

## APPARENT NON-COMPLIANCES AND MAJOR ERRORS IN WRL PACR

**Introduction:** In addition to the apparent non-compliances listed in the report “[Apparent Non-Compliances in WRL PACR and Updated Assessment](#)” (report on WRL assessments), further apparent non-compliances in the [WRL PACR](#) (PACR) are identified below. Very significant apparent errors have been found by analysing the excel spreadsheets that calculated the NPV of costs and benefits crucial to the RIT-T financial assessments for the WRL PACR. One of these spreadsheet errors omitted 93% of the O&M costs for both options noting that the correct O&M costs for option C2 (C2) would require a total expenditure over its economic life of 175% of its capital cost and 190% for option B3 (B3). The apparent additional non-compliances and significant errors are documented below and appear to have erroneously increased the net benefits of both WRL options. Had these errors and non-compliances not been made, the PACR would have concluded that both options would deliver very significant negative net benefits and not pass the AER Regulatory Test. Other abbreviations used in this report include: [RIT-T instrument](#) (RIT), [NER](#) Chapter 5.15 and 5.16 (NER), AER [Guidelines for application of the RIT-T](#) to non-actionable projects (*Guidelines*).

**Background:** The financial calculations for the PACR are performed in excel spreadsheets accessible via the link “market benefit calculations” on the AEMO WRL website link <https://www.aemo.com.au/initiatives/major-programs/western-victorian-regulatory-investment-test-for-transmission/reports-and-project-updates>.

The excel page labelled BENEFITS – OPTION C2 (C2 spreadsheet) and the corresponding B3 spreadsheet are referenced below including the relevant columns and row numbers to access relevant data that has been used to identify apparently gross errors in the calculations. The C2 spreadsheet includes the financial calculations for C2’s costs, both capital and operating, as well as the market benefits for generation/storage capital savings and fuel cost savings (calculated from differences between the C2 and an undisclosed base case spreadsheet.) for every one of the ten scenarios used in the PACR assessment. It also includes the calculation of market benefits for C2 deferring VNI capital expenditure. The B3 spreadsheet includes the same calculations for B3. There are also spreadsheet pages for common assumptions and comparisons. The report on WRL assessments has already provided details of apparent non-compliances that would invalidate the savings from deferring/reducing VNI capital expenditure in C2 as well as overstating the market benefits from deferring generation/storage capital investment and fuel cost savings. The apparent non-compliances and major errors identified below are in addition to the issues identified in the report on WRL assessments. The absence of any information on the base case has made the task of checking the market benefits for C2 and B3 difficult and complex.

**(a) Estimation of WRL capital expenditure:** Table 14 on page 40 of the PACR summarises the four capital expenditure estimates (CAPEX) obtained by AEMO for B3 and C2 (with C2 separated into its 220kV and 500kV components). It shows that AEMO used the average of the four CAPEX estimates in the PACR, and that the AusNet Services’ C2 CAPEX was \$48m higher (10.1% and ~\$38.5m NPV) than the assumed C2 CAPEX of \$473m used in the PACR. AusNet Services CAPEX estimate for the 500kV part of C2 was \$36m (12.6%) higher than the \$285m used in the PACR. This could reflect the higher risks and complexities of 500kV projects for which Table 3 of the WRL updated assessment has added ~40% for adjustments and risks. Ausnet Services CAPEX estimate for B3 was only \$19m (5.7% and \$16m NPV) greater than the \$335m used in the PACR. As an experienced TNSP, AusNet Services would be aware of these higher risks and factor them into their cost estimates provided to AEMO whereas the cost estimates from other contractors may not. In the text above Table 10, the PACR states that AusNet Services also provided details of the “Division of costs between CAPEX and Operating expenditure (OPEX)” as well as administration and overheads. Experienced TNSP’s like AusNet Services know that the AER allows costs incurred in delivering a major project to be split between OPEX and CAPEX where the OPEX is an allowable operating expense and the CAPEX is rolled into the TNSP’s regulated asset base as the project progresses. Both increase the TNSP’s regulated revenue and the cost charged to electricity users. These OPEX costs in delivering a major project would normally be in addition to the Operation and Maintenance costs (O&M) which the PACR shows have been estimated at 3.5% of the project CAPEX for C2 and 3.8% for B3. It appears that only the CAPEX component of AusNet Services estimates has been included in Table 14. This could mean, that in addition to the \$48m difference between AusNet Services CAPEX estimate and the \$473m CAPEX estimate used in the PACR, there may also be an OPEX cost incurred in delivering the project in addition to the 3.5% O&M. The spreadsheet C2 (column D, lines 6 to 10) indicates that an additional \$25.983m (5.5% of C2 CAPEX and \$22.8m NPV) has been added to C2. Spreadsheet B3 indicates that an equivalent \$32.624m (9.7% and \$28.5m NPV) has been added to B3. This could be the estimated split of project expenditure allocated to OPEX, which would increase the total cost of constructing/delivering each project to \$499m and \$368m respectively. No explanation is given in the PACR for these additional expenditures or why the percentage amount added to B3 is almost double that added to C2. Taking both of the above potential cost increases into account, had the AusNet Services cost estimates been used, the total cost of delivering C2 could

have been \$74m greater (15.6% with \$61.3NPV) than the *PACR*'s \$473m and *B3* could have been \$52m greater (15.5% and \$44.3 NPV) than the *PACR*'s \$335m. Despite AusNet Services significantly greater cost estimates, they were subsequently awarded the contract by AEMO to deliver, finance and operate/maintain *C2*, which could indicate that the *C2*'s cost could be ~15% greater than the \$473m CAPEX stated in the *PACR*. **Based on the above, the potential increase in *C2* costs could be \$61.3m NPV and \$44.3m NPV for *B3* compared with the costs in the *PACR*.**

**(b) Calculation of NPV of WRL's CAPEX:** 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". Paragraph 11(e) of the *RIT, NER* clause 5.15A2(b)(v) and clauses 3.7.3 and A5 of the *Guidelines* allow market benefits to include changes in timing of transmission investments but not changes in annualised capital charges. This is to ensure that investment required to fund the full CAPEX is included when it is required. By using the theoretical concept of annualised capital charges instead of transmission investment costs to calculate the NPV of the capital cost of credible options, the NPV of costs to the end of the modelling period (i.e., 2034) could be substantially understated. However, Column C, lines 25 to 42 of the *spreadsheet*, shows that the NPV of option *C2*'s CAPEX has been calculated from the annualised capital charges up to 2034. This could understate the NPV of CAPEX by some \$163m for *C2* during the modelling period. The *spreadsheets* also shows that a residual value of \$377m has been included in 2035 based on the undepreciated value of the capex. Clause 5.3.3 of the *Guidelines* requires the terminal value to "represent an asset estimated costs and benefits during the remaining life of the asset", rather than assuming the undepreciated cost of the asset. That significant non-compliance was identified in the report on *WRL assessments*, however, there appears to be other apparent non-compliances, inconsistencies and errors in the financial methodology and calculations used in the *spreadsheets*. For example, the spreadsheet financial modelling has combined annualised costs during the modelling period with a residual value at the end of the period, calculated from the undepreciated CAPEX using straight-line depreciation. This is like terminating a bank loan 10 years into its 50-year term and expecting the residual value of the loan to reduce by 20% (10/50) whereas the actual outstanding loan would be much larger because the annualised loan repayments are mostly used for interest on the larger loan balance in the first 10 years. The non-compliant financial modelling in the spreadsheets assumes straight line depreciation whereas sinking-fund depreciation would be required to be financially and mathematically correct. In addition, the *C2 spreadsheet* has used only the \$473m CAPEX to calculate residual values, whereas the *PACR* states that AEMO adds interest during construction to the CAPEX which from the spreadsheet appears to be ~10%. **All of the above apparent non-compliances and errors, appear to have incorrectly reduced the cost of *C2* by an estimated ~\$24m NPV and *B3* by an estimated ~\$16m NPV.**

**(c) Calculation of NPV of O&M costs.** The *PACR* states that the estimated O&M for *C2* is 3.5% pa of its CAPEX and 3.8% for *B3*. No explanation is given why the percentage O&M for *C2* is lower than *B3*. In column D, lines 25 to 42 of the *C2 spreadsheet* the annual O&M expenditure has been calculated as 3.5% of the annualised capital charges of \$32.9m pa rather than 3.5% of the CAPEX of 473m. This major *C2 spreadsheet* error has understated the O&M of *C2* by \$15.4m p.a. for every year from 2025 to 2034 with an NPV of \$84.5m. In addition, column D, line 42 of the *C2 spreadsheet* show a residual O&M value of only \$13m whereas the NPV of \$16.5mpa over the remaining 40 years would be \$248m some \$235m greater than the *C2 spreadsheet* and with an NPV of ~\$92.5m. **The total understatement of O&M costs for *C2* because of the above *C2 spreadsheet* errors is \$177m NPV. The equivalent errors for *B3* have understated its O&M costs by some ~\$145m NPV.** This may be in addition to making no allowance for non-routine O&M costs as the assets ages as identified in the report on the *WRL assessments*.

**(d) Calculation of NPV of changes to transmission network (i.e., VNI West) costs:** Column N lines 26 to 48 of the spreadsheet shows that the base case includes the additional capital annuities for extending VNI West to Sydenham (which is really the 500kV part of *C2*) from 2035 to 2040 plus its residual value. The investment in these assets must clearly be made when *C2* is built and there is no second investment in these same assets by VNI West to be deferred. Paragraph 8(b) of the *RIT* forbids crediting market benefits based on deferring expenditure on the credible option itself (i.e., *C2*). This non-compliant market benefit has been calculated from the capital annuity of \$20.7m pa for six years and a residual cost of \$260m with a total NPV of \$115m. In the *PACR*, this has incorrectly **increased the benefits of *C2* by \$115m NPV but not changed the benefits of *B3*.**

**(e) Calculation of NPV of fuel cost savings:** Columns A to F, rows 99 to 116 of the *C2 spreadsheet* show that the residual values for fuel cost savings have been calculated from the fuel cost savings from the final year 2034 assuming they will continue at that level for the next 40 years beyond the modelling period. However, the fuel cost savings have declined 30% (i.e., from \$25.1m to \$17.8m the 4 years from 2031 to 2034) as shown in the

*spreadsheet* for the base-case scenario, hence it appears illogical for the *PACR* to assume that fuel cost savings remain at the 2034 level for the next 40 years. The high fuel cost savings in the *PACR* may be driven by its assumption that Victoria’s brown-coal fired power stations will continue to operate until 2075 which is clearly inconsistent with current predictions of much earlier retirement dates. Also, no allowance has been made for the expected effects of VNI West to reduce fuel costs or the effects of the apparent non-compliances identified in the report “Apparent non-compliances in the VNI West *PADR* and proposed approach to the *PACR*” which may also overstate fuel cost savings. The residual value for the fuel cost savings across the NEM in the base case scenario for C2 is \$267m (\$111m NPV) compared with \$189m (\$79m NPV) for B3. Should fuel cost savings continue to reduce by 30% every four years beyond the modelling period, the fuel cost savings would reduce by 75% by 2050 and the NPV of the residual fuel cost savings would be less than half of those calculated in the *PACR spreadsheet* for the base case scenario. That alone **would reduce the NPV of the residual fuel cost savings by \$57m NPV for C2 and \$40m NPV for B3.**

**(f) Calculation of NPV of savings in generation/storage costs.** Columns A to C, lines 78 to 96 of the *C2 spreadsheet* shows that the savings from deferring/avoiding generation/storage capital has reduced 67% from its peak of \$73.7m in 2024 to its lowest level of \$17.3m in 2034. However, the residual value of \$68.9m in the *C2 spreadsheet* assumes that these savings will continue at the 2034 level for the next 40 years. Given the declining trend and that the economic life of generation/storage assumed in the *PACR* is 15 years for batteries, 20 years for wind and 30 years for solar and PHES, it is expected that the capital savings would continue to decline beyond the modelling period and be negligible by 2055, 30 years after the generation/storage was avoided/deferred. This would reduce the residual values by ~75% which would reduce the NPV of the generation capital savings for both C2 and B3 by ~\$21m NPV.

**Estimated total financial impact of the above non-compliances and other matters.** The total financial impact of the above non-compliances and *spreadsheet errors* in the *PACR* could increase the costs and reduce the benefits of C2 and B3 by the following amounts, thereby **reducing the net benefits of C2 to negative \$304m NPV and B3 to negative \$197m NPV.**

<b>Option C2</b>	from PACR	(a)	(b)	(c)	(d)	(e)	(f)	Adjusted PACR
Gross Benefits	\$515m	-	-	-	(\$115m)	(\$57m)	(\$21m)	\$322m
Costs	\$364m	\$61m	\$24m	\$177m				\$626m
Net Benefits	\$151m	(\$61m)	(\$24m)	(\$177m)	(\$115m)	(\$57m)	(\$21m)	<b>(\$304m)</b>
<b>Option B3</b>	from PACR	(a)	(b)	(c)	(d)	(e)	(f)	Adjusted PACR
Gross Benefits	\$351m	-	-	-	-	(\$40m)	(\$21m)	\$290m
Costs	\$282m	\$44m	\$16m	\$145m				\$487m
Net Benefits	\$ 69m	(\$44m)	(\$16m)	(\$145m)	-	(\$40m)	(\$21m)	<b>(\$197m)</b>

There appears no doubt that (c), the spreadsheet error that omitted ~93% of the O&M costs for both options for 50 years must be corrected. This adjustment alone would reduce C2’s net benefits to negative \$26m NPV (i.e., \$151m - \$177m) and B3’s net benefits to negative \$76m NPV (i.e. \$69m - \$145m). There is also no doubt about removing (d) the \$115m market benefit incorrectly credited to C2 for deferring its own \$235m investment in its 500kV assets as this investment must clearly be made when C2 is built and there is no second investment in these same assets by VNI West to be deferred. This would further reduce the net benefits of C2 by \$115m to negative \$141m NPV. Whilst the other reductions in net benefits (a), (b), (e) and (f) totalling another \$163m NPV for C2 and \$121m NPV for B3, may take more time for AEMO to review, it appears clear that the *PACR* should have concluded neither C2 nor B3 would deliver a positive net benefit and that neither should have been selected as the preferred option. The only cases permitted under the *NER* to be selected as the preferred option are where an identified need is for reliability corrective action or for providing inertia network services under *NER* clause 5.20B.4, or providing system strength services under *NER* clause 5.20C.3.e. WRL does not appear to be meet of

**these exceptions. Proceeding with other category of regulated transmission projects that have a significant negative net benefit could be contrary to the National Electricity Objective.**

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