



Final: SP AER28 – Description of process followed to identify priority projects for NCIPAP – 19/07/13

Please provide a document that describes the process that SP AusNet conducted to determine the specified limits and to identify priority projects under the Network Capability component of the STPIS.

SP AusNet Response:

This document incorporates additional detail to the original response to AER28, as requested by the AER, and also includes input from AEMO.

SP AusNet and AEMO followed the process described below to identify network constraints that can be resolved through minor capital or operating expenditure for inclusion in the AER's Network Capability Incentive Parameter Action Plan (NCIPAP). SP AusNet provided information on plant and network ratings and cost estimates, and AEMO undertook the planning review and has assessed the economic benefits of the projects included in the NCIPAP.

Some of the steps described below were progressed in parallel to meet the TRR submission deadlines.

The key steps of the process were as follows:

1. SP AusNet and AEMO jointly identified network constraints for normal flow paths¹ for every transmission circuit and injection point for the Victorian Transmission System by comparing the rating of each component (interplant connections, switchgear, secondary plant, etc.) with the rating of the relevant transmission circuit, major power transformer or connection point. Constraints were identified in the form of network elements which limit flows based on their thermal current ratings. The assessment included consideration of the influence that ambient temperature have on transmission line and power transformer ratings². Transformer cyclic ratings have been used rather than the nameplate ratings, consistent with the planning practices used by AEMO and the Victorian Distribution Businesses. This step of the review focused on thermal limits rather than voltage stability or dynamic limits, notwithstanding the fact that some of the thermal limitations identified may not be economic to address as the voltage stability or dynamic limits might be

¹ Non-standard network operating configurations, like contingency scenarios, were not considered in this step. These were assessed later to ensure all possible network operating scenarios were considered.
² Summer and winter ratings are defined for transmission lines and power transformers in SP AusNet's ratings database – RADAR. The summer ratings are lower than the winter ratings. Constraints normally occur in summer when demand is higher and line and power transformer ratings lower. Transmission line ratings are based on a wind speed of 0.6 m/s and 35 deg C or 5 deg C ambient temperature for the summer and winter ratings respectively. Intra and extrapolation are used for ratings at different ambient temperatures using the summer and winter ratings.



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lower than the thermal limit. AEMO agreed to undertake the planning review of the NCIPAP, which identified where this was the case.

2. Software changes were made to SP AusNet's ratings data base (RADAR) so that network constraints for all possible flow paths (special operation and contingent scenarios) could be assessed.
3. Once the limiting element was identified, a project to replace the element with a higher rated element was scoped and compiled in a list of potential NCIPAP projects. Major plant (e.g. power transformers and transmission lines) was excluded due to the significant cost to augment the capacity of these network elements, which are by definition excluded from the NCIPAP.
4. AEMO also identified operational network constraints for some transmission lines with potential for increased ratings through dynamic line model development and wind monitoring schemes.
5. Other projects in the list of potential NCIPAP projects included new control schemes to manage overvoltage and plant overload following contingencies and fault level withstand capability assessments to allow for future increase in fault levels.

From this list, SP AusNet and AEMO identified some projects which needed to be undertaken before summer 2012/13, and some that were already approved to remove network constraints. These projects were excluded from the NCIPAP.

6. SP AusNet identified further network constraints based on all possible flow paths and provided the list of constraints to AEMO for AEMO's planning review of the economic benefits of these projects and to finalise the NCIPAP project list.
7. AEMO assessed the system risks presented by each network constraint and the indicative gross economic benefits that would be achieved when these constraints are removed in order to consider whether the upgrades would:
 - I. benefit wholesale market outcomes; and/or
 - II. increase the capability of the transmission system at times when network users place greatest value on the transmission systems reliability.

The indicative gross economic benefits for transmission circuits were primarily determined from AEMO's 2012 Victorian Annual Planning Report (VAPR).



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Where benefits have not been quantified, AEMO has qualitatively defined the gross benefits. The indicative gross benefits for injection points were determined from the supply risks described in the 2012 Transmission Connection Planning Report (TCPR).

8. AEMO developed a revised list of potential NCIPAP projects based on the gross economic benefits of these projects.
9. SP AusNet prepared cost estimates for the list of potential NCIPAP projects, identifying that some of the NCIPAP projects could be more efficiently delivered if minor projects are grouped together at a terminal station level. The cost estimates were prepared using SP AusNet's standard cost estimating process and database, which define the costs for the design, procurement, installation and project management for each project. Grouping NCIPAP projects together at a terminal station level delivers savings in site establishment and project management and was included in the NCIPAP cost estimates. SP AusNet consulted with AEMO regarding grouping of NCIPAP projects at a terminal station level, particularly for more expensive components like current transformers (more than \$200K).
10. SP AusNet reviewed the NCIPAP projects seeking project delivery synergies with existing major terminal station projects over the TRR control period 2014 to 2017. No additional synergies were identified.
11. AEMO developed a revised list of potential NCIPAP projects prioritised based on the net economic benefits of these projects.
12. SP AusNet finalised and documented the NCIPAP for SP AusNet's TRR submission.