



Heywood Interconnector Upgrade

Response to AER Information Request

31 January 2014



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The following information is provided in response to the information request from the AER on the Heywood Interconnector Upgrade submitted to ElectraNet via email on 21 January 2014.

1. Question 4 – Control Scheme

ElectraNet Response

Further to the information provided in response to this question on 24 January 2014, ElectraNet encloses a copy of the economic assessment undertaken to evaluate the potential benefits of the inclusion of the South East control scheme in the scope of the Heywood Upgrade Contingent Project. This report is contained in Attachment A.

The results of the NPV analysis undertaken in this assessment are presented in Table 1-1 below.

Table 1-1: South East Control Scheme Economic Assessment

Scenario	Net Benefit (\$'000)
Base Case	423
Sensitivity - Rural	1,968
Sensitivity - Higher generation cost	604

This analysis demonstrates that in each of the cases considered, the control scheme delivers a positive net market benefit.

This confirms that there are sufficient benefits created by the South East control scheme to reasonably conclude it is beneficial to the long term interests of the NEM should the load in the South East fall. Given the increased certainty of this load reduction, under these conditions the PACR findings support a South East control scheme as part of the preferred option. On this basis, the control scheme has been included within the scope of the Heywood Upgrade Contingent Project.

2. Question 8 – Decommissioned Lines

AER Request

With regards to the extract of the 'Heywood Interconnector RIT-T PACR' (PACR) referenced in the contingent project application, on pages 24 and 25 of the PACR it notes that the 'condition and age of low 132 kV capacity transmission lines and associated foreshadowed ongoing maintenance costs' and goes on to say that \$55m is required over the next 15 years to maintain the 132KV lines in a 'safe and serviceable condition'. It goes on to say that 'detailed least cost analysis was carried out to analyse various options involving maintaining/retaining, replacing and removal of the two lines'. Please provide:

- a) *a copy of the least cost analysis report and supporting detailed estimates and models*
- b) *a detailed explanation of why it is necessary to remove the 132 kV lines*

- c) *an detailed explanation of any asset management implications, property implications, legal implications, and risks that ElectraNet foresees where the 132 kV lines are isolated, made safe and retained in an out of service de-energised state*
- d) *if not detailed in the estimates or models, provide a calculation of the avoided operating costs resulting from decommissioning various 132 kV assets.*

ElectraNet Response

The following response provides further information as requested on the analysis used to assess options for the two 132kV lines (Snuggery-Keith and Keith-Tailem Bend # 1 132kV lines, comprising F1836 and F1837 built sections) to be decommissioned as part of the Heywood Interconnector Upgrade project.

- a) A detailed technical and economic assessment was carried out in the course of the Heywood Interconnector RIT-T assessment to analyse various options involving maintaining/retaining, replacing and removal of the Snuggery-Keith and Keith-Tailem Bend # 1 132kV transmission lines.

This assessment involved an economic PV analysis, which concluded that the least cost solution to customers is an option involving the removal of both of these transmission lines. A copy of this analysis is included as Attachment B to this response.

For the reasons set out in part (c) of this response below, retaining the lines indefinitely in an out of service, de-energised state in their present condition is not a viable option, and was not considered in this assessment.

The results of the assessment of alternative options are summarised in Table 2-1 on the following page.

Table 2-1: Heywood Interconnector Upgrade – Network option assessment

Project option	Description	PV (\$m)	Rank
Full Decommissioning	Upgrade Heywood 500/275 kV substation, install a third 500/275 kV transformer and: <ul style="list-style-type: none"> disconnect and remove the Keith – Tailem Bend #1 and Keith – Snuggery 132 kV lines to alleviate the thermal limitation in the South East 132 kV 	56.5	1
Partial Decommissioning	Upgrade Heywood 500/275 kV substation, install a third 500/275 kV transformer and: <ul style="list-style-type: none"> disconnect and remove the Keith – Tailem Bend #1 line 	68.5	2
Un-Mesh	Upgrade Heywood 500/275 kV substation, install a third 500/275 kV transformer and: <ul style="list-style-type: none"> completely re-configure the lower South East 132 kV network to form a lower SESA 132 kV loop 	89.8	3
Base Case ('Do Nothing')	Upgrade Heywood 500/275 kV substation, install a third 500/275 kV transformer and: <ul style="list-style-type: none"> maintain existing network configuration in South Australia 	96.6	4

This analysis was conducted over a forecast period of 20 years and demonstrates that decommissioning of both of these transmission lines provides the least cost and most efficient solution for the preferred option identified through the RIT-T process. The supporting maintenance cost estimates underlying this analysis are discussed further in part (d) of this response below.

Sensitivity analysis undertaken as part of this assessment demonstrates the robustness of this outcome to potential variations in line maintenance cost. The sensitivity analysis shows that the line maintenance requirement over the forecast period would need to be approximately 70% lower than the current estimate for the second lowest cost option (partial decommissioning) to become the preferred option to full decommissioning of the lines. A summary of the sensitivity outcomes is included in Attachment B.

- b) ElectraNet has undertaken detailed condition assessments of the Snuggery-Keith and Keith-Tailem Bend # 1 132kV lines. These condition assessment reports are included as Attachments C and D to this response.

These assessment reports detail the condition of the key line components and make an assessment of the expected remaining engineering life of the assets based on available information. Specifically, these assessments have identified that:

- The lines are around 50 years old and have been exposed to a high corrosion environment for a considerable length of time;
- The conductors, foundations, and insulators, and to some extent tower fasteners, are in poor condition. Many defects have been identified on the conductors that clearly show significant corrosion is occurring;

- Insulator and tower fastener condition indicate that significant refurbishment will also be needed for these components. For the insulators, while the glass discs are still in serviceable condition, the metal components are suffering from excessive wear and corrosion; and
- There is a significant issue with corroded nuts / bolts, and refurbishment would be needed to maintain the line in a safe and serviceable condition.

From these assessments, the maintenance works that would be required to maintain the assets in a safe and serviceable condition have been identified, with an estimated cost of \$55m over the next 15-20 years. The details of these cost estimates are discussed further in part (d) of this response below.

Given the costs involved in maintaining the assets in a safe condition, the PV options assessment discussed above demonstrates that the least cost option is the removal of the lines.

- c) ElectraNet faces a range of safety and technical obligations with which it must comply in the design, operation and maintenance of its assets.

Section 60 of the Electricity Act (SA) 1996 requires a person that owns or operates electricity infrastructure or an electrical installation to take reasonable steps to ensure that the infrastructure or installation is safe and safely operated.

In addition, as a condition of ElectraNet's Electricity Transmission Licence, ElectraNet must prepare, comply with and review on an annual basis a safety, reliability, maintenance and technical management plan (SRMTMP).

Section 7 of ElectraNet's 2013 SRMTMP states ElectraNet's asset management practices with particular reference to:

- The safe maintenance and decommissioning of the electricity infrastructure owned and operated by ElectraNet,
- The monitoring of ElectraNet's electricity infrastructure for the purposes of identifying infrastructure that is unsafe or at risk of failing or malfunctioning; and
- The monitoring of compliance with vegetation clearance requirements.

Specifically, section 7.2.8 of the 2013 SRMTMP highlights ElectraNet's obligations regarding asset replacement and decommissioning. This section notes that:

"Where assets have been assessed as reaching the end of their technical lives, and the aggregate effect of those assets is likely to cause a material impact on safety, reliability or performance and network and asset refurbishment is not cost effective, asset replacement/decommissioning projects are identified based on:

- *The overall maintenance effort associated with asset life cycle;*
- *The functionality or health of the asset; and*
- *Major asset replacement projects are associated with substation replacement. The required replacement projects to deliver on these*

objectives and associated expenditure requirements are identified in the Asset Management Plan.”

Compliance with this Plan is externally reviewed and audited on an annual basis and reported to the Office of the Technical Regulator (OTR) and Essential Services Commission of South Australia (ESCOSA) as a licence requirement. A breach of licence constitutes an offence under the Electricity Act, which carries fines of up to \$1m.

In accordance with these obligations, the operating costs that would be associated with maintaining the lines in a fit and proper state from an asset management perspective are detailed above, as reflected in the options assessment. Given the assessed condition and risks associated with the assets, retaining the lines indefinitely in an out of service state in their present condition is not consistent with the above safety and technical obligations and is therefore not a viable option.

From a legal perspective, ElectraNet also faces potential legal exposures given the risk to private land owners and the public in general if its line assets are not maintained in a safe condition. In the event of a physical asset failure event causing personal injury or property damage, if found to be negligent ElectraNet would face potential liability claims from land occupiers and third parties. It is noted also that the lines traverse a high bushfire risk zone, adding significantly to this risk.

From an operational perspective, a risk in leaving the lines in a fully de-energised state is that there would be no immediate notification of equipment failure events such as fallen conductors, tower collapse or vandalism damage, as remote monitoring is not available on de-energised lines. This would further compound the safety risks given the current state of the lines.

In summary, it is not a feasible option to retain the line assets indefinitely in their present condition, given the assessed risks associated with these assets and ElectraNet’s safety and technical obligations. All available options given the condition of these assets have been identified and economically assessed, demonstrating that removal of the lines is the least cost solution.

- d) The maintenance cost model provided in Attachment E details the operating costs required to maintain the 132kV lines in a safe condition over the next 15-20 years that would be avoided if the lines are decommissioned as part of the Heywood Interconnector Upgrade project. As above, these costs have been estimated at \$55m over this period.

Table 2-2 below details the required operational expenditure by asset type over this period.

Table 2-2: Ongoing maintenance requirements - Snuggery-Keith-Tailem Bend 132kV lines

Asset Type	Total cost (\$m)
Foundations	29.0
Conductors	3.3
Cross arms	22.2
Total	54.6

3. List of Attachments

The following attachments are supplied with this response. Given the commercially sensitive nature of the detailed costings and related information contained in these files, a number of these are supplied to the AER on a confidential basis as indicated below:

Attachment A	Heywood Interconnector Augmentation – South East Control Scheme, February 2013
Attachment B	PV Analysis Network Project Options – Heywood Interconnector Upgrade Project - CONFIDENTIAL
Attachment C	Condition Assessment Report – F1836 Build Section - CONFIDENTIAL
Attachment D	Condition Assessment Report – F1837 Build Section - CONFIDENTIAL
Attachment E	Cost Analysis Model, ongoing maintenance of F1836 and F1837 build sections - CONFIDENTIAL