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Daniel Collins
Manager - Sector Coupling
Australian Energy Market Operator (AEMO)

Via email: forecasting.planning@aemo.com.au

Dear Mr Collins

Submission to Draft 2025 IASR Scenarios Consultation

AusNet welcomes the opportunity to make this submission in response to the AEMO's Consultation Paper on the Draft 2025 Inputs Assumptions and Scenarios (IASR) Scenarios (the Consultation Paper).

AusNet is the largest diversified energy network business in Victoria and owns and operates over $11 billion of regulated and contracted assets. It owns and operates three core regulated networks: electricity distribution, gas distribution and the state-wide electricity transmission network, as well as a significant portfolio of contracted energy infrastructure. It also owns and operates energy and technical services businesses (which trade under the name "Mondo").

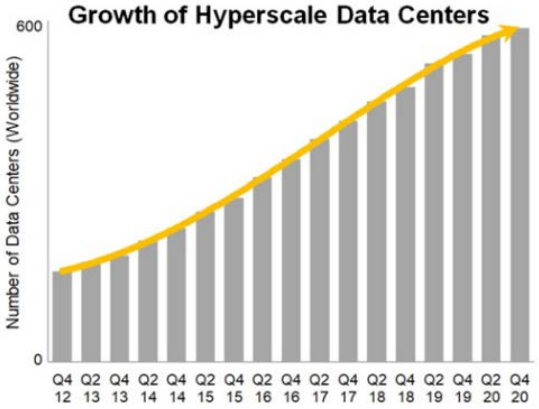
Our submission expresses AusNet's support for the inclusion of 'emerging commercial loads' (i.e. data centres) within the proposed 2025 IASR scenario parameters. It also provides our initial thoughts on the key drivers of data centre growth, which in our view is better tied to a specific set of drivers rather than 'domestic economic drivers.'

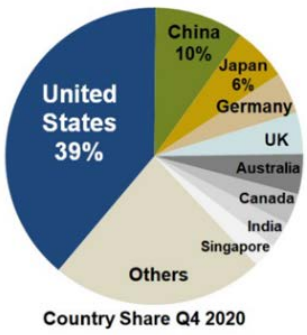
We note that the AEMO has separately released its Electricity Demand Forecasting Methodology Consultation, which is exploring a bespoke approach to forecasting data centre demand when determining future electricity consumption. AusNet also intends to respond to this consultation.

The NEM is experiencing unprecedented levels of inquiry for data centre connections.

Data centres are a global investment trend driven by business and consumer appetite for cloud based digital capacity, artificial intelligence (AI) and machine learning. A recent global property report found that there were 7.1 GW of data centres under development across 63 markets in 2023. This continues to grow rapidly, with more than 12 GW under development by March 2024.[1]

Data centres proponents are increasingly prioritising larger 'hyperscale' data centres (300-1000 MVA) as they focus on infrastructure optimisation and scale, and support generative AI (e.g. ChatGPT) which requires five times the processing power and storage of traditional data centres.[2] Recent industry data found that there are now 1000 hyper-scale data centres globally, the majority of which is leased to established and vertically integrated cloud providers (e.g. Amazon, Microsoft,





Source: Synergy Research Group

[1] Cushman & Wakefield, 2024 Global Data Center Market Comparison, January 2024
[2] Vertiv, Capital Market Day, 2023

Google). Synergy expects that number will double in the next four years as the average capacity within each data centre continues to climb.[3] One report has the 'mega' DC market valued at $USD 24 billion USD in 2023, and expanding to $USD 29 billion by 2028.[4]

Due to low sovereign risk, strong privacy laws and global interconnectivity Australia is considered an emerging data centre hub. To date, 1.05 GW has already connected via a handful of global players. Sydney experienced growth in the last three years and now Melbourne has been identified as the next regional hub for hyperscale data centres in Australia, followed by Canberra and Brisbane.[5] Morgan Stanley has estimated that Australian data centres energy use could grow 17% per annum out to 2030 – shifting from 5 per cent of demand today (1.05 GW) to 9 per cent (2.5 GW) by 2030. Other forecasts suggest data centres could represent as much as 15 per cent of NEM demand.[6]

In Victoria, AusNet is observing a significant increase in interest for hyperscale data centres looking to connect to the declared transmission network (220 kV and above). As of June 2024, we have a pipeline of data centre connection prospects totalling more than ~3.1 GW already 'in' the transmission connections process, of which ~1.8 GW we expect to reach connection application phase in Victoria by 2028. This is in addition to the numerous smaller 'edge' data centres that are suitable for distribution connection.

Data centres offer genuine benefits to Australia's economy and electricity system, however investors will pursue markets overseas if power and network constraints are not resolved.

Data centres are a significant opportunity for Australia's economy and energy system. Firstly, data centres offer both direct and indirect economic benefits. As a general rule it costs between $AUD 9 to $AUD 14 million per MW of commissioned IT load to build a complete data centre.[7] This means each 1 GW of data centres developed results in betweem $AUD 9-14 billion in construction capital spent.[8] One study estimates data centre market spend is growing year on year by 7.5% with an estimated spend of $AUD 8 billion across Australia in 2024.[9] In addiion, periodic investments are made over the 20+ year operational lifespan to update data storage equipment, and maintain HVAC and back up generation facilities years. An average data centre will employ between 30-60 staff on a full time basis.

While most data centres are pursuing sites in urban centres, we anticipate there is some appetite to develop data centres outside of major cities (within 150-200 km). In particular, generative AI data centres do not require the same degree of fibre latency as traditional cloud service data centres. Given the scale of data centre developments, There may also be opportunities for projects to contribute towards community benefit sharing schemes similar to those being explored for renewable energy zones.

Many data centre developers (or their contractors) also have sustainability targets requiring power offset from 100% renewable sources. In order to achieve these targets, major cloud providers are underwriting new renewable projects with corporate PPAs which assists them to reach financial close. Recent examples include Rye Park Wind Farm, Golden Plains Wind Farm and Wandoan South Solar Farm.

From an electricity system perspective data centres can offer a range of benefits. This may include, but is not limited to:

- Reducing curtailment of renewables - grid scale and customer energy resources (CER) - by addressing minimum demand issues across the network particularly during periods of high distributed solar PV output.
- Locating data centres close to generation (current and future) minimises network constraints and losses, and therefore can reduce the need for network augmentation.
- Developing shared network infrastructure (e.g. new terminal stations, bays or lines) as part of their connection increases network capacity, security and reliability providing benefits to customers and generators. It may also provide additional connection options for renewable generators co-locating nearby.

[3] Synergy Research Group, Industry Data, April 2024
[4] Industry Arc, Mega Data Centre Market Size & Share Analysis - Growth Trends & Forecasts (2023-2028), 2023
[5] Morgan Stanley Research.
[6] Ibid.
[7] AusNet internal
[8] Construction costs is predominantly electrical systems (up to 45%), followed by building fit-out, land and mechnical equipment.
[9] Statista, 2023 Outlook, 2023

- Developing hybrid data centre and BESS systems, which have the potential to provide anxiliary services such as FCAS, demand side participation (DSP) and network voltage stability (as part of an NSCAS arrangement).
- Reducing the proportion of total electricity costs borne by residential and businesses consumers.

Similar to other countries, realising these benefits requires Australia to resolve known barriers to data centre growth. They are (1) the availability of generation to supply data centres and (2) the access to network capacity.

The scale of data centres mean that they are on par with the largest existing loads on the existing network. As a result, in Victoria interest at feasible sites far outweighs available hosting network capacity and without targeted network investment will limit connection of data centres.

AusNet stresses that data centre proponents are actively canvassing sites across countries/regions in search of suitable locations to meet the current wave of AI driven growth. Global fibre interconnectivity means that proponents can be selective about where they choose to develop as they are not bound by the same requirements as renewable developers (e.g. high resource quality zones). If achieving access to spare generation and network capacity in the NEM is too difficult, data centre proponents will look elsewhere to progress their projects. Singapore, Japan and Hong Kong are recent examples of jurisdictions where investors have chosen to leave the market due to power security risks. A recent global data centre trends report described Singapore as "the world's most power constrained market."

This international capital flight risk highlights the value in AEMO signally Australia's intent to plan for data centre load growth through the 2025 IASR Scenarios. Without this and other actions to enable the swift connection of data centres, Australia will not realise the associated benefits.

Resolving these issues will require proactively incorporating the electricity system benefits provided by data centres into economic planning decisions underpinning specific network investments (e.g. ISP, RIT-Ts, TAPRs, TCPRs).

Forecasting data centre load growth with the IASR Scenarios is a critical step to enable networks to plan for the opportunity, but only if drivers capture the scale of growth.

The Consultation Paper proposes amendments to the ISP scenario parameters, while retaining the three existing scenarios. This includes a new 'emerging commercial loads' parameter that is exploring whether to tie data centre growth across the three scenarios to their underlying 'domestic economic drivers'or an alternative driver.

For all the reasons explored earlier in our submission, AusNet strongly supports the decision to include data centre load growth as a new scenario parameter. However, we do not consider data centres will experience higher or lower growth on the basis of economic growth conditions (GDP, or GSP). Coupling NEM data centre growth to the domestic economy assumes that:

- Demand for data centre services will follow an incremental growth pathway similar to traditional infrastructure services (road, rail, electricity, water), rather than the exponential (and lumpy) growth trajectory typically seen with digital economy and technology driven industries.
- Data centre proponents and investors (more than half of which are operated by a handful of global cloud providers) are making investment decisions in an Australian rather than global context.

Instead, AusNet sees data centre growth driven by a specific set of locational and global drivers that are not reflective of domestic economic growth.

On locational drivers, power is the biggest factor in determining the location of a data centre site. Other key factors include access to water and fibre.[10] At present, data centres require large amounts of water (circa 25m litres per MW per year) for cooling, albeit this requirement is reducing due to efficiency improvements. Data centres also required to be located relatively closely (150-200 km) to global fibre networks. Australia currently has 20 subsea fibre cables to Asia and the world, with more planned in Australian capital cities this decade. A further potential locational driver of data centre growth is domestic policy. This may include jurisdictional data centre targets (e.g. achievement of GW targets within defined timeframes) but also more specific requirements for certain cloud services to be hosted within Australia for cyber security reasons.

[10] We note that there are many other factors that data centre proponents may consider when choosing to locate in Australia or at a particular site.

On global drivers, those are more complex to forecast. There are now established mega trends and technologies driving the need for data centre services. Generative AI and machine learning platforms require exponential computing capacity, resulting in higher power density requirements within hyperscale data centres. Understanding these global drivers will require in-depth research and analysis to improve forecasting.

Given above, we suggest AEMO develop a bespoke set of 'data centre' drivers that better align with locational and global drivers and that reflects the scale of growth. This could be achieved by commissioning an independent study to inform AEMO's scenario development (i.e. the total forecast volume and timing of data centre load) in the same way done for other emerging technologies (e.g. CSIRO's EV Forecasts Report). A key part of this work should be aligning with the bespoke data centre demand forecasting approach being consulted on as part of AEMO's Electricity Demand Forecasting Methodology Consultation.

If you have any questions regarding AusNet's submission, please contact me by email at jason.jina@ausnetservices.com.au.

Sincerely,

Jason Jina
Policy and Reform Manager

AusNet