NEED/OPPORTUNITY STATEMENT (NOS)

Making the Grid Smarter - Installation of Transfer Tripping Scheme at Gadara, Tumut and Burrinjuck

NOS- 000000001401 revision 5.0

Ellipse project description:
TRIM file: [TRIM No]

Project reason: Imposed Standards - Control Systems to meet NER requirements
Project category: Prescribed - NCIPAP

Approvals

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Date submitted for approval	6 December 2016	

1. Background

This proposal forms part of the Network Capability Incentive Parameter Action Plan (NCIPAP), for the 2018/19 to 2022/23 regulatory control period. The NCIPAP portion of the STPIS described in section 5 of the STPIS guideline[1] is a plan consisting of a suite of small *priority projects* aimed at improving the capability of transmission assets through operational expenditure and minor capital expenditure on the transmission network which results in:

- Improved capability of those elements of the transmission system most important to determining spot prices; OR
- Improved capability of the transmission system at times when Transmission Network Users place greatest value on the reliability of the transmission system.

This project proposes a *priority project* to improve the limit of the injection point at Burrinjuck and Blowering generators, for the benefit of the Transmission Network Users (customers at Tumut and the generators). This *priority project* is consistent with the requirements of the clause 5.2(a)(2) in section 5 of the STPIS guideline and is consistent with the objectives of the NCIPAP scheme[2].

The 132 kV transmission network supplying Tumut town and Visy paper mill at Gadara consist of 970 Yass to Burrinjuck line, 992 Burrinjuck to Tumut line, 99P Tumut to Gadara line and 993 Gadara to Wagga line. This network also provides connection points to the hydro generators at Burrinjuck and Blowering (connected to Tumut substation). In addition, there are two steam generation units at Gadara which are owned and operated by Visy paper mill.

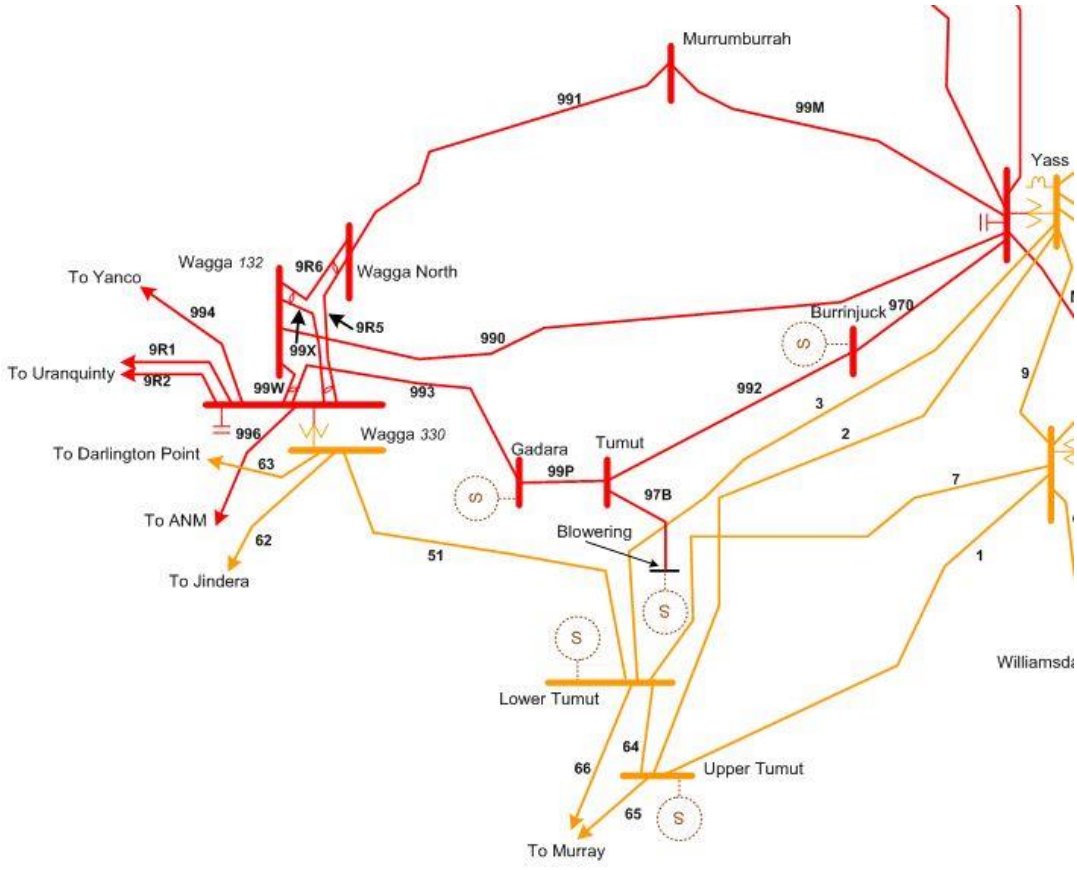
A coincident outage of two lines in this interconnection (e.g. Line 970 and Line 993) could result in an island consisting of generation and load (e.g. in the case of outage of Lines 970 and 993, Tumut town and Visy paper mill loads and the Blowering, Burrinjuck and Visy generators will be in an island). In the case of an island being formed, the islanded system may operate in an unstable manner.

The current transmission limitation is therefore the post contingent capability of the 132 kV network during periods of outage of the transmission lines 993, 992, 99P or 970. or 99P. These outages will result in a radialised network and will constrained the hydro generators at Burrinjuck and Blowering connection points to 0 MW output to cater for the next contingency on the radial feeder.

[1] AER, Final Electricity Transmission Network Service Providers Service Target Performance Incentive Scheme, Version 5 October 2015.

[2] Explanatory statement section 5.3.1 - AER, Draft Electricity Transmission Network Service Providers Service Target Performance Incentive Scheme, Version 5 June 2015.

Figure 1: Transmission Network in NSW South West area.



2. Need/opportunity

There is an opportunity to improve the contingent capability of the 132 kV network by the installation of a transfer tripping scheme at Gadara, Tumut and Burrinjuck. The scheme could be used to disconnect generation and open line connections within the island, preventing unstable operation following the coincident outage of two lines such as Lines 970 and 993. During these conditions the generation injection at the connection point is zero.

The implementation of this tripping scheme will improve the post contingency limits imposed on the generators in this area of the network. Instead of a post-contingent constraint of 0 MW, the new constraint will be 100% of possible generation, until such time as the second transmission line trips, and the tripping scheme is triggered.

The transfer tripping scheme should be designed to trip the specified in-service lines for line outage combinations as given below in the event of the formation of an island:

Line outage combinations	Limit with Do nothing Option	Limit with Transfer Tripping Scheme Option	Lines to be tripped
Lines 970 & 993	0 MW	140 MW	Lines 99P, 992 and O97B
Lines 992 & 993	0 MW	140 MW	Lines 99P and O97B
Lines 970 & 99P	0 MW	140 MW	Lines 992 and O97B

Lines 992 & 99P	0 MW	140 MW	Line O97B

The benefit of this *priority project* increases the contingent limit of Blowering, Burrinjuck and Visy generation from zero during the planned or forced outage of any of the above listed lines to the generator name-plate ratings.

3. Related needs/opportunities

Nil.

4. Recommendation

It is recommended that the installation of transfer tripping scheme at Gadara and Tumut be included as a *priority* project in TransGrid NCIPAP for the regulatory period 2018 – 2023.

Attachment 1 Market benefit calculation

The market benefit of implementing a transfer tripping scheme to allow the generation from Blowering, Burrinjuck power station to generate during the planned or forced outage of any one of the 132 kV lines in this interconnected network per year is assessed based on the following assumptions:

Average generation cost of thermal generation compared to renewable generation[3] = $25/MWh

Blowering Benefit[4] = Average Blowering generation[5] x generation cost x total outage hour (planned and unplanned outages of 970,992,993 and 99P lines[6])

= 26.52 MW x $25/MWh x (20+76+9+37) = $ 94 K/year

Burrinjuck Benefit[7] = Average Burrinjuck generation [7] x total outage hour (planned and unplanned outages of 970,992,993 and 99P lines[2])

= 2.2 MW x $25/MWh x (20+76+9+37) = $ 7.8 K/year

Using the above assumptions and calculation, the market benefits is assessed for Blowering and Burrinjuck to be $101 K per year

[3] Based on the NSW Black Coal variable costs of $25 – refer page 61 of Jacobs report "Retail electricity price history and projections.pdf" filed in PDGS supporting documents. Typical bid price for renewable (wind/solar) generation is either $0 or negative. Accordingly, Market impact = $25 - $0 = $25.

[4] Typically, Blowering Bid Prices are less than the NSW Price. Refer file "Blowering Bid Price comparison example" in PDGS

[5] Based on historical Blowering & Burrinjuck generation – refer to file "1401 – Risk Assessment" in PDGS for details

[6] TransGrid historical asset performance assessment – as at May 2016

[7] Burrinjuck is a non-scheduled generator. Constraining Burrinjuck will cost the market at least NSW Dispatch Price or more per MW of Burrinjuck generation.