VEPC Submission on VNI-West Project Assessment Draft Report (PADR)

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AEMO (Victorian Planning) and TransGrid

By email: VNIWestRITT@aemo.com.au.

Dear Madam/Sir

SUBMISSION ON VNI-WEST PROJECT ASSESSMENT DRAFT REPORT (PADR)

We appreciate the opportunity to make this submission on your VNI West PADR. This submission should be seen in the context of our prior work on transmission augmentations that AEMO has advocated for through its Integrated System Plan (ISP). This includes our submission on AEMO's Draft 2022 ISP; two reports on Marinus Link (here and here); and a submission on TransGrid's HumeLink Project Assessment Conclusions Report.

VNI West together with the "VNI West share" of the Western Renewables Link (i.e. the new North Ballarat substation and the 500 kV upgrade to the lines to the Sydenham substation) will be the biggest transmission augmentation in the history of the NEM[1]. It will increase the regulated asset value of transmission assets in Victoria by about 75%, and so is likely to proportionally increase the average transmission charges in Victoria.

The relative effect of VNI West on transmission asset values will be smaller in NSW, but it will contribute to roughly a doubling of the regulated asset value of transmission assets in NSW that will arise (before counting REZ zone investments) as a result of NSW's share of Project Energy Connect, VNI West, HumeLink and the Sydney Ring augmentation (which is driven by HumeLink).

[1] When properly counting the cost including the North Ballarat substation and upgrade of North Ballarat to Sydenham transmission line, as discussed later.

The VNI West PADR concludes that the benefits of VNI West exceeds its costs (in the ratio of about 1.2 to 1) and so, AEMO/TransGrid argue, it should be developed and consumers in NSW and VIC should pay for. The claimed benefits are that it will defer (mainly) renewable generation and storage for about a decade while under construction and it will avoid some gas-fired generation before, but mainly after, VNI West is built.

AEMO/TransGrid's modelling results show that VNI West will make almost no perceptible difference to renewable electricity production or greenhouse gas emissions over the period that has been modelled (from 2024 to 2048) relative to the Counter-Factual that VNI West is not built. In particular, the modelling ouput spreadsheets reveal that as a percentage of total NEM generation, relative to the Counter-Factual VNI West will:

- reduce generation from gas and diesel generators by 0.5%;
- increase generation from renewable sources by 0.3%;
- increase generation from coal-fired sources by 0.3%;
- reduce greenhouse gas emissions by 0.3%.

The inconsequential impact of VNI West relative to the Counter-Factual can also be seen in the quantity of renewable generation capacity. Over the modelled period, building VNI West is associated with 3,180 MW of additional solar generation but this is more than offset by 3,722 MW less wind generation, for the Step Change scenario.

It bears particular observation that relative to the Counter-Factual, VNI West will *increase* greenhouse gas emissions by 14 $mtCO_2$ (2%) between 2024 and 2033 (Step Change). It does this by increasing electricity generation from coal and decreasing it from renewables in the period to 2034 relative to the Counter-Factual. VNI West therefore undermines the Australian Government's and State Governments' 2030 emission reduction policies, relative to the Counter-Factual.

I do not think that AEMO/TransGrid have made a persuasive argument for the construction of VNI West. To the contrary, the evidence from the modelling seems to substantiate exactly the opposite conclusion. I substantiate this view through four arguments:

1. The Counter-Factual against which VNI West's benefits are established is not consistent with governments' emission reduction policy.
2. AEMO/TransGrid has failed to account for the time value of emissions.
3. Benefits with a present value of $536m that arise after 2048 have been included but the power system is assumed to be full decarbonised by then. Such benefits will not arise.

4. AEMO/TransGrid has defined VNI West in a way that excludes a large amount of its costs and these costs are not assessed elsewhere.

Point 1: The Counter-Factual against which VNI West's benefits are established is not consistent with governments' emission reduction policy

The PADR, as with other regulatory investment tests, is a counter-factual assessment. Benefits are established by comparing the preferred case relative to a hypothetical Counter-Factual. The Counter-Factual (also known as the Base Case) is not objectively known, it is a subjective hypothesis that AEMO/TransGrid have asserted. The construction of the Counter-Factual affects the estimate of the benefits. So, it is possible to pump up the benefits not through any intrinsic property of the preferred project, but by asserting an unrealistic Counter-Factual. I argue that this is what AEMO/TransGrid has done in this PADR and I note that it is consistent, in principle even if not precisely in detail, with what TransGrid has done in the ISP.

Specifically, in the Counter-Factual AEMO/TransGrid assumes less coal generation if VNI West is not built than if it is built (755 TWh for Counter-Factual versus 772 TWh if VNI is built). The 17.3 TWh difference results in roughly 16.4 million tonnes less CO_2 from coal-fired generation in the Counter-Factual. This creates "headroom" for additional gas-fired generation in the Counter-Factual compared to with-VNI (254 TWh in the Counter-Factual versus 223 TWh with-VNI). The additional gas generation in the Counter-Factual soaks up the CO_2 headroom that arises as a result of the lower coal generation in the Counter-Factual, so that the Counter-Factual and VNI cases have similar aggregate emissions over the modelling period.

This arrangement of fossil fuel generation in the Counter-Factual is essential to the calculation of VNI West's benefits. These benefits arise firstly by having more coal-fired generation in VNI West which, in AEMO/TransGrid's calculation, creates a benefit by deferring capital expenditure on storage, wind and solar generation for about a decade. This accounts for about half the benefit of VNI West. Then, when VNI West is commissioned, it is shown to create fuel benefits by displacing the gas-fired generation that is assumed to occur in the Counter-Factual. This accounts for the other half of the benefit of VNI West.

In this way, VNI West is portrayed to be a development that is in the public interest. Exactly the same approach is adopted in the ISP to argue that the "actionable" projects are in the public interest.

But the plausibility of this approach (i.e. the way that AEMO/TransGrid has constructed the Counter-Factual) relies on the assumption that governments' emission reduction

policy does not seek to continually reduce emissions. Instead AEMO/TransGrid assumes that governments are content that any early outperformance would be met with a policy response that then relaxes emission constraints so that the outperformance is then "consumed" by higher emissions (i.e. the gains from early coal generation reductions are later used up with higher gas generation).

This assumption is not consistent with any of the State government emission reduction policies and neither is it consistent with this or the previous Australian Government's emission reduction policies. In all cases, governments have set net zero targets by 2050 at the latest (or "as soon as possible" in the case of the last Australian Government which then changed its policy to "by 2050 at the latest" shortly before the Glasgow Conference of the Parties). In the case of the State governments it was, in all cases, net zero by 2050 at the latest and also with non-trivial 2030 reduction targets.

By adopting the carbon budget approach that it has, AEMO/TransGrid has established a Counter-Factual that inflates the purported benefits of its preferred option, while still being able to claim comparable aggregate emissions for the Counter-Factual and its preferred option over the modelling period. But these purported benefits are based on a bogus Counter-Factual that is inconsistent with governments' policies.

Point 2: AEMO/TransGrid has failed to account for the time value of emissions

In its analysis AEMO/TransGrid has not accounted for the time value of emissions. Emissions are a cost recognised by State and Australian Government emission reduction and renewable electricity policy. Just like the cost of fossil fuels and capital, emission costs must be brought into the analysis and valued to the present for the purpose of establishing the relative balance of costs and benefits.

I address this by calculating the greenhouse gas costs that VNI West will give rise to, compared to the Counter-Factual. These calculations use values of the Social Cost of Carbon (SCC) that range between $100 and $500 per tonne $CO_{2\text{-}e}$[2]. I calculate the emission

[2] For example, Ricke, K., L. Drouet, K. Caldeira, M. Tavoni. "Country level social cost of carbon." Nature (2020) https://doi.org/10.1038/s41558-018-0282-y provide a 66% confidence level estimate of SCC of US$177–805 per tCO_2. In more recent research, Rennert, K., Errickson, F., Prest, B.C. et al. "Comprehensive Evidence Implies a Higher Social Cost of CO2". Nature (2022). https://doi.org/10.1038/s41586-022-05224-9 conclude their preferred mean SCC is USD185 per tCO_2(2020 dollars). For the avoidance of doubt, SCC is a measure in policy evaluation. It does not imply that this is the emission price that policy makers would be willing to include in electricity prices. Indeed in electricity none of the State governments or the Federal Government have agreed

cost using your data on generation dispatch by fuel type, for the Step Change and Progressive Change scenarios. In all cases there is a net emission cost (i.e. detriment). This is because, relative to the Counter-Factual, VNI West *increases* greenhouse gas emissions for the first 12 years and only starts to reduce them after that. Accounting for time preference by discounting future emission costs, correctly establishes the present value of those costs.

The table below presents the outcome of this analysis. It shows a net present emission cost (i.e. detriment or disbenefit) that ranges between $186m and $1,975m for the three estimates of SCC and for the Step Change and Progressive Change scenarios.

SCC ($ / tCO_2) / Modelled scenario	**$100**	**$250**	**$500**
Step Change	$395m	$987m	$1,975m
Progressive Change	$186m	$466m	$932m

Point 3: Benefits with a present value of about $536m that arise after 2049 have been included but the power system is assumed to be fully decarbonised by then. Such benefits will not, by definition, arise.

The emission reduction policy of all the Australian Governments demand full decarbonisation of electricity supply by 2050 at the latest. By definition, from this date, VNI can not deliver any fuel substitution benefit (there is no fossil fuel to substitute). Likewise any claim to capital deferral after 2049 is not realistic for a transmission line that by then will have been in service for 20 years, and in a fully decarbonised power system. Indeed this what AEMO/TransGrid's modelling shows for the last five years of the modelling period. Yet AEMO/TransGrid still assume around $536m[3] of benefits (present value, Step Change) arise after 2049 when the power system is assumed to be full decarbonised. This is not plausible, the number should be zero.

to explicitly include emission prices in electricity prices. This does not affect the calculation of the SCC, a measured used in regulatory and policy analysis.

[3] This is the present value of the $2.044bn residual value in 2048.

Point 4: AEMO/TransGrid has defined VNI West in a way that excludes a large amount of its cost and these costs are not assessed elsewhere

AEMO/TransGrid has excluded the cost of the North Ballarat substation and the North Ballarat to Sydenham 500 kV upgrade from the Western Rnewable Link, from the time that VNI West is commissioned. This cost must therefore be brought into the VNI West assessment from the time that VNI West has been commissioned. This means AEMO/TransGrid has understated the present cost of VNI West by around $300m.

Summary of the main points

Relative to the Counter-Factual VNI West will result in substantial increases in electricity transmission charges; will increase coal generation; makes almost no difference to aggregate renewable electricity generation expansion or greenhouse gas emissions and has a substantial emission cost because it defers emission reductions.

AEMO has advocated for VNI West (or "Snowy Link South" as it was originally known) since Snowy 2.0 was announced. Indeed AEMO's assumption that VNI West would proceed, determined the outcome of AEMO's assessment of the Western Renewables Link. By virtue of these historic pronouncements, AEMO has powerful incentives to deliver an assessment of VNI West that is favourable to it. But taking into account the bogus Counter-Factual, the failure to recognise the time value of emissions, the implausible claims of benefits even after the NEM's electricity supply has fully decarbonised and the under-statement of VNI's costs leads me to the conclusion that VNI should not be built.

From first principles it is not hard to see why VNI West does not stack up. From Sydenham to Wagga Wagga via Ballarat, Bendigo and Kerang is about the distance from Paris to Munich, to put it in geographic markers that are probably more familiar to most Australians. At around $9million per km of 500 kV line, and with three new 500 kV substations (North Ballarat, Bendigo, Dinawan) this is an enormous transmission project.

The supposed benefits of load and generation diversification between NSW and VIC, including stronger access to the generators in the Snowy Mountains, is evidently not nearly valuable enough to cover the cost of this massive transmission project.

This can be no surprise: the cost of producing electricity from the wind and sun (our future) and storying it in batteries of various forms is likely to be much the same in NSW and VIC. Just where, then, can be the value to justify such massive interconnection? It can not be found because, evidently, it does not exist.

Has the decision to build VNI West already been made?

As noted earlier, three years ago AEMO selected the more expensive option for the Western Renewables Project on the basis that much of the cost of that more expensive option need not be counted because VNI West, covering the same route in part, would be built anyway. Similarly in this PADR AEMO included $921m of benefits that it calculates will arise ***before*** the decision to build VNI West is formally made. Evidently AEMO/TransGrid assumes that VNI West will be built and also that investors are already convinced of this and so are altering their investment decisions now[4]. If so, what then is really under consideration here?

Why is an investment contrary to governments' emission reduction policy being advanced?

If the arguments and evidence in this submission withstand scrutiny, it begs the question of why an investment that is contrary to governments' emission reduction policy is being advanced. Might it be that, actually, AEMO/TransGrid do not really believe what they say will happen with and without VNI West; and that what AEMO/TransGrid really believe is that building VNI West will actually facilitate the development of renewables and so will advance, not retard, the decarbonisation of electricity supply?

If this is the case, then why does AEMO/TransGrid's not report this truth as they really believe it to be? One answer might be that the truth of the matter will not satisfy the regulatory investment test i.e. that an outcome that is consistent with emission reduction policy will not satisfy the test. If this is indeed the case – and our critique suggests it is for the project proposed – then AEMO/TransGrid is in the invidious position of choosing the truth it really believes and failing the test, or choosing a falsehood that depends on the use of a bogus Counter Factual, ignoring the time value of emissions and understating costs and so, purportedly although not in actuality, passing the test.

It would seem to me that AEMO/TransGrid has chosen the latter (pursuit of a falsehood the promises, vainly when scrutinised, to pass muster). How can this be convincing to the communities being asked to supply the "social licence" that VNI West and Western Renewables Link so desperately need? Would it not be better to tell the truth and if that fails the regulatory test as it obviously will, that difficulty that should be referred to

[4] As an aside this raises yet another conundrum intrinsic to counter-factual assessments: if investors already anticipate VNI West, then deciding on VNI-West in some future period does not give rise to the benefits that pre-date that decision – if the outcome has already been anticipated it matters not a jot what that outcome utilimately turns out to be and benefits derived in anticipation of that outcome should not be booked to the outcome.

governments to resolve. In EnergyCo and VicGrid, the NSW and VIC Governments are showing great appetite to address these challenges.

Unpriced detriments and other concerns

I draw attention to unpriced detriments including the sterilisation of large tracts of land, the loss of amenity and detrimental social and environmental impacts by communities affected by VNI West. Such detriments should be explicitly included in the evaluation.

Finally I understand that there are now shortages of skilled workers across the economy. Grandiose projects like VNI West that have adverse emission impacts and make no appreciable difference to renewable electricity generation relative to the Counter-Factual, should make way for transmission augmentations that will quickly deliver more renewable electricity generation and that will quickly reduce emissions.

Acknowledgements

I acknowledge, with thanks, helpful comments from Ted Woodley, Simon Bartlett, Hugh Outhred and also AEMO staff in their preliminary responses to questions that arose during the preparation of this submission.

Yours faithfully,

Professor Bruce Mountain
Director