1. **Recommendation**
Description
2. **Recommendation**
Description
3. **Recommendation**
Description
4. **Recommendation**
Description

Baringa

Our assessment of the materiality and reasonableness of each key methodology element and input assumption leads to our level of concern rating.

Level of concern		Reasonableness of approach			
Expected materiality of impact on output		Scale			
Scale	Rating	Reasonable	Somewhat reasonable	Somewhat unreasonable	Unreasonable
○	Immaterial	No or limited concern	No or limited concern	Some concern	Some concern
◔	Low materiality	No or limited concern	No or limited concern	Moderate concern	Moderate concern
◑	Somewhat material	No or limited concern	Some concern	Moderate concern	Significant concern
●	Material	No or limited concern	Some concern	Significant concern	Significant concern

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3. Summary of Powercor’s demand proposal

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Powercor's maximum demand forecasts are produced using a third-party model developed by Blunomy, based on historical data, inputs and assumptions provided by Powercor or sourced externally.

Forecasting methodology

- CitiPower, Powercor and United Energy (CPU) jointly use third-party provider Blunomy to produce their maximum demand forecasts.
- CPU provides historical data, inputs and assumptions to Blunomy, who then produce forecasts for each network at system and spatial levels.
- We understand that CPU do not play a direct role in the development of the proprietary demand forecasting methodology.
- In this way, while the inputs are provided by CPU, the outputs are a product of Blunomy's model.
- CPU noted the failure to include electrification of gas in their forecasts due to an 'error', leading to lower forecast (with uncertain, but not negligible, materiality).

Transparency of approach

- CPU have stated their inputs and assumptions relatively clearly. However, as they outsourced to Blunomy to prepare their demand forecasts, and Blunomy's documentation of its approach is limited, this made CPU's approach more challenging to validate, given the information provided.
- For example, their methodology for CER spatial disaggregation was reasonable, however its application was difficult to validate absent more detail on CER uptake and spatial demand.
- This is representative of their overall forecasting approach which was able to be described, but additional data and evaluation was required.

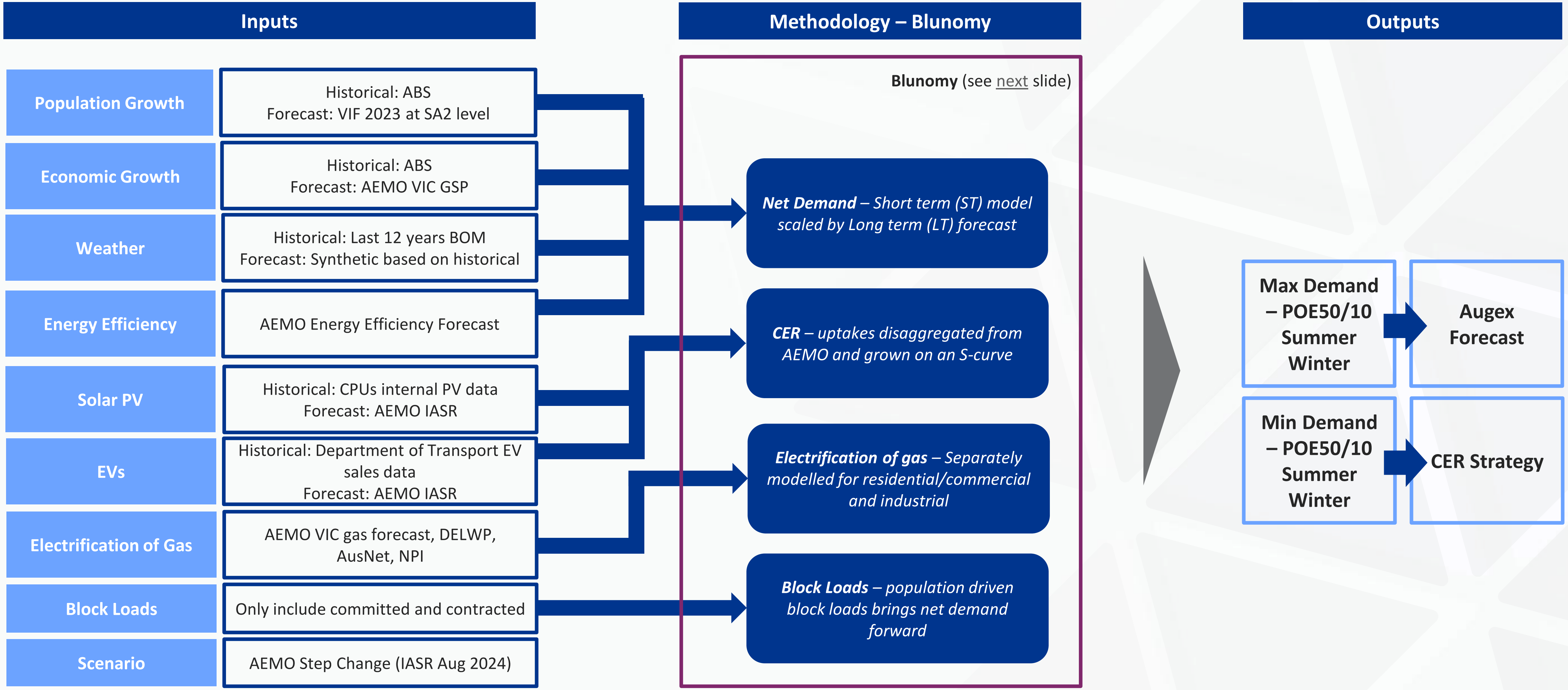
Relative to the current regulatory period, Powercor is proposing significant increases in demand driven capital expenditure, including 73% growth in augmentation spend.

	2021-2026 period actual/estimate totals		2026-2031 period changes		
	Augmentation	Connections (net)	Augmentation	Connections	Demand growth
Powercor	$317.9M	$440.4M	73%↑	38%↑	5.8%↑

- The above table outlines Powercor's augmentation and gross connections (i.e. before capital contributions are considered) capex across current period actuals and new regulatory period forecasts. These two expenditure categories are primarily (but not wholly) demand-driven. When compared to the current 2021-26 regulatory period, Powercor is proposing higher capex spend that is driven by the higher proposed demand growth of 5.8%. Powercor's approach and assumptions will be a key focus for review.
- Powercor has proposed significant increases in demand driven capital expenditure. Total augmentation expenditure is $550.1 million. This is an increase of 73% in comparison to the current regulatory period. Powercor states that this forecast is driven by a significant increase in electrification of gas and transport.[1] In Section Five, we have assessed Powercor's local demand forecasts underlying material business case for Greater Western Melbourne Supply area.
- For connections, $607.7 million is net connections expenditure, which is an increase of 38%. Residential and data centre connections are driving the increased expenditure.

Source: (1) AER Issues paper - CitiPower, Powercor and United Energy electricity distribution determinations 2026-31 - March 2025, p. 40

CPU has adopted Blunomy's tool to produce their max/min demand forecasts, with their role being to provide their preferred inputs and assumptions upfront.



Note: This depiction of CPU's methodology has been prepared by Baringa and reflects our interpretation of the available documentation from CPU.

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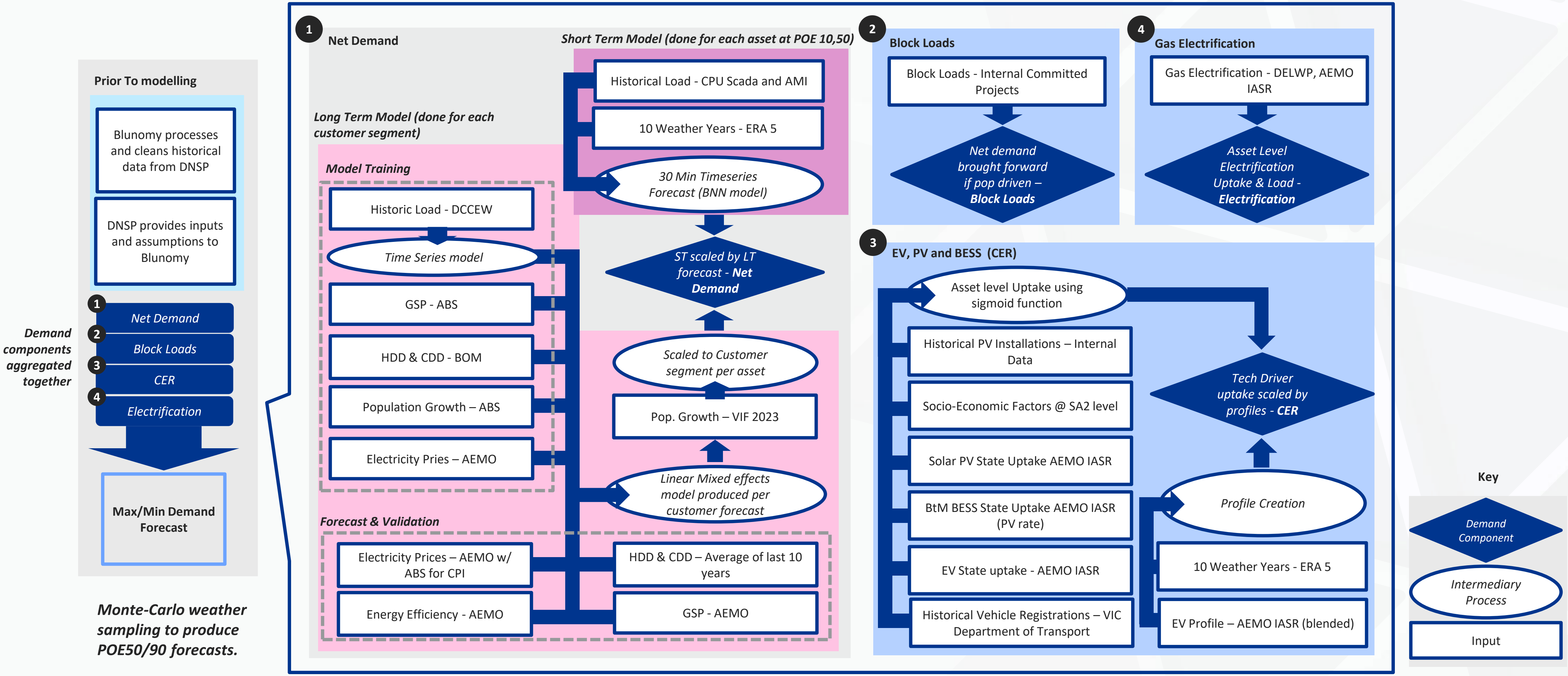
Blunomy's third-party forecasting tool has been deployed for both CPU and Jemena to produce max/min demand forecasts.



Note: This depiction of Blunomy's methodology has been prepared by Baringa and reflects our interpretation of documentation provided by Blunomy, CPU and Jemena.

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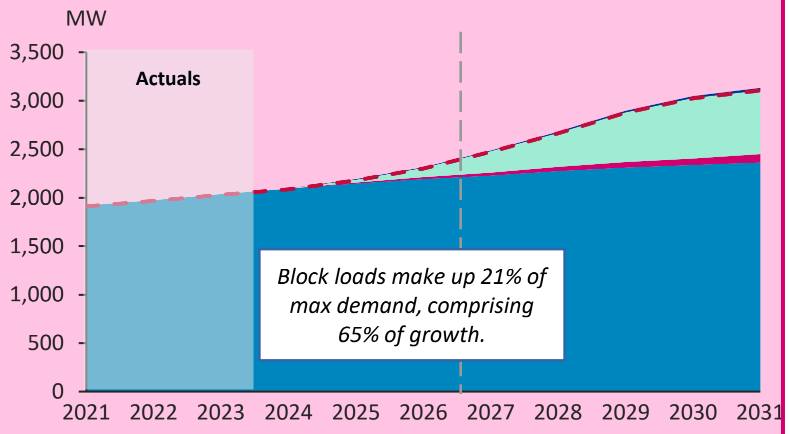
Powercor's maximum demand forecasts are among the highest of the Victorian DNSPs, with growth largely driven by block loads.

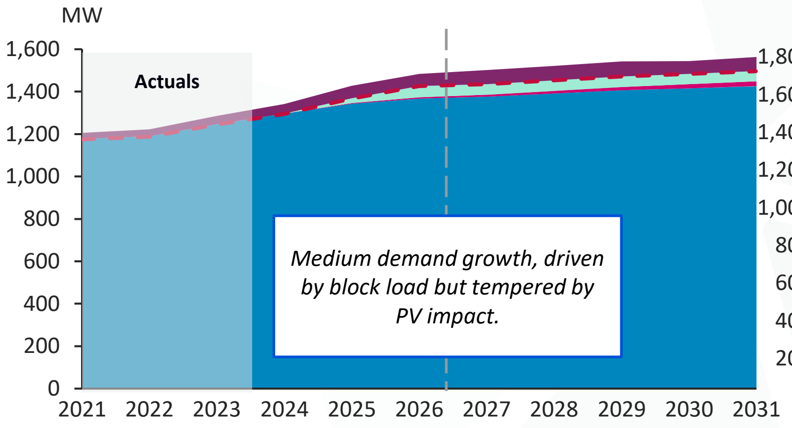
Powercor



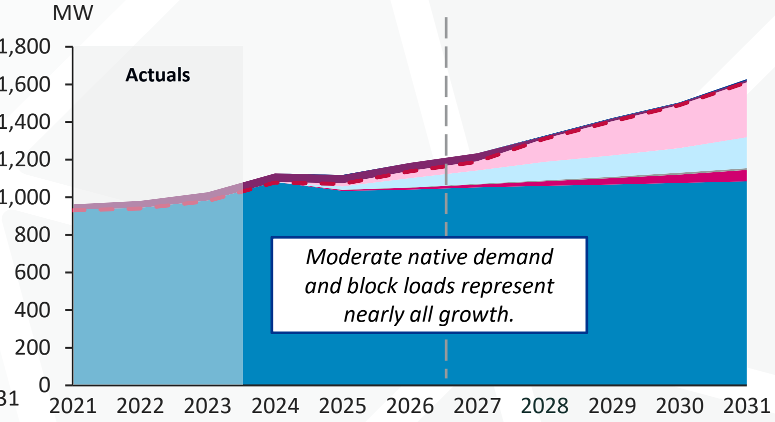
Commentary

- Powercor's network has high overall demand growth, at approximately 5.8% compounding over 2024.
- Block loads comprise a significant portion of max demand and are a large demand driver (65% of growth). Segmenting these block loads further, 86% of this is data centre demand.
- For CER technologies, EVs contribute 2.7% of max demand. Peak demand occurs in the evening at ~8pm.

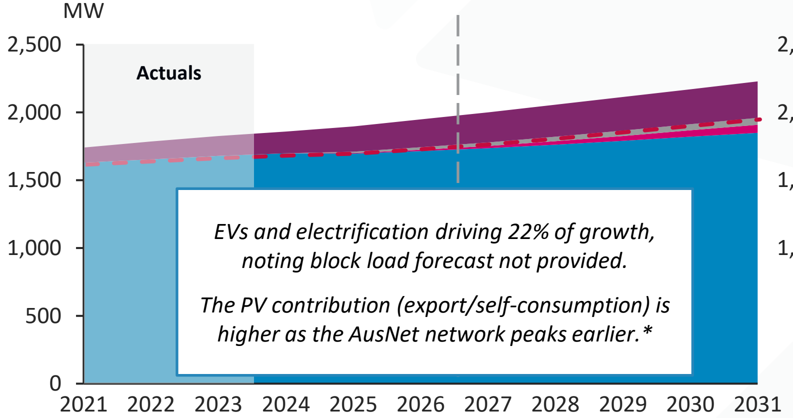
CitiPower



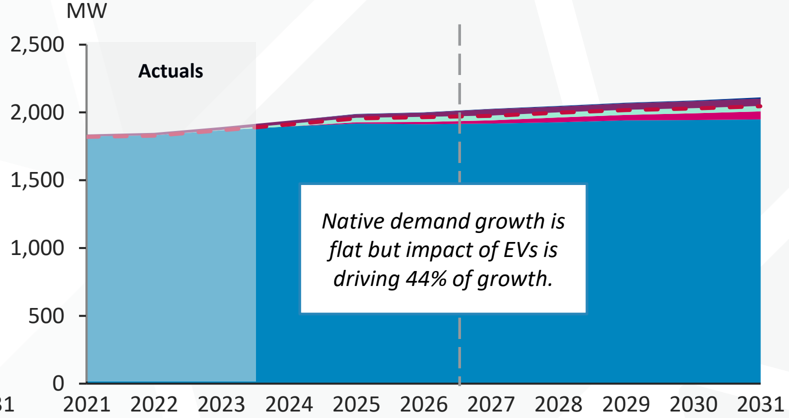
Jemena



AusNet



United Energy

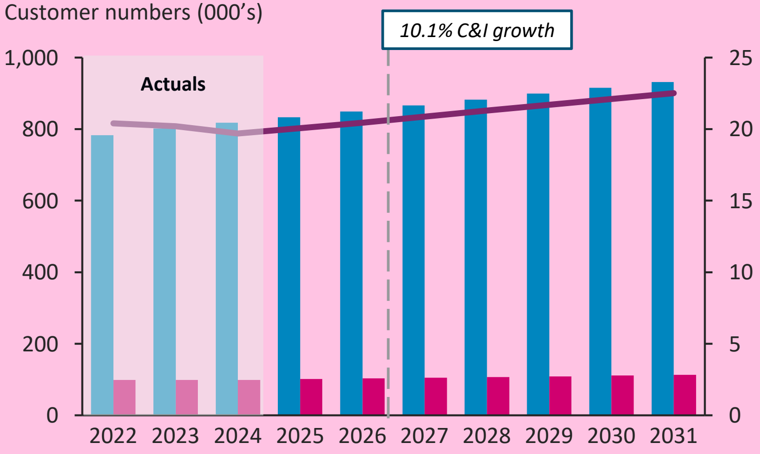


Base Less PV | Gas Electrification | PV | Non-DC Block Loads | Operational Demand
EV | Block Loads (DC and Non-DC) | BESS | DC Block Loads

Source: Data provided by DNSP in IR responses

Powercor's customer forecasts are higher than other Victorian DNSPs, with growth led by residential customers and data centre connections.

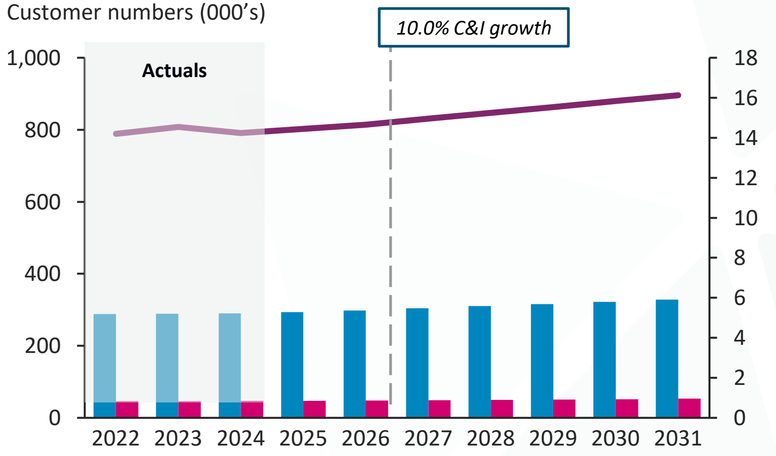
Powercor



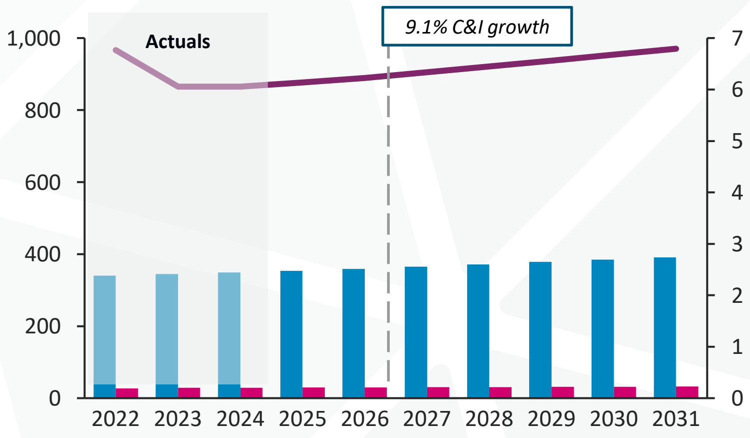
Commentary

- Powercor is forecasting total customer growth over the regulatory period to increase by 9.8% with strong growth across residential customers.
- Greater C&I customer growth is expected over the regulatory period at 10.1% largely driven by data centres.
- This trend is resulting in higher expenditure for, augmentation, connections and customer-driven works.

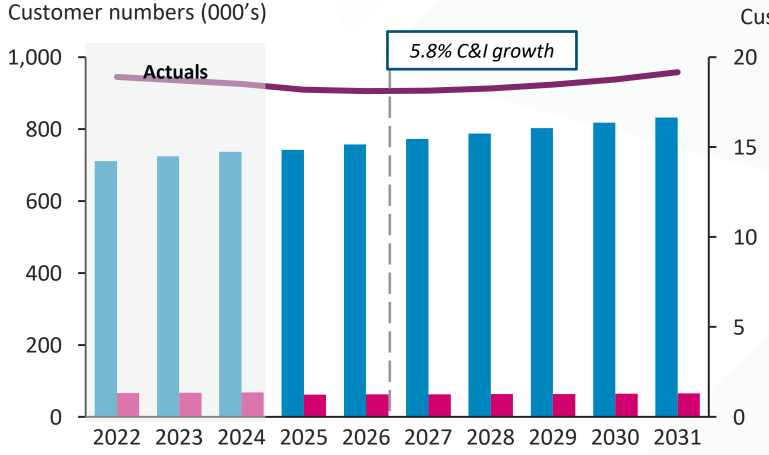
CitiPower



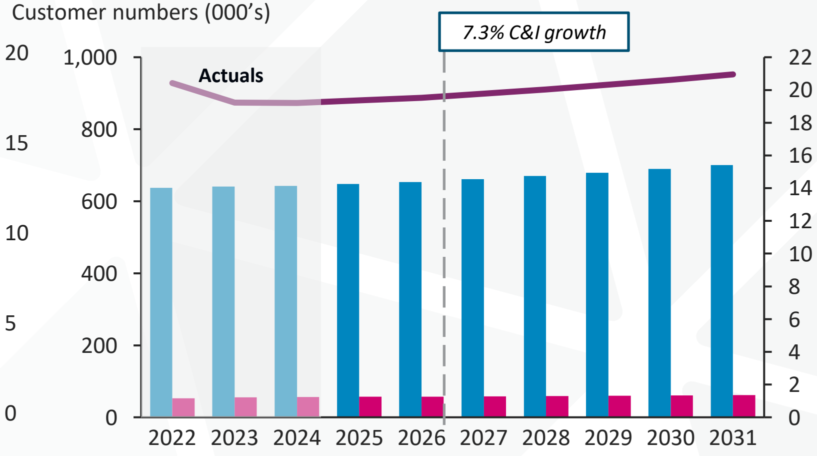
Jemena



AusNet



United Energy



Residential (LHS) Small Business (LHS) Commercial/Industrial (RHS)

Source: Analysis based on DNSP Reset RIN data

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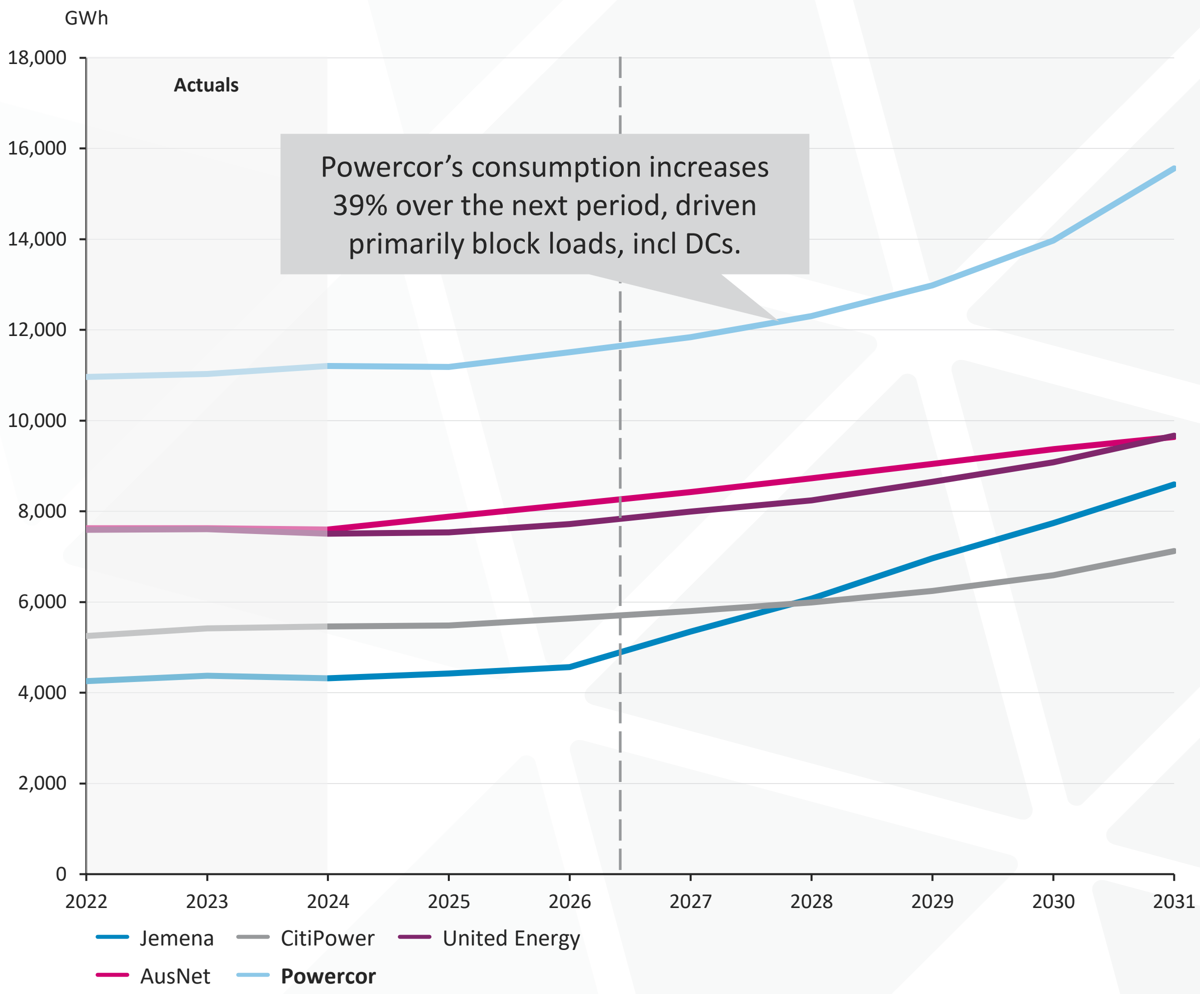
With the highest throughput among Victorian DNSPs, Powercor is forecasting significant growth, driven primarily by data centre uptake.

Key consumption drivers

- Energy consumption is a measure of all customers' total energy use over time. The chart illustrates the energy consumption for the five Victorian DNSPs for the current and upcoming regulatory periods.
- Forecasting energy consumption is relevant as the consumption volumes for each year act as an input into setting prices for that given year such that the DNSP's expected revenue is equal to the maximum regulated revenue.
- Key changes and drivers include:
  - **AusNet**: Relatively consistent at approximately 7,600 GWh before a moderate increase to over 9,600 GWh by 2031 driven by steady growth across all consumption categories – native demand, CER and gas electrification.
  - **Jemena**: Shows the most significant increase in consumption pinpointed at the start of the period, driven primarily by data centres and ultimately doubling energy throughput to 8,594 GWh by 2031.
  - **CitiPower**: A 31% increase compared to 2024 levels with 7,124 GWh by the end of the period. Driven initially by CER and electrification of gas then data centres late in the regulatory period.
  - **Powercor**: Highest level of throughput with a significant rate of change driven largely by data centre uptake in the network. 11,204 GWh in 2024 and projected to reach over 15,562 GWh by 2031, representing a 39% increase.
  - **United Energy**: Similar to AusNet, at approximately 7,500 GWh before a steady increase to over 9,600 GWh by 2031. Driven initially by CER and electrification of gas then data centres late in the regulatory period.

Victorian DNSP energy consumption historical and forecast



Source: Analysis based on DNSP Reset RIN data

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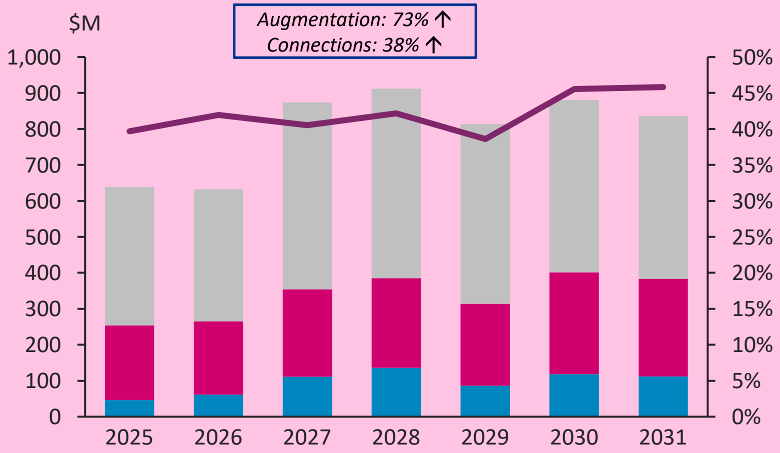
Powercor's demand forecast is driving higher investment, with moderate augmentation increase and lower connections growth than some Victorian DNSPs.

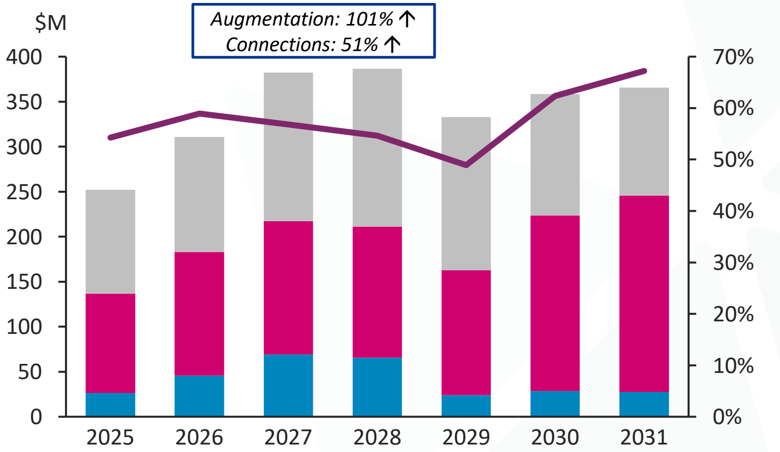
Powercor



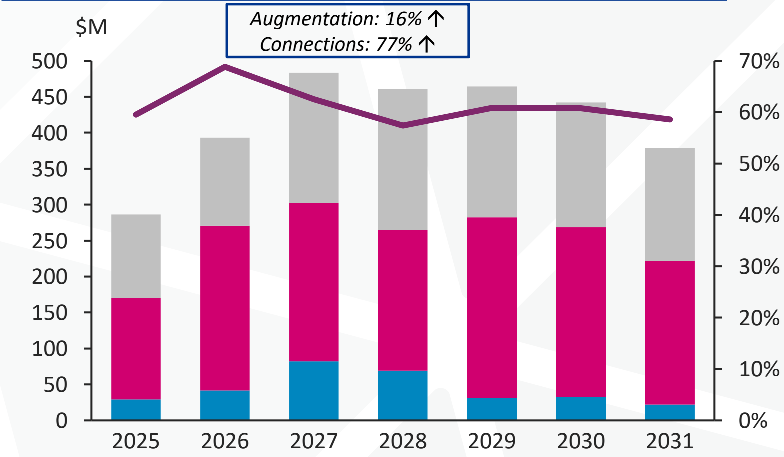
Commentary

- All DNSPs are proposing increases in expenditure, with demand-related capex accounting for approximately 42.5% of Powercor's total capex.
- Powercor's augmentation proposal contributes to the uplift in expenditure over the next regulatory period. At 73%, the proposed increase is among the larger uplifts compared to other Victorian DNSPs
- Net connections capex is also 38% higher, but this is relatively low compared to the other DNSPs.

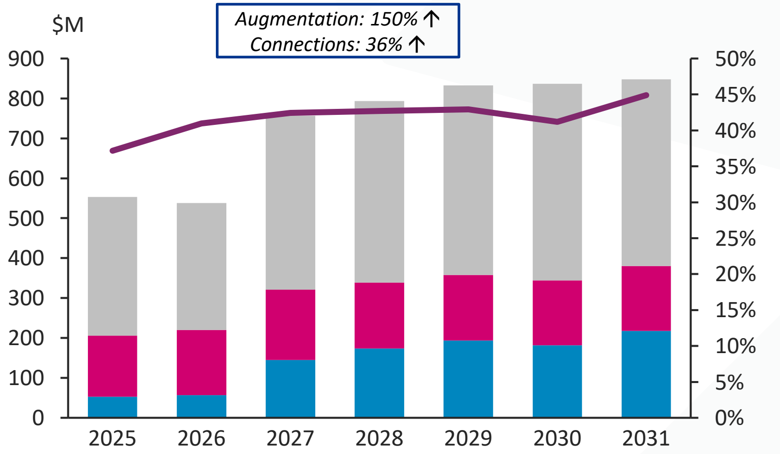
CitiPower



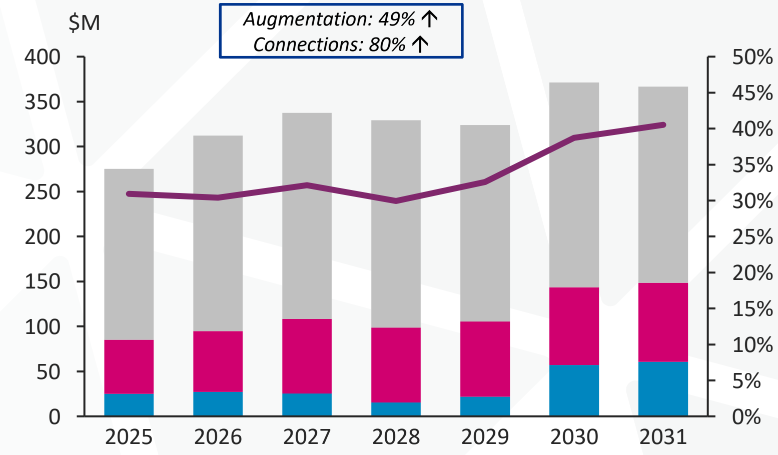
Jemena



AusNet



United Energy



Augmentation capex
Other Capex
Connections capex (gross)
Proportion of demand-related capex (RHS)

Change from current period

Source: Analysis based on DNSP Reset RIN data

4. Our overall evaluation on key demand methodology and input assumptions

Note: This section is broadly the same across each of our reports for CitiPower, Powercor and United Energy given the common methodology adopted by the DNSPs. The main differences are in our assessment of data centres, rooftop solar PV and EVs, given the different materiality of these drivers on the demand forecasts for each DNSP.

We identified the following as the key input assumptions and methodology processes for review.

Key inputs

Traditional drivers
- Population
- Economic growth
- Customer numbers

Technology-induced drivers
- PV
- Electric vehicles
- BtM batteries
- Gas electrification
- DCs
- Other block loads

Key methodological processes

Min/max demand
- Native Demand Forecasting
- Technological uptake
- Spatial disaggregation
- Historical data use
- Major customers and block loads
- Profile Creation
- Scenario use and sensitivities
- Validation, testing and review

Customer numbers
- Residential Customer Number Forecast
- Business Customer Number Forecast

Energy consumption
- Native Demand Forecasting
- Technological uptake by customer segment
- Historical data use
- Major customers and block loads
- Scenario use and sensitivities
- Validation, testing and review

Powercor's traditional assumptions broadly align with AEMO and other relevant data sources.

	Key inputs	Output	Materiality	×	Reasonableness	=	Concern	Assessment detail – Inputs and assumptions
Traditional	**Population growth**	Max/min	◑		● (green)		No or limited concern	• We consider the population growth assumption to be reasonable due to the reliance on credible sources, such as Victoria in Future (VIFSA) Statistical Area 2 (SA2) forecasts, which provide detailed demographic inputs for network demand forecasting. These forecasts align broadly with AEMO's Victoria population projections (prepared by Deloitte Access Economics) until 2036, supporting their credibility and medium-term reliability.[1,2] • While slight differences in growth trajectories exist, they are not significant enough to materially affect the demand forecasting process. The mapping of VIFSA SA2 data to network infrastructure, such as ZSS, allows for geographically relevant customer forecasts, forming a logical basis for per-customer demand projections.
		Energy	◑		● (green)		No or limited concern	
		Customers	●		● (green)		No or limited concern	
	Economic growth	Max/min	◑		● (green)		No or limited concern	• The inclusion of AEMO's Gross State Product (GSP) forecast is a logical and appropriate element of the demand forecasting process, as GSP reflects economic activity, which directly influences energy demand across residential, commercial, and industrial sectors.[1] The GSP forecasts, grounded in economic data, provide a robust basis for projecting future growth by capturing trends in productivity, industry composition, and overall economic performance. • Using forecasted GSP ensures a strong link between economic output and energy demand, where rising GSP corresponds to higher energy consumption from businesses, infrastructure, and population growth. The alignment of GSP growth rates with historical trends ensures forecasts are realistic, reflecting both long-term economic dynamics and short-term variability, thereby supporting accurate projections of non-residential energy demand.
		Energy	◑		● (green)		No or limited concern	
		Customers	●		● (green)		No or limited concern	
	Customer Numbers	Customers	◑		● (yellow)		Some concern	• See section *Methodological approach – Customer numbers*

Source: (1) PAL ATT 2.02 – Demand forecasting methodology – Jan2025 – Public, p. 5; (2) Powercor – IR#023 – Q17.

Baringa

Powercor's technology assumptions broadly align with AEMO or better data.

Technology-based

Key inputs	Output	Materiality	×	Reasonableness	=	Concern	Assessment detail – Inputs and assumptions
PV generation and uptake	Max/Min	◑		● (green)		No or limited concern	• The use of AEMO's Victoria PV uptake forecast (Step Change scenario) is appropriate. [1,3] Incorporating historical uptake data to distribute PV generation spatially across feeders, zone substations (ZSS), and terminal stations (TS) is logical, offering valuable insights into regional adoption patterns. This spatial granularity is critical for accurately modelling the effects of PV uptake on maximum and minimum demand. • Using ERA5 irradiance data to create asset-specific generation profiles is a robust approach, providing detailed insights into localised PV output during maximum and minimum demand conditions. However, there is a slight risk of alignment issues between ERA5-based profiles and AEMO's PV load factors, which could introduce inconsistencies in the demand forecasts.
	Energy	●		● (green)		No or limited concern	
EV charging profiles and uptake	Max/min	◑		● (green)		No or limited concern	• The AEMO Victoria EV uptake forecast (Step Change scenario) provides a strong basis for modelling EV charging impacts on demand. [1] The use of historical Department of Transport (DoT) data to spatially allocate EV charging demand is a logical approach, effectively capturing ownership distribution and mapping charging loads to feeders, ZSS, and TS. [2,3] This spatial detail is crucial for assessing localised impacts on maximum and minimum demand, particularly in regions with higher EV penetration. • Overall, we consider the inputs and assumptions methodology is geographically aligned, sufficient for predicting EV charging impacts.
	Energy	◑		● (green)		No or limited concern	
BtM BESS charging profiles and uptake	Max/min	◑		● (green)		No or limited concern	• We consider the inputs for BtM BESS charging profiles and uptake to be reasonable, based on credible data and assumptions. However, the approach may be conservative given the growing impact of Virtual Power Plants (VPPs). • This is reasonable because AEMO's Victoria storage uptake forecast – August 2024 has been used and provides a strong basis for modelling BtM BESS uptake, while historical load data per feeder ensures spatially accurate charging and discharging profiles.[3] Blunomy's assumption that BtM BESS act to reduce peak demand, rather than follow price signals, reflects current usage patterns but may not fully capture future VPP-driven behaviours. Incorporating these dynamics in future forecasts would improve alignment with market trends, however this is a limited concern.
	Energy	○		● (green)		No or limited concern	

Source: (1) Powercor – IR#017 – Q6; (2) Powercor – IR#017 – Q3; (3) PAL ATT 2.02 – Demand forecasting methodology – Jan2025 – Public, p. 5.

Baringa

Electrification is excluded in maximum demand forecast and DC treatment is inconsistent between energy and maximum demand.

Technology-based

Key inputs	Output	Materiality	× Reasonableness	= Concern	Assessment detail – Inputs and assumptions
Gas electrification residential, commercial and industrial	Max/min	◑	● (red)	Significant concern	• We consider the exclusion of gas electrification from the maximum and minimum demand forecasts due to a modelling error to be a significant oversight, and it should be incorporated in the final forecast.[1] Excluding gas electrification from the max/min demand forecast fails to account for one of the significant drivers of future electricity demand growth, particularly as gas is phased out in favour of electric systems. Incorporating this would improve the accuracy of long-term demand projections. • Conversely for energy consumption, the choice of inputs used for estimating gas consumption is reasonable and provides a strong foundation for forecasting. This is reasonable because AEMO's 2024 ESOO data is a credible source for forecasting total gas consumption and aligns well with expected long-term trends. DEECA data provides reliable splits between residential and commercial gas usage, offering a clear view of sector-specific electrification impacts. Additionally, the use of the National Pollution Inventory to estimate industrial gas usage ensures the methodology captures industrial demand with sufficient granularity.[2]
	Energy	◑	● (green)	No or limited concern	
Data centre block loads	Max/min	●	● (orange)	Significant concern	• Powercor states it only includes committed and contracted data centre connections in its max demand forecasts.[3] Powercor provided a block load register and a list of de-identified DC connections that align with their initial demand forecast. However, Powercor stated due to the non-disclosure agreements it has in place with the DCs, it can not provided detailed named information on these committed and contracted DCs in the absence of a formal information noticed issued by the AER. We have therefore not been able to validate these customers and given the material impact on the forecasts recommend the AER consider validating this information through a formal regulatory obligation. See section *Further assessment – Data centres* where we compare our forecasts to Powercor's. • Powercor also provided ramp-up rates and load profile estimates of the demand impact over time, [4] reducing uncertainty. This conservative approach appropriately aligns with reasonable practices for demand forecasting. • Further, the L.E.K. DC demand forecast is incorporated into the energy consumption forecast and not the max/mix demand forecast. The inconsistency in applying additional DC load assumptions across the two forecasting methodologies introduces ambiguity and lead to misrepresenting impacts and has not been sufficiently justified. [5] • For non-DC block loads such as mix-use buildings, Powercor only include contracted connections (this is consistent with the DC approach) if they are expecting to demand over 1MW of load.[6]
	Energy	●	● (red)	Significant concern	

Source: (1) Powercor – IR#017 – Q2; (2) PAL ATT 2.02 – Demand forecasting methodology – Jan2025 – Public, p. 5; (3) Powercor – IR#035 – Q1; (4) Powercor – IR#035 – Q3; (5) Powercor – IR#035 – Q7; (6) Powercor – IR#035 – Q8.

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Baringa

Powercor's methodology is generally well-documented, however their native demand has been difficult to validate absent detailed data.

Key approach	Output	Materiality ×	Reasonableness =	Concern	Assessment detail – Maximum demand
Native Demand Forecasting	Max/min	● (black)	● (amber)	Some concern	• Our view is that the native demand approach describes in their methodology is reasonable but has been difficult to validate as they have not been able to provide us with native demand by customer type. • Blunomy's native demand forecast is split into a long-term component and a short-term component. The long-term demand model evolves underlying net demand per customer segment using macro-economic trends (GSP, population growth and energy efficiency). Shape of profile does not change, but total consumption does. The model does this using two logistic functions. The first logistic function simulates population growth. The second logistic function is used to account for non-population drivers like energy efficiency and GSP. • The short-term model captures weather and calendar effects on native demand and is modelled using a Bayesian Neural Network (BNN) model. While we consider long-term and short-term modelling methodologies as described generally reasonable, the overall long-term approach has been difficult to validate as Powercor has been unable to provide data on the evolution of native per customer type over the forecast period.[1] Customer numbers are grown using the VIF SA2 data at ZSS level. The ZSS-level customer number type/demand data was not available for validation.
Technological Uptake	Max/min	● (black)	● (green)	No or limited concern	• Blunomy generates adoption S-curves at each zone substation for EV and PV uptake, taking into account historical trajectory and socio-economic factors. [2] Penetration is capped at a saturation point, meaning ZSS with historically high uptake may level off sooner. S-curves are considered a good representation of tech uptake, representing an initial slow growth, followed by rapid uptake, and capping out at a saturation point. This approach is broadly reasonable, EV growth aligned with AEMO while PV growth is slightly higher than AEMO' forecasts it is unclear on driver for this. • BtM BESS deployment assumed to follow same uptake trend as PV, which is reasonable. [2]

Source: (1) Powercor – IR#037 – Q1; (2) Powercor – IR#037 – Q3d

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Baringa

We have some concerns with Powercor's spatial forecast and use of historical data as there is a degree of uncertainty with the validation of the described methodology.

Key approach	Output	Materiality ×	Reasonableness =	Concern	Assessment detail – Maximum demand
Spatial disaggregation	Max/min	●	●	Some concern	• We consider the spatial disaggregation methodology to be somewhat reasonable, as it uses appropriate tools and aligns demand forecasts with asset-level and demographic data. However, greater clarity on the integration of HV and LV tools would enhance confidence. • This is reasonable because the HV forecast tool effectively projects demand at the ZSS and HV feeder level for max and min demand, while the LV model focuses on CER integration and rural programs. These tools provide complementary granularity across the network. • Demand forecasts are built from asset-level data, with SA2 demographics disaggregated to assets using a method mapping dwellings to assets and assets to SA2 regions. CER uptake is projected using a data-driven spatial adoption curve at the ZSS level, and the CER growth rates align with the stated methodology, supporting the forecasts' reliability. [1] • Powercor was not able to provide a mapping of their network assets to SA2 regions. While this information is used in forecasting processes, it is embedded within Blunomy code and is not readily accessible. We consider that providing clarity on how the HV and LV tools integrate would further improve transparency.
Use of historical data	Max/min	◑	●	Some concern	• Powercor uses historical EV and PV numbers to set the starting point for technological uptake at a post-code level. These historical uptake rates impact the S-curve. • Historical demand, weather data, and calendar data feed into the short-term model. The starting point maximum demand at HV Feeder level uses historical, weather-corrected and transfer-corrected data. In the top-down model, historical demand, weather data, and calendar data feed into the short-term model. Using a BNN, this model generates a range of stochastic demand outcomes driven by weather scenarios (based on 12-year historical data). [2] • Usage of a BNN is reasonable for capturing multiple nonlinear relationships. However, the algorithm is complex, not transparent and difficult to validate without clear data. In particular, we have concerns on Powercor's assumption for large renewable generation and their impact on historical maximum demand.[3] We therefore consider while the approach is intuitive, it is not easily reproducible and has not been sufficiently described how this is being derived from Blunomy's model.

Source: (1) Powercor – IR#023 – Q15; (2) PAL ATT 2.03 – Blunomy – Detailed demand forecasting methodology – Jan2025 – Confidential, p. 9; (3) Powercor – IR#017 – Q2.

Approach to data centres and block loads generally reasonable with validation required to ensure outputs calculated as described.

Key approach	Output	Materiality	× Reasonableness	= Concern	Assessment detail – Maximum demand
Major customers and block loads and data centres	Max/min	● (black)	● (yellow)	Some concern	• We consider the approach for incorporating major customers, block loads, and DCs into the forecasts to be reasonable and broadly conservative, given the inclusion of only committed and contracted loads.[1] • This is reasonable because including only committed and contracted block loads is a sensible approach, avoiding the risk of overstating demand impacts from speculative projects. However, it is currently unclear if only committed loads have been included in practice, and the degree to which these loads will proceed through validation of the signed connection agreements is needed to ensure the methodology is consistent with actual forecast inputs and growth expectations. • The assumption that contracted block loads fully ramp up without derating and that population-driven block loads bring load growth forward, rather than adding to native demand, is logical. Powercor only includes material contracted connections in their separate block load register if they are expecting demand over 1MW of load. This is to ensure that block loads do not overlap with the native growth demand to ensure further accuracy.[2] However, we note that some non-DC block loads are less than 1MW in the block load register but refer to the same site which raises concern.[3] • We noted initial discrepancies in the treatment of DC demand which highlighted the need for consistency. Powercor's block load register forecasts an increase of 568 MW of DC demand by 2031, but this differed from the 292 MW shown in their connections model. Powercor explained these do not reconcile due to different assumptions on future forecast data connections (ie not yet contracted).
Profile Creation	Max/min	● (black)	● (green)	No or limited concern	• We consider the profile creation methodology for BtM BESS, EVs, and solar to be reasonable, as it uses credible inputs and provides sufficient spatial and behavioural detail for accurate forecasting. • This is reasonable because BtM BESS profiles, generated from historical demand series to minimise maximum demand, reflect current usage patterns. EV profiles are based on AEMO's charging behaviour archetypes, which we validated as broadly aligning with AEMO's data. Solar profiles are produced via PVLib at feeder, ZSS, and TS levels, offering greater spatial granularity than AEMO's statewide forecasts, improving localised modelling accuracy.[4]

Source: (1) Powercor – IR#035 – Q1a; (2) Powercor – IR#035 – Q8; (3) Powercor – IR#035 – Q3; (4) Powercor – IR#037 – Q3d

The validation of bottom-up forecasts and forecasting review seem reasonable but difficult to confirm with the data and explanation provided.

Key approach	Output	Materiality	× Reasonableness	= Concern	Assessment detail – Maximum demand
Scenario use and sensitivities	Max/min	● (full)	● (green)	No or limited concern	• We consider the use of AEMO Step Change scenario inputs (as of August 2024) to be reasonable and credible.[1] However, the forecasts should be updated to the 2025 IASR when available to ensure they remain current and aligned with the latest trends. • This is reasonable because the AEMO Step Change scenario reflects plausible trends in electrification and decarbonisation and was the most recent data at the time of modelling. Updating to the 2025 IASR will ensure the forecasts incorporate the latest assumptions reducing the risk of outdated projections.
Validation of bottom-up forecasts	Max/min	◑ (half)	● (yellow)	Some concern	• Discrepancies and limited transparency reduce the ability to fully validate accuracy of Powercor's bottom-up forecasts. • The block loads included at different levels of the network may not be the same, as each may differ in what have been captured in the trend and other components. However, it is unclear from the information submitted by Powercor about the approaches to block loads at the spatial level vs system-level, and how they reconcile to each other • While Blunomy's forecasting tool aligns network-level and spatial forecasts, our analysis of the ZSS max demand produces a small immaterial delta (42 MW) for Powercor.[2] Approaches, including sigmoid curves for technology uptake, logistic functions for native demand, and BNN Monte Carlo simulations, are methodologically robust. • However, limited data from Powercor hinders complete validation. Increased access to inputs and outputs would improve transparency and confidence in the forecasts.
Review of forecasting approach	Max/min	◑ (half)	● (orange)	Moderate concern	• Blunomy states they undertake a data quality assurance process as part of the demand forecasting approach.[3] • This includes topology checks, evaluating quality in inputs and performance of the forecast. However, only the short-term model is evaluated. While there is an assumption that the final produced demand forecast has passed this assurance check, it is not made clear how any discrepancies are logged and addressed.

Source: (1) Powercor – IR#017 – Q6; (2) Powercor – IR#037 – Q7; (3) PAL ATT 2.03 – Blunomy – Detailed demand forecasting methodology – Jan2025 – Confidential, p. 55

Methodology for customer growth has inconsistency with segmental customer numbers in the RIN.

Key approach	Output	Materiality ×	Reasonableness =	Concern	Assessment detail – Customer numbers
Customer Number Forecast (Spatial and GSP)	Customers	◑	●	Some concern	• The customer number forecast leverages credible sources, with Victoria in Future (VIF) 2023 projections used for residential customers and AEMO's ESOO 2024 Victoria GSP growth for small business customers.[1] However, while these inputs imply faster growth for small business connections due to higher GSP growth and therefore a differentiating factor, the forecast growth rates in the RIN appear to be uniform across both segments, which is inconsistent with the methodology and required clarification. • VIF 2023 provides robust demographic data for projecting residential customer growth, while AEMO's ESOO 2024 GSP forecast appropriately reflects economic drivers for small business growth. Based on these differing inputs, commercial customer growth would logically outpace residential growth, as GSP typically exceeds population growth rates. • Reconciliation would strengthen the transparency and credibility of the forecast, however Powercor state that increasing the proportion of small business customers and lowering the proportion of residential customers would not impact demand forecasts as their demand forecasts do not use customer numbers as an input.[2] • As a result, we have some concern with the approach as we usually consider customer numbers to be a key demand driver.

Source: (1) CPU Demand Forecasting Workshop materials, 160425, p. 56; (2) Powercor – IR#037 – Q9

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Powercor's energy forecasting approach is simple but is mostly consistent with the maximum demand approach.

Key approach	Output	Materiality	× Reasonableness	= Concern	Assessment detail – Energy consumption
Native Demand Forecasting	Energy	◑	🟢	No or limited concern	• The approach relies on credible inputs, using actual energy consumption from CPU's 2024-25 pricing proposals, grown with VIF 2023 population and household projections for residential consumption and AEMO's Victoria GSP growth for business consumption.[1] This is a logical approach that aligns demand growth with key drivers for each customer segment. • CPU's 2024-25 pricing proposals provide a good foundation, utilising actual energy consumption data. For residential consumption, VIF 2023 usage ensures the forecasts are grounded in expected population and household growth. Business consumption growth tied to AEMO's Victoria GSP forecast appropriately reflects the correlation between economic activity and business energy use. • This approach ensures residential and business demand forecasts are logically aligned with their respective drivers.
Technological Uptake	Energy	◑	🟢	No or limited concern	• We consider the technological uptake forecasting approach to be reasonable, as it captures key demand drivers while accounting for reductions from rooftop solar self-consumption, providing an accurate representation of net network demand. • This is reasonable because it uses AEMO's 2024 ESOO Victoria Central scenario to include incremental impacts from electrification, EVs, and energy efficiency, which are credible drivers of gross demand. These are appropriately offset by reductions from rooftop solar generation based on AEMO's forecasts, multiplied by the estimated self-use proportion to exclude export impacts. [2] • By combining these factors, the methodology balances growth with credible offsets and using AEMO's forecasts ensures reliability.
Use of historical data	Energy	◔	🟡	No or limited concern	• We consider the use of historical data to be mostly reasonable, but it is unclear what historical data underpins the 2024/25 forecast consumption which is used as the starting point. [1] • This is important because the accuracy of forecast depends on the quality and relevance of the underlying historical data. Historical inputs should reflect recent trends in energy consumption, efficiency, and economic conditions. Without transparency on the data source, timeframes, or adjustments, there is a minor risk it may not fully capture baseline consumption patterns.

Source: (1) Powercor – IR#023 – Q26; (2) Powercor – IR#023 – Q26 – Energy consumption forecasts.xslx

There is inconsistency between block load treatment between maximum demand forecast and energy forecast and the rationale is unclear.

Key approach	Output	Materiality	× Reasonableness	= Concern	Assessment detail – Energy consumption
Major customers and block loads and data centres	Energy	● (full)	● (red)	Significant concern	• We consider the treatment of major customers, block loads, and DCs to be inconsistent, with discrepancies between DC and non-DC methodologies across demand and energy consumption. Greater alignment is necessary to improve forecast reliability and assurance. • Powercor uses the LEK forecasts for future connections and consumption.[1] While this captures DC growth, non-DC block loads are not consistently treated. The methodology grows demand by population and GSP but excludes mention of block loads, while the Blunomy demand forecast methodology incorporates block loads, revealing a methodological gap. • Conversely, non-DC block loads are also excluded from the consumption forecast, without clear rationale.[2] Given their potential material impact on demand and energy consumption forecasts, greater consistency and transparency are needed to ensure the appropriate treatment of all major customer loads in the modelling process. • However, as total DC demand (568 MW) is greater than other block loads (92MW), the overall impact of including anticipated future DCs (i.e. those that are not committed/contracted) and their associated consumption results in the total consumption forecast being overstated.[3]
Scenario use and sensitivities	Energy	◑ (half)	● (green)	No or limited concern	• We consider the use of AEMO Step Change scenario inputs (August 2024) and VIF 2023 population growth data to be reasonable and credible.[4] However, forecasts should be updated to incorporate the 2025 IASR when it becomes available to ensure they remain current. • This is reasonable because the AEMO Step Change scenario reflects ambitious yet plausible trends in electrification and decarbonisation, while VIF 2023 provides reliable demographic data to inform demand forecasts. However, the 2025 IASR will refine key assumptions, such as technology adoption and economic growth, making it critical to update inputs to maintain accuracy.
Review of forecasting approach	Energy	◑ (half)	● (amber)	Some concern	• It is unclear what review or QA processes are performed on the energy consumption forecasts because this has not been clearly outlined in the information provided by Powercor. Powercor state that energy consumption forecasts are only prepared annually for the purposes of the annual pricing proposal.[5] • We acknowledge the differences in forecasting demand and consumption however, we consider that aligning the consumption forecasting approach with the max/min demand methodology and resolving inconsistencies would improve transparency and credibility for the overall forecast.

Source: (1) Powercor – IR#035 – Q1a; (2) Powercor – IR#035 – Q8; (3) Powercor – IR#017 – Q2; (4) PAL ATT 2.02 – Demand forecasting methodology – Jan2025 – Public, p. 5; (5) Powercor – IR#23 – Q26.

We note the quality and completeness of the information for the following inputs and methodology processes have limited our review.

Key inputs

Traditional drivers
- Population
- Economic growth
- Customer numbers

Technology -induced drivers
- PV
- Electric vehicles
- BtM batteries
- Gas electrification
- DCs
- Other block loads

Key methodological processes

Min/max demand
- Native Demand Forecasting
- Technological uptake
- Spatial disaggregation
- Historical data use
- Major customers and block loads
- Profile Creation
- Scenario use and sensitivities
- Validation, testing and review

Customer numbers
- Residential Customer Number Forecast (Spatial)
- Business Customer Number Forecast (GSP)

Energy consumption
- Native Demand Forecasting
- Technological uptake by customer segment
- Historical data use
- Major customers and block loads
- Scenario use and sensitivities
- Validation, testing and review

Key: *Sufficient* | *Incomplete information*

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Baringa

Powercor should address the below deficiencies in their Revised Proposal which would enable a clear review of their submission.

Input/process	Output	Expected level of detail required

• **Data centres and other block loads**
• **Validation, testing and review**
	Demand
	Energy
		• Evidence from each prospective connections (data centres and other major customers) on their progress towards commercial operation, including but not limited to:
		  • information sources and supporting documents from the requested parties
		  • method for calculating the loads or validating the loads requested
		  • load profile, and ramp up rate
		  • spatial allocation to feeder/zone substation/terminal station
		  • whether the load is included or excluded from load forecasts at zone substation and above due to potential overlapping
		• Evidence of reconciliation of block loads at spatial-level vs system-level

• **Gas electrification**	Demand	• Inclusion and modelling of gas electrification impacts to maximum demand
• **Native demand forecasting**	Demand	• ZSS-level customer number/demand data by type
• **Spatial disaggregation**	Demand	• Detailed mapping of network assets to SA2 regions showing CER and population-driven demand
• **Historical data use**	Demand Energy	• Evidence and example of calculation of large renewable generation impact to historical maximum demand • Calculation and worked example of BNN outputs • Data and example evidence of Monto Carlo simulation to validate historical outcomes

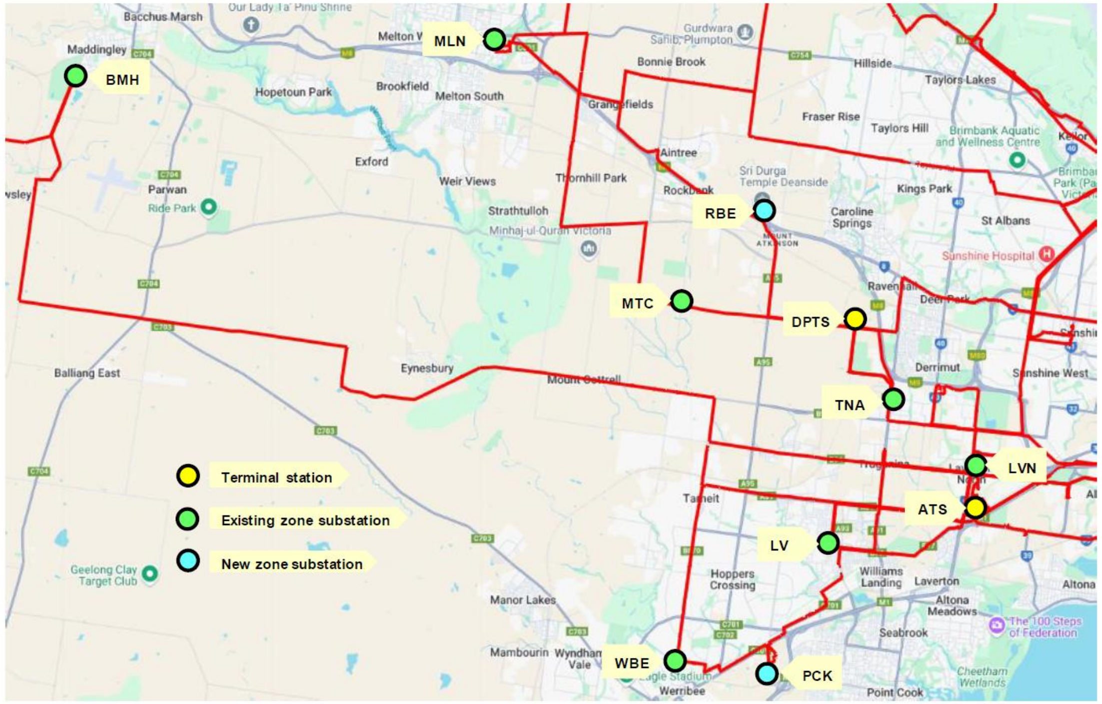
5. Further assessment on selected topics

Locational-demand driven case study assessment

Background for Greater Western Melbourne Supply Area

We selected the Greater Western Melbourne Supply Area business case to dive deeper into Powercor's approach to spatial disaggregation of demand. This project was selected as it is a major capex project that is driven by location-specific demand growth.

Greater Western Melbourne Supply Area	
Location of Project	Western Metropolitan Melbourne, Melton and Wyndham LGAs
Problem addressed by project	Mitigate forecast unserved energy (N and N-1) at various zone substations across the Melton (MLN), Mount Cottrell (MTC), Werribee, Bacchus Marsh (BMH), Laverton (LV), Truganina (NTA) and Laverton North (LVN) substations, driven by high forecast population growth.
Preferred option description	New transformer at Mount Cottrell, re-build of Bacchus Marsh, and two new substations, Point Cook (PCK) and Rockbank East (RBE)
Cost of preferred option	$93m

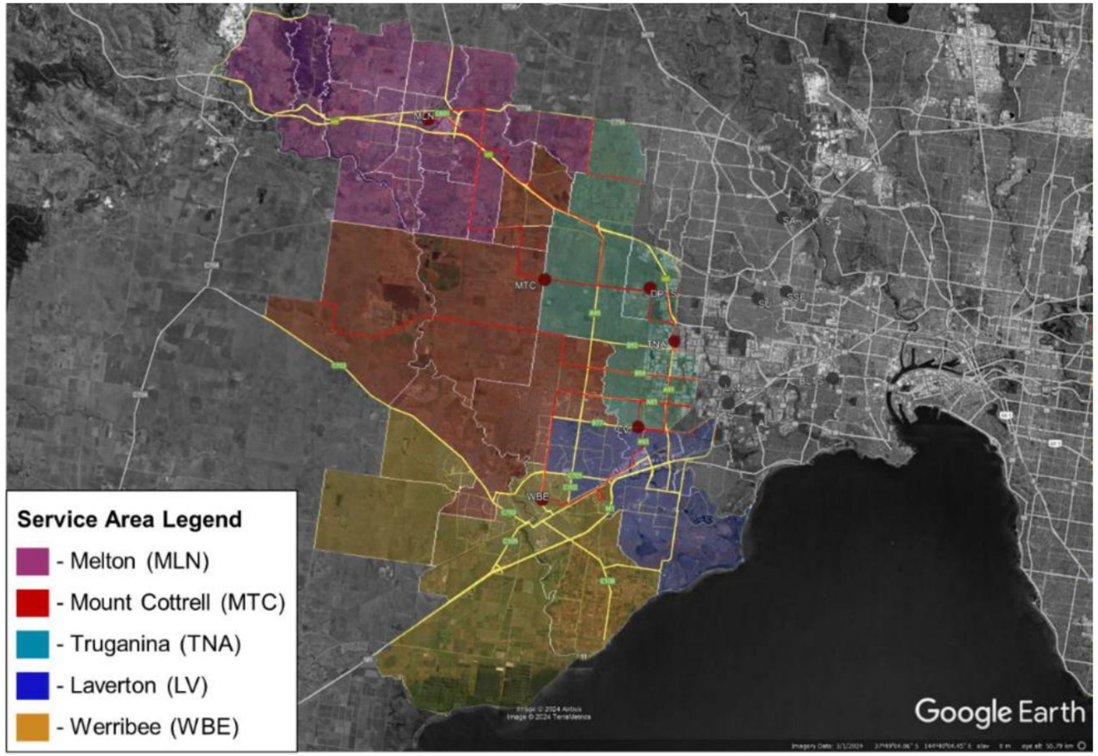


Source: PAL BUS 3.07 – Greater western Melbourne supply area – Jan2025 – Public

Population and economic growth across Melton and Wyndham is the primary driver for the Greater Western Melbourne Supply Area business case.

Summary of Powercor's demand forecasting drivers for the Greater Western Melbourne Area business case

- Powercor has identified population and economic growth across the Melton and Wyndham. The growth drivers[1] from 2025 to 2031 differ depending on the individual substation:
  - BMH sees solid growth (23%) primarily driven by native demand growth (82%), EV demand growth (19%), and block loads (7%).
  - LV sees some growth (9%). In 2027, LV has 7% of its net demand transferred out. Without the transfer, demand growth would've been 17%, primarily driven by native demand (59%) and EV demand growth (31%).
  - LVN sees some growth (7%) driven by native demand growth (85%), block loads (10%) and EV growth (7%), offset by PV (-3%).
  - MLN sees relatively high growth (39%) despite a 4% transfer of its net demand in 2027. Without the transfer, the growth would've been 46%, driven by native demand growth (69%), block loads (25%), and EV (8%).
  - MTC is transferred 51 MW in 2026 and has a native demand of 12 MW. Net demand grows 55% by 2031, driven by growth in the transferred demand (74%) and native demand (26%) and zero contribution from other components
  - TNA sees virtually no growth (1%), due to transfers in and out (net 29% drop) in 2027. Without the transfers, growth would've been 43%, driven by native demand (78%), block loads (25%).
  - WBE sees low growth (4%), due to transfer of 12% of its load in 2027. Without the transfer, demand would've grown by 18%, driven by 80% native demand growth, and 26% EV growth.



1. Contribution of individual components is as a % of total growth

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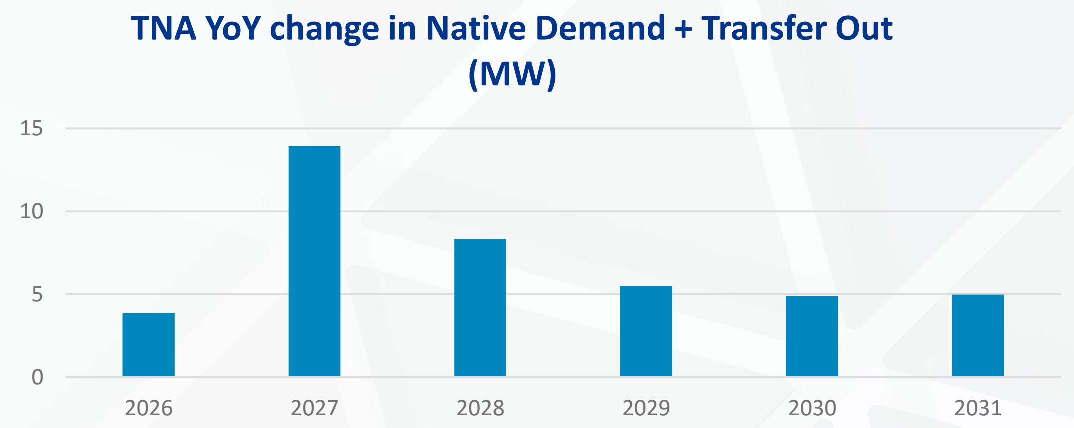
Demand transferred from existing substations accounts for significant portion of demand at Mount Cottrell.

Assessment findings

- The following factors are broadly conservative, contributing to a lower maximum demand than would be expected:
  - Lack of electrification is generally conservative
  - PV contribution is potentially double-counted in the net demand calculation[1]. In Powercor's data, native demand already equals underlying demand - PV, therefore the PV contribution is double-counted. Alternatively, underlying demand is being misreported as Native Demand + PV.
  - The block loads included in the MD component breakdown are all less than what is reported in the block load register.
- The business case for the Greater Western Melbourne Supply Area augmentation has a significant amount of transfers between substations, making the spatial calculations more difficult to validate. We are unable to validate the specific calculations feeding into the transfers in and out.
- Powercor's net demand calculation assumes that transfers out are netted from the native demand calculation, but transfers in are not[1], i.e. net demand includes the summation of both transfer in and native demand. For TNA, this accounting of net demand results in an unexpected increase in native demand (before transfer out), therefore the transfer in appears to be accounted for in native demand, and therefore double-counted in the net demand calculation.



1. In provided MD component data (IR37, Q3 a-d), Net demand = Transfer In + Block Loads + Electrification + BESS + EV + Native Demand - PV . Transfers out decrease native demand, but transfers in do not increase native demand

Source: Baringa analysis of data supporting IR37, Q3

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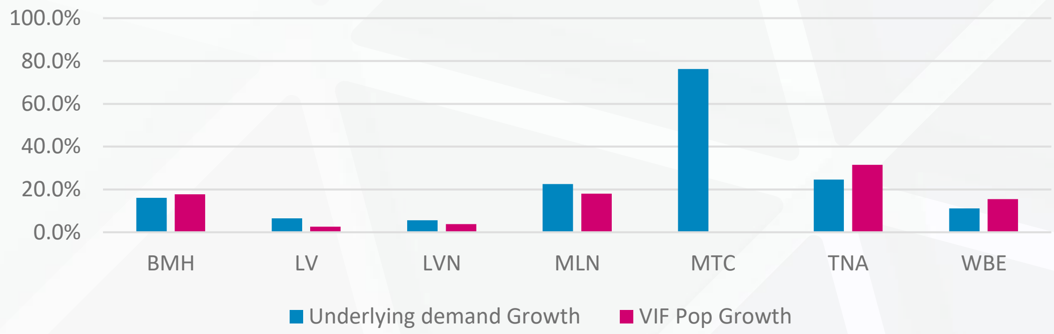
Powercor's native demand growth broadly reconciles against VIF 2023 population data.

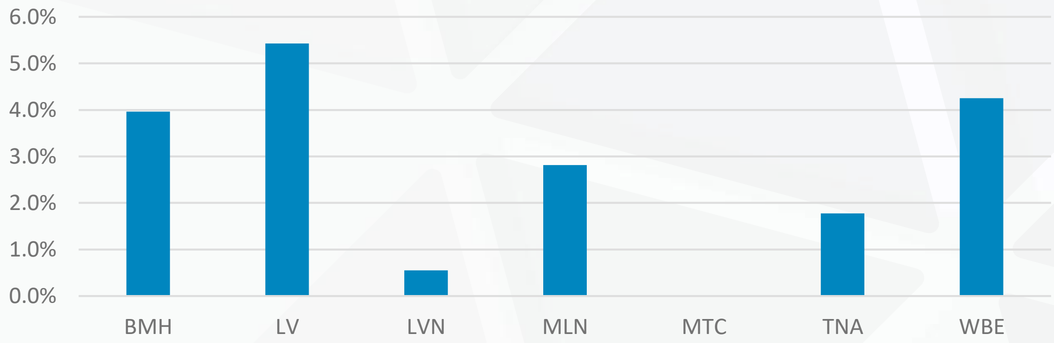
Assessment findings

- Underlying demand growth (before removing transferred demand) has been broadly reconciled against VIF 2023 data (see chart to right). MTC was not mapped against an SA2 code, however, there are two SA2's named Mount Cottrell – Rockbank (55% growth) and Tarneit (44% growth) – while not reaching the 76% growth expected by Powercor, it should be noted that underlying demand is a relatively small portion of MTC's demand (20% in 21% by 2031), as MTC demand is primarily driven by growth in the demand transferred in. Overall demand growth (underlying + transfer in) at MTC grows in line with the Rockbank/Mount Cottrell SA2 – 55% from 2026-2031.
- Comparing forecast demand to historical demand, the following substation have an unexplained jump in MD from the 2024 CARIN (Weather-corrected POE50 MW) to 2025 (POE50 MW):
  - LV increases from 88 to 99 MW
  - MLN increases from 82 to 96 MW
  - TNA increases from 109 to 123 MW
- By 2031, EV load accounts for c.3% of the maximum demand across the seven zone substations, which is broadly aligned with ESOO 2024's 2.2% summer contribution for 2031. The variance of EV contribution between the zone substations is high, with LV being 5%, LVN being 0.5% and MTC being zero. The latter is likely driven by MTC's demand being transferred from other zone substations, potentially with EV load growth embedded in the transfer in load growth. However, this is not entirely clear given the data provided.

Underlying Demand Growth Projection vs VIF23 Pop Growth (2026-2031)



2031 EV Peak Demand Contribution



Source: Baringa analysis of data supporting IR37, Q3

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Baringa

Plans to update demand forecasts for changes in external data

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Powercor should update the demand forecasts for the Revised Proposal to the latest information available, which will be July 2025 IASR plus any further updates in ESOO.

Key data sources (Jan 2025 initial proposal)	**Powercor's plans to update its forecast** (Dec 2025 revised proposal)	**Our assessment**
• August 2024 IASR *CER Uptakes, EV profile*	• February 2025 AEMO IASR update	• There is adequate time for Powercor to update to Final IASR 2025 (July 2025) before the revised proposal, noting that AEMO's 2025 IASR is used as inputs for their 2025 ESOO. • Powercor should ensure their max demand forecast in their revised proposal includes the 2024/2025 weather year as this will have an impact on forecasts, which Powercor also recognise. • Powercor will incorporate new connections that have since committed to connect to the network that were not captured in their previous forecast.
• Historical Network Data (Does not include Summer 2024/25)	• Historical Network Data (Include Summer 2024/25)	
• Customer number forecast (Aug 2024)	• Updated new committed connections	

Timing	Milestone
2025 January	DNSPs submitted Proposals
2025 February	AEMO published Draft IASR 2025 **(window opened to re-run forecasts based on this assumptions set)**
2025 July	AEMO to publish Final IASR 2025
2025 July	**Powercor expects to complete a final max demand forecast**
2025 September	AER publishes Draft Determination
Window to re-run demand forecasts for feedback and update proposals	
2025 December	DNSPs submit Revised Proposals
2026 April	AER published Final Determination

* The Draft IASR 2025 includes higher electrification but, lower PV, EV, and higher energy efficiency.

Data centres

Data centres (DC) have a range of criteria for site selection. Typically, they prioritise speed to network connect, though also consider potential to upsize.

Site assessment criteria	Definition	Impact
Speed to network connection	Locations that are able to accelerate connection to the network with simple processes can address development and commercial risk	Development timeline and cost
Power capacity and availability	Capacity and availability of network connection and future network configuration options to upsize (feasibility of dual power supply)	Size, development timeline, resiliency
Proximity to end users	Distance to the end users of DC services (population concentration, private/public sector customer demand)	Latency and cost
Proximity to fibre	Distance to high-speed cables for data transmission (proximity to fibre providers, accessibility to cable landing stations)	Resiliency and latency
Availability of internet service providers	Number and variety of ISPs offering services such as broadband in the area	Latency
Proximity to other DCs	Distance to other operational DCs	Resiliency, disaster recovery
Security and compliance	Adherence to regulatory standards and level of protection against physical and cyber threats	Compliance, safety
Physical risk minimisation	Exposure of the site to environmental hazards, e.g., flight paths, flood risk, earthquake, hurricane	Safety, losses
Site accessibility	Distance to an airport or port for shipping of hardware, roads for construction and maintenance, and a supply of skilled labour	Ease of operations

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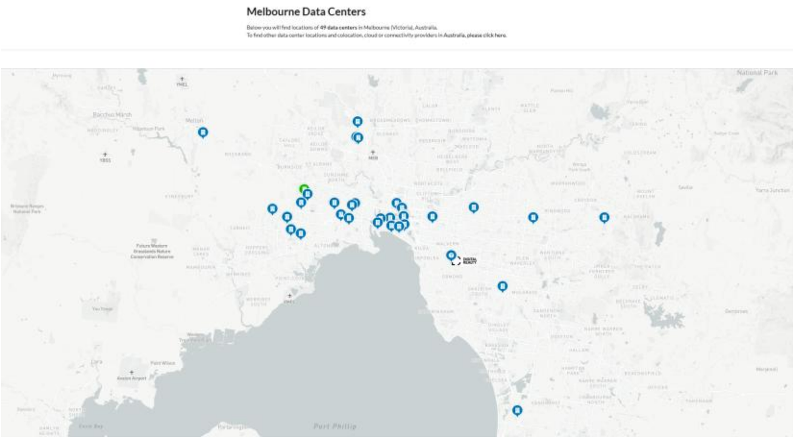
DCs are a rapidly growing sector, driven by increased appetite for cloud computing and AI-based applications, and are seeking distribution connections.

Different types of data centres

Edge	Colocation	Hyperscale
Smaller facilities usually with a capacity of less than 10MW, often placed near end-users	Provision of shared DC infrastructure and IT systems rented out for tenants	Large capacity of usually greater than 100MW, and supports major cloud services and extensive operations

Current DC siting map in Victoria*



*Retrieved May 7, 2025 from Melbourne Data Centers

Commentary

The network connection needs differ amongst DC project types

- A key consideration on siting is available network capacity, as proponents will find more commercial attractiveness in speed-to-connect to the network as well as the ease of opportunity to scale.
- Proponents are typically focused in metropolitan areas to reduce latency (the time delay of data between device and data centre), and so they will consider a large connection in regional areas if there are favourable network conditions.
- DCs are assumed to have an initial ramp-up period where they will be operating below full load and right-sizing of network connection can be later updated.

The decision to connect to the distribution or transmission network

- DCs connected to the distribution network are typically edge facilities, allowing them to be close to end users, however, they can also be co-location facilities under certain circumstances.
- Conversely, hyperscale DCs require transmission connections due to the need for progressively scalable consumption over time and high reliability requirements.

DC siting today and into the future

- The focus for the initial tranche of new DCs (expected during forthcoming regulatory period) will likely be siting in high density metropolitan areas, as they will service streaming services that require fast broadband and limited latency.
- The current locations of DCs support this underlying need to sit within a 'cloud availability zone'. That is, within proximity of the end-user population and typically close to existing infrastructure.
- Looking forward to future AI and other use cases, latency may be less pressing for proponents to consider, and so opportunities to locate DCs further out into the network and closer to renewable sources may be an option.

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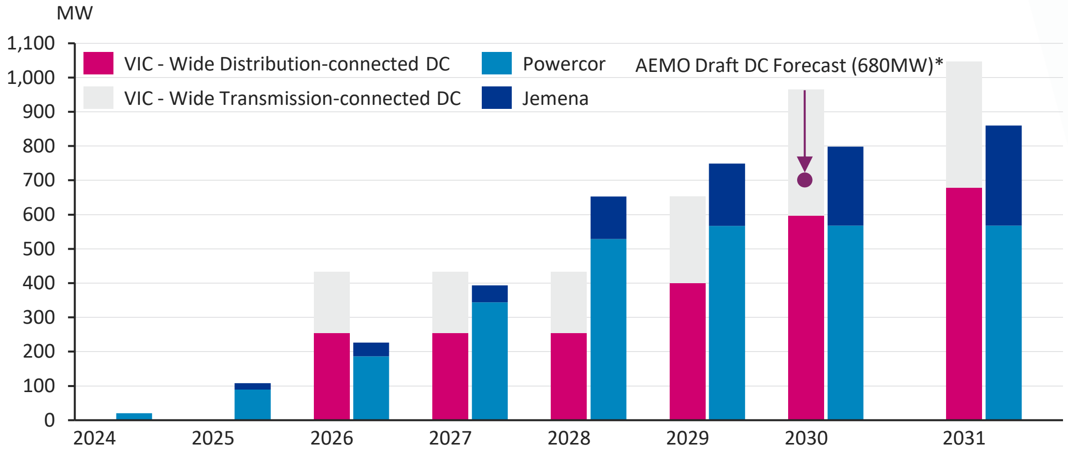
Powercor has stated their demand forecasts includes committed and contracted block loads, but due to NDAs these have not been able to be verified.

Assessment findings

	Materiality	Reasonableness	Concern
Max/min	● (black)	● (amber)	Some concern

Analysis of DC contribution to system-level maximum demand by DNSP



Source: Draft 2025 Data Centre forecasts, Oxford Economics, AEMO. AEMO also acknowledge DCs have the potential to contribute towards significant growth in future demand. In its latest draft ESOO, DC demand growth in Melbourne is approximately 680MW by 2030. Our current view is slightly higher at 597MW, as AEMO has applied future demand weighting.

Baringa bottom-up DC estimate assumptions:

- Projects <10MW are edge DCs connecting into the distribution network,
- Projects between 10-100MW with an initial weighting towards distribution,
- Projects >100MW are hyperscale facilities connected to the transmission network with a 50% probability applied

Commentary

- Powercor's block load register, which is reflected in their demand forecasts, only includes data centres that are committed or existing sites that are ramping up their required capacity.[1] Powercor have also provided a list of de-identified DC connections that align with their initial demand forecast. Powercor notes that for anticipated connections, there remains a level of uncertainty surrounding the locations of new DCs and their subsequent demand. These non-firm contracts are not included in demand forecasts. Without detailed site-specific contract information or location data, validating the contribution of proposed data centres to forecasts becomes difficult.
- Baringa has developed a preliminary view on a potential pipeline for DC demand growth as of June 2025. Our estimate includes both transmission and distribution connections, whereas their forecast is distribution only. Because our forecast is based on publicly available information, we recognise it may potentially understate DCs because it may not capture planned DCs for which there is currently no public information. We note that timing may slightly differ and is based on the best available information.
- While there will be DCs that may initially connect at the distribution-level, they may also at a later stage uprate their connection and consider switching to a transmission-level connection should they require further capacity upgrades (i.e. all DCs in the DNSPs forecasts may not remain at the distribution-level), and so we recognise that there is a degree of similarity between the total forecasts for the first years of the regulatory period.
- Overall, while Powercor's approach to incorporating only contracted DCs is sound, we have some concern as the DC contracts were not provided in the review process due to non-disclosure agreements. We have therefore not been able to validate these customers and given the material impact on the forecasts recommend the AER consider validating this information through a formal regulatory obligation.

Source: (1) Powercor – IR#035 - Q1a

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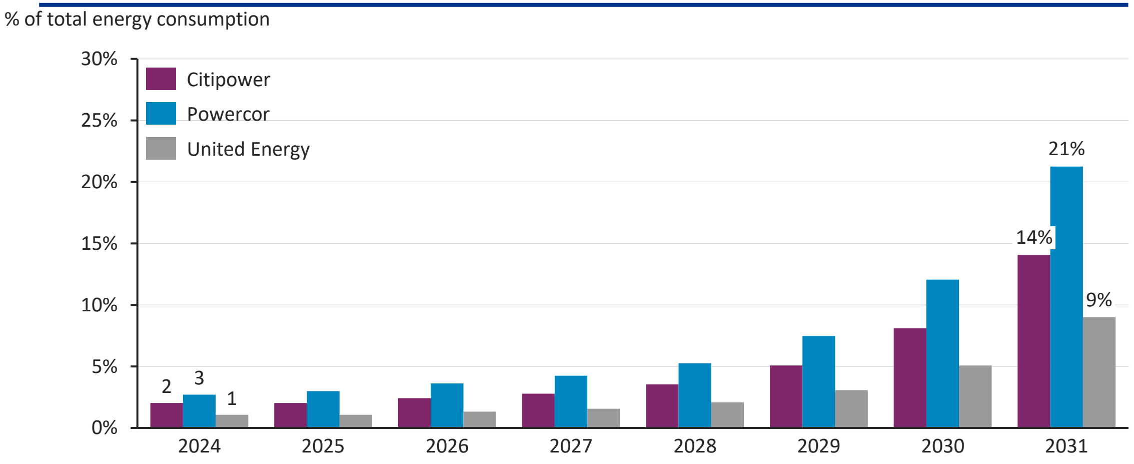
Powercor's DC energy consumption forecasts reflect anticipated future connections and are a departure from their maximum demand approach.

Assessment findings

	Materiality	Reasonableness	Concern
Energy	●	●	Significant concern

DC contribution to energy consumption by DNSP^



Commentary

- Powercor applies DC load differently in energy consumption versus maximum demand forecasts. For energy consumption, Powercor has a significant DC pipeline beyond the contracted loads included in the demand forecast relying on the LEK report. Powercor's connections forecast also relies on this report.
- LEK has estimated future supply for DCs within the Citipower, Powercor and United Energy (CPU) networks based on public announcements as well as unannounced additional capacity based on applications.[1] This has an additive impact by adding speculative DCs that are not committed or contracted – a departure from the maximum demand approach.
- This inconsistency is problematic, as energy consumption forecasts should align with maximum demand methodologies to ensure consistency in forecasting usage across the network and undermines the rationale of conservatism and reasonableness in the demand forecast.
- Powercor notes that each block load is assigned a usage profile and a ramp rate commensurate with the type of connection or specified milestones in customer contracts to reflect the scale-up of load over time. Powercor states that DCs take up to 24 months to fully ramp up,[2] with this approach based on historical observations which we consider is generally reasonable. We also consider that Powercor should apply these ramp-up rates to only the committed DCs to be consistent with their demand forecast.
- When analysing the DC contribution to energy consumption for the CPU networks, we also note that speculative DCs are adding to the consumption forecast. With no committed or contracted DCs from CitiPower and United Energy in the forecast regulatory period, it is inconsistent practice for there to be an increasing DC impact on energy consumption. We therefore have significant concern with this approach and consider that the DC contribution should align with the DCs accepted in the demand forecast.

Source: (1) PAL ATT 6.02 LEK - Data centre load forecasts - Oct2024 – Confidential, p. 12; (2) Powercor – IR#035 – Q3.

Appendix

Abbreviations and Technical glossary

Note: This section is identical across all reports.

Technical glossary

Term	Definition
Block loads	Customers that drive significant step changes in loads, e.g. data centres, apartments.
Bootstrapped weather year	A synthetic weather year created by resampling weather data from historical records to simulate a range of plausible weather conditions.
Consumption/Energy Forecast	In the context of this review, consumption/energy forecast is the DNSP's forecast of energy volume summed across a measurement period (typically year or month). This contrasts to max/min demand, which is the maximum/minimum interval reading across a measurement period.
Gas electrification	The process of replacing gas appliances and industrial processes with electrical equivalents, e.g. electric stoves, heat pumps.
Historical data use	Approach to incorporating historical data into the forecast
Monte-Carlo Simulation	An approach that uses repeated random sampling to approximate numerical results. It leverages randomness to estimate solutions.
Native Demand Forecasting	In the context of this review, the approach to forecasting demand based on traditional drivers, e.g. population and consumption per customer, in contrast to technology-driven demand growth, e.g. electric vehicles and rooftop solar
Post modelling adjustments	Manual adjustments to a forecast made outside of the core forecasting model.
Profile Creation	The process of generating interval level, e.g. charging profile for an electric vehicle, generation profile for rooftop solar.
Scenario use and sensitivities	The DNSP's selection and usage of base and alternative scenarios and whether they run any sensitivities to the base scenario.
Spatial disaggregation	Approach to mapping system-level demand drivers to the level of network elements, e.g. Feeders, Zone Substations.
Spatial Pop Forecast	Approach to applying population forecasts at the level of network elements, e.g. Feeders, Zone Substations.
Technological uptake	Demand growth driven by customers deploying Consumer Energy Resources, e.g. electric vehicles, rooftop solar, BtM batteries
Weather normalisation	The approach to adjusting demand data to account for weather variability and extreme events to allow for better evaluation of demand trends.

Abbreviations

Term	Definition
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AGIG	Australian Gas Infrastructure Group
AMI	Advanced metering infrastructure
ARIMA	Autoregressive integrated moving average, a type of predictive statistical model
BtM	Behind-the-meter
BESS	Battery energy storage systems
BNN	Bayesian neural network
CER	Consumer energy resources
CIC	Customer initiated capital
CPI	Consumer Price Index
CPU	In the context of this report, Citipower, Powercor, United Energy
DC	In the context of this report, a data centre
DCCEW	Department of Climate Change, Energy, the Environment and Water
DELWP	Department of Environment, Land, Water and Planning
DNSP	Distribution network service provider
DoT	Department of Transport
ERA5	Fifth generation of ECMWF (European Centre for Medium-range Weather Forecasts) Atmospheric Reanalysis of the Global Climate
ESOO/GSOO	Electricity Statement of Opportunities/Gas Statement of Opportunities
EV	Electric vehicles
GAM	Generalised additive model
GSP	Gross state product

Abbreviations

Term	Definition
HDD/CDD	Heating degree days/cooling degree days
HV/LV	High voltage/low voltage
IASR	Inputs, Assumptions and Scenarios Report
ISP	Integrated System Plan
NPI	National Pollutant Inventory
POE	Probability of exceedance
PV	Photovoltaic
SA2	Statistical areas Level 2
VIF	Victoria in Future
ZSS	Zone substation