

NEED/OPPORTUNITY STATEMENT (NOS)



Making the Grid Smarter - Finley 66kV Full SCADA Capacity Augmentation

NOS- 000000001463 revision 2.0

Ellipse project description:

TRIM file: [TRIM No]

Project reason: Imposed Standards - SCADA installation to meet NER requirements

Project category: Prescribed - NCIPAP

Approvals

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Reviewed/Endorsed	Hoang Tong Jahan Peiris	Operations Analysis Manager A/Network & Connections Analysis Manager
Approved	Nalin Pahalawaththa	Manager/Power System Analysis
Date submitted for approval	28 October 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 guideline¹ 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.

This project proposes a *priority project* to improve the limit of the injection point for the benefit of the Transmission Network Users. 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 scheme².

The SCADA/EMS (Supervisory Control and Data Acquisition/Energy Management System) is a critical power system management tool which enables TransGrid to fulfil its objectives to safely, securely and reliably operate the NSW high voltage transmission network.

SCADA is a system that operates with coded signals over communication channels so as to provide control of remote equipment. The control system may be combined with a data acquisition system by adding the use of coded signals over communication channels to acquire information about the status of the remote equipment for display or for recording functions. The SCADA system allows TransGrid control rooms to monitor the transmission system, respond to system incidents and remotely operate equipment in the various substations throughout NSW.

The **energy management system (EMS)** is a system of computer-aided tools used to monitor, control, and optimize the performance of the generation and/or transmission systems. EMS is used to identify system elements that could reach operating limits following a system incident such as a line or transformer fault and undertake contingency analysis before such incidents occur. EMS also allows effective “what if” analysis of the real time system.

SCADA/EMS system enables TransGrid to collect, store and analyse data from many data points in the network, perform network modelling, simulate power operation, pinpoint faults, pre-empt outages, and participate in energy trading markets.

There are some 80,000 data points in the system and more than 2000 data pages (screen pictures), all of which provide live data on the status of the transmission system. Information such as circuit breaker status (open or closed), generator outputs, transmission line flows etc are all available on-line. An increasing number of control schemes used to manage the reliability of the network are also programmed into the system. The system also provides data to AEMO, generators and distributors within NSW consistent with obligations under the National Electricity Rules.

To enable this functionality, it is necessary for SCADA to be connected to a substation and the correct data points wired which will allow both the control of plant and equipment as well as the ability to monitor the status of vital elements. There are still substations in the TransGrid network which are not connected to SCADA and therefore full remote control of the substation is not possible.

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.

2. Need/opportunity

Full SCADA control of all aspects of a substation represents the most efficient and practical way to manage high voltage plant and equipment. Without this control and metering, network control centre staff are unable to see the state of equipment and are unable to operate the equipment. It is necessary to send staff to site to both ascertain the current equipment state and perform any necessary equipment operations.

Having visibility of the status of the sub-station provides a greater level of situational awareness for the control room operator which, when combined with the ability to control active plant, means that loss of load situations can be minimised. This can represent a saving in both dollars and reputation.

Additionally, the ability to monitor and control a site without the need to dispatch field resources means a saving in field costs.

The substation at Finley currently doesn't have full SCADA connectivity. The attached High Voltage Operating Diagrams (figure 1) show the plant which is not able to be controlled remotely.

Therefore, with this proposed *priority project*, the post contingency capacity at the supply point can be improved as follows:

Option	Post contingency (feeders and bus faults) capacity	Duration
Do nothing	0 MW	3 hours
Installation of full SCADA control	8 MW average demand	2.5 hours

4X2 SUBSTATION (NOT CONNECTED)

99A URANQUINTY

99R1, 99R2, 99R3

13kV BUS

66kV BUS

84B FINLEY

84A JERILDERIE

SWITCHYARD FENCE

TransGrid

Drawn: JPM, 10-10-2015
 Reviewed: TYP, 01-09-2015
 Approved: TYP, 01-09-2015

APPROVED

Scale: 1:1

Supervised by: JPM

Sheet: 26 of 26

Project: FNY606098

Revision: 1

Effective date: 10/10/2015 4X2 spare CVT removed

3. Related needs/opportunities

NOS 1499 Deniliquin full SCADA connectivity.

4. Recommendation

It is recommended that SCADA connectivity at Finley be increased to provide full operating and monitoring capabilities.

Attachment 1 Risk costs summary

Current Option Assessment - Risk Summary

Project Name: Finley 66kV SCADA Capacity Augmentation

Option Name: 1463 - Base Case

Option Assessment Name: 1463 - Base Case - Assessment 1

Rev Reset Period: Next (2018-23)



Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF (\$M)	Failure Mechanism	NoxLoC xCoF (\$M)	PoF (Yr 1)	Total Risk (\$M)	Risk (\$M) (Rel)	Risk (\$M) (Op)	Risk (\$M) (Fin)	Risk (\$M) (Peo)	Risk (\$M) (Env)	Risk (\$M) (Rep)
Busbar Failure	2	Busbar	Unplanned Outage - HV (Busbar Failure)	\$0.53	Structural Failure	\$1.06	5.00%	\$0.05	\$0.05		\$0.00			\$0.00
Feeder Failure	3	Conductor (inc Joints)	Unplanned Outage - HV (Feeder Failure)	\$0.41	Break	\$1.23	7.02%	\$0.09	\$0.08		\$0.00			\$0.01
				\$0.94		\$2.29		\$0.14	\$0.12		\$0.00			\$0.01

Total VCR Risk: \$0.12

Total ENS Risk: