NEED/OPPORTUNITY STATEMENT (NOS)

Capacitors to improve NSW-VIC limits

NOS- 000000001699 revision 2.0

Ellipse project no(s):
TRIM file: [TRIM No]

Project reason: Economic Efficiency - Network developments to achieve market benefits
Project category: Prescribed - NCIPAP

Approvals

Author	Jay Esson	Network Modelling & Performance Engineer
Reviewed/Endorsed	Jahan Peiris	Network Modelling & Performance Manager
	Hoang Tong	Operations Analysis Manager
	Anwar Kurukchi	Project Portfolio Sponsorship Manager
	Garrie Chubb	Investment Support Manager
Approved	Andrew Kingsmill	Manager/Power System Analysis
Date submitted for approval		

Change history

Revision	Date	Amendment
0	October 2016	Initial issue
1	November 2016	Updated market benefit calculation

1. Background

This proposal forms part of the Network Capability Incentive Parameter Action Plan (NCIPAP), for the 2018/19 to 2023/24 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 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.

2. Need/opportunity

According to recent historical performance of the NSW - VIC interconnector, NSW export to Victoria is often limited due to the following constraint:

1. N^^V_NIL_1: Avoid voltage collapse in southern NSW for loss of the largest VIC generating unit or Basslink

The above voltage stability limit can be improved by adding capacitor banks at a substation in the southern area. For example, a 100 MVAr capacitor at Canberra or Stockdill (future) or Williamsdale will increase the above limit by about 30 MW[2].

Typically, NSW export to VIC constraint set includes the following limits:

Constraint ID	Description	Typical headroom compared to critical limit (MW)
N^^V_NIL_1	Avoid voltage collapse in southern NSW for loss of the largest VIC generating unit or Basslink	0
N:V_NIL_BWRG	Out=Nil, NSW to Victoria Transient stability limit, for the trip of Bayswater to Regentville (31) line	816
N::V_NIL_MSDD	Out=Nil, NSW to Victoria Transient stability limit for the trip of Murray - Dederang (67 or 68) line	1036

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

[2] Estimated based on the limit provided in Operating Manual 520 – Operation of Main Grid Under Normal Conditions

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Constraint ID	Description	Typical headroom compared to critical limit (MW)
N::V_NIL_BWSW	Out= Nil, NSW to Victoria transient stability limit for trip of Bayswater to Sydney West (32) line	1305
N:V_NIL_BYYS	Out= Nil, NSW to Victoria transient stability limit for trip of Bannaby to Gullen Range (61) line	1375
N::V_NIL_UTMS	Out=Nil, NSW to Victoria Transient stability limit for trip of Upper Tumut - Murray (65) line	1459

Accordingly, addition of capacitors in the southern NSW will increase the NSW to VIC transfer limit. There is adequate room before the next stability limit is reached.

3. Related needs/opportunities

None

4. Recommendation

It is recommended to investigate the options to address the voltage stability limit in order to increase the NSW – VIC export and import limits.

And these are to be included in TransGrid NCIPAP for the regulatory period 2019 – 2023.

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Attachment 1   Market benefit summary

The market benefit due to a new 100 MVAr[3] capacitor is estimated using following assumptions:

Market impact due to NSW export limit binding[4] = $15/MWh

Probability of NSW export to VIC limit binding = 20%[5]

Market impact = [{(Probability of NSW export limit binding) * (Market impact due to NSW export limit binding) * (MW increase in NSW export due to 100 MVAr capacitor)}] * (duration)

Market impact = $[{0.2*15* 30}]*24*365 = $0.79 million /year

Market impact = $0.79 million/year

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[3] Estimated based on the limit provided in Operating Manual 520 – Operation of Main Grid Under Normal Conditions

[4] Based on the difference between VIC Brown Coal variable costs and typical Renewable Generation bid price of $0 (or less) – refer page 61 of Jacobs report "Retail electricity price history and projections.pdf" filed in PDGS supporting documents for VIC Brown Coal Price details. VIC price is expected to be at higher end following retirement of Hazelwood Coal Power Station. Hence, high -range Coal prices in VIC was used. Accordingly, Market impact = $15 - $0 = $15.

[5] Based on total duration of the constraint N^^V_NIL_1 binding historically , expected change in NSW export to Victoria due to retirement of Hazelwood power station in Victoria, and expected increase in NSW Renewable Generation. Average Hazelwood generation in 2015-16 was 1200 MW. It is assumed that about 50% of this generation would be supplied from NSW/QLD and Renewables in NSW.

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