Decision

ElectraNet Heywood Interconnector Upgrade

Contingent Project

28 March 2014

AUSTRALIAN ENERGY REGULATOR

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Executive summary

On 13 December 2013 ElectraNet submitted a request to the Australian Energy Regulator (AER) for a determination that its revenue allowances should be adjusted for implementation of the Heywood Interconnector Upgrade Contingent Project. The project is expected to deliver a net market benefit to consumers of more than $190m when completed.

Our determination is that ElectraNet's revenue allowance should be amended to allow the Heywood Interconnector Upgrade Contingent Project to proceed, subject to the adjustments that we have made to the capital and operating allowances ElectraNet proposed for this project. The project will increase the capacity of the interconnector between South Australia and Victoria from 460 MW to 650 MW.

This determination means ElectraNet can now recover the cost of the Heywood interconnector upgrade in charges during the remainder of the 2013–2018 period. The unsmoothed maximum allowed revenue will increase by $9.9m to $1592.9m ($nominal). This will increase transmission network prices on average by 0.625%.

As this project involves the interconnector between South Australia and Victoria, the Australian Energy Market Operator (AEMO) has separately arranged to undertake complementary work on the Victorian end of the interconnector. The Victorian work is funded under different arrangements applicable to Victoria alone and, except for the timing of the work, is not discussed in this decision.

Contingent project trigger

In its revised revenue proposal, submitted to the AER on 16 January 2013, ElectraNet proposed a three element trigger for the Heywood Interconnector Upgrade. In our final decision on ElectraNet's 2013–2018 revenue determination, published on 30 April 2013, we approved the Heywood Interconnector Upgrade as a contingent project. To be eligible to seek approval of the funding for the contingent project ElectraNet is required to demonstrate the specified trigger has occurred. The trigger comprises:

1. successful completion of the RIT-T demonstrating net market benefits;
2. determination by the AER under clause 5.16.6 that the project satisfies the Regulatory Investment Test for Transmission (RIT-T); and
3. ElectraNet Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.

The completion of the Heywood Interconnector RIT-T on 9 January 2013 satisfied the first trigger element. On 4 September 2013, the AER determined that the preferred option identified by ElectraNet and AEMO had satisfied the RIT-T requirement of the National Electricity Rules (NER).[1] This satisfied the second trigger element.

On 21 November 2013 the ElectraNet Board committed to proceed with the project subject to the AER amending the revenue determination. ElectraNet provided an extract of the Board minutes as evidence of this element having been satisfied.

On 13 December 2013 ElectraNet submitted a contingent project application to the AER under clause 6A.8.2 of the Electricity Rules. As all three trigger elements occurred in the 2013–2018 regulatory

[1] See: http://www.aer.gov.au/node/19916.

control period, ElectraNet applied to the AER to amend its 2013–18 revenue determination to account for the cost of the South Australian component of the Heywood Interconnector Upgrade.

Preferred option

In the joint ElectraNet and AEMO RIT-T assessment, the project assessment conclusions report identified a preferred option to achieve the contingent project's goals. The preferred option—called 'option 1b'—involves the installation of a third transformer at Heywood, series compensation[2] in South Australia and the reconfiguration of the South Australian 132 kV network between Snuggery-Keith and Keith-Tailem Bend. This option is expected to increase interconnector capability by about 40 per cent in both directions. The key market benefits associated with the preferred option are the changes in fuel costs arising through different patterns of generation dispatch. The AER assessment under rule 5.16.6 agreed this option was sound.[3]

ElectraNet has adopted this option with one modification. Another element investigated in the RIT-T assessment was the addition of a control scheme in the South East of SA to manage flows when generation sources operate in the South East region. ElectraNet has included this control system as an enhancement on the basis that changes in the committed generation in the South East region since the RIT-T was undertaken will now result in positive net benefits if the control scheme is implemented.

Assessment approach

The AER published the application for public comment on 18 December 2013. We identified that the issues involved appeared difficult or complex and required further consideration. Accordingly, we issued a notice to ElectraNet on 24 January 2014 advising that the AER would extend the time limit to make this decision until on or before 31 March 2014.

We reviewed the project proposal and concluded that an external technical adviser would not be required to assist with this decision. Our internal technical advice team was used instead.

We examined the material presented by ElectraNet in its application. We assessed the completeness of the information and identified a number or areas where additional information was desirable. We issued a set of questions to ElectraNet. We examined ElectraNet's response and prepared a second round of questions and assessed the responses. In coming to its determination, the AER took into account ElectraNet's application, the submissions received during public consultation and other the written information provided to the AER in the course of considering the application. ElectraNet was briefed on the proposed decision 14 March 2014 and allowed a final opportunity to respond to the AER's proposed decision. ElectraNet replied on 18 March 2014. We took this reply into account.

Concerns raised

Stakeholder comments on ElectraNet's application were valuable in highlighting a range of issues for us to consider. Three submissions were received. The submissions of the Major Energy Users (MEU), and the Australian Energy Market Operator (AEMO) supported the project proceeding as planned, although MEU raised some issues on the size of the opex that was proposed. The South Australian Council of Social Services (SACOSS) asked that the AER review the assumptions underpinning the project timing with a view to deferring the investment into a later period.

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[2] 'Series compensation' requires that capacitors be installed to compensate for adverse reactive power conditions.
[3] AER, Decision South Australia – Victoria (Heywood) Interconnector Upgrade, p43

AER assessment

The Australian Energy Regulator considers the Heywood Interconnector upgrade contingent project should proceed.

However, we do not agree that the demolition of two redundant transmission lines should occur immediately. ElectraNet proposed two lines be removed on safety grounds at a cost in excess of $20m. To justify this ElectraNet applied a very high safety standard. We consider an efficient business would not incur these high costs when a safe, lower cost alternative option is available. Our preferred alternative is a passive safety program involving de-energising the lines, conducting a safety audit, repairing defects that pose a safety hazard and regularly patrolling the lines.

The AER estimates the cost at $47m (nominal). This is lower than the costs proposed by ElectraNet of about $66m (nominal). The impact on prices is expected to be very small. As transmission prices in South Australia are only about 9% of retail prices, the retail price effect will be much less than 1%. We expect the benefits of lower peak energy costs should more than offset the increase.

AER determination

In accordance with clause 6A.8.2 of the National Electricity Rules, and taking into account stakeholder comments, our determination is that the project should be approved subject to adjustments to the capital and operating expenditure amounts sought. We consider that:

- the trigger event specified for this project has occurred;
- the capital amount sought exceeds the threshold specified in rule 6A.8.1(b)(2)(iii);
- the project proposal is consistent with 'Option 1b' as was identified in the RIT-T as the preferred option;
- incorporation of the south east control scheme is warranted;
- the demolition of two ElectraNet 132kV transmission lines numbered F1836 and F1837 as proposed by ElectraNet should not be included in this project;
- a better estimate of the incremental operating expenditure we consider is reasonably required for the purpose of undertaking the project in each year of the regulatory period is $1.87m ($2012-13);
- a better estimate of the capital expenditure we consider is reasonably required to complete the project is $45.71m as-incurred ($2012-13);
- the smoothed maximum allowed revenue (MAR) should be adjusted to $1,587.4m total ($nominal) based on an unsmoothed MAR of $1592.9m ($nominal) - an increase of 0.625% on average transmission network prices;
- the X-factors should be adjusted as set out in section 4 to maintain the a difference in the final year revenue (2017-18) of not more than 3%, consistent with the ElectraNet revenue determination; and
- the completion date for this project is 30 June 2017.

1 Introduction

This chapter sets out the relevant background information to our determination. This is whether the contingent project trigger has been met and whether and to what extent the ElectraNet revenue allowance should be amended to include the efficient costs of implementing the preferred option. In this section we describe our consultation process.

1.1 Who we are and our role in this process

The Australian Energy Regulator (AER) is the economic regulator for electricity transmission and distribution services in the National Electricity Market (NEM).[4] We are an independent authority, funded by the Australian Government. Our electricity-related powers and functions are set out in the National Electricity Law (Electricity Law) and National Electricity Rules (Electricity Rules).

When we receive an application to approve a contingent project application we publish the proposal and seek public comment. We assess the proposal is to determine whether it contains the information required by the NER.[5] We examine evidence provided to determine if the mandatory pre-defined trigger event has occurred. We also examine whether the project before us is consistent with the contingent project approved in the revenue determination. We also analyse the proposal to determine if the costs proposed represent a reasonable forecast of the capital and incremental operating expenditure required for the purpose of undertaking the contingent project both overall and in each year remaining in the regulatory control period. Where we have differed from the businesses proposal we apply our adjustments to the post-tax revenue model to calculate the revenue the business may charge customers for the remainder of the regulatory period.

1.2 Who are ElectraNet and AEMO?

ElectraNet is a transmission business which plans, owns, builds and operates the transmission network in South Australia, comprising 5600 kilometres of high voltage electricity lines. ElectraNet's transmission revenues are regulated by the AER through five year transmission determinations. ElectraNet's current transmission determination commenced on 1 July 2013 and will finish on 30 June 2018.

The Australian Energy Market Operator (AEMO) is an independent organisation which operates the NEM. They are the market and system operator, responsible for power system security and national transmission planning. In Victoria, AEMO is also responsible for transmission planning and directing augmentations of the electricity transmission network. AEMO does not own or build the Victorian transmission network. There are multiple asset owners who own and operate the Victorian transmission network.

ElectraNet and the Australian Energy Market Operator (AEMO) jointly conducted the Heywood Interconnector RIT-T. The ElectraNet application relies on the joint RIT-T application. This decision only concerns the ElectraNet application. Different arrangements apply to the recovery of costs incurred by AEMO.

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[4] In addition to regulating NEM transmission and distribution, we also monitor the wholesale electricity and gas markets to ensure suppliers comply with the legislation and rules, taking enforcement action where necessary, and regulated retail energy markets in the ACT, South Australia, Tasmania (electricity only) and New South Wales under the National Energy Retail Law.

[5] National Electricity Rules, clause 6A.8.2(b)(3)

1.3 ElectraNet proposal

On 13 December 2013 ElectraNet lodged a contingent project application for approval of the Heywood Interconnector Upgrade Project. This application was received after the close of business. Consequently, the effective date of lodgement is 16 December 2013. We published the application for public comment on 18 December 2013. Consultation closed on 5 February 2014. We identified that the issues involved appeared difficult or complex. Accordingly, we issued a notice to ElectraNet on 24 January 2014 advising that the AER would extend the time limit to make this decision until on or before 31 March 2014.

The project contains four components:

1. The installation of series capacitors on the two Tailem Bend to South East 275kV transmission lines, at a new site at Black Ridge;
2. Implementation of a control scheme to prevent overload of the South East transformers at times of low load and high wind energy export;
3. Upgrading of assets at various substations to allow utilisation of at least full winter transmission line ratings along the 275 kV interconnector and the underlying 132 kV network in the South East region; and
4. Decommissioning of two South East 132 kV lines that can cause thermal limitation on interconnector capacity.

ElectraNet sought an amended maximum allowed revenue (MAR) allowance as set out in Table 1.

Table 1: Amended building block revenue requirement ($m nominal)

	2013–14	2014–15	2015–16	2016–17	2017-18	Total
AER annual building block revenue requirement	268.1	291.3	319.0	345.2	359.4	1,583.0
Heywood interconnector upgrade revenue requirement	0	0.2	0.9	3.4	5.7	10.1
Amended annual revenue requirement (unsmoothed)	268.1	291.5	319.8	348.6	365.1	1,593.0

Source: ElectraNet, Heywood Interconnector Upgrade Contingent Project Application, 13 December 2013, table 6-5, p.18

Under ElectraNet's application for the Heywood project, the total estimated capital cost is $66.0m ($2012-13)[6] (including real cost escalation) and the incremental operating expenditure sought is $1.55m ($2012-13).[7] ElectraNet advised the project completion date to be June 2018. These

[6] ElectraNet Heywood Interconnector Upgrade Contingent Project Application, 13 December 2013, p.13
[7] ElectraNet Heywood Interconnector Upgrade Contingent Project Application, 13 December 2013, p.15

amounts, once annualised in terms of opex and return on and of capital, are added to the building block revenue requirement are shown in tables 1 and 2.

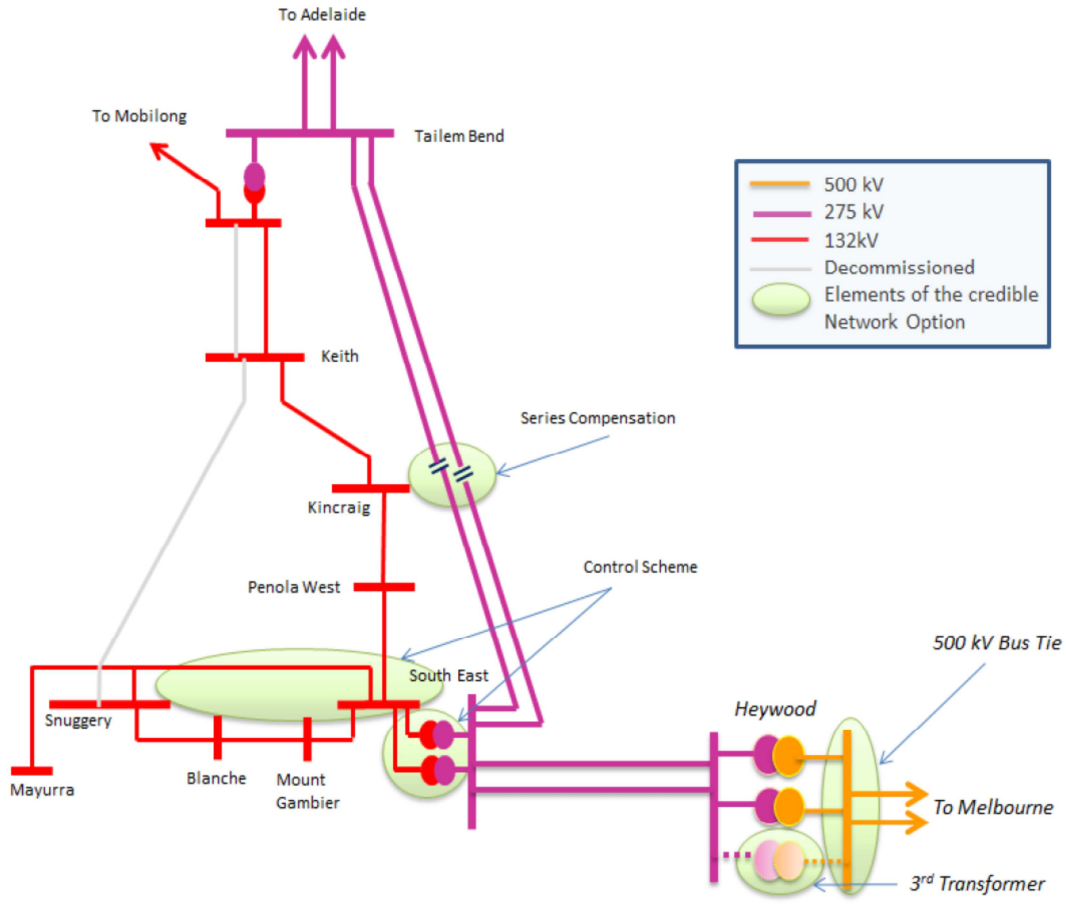
The smoothed maximum allowed revenue proposal is set out in Table 2.

Table 2: Amended maximum allowed revenue ($m nominal)

	2013–14	2014–15	2015–16	2016–17	2017-18	Total
MAR (smoothed)	284.0	299.8	316.5	334.1	352.8	1,587.2
X factor		-2.99%	-2.99%	-2.99%	-2.99%	

Source: ElectraNet, Heywood Interconnector Upgrade Contingent Project Application, 13 December 2013, table 6-6, p.18

Figure 1 is a diagrammatic view of the electricity network changes that are proposed.



Source: ElectraNet, December 2013, "Heywood Interconnector Upgrade, Contingent Project Application", p. 7.

Note: The two lines marked in grey are to be decommissioned.

1.4 The Heywood Interconnector RIT-T

ElectraNet and AEMO estimated that the total cost of the Heywood Interconnector Upgrade would be around $108 million in its project assessment conclusions report, with $63 million allocated to the South Australia network.[8] The total benefits of the investment were estimated at $271 million, including market benefits associated with changes in fuel costs arising from different patterns of generation dispatch.[9]

1.5 Why did ElectraNet request the AER to make a determination?

In its 2013–18 revenue proposal, submitted to the AER on 31 May 2012, ElectraNet sought to include the Heywood Interconnector Upgrade as a contingent project. Contingent projects are significant network augmentation projects that may arise during the regulatory period but are not yet committed and are not provided for in a capital expenditure forecast. Contingent projects are linked to unique investment drivers, which and are defined by a unique 'trigger events' that are set by the AER when it determines to accept a proposed contingent project in a revenue proposal.[10]

If the trigger for a contingent project occurs the network service provider must apply to the AER to amend its revenue determination to include the capital and operating components required to undertake the project in the current regulatory period. The AER must determine if the proposed costs are prudent and efficient.[11] The AER must also determine the total cost of the project to be incurred in the current and subsequent regulatory periods.[12]

1.6 Our consultation process

Following the publication of the contingent project application, the AER received submissions from the Major Energy Users (MEU), South Australian Council of Social Services (SACOSS) and the Australian Energy Market Operator (AEMO).

The MEU supported the proposal but noted that the scope of the project had changed. They considered the benefits of increased trade merited the project being approved as scheduled. They expressed concern that the project now included operational expenditure which had not previously been mentioned in the RIT-T examination and also suggested that the AER should examine the capital estimates carefully.

The SACOSS submission noted that the costs of network augmentation pass on to all consumers, including its constituency. SACOSS noted there was recent evidence of falling demand and asked the AER to consider whether this impacted the project. They particularly asked that the AER examine the assumptions affecting the timing of the investment:

> SACOSS asks the AER to revisit the assumptions underpinning the timing of this investment in light of the changing market needs[13]

AEMO provided a submission that confirmed that on 20 January 2014 a contract for the Victorian component of the works had been signed with SP AusNet, the Victorian transmission network company. AEMO stated the expected completion date for work in the Victorian region is October

[8] ElectraNet & AEMO, 9 January 2013, Heywood Interconnector RIT-T project assessment conclusions report, p. 119.
[9] ElectraNet & AEMO, 9 January 2013, Heywood Interconnector RIT-T project assessment conclusions report, p. 84.
[10] National Electricity Rules, clause 6A.8.1(c)(5).
[11] National Electricity Rules, clause 6A.8.2(f)(2)
[12] National Electricity Rules, clause 6A.8.2(e)(1)
[13] SACOSS Submission, 7 February 2014, p.2

2015. AEMO also stated for the customer benefits to be maximised it was essential for works to be carried out on both transmission networks (i.e. the Victorian and South Australian transmission networks). Although AEMO indicated the outages to complete the works would occur in August/September, they subsequently clarified in discussion with AER staff that the outage timings should be regarded as indicative and may change.

Copies of the stakeholder submissions are available on the AER's website.[14]

1.7 Structure of this document

This document sets out our determination on the timing and amount of capital and incremental operating expenditure reasonably required within the current regulatory period to undertake this contingent project.

The decision is structured as follows:

- chapter two sets out our assessment approach
- chapter three sets out our assessment of the application by ElectraNet
- chapter four sets out the AER's calculation of the maximum allowed revenue (MAR)
- chapter five sets out the AER's determination.

[14] http://www.aer.gov.au/node/19916.

2 Assessment approach

This chapter outlines the AER's assessment approach.

The Electricity Rules state a contingent project application must contain the following information[15]:

i. an explanation that substantiates the occurrence of the trigger event;

ii. a forecast of the total capital expenditure for the contingent project;

iii. a forecast of the capital and incremental operating expenditure, for each remaining regulatory year which the Transmission Network Service Provider considers is reasonably required for the purpose of undertaking the contingent project;

iv. how the forecast of the total capital expenditure for the contingent project meets the threshold as referred to in clause 6A.8.1(b)(2)(iii);

v. the intended date for commencing the contingent project (which must be during the regulatory control period);

vi. the anticipated date for completing the contingent project (which may be after the end of the regulatory control period); and

vii. an estimate of the incremental revenue which the Transmission Network Service Provider considers is likely to be required to be earned in each remaining regulatory year of the regulatory control period as a result of the contingent project being undertaken as described in clause 6A.8.2(b)(3)(iii);

In assessing the proposal the AER must take into account[16]:

(1) the information included in or accompanying the application;

(2) submissions received in the course of consulting on the application;

(3) such analysis as is undertaken by or for the AER;

(4) the expenditure that would be incurred in respect of a contingent project by an efficient and prudent operator in the circumstances of the Transmission Network Service Provider;

(5) the actual and expected capital expenditure of the Transmission Network Service Provider for contingent projects during any preceding regulatory control periods;

(6) the extent to which the forecast capital expenditure for the contingent project is referable to arrangements with a person other than the Transmission Network Service Provider that, in the opinion of the AER, do not reflect arm's length terms;

(7) the relative prices of operating and capital inputs in relation to the contingent project;

(8) the substitution possibilities between operating and capital expenditure in relation to the contingent project; and

[15] National Electricity Rules, clause 6A.8.2(b)(3)
[16] National Electricity Rules, clause 6A.8.2(g)

(9) whether the capital and operating expenditure forecasts for the contingent project are consistent with any incentive scheme or schemes that apply to the Transmission Network Service Provider under clauses 6A.6.5, 6A.6.5A, 6A.7.4 or 6A.7.5.

We examined whether the project trigger event had been satisfied. We concluded it had. We tested whether the amount sought exceed the threshold for a contingent project. We agree it is an eligible contingent project as the capex of $66m exceeds the $30m threshold set out in rule 6A.8.2. The AER then reviewed the proposal and public submissions. We identified a number of issues to investigate. These centred on the timing and coordination of the proposed works as the interconnector upgrade requires works in both Victoria and South Australia. We identified issues specific to the ElectraNet proposal which merited closer examination. These included the inclusion of the South Eastern control scheme, the proposed demolition of lines F1836 and F1837, ElectraNet's process for creation of a risk estimate and ElectraNet's calculation of the incremental operating expenditure. These matters are discussed further in chapter 3.

Questions addressing these issues were developed and put to ElectraNet. ElectraNet provided written responses. The AER asked further questions to clarify some aspects of the replies that remained unclear. ElectraNet replied by email with further explanations.

We considered whether an efficient and prudent network business would have structured the project in similar or a different form to that proposed by ElectraNet. We concluded, with the exception of the demolition of two older lines, they would. While ElectraNet has added the South-East control scheme to the proposal since the RIT-T examination, we consider the project as a whole is consistent with the project submitted for RIT-T examination. To assess this addition, we examined if the business case for the control scheme was sound. We concluded that it was. We also examined the proposal for any conflict of interest but we saw nothing to suggest that there were any arrangements that were not at arm's length.

Although ElectraNet has previously undertaken contingent projects, apart from some aspects of the ElectraNet operating expenditure estimating technique, we did not consider those projects relevant to this project. ElectraNet did not suggest they were relevant.

In a number of instances ElectraNet asked that commercially sensitive information submitted to us as part of its application not be published. We accept that the project involves substantial new works that have yet to be put to tender. Publishing the ElectraNet information will make it easier for intending tenderers to anticipate the price expectations of ElectraNet. In turn, this will tend to lessen competitive pricing pressure. Although our general preference is to publish all relevant information, on balance, we consider that maintaining the confidentiality of the specific estimates involved in this project will better serve the long term interests of consumers than would publication. This is also consistent with our confidentiality guideline.[17]

The AER's Technical Advisor Group (TAG) is an internal group of experts that provides the AER with insight and advice into electricity supply industry decision making, design and operating practices and costs. We sought the TAG's advice to assist us in making this determination. The TAG produced a report which is annexed to this determination.[18] The TAG reviewed the method of calculation of cost estimates employed by ElectraNet. They examined how these estimates were developed and

[17] AER website: http://www.aer.gov.au/node/18888

[18] Technical Advisors Group 'ElectraNet Heywood Interconnector Upgrade - Contingent Project Application - Technical Review', February 2014

identified weaknesses with the ElectraNet approach in some instances. We also performed analysis to calculate operating expenditure allowances and test the proposed timing of the demolition of two lines made redundant by the project. The significant changes we have made to the proposal arose from this work. As is discussed in the next section, the optimum timing of the demolition of two redundant lines is dependent on the substitution possibilities between operating and capital expenditure and the relative prices of those inputs.

As suggested by SACOSS, we considered whether the assumptions that underpin the timing of this project remained valid. We note that the RIT-T process decision was recently completed, in September 2013. The assumptions that underpin the project were extensively canvassed in that process. SACOSS noted that the forecasts of demand had moderated in recent times. However, the benefits of this project are strongly linked to the market benefits to trade that result by the substitution of lower operating cost plant for higher cost plant. The demand forecast was not a significant factor in the RIT-T assessment. We therefore consider that the change in the AEMO demand forecast is unlikely to significantly affect the market benefits of plant substitution, which was the basis of the RIT-T assessment.

Our assessment included comparison at the line item level of the ElectraNet proposals with our expectations for similar costs based on the collective experience of the TAG. Where the TAG did not agree with an estimate or all the components of an estimate, the TAG formulated an alternative estimate based on the information ElectraNet has provided. These estimates were developed taking account of the TAGs knowledge and experience of other similar works carried out by the electricity network industry.

We consider that the impact of the project on any of the incentive schemes which might apply to ElectraNet under chapter 6A of the NER is not significant in a positive sense. The reverse may be true: the market impact parameter of the service target performance incentive scheme (STPIS) is likely to worsen due to the outages that will be necessary to implement this project. This gives ElectraNet a powerful incentive to carefully plan the necessary outages to minimise the penalty which may arise if the outages are poorly planned. This outcome is consistent with the intended impact of the STPIS: amongst other things it incentivises a network service provider to carefully plan outages to minimise the adverse impact on themselves and their customers.

Having determined the required capital and operating expenditure necessary to complete the project, we modified the proposed post tax revenue model (PTRM) to reflect the allowances we considered appropriate, but otherwise using the parameters as determined by the AER. Before this decision was finalised ElectraNet was given a further opportunity to comment on the AER's preferred alternative decision. ElectraNet responded on 18 March 2014.[19] We took this response into account.

The allowances we have determined were then converted to a modified revenue requirement and 'X-factors' as required under rule 6A.8.2(h)(3). The results of this assessment are presented in the following chapters.

[19] ElectraNet - Comments on PTRM modelling, 18 March 2014, p.8

3 AER assessment

In accordance with the assessment approach outlined in chapter 2 above, this section outlines our assessment of whether the Heywood Interconnector contingent project satisfies the requirements of rule 6A.8.2. Where the assessment identifies an aspect of the Heywood Interconnector Contingent Project which may not satisfy the NER, we have calculated an alternative allowance.

3.1 Trigger event

In its revised revenue proposal, submitted to the AER on 16 January 2013, ElectraNet proposed a three element trigger for the Heywood Interconnector Upgrade. In our final decision on ElectraNet's 2013–2018 revenue determination, published on 30 April 2013, we approved the Heywood Interconnector Upgrade as a contingent project. The trigger comprises:

1. successful completion of the RIT-T demonstrating net market benefits;
2. determination by the AER under clause 5.16.6AA that the project satisfies the RIT-T; and
3. ElectraNet Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.

To be eligible to seek approval of the funding for the contingent project ElectraNet is required to demonstrate the specified trigger has occurred. The completion of the Heywood Interconnector RIT-T on 9 January 2013 satisfied the first trigger element. On 4 September 2013, the AER determined that the preferred option identified by ElectraNet and AEMO had satisfied the RIT-T requirement of the National Electricity Rules.[20] This satisfied the second trigger element.

On 21 November 2013 the ElectraNet Board committed to proceed with the project subject to the AER amending the revenue determination. ElectraNet provided an extract of the Board minutes as evidence of this element having been satisfied.

As all three trigger elements occurred in the 2013–2018 regulatory control period, on 13 December 2013 ElectraNet submitted a contingent project application to the AER under clause 6A.8.2 of the Electricity Rules. They asked the AER to amend its 2013–18 revenue determination to account for the cost of the South Australian component of the Heywood Interconnector Upgrade.

3.1.1 AER view

The trigger event is the completion of all three elements of the pre-determined trigger. We are satisfied all three elements have occurred. The preconditions necessary to activate the trigger have been demonstrated.

3.2 Expenditure threshold

The NER currently stipulates the threshold for a contingent project is the proposed capital expenditure:

[20] National Electricity Rules, clause 5.16.6.

> exceeds either $30 million or 5% of the value of the maximum allowed revenue for the relevant Transmission Network Service Provider for the first year of the relevant regulatory control period whichever is the larger amount [21]

Notwithstanding this application was made under the current rules, the ElectraNet determination was made under an earlier version of the rule, which stipulated that the threshold was $10m or 5% of the maximum allowed revenue for the relevant Transmission Network Service Provider for the first year of the relevant regulatory control period. Under that version of the rule ElectraNet propose the minimum threshold amount is $14.2m.

3.2.1 AER view

ElectraNet sought capital expenditure of nominally, $67.66m. This greatly exceeds the $14.2m threshold figure. Taking into account the reduction calculated by the AER of $20.82m ($2012-13) the capital amount sought will still exceed $30m. We note therefore that even had the higher threshold applied, this project will still qualify. Consequently, as the capital expenditure threshold has been met under either version of the rule, we agree the threshold has been met.

3.3 South East control scheme

In the AER's RIT-T examination AEMO and ElectraNet noted that subsequent to the RIT-T Project Assessment Conclusions Report (PACR) additional analysis had found that the inclusion of the control scheme proposed by Infigen Energy was economic. At the time the AER stated:

> We consider that ElectraNet's proposal to include the South East control scheme does not alter the preferred option identified in the Heywood Interconnector RIT-T. Therefore, it does not affect our determination of whether the preferred option satisfies the RIT-T.[22]

On this basis it was excluded from the identified preferred option 1b. As was foreshadowed in the RIT-T examination, ElectraNet has included the control scheme in the contingent project application.

3.3.1 AER view

The purpose of the control system is to prevent overloading of the South Eastern transformers when high local generation is not matched by local load conditions. The control scheme was not considered viable as part of the options considered in the initial RIT-T evaluation based on the prevailing load and generation conditions at the time of the evaluation.

However, since that time ElectraNet has received an application to connect additional energy generation from a major customer based in the South East region. The additional generation has tipped the economic evaluation of the control scheme to 'economic'. We examined the Net Present Value (NPV) analysis submitted by ElectraNet to support this addition.[23] The net benefit is estimated to lie in the range $440k to $1.9m on a $0.9m investment. We agree with that analysis. We also consider this amendment will increase the long-term benefits to consumers and therefore, is warranted. As the scope of the variation is small at $0.88m, no separate RIT-T evaluation is required. We accept this addition is justified.

[21] National Electricity Rules, clause 6A.8.1(b)(2)
[22] AER, Decision South Australia – Victoria (Heywood) Interconnector Upgrade, Box 3.1, p.23
[23] ElectraNet, Response to initial questions part 2, 31 Jan 2014, p.4

3.4 Demolition of redundant 132kV lines

When a weak transmission line operates in parallel with a stronger transmission line a problem frequently arises for the use of the lines: the rating of the weaker line limits the ability of the stronger line to be fully utilised. This situation arises in the Heywood project. To address this problem ElectraNet propose to disconnect and dismantle the two lines identified as lines F1836 and F1837. ElectraNet submitted a model which calculates the Net Present Value (NPV) of a range of options for retaining the lines or decommissioning them either immediately, or after 5, 10 or 15 years. Based on this model, ElectraNet propose to demolish the lines at the earliest opportunity, in the 2016-18 period. This set the expected end date for the project as June 2018.

ElectraNet's model produces the lowest NPV cost to customers of $56.5m if the line is demolished as proposed.[24] All other options ElectraNet studied impose higher NPV costs on customers.

3.4.1 AER view

We agree with the need to remove these two 132kV lines from service but we do not agree they should be demolished immediately. Our examination of the proposal identified the high cost (i.e. $18.62m plus $2.2m on-costs including $0.98m risk allowance ($2012-13)) of works in decommissioning the two existing 132kV lines as requiring further justification. We also identified a number of issues with the NPV analysis ElectraNet used to calculate the optimum timing. ElectraNet's model seeks to assess potential future need for network assets in the South East region on a long-term view.

The NPV analysis model used by ElectraNet is dependent on a number of factors in addition to the actual cost of the demolition. These include:

1. the quantum of opex required to inspect and maintain a disused line in a safe condition before it is demolished;

2. the option cost of meeting future demand and generation growth in the South East region if the lines are withdrawn from service; and

3. accelerated depreciation of the decommissioned lines.

We believe that ElectraNet have adopted an overly conservative approach to safety for a line that is no longer in service. ElectraNet argue that their current safety standards would not allow the line to be turned off and abandoned in situ.[25] For the purposes of the calculation of the NPV they assume the alternative to total de-commissioning is for the line to be monitored in an active state and maintained to a standard equivalent to being able to be returned to service at very short notice. Any defects identified in the line which reduces its mechanical strength or current carrying capacity would be repaired as though the line were operational. We do not accept this is the appropriate alternative state that should be compared. Instead, ElectraNet should have compared the costs of a de-energised state for the line, with passive monitoring. Our first issue is this approach to active monitoring of a redundant line results in a very high operating cost profile that favours the earliest possible retirement of the line.

The opinion of the AER's Technical Advisors Group (TAG) based on their collective professional expertise and industry experience is that active monitoring of a redundant line is an unnecessary and

[24] ElectraNet - Response to questions part 2, 31 January 2014, p.6
[25] ElectraNet - Response to questions part 2, 31 January 2014, p.8

expensive practice. The TAG considers that the better approach would have been to adopt the totally de-energised state, perform a non-destructive condition assessment and patrol the line at regular intervals to identify any deterioration in the mechanical safety of the line. In a de-energised state, safety inspection costs are significantly lower than when a line is energised. However, ElectraNet has calculated their costs assuming that the line is energised or subject to DC signal injection. They have not considered leaving the line de-energised and passively monitored.

Table 3: 20 year operating cost profile: ElectraNet c.f. AER

	Years 1,2,3	Years 3,4,5	Years 6,7,8,9,10	Years 11,12,13,14,15	Years 16,17,18,19, 20
F1836	$453,625	$4,787,478	$11,844,879	$7,110,506	$513,100
F1837	$518,250	$1,599,390	$16,663,123	$10,261,288	$800,225
Total	$971,875	$6,386,868	$28,508,001	$17,371,794	$1,313,325
AER	$439,500	$439,500	$732,500	$732,500	$732,500

Source: ElectraNet, Response to questions, Attachment E, cost analysis ongoing maintenance, January 2014, AER Analysis

We understand that it has been common industry practice to isolate and make electrically safe redundant lines pending their ultimate removal. As there remains residual risk from the mechanical failure of the lines they are patrolled at regular intervals whilst in the decommissioned state to monitor their physical state. Essential safety repairs are made as they arise. These practices if adopted by ElectraNet should address the requirements of their safety regulator to maintain surplus assets in a safe condition. The AER recognises that active monitoring achieves a very high safety standard but we consider the cost of achieving this standard is excessive and unnecessary. We consider an efficient business would not incur these potentially high costs when the physical location of the lines involved and their environs suggest a lower cost option is available. The two lines are in an open, flat rural environment with minimal exposure to populated areas. Were some elements of the line to fail the risk of consequential property damage or injury will be low, especially when the detailed condition assessment and line patrol program preferred by the AER is adopted.

Our view is that the lines would be demolished only when the risk of mechanical failure reached an unacceptable level. This view is supported by ElectraNet's condition reports for lines F1836 and F1837.[26] The reports identify safety concerns for staff climbing the towers with the design of the crossarms on many of the towers. They also note deterioration of the footings in some cases. Despite these limitations, ElectraNet assess the lines as still having more than 10 years of potential service life remaining when in an energised state. De-energising the lines results in lower operating costs and means de-commissioning of the lines can be deferred. We believe the crossarm safety issue is unlikely to be significant if the lines are de-energised because alternative techniques for surveying the line (e.g. aerial surveys) do not rely on climbing the towers. The AER accepts that some work to maintain the lines and towers in a safe condition will be required but we consider the ElectraNet program, which includes allowances for non-destructive testing of some footings, is excessive. The

[26] ElectraNet - Condition Assessment Report Tailem Bend - Keith 132 kV, Oct 2011 - Confidential and ElectraNet - Condition Assessment Report Keith - Snuggery 132kV, Oct 2011 - Confidential

significantly reduced scope of the operating expenditure required to maintain the line will result in a much lower operating cost profile over the next 20 years than ElectraNet assumed.

The second issue with the ElectraNet model is it incorporates allowance for future demand growth in the South East region in the period 2031-2 to 2035-6. This triggers a need for a new network development in the region. This need would occur in 16 to 20 years' time. The demand/generation trigger is not stated. This introduces a number of very large lump sums into the analysis that conflates two issues: the optimum timing of the demolition of the line and the distant future demand growth in the region. In practice, our testing of the ElectraNet model found the effect on the net NPV outcome of excluding this analysis is minimal. Our reason for discounting the need to retain this element in forming an alternative view is that it adds a great deal of complication to the analysis but does not assist in identifying the optimum timing of demolition. Removing these elements from the NPV analysis makes it easier to determine a preferred alternative.

Our third issue is the application of accelerated depreciation on decommissioned assets. Although accelerated depreciation may apply, the ElectraNet revenue determination did not differentiate the depreciation rate between transmission lines in service and decommissioned lines. The AER expects the calculations for all aspects of a contingent project will be consistent with the decisions made at the time of the determination. Moreover, in the ElectraNet economic analysis it is assumed the lines are to be maintained to an in-service condition but ElectraNet has also applied accelerated depreciation to the redundant assets. We consider this approach is inconsistent. Applying accelerated depreciation to decommissioned assets has the effect of favouring early replacement.

We reject the ElectraNet analysis accordingly. It was not practical for the AER to modify the ElectraNet model to evaluate a de-energised line option in the same manner as ElectraNet. The ElectraNet model is complex and contains many obscure interdependencies. However, we did use the ElectraNet model and assumptions to extract the annualised costs and benefits of the AER's alternative option. We estimate the annualised cost of monitoring the two lines under our preferred alternative is $90,000.[27] When allowance is made for corrective maintenance of safety related defects as they arise, the annualised cost increases to $146,000.[28] The annual benefit of deferral is estimated at $600,000.[29] Over time we expect the annualised cost to increase and the deferral benefit to decrease but we expect the relative rates of change of these competing parameters will be slow. This supports our assessment that the optimum timing of demolition is unlikely to arise until the assets approach the end-of-life indicated by the ElectraNet condition reports, nominally at least 10 years.

On this basis, the expenditure to demolish the existing lines is not considered to be a necessary part of this contingent project.

Our view is the lines should not be demolished immediately. This view leads to a substitution of ElectraNet's proposed capital expenditure with operating expenditure. This also changes the effective date for completion of the project. We consider that ElectraNet should adopt a passive monitoring program commencing with an immediate condition survey in 2016-17 and repeated at 5 year intervals at an estimated cost of $300k (2012-13). Additionally, the lines should be subject to ground or aerial

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27 AER, ElectraNet Heywood Interconnector Upgrade Contingent Project Application - Technical Advisors Group Technical Review, February 2014, p.10

28 AER analysis

29 AER, ElectraNet Heywood Interconnector Upgrade Contingent Project Application - Technical Advisors Group Technical Review, February 2014, p.10

patrols on an annual basis at a cost of $30k per annum. We sought ElectraNet's comments on this approach:[30]

> However, ElectraNet notes that if the lines are to be maintained, a number of high priority corrective maintenance activities will also need to be undertaken during the current regulatory period to address immediate known issues which impact on the safety and mechanical integrity of the lines. It has only been possible to defer addressing these known risks given that the lines were scheduled for removal in the current regulatory period.

We accept this view is correct. Under the AER's approach it is also necessary to estimate an allowance for essential safety maintenance from 2016-17 because the lines are not to be demolished. We sought additional information from ElectraNet to calculate this allowance. We compared ElectraNet's estimate for corrective works with our own estimate and found the difference to be $220K for 2 years. However, our estimate did not take into account the backlog of defects that have accumulated in the expectation the lines would be demolished. ElectraNet provided a list of those defects to support their revised estimates. We agree the additional work should be funded.

This new operating expenditure is offset by a slight (i.e. $12k) reduction in routine maintenance expenditure that would otherwise have been spent maintaining the lines in a serviceable condition. The necessary changes to operating expenditure are discussed further in section 3.6.1. The capital expenditure reduction (all costs in $2012-13) will be $20.82m (comprising $18.62m demolition costs and $2.2m on-costs including $0.98m risk allowance). As the last stage of ElectraNet's project was the demolition of these lines the project end date will now occur sooner, upon commissioning of the new substation and series compensation works. This brings the project completion date forward, to 30 June 2017, as set out in the ElectraNet timetable.

3.5 Risk estimate

A standard practice within ElectraNet is to calculate an allowance for the risk of mis-estimation or the occurrence of foreseeable but unlikely events when planning a capital project. These allowances are weighted by the probability of a risk arising. The products of the probability (which is always less than unity) and risk cost are summed to create a risk estimate. ElectraNet used a statistical technique called 'Monte Carlo' analysis to complete this calculation.

3.5.1 AER view

Apart from removing the $0.98m ($2012-13) associated with the risks specific to the demolition of the two 132kV lines, we are generally satisfied with the ElectraNet risk estimate. However, we note that the whole estimate of approximately $3m is questionable. In particular, the approach ElectraNet takes can lead to the asymmetric application of risk estimates. This is because ElectraNet does not consider covariance. Covariance is the effect whereby individual risks may interact and lead to an increase or decrease in the total risk. Our investigation has revealed that ElectraNet ignores covariance and thus, does not allow sufficiently for reductions in the risk estimate when covariance is favourable to the customer.

Covariance can be difficult to identify and quantify. The AER did not identify any covariance affecting this project but this assessment was based on a limited investigation. As our time available to assess a contingent project is limited, our investigation also considered whether the effect was likely to be material for this project. We concluded that any adjustment for covariance, if it were identified, would likely be relatively small, probably no greater than 1% of the total expenditure for this project. This

[30] ElectraNet , Comments on PTRM Modelling, 18 March 2014, p.8

small effect may not be true for other contingent projects and thus, it should not be assumed this effect can be ignored for other projects. Consequently, beyond the $0.98m ($2012-13) associated with the demolition works, no other changes to the risk allowance are included in this decision.

The AER will expect in future applications which involve risk estimates that the proponent will actively consider and comment on covariance. This will improve the techniques used by networks to estimate risk to improve transparency and facilitate future reviews.

3.6 Operating expenditure (Opex)

To estimate the incremental opex ElectraNet took the opex model employed in the last revenue determination process and adjusted the opex in proportion to the change in size of the asset base. They proposed a minor adjustment of $12k ($2012-13) for avoided routine maintenance. ElectraNet sought a total of $1,624,316 ($2012-13) over the last two years of the current regulatory period. This approach has been applied to previous contingent projects. Unlike the previous projects which did involve complex works involving both new assets and rebuilding of existing assets in various stages of their life-cycle, this project contains only minor amounts of such works. The major work here is the construction of a new substation to house the series capacitors and line strengthening to support the higher power flows.

3.6.1 AER view

The opex model approach used by ElectraNet produces estimates for all the relevant categories of expenditure but also introduces estimates of expenditure in categories that are not related to new assets. The opex model is an asset growth model which distributes the change in assets pro-rata across all categories of expenditure. While this approach was accepted in the revenue determination it should only be applied when a project contains a number of elements and is broadly similar to the general asset base of the service provider. Otherwise, it introduces opex components that are not relevant when a project does not have that characteristic. As this project does not involve significant components of existing assets beyond the upgrading of specific items of plant at existing substations, we consider the application of the model to this project flawed. In particular, it introduces estimates for corrective maintenance and operational refurbishment that should not arise for new assets. We consider that the components for corrective maintenance – $362,885 ($2012-13) and operational refurbishment – $209,185 ($2012-13) claimed by ElectraNet are not appropriate.[31] These costs are not likely to arise in relation to this project.

The ElectraNet approach may also overstate the cost of routine maintenance for new substation assets. New assets will generally have lower initial maintenance needs during the initial warranty period. However, establishing an estimate for the capacitor banks involved is complicated by the fact that the final configuration of the network is not known. The number and type of switches necessary to implement the substation is not currently settled. Until this is settled we accept that the estimate of this component is subject to uncertainty. We think it unlikely that the difference in the amount calculated by the AER were this information available would be material. Therefore, we have not made an adjustment to the substations component of the routine maintenance allowance.

ElectraNet calculated a modest $12k ($2012-13) reduction in routine line maintenance costs under their approach. The AER approach of passive monitoring will replace annual line inspection costs with an allowance for patrol costs of $30,000 ($2012-13) p.a. for two years and an initial condition survey ($300,000) ($2012-13) repeated at 5 year intervals. A further cost which we consider will arise under

[31] ElectraNet: 140304 AER Opex allowance incl Heywood.xlsx

this approach is the cost of making defects safe. We estimate that on a forward looking basis ElectraNet would be likely to incur an annualised cost of $146,000 to maintain the safety of these lines.

As discussed in section 3.4.1 ElectraNet was asked to provide further details of the expected line maintenance costs if the lines were not demolished. ElectraNet estimated these costs to be $269k ($2012-13) in each of 2016-17 and 2017-18. To support this estimate, ElectraNet provided a list of the essential items of work for each line.[32] The work required totals 428 separate items consisting of:

- repairs to earthing straps;
- restoration of safety warning signs;
- minor repairs to ensure the mechanical integrity of the lines; and
- access track clearance work.

We are satisfied that these works would not be undertaken if the line were demolished. The items listed are consistent with our view that a passive monitoring program should be put in place. We are also satisfied that the works should take place if the lines are not demolished. The AER's estimate for this aspect of the passive safety program did not take into account the accumulated backlog. Taking into account the backlog of defects, we consider the ElectraNet estimate to be reasonable.

The AER has determined the total opex to be $1.87m ($2012-13), taking into account each of the adjustments noted above. This amount is greater than the $1.55m ($2012-13) initially sought by ElectraNet. This is because it is necessary in the first year that the lines are removed from service to undertake a detailed safety inspection and address known defects, as detailed above. To minimise the impact on prices of addressing defects, this cost is spread over two years. Including the initial establishment costs the annualised cost over 5 years is equal to $197,600.[33] The estimated annual deferral benefit achieved by not spending $20.82m ($2012-13) in capital remains at $600,000. Although this cost is greater than our initial estimate of $146,000 the annualised cost remains substantially lower than the annualised benefit. We therefore consider that deferring the demolition will best meet the National Electricity Objective because it reduces the long-term costs to customers of ElectraNet.

[32] ElectraNet - Comments on PTRM modelling, 18 March 2014, Attachment C
[33] Calculated over 5 years, this is $300,000+$30,000x5+$269,000x2=$988,000 total cost.

4 Maximum allowed revenue (MAR)

The total estimated capital cost determined by the AER is $45.1m ($2012-13) (including real cost escalation). The incremental operating expenditure we have determined to be $1.87m ($2012-13).

ElectraNet provided comments on the AER's proposed changes to the PTRM as a consequence of our decisions on capital and operating expenditure and project timing. They noted two errors had been identified in their 13 December 2013 application:

> Real escalation had been omitted inadvertently from the as incurred capex inputs to the original contingent project PTRM[34]

and

> …it is noted that nominal operating expenditure values (totalling $1.62m) were inadvertently inputted into the original PTRM which accompanied the application[35]

We have reviewed these errors and agree they should be corrected. We also amended the capital and operating expenditure inputs to give effect to our decision. Table 4 summarises our decision on the building block requirements.

Table 4: AER amended building block revenue requirement

Year	2013-14	2014-15	2015-16	2016-17	2017-18	Total
($m Nominal)						
Return on Capital	155.2	169.7	179.5	191.3	198.6	894.2
Regulatory Depreciation (Return of Capital)	27.1	32.8	45.0	52.8	54.5	212.2
Opex Allowance	81.8	87.0	90.8	98.1	100.9	458.7
Efficiency Carryover	(1.3)	(3.6)	(1.4)	-	4.8	(1.5)
Net Tax Allowance	5.2	5.6	6.0	6.7	5.9	29.4
Annual Building Block Revenue Requirement (unsmoothed)	268.1	291.5	319.8	348.9	364.7	1,592.9
Maximum Allowed Revenue (smoothed)	284.0	298.9	316.2	334.5	353.8	1,587.4
X Factor	n/a	-2.68%	-3.20%	-3.20%	-3.20%	n/a

Note: X - factors are negative numbers

We have adopted a modified smoothing profile from that proposed by ElectraNet in table 4. This is because the NER requires the difference between the smoothed and unsmoothed revenue to be minimised in the final year of a regulatory period. In the current ElectraNet determination we interpreted this to mean the difference should be no greater than 3%. To maintain this outcome we have determined the adjusted revenue and x-factors highlighted in green should apply to this decision. Note that the x-factors are the year to year change in prices, which are adjusted as necessary to achieve the final year target. This adjustment is NPV neutral to ElectraNet.

[34] ElectraNet - Comments on PTRM, 18 March 2014, p.5
[35] ElectraNet - Comments on PTRM, 18 March 2014, p.9

We have determined therefore that the smoothed maximum allowed revenue (MAR) should be adjusted to $1,587.4m total ($nominal) based on an unsmoothed MAR of $1592.9m ($nominal). This equates to an increase of 0.625% on average transmission network prices.

5 AER determination

In accordance with clause 6A.8.2 of the National Electricity Rules, our determination is that ElectraNet's revenue allowance should be amended to allow the Heywood Interconnector Upgrade Contingent Project to proceed, subject to the adjustments that the AER has made to the capital and operating allowances ElectraNet proposed for this project.

We consider that:

1. the trigger event specified for this project has occurred;
2. the capital amount sought exceeds the threshold of $30m specified in rule 6A.8.1(b)(2)(iii);
3. the project proposal is consistent with 'Option 1b' as was identified in the RIT-T as the preferred option;
4. incorporation of the south east control scheme is warranted;
5. the demolition of two ElectraNet 132kV transmission lines numbered F1836 and F1837 should not be included in this project;
6. a better estimate of the incremental operating expenditure we consider is reasonably required for the purpose of undertaking the project in each year of the regulatory period is $1.87m ($2012-13);
7. a better estimate of the capital expenditure we consider is reasonably required to complete the project is $45.71m as-incurred ($2012-13);
8. the smoothed maximum allowed revenue (MAR) should be adjusted to $1,587.4m total ($nominal) based on an unsmoothed MAR of $1592.9m ($nominal);
9. the X-factors should be adjusted as set out in section 4 to maintain the difference between the smoothed and unsmoothed revenue in the final year (2017-18) of not more than 3%, consistent with the ElectraNet revenue determination; and
10. the completion date for this project is 30 June 2017.