

# QNI Minor Upgrade Project | Contingent Project Application

17 January 2020



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### **Executive Summary**

This contingent project application (Application) relates to expanding the transfer capacity between New South Wales (NSW) and Queensland.<sup>1</sup> This Queensland to NSW Interconnector (QNI) Minor Upgrade Project (QNI Project) is defined in the National Electricity Rules (NER) as one of the two QNI projects<sup>2</sup>. It is also a priority project for early implementation under the NER,<sup>3</sup> consistent with the AER's expedited regulatory investment approval process.<sup>4</sup>

The Australian Energy Market Operator's (AEMO) 2018 Integrated System Plan (ISP) found that the QNI Project is an immediate priority that would deliver positive net market benefits once it is commissioned. AEMO's draft 2020 ISP, published on 12 December 2019, builds on its 2018 ISP assessment and refers to it as a 'no regret' action.<sup>5</sup> AEMO's 2019 Electricity Statement of Opportunities (ESOO) also reconfirmed the importance of completing an incremental upgrade to QNI, ahead of the forecast closure of Liddell Power Station, to improve the supply-demand balance in NSW and reduce the likelihood of unserved energy.<sup>6</sup>

On 20 December 2019, together with Powerlink we published the Regulatory Investment Test for Transmission (RIT-T) Project Assessment Conclusions Report (PACR) for the QNI Project.

The PACR assessed that uprating the Liddell to Tamworth lines, and installing new dynamic reactive support at Tamworth and Dumaresq and shunt capacitor banks, will deliver the greatest expected net benefits of the options considered and is therefore the preferred option<sup>7</sup>. This QNI Project will be undertaken solely in our transmission network.

The PACR found that the preferred option for the QNI Project is expected to:

- > deliver approximately \$170 million in net benefits over the assessment period to 2044-45 (in present value terms), which includes significant wholesale market cost savings that will put downward pressure on electricity prices with flow-on benefits to customers
- > reduce the need for new generation and large-scale storage in NSW to meet demand following Liddell Power Station's forecast retirement over 2022 and 2023
- lower the aggregate generator fuel costs required to meet future demand in the National Electricity Market (NEM)
- > avoid the capital expenditure (capex) for integrating renewables in the NEM, and
- > generate sufficient benefits to recover the capex seven years after the QNI Project is commissioned.

<sup>&</sup>lt;sup>1</sup> AER, *TransGrid transmission determination 2018 to 2023*, Attachment 6 – Capital expenditure, May 2018, p. 138.

<sup>&</sup>lt;sup>2</sup> See definitions of 'ISP Projects' and 'QNI Projects' in clause 11.114.1 of the NER, in Part ZZZP which deals with early implementation of ISP priority projects. 'QNI projects' are defined as the following two projects: (1) the QNI Upgrade (Queensland component) (\$66.7m) contingent project specified in Powerlink's revenue determination for the regulatory period commencing 1 July 2017; and (2) Reinforcement of Northern Network (QNI upgrade) (\$63m to \$141m) contingent project specified in our Revenue Determination for the regulatory period commencing 1 July 2018.

<sup>&</sup>lt;sup>3</sup> See Part ZZZP of the NER, and definitions in clause 11.114.1.

On 15 July 2019, the AER released a guidance notice covering how the QNI RIT-T and the wider regulatory investment approval process (including the contingent project process) are to be expedited. This expedited approval process involves this Application and our request to the AER to determine that the preferred option satisfies the RIT-T being lodged around the same time. <u>https://www.aer.gov.au/communication/queensland-nsw-interconnector-rit-t-guidance-notice-and-engagement-process</u>

<sup>&</sup>lt;sup>5</sup> AEMO, *Draft 2020 Integrated System Plan*, 12 December 2019, p. 50.

<sup>&</sup>lt;sup>6</sup> AEMO, 2019 Electricity Statement of Opportunities, August 2019, pp.4 & 93.

<sup>&</sup>lt;sup>7</sup> The preferred option is defined as the option that maximises net market benefits under the RIT-T framework.

At the same time as publishing the PACR, we sought a determination from the AER that the preferred option satisfies the RIT-T requirements in clause 5.16.6(a) of the NER. The AER has indicated that it will make its RIT-T Determination by the end of March 2020.<sup>8</sup>

This Application requests that the AER amend the revenue requirements and maximum allowed revenue (MAR) in our 2018-19 to 2022-23 Revenue Determination (2018-23 Revenue Determination) for the QNI Project. The Determination includes the QNI Project as a contingent project<sup>9</sup>. This Application is therefore made under clause 6A.8.2 and clause 11.114.3 of the NER, which relate to contingent projects.

In October 2019, the Federal and NSW Governments announced the QNI Underwriting Agreement (the Underwriting Agreement) to enable us to progress early project delivery works, such as equipment procurement, to commence before regulatory approval is obtained.<sup>10</sup>

The capex and operating expenditure (opex) forecasts in this Application reflect the prudent and efficient costs of delivering the QNI Project. Table 1 details the forecast incremental expenditure, and the associated revenue and price impacts.

#### Table 1 – QNI Project Overview

Component	Value
Capex forecast 2018-2023 (\$M, Real 2017-18)	222.8
Opex forecast 2018-2023 (including debt raising costs) (\$M, Real 2017-18)	1.7
Revenue 2018-2023 (\$M, Nominal)	30.3
Customer price impact (by 2022-23) (\$pa, Nominal)	0.6



<sup>&</sup>lt;sup>8</sup> This assumes we provide the information that the AER requires under the NER and there are no disputes on the RIT-T PACR.

<sup>&</sup>lt;sup>9</sup> Reinforcement of Northern Network (QNI upgrade)

<sup>&</sup>lt;sup>10</sup> https://minister.environment.gov.au/taylor/news/2019/ensuring-future-reliable-electricity-supply-nsw

## 1. Introduction

Our 2018-23 Revenue Determination includes a contingent project for the QNI Project.<sup>11</sup>

Section 3.2 explains the occurrence of the relevant trigger events for the QNI Project.

This Application seeks the AER's approval to amend the revenue requirements and MAR in the 2018-23 Revenue Determination so that we can recover the efficient costs of the QNI Project.

Unless otherwise specified, all dollar values in this Application are in \$2017-18, consistent with the 2018-23 Revenue Determination.<sup>12</sup>

### 1.1 Compliance with NER

This Application and the supporting documents establish the matters in clause 6A.8.2(f) of the NER, being:

- (1) 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)
- (2) the amounts of forecast capital expenditure and incremental operating expenditure reasonably reflect the capital expenditure criteria and the operating expenditure criteria, taking into account the capital expenditure factors and the operating expenditure factors respectively, in the context of the contingent project
- (3) the estimates of incremental revenue are reasonable, and
- (4) the dates are reasonable.

#### 1.2 Expedited regulatory investment approval process

On 15 July 2019, the AER released a guidance notice for an expedited regulatory investment approval process for the QNI Project. The expedited investment approval process is summarised in Figure 1 below.



<sup>&</sup>lt;sup>11</sup> AER, TransGrid transmission determination 2018 to 2023, Attachment 6 – Capital expenditure, May 2018, p. 138.

<sup>&</sup>lt;sup>12</sup> Note that dollar references used in PADR are \$2018-19 and the dollar references in the PACR are \$2019-20. Where required, the RIT-T dollar references have been adjusted in this submission for consistency.

#### Figure 1 – Expedited investment approval process for this RIT-T<sup>13</sup>



Source: Indicative timetable for the Queensland-NSW Interconnector RIT-T, available at: <u>https://www.aer.gov.au/communication/queensland-nsw-interconnector-rit-t-guidance-notice-and-engagement-process</u>

In October 2019, the Federal and NSW Governments announced they would each contribute \$51 million (i.e. \$102 million in total) to underwrite the early works required for the QNI Project.<sup>14</sup> This underwriting is expected to assist us to deliver the upgrade in the timeframes specified.

In December 2019, in accordance with the expedited regulatory investment approval process, we:

- > published the PACR, and
- > sought a determination by the AER that the preferred option satisfies the RIT-T requirements in clause 5.16.6(a) of the NER.

#### 1.3 Structure of this document

The remainder of this document is structured as follows:

- > Chapter 2 describes the proposed contingent project. It also provides a summary of the PACR
- > Chapter 3 sets out the regulatory requirements for this Application
- Chapter 4 sets out forecast capex for the QNI Project and incremental opex for the 2018-23 regulatory period
- > Chapter 5 details the structure of the documents that comprise this Application. It also sets out how the NER requirements have been addressed
- > Appendix A is our revenue application
- > Appendix B is a glossary of terms, and
- > Appendix C is the Board resolution for the QNI Project.



<sup>&</sup>lt;sup>13</sup> The end-March 2020 milestone assumes that we provide the information that the AER requires under the NER and there are no disputes on the RIT-T PACR.

<sup>&</sup>lt;sup>14</sup> https://minister.environment.gov.au/taylor/news/2019/ensuring-future-reliable-electricity-supply-nsw

#### 1.4 Structure of the QNI Contingent Project Application Documents and Models

There are a number of other attachments and models that support, and form part of, our Application for the QNI Project. This document references these attachments, models and other supporting documents for further detail and should be read in conjunction with them.

Our Application is structured as illustrated in Figure 2 to be as clear and accessible as possible to the AER, customers and other stakeholders.



Figure 2 - QNI Project Application document structure

The attachments and supporting models that, together with this document, comprise our Application are summarised in Table 2.

Document / model number	Name	Content/ purpose
1	QNI Minor Upgrade Project - Contingent Project Application	Seeks the AER's approval to amend the revenue requirements and MAR in the 2018-23 Revenue Determination.
2	Capex forecasting methodology for QNI Minor Upgrade Project	Explains key steps to develop and validate capex forecast.
3	Corporate and network overhead forecast for QNI Minor Upgrade Project	Explains bottom-up forecast of overheads, which are a component of the total capex forecast.
4	Capex Model	Calculates the capex forecast.
5	Independent engineering capex verification and assessment	GHD's independent assessment of our forecast capex.
6	Consistency of TransGrid's proposed capex for the QNI minor upgrade with the NER requirements	HoustonKemp's independent assessment of the consistency of our forecast capex with the NER requirement.

Table 2 -	Documents and models of	omprising this	Application	(excluding or	ur other si	upporting	documents)
	Documents and models o	omprising this	Application	(chordaning of		upporting v	accuments



Document / model number	Name	Content/ purpose
7	Opex forecasting methodology for QNI Minor Upgrade Project	Explains key steps to develop and validate opex forecast.
8	Opex Model	Explains key steps to develop and validate opex forecast.
9	QNI Aon Insurance	Independent insurance report.
10	QNI Post-Tax Revenue Model	Demonstrates the calculations to get to the incremental revenue requirements and MAR from the QNI Project.
11	QNI Corporate and network overhead spreadsheets	Calculates the corporate and network overhead forecast for QNI the Project
12	QNI capex forecast inputs	Provides detailed inputs for the capex model, to support the capex forecast

In addition to the documents and models listed in Table 2, we have provided the AER with other supporting documents that are referenced in the documents in Table 2.



## 2. Project overview

The background and justification for the QNI Project is set out in the RIT-T documentation.<sup>15</sup>

As noted above, in parallel with the RIT-T, we have undertaken the further necessary detailed planning, consultation and market testing of the investments required to implement the preferred option. This has resulted in detailed project specifications and costings. As mentioned in section 1, the expenditure for these early works has been underwritten by the Federal and NSW Governments and is included as part of the efficient expenditure for this Application.

#### 2.1 Project description

At a high-level, the project involves incremental investments to the existing network to increase transfer capacity in the near-term. This option is the same as that recommended in the 2018 ISP for Group 1.

The two key components of the QNI Project are:

- > uprating the Liddell to Tamworth lines, and
- > installing new dynamic reactive support at Tamworth and Dumaresq and shunt capacitor banks.

The figure below illustrates the network diagram for the project, with the existing network shown in black and new elements in red.



#### Figure 3 – Network diagram for the QNI Project

<sup>&</sup>lt;sup>15</sup> Consultation documents and accompanying material associated with the Expanding NSW-QLD Transmission Transfer Capacity RIT-T is available from our website at <u>https://www.transgrid.com.au/what-we-do/projects/current-projects/ExpandingNSWQLDTransmissionTransferCapacity</u>.



#### 2.2 Project benefits

The PACR, and accompanying reports, found that the project will:

- > deliver net benefits of approximately \$170 million over the assessment period to 2044-45 (in present value terms), which includes significant wholesale market cost savings that will put downward pressure on electricity prices with flow-on benefits to customers
- > allow more efficient sharing of generation across the NEM, thereby avoiding the use of higher cost generators and deferring, or avoiding, the construction of new, more expensive generation and largescale storage in NSW to meet demand following Liddell Power Station's forecast retirement over 2022 and 2023
- > facilitate the transition to a lower carbon emissions future and the adoption of new technologies through improving access to high quality renewable resources across regions, which further avoids the use of high-cost generators and defers, or avoids, the need to build new generation
- > lower the aggregate generator fuel costs required to meet demand in the NEM
- > avoid capex for integrating renewables in the NEM, and
- > generate sufficient benefits to recover the capex seven years after the QNI Project is commissioned.



### 3. Regulatory requirements

The regulatory requirements for contingent projects are contained in:

- > clause 6A.8.2 of the NER, and
- > the AER's Process Guideline for Contingent Project Applications.<sup>16</sup>

The key requirements are outlined below. Chapter 5 of this Application shows how we have satisfied the regulatory requirements.

#### 3.1 Regulatory requirements

Clause 6A.8.2 of the NER, as modified for the QNI Project by clause 11.114.3 of the NER, sets out the requirements for making an application to amend a revenue determination to include a contingent project.

This Application is made in accordance with the requirements of clause 6A.8.2(a), (a1) and (b) of the NER, being made:

- > during the 2018 to 2023 regulatory period
- > to amend the revenue determination that applies to us in respect of a contingent project included in the revenue determination, and<sup>17</sup>
- > within the specified time limits.<sup>18</sup>

This Application includes the information specified in clause 6A.8.2(b) of the NER:

- (3) except in the case of a clause 5.16.6 trigger,<sup>19</sup> an explanation that substantiates the occurrence of the trigger event
- (4) a forecast of the total capital expenditure for the contingent project
- (5) 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
- (6) 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)
- (7) the intended date for commencing the contingent project (which must be during the regulatory control period)
- (8) the anticipated date for completing the contingent project (which may be after the end of the regulatory control period), and
- (9) 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 subparagraph (3), which must be calculated:
  - a. in accordance with the requirements of the post-tax revenue model referred to in clause 6A.5.2
  - b. in accordance with the requirements of the roll forward model referred to in clause 6A.6.1(b)



<sup>&</sup>lt;sup>16</sup> AER, Process Guideline for Contingent Project Applications under the NER, September 2007

<sup>&</sup>lt;sup>17</sup> NER clause 6A.8.2(a)

<sup>&</sup>lt;sup>18</sup> NER clause 6A.8.2(a)

<sup>&</sup>lt;sup>19</sup> That is, a determination that a preferred option satisfies the regulatory investment test for transmission

- c. using the allowed rate of return for that Transmission Network Service Provider for the regulatory control period as determined in accordance with clause 6A.6.2
- d. in accordance with the requirements for depreciation referred to in clause 6A.6.3, and
- e. on the basis of the capital expenditure and incremental operating expenditure referred to in subparagraph (b)(3).

In addressing these requirements, we have had regard for the AER's Process Guideline for Contingent Project Applications<sup>20</sup>. We have met regularly with the AER in preparing our RIT-T documentation and this Application.

#### 3.2 Trigger events

Table 3 shows that the trigger events approved by the AER in its 2018-23 Revenue Determination for the QNI Project have been, or are in the process of being, met.

#### Table 3 – Occurrence of the Trigger Events

Trigger event	Status
<ul> <li>(a) One or more of the following:</li> <li>(i) Committed retirement of more than 1,100 MW of generation in the Hunter or Central Coast area</li> <li>(ii) New generation of more than 1,100 MW is committed in northern NSW at any current or future connection point(s) north of Armidale</li> <li>(iii) New generation of more than 350 MW is committed at any current or future connection point(s) south of Liddell and Bayswater</li> </ul>	<ul> <li>&gt; Event (i) has been met because, on 2 August 2019, AGL informed AEMO that it plans to retire three of Liddell's four units in April 2023 – the other unit will be retired in April 2022.<sup>21</sup> The four units of Liddell Power Station have a combined a capacity of 2,000 MW.<sup>22</sup></li> <li>&gt; Event (iii) has been met and we have approximately 692 MW connected in these areas, 150 MW in-commissioning as well as another 426 MW committed.</li> </ul>
<ul> <li>(b) Two or more of the following:</li> <li>(i) Inclusion of an augmentation to increase the capacity of the interconnection between NSW and Queensland in AEMO's Integrated Grid Plan or similar plan as recommended by the Independent Review in to the Future Security of the National Electricity Market by Professor Alan Finkel and accepted by the COAG Energy Council</li> <li>(ii) Notification to TransGrid by the Federal Government, COAG Energy Council, NSW Government, Queensland Government or the Energy Security Board that it considers that augmentation of the transmission network to increase the capacity of the interconnection between NSW and Queensland is required in order to meet or manage the expected demand for prescribed transmission services or comply with an applicable</li> </ul>	<ul> <li>&gt; Event (i) has been met as the 2018 AEMO ISP included the QNI Project investments proposed in this Application (and assessed in the recently completed RIT-T).<sup>23</sup></li> <li>&gt; Event (iii) has been met. On 20 December 2019, we published a PACR for the QNI Project in which the investments covered in this Application demonstrated positive net economic benefits.</li> <li>&gt; Event (iv) is in progress and the AER is expected to make its determination in March 2020 (please refer to section 1.3 above).</li> </ul>

<sup>&</sup>lt;sup>20</sup> AER, Process Guideline for Contingent Project Applications under the National Electricity Rules, September 2007 available at: <u>https://www.aer.gov.au/system/files/ac06907-Final%20guideline.pdf</u>.



<sup>&</sup>lt;sup>21</sup> https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2019/august/schedule-for-the-closure-of-agl-plants-in-nsw-and-sa

<sup>&</sup>lt;sup>22</sup> <u>https://www.agl.com.au/about-agl/how-we-source-energy/agl-macquarie</u>

<sup>&</sup>lt;sup>23</sup> AEMO, *Integrated System Plan*, July 2018, pp. 8-9.

Trigger event	Status
regulatory obligation or requirement associated with the provision of prescribed transmission services	
(iii) Successful completion of a RIT-T or alternate framework introduced in response to the recommendation of the Independent Review in to the Future Security of the National Electricity Market by Professor Alan Finkel and accepted by the COAG Energy Council (including comprehensive assessment of credible options) demonstrating that increasing capacity of the network between Bulli Creek and Liddell zones at 330/132kV or other voltages used in future is the option or part of the option that maximises the positive net economic benefits	
<ul> <li>(iv) Determination by the AER that the proposed investment satisfies the RIT-T or abovementioned alternate framework</li> </ul>	
(c) TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.	Our Board committed in January 2020 to proceed with the QNI Project subject to the AER awarding incremental revenue commensurate with the capex and opex for the project that we proposed. See Appendix C.

#### 3.3 **Project timing**

The PACR details how the QNI Project would provide net benefits to the market as soon as it is delivered. The expected applicable dates for the QNI Project are as follows:

- > date for commencement of the contingent project March 2020 (environmental approval and early works are planned to be completed in February 2020), and
- > anticipated date for completion of the contingent project September 2021.

This timing reflects a realistic assessment of the earliest dates that the investments can be delivered and is consistent with indicative dates in the PACR.

The capex for the QNI Project will occur exclusively during the 2018-23 regulatory period. Opex activities will continue into subsequent regulatory periods once the assets are operational.

#### 3.4 Stakeholder input and pre-lodgement consultation

We have engaged closely with our customer representatives and stakeholders on the QNI Project.

This engagement has informed customers and other stakeholders about the need to increase transfer capacity between NSW and Queensland and the options for delivering it to allow them to provide their views, input and perspectives on the project.

Our engagement activity included:

- > two webinars, one for the Project Specification Consultation Report and another for the Project Assessment Draft Report
- > publishing separate detailed market modelling and assumptions reports



- > bilateral discussions with interested stakeholders
- > releasing detailed analysis in response to stakeholder requests
- > receiving and assessing submissions from interested parties
- > briefing Powerlink and our Customer Panels, and
- > presenting at the Transmission Network and Annual Planning Forums in September 2019.

All consultation materials, submissions received, and actions taken to address stakeholder feedback on the RIT-T process are available on our website.<sup>24</sup> The PACR details the matters raised through our consultation and our response.

We will continue to engage with stakeholders throughout the final stage of the regulatory approval process.

The options and analysis in the PACR were shaped by this consultation, which has helped test the conclusions reached and ensure the robustness of the analysis.

As noted above, we also engaged regularly with the AER throughout the preparation of this Application. We have reflected the AER's feedback in this Application.

#### 3.5 Satisfying requirements

Clause 6A.8.2(f)(2) of the NER requires the AER to accept the relevant amounts in the Application if it is satisfied that:

the amounts of forecast capital expenditure and incremental operating expenditure reasonably reflect the capital expenditure criteria and operating expenditure criteria, taking into account the capital expenditure factors and operating expenditure factors, in the context of the contingent project.

We have addressed these requirements as follows:

- > Chapter 4 of this Application sets out our incremental and total forecast capex and incremental opex for this contingent project. It also summarises the assumptions and methodology underpinning these forecasts.
- > Chapter 5 is a checklist of the regulatory requirements, with cross-reference to the relevant sections of this Application and supporting documents that address these requirements.
- > Appendix A of this Application sets out the incremental revenue requirements, MAR and price impact for customers.

<sup>&</sup>lt;sup>24</sup> <u>https://www.transgrid.com.au/what-we-do/projects/current-projects/ExpandingNSWQLDTransmissionTransferCapacity</u>



### 4. Forecast capex and opex

This section sets out total forecast capex and opex for the QNI Project.

#### 4.1 Forecast capex

This section presents the capex forecast for the QNI Project to address clause 6A.8.2(b) of the NER. All of this capex will be incurred in the 2018-23 regulatory period.

The capex forecast is prudent and efficient having regard for the capex objectives, criteria and factors in clause 6A.5.7 of the NER.<sup>25</sup> The total forecast capex also satisfies the contingent project expenditure threshold.

#### 4.1.1 Capex forecast

The total forecast capex for the QNI Project is \$222.77 million over the 2018-23 period.

Table 4 – 2018-23 forecast capex (\$M, Real 2017-18, including overheads)

2018-19	2019-20	2020-21	2021-22	2022-23	Total
1.42	74.51	112.11	34.72	0.00	222.77

#### 4.1.2 Basis for estimates

Our capex forecasts have been developed using methods that reflect the nature and timing of the QNI Project.

Our capex forecast is explained and justified in the following supporting documents:

- > Capex forecasting methodology for the QNI Project
- > Corporate and network overhead forecast for the QNI Project
- Consistency of our proposed capex for the QNI Project with the NER requirements this independent expert report prepared by HoustonKemp shows that our capex forecast is prudent and efficient and meets the capex objectives, criteria and factors in clause 6A.6.7 of the NER, and
- Independent engineering capex verification and assessment this independent expert report prepared by GHD confirms that the scope of the QNI Project is reasonable and realistic to meet the investment needs and that our forecast capex is consistent with that which would be incurred by a prudent and efficient business.

Our capex forecast model is also provided as an attachment to this Application.

We expect that around 87 per cent of the capex for the Project will be based on market prices.

<sup>&</sup>lt;sup>25</sup> As required by clause 6A.8.1(b)(2)(ii) of the NER.

Category of QNI capex	Basis of capex	Status	Capex \$M	% of total capex
1.SVCs	Externally tendered - directly procured asset approach	Complete	55.5	24.9
2.Substations	Externally tendered - design and construct approach	Complete	80.6	36.2
3.Capacitor banks	Externally tendered - directly procured asset approach	Complete for Armidale and Dumaresq and in progress for Tamworth. Current Tamworth forecast is an estimate.	14.6	6.5
4.Transmission lines	Externally tendered - design and construct approach	Complete	36.4	16.3
5.HV switchgear	Externally tendered - directly procured asset approach	In progress. Current forecast is an estimate.	6.2	2.8
6.Transmission line insulators	Externally tendered - directly procured asset approach	In progress. Current forecast is an estimate.	0.2	0.1
7.Corporate & network overheads	Actual capex reflects records in Ellipse. Forecast capex internal bottom-up build.	Complete	28.7	12.9
8.Connections	Externally tendered - directly procured approach	In progress. Current forecast is an estimate.	0.1	0.0
9.Real input costs	Internally bottom-up build using AER's forecast real labour cost escalators	Complete	0.6	0.3
Total capex			222.8	100.0

#### Table 5 – Total forecast capex for QNI Project by category (\$M, Real 2017-18)

Our capex forecast for the Project is prudent and efficient. This is demonstrated by:

- > a rigorous, well-defined and transparent capex forecasting methodology
- > the application of our governance framework and process
- > the reliance on market testing and expert reports, and
- > external validation of both the capex forecast and deliverability.

We consider that the forecast capex is efficient and prudent in accordance with the capex criteria and meets the required capex objectives set out in the NER.



#### 4.1.3 Capex threshold

Table 6 shows that the forecast capex satisfies the relevant threshold. This means that the capex is covered by the contingent project requirements of the NER.

AER Decision First year MAR	5% of MAR	Contingent Project Threshold	Pass / Fail
716.7 <sup>26</sup>	36	36	Pass (as capex > \$36 million)

Table 6 – Contingent project thresholds (\$2017-18, Million)

Note: NER clause 6A.8.1(b)(2)(iii) requires that expected capex is higher than the greater of \$30 million or 5% of MAR. The threshold is \$36 million (being 5% of MAR).

#### 4.1.4 Application of the CESS

The AER's capital expenditure sharing scheme (CESS) applies to our 2018-23 regulatory period. As previously discussed with the AER, we propose to exclude capex for the QNI Project, and all of our other Major ISP Projects, from the CESS. This is because of the size, scale and unique risks of these projects. We use our best endeavours to forecast accurately the prudent and efficient costs of the Major ISP Projects to comply with the regulatory timeframes, recognising project-level uncertainties. However, we do not consider it appropriate or reasonable for either ourselves or our customers to bear the regulatory risks of recovering the costs of these projects, especially given that their delivery and timing are being mandated through the actionable ISP rules.

Our proposal is to remove any financial benefit (or penalty) we would receive (or incur) under the CESS in the event that our actual capex for the QNI Project contributes to our total capex for the period being less than (or greater than) the forecast total capex approved by the AER.

We will continue to engage with the AER, customers and other stakeholders on this matter so that the AER can reflect our proposal into its determination on this Application<sup>27</sup>.

#### 4.2 Forecast opex

This section presents forecast incremental opex required for the QNI Project for the 2018-23 regulatory period in accordance with the requirements of clause 6A.8.2(b)(iii) of the NER.

#### 4.2.1 Opex forecast

Total forecast opex is \$1.74 million over the 2018-23 regulatory period.

#### Table 7 - 2018-23 forecast opex (\$M, Real 2017-18)

2018-19	2019-20	2020-21	2021-22	2022-23	Total
0.00	0.00	0.18	0.35	1.21	1.74

Note: Opex is incremental to that allowed in the AER's 2018-23 determination and includes debt raising costs.

<sup>&</sup>lt;sup>27</sup> This would be consistent with the treatment of any cost underspend for the Powering Sydney's Future project approved by the AER in its 2018-23 Revenue Determination



<sup>&</sup>lt;sup>26</sup> AER, Final Decision – TransGrid – Post-tax Revenue Model – May 2018, Revenue Summary.

#### 4.2.2 Basis of opex forecast

Our Opex forecasting methodology for the QNI Project, provided as an attachment to this Application, explains and justifies the incremental opex forecast. Our opex forecast model is also provided as an attachment to this Application.

We have applied a bottom-up build approach to forecast incremental opex for the QNI Project for the 2018-23 regulatory period. In calculating our opex forecast, we have adopted the inflation and real cost escalation assumptions approved by the AER in its current 2018-23 Revenue Determination. The bottom-up build approach reflects the AER's preferred approach for how it would like us to prepare our opex forecast.<sup>28</sup> It is also consistent with the approach accepted by the AER for all contingent projects to-date.

We consider that the forecast opex is efficient and prudent in accordance with the opex criteria and meets the required opex objectives set out in the NER.

<sup>&</sup>lt;sup>28</sup> The AER advised us on 18 October 2019 in relation to Project EnergyConnect that it preferred a bottom-up build approach to forecast incremental opex. We have used this approach for the QNI Project application.



### 5. Guide to compliance

Table 8 details how this Application complies with the NER requirements.

#### Table 8 – Compliance with NER requirements

NER, clause 6A.8.2(b) requirements	Reference in Application	Document / model number
(1) an explanation that substantiates the occurrence of the trigger event	Section 3.2	
(2) a forecast of the total capex for the contingent project	Section 4.1	2 to 6
(3) a forecast of the capital and incremental opex, for each remaining regulatory year which the Transmission Network Service Provider considers is reasonably required for the purpose of undertaking the contingent project	Section 4.1 and 4.2	Capex – 2 to 6 Opex – 7 & 8
<ul><li>(4) how the forecast of the total capex for the <i>contingent project</i> meets the threshold as referred to in clause</li><li>6A.8.1(b)(2)(iii)</li></ul>	Section 4.1.4	2,5&6
(5) the intended date for commencing the <i>contingent project</i> (which must be during the <i>regulatory control period</i> )	Section 3.3	
(6) the anticipated date for completing the <i>contingent project</i> (which may be after the end of the <i>regulatory control period</i> ) and	Section 3.3	
(7) an estimate of the incremental revenue which the <i>Transmission Network Service Provider</i> considers is likely to be required to be earned in each remaining <i>regulatory year</i> of the <i>regulatory control period</i> as a result of the <i>contingent project</i> being undertaken as described in subparagraph (3), which must be calculated:	Appendix A	10
(i) in accordance with the requirements of the <i>post-tax revenue model</i> referred to in clause 6A.5.2		
(ii) in accordance with the requirements of the <i>roll forward model</i> referred to in clause 6A.6.1(b)		
(iii) using the allowed rate of return for that <i>Transmission</i> <i>Network Service Provider</i> for the <i>regulatory control period</i> as determined in accordance with clause 6A.6.2		
(iv) in accordance with the requirements for depreciation referred to in clause 6A.6.3, and		
(v) on the basis of the capex and incremental opex referred to in subparagraph (b)(3).		



## Appendices

#### Appendix A – Our revenue application

This Appendix A sets out our estimate of the incremental revenue for the QNI Project over the 2018-23 regulatory period, having regard for clause 6A.8.2(b)(9) of the NER.

Our incremental revenue is relatively small given that incremental opex for the QNI Project is low and incremental capex is not expected to be commissioned until September 2021. As shown in Table 18 below, this means that the customer bill impact in the current regulatory period is also expected to be low (relative to a typical retail bill).

Table 9 sets out the incremental MAR for the QNI Project for the 2018-23 regulatory period. This has been calculated using the AER's 2018-23 PTRM, updated for:

- > the 2019-20 return on debt estimate, and
- > incremental forecast capex, opex and energy delivered for the QNI Project.

#### Table 9 – Incremental MAR (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	734.28	755.69	793.55	829.66	843.21	3,978.92
Impact of QNI Project	0.00	0.00	0.00	14.83	15.49	30.32
Updated MAR	734.28	759.55	793.55	843.92	881.66	4,012.93

The rest of this Appendix A:

- > identifies the weighted average cost of capital (WACC) and standard asset life assumptions
- > sets out projected regulatory depreciation, tax allowance, debt and equity raising costs, unsmoothed revenue requirements and MAR, and
- > details the potential customer bill impact from the incremental revenue requirements resulting from the QNI Project.

#### A1 WACC

We have calculated the incremental revenue for the QNI Project using the same WACC assumptions as those adopted by the AER in its 2018-23 Revenue Determination, updated for the 2019-20 return on debt averaging period. This is consistent with clause 6A.8.2(b)(4)(ii) of the NER.

The WACC parameters are set out in Table 10.

#### Table 10 – WACC parameters

Parameter	AER Approved Value <sup>29</sup>
Forecast inflation	2.45%
Value of imputation credits	40%

<sup>&</sup>lt;sup>29</sup> As last annually updated by the AER for the trailing average cost of debt in January 2019.



Parameter	AER Approved Value <sup>29</sup>
Gearing	60%
Nominal pre-tax return on debt	5.97% for 2018-19 5.77% for 2019-20 onwards
Nominal post-tax return on equity	7.40%
Nominal vanilla WACC	6.54% for 2018-19 6.42% for 2019-20 onwards

#### A2 **Asset lives**

We have allocated our forecast capex for the QNI Project across regulatory asset classes, as detailed in the Capex Forecasting Methodology. Capex is depreciated in the PTRM using the standard asset lives used in the AER's 2018-23 Revenue Determination, with the exception that the standard life for equity raising costs was updated from 'n/a' to 34.2 years using the approach adopted by the AER in its recent determinations.

The standard asset lives are set out in Table 11.

able 11 – Asset lives		
Asset Category	Standard Life (years)	Explanation
Transmission lines	50	As per the AER's 2018-23 Revenue Determination
Substations	40	As per the AER's 2018-23 Revenue Determination
Secondary systems	15	As per the AER's 2018-23 Revenue Determination
Communications (short life)	10	
Land and easements	n/a	
Equity raising costs	34.2	As per recent AER decisions, this is calculated as the weighted average standard life for forecast net commission capex <sup>30</sup>

#### Tab

#### **A3 Depreciation**

Table 12 sets out our forecast incremental regulatory depreciation for the 2018-23 regulatory period for the QNI Project, consistent with clause 6A.8.2(b)(7)(iv) of the NER. This forecast has been calculated using the PTRM, projected incremental capex, and the asset lives in section A2.

Incremental regulatory depreciation is negative over the 2018-23 regulatory period. This is because the longlived nature of the assets leads to indexation being higher than real straight-line depreciation earlier in the lives of those assets. This relationship will reverse later in the assets' lives, leading to positive regulatory depreciation.

See, for instance, AER, April 2019, Final Decision, Power and Water Corporation, Post-tax Revenue Model, PTRM input sheet, W327 cell. Net commissioned capex was used in the weighted average, rather than net as incurred capex, as the former is used to calculate regulatory depreciation in the 'Assets' sheet of our PTRM.



#### Table 12 – Incremental regulatory depreciation (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	101.23	118.85	131.75	134.11	144.58	630.52
Impact of QNI Project	0.00	(0.04)	(1.99)	(5.05)	0.08	(7.99)
Updated regulatory depreciation	101.23	118.81	129.76	129.06	144.66	623.53

#### A4 Tax allowance

Table 13 sets out the forecast incremental net tax allowance for the 2018-23 regulatory period attributed to the QNI Project. This has been calculated using the PTRM and projected incremental capex.

We have not made any other changes to the net tax calculation from that used in the AER's 2018-23 Revenue Determination.

Table 13 – Incremental net tax allowance (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	31.70	33.70	35.26	37.33	39.13	177.13
Impact of QNI Project	0.00	0.00	0.09	0.23	0.34	0.66
Updated net tax allowance	31.70	33.71	35.35	37.56	39.47	177.79

#### A5 Debt and equity raising costs

Our forecast incremental revenue includes allowances for debt and equity raising costs, consistent with the AER's 2018-23 Revenue Determination. Both costs are calculated automatically within the PTRM.

Debt raising costs are included within the opex building block and are calculated as follows:

> projected opening RAB at the start of each regulatory year is multiplied by assumed gearing (of 60%) and the debt raising cost benchmark (of 0.085%).

Equity raising costs are included within the capex forecast and recovered via the return on and of capital building blocks. These costs are calculated as follows:

- > retained cash flows are projected by subtracting opex, interest payments, revenue adjustments, tax payable, and dividends from projected smoothed (i.e. MAR) revenue
- equity raising is projected by subtracting retained cash flows from the equity funding component of projected capex (assuming 60% gearing), and split between distribution reinvestment and external equity raising sources, and
- equity raising costs are calculated by multiplying the two sources by assumed benchmark equity raising cost rates.

No equity raising costs were projected in the AER's 2018-23 Revenue Determination, because retained cash flows were sufficient to cover projected equity funding. Adding the QNI Project capex does not change this, given its relatively small size.



#### Table 14 – Incremental debt raising costs (\$M, Real 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	3.24	3.26	3.30	3.33	3.36	16.49
Impact of QNI Project	0.00	0.00	0.04	0.10	0.12	0.25
Updated debt raising costs	3.24	3.26	3.34	3.42	3.48	16.74

### A6 Incremental revenue requirements for each year to end of period

Table 15 details the incremental annual building block revenue requirements for the QNI Project, based on the forecasts provided above and using the PTRM.

Table 15 – Incremental revenue requirements (\$M, Nominal)							

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination						
Return on capital	416.77	417.05	427.21	437.25	449.78	2,148.07
Regulatory depreciation	101.23	118.85	131.75	134.11	144.58	630.52
Opex	179.86	187.56	196.50	208.26	204.57	976.74
Revenue adjustments	4.71	18.53	5.37	12.71	5.14	46.46
Net tax allowance	31.70	33.70	35.26	37.33	39.13	177.13
Unsmoothed revenue requirement	734.28	775.69	796.09	829.66	843.21	3,798.92
Impact of the QNI Project						
Return on capital	0.00	0.10	5.22	13.24	16.06	34.61
Regulatory depreciation	0.00	(0.04)	(1.99)	(5.05)	0.08	(6.99)
Opex allowance	0.00	0.00	0.19	0.39	1.37	1.95
Revenue adjustments	0.00	0.00	0.00	0.00	0.00	0.00
Net tax allowance	0.00	0.00	0.09	0.23	0.34	0.66
Unsmoothed revenue requirements	0.00	0.06	3.51	8.81	17.85	30.38
Updated						
Return on capital	416.77	417.14	432.43	450.48	465.84	2,182.68
Regulatory depreciation	101.23	118.81	129.76	129.06	144.66	623.53
Opex allowance	179.86	187.56	196.69	208.64	205.94	978.69



	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Revenue adjustments	4.71	18.53	5.37	12.71	5.14	46.46
Net tax allowance	31.70	33.71	35.35	37.56	39.47	177.79
Unsmoothed revenue requirements	734.28	775.75	799.60	838.46	861.06	4,009.15

#### A7 Amended MAR

The AER's final decision on the annual building block revenue requirements for the 2018-23 regulatory period is set out in Table 16, together with the calculation of the amended revenue required for the QNI Project.

We will begin to recover incremental revenue approved by the AER in the 2021-22 regulatory year, in accordance with our approved Transmission Pricing Methodology, as shown in Table 16.

Table 16 - Amended a	annual building	block revenue	oquiromonte	/¢M	Nominal
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	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	734.28	775.69	796.09	829.66	843.21	3,798.92
Impact of QNI Project	0.00	0.06	3.51	8.81	17.85	30.23
Updated annual revenue requirements	734.28	775.75	799.60	838.46	861.06	4,009.15

Table 17 sets out the updated MAR and X-factors for the current regulatory period.

The incremental revenue requirements have been smoothed so that the only change to the MAR occurs in the 2021-22 regulatory year. This approach was adopted to ensure that the final year (2022-23) difference between MAR and the annual revenue requirements was less than 3 per cent and so that there is minimal change to the revenue profile from the 2018-23 Revenue Determination.

#### Table 17 – Amended MAR and X factors (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total		
MAR (i.e. smoothed revenue)								
AER 2018-23 determination	734.28	759.55	793.55	829.06	866.17	3,982.61		
Impact of QNI Project	0.00	0.00	0.00	14.83	15.49	30.32		
Updated MAR	734.28	759.55	793.55	843.89	881.06	4,012.93		
X-factors								
AER 2018-23 determination	(0.51%)	(0.97%)	(1.98%)	(1.98%)	(1.98%)	n/a		
Impact of QNI Project	0.00%	0.00%	0.00%	(1.82%)	0.00%	n/a		
Updated X-factors	(0.51%)	(0.97%)	(1.98%)	(3.80%)	(1.98%)	n/a		

Note: Negative X factors represent a real revenue increase.



#### A8 Customer bill impact

The QNI Project is expected to have only a marginal impact on customer bills over the 2018-23 period. This is largely because return of capital is pushed back into future regulatory periods and energy throughput is expected to increase (reducing per MWh costs).

Table 18 shows the indicative customer bill impact of the QNI Project, assuming that a typical customer consumes 4.22 MWh per year.

	2018-19	2019-20	2020-21	2021-22	2022-23
AER 2018-23 determination	46.38	48.29	50.60	52.97	55.57
Impact of QNI Project	0.00	0.00	0.00	0.63	0.54
Updated typical customer bill impact	46.38	48.29	50.60	53.59	56.11

#### Table 18 - Indicative customer bill impact (\$ per household, Nominal)

Note: Typical customer bills are calculated by multiplying the projected MAR per MWh by assumed consumption of 4.22 MWh per year per household. The QNI Project is expected to increase energy delivered in 2022-23 by 526 GWh. The increase in energy delivered was estimated using market modelling that underpins the project design.



### Appendix B – Glossary

Abbreviations/acronyms	Definition				
AEMO	Australian Energy Market Operator				
AER	Australian Energy Regulator				
Application	Contingent Project Application				
Сарех	Capital expenditure				
CESS	Capital Expenditure Sharing Scheme				
EBSS	Efficiency Benefit Sharing Scheme				
GWh	Gigawatt Hour				
ISP	Integrated System Plan				
kV	kilovolt				
Μ	Millions				
MAR	Maximum Allowed Revenue				
MWh	Megawatt Hour				
NEL	National Electricity Law				
NEM	National Energy Market				
NEO	National Electricity Objective				
NER (Rules)	National Electricity Rules				
NSW	New South Wales				
Opex	Operating expenditure				
PADR	Project Assessment Draft Report				
PACR	Project Assessment Conclusions Report				
PTRM	Post-Tax Revenue Model				
RAB	Regulatory Asset Base				
RIT-T	Regulatory Investment Test for Transmission				
ROE	Return on equity				
SA	South Australia				



### Appendix C – Board resolution

Below is a certified extract of the relevant board resolution.

On 15 January 2020, TransGrid resolved to commit to proceed with the Queensland to New South Wales Interconnector (QNI) Minor Upgrade Project (QNI Project) subject to the AER awarding incremental revenue commensurate with the capital and operating costs of the project proposed by TransGrid.

