



Artesian Capital Management Pty Ltd

Research topic: ***AI, Energy & ESG***

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The Physical Cost of Intelligence

The proposition

- AI has a credible economic case in Australia: higher productivity, large infrastructure investment and greater domestic digital capability.
- Its ESG case is conditional. When expressed through data centres, the main impacts are energy, water demands and local community amenity.
 - ➔ Water efficiency is improving. CDC Data Centres, a major Australian data centre operator, has used closed-loop liquid cooling across its facilities since 2007. By continuously recirculating cooling water rather than relying on water-intensive evaporative cooling, this approach can substantially reduce ongoing water consumption. While the technology itself is not new, its broader relevance is increasing as AI drives greater computing density and cooling requirements. Commitments to Net Zero emissions by data centres are recognized and applauded but need to be considered in context of Scope 3 emissions as well as carbon offset.
- With data centre electricity demand forecast to grow faster than new renewable supply, the implications extend beyond individual facilities to the broader electricity system, including generation capacity, grid resilience and, potentially, the cost and availability of power for other users.
- For bond investors focused on impact, the key question is, therefore, not whether AI is "green" or "brown", but whether each financing contributes to additional clean supply of energy, system resilience and efficient resource use, with transparent disclosure and sensible cost allocation.

Why AI is now a Fixed Income and ESG question

Three events over the course of eight days in August neatly captured the change in the Australian AI debate;

(i) On August 19th, Alphabet raised A\$5.5 billion across six Australian-dollar bond tranches, in the largest corporate bond transaction completed in the local market, with an order book of about A\$18 billion.

(ii) On August 25th, AEMO's 2026 Electricity Statement of Opportunities forecast that data centre electricity consumption in the National Electricity Market (NEM) would rise from about 5 TWh today to 34 TWh by 2035-36.

(iii) On August 26th, the National Cabinet agreed to develop nationally consistent mandatory standards for large data centres, while leaving further

work to settle how new power supply should be provided across jurisdictions.^{1,2,3}

The juxtaposition matters for fixed income investors. AI is still a technology theme, but it is now also a financing, power-system and infrastructure theme. Data centres are the most visible physical proxy for that shift. They are not synonymous with AI, cloud computing and other digital workloads also drive demand, but AI undoubtedly drives most of the near-term electricity and water consumption, along with substantial capital investment.²

1. The economic case: productivity, investment and sovereignty

The upside is material, although it should be treated as scenario analysis rather than as a forecast. The Productivity Commission's December 2025 inquiry concluded that multifactor-productivity gains above 2.3% over a decade were plausible under faster adoption of data and digital technologies, with a back-of-the-envelope GDP uplift of roughly A\$116 billion in 2023-24 prices. EY-Parthenon's August 2026 modelling produced a similar GDP uplift range: A\$95-116 billion of additional economic output by 2036, 2.0-2.4% higher multifactor productivity and 36,000-44,000 additional full-time-equivalent jobs.^{4,5}

Capital commitments are already large. Microsoft has committed A\$25 billion through 2029 to Australian digital infrastructure, AI capability and skills, while Amazon has announced A\$20 billion of Australian data centre investment between 2025 and 2029. CDC Data Centres' 555 MW customer contract, signed in May 2026 for an initial 30-year commitment with renewal options, gives a sense of the scale now moving from pipeline to contracted demand.^{6,7,27}

There is also a strategic argument. The National AI Plan places domestic digital infrastructure alongside skills, adoption and safeguards, reflecting the value of onshore compute and data residency for government and nationally important industries. This benefit is harder to quantify than construction spending, but it is relevant in a world where computing capacity and cloud infrastructure increasingly sit alongside energy and telecommunications as critical economic inputs.⁸

2. The physical bill: electricity, emissions and water

The cost side starts with electricity. AEMO's latest central view has data centre consumption in the NEM rising roughly seven-fold, from about 5 TWh in 2025-26 to 34 TWh in 2035-36, equivalent to around 13% of electricity supplied through the grid. AEMO sees no reliability gap before 2030 under committed and anticipated projects, but says continued investment will be required thereafter. Separately, CEFC-commissioned modelling by Baringa put 2035 data centre consumption at 24-35 TWh across the NEM and WEM.^{2,9}

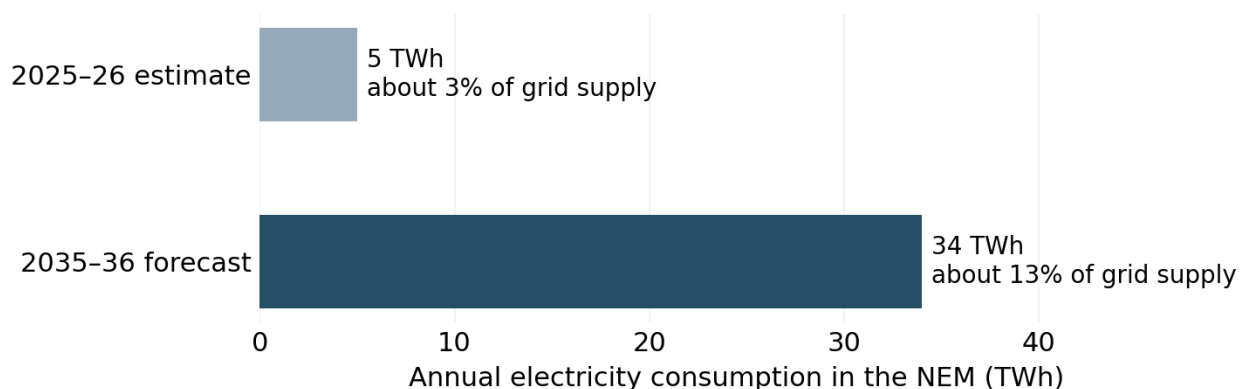


Figure 1 Data centre electricity demand in the NEM. Source: AEMO 2026 ESOO. Endpoint comparison only; the forecast is not an observed outcome.

What matters is whether supply arrives with the demand load

CEFC / Baringa 2035 scenario	NSW wholesale price	Victoria wholesale price	NEM emissions
Incremental load, no matching supply	+26%	+23%	+14%
+3.2 GW additional wind & solar	+7%	+6%	No increase
+1.9 GW storage added	+3%	+2%	Not separately quoted

Source: CEFC / Baringa, *Getting the balance right* (December 2025). The figures are modelled scenarios, not forecasts.⁹

That distinction is important. Modelling does not say that data centres will mechanically raise wholesale prices by 26% in New South Wales. It says that a large new load without commensurate generation and storage can tighten the market materially; adding supply reduces the impact sharply. The ESG

question is therefore as much about the sequencing and financing of power infrastructure as it is about the efficiency of the data centre itself.⁹

On the other hand, while data centre efficiency does matter, total electricity demand is more important. Power Usage Effectiveness (PUE) measures facility electricity consumption relative to IT electricity consumption; it does not measure the usefulness of the computation. A lower PUE can coexist with higher total electricity use as computing capacity expands. Investors need both efficiency ratios and absolute consumption, alongside the timing and location of the load.

Wholesale prices are relevant to affordability, while electricity use and emissions measure the physical impacts of AI. Current retail tariff movements cannot isolate the effect of data centres because fuel costs, hedging, network costs and regulation also affect bills. Therefore, the investment question is whether developers fund the incremental infrastructure required to support their demand and manage resource impacts, including during periods of system stress.

The New South Wales data centre framework explicitly seeks to prevent costs from being shifted to households and communities. Its August 2026 framework calls for data centre operators to fund additional energy and water supply, alongside environmental and amenity standards. The Commonwealth's proposed national standards similarly focus on new power supply, connection costs, flexible demand and water efficiency. Hence, negative externalities to local communities are alleviated as data centre operators are bearing the marginal infrastructure cost through funding additional energy and water supply.^{12,3}

Regarding water use in data centres, Sydney Water stated that data centres currently use about 3.5 billion litres a year, less than 1% of Sydney's drinking water demand, but by 2035 demand could rise to a volume equivalent to roughly one-quarter of today's annual drinking water. That is a planning scenario rather than a measured future outcome, and cooling design can change it materially. Evaporative cooling consumes water; closed-loop liquid cooling can reduce ongoing water consumption, although every design still needs to be assessed against local water stress and its electricity trade-offs.^{10,29}

3. Can AI demand accelerate clean energy? Yes - but only conditionally

There is credible evidence of additionality at individual projects. Amazon signed nine new Australian renewable-energy agreements in April 2026, adding 430 MW and taking its contracted Australian portfolio to about 990 MW once operational. In addition, Microsoft signed a 15-year power-purchase agreement for the 300 MW Walla Walla Solar Farm in the Riverina and helped the project reach financial close.

Big Tech firms are huge supporters of clean energy demand globally. According to Bloomberg data, Meta, Amazon, Google and Microsoft accounted for 49% of corporate clean-energy deal volume in 2025, although the same data shows why this contribution should not be overstated: total corporate PPA volumes fell 10% that year, the first annual decline in nearly a decade. Hyperscalers can be powerful buyers without being sufficient, on their own, to fix planning, transmission, connection and construction bottlenecks as other stakeholders are required.¹⁵

Australia's delivery gap remains the constraint. AEMO's 2026 Integrated System Plan calls for about 18 GW of new wind by 2030, compared with roughly 9 GW then in the connection pipeline. The Clean Energy Council reported only 2.3 GW of new large-scale renewable generation reaching financial close in 2025, one of the weakest years in a decade. The Capacity Investment Scheme awarded 7.8 GW of generation in Tender 7 in May 2026, but the awarded project is not yet an operating megawatt. Data centre demand may improve the revenue signal for new projects; it cannot eliminate execution risk.^{17,18,19}

AI may also help the energy system itself. The IEA estimates that broader use of AI and digital tools could unlock up to 175 GW of additional transmission capacity globally from existing lines through better monitoring, forecasting and network operation. That is a global technical potential, not an Australian capacity forecast, and it does not replace the need for new transmission. It does, however, illustrate the other side of the ESG ledger: AI can both consume electricity and make parts of the electricity system more efficient.¹⁶

Google's latest environmental disclosure captures the same tension at the company level. In 2025, its electricity demand rose 37%; operational emissions fell 2%, but supply-chain emissions increased 25% as data centre construction and equipment procurement expanded. The lesson is not that clean procurement failed. It is that operational electricity is only one part of the

footprint: embodied carbon in buildings, servers and supply chains also matter as the physical build accelerates.²⁰

4. What can fixed-income investors do?

Australia does not yet have a domestic taxonomy test for data centres. The first version of the Australian Sustainable Finance Taxonomy covers six priority sectors: agriculture and land; mining and metals; manufacturing and industry; electricity generation and supply; construction and buildings; and transport. Information and communications technology, including data centres, is not currently included. That does not make data centres ineligible for ESG analysis, it means investors need a more explicit set of operating and financing tests.²¹

Four tests for a credible Australian data centre ESG case

Test	What to look for	Why it matters
1. Additionality	Long-dated PPAs or underwriting of new generation; storage/firming; evidence the contract helped a project reach finance or construction.	Separates incremental clean supply from simply buying certificates after the electricity has been consumed.
2. Cost allocation	Who pays for grid connection, network upgrades and water infrastructure; ability to curtail or shift load at stressed times.	Reduces the risk that private AI investment creates a public affordability or reliability burden.
3. Efficiency & disclosure	Operational PUE and WUE; location- and market-based emissions; scope 3; refrigerants; embodied carbon; site-level energy and water disclosure.	Makes resource claims comparable and exposes trade-offs that a single "renewable" claim can hide.
4. Financing integrity	Use-of-proceeds discipline, taxonomy alignment where applicable, external review and ongoing allocation/impact reporting.	Ties the bond to assets or outcomes rather than assuming the issuer or sector is inherently green.

Two external benchmarks help fill the local taxonomy gap. EU Taxonomy activity 8.1 sets technical criteria for data processing and hosting, including implementation and periodic verification of relevant data centre energy

efficiency practices. In Australia, NABERS Energy for Data Centres provides an operational rating based on actual performance; the Commonwealth requires a five-star NABERS Energy rating, or an equivalent efficiency standard, for data centre facilities used by government under its Net Zero in Government Operations Strategy.^{22,23}

For labelled (green, sustainable & social) bonds, the Australian Taxonomy-aligned Debt Guidance published in March 2026, is useful where proceeds finance eligible taxonomy activities such as electricity networks. Victoria Power Networks' A\$750 million green bond in October 2025 was the first transaction understood to align with the new taxonomy. SA Power Networks followed in May 2026 with a A\$300 million five-year green bond described as the first fully taxonomy-aligned issue. These transactions illustrate where fixed income capital can have a comparatively direct link to funding the infrastructure needed to accommodate electrification and new data centre load.^{24,25}

Where an asset cannot satisfy a green taxonomy on day one, but is genuinely part of a credible decarbonisation pathway, ICMA's Climate Transition Bond Guidelines, published in November 2025, provide a separate use-of-proceeds label with transition-project safeguards. That is preferable to stretching a green label around an asset whose environmental performance is still dependent on future system changes.²⁶

5. Case study: CDC Data Centres - strong credit, conditional ESG case

CDC Data Centres (CDC) is a useful test because it brought attention of AI infrastructure directly into the Australian public bond market in 2026. Moody's assigned the Australian business a first-time Baa2 rating with a stable outlook in April, supported by more than 90% of revenue from investment grade rated customers and a weighted average lease expiry of 28.4 years including options. In June, CDC issued A\$1.0 billion of subordinated hybrid bonds in two tranches, receiving 50% equity credit from Moody's. In July, it followed with a A\$700 million dual-tranche senior secured issue, the first senior data centre bond in the Australian medium term note market.^{27,28}

From a credit perspective, the attraction is straightforward: high-quality counterparties, very long contractual duration and diversified access to capital markets. From an ESG perspective, there are more interesting points for discussion.^{27,28}

CDC disclosure	Investor read-through
FY26 portfolio WUE below 0.02; closed-loop liquid cooling is designed to minimise ongoing cooling-water draw.	A strong operating efficiency signal, but investors should still monitor site level water stress and absolute consumption as capacity grows.
CDC says its closed-loop design saves about 5 GL of water a year across 13 Australian and New Zealand sites compared with conventional evaporative cooling.	Pioneers in the use of LiquidCore, an innovative liquid cooling system designed to reduce water consumption as opposed to conventional evaporative cooling, which is more water intensive.
100% of FY26 electricity consumed in CDC data centres was matched with renewable electricity.	Useful for market-based accounting, but matching through certificates or retailer arrangements is not the same as proving that new renewable generation was built for the load.
Net-zero target for 2030 covers scope 1, scope 2 and three scope 3 categories.	Material progress will depend on the treatment of customer electricity, construction and equipment supply-chain emissions, and the role of offsets.

Sources: CDC 2026 Sustainability Report and sustainability disclosures.²⁹

Neither of CDC's 2026 public bond transactions carries a green or sustainability label. That is not a negative in itself: the bonds should first be assessed on their credit fundamentals. It does mean, however, that investors cannot infer use-of-proceeds additionality from the security. For an ESG allocation, the key follow-up questions are whether new campuses are matched by genuinely incremental generation and firming, whether grid and water system costs are borne by the project, and whether facility level resource and scope 3 disclosure improves as the portfolio scales.^{28,29}

Conclusion: the ESG case is conditional, not binary

We believe that AI is not environmentally positive simply because it can optimise grids, nor is it environmentally negative because it consumes large amounts of electricity. For Australia, the ESG impact of AI development and data centres built to support it will also be determined by the physical infrastructure around them: new generation, storage and networks, efficient cooling, transparent emissions and water data and rules that stop marginal costs being shifted to households and communities.^{2,9,12}

For fixed income investors like us, we think that we play a crucial role in the capital allocation process and the opportunity to deliver impact to our investors goes beyond labelled hyperscalers or data centre bond issuers. This is because other sectors such as renewable generation, storage and network assets play an equally vital role in the AI buildout to ensure that the load is sustainable. The investment discipline, therefore, is to finance the build out without confusing economic importance with environmental additionality.^{24,25,29}

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