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The Chairman
Select Committee on Energy Planning and Regulation in Australia
Parliament of Australia
By email: epra.sen@aph.gov.au

14 October 2024

Dear Sir,

Please find attached my submission to your Select Committee's inquiry into Energy Planning and Regulation in Australia. I would be pleased to answer any questions the Committee may have of me.

Yours faithfully,

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1 Introduction

I commend the Senate for establishing this Select Committee to inquire into and report on the institutional structures, governance, regulation, functions, and operation of the Australian energy market.

The Committee's terms of reference are broad and deep and yet its timeline is very tight. The main argument that I make in this submission is that the progressive "nationalisation"¹ of the oversight of the electricity in the National Electricity Market (NEM) is the main explanation for the poor outcomes it has delivered. However, having regard to the limited time I have had to prepare this submission and the limited time the Committee has to report, in this submission I focus only on the nationalisation of the arrangements for transmission planning in the NEM. This is the most recent aspect of electricity industry control to be centrally monopolised, and I think rectifying this mistake is the most pressing issue for policy makers to focus on at this point. In the next section of this introduction, I set out the "nationalisation" context in which my concerns about transmission planning are situated. The section that follows that introduces my submission and explains its layout.

Context

When the Australian Competition and Consumer Commission authorised the National Electricity Code in 1996, thereby bringing the NEM to life, it cited claims by the Industry Commission (now Productivity Commission) that the NEM would deliver substantial increases in productivity (equal to 1.4% of gross national income) which it said was the largest single benefit in the overall Hilmer and related reforms estimated by the IC. The ACCC authorisation also made clear that it expected that the NEM would deliver lower electricity prices.

The opposite has occurred in both productivity² and prices. In preparing this submission I analysed the ABS Consumer Price Index data.³ These data reveal that since the start of the NEM in 1998, retail (household) electricity prices in constant currency have almost doubled (i.e. increased almost twice as fast as the Consumer Price Index) in Sydney and Hobart and have increased 50% faster than the Consumer Price Index in Melbourne and Brisbane and by 30% in Adelaide.

When the NEM started in 1998, only power system operation and market operation was overseen centrally. Electricity transmission was then the province of the ACCC and all other regulation was left to the jurisdictions.

¹ To be strictly correct "sub-nationalisation" – the NEM is not a national electricity market.

² See for example: https://www.aer.gov.au/system/files/2023-11/AER%20%E2%80%93%20Fact%20Sheet%20for%20the%202023%20Annual%20Benchmarking%20Report%20%E2%80%93%20Electricity%20distribution%20network%20service%20providers%20%E2%80%93%20November%202023_1.pdf

³ ABS table 6401.0 adjusted with the price effect of the Australian Government's most recent retail customer subsidy payment.

Over the 26 years that it has existed, regulation and oversight of the National Electricity Market has become ever more centralised. The creation of the Australian Energy Markets Commission (AEMC) and AER (Australian Energy Regulator) in 2004 resulted in the bifurcation of economic regulation into two agencies: the design of economic regulation (under the AEMC) and the implementation of regulation (under the AER). The bifurcation arose because the jurisdictional governments were not willing to cede regulation to a federal agency without being able to control the design of the regulation. The AEMC (appointed by the States) as regulation designer and AER (appointed and funded by the Commonwealth) as implementer of the AEMC's designs was the consequent compromise. By global comparison, this bi-furcation was a unique institutional arrangement in the economic regulation of energy when it was introduced 20 years ago. After its manifest failure it is no surprise that it has not been emulated elsewhere.

The AER-AEMC institutional compromise set the starting point for ever greater centralisation starting with the economic regulation of transmission (transferred to AEMC and AER in 2004), then of distribution (2005) then retail market regulation (except Victoria, from 2012) and then of transmission planning (transferred to AEMO and AER from 2020).

In the 26 years that the NEM has been in place, it seems that there never has been a problem brought before the NEM polity and energy regulators to which their solution has not been more yet more centralisation and regulation, by them. Consequently the National Electricity Rules have grown from the 596 pages in the original 1996 National Electricity Code to 909 pages in the first version of the National Electricity Rules and now to 1938 pages in the current (216th) version of the Rules. In addition, 216 pages of Retail Energy Rules (needed for retail market deregulation) have been added in the current (42nd) version. And the AER has now written, and enforces, 171 Guidelines, 64 Schemes and 32 Models in addition to having undertaken 82 Reviews.

The AER, AEMC and AEMO now collect more than \$526 million⁴ each year to pay for their services. Capitalised at the current RBA cash rate, the present value of this administrative burden is \$12 billion. An amount at least as large as this is also incurred by the industry – and also recovered from electricity consumers - in responding to the regulators' demands.

Policy makers have not been slow to recognise that things have not worked well. Since the start of the NEM, there have been five independent reviews that have been focussed on various aspects of electricity regulation (Parer in 2003, Scales (ERIG) in 2006, Garnaut in 2011, Yarrow in 2012 and Finkel in 2017) two Senate Inquiries have focussed on regulation (2013, 2014), there was a Productivity Commission Inquiry (2014) and an ACCC Inquiry (2018) and the Energy Security Board was in place from 2018 to 2023 ostensibly to drive a program of market reform. Yet prices continue to rise, productivity continues to decline and newspapers and television programs relentlessly reflect popular frustration about power price increases and power supply shortfalls. Apparently powerless

⁴ This uses the latest available information as follows: AER figures (\$82m) for year to 30 June 2023 from ACCC Annual Report; AEMC figures (\$36.5m) for year to 30 June 2023 from annual report; AEMO figures (\$489m) cover NEM core, NEM functions, NEM connections and Vic TNSP and so exclude "CIS, NSW Roadmap, other", Western Australia and East Coast Gas.

to address the failures, the Australian Government and some jurisdictional governments now seem to have settled into the habit of using taxpayers' money to subsidise all retail electricity consumers, and not just those experiencing hardship.

My perspective, as a student of long standing in the field of energy policy and regulation in Australia, is that the main problem explaining much of the failure, is the centralisation of regulation and administration under a system that fails to hold regulators to account effectively.

This problem originates in the co-operative federalism on which the NEM is based. My argument is that the ministerial council⁵ of nine jurisdictional government energy ministers chaired by the Commonwealth energy minister and supported by a committee of jurisdictional government officials with rotating leadership, has resulted in diffuse, opaque and consequently weak accountability of the AEMC, AER and AEMO. To be accountable to everyone is to be accountable to no-one. The consequence of this is a deeply entrenched culture of blame-shifting, risk aversion, empire-building and stifled innovation in the regulation and oversight of the electricity industry.

It is possible (and realistic) that the problem of diffuse accountability is an inevitable consequence of the system of co-operative federalism that underpins the existence of a regionally co-ordinated wholesale market and power system (i.e. the NEM). Policy makers can still do much to improve the situation by recognising that the problem of diffuse accountability is unavoidable and consequently making every effort to refer regulatory powers back to the jurisdictions (from whence they came) and where much clearer accountability might be expected.

It should be recognised that such referral is likely to be strenuously resisted by the market bodies (on account of a diminution of their empires) and by the regulated entities who are unlikely to welcome a more accountable regulator. The direction of travel since the creation of the NEM has been in the opposite direction. Decentralisation may also be opposed by jurisdictional government (and the Commonwealth) energy ministers who have long used the AER, AEMC and AEMO to provide cover for politically unpopular decisions. The same opportunity for cover may be less likely with regulators that are more clearly accountable.

This submission

This submission examines and critiques the creation of the NEM-wide planning monopoly (under AEMO primarily but also involving the AER) that is vested with the power to ensure its plans are given effect.

This monopoly planner came about through changes to the National Electricity Rules in 2020 that made the Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP), "actionable". There is still a prospect that this serious policy and regulatory failure

⁵ Over its life this committee has been called the Ministerial Council on Energy, then the Council of Australian Governments' Energy Council then the Energy National Cabinet Reform Committee and most recently (since October 2022) as the Energy and Climate Change Ministerial Council.

might be rectified, and the substantial damage to the interest of consumers, landholders and the environment avoided.

The “Actionable ISP Rule Changes” have given AEMO a monopoly on NEM-wide transmission planning. It means that transmission projects that AEMO determines to be “actionable” are thereby authorised for development, and for their costs as approved by the Australian Energy Regulator to be recovered from electricity consumers, and for their social costs to be imposed on the community and individual land holders.

I argue that a NEM-wide planner is not needed and that AEMO’s decisions pursuant to its NEM-wide planning power have been damaging to the interests of consumers, landholders and the environment and that they are undermining the decarbonisation of electricity supply.

This is a very important policy and regulation error and merits serious consideration in your inquiry.

My submission is set out as follows:

- Section 2 makes the case that optimal transmission plans do not exist and cost-benefit analysis is easily manipulated. I start my submission with this section in order to rebut the oft-repeated assertion that a NEM-wide planner is needed in order to deliver “optimal” transmission plans.
- Section 3 presents evidence that AEMO has produced biased assessments of transmission expansion. This evidence supports my argument that important mistakes have been made.
- Section 4 makes the case that the argument for a NEM-wide planning monopoly during the fossil-fuel generation era was tenuous and that with the transition to decarbonised supply there is now no justification for a NEM-wide planning monopoly.
- Section 5 discusses the evidence presented in the previous sections. It starts by summarising the evidence, then considers what has motivated AEMO’s bias and why my critique has few friends amongst industry stakeholders.
- Section 6 makes suggestions for improvements in AEMO governance, transmission planning and in consumer representation.
- Section 7 summarises the evidence and argument in this submission.

2 Optimal transmission plans do not exist and cost-benefit analysis is easily manipulated

AEMO describes the (actionable) ISP as a “roadmap” for the transformation of the National Electricity Market and that it determines the “*optimal mix of generation, storage and transmission*” and that it finds the “*optimal development path that will meet the NEM power system’s reliability and security needs, that is aligned with government emission reductions and other policies, doing so at the lowest long-run cost to consumers*” (2024 ISP, page 6).

Who would not want such a thing? Yet central planning is difficult and if promises of “optimality” were really plausible we might expect it to become the dominant institution across the economy. But it is not. In market economies like Australia’s, governments turn to planners as a last resort not a first resort because the long history of central planning is of failure. There are a number of features in electricity that make central planning especially difficult. These include:

1. **Indivisibility and lumpiness:** transmission capacity is available in discrete voltage-based increments. Since transmission capacity rises as the square of the voltage, this raises the problem of lumpy increases in transmission capacity in the context in which both demand and supply expand in much smaller increments.
2. **Scale economy:** the capital of transmission technology rises linearly with voltage but the capacity of the transmission technology rises as the square of voltage.
3. **Network usage spill-overs:** electrical currents in networks obey Ohms and Kirchoff’s laws. This means that capacity increases in one part of a network can affect flows (and hence capacity limits) in other parts of the network. Depending on the particular circumstances it can be the case that augmenting the capacity of one part of a network can reduce the aggregate network’s transfer capacity.
4. **Network characterisation in modelling:** the physical system of conductors and generators is extremely complicated and detailed. This makes it extremely hard to effectively represent in models. All planning models therefore use a reduced-form representation of the actual network. This makes analysis tractable but greatly reduces its ability to represent how the power system actually works.
5. **Market characterised in modelling:** The NEM is a 5 minute regional market with co-optimised ancillary services markets. In planning time scales stretching several decades ahead) any attempt to model how generators will be dispatched in that is able to realistically account for the detail of the volume price pairs (10 bands) and technical limitations (ramp rates and minimum stable generation) and the way that generators might choose to respond to prices is simply not practically tractable. AEMO’s ISP modelling (understandably) does not even attempt to model the market and assumes, rather, least cost generation dispatch. This is likely to deliver very different outcomes to what a market would deliver, as AEMO recognises and which has profound implications which I allude to later.
6. **Externalities:** transmission lines have a large impact on landholders and on the local environment. Information on these externalities only arises at a very far advanced stage in the planning price – when AEMO or network service providers have narrowed their route selection.

7. **Uncertainty:** electrical generation and storage technologies are evolving extremely quickly. Modellers need to make many assumptions on how these will evolve in future in order to develop their plans.

For these reasons, amongst others, expert electricity modellers can arrive at very different views of what they think to be an optimal plan. AEMO's confident claims of "optimality" and "optimal development paths" of their modellings reveals a lack of understanding of what they are actually trying to do. No-one has a right to make such claims: "optimal developments paths" do not exist.

None of this is to suggest that the pursuit of "optimal" plans is worthless and does not have a useful place. To the contrary such modelling is now a staple in academia in electrical engineering mainly, and in operations research to a lesser extent. Open-source linear optimisation models⁶, cloud computing and hosted databases have made sophisticated least-cost models widely accessible. Their development and use is a valuable source of learning and insight and have useful spin-offs in data formation. This is where such modelling naturally belongs and it is to be encouraged in such context⁷.

This is also not to suggest that the deep involvement of government in the electricity sector is unnecessary. Many of the characteristics listed above explain also why governments become involved in the electricity industry particularly in the challenging task of co-ordinating investment in the natural monopoly (transmission) with the contestable sectors (storage and production).

In addition to the inevitable subjectivity of optimisation modelling, another layer of subjectivity (and opportunity for manipulation) arises in the process of establishing the costs and benefits of transmission augmentations. Through our reviews of AEMO's ISPs and of transmission network services providers' (TNSPs) regulatory investment tests we [documented](#)⁸ seven "tricks" that AEMO and network services providers can and do play to get their cost-benefit assessments to deliver the results they want. In summary the main ones are:

1. **Biased counter-factual trick:** by making assumptions on what would happen if the transmission project was not built it is possible to make the transmission project look better. AEMO has done this for example by assuming that all Victorian brown coal generators would have closed by 2028, so as to generate the "benefit" of keeping them open if their transmission project was developed. But of course all Victorian coal generators will not be closed by 2028!
2. **The "Roman arch" or "Divide and rule" trick:** Count the full benefits of building the bridge but only count one half of the cost of the bridge. Then later repeat the exercise for the second half. This has done for VNI-West (for its two elements) and also for HumeLink and last leg "Sydney Ring South".

⁶ <https://pypsa.readthedocs.io/en/latest/getting-started/introduction.html>

⁷ Steven Percy, a previous employee at the Victoria Energy Policy Centre developed such a model and VEPC has used it to analyse energy policy in Victoria – see for example https://www.vepc.org.au/_files/ugd/cb01c4_65036737daf14413868a6f9641f99119.pdf - and for the provision of advice, including to AEMO.

⁸ <https://reneweconomy.com.au/the-investment-test-for-electricity-transmission-has-become-a-sham/>

3. **The “sunk cost” trick:** treat various costs that will arise in future as if they have already been spent or committed. As discussed earlier, this has been a big part of AEMO’s analysis of MarinusLink (ignoring the costs of wind farms in Tasmania in their calculation of the benefits of MarinusLink) and AEMO (and TransGrid’s) analysis of HumeLink (ignoring the cost of Snowy 2.0 but counting the “benefit” of connection to Sydney).
4. **The “under-quoting attracts buyers” trick:** This involves starting with unrealistically low cost estimate in order to get a benefit/cost outcome that is sought, then progressively increase cost estimates later (of course always claiming that benefits still exceed costs). This is endemic to all projects assessed by network providers and AEMO. We are not aware of any projects that have not now estimated to cost at least double what AEMO/TNSPs initially said they would (in the case of HumeLink it is more than six times their initial claim).

The main point here is that AEMO and TNSPs have considerable discretion in how they formulate costs and benefits and how they model the power system. Through this discretion they can easily ensure that their modelling and calculations gives them the answers that they are seeking. The next section documents this in detail with reference to the three large “actionable ISP” projects that AEMO is promoting.

This subjectivity suggests that it is important to critically assess AEMO’s technical analyses that purport to make recommendations on “optimal” transmission expansion. It also suggests that consideration of institutional incentives and the arrangements for governance are very important when seeking to understand AEMO (and TNSPs’) recommendations. This is a large part of the discussion in the last section.

3 The evidence suggests that AEMO has produced biased assessments of transmission expansion

VEPC, often in collaboration with other experts, has critiqued the cost-benefit analyses of the three large “actionable ISP” projects (HumeLink, MarinusLink and VNI-West) that AEMO has so far decided upon.

In this part of my submission, I draw out the main critiques and point to the evidence and analysis VEPC has produced, and reference the relevant reports and papers to support our conclusion that AEMO’s calculations of the net benefits of its actionable projects are biased.

In our work on this over the years we have also made an effort to encourage public debate and inquiry by submitting articles to The Conversation and also to the website RenewEconomy (www.reneweconomy.com.au) both of which allow readers to comment. These articles have often drawn discussion from interested readers. I have found much of this valuable. These comments can be accessed by clicking through to the relevant URLs.

3.1 HumeLink

HumeLink, originally known as SnowyLink North, is a 500 kV double-circuit transmission line linking Snowy 2.0 with Wagga Wagga and the Bannaby Substation (near Goulburn). SnowyLink North was formally proposed at the time that Snowy Hydro announced their possible intention to build the Snowy 2.0 pumped hydro power station.

TransGrid is the TNSP that formally assessed HumeLink, but AEMO played an important role in the assessment of HumeLink by including it as an “actionable project” in its ISPs. AEMO included SnowyLink North (as it was then known) in its inaugural 2018 ISP. It costed it then at about \$0.9bn.⁹ In its Draft 2020 ISP, the estimated cost of what was then renamed HumeLink increased to \$0.95bn - \$1.76bn, and then to \$1.47bn - \$2.73bn in the final 2020 ISP. The estimated cost increased again in the 2022 ISP to \$3.32bn and most recently to \$4.98bn in the 2024 ISP. In addition, over the period of these assessments, AEMO has reduced the estimated capacity of HumeLink from 2,570 MW to 2,200 MW.

TransGrid has estimated a further \$1.55bn will need to be spent on Sydney Ring South, and AEMO’s latest ISP classifies this an actionable project. Therefore the latest estimated total cost of transmission needed to make Snowy 2.0 useful to the NSW power system is about \$6.5bn. This is over 6 times TransGrid (and AEMO’s) initial claim of the cost of Snowy Link North. We suggest the final amount will almost certainly be higher, possibly significantly so.

⁹ Page 69 of the 2018 ISP Appendices had an estimate of \$1.171bn for two single-circuit lines (including 2x500kV circuits from Darlington Point to Wagga as part of the now EnergyConnect). So, the HumeLink component, for the now double-circuit design, would be about \$0.9bn.

In every successive examination of the benefits of HumeLink, AEMO (and TransGrid) have claimed that the benefits have risen more than the costs have, and so HumeLink was always “actionable”.

I suggest AEMO’s treatment of HumeLink has been biased for the following reasons:

1. When it first decided to include HumeLink and recommend it for immediate action (in its inaugural 2018 ISP published in June 2018) AEMO treated Snowy 2.0 as a sunk cost. But the decision to invest in Snowy 2.0 had not yet been made (it was only made in December 2018) and so Snowy 2.0 was not a sunk cost. If AEMO had properly accounted for Snowy 2.0, HumeLink would have been revealed to be a deeply uneconomic transmission augmentation.
2. AEMO consistently failed to critique TransGrid’s unrealistic cost estimates in all four ISPs. TransGrid’s incentive to understate HumeLink’s cost is powerful and obvious.
3. AEMO failed to point out that wind and solar farms (and imports from South Australia through EnergyConnect and from Victoria through VNI West) will need to be constrained off when Snowy 2.0 is generating electricity (which Snowy Hydro says will be almost all the time except when it is pumping, so about 10 hours each day). This is because HumeLink will only add enough capacity to accommodate Snowy 2.0. (Alternatively Snowy 2.0 will need to be constrained off and AEMO should then have pointed out that Snowy 2.0’s production assumptions were not credible because the network would not accommodate them and the other producers that assumed would require access to HumeLink.)
4. AEMO consistently failed to point out that Sydney Ring South is also needed to ensure that HumeLink’s capacity will be useful where it is needed - in Sydney / Newcastle / Wollongong.

We raised these concerns in a detailed [review](#)¹⁰ of HumeLink’s Project Assessment Conclusions Report.

3.2 MarinusLink

VEPC had reason to first examine MarinusLink after having been asked by the Bob Brown Foundation to evaluate the economics and greenhouse gas impact of MarinusLink¹¹. Our 2020 [report](#)¹² to BBF concluded that batteries in Victoria could provide a comparable services to MarinusLink, and more cheaply.

BBF asked us to [update](#)¹³ the report in 2021. The update concluded that continued declines in the relative cost of battery storage compared to MarinusLink and Battery of the Nation¹⁴ meant that the case for MarinusLink was even weaker.

¹⁰ https://www.vepc.org.au/_files/ugd/cb01c4_d1b5aa92aca748abb2019c008f067903.pdf

¹¹ As the market advisor to Temasek in their purchase of Basslink in 2006 I had developed a detailed understanding of the economics of interconnection between Tasmania and Victoria.

¹² https://www.vepc.org.au/_files/ugd/cb01c4_a7e32d421b0244418408be0ff6e425ce.pdf

¹³ https://www.vepc.org.au/_files/ugd/cb01c4_eb85523842b94754bf8599ea013463ba.pdf

¹⁴ An undefined term but generally understood to mean a re-powered Tasmanian power system capable of meeting Tasmanian demand and ultra-long duration reliable supply of 1500 MW to Victoria.

AEMO's inaugural 2018 ISP did not include MarinusLink in its list of recommended projects. However AEMO said that MarinusLink would be beneficial if further renewable generation development in Tasmania delivered the value highlighted by the Tasmanian TNSP's Stage 1 Battery of the Nation studies.

In the 2020 ISP AEMO included MarinusLink (two stages, each 750 MW). In its cost-benefit analysis of MarinusLink, AEMO excluded the costs associated with the development of 1,900 MW of additional wind generation in Tasmania, on the basis that the Tasmanian Government had legislated the 200% Renewable Electricity Target. But that legislation only required the Tasmanian bureaucracy to report progress against the target, not to fund or orchestrate the development of new renewable generation in Tasmania. The full cost of developing the wind generation should therefore have been included in the assessment of the costs and benefits of MarinusLink. Had this been done then, just as for HumeLink and Snowy 2.0, the costs of Marinus Link would have substantially exceeded their benefits.

We made this point in our [submission](#)¹⁵ to AEMO's Draft 2022 ISP. In its Final 2022 ISP, AEMO rejected our criticism that their calculation of costs and benefits was flawed but failed to provide any evidence to substantiate their rejection of our claims. We subsequently drew on this as part of a broader critique, for an invited [presentation](#)¹⁶ to the Economic Society of Australia's Annual Conference in Hobart in 2022.

Later in 2022 we examined whether concessional finance through the Government's Rewiring the Nation policy would change the case for MarinusLink. Media coverage that followed the Australian Government's announcement of concessional funding suggested that the Australian Government had said that it expected the effect of its concessional financing would be to reduce prices by 50%. We [concluded](#)¹⁷ that the effect would be much smaller (12%) and eaten up by the almost certain under-estimation of the cost of the project.

Since the end of 2022, the Tasmanian Government has now recognised that AEMO's and TasNetwork's estimates of the costs of MarinusLink were not credible (under-stated by a factor of at least two). Consequently MarinusLink Pty Ltd is now only proposing to develop a single (750 MW) cable. The final investment decision has been repeatedly deferred, most recently to May 2025.

It also now clear that TasNetwork's and AEMO's estimate of the cost of the Tasmanian on-shore transmission expansion needed to develop the "Battery of the Nation" (i.e. the North West Transmission Project) was also under-estimated by a factor of at least two.

The Tasmanian Government's recent Budget Papers also reveal a payment of \$106m from the Tasmanian Government to TasNetworks to compensate it for the money TasNetworks has already spent on MarinusLink, which we understand to be mostly explained by the

¹⁵ https://www.vepc.org.au/_files/ugd/92a2aa_299a2ac91c5243278396f7dd47ea6f33.pdf

¹⁶ https://www.vepc.org.au/_files/ugd/cb01c4_53a21bff96be45e293086b7b1c0cd4a4.pdf

¹⁷ <https://reneweconomy.com.au/does-rewiring-the-nations-concessional-finance-really-change-the-case-for-marinus/>

purchase of an option, from the Italian cable provider, for the possible future purchase of their cables.

3.3 VNI West

Of the three “actionable” interconnectors¹⁸ we have made the greatest effort to critique AEMO’s assessment of VNI-West (and the Western Renewables Link (WRL) which is the first half of the Victorian part of VNI-West), in collaboration with Simon Bartlett and Darren Edwards. AEMO was the transmission planner in Victoria for VNI-West and so its involvement with VNI-West extends beyond its ISP assessments.

AEMO’s first cost-benefit study of VNI-West, starting with the first “WRL” component was started in 2017 and the “Project Assessment Conclusions Report” was completed in July 2019. This identified options for the augmentation of transmission to Western Victoria and focussed specifically on one expansion (“B2”) that went in a south westerly direction from Victoria and did not entail interconnection to NSW. The second option (“C3”) was intended to be the first leg of the new VNI-West interconnector.

AEMO’s calculations show that it estimated that the main benefit of C3 was the fuel cost savings that it said would arise by *increasing* brown coal generation in Victoria and reducing much more expensive black coal generation in NSW and QLD, and from expenditure reduction that would arise by *decreasing* wind generation in Victoria. AEMO calculated these benefits to June 2074, effectively assuming that Victoria’s brown coal generation would be running until this date.

Such analysis was obviously inconsistent with the Victorian Government’s policy, and indeed obviously inconsistent with AEMO’s then first ISP published the previous year. Neither the Victorian Government nor renewable generators had anything to say about such analysis that was so clearly contrary to their stated objective of rapidly decarbonising electricity supply and expanding wind generation in Victoria.

Our first [critique](#)¹⁹, in 2022, of AEMO’s proposals for the second leg of the VNI-West line (at that time from Ballarat to the border with NSW) focussed on AEMO’s Project Assessment Draft Report for this transmission expansion. We found that AEMO’s calculation of the main benefits of building VNI-West to Victoria was that it would *defer* the construction of renewable generation and storage and *increase* greenhouse gas emissions between 2024 and 2033 relative to what AEMO said would otherwise happen.

We pointed out that this was obviously inconsistent with the Victorian’s governments policy. We also pointed out that AEMO had excluded a large amount of the cost of VNI-West (i.e. the terminal station in Ballarat) by assuming that these costs were covered by the Western Renewables Link. But in its assessment of the Western Renewables Link AEMO also excluded those same costs on the basis that they were included in the estimate of VNI-West.

¹⁸ HumeLink is an interconnector in the sense that it connects to VNI-West.

¹⁹ https://www.vepc.org.au/files/ugd/cb01c4_fcf604ba06e745a78260c337390db13d.pdf

AEMO then redefined VNI-West and issued a new “VNI-West Consultation Report – Options Assessment” in mid-February 2022 with a closing date for submissions shortly thereafter. That study claimed that the main benefit (to Victoria) from building WRL-VNI was that without the new interconnector Victoria would have to build expensive pumped-hydro storage (at some unspecified location). Building the interconnector would mean that cheaper batteries in NSW would be able to replace the need for more expensive pumped hydro generation in Victoria. Since batteries can be built for the same price in Victoria as in NSW, this provoked the obvious question of why pumped hydro rather than batteries would be built in Victoria if WRL-VNI was not built: an interconnector was not needed to import battery storage services in Victoria, from NSW. This was one of several points we made in a detailed 118 page [critique](#)²⁰ of AEMO’s “Options Assessment” of VNI-West. AEMO did not respond to our critique.

Drawing on the modelling results in AEMO’s Options Paper and our critique of it, we then published an [article](#)²¹ pointing out that WRL-VNI would add just 1209 MW of additional firm renewable hosting capacity in Victoria and that even then the average annual spillage, according to AEMO’s results over the full study period, would be 34% for solar in the South West NSW Renewable Energy Zone (REZ), 23% for solar in the Murray REZ and 26% for wind in the Western Victoria REZ.

A few months later, the CEO of AEMO claimed on Radio National that VNI-West was justified in order to export cheap rooftop solar generated in Victoria, to NSW. We responded to this in an [article](#)²² that pointed out that AEMO’s modelling results in its Options Assessment report claimed that AEMO’s analysis had found that the main justification to Victoria for the building the interconnector was to avoid building pumped hydro in Victoria (which as we had already pointed out to AEMO was a preposterous claim).

We expanded on this to point out that actually AEMO’s modelling found that WRL-VNI would turn Victoria into a massive net importer of electricity so that by 2040, 26% of the electricity consumed in Victoria would be imported. We asked how this could be consistent with the Victorian Government’s claim that VNI-West would turn Victoria into a renewable energy power house. Neither AEMO nor the Victorian Government have answered this.

Having set out extensive critiques of AEMO’s analysis we felt it was incumbent on us to develop an alternative transmission development plan for Victoria, that was consistent with the Victorian Government’s renewable electricity targets but would have much lower impact on land-holders, the environment and consumers.

We set this out in the report “No longer lost in transmission” otherwise known as the “Plan B” [report](#)²³. This is a detailed, costed, transmission expansion plan and its development involved a very great deal of engineering analysis particularly by Simon Bartlett.

²⁰ https://www.vepc.org.au/_files/ugd/cb01c4_aa208c2ff72b49a8b9d5cccf534c1ae9.pdf

²¹ <https://reneweconomy.com.au/put-up-a-parking-lot-why-these-new-transmission-projects-will-fail-wind-and-solar/>

²² <https://reneweconomy.com.au/new-links-could-turn-victoria-into-energy-importer-solar-and-storage-would-be-cheaper/>

²³ https://www.vepc.org.au/_files/ugd/cb01c4_ade2391c5414148bf8f388a0f1dcebe.pdf

We provided advance copy to AEMO and invited them to attend the launch. AEMO declined to attend the launch and instead issued a dismissive two-page [release](#)²⁴ to the media²⁵. We [responded](#)²⁶ to this a few days later.

In Victoria, Minister D’Ambrosio [responded](#)²⁷ to media inquires about our Report to the effect that “*We will consider the report but rigorous analysis by AEMO shows that VNI-West provides value to Victorian energy consumers, helping to keep the lights on across the state as our ageing coal-fired generators close*”. The Minister committed that “in good faith” she would ask VicGrid, a sub-division of her Department, to undertake a review.

VicGrid hired Jacobs, a consultancy, ostensibly to provide an “independent review” and VicGrid set a timeline of the review to be completed by October 2023. We asked to see the terms of reference of Jacobs’ appointment but VicGrid refused our request although we were verbally assured by VicGrid as to Jacobs’ instruction. We asked to be present in meetings between Jacobs and VicGrid, taking into account that this was meant to be an “independent” review. This was also refused. VicGrid asked that the review be conducted under “Chatham House” rules, which we agreed to on condition that this was not against the public interest.

We were provided with a copy of Jacobs’ “Draft Report” in November 2023 which we [responded](#)²⁸ to in early December, reserving our rights to make our response public on the completion of the review, should we so choose. Our response to Jacob’s Draft Report concluded as follows:

“We believe that the Government of Victoria is sincere in its desire to decarbonise electricity supply in Victoria and it is vexing that the Government persists in supporting an interconnector that – on the AEMO’s own evidence – so clearly undermines the Government’s policy, and at great cost to communities, consumers, the environment and affected land holders.

In the attachment to this letter (starting on the next page) we have added a few comments on aspects of the detail of Jacobs’ report, for completeness only. We consider the technical content of Jacobs’ work to be poor quality although this is not its biggest flaw: Jacobs’ refusal to do what it was instructed to do (and VicGrid’s acceptance of that) renders the Jacobs report irrelevant to the assessment of Plan B. It is now clear that there is a very serious gap between the Government’s apparent energy policy and its actual energy policy.

The issues in the development of VNI-West, while germane, are overshadowed by much bigger challenges of energy security and energy independence that arise from turning Victoria into a state that will depend on NSW for so much of its electricity supply. While we continue to be willing to cooperate with VicGrid and the Government on its assessment

²⁴ <https://aemo.com.au/newsroom/media-release/aemo-responds-to-vni-west-alternative-plan>

²⁵ <https://aemo.com.au/newsroom/media-release/aemo-responds-to-vni-west-alternative-plan>

²⁶ https://www.vepc.org.au/_files/ugd/92a2aa_e9a4bfe6fd1f44ffb16b1d3eb9da3e5c.pdf

²⁷ <https://www.afr.com/policy/energy-and-climate/d-ambrosio-rejects-plan-b-for-victoria-s-green-grid-20230801-p5dsw5>

²⁸ https://www.vepc.org.au/_files/ugd/92a2aa_9c2ac960b397430f83a9b7185a4cffd8.pdf

of Plan B, the much more pressing issue for the Government seems to be to confirm and properly communicate its actual energy policy to the Parliament and people.”

VicGrid released Jacobs Final Report and VicGrid’s own summary of it on Easter Sunday 2024. VicGrid summarised Jacobs’ “findings” but did not say more than that. We [responded](#)²⁹ shortly thereafter.

We note that the Legislative Council of Victoria has recently announced a Parliamentary Inquiry into the expansion of transmission lines in Victoria.

²⁹ https://www.vepc.org.au/_files/ugd/92a2aa_9c2ac960b397430f83a9b7185a4cffd8.pdf

4 **There is no need for a NEM-wide monopoly transmission planner**

The second section of my submission made the case that transmission planners have considerable freedom to make plans and do cost-benefit models to provide the answers they want. The third section set out evidence to support my claim that AEMO's transmission evaluation has been biased. In this section I make the argument that there is no need for a NEM-wide monopoly transmission planner.

The section starts by drawing on Mountain (2024)³⁰ to summarise the institutional arrangements for transmission planning in the NEM over its history. The second subsection sets out the substantive argument.

4.1 **Relevant history**

What is transmission planning? In essence, it is the activity of planning and approving for the expansion of electricity transmission infrastructure (typically the overhead wires, towers and substations containing mainly transformers and switch-gear). In the long history of electricity supply in Australia, transmission planning was the sole responsibility of state-based transmission entities. The construction of the Snowy Mountains hydro scheme led to interconnection between NSW and Victoria. South Australia and Victoria were subsequently linked in 1989, Queensland and NSW in 2000 and Victoria and Tasmania in 2005. Each of these “interconnectors” came about through agreement between the neighbouring states, largely to facilitate the sharing of reserves and the trade of surpluses.

The Council of Australian Governments' Independent Energy Market Review (the “Parer Review”) published in 2002, a little under five years after the NEM started, was the first formal review of the NEM. It was critical of the arrangements for the provision of transmission, which it described as “the largest NEM problem”(Breslin et al., 2002, p. 22)³¹. Its main criticisms were that transmission planning was fragmented and the calculation of the benefits of transmission interconnection failed to reflect the effect of the exercise of market power by the generators and so “fail(ed) to facilitate sufficient inter-regional trade and competition” (Breslin et al., 2002, p. 125). Its main recommendation was to strengthen the position of the National Electricity Market Management Company (NEMMCO), AEMO's predecessor, by making NEMMCO rather than the regional TNSPs responsible for transmission planning.

³⁰ Mountain, B.R. (2024). The national electricity market 25 years on: outcomes and prospects. In “Captured: How neoliberalism transformed the Australian state”. Toner, P. and M Rafferty (eds.) Sydney University Press.

³¹ Breslin, P., Sims, R., & Agostini, D. (2002). “TOWARDS A TRULY NATIONAL AND EFFICIENT ENERGY MARKET”.

<https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id:%22library/lcatalog/00114677%22>

Four years later energy ministers commissioned another report “Energy Reform: The way forward for Australia” (also known as the Energy Reform Implementation Group “ERIG” Review)³². The first point in the Terms of Reference of the Report required it to make recommendations for achieving a “fully national transmission grid” (Scales et al., 2007, p. 4).

The ERIG Review however came to quite a different view to the Parer Review. It started by asking what is meant by a fully national transmission grid and what characteristics such a grid would display. It noted that “*the character and performance of a transmission grid cannot be assessed in isolation of the location and capacity of generators and of the loads they seek to serve*” (Scales et al., 2007, p. 158) and concluded that “*the current level of transmission and interconnection investment is reasonably appropriate for the installed generation capacity and peak demand*” (Scales et al., 2007, p. 152).

Nonetheless ERIG concluded that “*whilst the general level of investment is reasonably appropriate and no new major interconnectors appear economical at present, the mechanisms are not in place to ensure the efficient ongoing development of the national transmission system*” (Scales et al., 2007, p. 152).

Accordingly it recommended “*a more co-ordinated strategic approach to the development of the energy sector*” (Scales et al., 2007, p. iii) and like, the earlier Parer Review, it too recommended “*the establishment of a strategic national planner under a reformed NEMMCO*” (Scales et al., 2007, p. iii). Specifically, ERIG recommended a “National Transmission Network Development Plan” (NTNDP) to deliver an integrated, national plan for the efficient development of the overall power system, and which would “*inform the setting of the revenue allowance provided for TNSPs for a regulatory period*” (Scales et al., 2007, p. 144) as a replacement for the cost-benefit analysis – the “Regulatory Test”.

The inaugural NTNDP was published in 2010 when AEMO itself came into existence. The NTNDP followed after NEMMCO’s “Annual National Transmission Statement” which was first published in 2004 and which itself took over from the “Annual Interconnector Review”. The inaugural NTNDP described itself very much as information provision whose main purpose was to provide potential investors with information on “*where and when electricity transmission expansion will be needed*” (AEMO, 2010, p. 3). It was described as based on information provided by TNSPs, and AEMO said that it did not itself question that information.

The NTNDP was published for the next 8 years. The third (2012 version) set out AEMO’s vision for a national transmission system and the final version of the NTNDP in 2018 then became the inaugural “Integrated System Plan” (ISP). Over this period the “plan” had evolved from information for investors of where transmission expansion was likely to be needed, to outlining “*targeted investment portfolios that can minimise total resource*

³² Scales, B., Carmody, G., Swift, D., & Rattray, A. (2007). “Energy Reform, The way forward for Australia”.

http://www.innovation.gov.au/energy/Documents/erig/ERIG_main_report20070413181231.pdf

costs, support consumer value, and provide system access to the least-cost supply resources over the next 20 years to facilitate the smooth transition of Australia’s evolving power system”(Australian Energy Market Operator, 2018, p. 3).

The Independent Review into the Future Security of the National Electricity Market chaired by Dr Alan Finkel (“the Finkel review”) recommended that “*AEMO have a stronger role in planning the future transmission network, including through the development of a NEM-wide integrated grid plan to inform future investment decisions. Significant investment decisions on interconnection between states should be made from a NEM-wide perspective, and in the context of a more distributed and complex energy system. AEMO should develop a list of potential priority projects to enable efficient development of renewable energy zones across the NEM.*”

However the Finkel Review, like the ERIG Review 11 years earlier stopped well short of recommending that AEMO have a monopoly over transmission planning. Instead its role only was to recommend “*a list of potential priority projects in each region that governments could support if the market is unable to deliver the investment required to enable the development of renewable energy zones*”. And it recommended that the AEMC should evaluate the priority projects and guide governments “*on the combination of circumstances that would warrant a government intervention to facilitate specific transmission investments.*”

One year after the Finkel Review was released, the Energy Security Board, representing AEMO, the AER and AEMC, recommended changes to the Finkel Review recommendations, to be implemented in new National Electricity Rules so that AEMO’s recommendations would become “actionable” i.e. by “*transferring responsibility for the coordinated identification and assessment of options to address needs for investment across the integrated system, from TNSPs to AEMO.*”³³

Since those “actionable ISP” rule changes, the most important tangible outcome of the ISP is a set of “actionable ISP projects” (transmission projects typically but not necessarily) that AEMO determines must be “actioned” (i.e. built) and if identified as “actionable” by AEMO through the ISP, they are so authorised and expenditure on them (later vetted by the Australian Energy Regulator) is approved for recovery through regulated charges to electricity consumers. The “Actionable ISP” has, for the first time, created a “NEM-wide” transmission planner.

4.2 A NEM-wide transmission planning monopoly is not needed

The Energy Security Board’s document “*Converting the Integrated System Plan into action*”³³ which recommended the actionable ISP rule change, made no meaningful attempt to justify its recommendation. The only explanation that it provided for such a momentous change (see page 31) was that “*AEMO estimates that optimal development*

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https://web.archive.org/au/awa/20210407113023mp_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/ESB%20Decision%20Paper%20%E2%80%93%20Actionable%20ISP%20Rule%20Changes.pdf

path in the draft (2018) ISP will result in \$2.55 billion of net market benefits in the central scenario, relative to the outcome that would arise if no new interconnectors are built". The recommendation to then create a transmission planning monopoly was then dressed up as if it was consistent with the Finkel Review recommendations:

"Following the delivery of the Finkel Review, the COAG Energy Council agreed on a timeline to implement 49 of the 50 recommendations, including those on System Planning. In August 2018, the Chair of the Energy Security Board was tasked with providing a plan to make the Integrated System Plan actionable, the Integrated System Plan: Action Plan was provided to the December COAG Energy Council meeting. At this meeting Minister's tasked the Energy Security Board with doing more work to operationalise the ISP."

It is evident that over the history of the NEM, the case for a NEM-wide planner (rather than state-based planners) has been contested. The NEM was created without a NEM-wide planner. The Parer Review recommended a NEM-wide planner with the ability to execute its plans. The ERIG review rejected that as did the Finkel Review in much as the same vein as the ERIG review.

There may have been a case for a NEM-wide planner when electricity production in the NEM was dominated by coal (and ignoring climate change policy). Specifically the argument is that the abundance and absence of an international market for Victoria's brown coal resource gave Victoria a competitive advantage relative to NSW and Queensland's relatively much more expensive black coal. A NEM-wide planner might have been able to force interconnection (if indeed this was necessary) so potentially achieving economies that might not otherwise arise. But there are many "ifs" here: will the trade benefits exceed the costs, and if so why would NSW and VIC not agree an interconnection expansion themselves, why would it need to be forced upon them? So, this argument for a NEM-wide planner is tenuous argument at best. At the peak of the coal era, the ERIG review's conclusion that *"the current level of transmission and interconnection investment is reasonably appropriate for the installed generation capacity and peak demand"* seem quite plausible.

There is no doubt that the coal generation era is drawing to a close in the NEM and that Victoria's brown coal cost advantage is now greatly outweighed by its greenhouse gas disadvantage. Coal generation is being replaced by low and zero emission alternatives, at present mainly wind farms and rooftop solar, backed up by some combination of electro-chemical batteries, existing hydroelectric power and pumped hydro and gas peaking generation.

None of the jurisdictions in the NEM have any meaningful advantage in renewable electricity production. Although solar yields are higher inland and to the north, solar panels are now so cheap, the cost of shipping what is slightly cheaper solar from Queensland to Victoria is obviously not viable.

Likewise wind yields in all NEM regions is approximately comparable with the exception of Tasmania which has a state-wide yield advantage of around 5% compared to Victoria. Tasmania however has a cost disadvantage and so its net advantage relative to the mainland is likely to be small and so not able to defray the huge cost of interconnection needed to make that wind generation available to Victoria.

With respect to storage, the dominant storage technology – electrochemical – can be developed throughout the NEM for a comparable cost and located at the load centres or renewable energy generators, minimising the need for additional transmission. Similarly there is no reason to believe that nuclear power, if it is ever developed will be any cheaper in one jurisdiction than another. We therefore can't see good argument for interconnection on the basis of production cost differences.

There might nonetheless be a case for interconnection on the basis of resource diversification (the sun shining/wind blowing in one state but not the other). We have examined this carefully – see [here](#)³⁴ and [here](#)³⁵ – and again find no reason to believe that the small inter-state diversity in wind (and tiny diversity in solar) will be able to produce anywhere near enough value to compensate for the enormous cost of interconnection.

We noted in the previous section, that AEMO has no coherent answer to this critique and that different AEMO representatives have produced a succession of internally inconsistent explanations of the benefits that arise from further interconnection between NSW and Victoria, and ultimately contradicted by Victoria's energy minister.

Our analysis and its conclusions might be wrong. Or, technologies may change and so interconnection might become more viable than it appears now. This does not necessarily lead to the conclusion that a NEM-wide planner is justified. Rather the justification would depend on a plausible argument that neighbouring states would choose to forego benefits from trade and economic gains would need to be forced on them by a central planner. I will leave others to try to make such an argument.

First-principles consideration of the value of interconnection would seem to explain why the Energy Security Board could not justify its recommendation for the creation of a monopoly NEM-wide planner and instead tried to dress it up as if it arose from the Finkel Review. They made no good argument, it would seem, because no good argument is there to be made.

³⁴ <https://reneweconomy.com.au/is-there-a-case-for-building-new-grid-interconnectors-aemos-own-data-suggests-not/>

³⁵ <https://reneweconomy.com.au/the-diversity-argument-for-this-new-transmission-link-doesnt-stack-up/>

5 Discussion

In this submission I have argued that optimal transmission plans do not exist and cost-benefit analysis is easily manipulated by the planner to get the answers they want. I went on to argue that this is what AEMO (and the network monopolies) have done to justify massive interconnection expansion. In the last section I argued that massive new interconnectors are not needed and neither is a NEM-wide planning monopoly.

Does this matter? I think it does, I think the transmission planning failure can account for a large part of the unravelling of the modicum of political stability in energy policy that was evident in the Australian Parliament before the effect of this planning failure became evident to the communities affected by it and manifest in the existence of this inquiry and similar inquiries now underway in Tasmania and soon to start in Victoria.

It is also evident in much slower decarbonisation of electricity supply as transmission lines that AEMO predicted to be operational already, are still languishing as a result of overly optimistic costing and through trenchant community opposition. The knock-on effect of this delay has resulted in uncertainty about transmission expansion across the system. Instead of quietly getting on with the job of facilitating the expansion of renewable energy projects that have obtained community consent, the system is gummed up waiting on AEMO's contested proposals.

AEMO's policy will, in due course, also have a major negative spill-over in the future development of a grid that is oriented around a 500 kV "NEMLink" interconnected backbone, instead of one that seeks to ensure that supply is as close to demand as reasonably possible, and that seeks to maximise the use of existing capacity and easements.

This failure was avoidable. I suggest that better alternatives exist, as we have proposed in our "[Plan B](#)" [transmission expansion plan for Victoria](#)³⁶, and by expanding battery-backed rooftop solar particularly on the vast tracts of unoccupied [roofs of business enterprises](#)³⁷.

5.1 What has motivated the bias in AEMO's analysis?

If AEMO has produced biased assessments, as I contend, what has motivated it to do this? The best explanation I can offer is that it is surely to be expected that an organisation that is required to develop and execute a NEM-wide transmission plan will as a matter of course be predisposed to think that a deeply interconnected grid is the right answer. Perhaps AEMO also prioritises consistency in the advice it provides, and this hinders its ability to respond to new information and particularly the effect of the incredible change in generation technologies (most particularly in photovoltaics and storage) which has killed the economic viability of long distance high capacity interconnection. The evidence seems to support both of these conjectures.

³⁶ https://www.vepc.org.au/_files/ugd/cb01c4_ade2391c5414148bf8f388a0f1dcebe.pdf

³⁷ https://www.vepc.org.au/_files/ugd/92a2aa_22dc7eb8187c4e8ebe839970f099dfbe.pdf

When it first existed as an entity, in 2010, AEMO published its inaugural “National Transmission Network Development Plan” (NTNDP). In that document AEMO introduced “the NEMLink concept” which it described as a 500kV “high capacity backbone” stretching from Tasmania to Queensland (and including South Australia). The CEO gave it special prominence in his inaugural covering letter, as his newly created organisation’s vision for the future.

In its then “pre-feasibility” modelling for NEMLink, AEMO said it concluded that the benefits of NEMLink would exceed its costs. The main benefit of NEMLink, it claimed, arose from coal and gas generation in Victoria displacing black coal in NSW, and it assumed that carbon capture and storage would be added to coal and gas by the late 2020s.

That inaugural 2010 NTNDP forecast grid demand that is about 50% higher than it has actually turned out to be. Furthermore AEMO’s five generation scenarios in that inaugural document all predicted that solar would have an inconsequentially small role in electricity production and that none of it would be located behind the meter. But in 2023 solar produced 20% of the electricity consumed in the NEM, and 66% of that is located on the customers’ premises.

In all five of its scenarios, AEMO projected a small amount of coal generation closure, some scenarios with coal expansion (with carbon capture and storage) and enormous expansion of gas generation often with carbon capture and storage. Yet the market we now have, has no carbon capture and storage (and no prospect of it for the foreseeable future), a large amount of coal generation has closed, gas generation now has a small role (in 2023 it was just 4.7% of supply). AEMO envisaged a future for geothermal (none exists and none is expected). The only technology that AEMO predict reasonably accurately and only for its “fast rate of change” scenario, was wind generation.

Comparing the first and its most recent ISPs also reveals how AEMO’s predictions have drastically changed. In the 2018 ISP AEMO said that the investment costs associated with replacing old and retiring infrastructure with new plant has an NPV cost of between \$8 billion and \$27 billion, depending on assumptions made around economic growth and rate of industry transformation. And it said that total system cost savings ranged between \$1.2 billion and \$2.0 billion with the integrated approach. But in its 2024 ISP AEMO now says that \$142bn will be needed in upfront capital investment for essential electricity infrastructure, but that transmission elements would repay their investment costs and save consumers a further \$18.5 billion in avoided costs.

I mean no criticism of AEMO for its inability to accurately predict the future. Such inability is surely to be expected considering such rapid technology and demand-side changes. The point here is to show the enormous changes in demand and supply from those that are expected and that no matter what AEMO said the future held, AEMO concluded that their 500 kV NEMLink backbone would be beneficial. This brings to mind Keynes’ response to the challenge about changing one’s mind: “When the facts change, I change my mind. What do you do, Sir?”

The observation of AEMO’s inflexible commitment to its first conclusion, even when the facts drastically change, is seen also in our analysis of AEMO’s recommendations on individual projects, for example in VNI-West. As explained earlier, when AEMO modelled the first leg of what was later renamed VNI-West (i.e. WRL, from Melbourne

to Ballarat) its modelling found that the effect of the interconnector it was recommending would be to increase Victorian brown coal generation to substitute black coal generation (and astonishingly AEMO calculated that this would continue until 2074) and that it would *reduce* wind generation in Victoria. AEMO's analysis showed that this was the main source of the "benefits" of its recommended interconnector.

But when AEMO modelled the benefits of the second leg of VNI-West (from Ballarat to the border with NSW) a year later it claimed that it was mainly justified (to Victoria) on the basis that batteries in NSW would be able to substitute for more expensive pumped hydro storage that would otherwise be built in Victoria.

This explanation seems to have been undermined by AEMO's CEO, who instead said VNI-West was justified on the basis that it would allow rooftop solar generation in Victoria to be exported to NSW! This in turn seems to have been undermined by the Victorian Energy Minister who said that actually VNI-West would mean that Victoria would become a major *exporter* of renewable electricity. Finally, in response to a legal challenge to AEMO's recommendations, the Minister issued Orders in Council absolving AEMO of the obligation to undertake further regulatory assessment of VNI-West.

5.2 Does this critique have friends in the industry?

I don't think my critique is popular in the industry or with market bodies or with customer representatives or environmental advocates (at least not publicly popular although behind closed doors the picture may be different). I suggest the following by way of explanation:

1. Understanding AEMO's analysis requires pain-staking sleuthing through the results of AEMO analysis, rather than acceptance at face value what AEMO says of it. This is difficult, effortful and inevitably controversial. The "truth" (such as it is) does not lie on the surface. Then, challenging a powerful organisation that has significant political and bureaucratic support is intimidating and strategically risky. It can be no surprise that few find this attractive and will rarely side with those who make what are seen as controversial critiques.
2. For their part, state governments depend on AEMO in many ways. Until recently, AEMO planned the Victorian electricity system and it still has carriage of VNI-West. The NSW Govt has hired AEMO to implement energy transition policies in NSW. All states in the NEM depend heavily on AEMO to keep the lights on in their state. And all states now depend heavily on the Australian Government to fund the expansion of renewable electricity, transmission and storage. AEMO's ISP claims to have produced a plan that is consistent with the Australian Government's policies (82% renewable electricity generation by 2030) and they promise almost complete decarbonisation of electricity supply by 2035. Arguing with AEMO is likely therefore to be perceived to be arguing with the Australian Government and so potentially jeopardising the flow of Australian Government funds. These deep dependencies are likely to cause the jurisdictions and Commonwealth to think twice before taking on such a powerful entity.
3. Network service providers have powerful pecuniary incentives to support AEMO because AEMO's plans will drastically expand their regulated assets and hence their revenues and profits. HumeLink and Sydney Ring South, alone, will roughly double the regulatory asset value of transmission in NSW. The Tasmanian on-land

transmission elements of MarinusLink and Battery of the Nation will more than double transmission asset values in Tasmania. VNI-West alone will more than double transmission asset values in Victoria. And, each of these projects are likely to only be the first of many further transmission projects that depend on them. None of the transmission monopolies could have hoped for such big increases to their regulated asset bases if they had proposed them, and so therefore can be expected to enthusiastically support AEMO's proposals.

4. Renewable electricity developers and their associations are (quite reasonably) persuaded that "there is no transition without transmission". A seemingly logical extension is that more transmission means more transition and I think reasoning along these lines has coloured their assessment of the issues here. Even though individual developers have an intense interest in transmission capability, they and their main association the Clean Energy Council are (quite understandably) less disposed to engaging in contentious debate about the arrangements for long term transmission planning. Furthermore, like the jurisdictions and Commonwealth, renewable generators have many important dealings with AEMO (AEMO controls their dispatch, pays them and arranges their network connection) and this affects their willingness to oppose AEMO.
5. What about consumer groups? My experience is that Energy Consumers Australia (ECA) has not engaged in the detail of the ISP or scrutinised its outcomes. ECA's Board Members are appointed by Ministers, on the advice of their officials, and ECA's Board Members have typically previously had careers in public administration, not business. The same is true of the ECA's current and past executive leadership. While ECA seeks to represent consumers, it does so with a keen understanding and background in public administration. The Energy Users Association of Australia (EUAA) also seems to have steered well clear of fundamental critique of the institutional arrangements. It might be that the EUAA prioritises harmonious relationships with the stakeholders that it repeatedly deals with. Evidence that might suggest this is seen in the EUAA's most recent annual conference was sponsored by network monopolies (7 out of the 10 sponsors, the remaining three being a gas producer, petrol retailer and energy retailer). This leaves AEMO's Energy Consumer Panel. This is a panel that was recommended by energy ministers in the process of approving the Energy Security Board's "actionable ISP" rule changes. The panel is constituted in the mold of a "critical friend", a model first adopted by the AER. The panel is made up of respected energy experts, selected by AEMO, who provide advice, for a fee, in response to AEMO requests. The focus of their effort has been on improving the ISP and its inputs and methods, rather than fundamentally challenging it or critiquing its outputs. Their role is specifically specified as such in the Rules. It does not have a mandate to engage in fundamental critique.
6. Finally, I think that most environmental advocates and those keen to see a rapid decarbonisation of electricity supply (I count myself in this cohort) might grumble behind closed doors but have pulled their punches in their public domain criticism of the current arrangements. AEMO says its vision is "enabling net zero" and its plan promises almost complete decarbonisation of electricity supply by 2035. Engaging in fundamental critique of AEMO would seem to be antithetical to those aspirations and undermining of an (apparent) ally in the struggle.

For these reasons I do not think that the unpopularity of my critique calls into question its credibility.

6 Possible improvements

I focus on three areas here: AEMO's governance, transmission planning and consumer representation.

6.1 AEMO Governance

From (relatively) humble origins as an entity responsible only for power system and market operation when the NEM started in 1998, AEMO has grown into a tremendously important organisation with a wide span of operations that now also covers transmission network connection, NEM-wide transmission planning and the execution of energy transition policies on contract to various states.

AEMO's governance has not kept up with the ever-greater responsibilities it now has. Despite its now huge role in the development implementation of policy, AEMO remains a private company limited by guarantee. The constitution of its Board of Directors requires not less than five and not more than 10 directors including the Chair, Managing Director and at least three but not more than six "Directors with Industry Experience". The Chair is appointed by the COAG Energy Council from amongst the Independent Directors and all other Directors (other than the Managing Director) are also appointed by COAG EC. The appointment process involves AEMO's Board Selection Panel (unknown membership) recommending candidates to AEMO's members who must approve their recommended list by resolution before it is sent to the COAG Energy Council who then approve which of those candidates to appoint taking advice from COAG's "Independent energy appointments selection panel" (also unknown membership).

This process is opaque to the public and presumably also to AEMO's members and possibly also even to much of its Board. It seems to me that this arrangement results in an organisation that seems to be answerable to everyone and so answerable to no-one, and thus a law unto itself and to those of its Directors able to drive their agendas behind closed doors.

That an organisation that is now effectively invested with substantial public policy responsibility, is held to account in this way would seem to be problematic. In Britain, the National Energy System Operator, an organisation with similar responsibilities to AEMO (but not including market operation) has recently been nationalised (it legally came into existence on 1 October 2024) and is now owned by the Department for Energy Security and Net Zero and its Board members are appointed by the Government. While the "co-operative federalism" on which the NEM is built is quite different to Britain's unitary system of government, the same public accountability pressures that are relevant here are relevant there too, and the British response to those pressures merits careful study in Australia.

I do not have any specific suggestions on how AEMO's governance should be reformed. The appropriate arrangements should reflect any changes to AEMO's roles and responsibilities. Neither can I suggest a process by which it may be reformed, but I do suggest this should be an important focus of your Committee's attention and recommendations.

6.2 Transmission planning

To recap, in this submission I have argued that:

- optimal transmission plans do not exist and system modelling and cost-benefit analysis can easily be manipulated to get the answers that the modeller wants to get;
- the case for greater NEM-wide interconnection in the fossil fuel generation era that is now coming to a close was tenuous at best; and the evidence suggests that in a decarbonised future there is now no good argument for high-capacity long-distance interconnectors. AEMO's founding "NEMLink" vision has been rendered irrelevant through technologies that AEMO evidently did not foresee;
- as the entity that has an obligation to deliver NEM-wide transmission expansion plans, AEMO is predisposed to find that stronger NEM-wide interconnection is the right answer, regardless of the facts.

On this reasoning the problem is solved by taking away AEMO's NEM-wide planning monopoly. This would not preclude AEMO from compiling the advisory "national transmission network development plans" if it wished to; or participating in an "Inter-regional Planning Committee" (as it used to do); or from offering advice or consultancy services to state government energy departments or network service providers interested in AEMO's advice. Entrepreneurs would continue to be free to develop interconnectors (as they have long been free to). State governments would be free to agree amongst themselves to develop interconnectors (or not to develop interconnectors) and to decide how costs should be shared (as they were able to do before the "actionable ISP" rule changes).

Taking away AEMO's NEM-wide planning monopoly authority (i.e. revoking the "actionable ISP" rules) is easier said than done. Even if your Committee and the Australian Government is convinced by my critique, Rules will need to be changed. The Australian Government can't direct this to happen. Perhaps the Commonwealth might obtain sufficient consensus amongst the members of the COAG Energy Council to be confident that Rule changes to revoke the "actionable ISP" rules will succeed. It might be the case that several members of the COAG Energy Council may be more receptive to such revocation than would seem to be the case at first sight:

- The Tasmanian Government is evidently now coming to the realisation that its Battery of the Nation³⁸ proposals and MarinusLink is a folly, taking account not just of the prodigious cost of MarinusLink (and that Victoria has little interest in imposing the cost on its electricity consumers) but also the enormous expense of re-powering the Tasmanian electricity system, which will be needed if Tasmania is to reliably provide a long duration supply during in the depths of a wind and solar drought in Victoria. [Evidently](#)³⁹ the Tasmanian Government is now giving up on that "vision" and is now seeking to justify MarinusLink as a way to import cheap electricity from Victoria in the middle of the day. Having already halved

³⁸ The departing CEO of Hydro Tasmania pointedly clarified that this term was coined by a previous Prime Minister.

³⁹ <https://tasgreensmps.org/parliament/energy-and-renewables-marinus-link-3/>

size of the actionable project recommended by AEMO, the Tasmanian Government has now instructed its Treasury Department to do a “whole of state” review to consider its merits. And having already spent [\\$103.5m](#)⁴⁰ on MarinusLink, the Tasmanian Government may be wondering anew about the merits of the system of transmission expansion planning that has got it to this point.

- In the case of NSW, its Government is now facing the prospect of having to explain to its consumers that the transmission cost of making Snowy 2.0 useful to NSW will be at least \$6.5bn (three quarters of the regulated value of all existing transmission infrastructure in NSW and well more than the NSW Government received from the Commonwealth for its share in Snowy Hydro). The previous NSW Government had entered into an agreement⁴¹ with the Commonwealth in March 2018 not to seek to recover Snowy 2.0 driven transmission costs from either Snowy Hydro or the Commonwealth. That agreement was made when TransGrid (supported by AEMO) estimated that the Snowy 2.0-driven transmission costs would be \$0.9bn. Evidently badly burned by this advice, perhaps the NSW Government will also be of a mind to consider fundamental change.
- In the case of Victoria, the Victorian Government remains committed to VNI-West but at some point it will have to explain to Victorian consumers that VNI-West will more than double the value of Victoria’s transmission assets, with a commensurate increase in transmission prices in due course. The prospect of compulsory acquisition of land from recalcitrant land-owners will be no less appealing. Perhaps also the Victorian Government has been embarrassed by AEMO’s ever changing rationale for VNI-West and the gap between what the Government expects VNI-West to do and what AEMO’s analysis says it will do. So perhaps the Government of Victoria might also be open to fundamental change.

A high-profile Review, such as the Finkel Review, might provide the basis for a major reform. But the track record on the success of Commonwealth-initiated reviews is not entirely encouraging: even though the Finkel Review rejected the creation of a NEM-wide monopoly planner it took the market bodies just one year to propose fundamental changes and then just another year to implement those changes, to create a NEM-wide planning monopoly ostensibly under the guise of the implementation of the Finkel Review recommendations.

The Commonwealth has limited ability to itself direct change to the Rules. However as a major provider of funding through the Capacity Investment Scheme and the Rewiring the Nation fund, the Commonwealth is now able to greatly influence the energy transition. In respect of its Rewiring the Nation policy, the Government has so far followed AEMO’s advice on the allocation of grant, equity and loans to those projects that AEMO decides should be actionable. The Government has no legal obligation to follow AEMO’s advice and if it decides that AEMO’s advice is not sufficiently convincing it is free to decide to withhold its grant, equity and loan capital from those projects. While this may not be determinative of the fate of those projects (capital might be expected to be found if projects have regulatory approval to recover costs from customers) it will make funding and public support more difficult to secure.

⁴⁰ <https://tasgreensmps.org/parliament/energy-and-renewables-marinus-link-3/>

⁴¹ Clause 8.2 of the Amended and Restated Snowy Regulatory Deed, March 2018 tabled before the Victorian Legislative Assembly.

I therefore suggest that if the actionable ISP Rules are not revoked, the Australian Government should commit to seeking independent review of AEMO's recommendations, and perhaps also establish its own independent expert advice to publicly advise on the Commonwealth's allocation of its Rewiring the Nation funds, rather than to unquestionably support AEMO's actionable projects. Perhaps the COAG Energy Council might similarly commit to seeking independent peer review of AEMO's recommendations.

6.3 Consumer representation

I suggest that significant changes should be considered to the arrangements for consumer representation in the NEM. The dominant entity – Energy Consumers Australia – is a government-appointed monopoly whose costs are imposed on consumers through regulation. This has resulted in highly professional representation from individuals that are skilled in the industry and its administration, but has come at the expense of being able to claim that it is the views of customers that those representatives actually represent.

One way forward might be to approach rate payer, consumer and business associations to encourage them to nominate some of their members to perform the equivalent of periodic “jury service” in energy consumer representation. These individuals should be supported through access to a standing panel of technical advisors who they can select and direct as they choose, to assist them in their task of representing consumer interests. Such a model is likely to result in consumer representation that might be able to claim greater legitimacy as representing the perspectives of households and businesses that actually pay the bills.

Finally, with respect to the “critical friend” consumer panels now common in energy regulation in Australia, the use of such panels is a matter for the relevant organisation. It would however be helpful to be clear that such panels are essentially mechanisms for the provision of consultancy services on the terms established by the client. Such panels can't legitimately be claimed to demonstrate meaningful customer engagement.

7 Summary of this submission

I summarise the evidence and argument presented in this submission as follows:

1. There are many degrees of freedom in the modelling needed to develop integrated system plans. This means that a modeller has considerable freedom to arrive at whatever conclusion they are seeking to arrive at.
2. AEMO's actionable transmission projects reflect deeply biased analysis that has overstated their benefits and understated their costs.
3. NEM-wide planning for a decarbonised future makes even less sense in future than it did in the past where the argument for it was, at best, tenuous. AEMO's bias might be explained mainly by its inflexible loyalty to a vision for transmission expansion that it set out when it first existed as an organisation, and that has since been superceded by technology changes.
4. Decarbonising electricity supply is difficult. The main challenges vary by region and so effective decision-making will rely on effective engagement with local and regional stakeholders, to arrive at compromises they find acceptable.
5. This means devolving the oversight of electricity transmission planning back to the states, where it has been over the long history of electricity supply in Australia.
6. I also suggest that AEMO's governance is problematic and major reform is needed to properly reflect AEMO's significant role in policy development and execution.
7. Finally I suggest the arrangements for consumer advocacy might be improved by ensuring that advocacy is led by actual consumers, rather than by professionals appointed by officials and ministers.

ⁱ <https://www.energy.gov.au/government-priorities/energy-ministers/energy-ministers-publications/actionable-isp-final-rule-recommendation>