

APPARENT NON-COMPLIANCES IN WRL PACR AND UPDATED WRL COST-BENEFIT ASSESSMENT

This report summarises the apparent non-compliances in the [WRL PACR](#) and updated [WRL cost benefit assessment](#) (*WRL assessments*) in applying the [RIT-T instrument](#) (*RIT*), [NER](#) Chapter 5.15 and 5.16 (*NER*) and the AER [Guidelines for application of the RIT-T](#) to non-actionable projects (*Guidelines*) as summarised below.

Background: In the *WRL assessments*, a market benefit has been credited to option C2 (*C2*), using clause A5 of the *Guidelines*, for a change in timing of investment on [VNI West](#) due to *C2*. In the updated WRL assessment this market benefit totals \$242million NPV. It is the net present value of the annualised capital charges and O&M costs, for extending VNI West to Sydenham from 2031/2032 (assuming VNI West is commissioned in July 2031) to the end of the study period in 2050/51 (*shared 500kV costs*). It has been calculated, by adding to all states of the world, except for *C2*, the *shared 500kV costs*. The reason given for not adding the *shared 500kV costs* to *C2* is that the shared 500kV assets are already part of *C2* so it's unnecessary to extend VNI West to Sydenham. As the *shared 500kV costs* were not added to *C2*, but were added to its counterfactual, the \$242m NPV of the *shared 500kV costs*, is credited to *C2* as a market benefit in the updated WRL assessment. The same assumption in the WRL PACR has credited *C2* with a \$115m NPV market benefit.

Apparent non-compliance with RIT-T paragraph 8(b) which states that “market benefits must not include the costs which meet paragraph 5”. Paragraph 5 states that “costs are the present value of the costs of a credible option”. This is to prohibit crediting market benefits to the credible option for deferring its own expenditure as the credible option must include and justify all of its own costs. However, the market benefit that has been credited to *C2* from changing the timing of the VNI West investment in the *WRL assessments* is the NPV of the *shared 500kV costs*. These shared assets must be built as part of WRL but are later shared with VNI West. This is explained in the updated WRL analysis which states “This sharing of the 500 kV double circuit transmission lines from Sydenham to North Ballarat is in fact the basis for the “Differences in the timing of transmission investment” benefit captured in option C2 in the original WRL PACR”. However, paragraph 8(b) of the *RIT* forbids crediting market benefits based on deferring expenditure on the credible option itself (i.e. *C2*).

Actionable Projects: Paragraph 28 of the *RIT* and the *Guidelines* (second last dot point bottom page 32), state that "actionable projects must form part of all states of the world". This is to ensure that RIT assessments align with the holistic plan of the [ISP](#) including its actionable projects as defined in the ISP. The 2022 ISP identifies VNI West as an actionable project defined in Table 6 and page 74 of the ISP and in Appendix 5 as “terminating north of North Ballarat 500KV substation”. It is not defined as extending to Sydenham. Whilst the definition of an actionable project in the *RIT* includes a project that meets the identified need in the ISP, the purpose of the *WRL assessments* is not to seek regulatory approval for VNI West. When undertaking a RIT-T for a non-actionable project, the *RIT*, *NER* and *Guidelines* do not require or legitimise changing the scope and cost of an actionable project in some, but not all states of the world. The explanation in the updated WRL assessment that this is necessary “to ensure the internal consistency of some states of the world”, does not comply with paragraph 28 of the *RIT* and *Guidelines* that "actionable projects must form part of all states of the world”. Not including the same actionable VNI project in all states of the world has actually created an inconsistency that generated the \$242m/\$115m NPV market benefit wrongly credited to *C2* and forbidden by the *RIT* itself.

Clause A5: This is the clause used in the *WRL Assessments* to justify crediting the \$242m/\$115m market benefit to *C2* for a change in VNI West timing. It states: “*A credible option may change the timing (or configuration) of other investments to be made (or for) the RIT-T proponent in the future. Market benefits from changes in timing of expenditure should not refer to expenditure on other investments with the same identified need as the set of credible options under consideration. RIT-T proponents derive the market benefits of all credible options by comparison against a common base case without any credible option in place. As such, a RIT-T proponent should view any transmission investment directed towards the same identified need as a (or part of a), competing credible option. The RIT-T proponent will therefore exclude these competing options from the base case. Therefore, the RIT-T proponent should only account for changes in the timing of transmission investments that address different identified needs to those that the credible option addresses. It is not clear whether or how many investments this category would include.*” As explained below, Clause A5 does not appear to apply to the WRL/VNI case where WRL’s 500kV assets are shared with VNI West. It appears incorrect to credit *C2* with a market benefit due to a change in timing of VNI West investment, because

- (a) *C2* does not change the timing (or configuration) of the future investment in VNI West
- (b) *C2*’s 500KV assets are part of *C2* and funded by *C2*, although they are later used by VNI West (terminating at North Ballarat substation) to meet its identified need.
- (c) There is only one investment in these shared assets, by *C2* when it is built, so there can’t be a future investment in the same assets by VNI West to be deferred.
- (d) Regardless of VNI West’s timing, *C2* determines the cost and timing of the shared 500kV assets

- (e) Extending VNI West to Sydenham in 2025, would be part of a competing option in the *WRL assessments*. Clause A5 requires competing options to be excluded from the common base case. As the *WRL assessments* included it in the C2 base case, the \$242m/\$115m market benefit was incorrectly credited to C2.

The *WRL assessments* do not appear to comply with paragraph 8(b) of the *RIT*, in crediting a market benefit to C2, which totals \$242m/\$115m NPV. Paragraph 28 of the *RIT* and the *Guidelines* require actionable projects in all states of the world and don't justify extending VNI West to Sydenham in only some states of the world. Clause A5 of the *Guidelines* has been incorrectly applied in the *WRL assessments* to credit C2 with a market benefit for changes to the timing of the VNI West investment. Removing the incorrectly applied market benefit in the *WRL assessments* would make B3 the preferred WRL option and may result in C2 having a negative net market benefit.

OTHER APPARENT NON-COMPLIANCES IN THE *WRL ASSESSMENTS*: The following apparent non-compliances may have incorrectly increased the net benefit of C2 by a further ~ \$100m.

Using “sunk costs” to deduct \$47m from C2 : In section 7.4 of the updated WRL cost benefit assessment, “*the AEMO TCD capital cost estimate for C2 has been reduced by \$47m being an amount equal to the estimated cost of the works relating to C2 that have already been completed (that is, the C2 sunk costs). These sunk costs would now need to be paid in all states of the world and therefore no longer influence the selection of the preferred option. Deducting these sunk costs from C2, reflects the future costs consumers would need to pay if this option were to remain the preferred option following a reapplication of the RIT-T. This reflects usual accounting practice.*” Not only does this seem illogical, but paragraph 5 of the *RIT*, *NER* clause 5.15A2(8)(i), and clause 3.5 of *Guidelines* require the RIT-T to include the direct cost of constructing each credible option. The \$47m of past expenditure on C2 should not be deducted from the cost of C2 as it will be part of the direct cost of C2 if it proceeds. Nor should it be added to the C2 counterfactual, or to the costs of B3 or its counterfactual. The \$47m is not part of the construction cost of B3 or a cost of any counterfactual. If C2 does not proceed, the past expenditure on C2 may need to be paid to AEMO's WRL contractor, depending on the associated contract, which is confidential. There would not be any transmission asset created by the cancellation of C2, nor would there be a RIT-T assessment to justify including any associated transmission asset in any TNSP's regulated asset base hence the wasted \$47m could be passed onto electricity consumers via an increased TNSP RAB, increased transmission revenue and charges. Any costs from terminating or varying the WRL contract would need to be managed in accordance with the legal framework for passing these costs through to market participants and electricity users.

Other “sunk costs” excluded: The third paragraph of section 7.4 of the updated WRL cost benefit assessments states “*The 'minor augmentations' referenced in Table 1 above form part of both C2 and B3 in the WRL PACR. Both C2 and B3 in the WRL assessments include the estimated capital cost and present value costs for the 'minor augmentations'. The minor augmentations were completed in 2021 and are now sunk costs. Therefore, these costs have not been included within the TCD estimated costs for C2 or B3.*” However, as explained above, paragraph 5 of the *RIT* requires the full cost of each option to be included. The same applies to the costs of the two 500kV exits, 500kV switching bays and associated secondary systems at Sydenham that C2 would require. These assets were recently constructed under an Ausnet Services replacement project, however it appears that the scope of that project also included the additional two 500kV bays for C2. The exclusion of the “sunk” cost of minor augmentations and Sydenham substation costs required for C2 does not appear to be valid under *RIT* paragraph 5 which requires a credible option's full direct costs to be included in the *WRL assessments*.

Economic Analysis Methodology used in *WRL assessments*: Paragraph 5 of the *RIT*, *NER* clause 5.15A2(8)(i) and clause 3.5 of *Guidelines* do not include annualised capital charges as an allowable class of costs or cost to be included in a RIT-T assessment. “*Costs can be included if they are incurred in constructing and providing the credible option*”. Likewise, paragraph 11(d) of the *RIT* requires “*market benefits to be determined from the changes in the timing and investments of other parties*” and do not permit the use of annualised capital costs of modelled generation, storage and transmission to determine market benefits. By using annualised costs and annualised market benefits in the *WRL assessments* instead of compliant capital investments, operating costs and terminal values, the NPV of benefits over the modelling period (associated with shorter-life generation and storage infrastructure) could be overstated (possibly by as much as 26%), relative to the NPV cost of the WRL transmission investments which have much longer economic lives. This is because the 7.5% p.a. annuity for a 25-year generation asset is 26% higher than the 5.9% p.a. annuity for a 50-year transmission asset. This discrepancy may be compounded by not including the residual costs of the generation/storage assets in the calculation of market benefits which would further overstate the NPV of the market benefits. Another reason is to ensure that costs and benefits are measurable in accordance with paragraph 4 of the *RIT* which requires “*Any cost*

or market benefit that cannot be measured as a cost or market benefit to those who produce, consume and/or transport electricity in the market must not be included in any analysis under the RIT–T”. Page 31 of the updated WRL analysis states that “capital investment in generation, storage and transmission infrastructure has been converted into an equivalent annual annuity”. The same methodology has been used in the WRL PACR where figure 10 shows that annualised costs were used to calculate the market benefits and WRL costs. Whilst the use of annualised costs of alternative investments are compliant for the purpose of long-term investment planning where the assets have different economic lives, the *RIT, NER and Guidelines* require up-front capital investments, annual O&M costs and terminal values to be used to determine the net market benefits of credible options.

Savings in REZ Transmission Investments: C2 has been credited with a market benefit of \$154m NPV for savings in REZ transmission investments, in the updated WRL assessment. In contrast, the savings in the WRL PACR was zero. Little information is provided on how this large market benefit was calculated. Given that the WRL up-dated assessment was undertaken at the same time as the VNI West PADR, it is reasonable to assume that the same methodology was used to derive this market benefit in both assessments. In the case of the VNI West PADR its \$204m market benefit was obtained by treating all transmission developments on the Optimal Development Path (ODP) in the ISP 2022 as actionable projects – i.e. assumed to be developed in every state-of-the-world at the timing published in the ISP. This method appears to be non-compliant with paragraph 28 of the RIT and may have exaggerated generation/storage capital deferral market benefits and fuel cost savings market benefits as well as erroneously crediting VNI West with its \$204m NPV of market benefits for avoiding/deferring REZ transmission investments across the NEM. Following is the limited information in the updated WRL assessment report which indicates that a similar methodology has been used and that WRL may have been incorrectly credited with the \$154m market benefits for deferrals in REZ transmission:

- (a) the increased transmission limits to the Western Victorian REZ are 520MW for WRL and 550MW for VNI West; and 1,600MW for Murray River REZ due to VNI West.
- (b) REZ transmission limits are a key input driving the benefits of each option
- (c) REZ transmission limits for C2, B3, and VNI West are inputs to the energy market model.
- (d) Deferrals of Victorian and/or other State REZ developments (that is, where, in the absence of the WRL Project, the transmission infrastructure servicing locations other than the Western Victoria REZ needs to be expanded because the generation from the Western Victoria REZ does not eventuate due to the lack of transmission network power transfer capability within and from the Western Victoria REZ to load centres).

It should be noted that REZ transmission expenditure should be justified in the model from savings in generation/storage capital investment and fuel savings for REZ’s with higher solar/wind resources, hence any change in timing of REZ transmission investments cannot be credited to WRL or VNI West. Consequently, it appears that the \$154m NPV market benefit credited to C2 and \$138m NPV market benefit credited to B3 may also be non-compliant and erroneous and should be removed from the WRL updated assessment.

Terminal Value Methodology: Clause 5.2.10 of the WRL updated cost benefit assessment states “As noted in the ISP Methodology (that has been adopted and applied for this analysis and the 2022 ISP), beyond the modelling horizon there is an inherent assumption that costs and market benefits are neutral for the remaining economic lives of the credible options”. However, clause 3.12 of the *Guidelines* states “RIT–T proponents should also include any relevant and material terminal values into their discounted cash flow analysis, where appropriate – that is, where the expected economic life is longer than the modelling period. Terminal values represent a credible option’s expected costs and benefits over the remaining years of its economic life after the modelling period. It is best practice for RIT-T proponents to explain and justify the assumptions underpinning terminal value calculations.” Table 10 of the WRL updated assessment summarises C2’s market benefits for the period up to 2050/51. Following is an examination of the four highest value categories of benefits to assess the likely value of C2’s benefits over the remaining years 2051/52 to 2074/75.

- (a) Other network investment cost savings is the largest claimed benefit at \$242m NPV, however as demonstrated above this market benefit appears to be erroneous and does not comply with the *RIT, NER and Guidelines*. For the same reason, there is unlikely to be any such savings beyond 2050/51.
- (b) Avoided and deferred investment in generation and storage at \$140m is believed to be overstated for the reasons given above. Figure 10 in the WRL PACR shows that this category of market benefits starts to decline from 2025 onwards and from 2033 remains unchanged. Given the WRL assessments have (incorrectly) used annualised costs to determine market benefits and that the economic life of OCGT’s, solar and wind-power is 25 years and batteries 20 years, this category of market benefits would be expected to end in around 2050, with zero benefits during the remaining 25 years of the economic life of WRL. This is consistent with the NEM completing its transition to renewables by 2050.
- (c) As explained above, market benefits from avoiding/deferring REZ transmission investments appear to have been incorrectly and non-compliantly credited in the *WRL assessments* and will also not exist beyond 2050.

(d) FOM savings of \$93m at avoided or deferred generation is unlikely to continue beyond 2050 for the reasons given in (b) above.

Paragraph 5(b) of the RIT-T instrument, NER Clause 5.15.A.3(b)(6)(11) and clause 5.22.5 of the Guidelines, require the RIT-T proponent to quantify O&M costs for each credible option and to provide a breakdown of the O&M costs in the PACR. This is because accumulated O&M costs, at 3.5% pa of the capital cost, would be 175% of the capital cost of a transmission asset over 50 years and in the interests of transparency. The WRL PACR assumed WRL's O&M costs of 3.5% pa but the WRL updated assessment assumed just 1% pa. Corrosion of transmission towers, conductors, earth-wires and insulators will require substantial non-routine O&M expenditure during the second half of WRL's 50-year life. There would also be substantial additional costs to replace obsolete substation equipment including electronic equipment such as control systems, communication systems, relays and other digital systems. Deteriorating insulation will drive replacement of transformers and reactors and the entire substation has an economic life of only 40 years. Table B3 of the AER's 2022 Annual Benchmarking Report – Electricity Network Service Providers – November 2022 has been used to demonstrate that the combined OPEX + CAPEX annual cost expressed as a percentage of the undepreciated asset base is close to 3.5% pa for all east coast TNSP's. Note that their CAPEX is mostly the cost of replacement and refurbishment of ageing assets, hence this component should be included in the life-cycle costs of transmission assets. The 1% allowance for WRL's total annual costs is clearly insufficient to cover the above non-routine costs from 2051/52 to 2074/75. If the total O&M costs increased to the 3.5% pa during the remaining 25 years (based on the 3.5% p.a. in the WRL PACR which aligns with the AER benchmarking), the total O&M costs beyond the modelling period for C2 would total \$645m whereas the market benefits would quickly fall away to zero based on the above. This would mean that the costs could exceed benefits by at least \$500m with an NPV of about \$47m, meaning that the NPV of C2's terminal value would be ~negative \$47m and B3's ~negative \$32m.

Under Clause 3.12 of the Guidelines, C2's terminal value must represent its expected costs and benefits over its remaining economic life. The assumption in the WRL assessments that the costs and benefits neutralise each other in that period, appears unjustified based on the above assessment which concludes that C2's terminal value may ~negative \$47m NPV and B3's negative ~\$32m. There is no explanation or justification given in the WRL assessments for the assumptions underpinning the terminal value calculations or for the low 1% pa O&M costs in the updated WRL assessment.

Changing the VNI WEST/WRL connection point: AEMO and TransGrid intend to investigate new VNI West routes in the VNI West PACR and claim this requires changing the VNI West/WRL connection point. They explain that changing the VNI West/WRL connection point would require C2 to omit the North Ballarat 500/220KV substation and to extend the 500KV part of C2 to the west of Ballarat by up to 100kms to a new 500/220KV substation that would be included in the scope and cost of C2. There would be very substantial changes to C2 with increased construction costs, O&M costs, environmental and social impacts. C2 would then include up to 100kms of additional 500kV transmission line and the new 500kV/220kV substation which based on the average cost of VNI West (\$8.2m/km = \$3.3bn/400km) could cost up to \$800m which would be removed from VNI West, and added to C2 and advanced from completion by 2031 to 2026.

Use of Incremental costs: AEMO & TransGrid are proposing to use incremental costs in the combined VNI West/WRL assessment calculated from the AEMO Transmission Cost Database (*TCD*). However, paragraph 5 of the *RIT* requires the full cost to be included in the RIT-T, not incremental costs, otherwise large costs may “fall between the gaps” between the VNI PACR and the WRL PACR. Also, Table 3 of the WRL updated assessment shows that *TCD* cost estimates must be increased by some 40% to allow for adjustments, risk allowances and indirect costs not included in the *TCD*. Early works costs including easement costs must also be added to the *TCD* cost estimates for the wider easement required for a 500kV double circuit line from Ballarat to the new connection point.

Overall Possible Financial Impact Taking into consideration the potential additional costs and reductions in market benefits identified in this report, it appears that neither C2 nor B3 should have passed the AER Regulatory Test in the *WRL assessments* and could deliver a net cost to customers of more than \$500m NPV is the proposed change in the VNI West/WRL connection point is also taken into account. This would be inconsistent with the National Electricity Objective and could swamp any net benefits from developing VNI West. The substantial changes to C2, would appear to trigger NER clause 5.16.4 (z4) (2) would require the RIT-T for WRL to be re-applied under NER clause 5.16.4 (z3) unless otherwise determined by the AER.

Author: Professor Simon Bartlett AM (BE, BSc, FIEAust, FTSE, FAICD, MIEEE, CPEng)