TransGrid

VNI Minor Upgrade | Contingent Project Application – Principal Application Document

27 November 2020

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Executive Summary

The Project and this Application

We are pleased to submit our contingent project application (Application) for the Victoria to New South Wales (NSW) Interconnector Minor Upgrade Project (the Project or VNI).

VNI is a joint TransGrid and Australian Energy Market Operator (AEMO) project, which involves increasing the transfer capacity of the existing interconnector between Victoria to NSW by approximately 170 MW during peak demand conditions in NSW.

VNI is defined in the National Electricity Rules (NER or Rules)[1] as a priority project for early implementation[2]. AEMO identified VNI, in its 2018 Integrated System Plan (ISP), as an 'urgent' investment that would provide substantive benefits to the National Electricity Market (NEM) as soon as it could be completed.

On 30 July 2020, AEMO published its Final 2020 ISP,[3] which sets out an actionable whole of system plan for eastern Australia's power system to optimise consumer benefits. This ISP identifies an optimal development path, which includes VNI as a no-regret 'actionable ISP' project (i.e. it has no downside) that is 'critical to address cost, security and reliability issues' in the NEM.[4] AEMO has assumed the upgrade is commissioned in 2022-23 under the five core 2020 ISP scenarios and concludes that it will deliver benefits to consumers if it can be delivered earlier.[5]

The NSW Government and the Energy Security Board (ESB) requested that we accelerate the completion of VNI by December 2021 in advance of the Liddell Power Station closure in 2023[6]. In December 2018, the NSW Government finalised the Preliminary Planning Works Agreement (the Underwriting Agreement) to enable us to progress preliminary planning works before regulatory approval is obtained.

VNI comprises three key elements:[7]

- installation of a second 500/330 kilovolt (kV) transformer at South Morang Terminal Station
- re-tensioning the 330 kV South Morang – Dederang transmission lines, as well as associated works (including replacement of series capacitors), to allow operation at thermal rating, and
- installation of modular power flow controllers (MPFC) on the 330 kV Upper Tumut – Canberra and Upper Tumut – Yass lines to balance power flows and increase transfer capability.

The third element reflects our investments and is therefore the focus of this Application.

Our Application is the last step in the regulatory assessment process for VNI. The AER's approval of our prudent and efficient expenditure forecasts, and the resultant changes in our revenues and prices that are reflected in this Principal Application document, will enable VNI to be delivered to meet AEMO's 2022-23 commissioning date.

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1 See definitions of 'ISP Projects' and 'VNI Project' in clause 11.114.1 of the NER, in Part ZZZP which deals with early implemnetation of ISP priority projects. 'VNI project' is defined as the Reinforcement of Southern Network ($60m to $393m) contingent project specified in TransGrid's revenue determination for the regulatory control period commencing 1 July 2018. See Link

2 See Part ZZZP of the NER, and definitions in clause 11.114.1.

3 AEMO, Final 2020 Integrated System Plan, July 2020 (Final 2020 ISP). Found at Link

4 AEMO, Final 2020 ISP, July 2020, page 14 and 84.

5 Final 2020 ISP, July 2020, pp. 64 and 84.

6 NSW Electricity Strategy, November 2019 p. 32. Found at Link

7 AEMO and TransGrid, *Victoria to New South Wales Interconnector Upgrade - Project Assessment Conclusions Report*, February 2020, p. 3. (VNI RIT-T PACR). See Link

Benefits of VNI

The Regulatory Investment Test for Transmission (RIT-T) Project Assessment Conclusions Report (PACR)[8] found that VNI will deliver approximately $268 million in net benefits over the assessment period to 2033-34 (in net present value (NPV) terms) by:

- reducing the dispatch costs, through more efficient dispatch of generation in Victoria and NSW, and
- reducing the capital costs associated with new generation in NSW.

The RIT-T PACR concluded that VNI will generate sufficient benefits to recover its capital costs within six years of being commissioned.[9]

The 2019 Electricity Statement of Opportunities (ESOO)[10] reconfirmed the importance of completing VNI before the forecast closure of Liddell Power Station to manage the risk of supply-demand shortfalls which may lead to reliability standard breaches in Victoria in the short term if unplanned generator outages were to occur during extreme heat conditions.

Our capital expenditure (capex) forecast and tender process

Our forecast capex in this Application reflects the prudent and efficient costs of delivering the NSW component of VNI. Our forecast capex is $45.0 million (Real 2017-18), of which:

- around 47 per cent relates to the Smart Wires MPFC technology, which has been subject to review through the RIT-T process, and
- around 36 per cent has been derived from our competitive procurement processes for the sub-station, transmission line and secondary system works.

This means that around 83 per cent of our capex forecast has been derived on the basis of costs determined either through submissions to the RIT-T or competitive procurement processes. This will ensure that customers are paying no more than they should be for the services that they will receive.

Our forecast capex in this Application has only increased by around 11 per cent compared to the cost estimate in the RIT-T PACR, which is within the ±30 per cent range tested at the time.

Financeability of the project

In order to undertake investment in our share of the Major Projects required by AEMO's ISP, including VNI, they must be financeable. This requires revenues in the early years of these projects to better match the investment needs, in order to support achieving the benchmark credit rating of BBB+ and gearing of 60 per cent (i.e. 60:40 debt to equity) that the AER assumes in its 2018 Rate of Return Instrument (RORI).

We have submitted a rule change proposal to the Australian Energy Market Commission (AEMC) to address this issue (Financeability Rule change). Our Financeability Rule change proposal requests the following changes for Major ISP Projects:

- remove the requirement to index the regulatory asset base (RAB) by inflation over the regulatory period, and
- calculate regulatory depreciation on as-incurred capex.

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8 The VNI RIT-T PACR was published on 14 February 2020. See Link

9 AEMO and TransGrid, *Victoria to New South Wales Interconnector Upgrade | Project Assessment Conclusions Report*, February 2020, p. 44.

10 AEMO, 2019 Electricity Statement of Opportunities (ESOO), p. 5. Found at Link

We expect that our Rule change proposal will enable us to maintain our current credit rating and so make VNI and other Major ISP Projects financeable, while maintaining the same total long-term cost to consumers (i.e. NPV neutral). The revenue in this Application reflects our Financeability Rule change proposal.

1. Introduction

Our 2018-23 Revenue Determination includes a contingent project for VNI,[11] which is defined in the NER as a priority project for early implementation.[12] The approved trigger events for VNI in our 2018-23 Revenue Determination include that:

> *New generation of more than 350 MW is committed in southern NSW at any current or future connection point(s) south of Bannaby and Marulan, or NSW import capacity from Southern Interconnectors is determined to be increased by more than 350 MW due to committed expansion of southern interconnections.*
>
> *Successful completion of the RIT-T demonstrating a network investment by TransGrid maximises the positive net economic benefits from increasing the capacity of the network south of Bannaby and Marulan at 132/330kV or other voltages.*

These trigger events have been met. However, consistent with the new ISP provisions in the NER[13], which have been introduce to convert the ISP into 'action', we are lodging this Application in accordance with clause 5.16A.5 of NER rather than the trigger events in our 2018-23 Revenue Determination.

Under rule 5.16A.5 of the NER, prior to submitting our Application to the AER, we must obtain AEMO's written confirmation in respect of the Project (Feedback Loop)[14] that:

- the preferred option from the PACR addresses the relevant identified need and aligns with the optimal development path in the 2020 ISP, and
- the cost of the preferred option does not change the status of the project as part of the optimal development path.

On 26 October 2020, we wrote to AEMO requesting written Feedback Loop confirmation. Under the NER, AEMO is required to provide Feedback Loop confirmation in respect of the total costs for VNI (i.e. the costs of both the NSW and Victorian components). We provided AEMO with the costs for the NSW component of VNI as set out in this Application, being $47.0 million (Real 2017-18), which comprise opex of $2.0 million (Real 2017-18) and capex of $45.0 million (Real 2017-18). Our capex forecast is 11 per cent higher than the capex estimate of $40.5 million (Real 2017-18)[15] published in the RIT-T PACR which is within the ±30 per cent range tested at the time.

At this time, AEMO advised us that it had already received the costs of the Victorian component of VNI, although these costs remain confidential.

On 26 November 2020, AEMO confirmed that VNI satisfies the Feedback Loop based on the total project costs, which it has assessed to be $140 million (real 2019-20).[16]

In accordance with the clause 6A.8.2 and clause 11.114.3 of the NER, this Principal Application seeks the AER's approval to amend our revenue requirements and maximum allowed revenue (MAR) in our 2018-23 Revenue Determination so that we can recover the efficient costs of our components of VNI.

Unless otherwise specified, all expenditure forecasts are expressed in real terms (Real 2017-18 dollars), and all revenue forecasts are expressed in nominal terms, consistent with our 2018-23 Revenue Determination.

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11 AER, *TransGrid transmission determination 2018 to 2023*, Attachment 6 – Capital expenditure, May 2018, p. 138. Found at Link
12 See Part ZZZP of the NER, and definitions in clause 11.114.1.
13 In accordance with clause 11.126.5 of the NER (under the savings and transitional arrangements)
14 In accordance with clause 5.16A.5(b) of the Rules
15 The PACR forecast capex of $41.0 million (Real 2019-20), which equates to $40.5 million (Real 2017-18)
16 The total cost of the NSW component is $47 million (real 2017-18)

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 Structure of this document

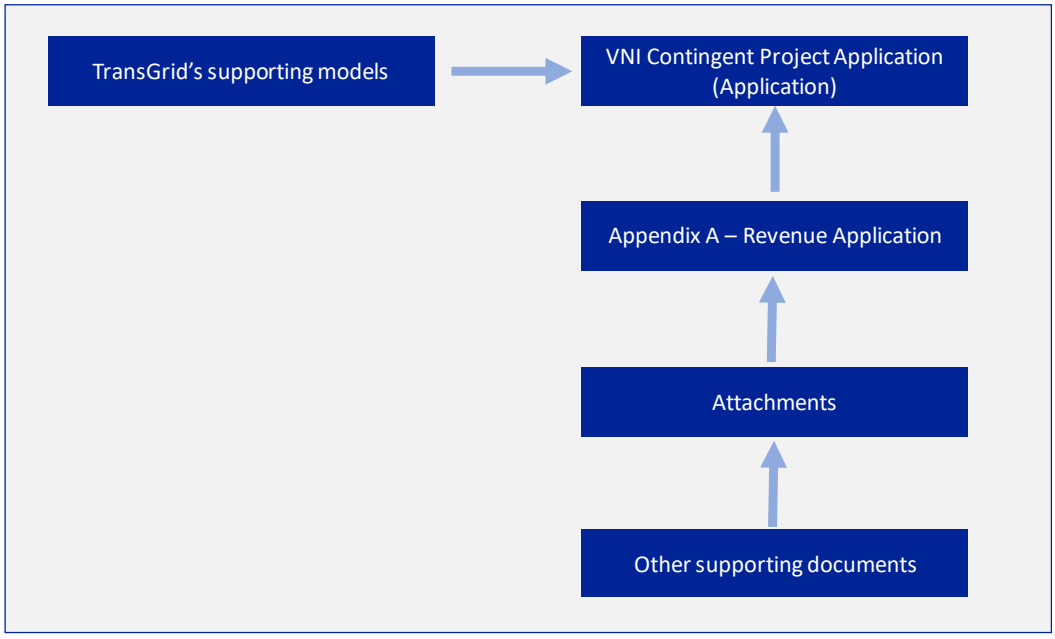
The remainder of this document is structured as follows:

- Chapter 2 describes VNI, the RIT-T process and the benefits expected to be delivered
- Chapter 3 sets out the regulatory requirements for this Application
- Chapter 4 sets out our forecast incremental revenue for VNI
- Chapter 5 sets out forecast capex for VNI and incremental opex for the 2018-23 regulatory period
- Chapter 6 sets out how the NER requirements have been addressed
- Appendix A is our revenue application, and
- Appendix B is a glossary of terms.

1.3 Structure Contingent Project Application for VNI

Our Application comprises the attachments and models (illustrated in Figure 1 and detailed in Table 1) as well as other supporting documents. This Principal Application document references these attachments, models and other supporting documents and should be read in conjunction with them.

Figure 1 - VNI Application document structure



The attachments and models are summarised in Table 1.

Table 1 – Documents and models comprising this Application (excluding our other supporting documents)

Document / model number	Name	Content/ purpose
A.1	Principal Application document	Seeks the AER's approval to amend the revenue requirements and MAR in the 2018-23 Revenue Determination based the expenditure in the Application.
A.2	Capex Forecasting Methodology for VNI	Explains and justifies our capex forecast and presents the basis on which the works have been efficiently scheduled.
A.3	TransGrid's Labour and indirect cost forecast for VNI	Explains the bottom-up forecast of our internal labour costs and overheads, which are a component of our total capex forecast. It explains our actual costs to 30 September 2020.
A.4	Capex Model for VNI	Calculates the capex forecast.
A.5	Labour and Overhead Costs spreadsheets for VNI	Calculates the internal labour costs and indirect costs for the Project and reflects actual costs to 30 September 2020.
A.6	Capex Forecast Inputs for VNI	Provides detailed inputs for the capex model, to support the capex forecast
A.7	GHD, Independent Verification and Assessment for VNI, October 2020	This is an independent engineering assessment of the scope, procurement process and forecast capex for the Project.

Document / model number	Name	Content/ purpose
A.8	HoustonKemp, Verification and Assessment for VNI, October 2020	This is an independent economic assessment of the scope, procurement process and forecast capex for the Project, based on the NER.
A.9	Opex forecasting methodology for VNI	This explains key steps to develop and validate our opex forecast.
A.10	Opex Model for VNI	Calculates our opex forecast.
A.11	Insurance for VNI	Independent insurance report.
A.12	VNI Post-Tax Revenue Model – (Financeability Rule change)	Demonstrates the calculations of our incremental revenue requirements and MAR, based on the expenditure set out in this Application by applying changes to the NER to support the financeability of Major ISP Projects. These changes include removing indexation and calculating depreciation using as incurred capex - they do not change the amount of revenue we will recover for VNI but rather the timing of when we recover revenue (i.e. they are NPV neutral).
A.13	VNI Post-Tax Revenue Model – (Base Model)	Demonstrates the calculations of our incremental revenue requirements and MAR, based on the expenditure set out in this Application without applying changes to the NER to support the financeability of Major ISP projects.
A.14A to A.14C	Our Feedback Loop request to AEMO and AEMO's Feedback Loop confirmation	Confirms that VNI satisfies the requirements under the Feedback Loop using the using the latest available total project cost information.

In addition, we have provided the AER with other supporting documents that are referenced within the documents listed in Table 1.

2. Project overview

VNI is a joint TransGrid and AEMO project, which involves increasing the transfer capacity of the existing interconnector between Victoria to NSW by approximately 170 megawatts (MW) during peak demand conditions in NSW.

AEMO's 2018 ISP concluded that VNI is required by 2020, or as soon as it can be built to[17]:

- 'provide capital deferral benefits by reducing the urgent need to invest in new flexible plant following the closure of Liddell Power Station' (then expected in 2022), and
- 'alleviate network congestion' over time, leading to 'additional benefits through fuel savings by allowing surplus generation to be shared between NSW, … , and Victoria, reducing the need to utilise high-cost fuels such as gas'.

AEMO's 2018 ISP also identified VNI as part of the 'Group 1' near-term projects, which together are expected to 'facilitate the development of projected new renewable resources to replace retired and retiring resources, and to provide essential system security'.

AEMO's Final 2020 ISP includes VNI in its optimal development path as a no-regret 'actionable ISP' project (i.e. it has no downside) that is 'critical to address cost, security and reliability issues' in the NEM.[18] AEMO has assumed the upgrade is commissioned in 2022-23 under the five core 2020 ISP scenarios and concludes that it will deliver benefits to consumers if it can be delivered earlier.

The NSW Government and the ESB requested that we accelerate the completion of VNI by December 2021 in advance of the Liddell Power Station closure in 2023. In December 2018, the NSW Government finalised the Preliminary Planning Works Agreement (the Underwriting Agreement) to enable us to progress preliminary planning works to commence before regulatory approval is obtained[19].

2.1 RIT-T process

We jointly undertook the RIT-T process for VNI with AEMO. The background and justification for VNI is set out in the RIT-T documentation[20], including the:

- Project Specification Consultation Report (PSCR)[21], published on 15 November 2018, which sought feedback on the identified need and proposed credible options to address the need
- Project Assessment Draft Report (PADR)[22], published on 30 August 2019, which identified and sought feedback on the preferred option which delivers the highest net market benefit, and
- PACR[23], published on 14 February 2020, which concludes on the preferred option and provides a summary of the submissions received on the PADR.

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17 AEMO ISP, July 2018 p.7 and 81 Found at Link

18 AEMO, Final 2020 ISP, July 2020, page 14 and 84.

19 NSW Electricity Strategy, p. 32. Found at Link

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

21 Found at Link

22 Found at Link

23 Found at Link

The scenarios considered in the RIT-T have identified and tested the preferred option in the context of differing assumptions about future demand and future capital costs, as well as different future policy settings in relation to emissions and different future rates of technology development.

The PACR found that Option 2 ('base option with MPFC') was the preferred option because it had the lowest costs and is expected to provide the highest net benefits in all three scenarios considered in the RIT-T (neutral, slow change and fast change). These scenarios covered a wide range of possible futures and are generally aligned with the AEMO's 2019 Planning and Forecasting Consultation Paper[24]. The PACR also found that Option 2 is the preferred option irrespective of scenario weightings and has a positive market benefit across all of the sensitivities considered in the RIT-T assessment:

- changing costs by ±30 per cent
- increasing the discount rate to either 8.6 per cent or decreasing to 3.2 per cent, and
- lower demand forecasts, with the adoption of 50% probability of exceedance (POE), rather than 10% POE.

Since the publication of the PACR, we have refined the specification and design requirements for the MPFC and related substation, transmission line and protection systems scope to ensure they are efficient and prudent and meet the investments required to implement the preferred option.

2.2 Project description

Option 2 comprises three key elements:

- installation of a new 500/330 kilovolt (kV) transformer at South Morang Terminal Station.
- re-tensioning the 330 kV South Morang – Dederang transmission lines, as well as associated works (including replacement of series capacitors[25]), to allow operation at thermal rating.
- installation MPFC on the 330 kV Upper Tumut – Canberra and Upper Tumut – Yass lines to balance power flows and increase transfer capability.

The third element reflects the investments in NSW to be undertaken by us, and is therefore the focus of this Application. This involves:

- supply of Smart Wires MPFC – Smart Wires i3600 Unit
- major substation augmentation works within our Stockdill 330kV substation to facilitate installation of the SmartWires i3600 unit
- installation and commissioning of the Smart Wires i3600 Unit at our Stockdill substation and the Smart Wires i2600 Unit SmartValves at our Yass substation
- minor transmission line augmentation works around our Stockdill 330kV substation, and
- ancillary works including design, procurement and installation of secondary systems equipment at eight of our surrounding substations.

GHD's Independent engineering capex verification and assessment, provided at Attachment A.7, confirms that the project scope is reasonable and realistic to meet the investment need. More specifically, GHD concludes that:[26]

> … the project investment scope aligns with the investment need and has undergone appropriate option analysis.

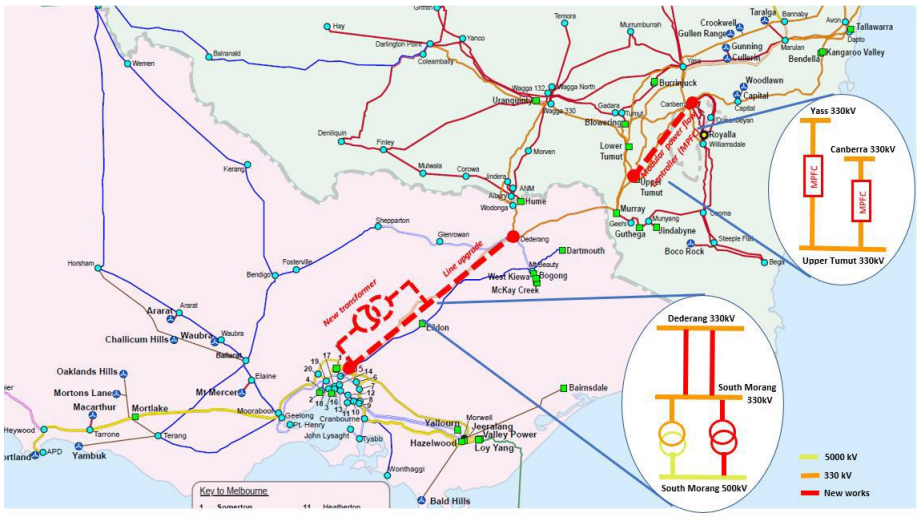
[24] See VNI RIT-T PACR. Found at Link.

[25] The capacitors will be replaced with higher rated capacitors to align with the new line ratings.

[26] GHD, *VNI - Independent Verification and Assessment*, 24 October 2020, p 23.

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

Figure 2 – Network diagram for VNI[27]



2.3 Updated costs

As discussed in Chapter 5, the capex forecast for the NSW component of VNI is $45.0 million (Real 2017-18). This is 11 per cent higher than the cost estimate of $40.5 million (Real 2017-18)[28] published in the PACR which is within the ±30 per cent range tested at the time.

The capex forecast in this Application reflects information on the prudent and efficient market-based costs of delivering VNI, which was not available at the time of publishing the PACR. This final forecast reflects the outcomes of further negotiations and refinement with Smart Wires for the MPFC and competitive procurement processes with multiple bidders for the sub-station, transmission line and secondary system works.

2.4 Benefits of VNI

The PACR, and accompanying reports, found that the project will deliver net benefits of approximately $268 million over the assessment period to 2033-34 (on a weighted basis in present value terms) through:

- reducing dispatch costs, through more efficient dispatch of generation in Victoria and NSW, and
- reducing the capital costs associated with new generation in NSW.

VNI is also expected to generate sufficient benefits to recover its capital costs within six years of being commissioned.[29]

The 2019 ESOO[30] reconfirmed the importance of completing VNI before the forecast closure of Liddell Power Station to manage the risk of supply-demand shortfalls which may lead to reliability standard breaches in Victoria in the short term if unplanned generator outages were to occur during extreme heat conditions.

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27 Victoria to New South Wales Interconnector Upgrade - Project Assessment Draft Report, page 4

28 The PACR forecast capex of $41.0 million (Real 2019-20), which equates to $40.5 million (Real 2017-18).

29 AEMO and TransGrid, *Victoria to New South Wales Interconnector Upgrade | Project Assessment Conclusions Report*, February 2020, p. 44.

30 AEMO, 2019 Electricity Statement of Opportunities (ESOO), p. 5. Found at Link

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.[31]

The key requirements are outlined below. Chapter 6 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 VNI 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[32]
- within the specified time limits.[33]

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,[34] 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)*

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31 AER, Process Guideline for Contingent Project Applications under the NER, September 2007

32 NER clause 6A.8.2(a)

33 NER clause 6A.8.2(a)

34 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).*

Clause 6A.8.2(f)(2) of the NER requires the AER to accept the relevant amounts in this Final 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.*

In addressing these requirements, we have had regard for the AER's Process Guideline for Contingent Project Applications[35]. We have met regularly with the AER in preparing this Final Application and the AER's feedback has informed the content and structure of this Final Application and supporting documentation.

3.2 Project timing

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

- date for commencement of the contingent project – August 2018, and
- anticipated date for completion of the contingent project – December 2021.

This timing reflects a realistic assessment of the earliest dates that the investments can be delivered and is consistent with indicative timing set out in the 2020 Final ISP.

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

3.3 Stakeholder input and pre-lodgement consultation

We have engaged closely with our customer representatives and stakeholders on VNI through various engagement channels including through the formal RIT-T process.

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

Our engagement activity included:

- bilateral discussions with interested stakeholders
- publishing separate detailed market modelling and assumptions reports[36]
- an industry Consultation Forum on the PADR on 4 October 2019[37]
- releasing detailed analysis in response to stakeholder requests
- receiving and assessing submissions from interested parties

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35 AER, *Process Guideline for Contingent Project Applications under the National Electricity Rules*, September 2007. Found at Link

36 Found at Link

37 Found at Link

- briefing our Customer Panel, and
- presenting at the Transmission Network and Annual Planning Forums in September 2019 and 2020.

All consultation materials, submissions received, and actions taken to address stakeholder feedback on the RIT-T process are available on AEMO's website.[38] 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.

[38] https://aemo.com.au/en/initiatives/major-programs/victoria-to-new-south-wales-interconnector-upgrade-regulatory-investment-test-for-transmission

4. Forecast revenue

This chapter sets out the total forecast revenue for VNI, which has been determined in accordance with our Financeability Rule change application to resolve the threshold financeability issue of appropriately aligning revenue and cost recovery for Major ISP Projects.

The current regulatory arrangements result in a misalignment between when a network service provider (NSP) incurs costs and when it recovers revenues, particularly in the early years of projects. This means that an NSP cannot achieve the benchmark credit rating and gearing assumptions in the AER's 2018 RORI, which are used by the AER to calculate the rate of return. This in turn undermines an NSP's ability to access efficient debt finance and therefore the financeability of projects.

On 1 October 2020, we lodged our Financeability Rule change application[39] with the AEMC to address this issue, which would enable VNI, and other Major ISP Projects, to be financeable, while maintaining the total long-term cost to consumers (i.e. NPV neutral). We consider that investment in Major ISP Projects including VNI, and therefore our financeability Rule change, is in the long-term interests of consumers because it is integral to achieving AEMO's optimal development path.

Table 2 summarises the incremental revenue forecast of $9.4 million (Nominal), broken down by building block component, and briefly explains how we have calculated each component.

Table 2 – 2018-23 forecast incremental revenue from the Project (Nominal)

Building block	$M	Approach
Return on capital	4.5	Calculated by multiplying the forecast opening RAB (updated to include expenditure on the Project) for a given year by the allowed rate of return adopted by the AER.
Return of capital	2.0	Calculated as forecast straight line depreciation for each asset class.
Opex	2.2	Calculated as a bottom-up build of expected opex once the Project assets are commissioned. Debt raising costs, calculated using the AER's standard approach are added on top.
Corporate income tax	0.6	Calculated as forecast pre-tax income multiplied by the corporate tax rate, less the assumed value of imputation credits.
Annual revenue requirement (i.e. unsmoothed)	9.4	
Impact of smoothing	0.0	Revenue is smoothed by shifting some revenue from 2019–22 to 2022-23 to reduce volatility, without affecting NPV of revenue. This slightly increases total revenue over the 2018–23 regulatory period.
Maximum allowed revenue (i.e. smoothed)	9.4	

[39] Found at Link

5. Forecast capex and opex

This section sets out total forecast capex and opex for VNI.

5.1 Forecast capex

This section presents the capex forecast for VNI 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.[40] The total forecast capex also satisfies the contingent project expenditure threshold.

5.1.1 Capex forecast

Our capex forecast for delivering the NSW component of VNI is $45.0 million (Real 2017-18), which comprises:

- $21.3 million (Real 2017-18), or around 47 per cent, for the installation of two Smart Wires MPFCs on the 330 kV Upper Tumut – Canberra and Upper Tumut – Yass lines. The Smart Wires MPFC is proprietary technology that can only be provided by Smart Wires. As a result, its identification as forming part of the preferred option under the RIT-T (which is an open process that allows all potential proponents of alternative solutions to participate) means that this cost has already been market tested and further testing through competitive procurement is not feasible. Our forecast capex for the Smart Wires MPFC, which is based on the negotiated contract price, is marginally lower than the cost estimate of $21.4 million (Real 2017-18) included in the RIT-T PACR.
- $16.2 million (Real 2017-18), or around 36 per cent, for associated sub-station, transmission line and secondary system works at Stockdill and Yass to facilitate the installation of Smart Wires MPFC units. We undertook a competitive early contract involvement (ECI) tender process for this work, which comprises:
  - major substation works at Stockdill to facilitate the installation of the MPFC
  - minor substation works at Yass, including installation of six additional SmartValves unit and other works, and
  - secondary system construction works, including protection replacement works, subsequent testing and commissioning support.
- $7.4 million (Real 2017-18), or around 17 per cent, for our direct labour and corporate and network overhead costs. This reflects our actual costs to 30 September 2020 and bottom up build of:
  - works delivery capex associated with the design and construction elements of VNI that we will undertake internally
  - project development capex associated with setting up and project managing VNI, and
  - other labour and indirect capex associated with stakeholder and community engagement and insurance costs.

This means that around $37.5 million (Real 2017-18), or 83 per cent, of our capex forecast has been derived from costs determined through either submissions to the RIT-T or competitive procurement processes. This will ensure that customers are paying no more than they should be for the services that they will receive.

As discussed in section 2.3 above, our capex forecast of $45.0 million (Real 2017-18) is 11 per cent higher than the cost estimate of $40.5 million (Real 2017-18)[41] published in the PACR, which is well within the ±30 per cent

[40] As required by clause 6A.8.1(b)(2)(ii) of the NER.

[41] The PACR forecast capex of $41.0 million (Real 2019-20) which equates to $40.5 million (Real 2017-18).

range tested in the PACR. Our capex forecast in this Application reflects prudent and efficient market-based costs of delivering VNI, which were not available at the time of publishing the PACR.

Table 3 details our capex forecast of $45.0 million (Real 2017-18) for our component of VNI over the 2018-23 period.

Table 3 – 2018-23 forecast capex ($M, Real 2017-18, including overheads)

2018-19	2018-1920	2019-20	2020-21	2021-22	Total
Actual	0.3	1.7	1.0	0.0	3.0
Forecast	0.0	1.8	12.7	27.5	42.0
Total	**0.3**	**3.5**	**13.7**	**27.5**	**45.0**

5.1.2 Basis for estimates

We have developed the capex forecasts based on a detailed scope of works using methods that reflect the specific nature of the costs, as shown in Table 4.

Table 4 – Total forecast capex for VNI by category ($M, 2017-18)

Category of VNI capex	Basis of capex	Status	Capex $M	% of total capex
Substations (including Smart Wires)	Contract cost from Smart Wires Externally tendered (competitive) - construction and design contracts and directly procured asset approach	Executed August 2020 (For Smart Wires) Offers provided May and August 200 (For design and construction)	34.5	76.8%
Transmission lines	Externally tendered (competitive) - construction and design contracts and directly procured asset approach	Offers provided May and August 2020	0.4	0.9%
Secondary systems	Externally tendered (competitive) - construction and design contracts and directly procured asset approach	Offers provided May and August 2020	2.6	5.8%
Direct labour	Actual capex reflects records in Ellipse. Forecast capex internal bottom-up build.	Complete	3.6	8.1%
Network and corporate overheads	Actual capex reflects records in Ellipse. Forecast capex internal bottom-up build.	Complete	3.6	8.0%

Category of VNI capex	Basis of capex	Status	Capex $M	% of total capex
(including indirect labour)				
Real input costs	Internally bottom-up build using AER's forecast real labour cost escalators	Complete	0.2	0.4%
Total capex			**45.0**	**100%**

Our capex forecast for VNI is prudent and efficient in accordance with the capex criteria and meets the required capex objectives set out in the NER. 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.

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

- Capex forecast Methodology for VNI – Attachment A.2
- Labour and indirect cost forecast for VNI – Attachments A.3
- Independent engineering capex verification and assessment – Attachment A.7. This independent expert report prepared by GHD confirms that the scope of the Project is reasonable and realistic to meet the investment need and that our forecast capex is consistent with a prudent and efficient business.
- Independent economic capex verification and assessment – Attachment A.8. This independent expert report prepared by HoustonKemp confirms that our capex forecast is prudent and efficient by reference to the NER requirements and that the project scope is justified and represents an efficient approach to meeting the Project's objectives.

We have also provided the following supporting capex models:

- capex forecast inputs model – Attachment A.6
- capex forecast model – Attachment A.4, and
- labour and indirect costs spreadsheets for VNI – Attachment A.5.

5.1.3 Capex threshold

Table 5 shows that the forecast capex satisfies the relevant threshold. This means that the capex is covered by the contingent project requirements of the NER.

Table 5 – Contingent project thresholds ($2017-18, Million)

AER Decision First year MAR	5% of MAR	Contingent Project Threshold	Pass / Fail
716.7	36	36	Pass (as capex > $36 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).

5.1.4 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 consider the application of the CESS to VNI should be considered in the context of the overall risk associated with Major ISP Projects under the current regulatory framework.

There is currently no provision in the NER for adjusting the capex allowance approved by the AER for Major ISP Projects to deal with unforeseeable and unquantifiable costs in a way that is fair to all market participants, including customers and NSPs. Currently, we would need to fund the gap in financing the investment for the remainder of the period and would be penalised under the CESS for any overspend, even when the higher levels of expenditure are efficient. This means that we may therefore not have a reasonable opportunity to recover the efficient costs of delivering Major ISP Projects. Further, if we significantly overspend our total capex allowance, we could be penalised through the ex-post capex review process by having actual capex incurred excluded from the RAB.

While we support an incentive based regulatory regime, we do not consider it appropriate or reasonable that we should bear the risk associated with unforeseeable and unquantifiable costs that may arise during the delivery of Major Projects, especially given that the delivery and timing are being driven by the broader ISP process.

We propose further engagement with the AER, and our other stakeholders to identify how best to manage, and fairly allocate, these risks for the Major ISP Projects. We consider the application of the CESS to Major ISP Projects should be considered as part of this discussion.

5.2 Forecast opex

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

The incremental opex forecast detailed is that reasonably required to undertake the Project, in accordance with the opex objectives, factors and criteria set out in the NER.

5.2.1 Opex forecast

Table 6 shows that forecast opex for VNI $2.0 million (Real 2017-18) over the 2018-23 regulatory period.

Table 6 – 2018-23 forecast opex ($M, Real 2017-18)

2018-19	2019-20	2020-21	2021-22	2022-23	Total
0.0	0.0	0.0	1.8	0.2	**2.0**

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

5.2.2 Basis of opex forecast

Our opex forecasting methodology for VNI, provided at Attachment A.9, explains and justifies our incremental opex forecast. Our opex forecast model is also provided as at Attachment A.10.

We have applied a bottom up-build approach to forecast incremental opex for VNI 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.[42] 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.

[42] 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 VNI Project application.

6. Guide to compliance

Table 7 details how this Application complies with the NER requirements.

Table 7 – Compliance with NER requirements

NER, clause 6A.8.2(b) requirements	Reference in Application
(1) an explanation that substantiates the occurrence of the trigger event	Chapter 1
(2) a forecast of the total capex for the contingent project	Chapter 5
(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	Chapter 5
(4) how the forecast of the total capex for the *contingent project* meets the threshold as referred to in clause 6A.8.1(b)(2)(iii)	Chapter 5
(5) the intended date for commencing the *contingent project* (which must be during the *regulatory control period*)	Chapter 3
(6) the anticipated date for completing the *contingent project* (which may be after the end of the *regulatory control period*) and	Chapter 3
(7) 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: (i) in accordance with the requirements of the post-tax revenue model referred to in clause 6A.5.2 (ii) in accordance with the requirements of the roll forward model referred to in clause 6A.6.1(b) (iii) 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 (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).	Chapter 4 and Appendix A

Appendices

Appendix A – Our revenue application

This Appendix A sets out our estimate of the incremental revenue for VNI 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 VNI is low and incremental capex is not expected to be commissioned until December 2021. As shown in Table 17 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).

Chapter 4 explains that applying the current regulatory framework to estimate incremental revenue for Major ISP Projects, such as VNI, results in a misalignment between when an NSP incurs costs and when it recovers revenues, particularly in the early years of these projects. This in turn undermines an NSP's ability to access efficient debt finance and therefore the financeability of projects.

On 1 October we lodged our Financeability Rule change application[43] with the AEMC to address this issue, which would enable VNI, and other Major ISP Projects, to be financeable, while maintaining the total long-term cost to consumers (i.e. NPV neutral). We consider that investment in Major ISP Projects including VNI, and therefore our financeability Rule change, is in the long-term interests of consumers because it is integral to achieving AEMO's optimal development path.

- the 2019-20 and 2020-21 return on debt estimates, and
- the AER's recent determination on the Queensland NSW Interconnector upgrade contingent project application (QNI CPA), and
- incremental forecast capex, opex and energy delivered VNI.

The last row of the table sets out the incremental MAR for VNI in the absence of the Financeability Rule change. All subsequent tables in this appendix only show values assuming that that rule change was applied.

Table 8 sets out the incremental MAR for VNI for the 2018-23 regulatory period calculated in accordance with our Financeability Rule change application and the AER's 2018-23 PTRM, updated for:

- the 2019-20 and 2020-21 return on debt estimates, and
- the AER's recent determination on the Queensland NSW Interconnector upgrade contingent project application (QNI CPA), and
- incremental forecast capex, opex and energy delivered VNI.[44]

The last row of the table sets out the incremental MAR for VNI in the absence of the Financeability Rule change. All subsequent tables in this appendix only show values assuming that that rule change was applied.

Table 8 – Incremental MAR ($M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination	734.3	759.5	779.5	828.2	865.2	**3,966.7**
Impact of VNI	**-**	-	-	4.6	4.8	9.4

[43] Found at Link

[44] Throughout this Appendix A we refer to the AER 2018–23 determination updated for the 2019-20 and 2020-21 return on debt estimates and the AER's recent determination on the QNI CPA as the 'AER 2018-2023 determination'.

Updated MAR	**734.3**	**759.5**	**779.5**	**832.8**	**870.0**	**3,976.1**
Updated MAR (Financeability Rule change not applied)	**734.3**	**759.5**	**779.5**	**831.4**	**868.6**	**3,973.2**

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 VNI.

A1 WACC

We have calculated the incremental revenue for VNI 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 9.

Table 9 – WACC parameters

Parameter	AER Approved Value[45]
Forecast inflation	2.45%
Value of imputation credits	40%
Gearing	60%
Nominal pre-tax return on debt	5.97% for 2018-19 5.77% for 2019-20 5.41% for 2020-21 onwards
Nominal post-tax return on equity	7.40%
Nominal vanilla WACC	6.54% for 2018-19 6.42% for 2019-20 6.21% for 2020-21 onwards

A2 Asset lives

We have allocated our forecast capex for VNI 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 33.8 years using the approach adopted by the AER in its recent determinations.

The standard asset lives are set out in Table 10.

[45] As last annually updated by the AER for the trailing average cost of debt in January 2019.

Table 10 – 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	33.8	As per recent AER decisions, this is calculated as the weighted average standard life for forecast net commission capex[46]

A3 Depreciation

Table 11 sets out our forecast incremental regulatory depreciation for the 2018-23 regulatory period for VNI, 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.

Table 11 – Incremental regulatory depreciation ($M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)	101.2	118.8	129.9	129.3	144.7	**623.9**
Impact of VNI	-	0.0	0.1	0.5	1.4	2.0
Updated regulatory depreciation	**101.2**	**118.8**	**130.0**	**129.8**	**146.0**	**625.9**

A4 Tax allowance

Table 12 sets out the forecast incremental net tax allowance for the 2018-23 regulatory period attributed to VNI. 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 12 – Incremental net tax allowance ($M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)	31.7	33.7	35.3	37.6	39.5	177.8
Impact of VNI	-	0.0	0.1	0.2	0.3	0.6

[46] 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.

Updated net tax allowance	**31.7**	**33.7**	**35.4**	**37.8**	**39.8**	**178.4**

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 VNI capex does not change this, given its relatively small size.[47]

Table 13 – Incremental debt raising costs ($M, Real 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)	3.2	3.3	3.3	3.3	3.4	**16.5**
Impact of VNI	-	0.0	0.0	0.0	0.0	0.0
Updated debt raising costs	**3.2**	**3.3**	**3.3**	**3.3**	**3.4**	**16.5**

A6 Incremental revenue requirements for each year to end of period

Table 14 details the incremental annual building block revenue requirements for VNI, based on the forecasts provided above and using the PTRM.

Table 14 – Incremental revenue requirements ($M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)						
Return on capital	416.8	417.1	417.7	434.8	449.9	**2,136.3**
Regulatory depreciation	101.2	118.8	129.9	129.3	144.7	**623.9**

[47] If capex for VNI is added following the AER's approval of Project EnergyConnect (PEC), then this would give rise to incremental equity raising costs for VNI.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Opex	179.9	187.6	196.7	208.6	205.9	**978.7**
Revenue adjustments	4.7	18.5	5.4	12.7	5.1	**46.5**
Net tax allowance	31.7	33.7	35.3	37.6	39.5	**177.8**
Unsmoothed revenue requirement	**734.3**	**775.7**	**785.0**	**823.0**	**845.1**	**3,963.1**
Impact of VNI						
Return on capital	-	0.0	0.3	1.2	3.1	**4.5**
Regulatory depreciation	-	0.0	0.1	0.5	1.4	**2.0**
Opex allowance	-	0.0	0.0	2.0	0.2	**2.2**
Revenue adjustments	-	-	-	-	-	**-**
Net tax allowance	-	0.0	0.1	0.2	0.3	**0.6**
Unsmoothed revenue requirements	**-**	**0.0**	**0.5**	**3.9**	**5.0**	**9.4**
Updated						
Return on capital	416.8	417.1	418.0	436.0	452.9	**2,140.8**
Regulatory depreciation	101.2	118.8	130.0	129.8	146.0	**625.9**
Opex allowance	179.9	187.6	196.7	210.6	206.1	**980.9**
Revenue adjustments	4.7	18.5	5.4	12.7	5.1	**46.5**
Net tax allowance	31.7	33.7	35.4	37.8	39.8	**178.4**
Unsmoothed revenue requirements	**734.3**	**775.8**	**785.5**	**826.9**	**850.1**	**3,972.5**

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 15, together with the calculation of the amended revenue required for VNI.

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 15.

Table 15 – Amended annual building block revenue requirements ($M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)	734.3	775.7	785.0	823.0	845.1	**3,963.1**

Impact VNI	-	0.0	0.5	3.9	5.0	9.4
Updated annual revenue requirements	**734.3**	**775.8**	**785.5**	**826.9**	**850.1**	**3,972.5**

Table 16 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 16 – 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 (updated for the QNI CPA)	734.3	759.5	779.5	828.2	865.2	**3,966.7**
Impact of VNI	-	-	-	4.6	4.8	**9.4**
Updated MAR	**734.3**	**759.5**	**779.5**	**832.8**	**870.0**	**3,976.1**
X-factors						
AER 2018-23 determination	(0.51%)	(0.97%)	(0.17%)	(3.70%)	(1.98%)	n/a
Impact of VNI	-	-	-	(0.58%)	-	n/a
Updated X-factors	**(0.51%)**	**(0.97%)**	**(0.17%)**	**(4.28%)**	**(1.98%)**	**n/a**

Note: Negative X factors represent a real revenue increase.

A8 Customer bill impact

VNI 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 17 shows the indicative customer bill impact of VNI, assuming that a typical customer consumes 4.22 MWh per year.

Table 17 – Indicative customer bill impact ($ per household, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23
AER 2018-23 determination (updated for the QNI CPA)	45.8	48.4	50.1	53.4	56.4
Impact of VNI	-	-	-	0.2	0.0
Updated typical customer bill impact	**45.8**	**48.4**	**50.1**	**53.6**	**56.4**

Note: Typical customer bills are calculated by multiplying the projected MAR per MWh by assumed consumption of 4.22 MWh per year per household. VNI is expected to increase energy delivered in 2022-23 by 342 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
Capex	Capital expenditure
CESS	Capital Expenditure Sharing Scheme
EBSS	Efficiency Benefit Sharing Scheme
ESB	Energy Security Board
GWh	Gigawatt Hour
ISP	Integrated System Plan
kV	kilovolt
M	Millions
MAR	Maximum Allowed Revenue
MWh	Megawatt Hour
MPFC	Modular power flow converter
NEL	National Electricity Law
NEM	National Energy Market
NEO	National Electricity Objective
NER (Rules)	National Electricity Rules
NPV	Net Present Value
NSP	Network Service Provider
NSW	New South Wales
Opex	Operating expenditure
PACR	Project Assessment Conclusions Report
PADR	Project Assessment Draft Report
POE	Probability of Exceedance

Abbreviations/acronyms	Definition
PSCR	Project Specification Consultation Report
PTRM	Post-Tax Revenue Model
QNI	Queensland NSW Interconnector upgrade
RAB	Regulatory Asset Base
RORI	Rate of Return Instrument
RIT-T	Regulatory Investment Test for Transmission
ROE	Return on equity
SA	South Australia
VNI (Project)	Victoria to NSW Interconnector Minor Upgrade Project