



# **Decision**

## **Reinforcing the NSW Southern Shared Network (Humelink)**

**Determination on dispute -  
application of the regulatory  
investment test for transmission**

November 2021

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## Executive Summary

This document sets out the Australian Energy Regulator's (AER) determination in regard to a dispute, brought by the Wunelli Pty Ltd (Wunelli), of TransGrid's regulatory investment test for transmission (RIT-T) for its Reinforcing Southern Shared Network (Humelink) project.

The AER is the economic regulator for electricity transmission and distribution services in the National Energy Market (NEM). Our electricity-related powers and functions are set out in the National Electricity Law (NEL) and National Electricity Rules (NER).

We are responsible for developing, publishing and maintaining the RIT-T and accompanying RIT-T Application Guidelines (RIT-T Guidelines). The RIT-T is an economic cost-benefit analysis that is used by transmission businesses to assess and rank different electricity investment options. We are also responsible for determining RIT-T disputes raised by parties following the conclusion of the RIT-T process as set out in the NER. This requires the AER to consider whether the RIT-T proponent (in this case TransGrid) applied the RIT-T in accordance with the National Electricity Rules (NER).

TransGrid initiated a RIT-T consultation process in June 2019 to identify a project that:

- increases the transfer capacity and stability limits between the Snowy Mountains and major load centres of Sydney, Newcastle and Wollongong, thereby enabling access to lower cost generation to meet demand in these major load centres; and
- facilitates the development of renewable generation in southern NSW.

TransGrid published the Project Assessment Conclusions Report (PACR) for the Humelink RIT-T on 29 July 2021.

The preferred option identified in the Project Assessment Conclusions Report (PACR) involves constructing new 500 kV double circuit transmission lines in an electrical 'loop' between Maragle, Wagga Wagga and Bannaby (referred to as option 3C). The cost is estimated cost to be \$3.317 billion.

Wunelli raised a dispute on 16 August 2021 under rule 5.16B of the National Electricity Rules (NER) on the grounds that the PACR fails to consider all credible options to address the network need. In section 2.3 of this document we have discuss the specific grounds of the dispute including reference to AER's assessment of each element. Broadly, the dispute notice asserted that:

- (a) There are other distinct network configurations of the preferred option, each having materially different route lengths, geographic or environmental risks, construction costs and network benefits, and also differing in their relationship to existing assets.
- (b) Given the high proportion of biodiversity offset costs, once the route specifics are identified and proper consideration given to environmental risks (e.g. bushfire, storm and lightning risks), the NPV ranking of the preferred option and the second ranked option may be reversed.
- (c) It is not clear whether the route corridors for costing the different options have been optimised for double circuit construction.

(d) TransGrid has provided insufficient transparency about the double circuit configuration of the preferred option.

After considering the grounds of the dispute, the AER's determination is that TransGrid is required to amend its PACR for Humelink RIT-T by 23 December 2021. In conducting our review:

- We consider that TransGrid did not meet the RIT-T requirements with respect to its consideration of credible options. Specifically, TransGrid could reasonably have been expected to include in the RIT-T analysis, a full double circuit configuration of option 1C (referred to as option 1C-new in this determination), in order to assess the net economic benefit associated with the option.
- We are satisfied that the costs and benefits of other distinct configurations of the top two ranked credible options are likely to be sufficiently similar in terms of costs and benefits such that the cost of considering these other configurations is likely to be disproportionate.
- We are satisfied that TransGrid met the RIT-T consultation requirements regarding double circuit configurations TransGrid assess full double circuit configurations of the top two ranked options in its PACR following the issue being raised in a submission to the Project Assessment Draft Report (PADR).

More broadly, we consider that in circumstances where updated estimated costs may change the ranking of the preferred option in the PACR, it is important to recognise that the NER requires the RIT-T proponent (in this case TransGrid) to reapply the RIT-T, if in the reasonable opinion of the proponent there has been a material change in circumstances that changes the preferred option.

A material change in circumstances could arise where updated estimated projects costs increase significantly from the costs estimated in the RIT-T as a result of finalising the route. We would expect TransGrid to consider its obligations under the NER in the event that updated estimated project costs, for example following route selection, significantly depart from those estimated in its PACR.

To ensure that the RIT-T meets the requirements of the NER and to ensure transparency of the RIT-T analysis, we require that TransGrid amend the Humelink PACR to include the following:

- A full double circuit option for the path between Maragle and Bannaby as a credible option - Option 1C-new.
- The estimated capital cost of this option, including the estimated biodiversity offset costs. We require TransGrid, when doing so, to explain the cost accuracy of these costs and ensure this is consistent with the expected accuracy of the top two ranked options in the PACR.
- A complete comparative cost benefit analysis (with and without competition benefits) including this option for each scenario and its impact on the ranking of the credible options assessed in the PACR.

- Sensitivity analysis for this option as assessed for options 2C and 3C in the PACR, to demonstrate the robustness of RIT-T modelling outcomes. In particular, we require that TransGrid include the following sensitivities for this option in the central scenario:
  - the impact of the Kurri Kurri and Tallawarra B gas generators
  - delaying VNI West until 2035/36
  - the impact on the positioning analysis of adopting the draft 2021 IASR assumptions
  - the impact of alternate scenario weightings i.e. higher weighting of the step-change scenario which is an increase of 10 per cent to the 2020 ISP scenario weightings
  - the impact of 25 per cent higher and lower network capital costs of the credible options (including the adoption of P90 costs); and
  - the impact of alternate commercial discount rate assumptions i.e. a high discount rate of 7.90 per cent and a low discount rate of 2.23 per cent.

We are also of the view that full provision of information is essential for ensuring the transparency and stakeholder confidence in the RIT-T process. In this instance, it may have helped prevent this dispute and ensured efficient and timely resolution of the RIT-T process.

# 1 Introduction

This chapter sets out the relevant background information to our determination on the dispute in relation to the Humelink RIT-T, including a summary of the dispute and the dispute resolution process.

## 1.1 Who we are and our role in this process

The AER is the economic regulator for electricity transmission and distribution services in the NEM.<sup>1</sup> Our electricity-related powers and functions are set out in the NEL and NER.

We are responsible for developing, publishing and maintaining the RIT-T and accompanying RIT-T Guidelines.<sup>2</sup> The RIT-T is an economic cost–benefit analysis that is used by transmission businesses to assess and rank different electricity investment options.<sup>3</sup> The purpose of the RIT-T is to identify the credible option<sup>4</sup> which maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the market (the preferred option).<sup>5</sup> The RIT-T Guidelines provide guidance on the operation and application of the RIT-T.<sup>6</sup>

Transmission businesses must apply the RIT-T to proposed transmission investments that are actionable ISP projects, except in the circumstances specified in clause 5.16.3(a) of the NER.<sup>7</sup> The RIT-T aims to promote efficient transmission investment decision making in the NEM and provide greater consistency, transparency and predictability.

## 1.2 The Humelink RIT-T

TransGrid initiated a RIT-T consultation process in June 2019 to identify a project that increases the transfer capacity and stability limits between the Snowy Mountains and major load centres of Sydney, Newcastle and Wollongong, thereby enabling access to lower cost generation to meet demand in these major load centres and facilitating the development of renewable generation in southern NSW.

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<sup>1</sup> In addition to regulating transmission and distribution in the NEM and Northern Territory, we also monitor the wholesale electricity and gas markets to ensure suppliers comply with the legislation and rules, taking enforcement action where necessary, and regulate retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only) and the ACT.

<sup>2</sup> <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/rit-t-and-rit-d-application-guidelines-2018>

<sup>3</sup> The current RIT-T, version 2.0, was published by the AER on 25 August 2020.

<sup>4</sup> A credible option is defined in NER, cl. 5.15.2(a) as an investment option that (a) addresses the identified need; (b) is commercially and technically feasible; and (c) can be implemented in sufficient time to address the identified need. A credible option is also an option that is identified as a credible option in accordance with paragraphs (b) or (d) of cl. 5.15.2 (as relevant).

<sup>5</sup> NER, cl. 5.15A.1(c)

<sup>6</sup> AER, Regulatory Investment Test for Transmission Application RIT-T Guidelines, December 2018,

<sup>7</sup> NER, cl.5.16A.3(a)


A project referred to as 'HumeLink' was identified as an actionable project in the 2020 ISP.<sup>8</sup> Projects that are identified as actionable are eligible for a streamlined process in a manner consistent with section 5.16A of the NER.

TransGrid published the PACR for the Humelink RIT-T on 29 July 2021.<sup>9</sup> The preferred option identified in the PACR involves constructing new 500 kV double circuit transmission lines in an electrical 'loop' between Maragle, Wagga Wagga and Bannaby. The cost is estimated cost to be \$3.317 billion. TransGrid's modelling indicates that the preferred option, upon construction, is expected to provide additional 2570MW of transfer capacity between the aforementioned load centres.

The PACR estimates that the preferred option, known as 3C, would deliver net market benefits of \$491 million. The second ranked option, option 2C, is estimated to have only four per cent higher capital costs however, the benefits are estimated to be 23 per cent lower than the preferred option. The PACR states there is a high degree of uncertainty regarding the estimated capital costs of the project and if these costs increase by 24 per cent, the preferred option (on a weighted scenario basis) no longer provides net economic benefits.

Table 1 presents the three highest ranked options along with their key features and a topology diagram reproduced from the PACR.<sup>10</sup> The topologies presented are indicative electrical lines rather than proposed geographical routes. Additionally, the PACR provides several variations of the options presented in Table 1, however these have lower net economic benefits.

**Table 1: Network topologies for credible options**

Summary	Topology
<p>Option 1C</p> <ul style="list-style-type: none"> <li>• Maragle to Bannaby</li> <li>• Two new 500 kV transmission lines, tie transformers and switchgear</li> <li>• Partial double circuit electrical configuration</li> <li>• 2510 MW capacity</li> </ul> <p><b>Capex:</b></p> <ul style="list-style-type: none"> <li>• Lines and substations: \$1,725m</li> <li>• Biodiversity offset: \$1,340m</li> <li>• Total capex: \$3,065m</li> </ul>	

<sup>8</sup> AEMO, 2020 Integrated System Plan, July 2020, p.14.

<sup>9</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021

<sup>10</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021, p.29.



Option 2C

- Maragle to Bannaby via Wagga Wagga
- Four new 500 kV full double circuit transmission lines, tie transformers and switchgear
- Full double circuit electrical configuration
- 2510 MW capacity

**Capex:**

- Lines and substations: \$2,585m
- Biodiversity offset: \$815m
- Total capex: \$3,400m



Option 3C

- Electrical loop between Maragle, Wagga Wagga and Bannaby
- Three new 500 kV transmission lines, tie transformers and switchgear
- Full double circuit electrical configuration
- 2570 MW capacity

**Capex:**

- Lines and substations: \$2,380m
- Biodiversity offset: \$935m
- Total capex: \$3,317m



Source: TransGrid, PACR, 29 July 2021

The PACR does not identify the preliminary route of the preferred option and TransGrid expects to further refine costs and identify the specific route following the Environmental Impact Statement process which is currently underway.<sup>11</sup>

### 1.3 The dispute

On 16 August 2021, the AER received a notice of dispute from Wunelli Pty Ltd (Wunelli), based in Tumut NSW, disputing the conclusions of the Humelink PACR.<sup>12</sup> The disputing party has raised the dispute on the grounds that the PACR fails to identify and consider all options that could reasonably be classified as credible options and the route selection may affect the ranking of the preferred option. In particular, Wunelli contends that:

- (a) "The PACR fails to identify that there are at least two distinct configurations of this option; each having materially different route lengths, geographic or environmental risks, construction costs and network benefits. These options also differ significantly in their relationship to existing assets." The dispute notice

<sup>11</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021

<sup>12</sup> <https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-wunelli-pty-ltd>

illustrates this with indicative "low diversity" and "high diversity" options and states that given "the scale of the HumeLink project, and the biodiversity and land acquisition costs constituting 30% of the PACR project cost estimate, it is critical that the proponent properly identify the characteristics of the proposed routes and evaluate all credible options."

- (b) "Once the route specifics are identified and proper consideration given to diversity benefits, the NPV ranking of... [the preferred option and the second ranked option]... may be reversed."
- (c) Late changes to double circuit constructure and lack of visibility on route alignment raises several questions:
- (d) "Are the corridors used for costing different options optimised for double circuit construction?"
- (e) Are previously investigated corridors intended for single circuit construction likely to be utilised due to time and / or budgetary pressure? Are these routes optimised for length and other considerations in the proposed double-circuit option?
- (f) Has there been sufficient industry consultation, given that the proposed solution was never previously presented?
- (g) How can consumers be satisfied the proposal represents a sound investment, when there is no visibility on the line length proposed? Similarly, when there is no indication of the types of terrain and vegetation, especially when biodiversity offset costs represent 28 cent of the project budget."

## 1.4 Structure of this document

This document sets out our determination on the dispute including the reasons for the determination.

The decision is structured as follows:

- Chapter two sets out our dispute resolution process and how it relates to the present dispute.
- Chapter three sets out our assessment of the application of the RIT-T by TransGrid.
- Chapter four sets out our determination on Humelink RIT-T dispute.

## 2 RIT-T dispute resolution

### 2.1 Our dispute resolution process

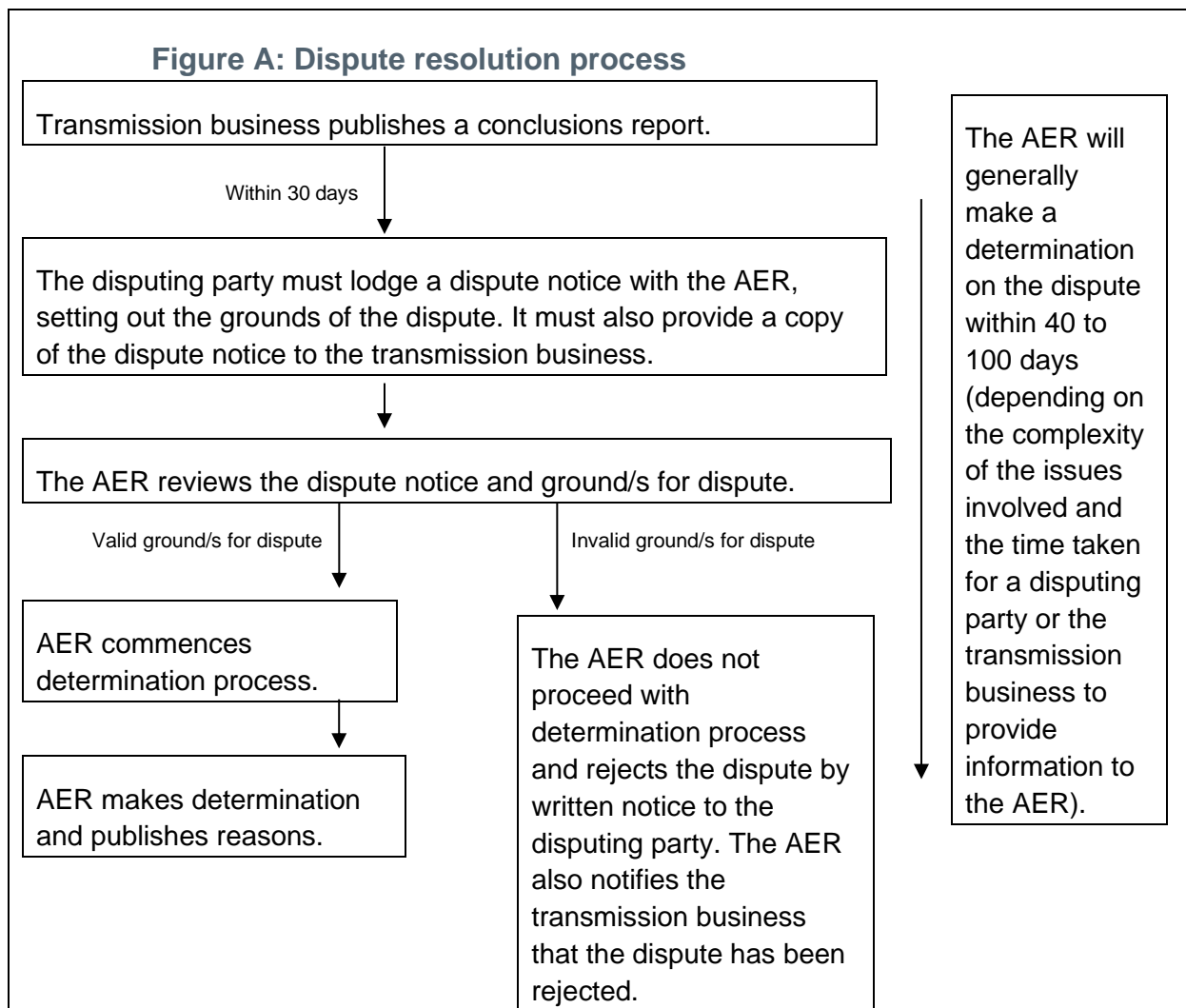
The AER is responsible for determining RIT-T disputes raised by parties following the conclusion of the RIT-T consultation process as set out in the NER. In accordance with rule 5.16B(c) of the NER, certain parties may raise a dispute in relation to the conclusions made in the PACR by a RIT-T proponent by lodging a written notice to the AER within 30 days of the publication of the PACR.

Rule 5.16B(a) of the NER identifies Registered Participants, the AEMC, Connection Applicants, Intending Participants, AEMO and interested parties as parties eligible to lodge a dispute notice. A dispute may be raised about conclusions made by the RIT-T proponent in the project assessment conclusions report in relation to:<sup>13</sup>

- the application of the RIT-T
- the basis on which the RIT-T proponent has classified the preferred option as being for reliability corrective action; or
- whether the preferred option will have a material inter-network impact.

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<sup>13</sup> NER, r. 5.16B (a)



A dispute notice may not be raised about any issues in the PACR which the RIT-T treats as externalities or relate to an individual's personal detriment or property rights.<sup>14</sup> The AER's RIT-T Guidelines provide guidance on the information that should be included in a dispute notice.<sup>15</sup> The RIT-T Guidelines also provide a summary of the RIT-T dispute resolution process. This summary has been reproduced as Figure A above.<sup>16</sup>

After considering the dispute notice and any other relevant information, we must either reject the dispute or make and publish a determination. We can:

- reject the dispute by written notice to the disputing party if we consider that the grounds for the dispute are misconceived or lacking in substance; and
- notify the RIT-T proponent that the dispute has been rejected.<sup>17</sup>

<sup>14</sup> NER, r. 5.16B (b)

<sup>15</sup> AER, December 2018, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines p. 74

<sup>16</sup> AER, December 2018, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines p.75

<sup>17</sup> NER, r. 5.16B (d)(1) and (2)

Alternatively, we must make and publish a determination that:

- directs the RIT-T proponent to amend the matters set out in the PACR, and specifies a reasonable timeframe for the RIT-T proponent to comply with the AER's direction; or
- states that, based on the grounds of the dispute, the RIT-T proponent will not need to amend the PACR.<sup>18</sup>

We must decide whether a dispute is valid and resolve the dispute within:

- 40 days of receiving the dispute notice; or
- an additional period of up to 60 days where we notify interested parties that additional time is required to make a determination because of the complexity or difficulty of the issues involved.<sup>19</sup>

In making a determination on the dispute, we:

- must only take into account information and analysis that the RIT-T proponent could reasonably be expected to have considered or undertaken at the time it performed the RIT-T
- must publish our reasons for making the determination
- may disregard any matter raised by the disputing party or the RIT-T proponent that is misconceived or lacking in substance; and
- must specify a reasonable timeframe for the RIT-T proponent to comply with the AER's direction to amend the matters set out in the PACR.<sup>20</sup>

Under rule 5.16B (f)(3) of the NER, we may request additional information regarding the dispute from the disputing party and/or the RIT-T proponent. The disputing party or the RIT-T proponent (as the case may be) must provide any additional information as soon as is reasonably practicable.<sup>21</sup>

A request for additional information will automatically extend the period of time for making a determination by the amount of time it takes the relevant party to provide the requested information, provided that:

- we make the request for additional information at least seven days prior to the expiry of the relevant period; and
- the RIT-T proponent or disputing party provides the information within 14 days of receipt of the request.<sup>22</sup>

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<sup>18</sup> NER, r. 5.16B (d)(3)

<sup>19</sup> NER r. 5.16B (d)

<sup>20</sup> NER, r. 5.16B (f)

<sup>21</sup> NER, r. 5.16B (h)

<sup>22</sup> NER, r. 5.16B (i)

## 2.2 Application of our dispute resolution process

We received a written dispute notice from Wunelli on 16 August 2021. Rule 5.16B (c) of the NER requires a dispute notice to be provided to us within 30 days of the date of the publication of the PACR. As the PACR was published on 29 July 2021, Wunelli met the deadline for raising a valid dispute.

After an initial assessment, we considered that the dispute notice was not misconceived nor lacking in substance and that it adequately specified the grounds of the dispute. The concerns raised in the dispute notice are summarised in section 1.3 above.

To better understand the concerns raised by Wunelli, we met with Wunelli and TransGrid on 18 and 24 August 2021, respectively. We also met with TransGrid on 25 October 2021 to seek additional information related to the dispute.

We also sought further information from TransGrid via information requests sent to TransGrid on 24 August (initial information request), 21 September and 12 and 22 October 2021 seeking further details on:

- Treatment of route diversity in exploring credible options and determining the preferred option in the PACR.
- The indicative route assumed for the preferred option and other credible options in the PACR for the purposes of estimating costs.
- Breakdown and methodology behind ascertaining biodiversity costs associated with the credible options assessed in the PACR.
- Consideration of double circuit configuration for the top three ranked credible options and impact on the cost benefit analysis in the PACR.

Copies of our information requests and TransGrid's responses are available on our website.<sup>23</sup>

## 2.3 Our assessment approach

In accordance with the NER, our review of this dispute was an assessment against the RIT-T requirements, in light of the grounds of the dispute. That is, we conducted a review as to whether the grounds of the dispute identified a failure by TransGrid to apply the RIT-T in accordance with the NER.<sup>24</sup>

Accordingly, our assessment focused on identifying whether TransGrid in its PACR for Humelink:

- Considered whether it was necessary to consider route variations of the top two ranked options assessed in the PACR, taking into account the costs and benefits of these route variations in addressing the identified need for investment.

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<sup>23</sup> <https://www.aer.gov.au/about-us/dispute-resolution/reinforcing-the-nsw-southern-shared-network-humelink-rit-t-dispute>

<sup>24</sup> NER, r.5.16B (a)

- Provided information and analysis including demonstrable reasons regarding underlying cost assumptions associated with the credible options demonstrating that costs have been derived taking into account material cost uncertainty for each credible option.
- Considered and optimised other credible options for 'double circuit' transmission line configurations that would meet the identified need of the Humelink RIT-T.

Table 1 sets out the specific list of issues raised by Wunelli and a reference to the relevant section in this document where we have addressed those issues.

**Table 1 Issues raised in dispute notice and AER assessment**

Issues raised in the dispute notice	Reference to AER Assessment
<p>The PACR fails to identify that there are at least two distinct configurations of this option; each having materially different route lengths, geographic or environmental risks, construction costs and network benefits. These options also differ significantly in their relationship to existing assets." The dispute notice illustrates this with indicative "low diversity" and "high diversity" options and states that given "the scale of the HumeLink project, and the biodiversity and land acquisition costs constituting 30% of the PACR project cost estimate, it is critical that the proponent properly identify the characteristics of the proposed routes and evaluate all credible options.</p>	<p><b>Section 3.1 Consideration of credible options and treatment of route diversity</b></p> <p><b>Section 3.1.1 Consideration of distinct variations of the preferred option</b></p>
<p>Once the route specifics are identified and proper consideration given to diversity benefits, the NPV ranking of the preferred option and the second ranked option may be reversed.</p>	<p><b>Section 3.1 Consideration of credible options and treatment of route diversity</b></p> <p><b>Section 3.1.1 Consideration of distinct variations of the preferred option</b></p>
<p>Late changes to double circuit constructure and lack of visibility on route alignment</p>	<p><b>Section 3.2.1 Stakeholder consultation on double circuit consideration of preferred option</b></p>
<p>Are the corridors used for costing different options optimised for double circuit construction?</p>	<p><b>Section 3.2.1 Consideration of full double circuit configuration of option 1C</b></p>
<p>Are previously investigated corridors intended for single circuit construction likely to be utilised due to time and / or budgetary pressure? Are these routes optimised for length and other considerations in the proposed double-circuit option?</p>	<p><b>Section 3.1 Consideration of credible options and treatment of route diversity</b></p> <p><b>Section 3.1.1 Transparency of indicative routes</b></p>
<p>Has there been sufficient industry consultation, given that the proposed solution was never previously presented?</p>	<p><b>Section 3.2.1 Stakeholder consultation on double circuit consideration of preferred option</b></p>
<p>How can consumers be satisfied the proposal represents a sound investment, when there is no visibility on the line length proposed? Similarly, when there is no indication of the types of terrain and vegetation, especially when biodiversity offset</p>	<p><b>Section 3.1 Consideration of credible options and treatment of route diversity</b></p>

costs represent 28 cent of the project budget.

**Section 3.1.1 Transparency of  
indicative routes**

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### 3 AER assessment of RIT-T dispute

This section outlines our assessment of TransGrid's application of the RIT-T for the Humelink project in response to the dispute notice we received from Wunelli.

#### 3.1 Consideration of credible options and treatment of route diversity

In its dispute, Wunelli contends that TransGrid failed to consider route diversity for the preferred option in the Project Assessment Conclusions Report (PACR).<sup>25</sup> In particular, there may be other distinct configurations of the preferred option, each having materially different route lengths, geographic or environmental risks, construction costs and network benefits, and differing in their relationship to existing assets.<sup>26</sup> Wunelli characterised variations to the preferred option as a 'low diversity variation' and a 'high diversity' variation as set out in Figure 1.

#### Figure 1: Different routes of preferred option

Figure 2: Low-diversity option.



The low-diversity 3C configuration includes routing the Wagga – Bannaby circuit via Maragle. This option has limited diversity potential as all new circuits travel through the same forested areas and parallel existing 330kV circuits in areas of known storm and fire danger using the corridors which have been investigated by the proponent. Although it is not communicated in the PACR, the proponent's actions to date indicate that this is the favoured option.

Figure 3: High-diversity option.



This option may result in a lower cost due to a similar or lower total circuit length, and a single corridor through forested areas. It would keep the Wagga-Bannaby circuit out of the forested areas around Maragle and provides multiple diversity opportunities. This includes options to avoid paralleling existing 330kV circuits in high-risk areas, consistent with the TAPR and the intent of HumeLink to increase the resilience of the network.

Source: Notification of dispute- Wunelli Pty Ltd- Humelink RIT-T<sup>27</sup>

Wunelli states that given the scale of the Humelink project, and the biodiversity and land acquisition costs constituting 30 per cent of the PACR project cost estimate, it is critical that

<sup>25</sup> <https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-wunelli-pty-ltd>

<sup>26</sup> ibid

<sup>27</sup> ibid

the proponent properly identify the characteristics of the proposed routes and evaluate all credible options.

Wunelli also raises concerns on the transparency of the proposed route. Wunelli states:

How can consumers be satisfied the proposal represents a sound investment, when there is no visibility on the line length proposed? Similarly, when there is no indication of the types of terrain and vegetation, especially when biodiversity offset costs represent 28% of the project budget?

### **Route diversity**

For the purposes of this determination and TransGrid's Humelink RIT-T, route diversity refers to the geographical routing of transmission lines between connection points. The credible options across the network topologies have different assumed geographical routes and therefore different costs and environmental and operating risks.

Both the NER, and the RIT-T application guidelines, published by the AER, define a credible option as an option that:<sup>28</sup>

- addresses the identified need, that is, achieves the objective that the RIT-T proponent seeks to achieve by investing in the network
- is commercially and technically feasible; and
- can be implemented in sufficient time to meet the identified need.

Clause 5.15.2 (b) of the NER requires RIT-T proponents to consider all options it could reasonably classify as credible options. Under the NER,<sup>29</sup> the RIT-T must not require a level of analysis that is disproportionate to the scale and likely impact of each credible option being considered. The identification and consideration of credible options a RIT-T proponent assesses for meeting a particular identified need should therefore be proportionate to the magnitude of the likely costs of any credible option.

The PACR considered a diverse range of credible options, including options based on operating capacity, connection points, and network configuration (voltage). As part of the RIT-T process a total of twelve credible options (full or partial single circuit configurations) were identified in the Project Assessment Draft Report (PADR), which involved three connection points namely Maragle, Wagga Wagga and Bannaby.<sup>30</sup> These options were further refined to seven credible options in the PACR, including consideration of full double circuit configurations of the top two ranked options, option 2C and option 3C (preferred). Option 1C involving a partial double circuit configuration ranked third in the PACR.

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<sup>28</sup> AER, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines, December 2018, p. 16. This is consistent with the definition in cl. 5.15.2(a) of the NER.

<sup>29</sup> NER, cl. 5.15A.3(b)(2).

<sup>30</sup> TransGrid, Humelink RIT-T, PADR, January 2020

In considering this ground of review, it is important to recognise that the NER defines a credible option as an option or group of options.<sup>31</sup> Thus, it is permissible for a RIT-T proponent to group variations of an option together as long as the overall cost-benefit analysis of each variation is very similar. In these circumstances, a more detailed analysis (of individual options) would be disproportionate. In reviewing whether the costs and benefits of potential variations are likely to be similar, we sought further information to understand the basis for the cost estimates. TransGrid advised that the cost estimates for each credible option in the PACR were developed based on the shortest corridor route lengths. TransGrid also stated that in estimating cost for each credible option:<sup>32</sup>

Uncertainty associated with the corridor routes is captured using the Hollmann model contingency toolset. This toolset, in conjunction with a Monte-Carlo Simulation program, uses a combination of Systemic (Parametric) and PACR option specific cost and schedule risk analysis to develop a probability weighted (P50) contingency.

Based on this further information we are satisfied that the PACR has optimised the costs of the preliminary route for each credible option and weighted the cost estimates for each credible option taking into account cost uncertainty.<sup>33</sup> TransGrid advised that it has also included biodiversity costs in estimating a probabilistic approach to estimating the total capital costs of credible options assessed in the PACR and this cost estimation approach was applied consistently between all credible options.

Wunelli considers that the PACR fails to consider route diversity costs and benefits associated with route variations to the credible options such that the costs and benefits of these variations should therefore be considered as distinct options.

We understand, in the context of the grounds of review, that route diversity costs and benefits refer to the impact of route selection associated with environmental factors affecting the performance of transmission lines. In particular, Wunelli refers to the impact of 'high-cost low probability' events (such as lightning strikes, bushfires or extreme wind events) that may affect multiple lines simultaneously.

As noted by Wunelli, the PACR stated that<sup>34</sup>:

Final decisions regarding route diversity for the preferred option will be based on an assessment of network risks and mitigation strategies, having regard to the relative cost of diversity options, that sits outside of the RIT-T process (specifically, the EIS process summarised in the introduction).

It appears that the PACR acknowledged that network diversity will be an important consideration to be balanced against costs in finalising the route.

Wunelli also raises concern that<sup>35</sup>:

Another aspect of the insufficient treatment of diversity in the PACR and the high proportion of biodiversity offset costs is that once the route specifics are identified and

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<sup>31</sup> NER, cl. 5.15.2(a)

<sup>32</sup> TransGrid, Response to AER information request, 5 October 2021

<sup>33</sup> RIT-T Clause 6

<sup>34</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021, pg 30

<sup>35</sup> <https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-wunelli-pty-ltd>

proper consideration given to diversity benefits, the NPV ranking of low-diversity 3C option (figure 2) and PACR option 2C may be reversed.

In considering the potential for the ranking of the top two ranked options to be reversed, the PACR also includes sensitivity analysis to assess the impact of estimated capital costs increase for the preferred option (option 3C) relative to option 2C. The PACR stated that<sup>36</sup>:

If Option 3C's capital costs are more than 24 per cent higher than the central estimates, it would no longer have positive estimated net benefits (on a weighted-basis). We also find that if Option 2C's costs were to remain constant, Option 3C's costs would need to increase by more than 4 per cent for Option 2C to become preferred.

### 3.1.1 AER Assessment

#### Consideration of distinct variations of the preferred option

Overall, we are satisfied that the consideration of route variations for the preferred option is not likely to result in sufficiently different costs and benefits to warrant treating these variations as distinct credible options from option 3C. We have reached the conclusion that the costs of considering variations to the preliminary route for each network topology are likely to be disproportionate, on the basis that:

- The PACR was undertaken at an early stage of project development when detailed route selection had not been completed. TransGrid has stated that, in identifying the preferred route, considerations of route diversity and costs need to be balanced and that it has adopted the shortest corridor lengths consistently for each of the credible options in the PACR. As such a consideration of route variations is not likely to be proportionate given this need to balance environmental risks and costs and this process will be finalised outside the RIT-T process.<sup>37</sup>
- In its response to our information request, TransGrid recognised that capital costs of the credible options (including biodiversity offset costs) are uncertain. In completing the PACR, TransGrid undertook a probabilistic analysis to understand the likely distribution of costs under each of the options.<sup>38</sup> We have reviewed TransGrid's methodology and consider that its approach is reasonable. We also consider as a result that the costs of undertaking further analysis of route variations of the preferred option at the PACR stage is likely to exceed the benefits of doing so.

It is also noteworthy that the NER requires the RIT-T proponent (in this case TransGrid) to reapply the RIT-T if, in the reasonable opinion of the proponent, there has been a material change in circumstances that changes the preferred option. A material change in circumstances could arise where updated estimated projects costs increase significantly from the costs estimated in the RIT-T as a result of finalising the route. The estimation of costs and benefits in a RIT-T will involve some uncertainty and the RIT-T seeks to address this uncertainty through scenario and sensitivity analysis. However, we would expect TransGrid to consider its obligations under the NER in the event that updated estimated

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<sup>36</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021, p. 56

<sup>37</sup> TransGrid, Response to AER information request, 5 October 2021

<sup>38</sup> *ibid*

project costs, for example following route selection and the completion of the Environmental Impact Statement, significantly depart from those estimated in its PACR.

### **Transparency of indicative routes**

We have also considered Wunelli's concerns in terms of:

- Whether consumers can be satisfied the proposal represents a sound investment, when there is no visibility on the line length proposed and there is no indication of the types of terrain and vegetation along the line, especially when biodiversity offset costs represent 28 cent of the project budget.
- Whether previously investigated corridors intended for single circuit construction likely to be utilised due to time and/or budgetary pressure and whether these routes optimised for length and other considerations in the proposed double-circuit option.

The PACR provided a high-level scope for each credible option and assumed an indicative route for each network topology. However, the assumed routes were not identified in the PACR. The PACR stated that TransGrid expects to further refine costs and the specific route following the Environmental Impact Statement process which is currently underway <sup>39</sup>.

In considering this issue, we consider it is good practice for a RIT-T proponent to be transparent regarding the assumed route in the PADR and PACR. The inclusion of the assumed route and the assumptions adopted in the PACR would have provided stakeholders with additional information to understand the basis of the estimated costs for each credible option (e.g. TransGrid advised that the shortest corridor lengths have been adopted for each network topology).

We also understand that TransGrid, following the PACR publication, published a geographic map of proposed route corridors for the preferred option on its website. The map identifies a broad study area where new transmission lines could be built to connect substations at Wagga Wagga, Bannaby and Maragle. It also provides details about how TransGrid intends to narrow the broad study area to a study corridor as the post RIT-T processes, such as the EIS process and landowner community consultation process.<sup>40</sup> To the extent that this information was available at the time of finalising the PACR and this was relevant to the preliminary routes, TransGrid could have considered whether this information should have been made available in the PACR. However, the AER does not consider that the PACR needs to be amended as this is subject to processes outside the RIT-T process.

## **3.2 Double circuit configuration of credible options**

The top two ranked options in the PACR include double circuit transmission line configurations. The PACR demonstrates that single circuit or double circuit configurations of transmission lines significantly impact the overall cost benefit assessment. Based on the information in the PACR and further information provided by TransGrid, we also understand that double circuit configurations of credible options have significantly lower biodiversity

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<sup>39</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021

<sup>40</sup> <https://www.transgrid.com.au/projects-innovation/humelink#Map>

offset costs than the single circuit configurations. Relevantly, the PACR considers that credible options include a double circuit configuration.

### **Double circuit vs single circuit electrical configuration of transmission lines**

On the basis of electrical configuration, transmission lines can be classified into single circuit and double circuit configurations. Generally, double circuit configurations of transmission lines provide benefits over single circuit in respect of reduced geographical footprint and ability to house multiple transmission lines on one electrical tower, thereby providing cost savings. However, double circuit transmission lines are also understood to be more exposed to operational risks, which may include bushfire, storm and lightning risks.

While full double circuit configurations of all credible options were not considered in earlier stages of the Humelink RIT-T, TransGrid, in response to stakeholder submissions, assessed full double circuit configurations of top two ranked options 2C and 3C (preferred) in its PACR. In its PACR, TransGrid stated that<sup>41</sup>:

The outworking of this process is that Option 2C and Option 3C from the PADR are presented in the PACR as complete double-circuit options, which allows significant cost reductions relative to where they are constructed as either a single-circuit, or a combination of single- and double-circuit, configuration.

In addition, while the other options are primarily single-circuit, they all now involve a 132 km double-circuit component west of Bannaby, an area where we consider bushfire risk is a more manageable risk, in order to reduce costs. We have not investigated complete double-circuit versions of these options, as we have for Option 2C and Option 3C, as any cost reductions are not expected to result in these options becoming top ranked options given their significantly lower net benefits than for Option 2C and Option 3C.

Wunelli questions whether the corridors for costing the different options have been optimised for double circuit construction. In considering this issue, the 'direct' path credible options between Maragle and Bannaby included in the PACR did not consider a full double circuit option. In particular, the PACR stated<sup>42</sup>:

Please note that the biodiversity offset costs shown in the tables below for Option 2C and Option 3C are lower than for Option 1C due to their full double circuit arrangement, while Option 1C involves two single circuit lines to be constructed in parallel (with a 132 km of double circuit lines) that translates to a larger easement width footprint. Similarly, Option 2C and Option 3C have lower biodiversity costs than Option 2B and Option 3B, respectively, since these 'B' options assume two single circuit lines (with the exception of the 132 km double circuit section).

Wunelli also raises concerns on the lack of transparency and stakeholder consultation on the consideration of double circuit configurations of the credible options in the PACR. Wunelli further raises concern that the PACR provided limited details on whether corridors used for costing different options were optimised for double circuit construction.

## **3.2.1 AER Assessment**

<sup>41</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021, pg 15

<sup>42</sup> *ibid*, footnote 75, pg 28

## Stakeholder consultation on double circuit consideration of preferred option

In relation to stakeholder consultation, Wunelli queries whether there has been sufficient consultation during the RIT-T process, as the double circuit configuration of the preferred option 3C was not presented in the Humelink PADR. However, the full double circuit configurations of options 3C and option 2C were assessed in the PACR following stakeholder feedback to the Humelink PADR<sup>43</sup>. In particular, the NER requires RIT-T proponents to have regard to the submissions received in response to the PADR, when preparing its PACR<sup>44</sup>. Accordingly, we are satisfied that TransGrid met the RIT-T consultation requirements.

## Consideration of full double circuit configuration of option 1C

We sought further information from TransGrid to understand the reasons why the PACR did not consider a full double circuit configuration of option 1C consistent with option 2C and 3C.

TransGrid submitted that<sup>45</sup>:

TransGrid conducted a screening step on the different circuit configurations for the top performing network topologies, and confirmed that Route 2 and 3 (i.e. Option 2C and Option 3C) will have higher net market benefits than Route 1 (Option 1C).

Both Options 2C and 3C have higher gross benefits since they provide a wider footprint via Wagga Wagga as compared with Option 1C. These options (Options 2C and 3C):

- ~ access additional capacity for new renewable generation in south west NSW; and
- ~ allow the additional transfer capacity between South Australia / Victoria and NSW provided by the proposed EnergyConnect project to flow to NSW major load centres.

We also sought further information to inform the estimated costs of a full double circuit option for the 'direct' path between Maragle and Bannaby. TransGrid (Table 2) estimated significant capital cost reductions with a full double circuit configuration of option 1C.

**Table 2: Network topology cost reductions from single and double circuit to full double circuit configurations<sup>46</sup>**

	Primary single circuit + 138km double circuit cost	100% double circuit cost	Km of previous single circuit	Reduction in biodiversity offset costs to get to full double circuit	Total cost reduction inclusive of substation and lines variations
Option 1C	\$3,065m	\$2,768m	272km	\$451m	\$297m
Option 2C	\$3,770m	\$3,399m	460km	\$357m	\$371m

<sup>43</sup> TransGrid, Project Assessment Conclusions Report- Humelink RIT-T, July 2021, pg 26

<sup>44</sup> NER cl. 5.16A.4 (i)

<sup>45</sup> TransGrid, Response to AER information request, 18 October 2021

<sup>46</sup> TransGrid, Response to AER information request, 28 October 2021

Option 3C	\$3,509m	\$3,317m	366km	\$287m	\$192m
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Further, cost benefit analysis provided by TransGrid also indicates that the ranking of the credible options changes, excluding competition benefits, with a full double circuit configuration of option 1C (referred to as 'Option 1C-new'). In particular, option 1C-new ranked as the second option. As indicated in Table 3, the net market benefits (excluding competition benefits) of option 1C significantly increase with a full double circuit configuration considered. The estimated net benefits of option 1C-new also increase significantly including competition benefits (Table 4), however, option 3C remains as the preferred option after the inclusion of competition benefits (refer to 5).

**Table 3 Positioning analysis (Option 1C-new), excluding competition benefits (Present Value)<sup>47</sup>**

Route	Option	Central	Step	Slow	Fast	Weighted	Rank
Route 1	Option 1A	-\$333m	-\$178m	-\$1,011m	-\$306m	-\$362m	6
	Option 1B	-\$371m	-\$175m	-\$1,389m	-\$331m	-\$422m	7
	Option 1C (DC+SC)	-\$182m	\$7m	-\$1,206m	-\$136m	-\$233m	4
	Option 1C-new (100%DC)	\$40m	\$229m	-\$985m	\$86m	-\$11m	2
Route 2	Option 2B	-\$639m	-\$62m	-\$2,015m	-\$599m	-\$649m	8
	Option 2C (100% DC)	-\$33m	\$537m	-\$1,413m	\$9m	-\$44m	3
Route 3	Option 3B	-\$287m	\$309m	-\$1,660m	-\$248m	-\$293m	5
	Option 3C (100% DC)	\$49m	\$634m	-\$1,340m	\$91m	\$39m	1

<sup>47</sup> TransGrid, Response to AER information request, 9 November 2021



**Table 4 Cost benefit analysis (option 1C-new), including competition benefits (Present Value)<sup>48</sup>**

Route	Option	Central	Step	Slow	Fast	Weighted	Rank
Route 1	Option 1C-new	\$375m	\$735m	-\$829m	\$404m	\$335m	3
Route 2	Option 2C	\$431m	\$1,168m	-\$1,253m	\$394m	\$399m	2
Route 3	Option 3C	\$520m	\$1,271m	-\$1,177m	\$487m	\$491m	1

TransGrid also states that it has refined the capital cost estimates of option 1C-new to class 4 estimates, which are consistent with the class 4 cost estimates presented for options 2C and 3C in the PACR.<sup>49</sup>

We consider that, as a double circuit configuration is a credible option, the PACR should have considered a full double circuit of option 1C i.e. the direct path between Maragle and Bannaby. Given the net benefits associated with this option (both with and without competition benefits being taken into account) the consideration of this option would not have been disproportionate. In addition, based on the further information provided by TransGrid, we consider that option 1C-new should have been included in the PACR's positioning analysis. In particular, we consider that by screening this option out, TransGrid has not reasonably considered all credible options (as defined in clause 5.15.2(a) of the NER) in the Humelink RIT-T process.

To ensure that the RIT-T meets the requirements of the NER and to ensure transparency of the RIT-T analysis, we require that TransGrid amend the Humelink PACR as set out in section 4.

### 3.3 Consultation Process

Early engagement between stakeholders and the proponent of a RIT-T, and fuller provision of information is essential for the efficient and timely resolution of a RIT-T process.

This dispute may have been avoided if more detailed information about TransGrid's consideration of credible options, treatment of route diversity, cost assumptions and impact on ranking of the credible options, was provided in the Humelink PACR. However, the AER does not consider that the PACR needs to be amended to provide this further information.

<sup>48</sup> TransGrid, Response to AER information request, 9 November 2021

<sup>49</sup> Class 4 estimates have cost certainty typically between -30 per cent and +50 per cent. In its 28 October 2021 information response to AER, TransGrid had reported class 5 estimates (cost certainty between +/- 50%) for Option 1C- new.

## 4 AER determination

Under rule 5.16B(d)(3)(i) of the NER, we determine that, based on the grounds of the dispute, TransGrid is required to amend its PACR by 23 December 2021. In conducting our review:

- We consider that TransGrid did not meet the RIT-T requirements with respect to its consideration of credible options. Specifically, TransGrid could reasonably have been expected to include in the RIT-T analysis, a full double circuit configuration of option 1C (referred to as option 1C-new in this determination), in order to assess the net economic benefit associated with the option.
- We are satisfied that the costs and benefits of other distinct configurations of the top two ranked credible options are likely to be sufficiently similar in terms of costs and benefits such that the cost of considering these other configurations is likely to be disproportionate.
- We are satisfied that TransGrid met the RIT-T consultation requirements regarding double circuit configurations as this issue was raised in a submission to the PADR.

To ensure that the RIT-T meets the requirements of the NER and to ensure transparency of the RIT-T analysis, we require that TransGrid amend the Humelink PACR to include the following:

- A full double circuit option for the path between Maragle and Bannaby as a credible option - Option 1C-new.
- The estimated capital cost of this option, including the estimated biodiversity offset costs. We require TransGrid, when doing so, to specify the cost accuracy of these costs and to ensure this is consistent with the expected accuracy of the top two ranked options in the PACR.
- A complete comparative cost benefit analysis (with and without competition benefits) including this option for each scenario and its impact on the ranking of the credible options assessed in the PACR.
- Sensitivity analysis for this option as assessed for options 2C and 3C in the PACR, to demonstrate the robustness of RIT-T modelling outcomes. In particular, we require that TransGrid include the following sensitivities for this option in the central scenario:
  - the impact of the Kurri Kurri and Tallawarra B gas generators
  - delaying VNI West until 2035/36
  - the impact on the positioning analysis of adopting the draft 2021 IASR assumptions
  - the impact of alternate scenario weightings i.e. higher weighting of the step-change scenario which is an increase of 10 per cent to the 2020 ISP scenario weightings

- o the impact of 25 per cent higher and lower network capital costs of the credible options (including the adoption of P90 costs); and
- o the impact of alternate commercial discount rate assumptions i.e. a high discount rate of 7.90 per cent and a low discount rate of 2.23 per cent.

These amendments may occur by way of an addendum or other approach TransGrid chooses to meet the requirements above.

These amendments will ensure Option 1C-new is presented alongside the two top-ranked options, improving the ability of stakeholders to understand and compare this option and ensuring the transparency and credibility of the RIT-T process.