



FINAL DECISION

TransGrid

Contingent Project

QNI Minor Upgrade

April 2020

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Executive Summary

TransGrid is progressing a project to expand the transmission transfer capacity of the Queensland-New South Wales Interconnector (QNI) by 2022 (known as the QNI minor upgrade project). TransGrid has sought regulatory approval of the incremental revenues required to recover the efficient costs of this project, through a contingent project application.

We have determined that TransGrid can recover \$28.2 million in additional revenue through transmission charges over 2021-22 and 2022-23. This reflects an estimate of the prudent and efficient capital expenditure for delivering the project of \$217.6 million (\$2017-18). The actual project costs will be added to TransGrid's regulatory asset base (RAB) at the end of the current regulatory control period.

Our determination will allow TransGrid to expand the transmission capacity between Queensland and NSW to meet demand following Liddell Power Station's forecast retirement over 2022 and 2023, while also ensuring the costs incurred are prudent and efficient and consumers do not pay more than necessary. This investment will benefit consumers and producers of electricity by deferring the need to build new generation and storage capacity in New South Wales, as well as allowing for more efficient sharing of generation across the NEM, and supporting the ongoing energy market transition.

The overall outcome of this determination is to increase annual transmission charges by 1.7 per cent per year in 2021-22 and 2022-23. It is estimated that the delivery of the QNI minor upgrade project would provide an indicative increase of \$2 per year for an average residential electricity bill in NSW.

This determination is the final step in the regulatory approval process for the QNI minor upgrade project, following our decision on the project cost-benefit analysis in March 2020.¹ This completes the expedited review process we undertook to provide regulatory certainty to stakeholders given the need to expand QNI transmission capacity in the near term ahead of the forecast retirement of Liddell Power Station.

QNI minor upgrade contingent project application

On 17 January 2020, TransGrid applied to the AER to amend its revenue allowance to fund the QNI minor upgrade contingent project. The application sought a \$30.3 million increase in TransGrid's revenue allowance over the remainder of the 2018–23 regulatory control period to deliver the project to expand the transmission transfer capacity between Queensland and NSW.

Contingent projects are significant network augmentation projects that may arise during a regulatory control period but the need and or timing is uncertain. While the

¹ AER, *Decision - Expanding NSW-QLD transmission transfer capacity*, March 2020.

expenditures for such projects do not form part of our assessment of the total forecast capex that we approve in a normal revenue determination, the cost of the projects may ultimately be recovered from customers if the trigger event defined in the relevant revenue determination is met.

On 30 April 2018, we released our final decision on TransGrid's revenue determination for the 2018–23 regulatory control period. The determination identified the expansion of transfer capacity over the QNI as a contingent project.

After our decision, in July 2018, AEMO's inaugural Integrated System Plan (ISP) identified that relieving transmission constraints between Queensland and NSW in the near term would provide substantial market benefits. This would reduce the short term need for new generation in NSW to meet demand once Liddell Power Station retires by 2023, as well as allow more efficient generation sharing between Queensland and NSW.

On 20 December 2019, TransGrid and Powerlink published the final report for a regulatory investment test for transmission (RIT-T) investigating investment options for the QNI minor upgrade project. It found that the preferred option to relieve power flow congestion between Queensland and NSW in the near term is to:

- update the existing 330 kV Liddell to Tamworth lines; and
- install new dynamic reactive support at Tamworth and Dumaresq substations and shunt connected capacitor banks at Tamworth, Armidale and Dumaresq.

On 30 March 2020, we published our determination that the preferred option identified by TransGrid satisfied the requirements of the RIT-T. This determination was the first step in the regulatory approval process for the QNI minor upgrade.

Efficient costs of the QNI minor upgrade project

TransGrid's application proposed \$222.8 million (\$2017-18) in capex to undertake the project. This included costs for procuring and installing equipment, construction to integrate the equipment into the existing transmission network, and overheads.

We examined TransGrid's proposed capex forecast and found that it is substantially expenditure that would be incurred by an efficient and prudent operator to deliver this project. This is because the majority (87 per cent) of the capital cost estimates were based on tender prices derived from competitive market tendering, and the proposed scope of work generally reflects the necessary works that we would anticipate as being required to deliver and install the relevant equipment.

However, we identified that TransGrid's forecast of corporate and network overheads for the QNI minor upgrade project is likely to be more than reasonably required to deliver the project. We substituted an alternative estimate of project overheads that we consider more appropriately reflects the needs of the project, and is consistent with overheads incurred by TransGrid in other capital expenditure projects. This reduces the proposed capex forecast by \$9.3 million.

We have also identified that the scope of the project should be prudently expanded to include \$4.8 million for an additional capacitor bank at the Armidale substation. TransGrid previously proposed this capacitor bank as a Network Capability Incentive Parameter Action Plan (NCIPAP) project as part of the network capability component of the Service Target Performance Incentive Scheme (STPIS). TransGrid intends to install this capacitor bank at the Armidale substation concurrently with the QNI minor upgrade project works at that site. We consider that this asset is a necessary part of the QNI capacity expansion and should be included within the scope of the QNI contingent project. This will reduce the cost of this asset to consumers by avoiding the STPIS incentive payment on this investment.

On this basis, our estimate of the prudent and efficient capex required to deliver the QNI minor upgrade project is \$217.6 million (\$2017-18). This is \$5.2 million less than TransGrid's proposal, but includes the addition of the Armidale NCIPAP capacitor bank that was not included in TransGrid's proposal.

1 Introduction

This section provides relevant background information on the AER's role, TransGrid's application, and the contingent project determination process.

1.1 What is a contingent project?

Contingent projects are significant network augmentation projects that may arise during a regulatory control period, but the need and or timing of the project is uncertain. As such, project costs are not provided for in expenditure forecasts for the regulatory control period. Rather, contingent projects are linked to unique investment drivers, which are defined by a 'trigger event' set by the AER when it determines to accept a proposed contingent project in a revenue proposal.²

If the trigger for a contingent project occurs, the network service provider may apply to the AER to amend its revenue determination to include the capital and operating expenditure required to undertake the project in the current regulatory period. The AER must determine if the proposed costs are prudent and efficient.³ The AER must also determine the total cost of the project to be incurred in the current and subsequent regulatory periods.⁴

When we receive a contingent project application, we publish the application and seek public comment. We assess the application to determine whether it contains the information required by the NER.⁵ We examine evidence provided to determine if the mandatory predefined trigger event has occurred and confirm the project is consistent with the contingent project approved in the revenue determination.

We analyse the application to determine if the costs proposed reflect a reasonable forecast of the capex and incremental opex required to undertake the contingent project, both overall and in each year remaining in the regulatory control period. If we are not satisfied that this is the case, we must determine a substitute forecast. Where we depart from the network business's application, we apply our adjustments to the post-tax revenue model (PTRM) to calculate the revenue the business may recover from customers for the remainder of the regulatory control period.

1.2 What is the QNI minor upgrade project?

On 30 April 2018, we released our final decision on TransGrid's revenue determination for the 2018–23 regulatory control period. The determination identified the expansion of QNI transfer capacity as a contingent project.

² NER, cl. 6A.8.1(c).

³ NER, cl. 6A.8.2(f)(2).

⁴ NER, cl. 6A.8.2(e)(1).

⁵ NER, cl. 6A.8.2(b).

In July 2018, AEMO's inaugural ISP identified that relieving transmission constraints between Queensland and NSW would provide substantial benefits to electricity consumers and producers in the market.⁶ The primary market benefit was providing reliable supply at the lowest cost by deferring the need to build new generation and storage capacity in NSW ahead of the forecast retirement of Liddell Power Station in 2022 and 2023.⁷

In November 2018, TransGrid and Powerlink initiated a RIT-T cost benefit analysis to explore options to increase the transfer capacity between Queensland and NSW. TransGrid and Powerlink considered a range of investment options including upgrades to the existing transmission network, as well as the use of 'virtual transmission line' grid-connected battery systems to provide network services.⁸

On 20 December 2019, TransGrid and Powerlink published the final report for this RIT-T which found that the preferred option to relieve transmission constraints between Queensland and NSW was a minor upgrade to the QNI. This involved:⁹

- upgrading the existing 330 kV Liddell to Tamworth lines, and
- installing new dynamic reactive support at Tamworth and Dumaresq substations and shunt connected capacitor banks at Tamworth, Armidale and Dumaresq.

TransGrid expects that construction of the project would start in early 2020, with delivery in September 2021 and completion of inter-network testing expected by June 2022.¹⁰

We have undertaken a streamlined and expedited regulatory review process of both the RIT-T cost benefit analysis and contingent project application for this project, as foreshadowed in our guidance note published in July 2019.^{11 12} This expedited process is intended to provide regulatory certainty to stakeholders given the need to expand QNI transmission capacity in the near term ahead of the forecast retirement of Liddell Power Station.

On 17 January 2020, TransGrid submitted a contingent project application to the AER seeking an increase in its allowed revenue in accordance with clause 6A.8.2 of the NER to account for delivery of the QNI minor upgrade project.¹³

⁶ AEMO, *Integrated System Plan*, July 2018, pp. 8-9

⁷ If the Liddell Power Station was not expected to close in that timeframe, then it is likely that the net benefits of the project would be different and the need for this investment in the near term would need to be reassessed.

⁸ TransGrid and Powerlink, *Expanding NSW-QLD transmission transfer capacity PACR*, December 2019, p. 53.

⁹ TransGrid and Powerlink, *Expanding NSW-QLD transmission transfer capacity PACR*, December 2019, p. 53.

¹⁰ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 11.

¹¹ On 4 April 2019 the AEMC made a final rule to streamline regulatory processes for three projects including the QNI minor upgrade. For these contingent projects the AEMC final rule allows the relevant TNSPs to submit an application for a contingent project revenue adjustment before the AER has made a RIT-T preferred option determination. The AER cannot make its revenue decision before the preferred option determination is made.

¹² AER, *Guidance Note – QNI Regulatory Investment Test*, July 2019.

¹³ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020.

On 30 March 2020, we published our determination that TransGrid and Powerlink had successfully completed the RIT-T cost benefit analysis for the QNI minor upgrade project.¹⁴ This determination was the first step in the regulatory approval process for the QNI minor upgrade.

The final step in the regulatory approval process is our determination on the incremental revenues required to recover the efficient costs of this project.

1.3 TransGrid's contingent project application

TransGrid's contingent project application sought \$30.3 million in incremental revenues over the 2018–23 regulatory control period to undertake the QNI minor upgrade project. Table 1 shows TransGrid's proposed revenues.

Table 1 Proposed incremental revenue requirement (\$m, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Project revenue requirement	0.0	0.0	0.0	14.8	15.5	30.3

Source: TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 18 and QNI Post-Tax Revenue Model - Public.

The expenditure associated with the above works was not included in TransGrid's revenue allowance for the 2018–23 regulatory control period. Instead, the AER's final decision specified that the project would be a contingent project (that is, a project whereby capital expenditure is probable in the regulatory control period, but either the cost, or the timing of the expenditure is uncertain).¹⁵

TransGrid's application proposed that forecast capex for the project is \$222.8 million.¹⁶ This is comprised of separate project elements including the procurement of equipment (e.g. static VAR compensators (SVCs) and capacitor banks), construction and installation of the equipment to the existing transmission network (e.g. substation works, transmission lines), and project overheads.¹⁷ These costs are consistent with the cost estimates assumed in the RIT-T for this project.

The forecast opex for the project is \$1.7 million.¹⁸ This primarily relates to maintenance and insurance costs once the assets have been commissioned.

¹⁴ AER, *Decision - Expanding NSW-QLD transmission transfer capacity*, March 2020.

¹⁵ AER, *TransGrid transmission final determination 2018–23 - Attachment 6 – Capital expenditure*, May 2018, p. 6-7.

¹⁶ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 13.

¹⁷ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 1.

¹⁸ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 15.

1.4 Our assessment approach

In making this decision, we applied clause 6A.8.2(e) of the NER, which specifies the determination we must make on a contingent project application. We had regard to the factors in clause 6A.8.2(g) of the NER. We also applied clause 6A.8.2(f), which specifies particular circumstances in which we must accept the relevant amounts and dates in the contingent project application. We also applied clause 6A.8.2(h) of the NER, which specifies that amendments to a revenue determination must only be to the extent necessary to reflect the new expenditure requirements (and resulting revenue requirements and X factors) due to the contingent project.

Firstly, we:

- verified that the project trigger event had occurred
- confirmed that the amount sought exceeded the threshold for a contingent project as set out in rule 6.6A.1(b)(iii)
- reviewed the application and public submission(s).

We published TransGrid's application for public comment on 23 January 2020. Interested parties were invited to make submissions on TransGrid's contingent project application by close of business 10 February 2020.

We received one confidential submission on TransGrid's application. In general terms, this submission related to alternative technical solutions for expanding the capacity of QNI. These matters were considered through the *Expanding NSW-QLD transmission transfer capacity* RIT-T process, which identified the preferred investment option. As such, this submission was not directly relevant to our consideration of the prudent and efficient costs required to deliver the project.

We then investigated whether the proposed project scope and forecast costs reasonably reflected the capex and opex criteria under the NER.

In doing this, we examined TransGrid's application and its supporting documents. We sought advice from our internal technical and engineering experts, the Technical Advisory Group, to examine the technical scope of the project and identify key areas of TransGrid's application that required further analysis.

To further inform our review of the application we issued a request for additional technical documentation on 14 February 2020, and an information request on 5 March 2020 on specific elements of the capex proposal.

We found that the prudent and efficient capex that is reasonably required for undertaking the QNI project was less than that in TransGrid's proposal. We considered that this allowance will enable TransGrid to meet its objectives and deliver the project, while also ensuring the costs incurred are prudent and efficient.

Having determined the capex and opex reasonably required to deliver the project, we modified TransGrid's proposed PTRM to reflect these amounts. All other parameters proposed by TransGrid remained unchanged.

2 Our determination

In accordance with clause 6A.8.2 of the NER, our determination is that TransGrid's revenue allowance for the 2018-23 regulatory control period be amended to allow it to recover the efficient costs of the QNI minor upgrade project.

Firstly, we are satisfied that:

- each element of the trigger event specified for this project has occurred (see section 2.1)
- the capital expenditure amount sought exceeds the applicable expenditure threshold specified in the NER (see section 2.2).

Second, in accordance with clause 6A.8.2(e) of the NER, we have determined:

- the amount of capex and incremental opex for each remaining year of the regulatory control period that we consider is reasonably required for the purpose of undertaking the contingent project¹⁹ (see sections 2.3 and 2.4)
- the total capex we consider is reasonably required to undertake the contingent project²⁰ (see section 2.3)
- the contingent project has commenced, and the likely completion date is September 2021²¹
- the incremental revenue which is likely to be required by TransGrid for each remaining regulatory year as a result of the contingent project²² (see section 2.5).

TransGrid's 2018–23 revenue determination is amended accordingly. This decision is accompanied by spreadsheets available on our website that set out the calculation of TransGrid's annual revenues, including the contingent project allowance.

2.1 Trigger events

To be eligible to seek approval of the funding for the contingent project TransGrid is required to demonstrate that a specified trigger event has occurred.

In our final decision on TransGrid's 2018–23 revenue determination, published on 18 May 2018, we approved the expansion of QNI as a contingent project.²³ The trigger event for this project is comprised of the following elements:

¹⁹ NER, cl. 6A.8.2(e)(i).

²⁰ NER, cl. 6A.8.2(e)(ii).

²¹ NER, cl. 6A.8.2(e)(iii).

²² NER, cl. 6A.8.2(e)(iv).

1. Either:
 - i. Committed retirement of more than 1,100 MW of generation in the Hunter or Central Coast area; and/or
 - ii. AEMO classification of generation developments as being at the 'committed' stage of development on the 'Generator Information' webpage, exceeding 1,100 MW at any current or future connection point(s) north of Armidale; and/or
 - iii. AEMO classification of generation developments as being at the 'committed' stage of development on the 'Generator Information' webpage, exceeding 350 MW at any current or future connection point(s) south of Liddell and Bayswater.
2. Successful completion of the RIT-T demonstrating a network investment by TransGrid that maximises the positive net economic benefits from increasing the capacity of the network between Bulli Creek and Liddell at 132/330kV or other voltages.
3. Determination by the AER that the proposed investment satisfies the RIT-T.
4. TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
5. Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out.

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

- TransGrid submitted that element 1(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 (with the other unit to be retired in April 2022).²⁴ The four units of Liddell Power Station have a combined capacity of 2,000 MW. TransGrid also advised that element 1(iii) has been met as it has approximately 692 MW connected in these areas, 150 MW in-commissioning as well as another 426 MW committed. This satisfied the first element of the trigger event.
- On 20 December 2019, TransGrid completed the *Expanding NSW-QLD transmission transfer capacity* RIT-T. This satisfied the second element of the trigger event.
- On 30 March 2020, the AER determined that the preferred option identified by TransGrid satisfied the requirements of the RIT-T. This satisfied the third element of the trigger event.

²³ AER, *TransGrid transmission final determination 2018–23 - Attachment 6 – Capital expenditure*, May 2018, p. 6-138.

²⁴ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 10.

- In January 2020, the TransGrid Board committed to proceed with the project subject to the AER amending the revenue determination.²⁵ TransGrid provided an extract of the Board minutes as evidence of this element having been satisfied. This satisfied the fourth element of the trigger event.

As the first four trigger elements were met, the fifth trigger element is not applicable.

2.2 Expenditure threshold

The expenditure threshold applicable to the forecast capital expenditure for the project is:²⁶

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

The maximum allowed revenue in the first year of TransGrid's 2018-23 regulatory control period is \$716.7 million (\$2017-18). Five per cent of this value is \$36 million (\$2017-18). This is higher than \$30 million and is the relevant expenditure threshold.

TransGrid's forecast capex for the contingent project is \$222.8 million (\$2017-18). This exceeds (and therefore meets) the expenditure threshold of \$36 million.

2.3 Capital expenditure

This section sets out our determination of the total capex that is reasonably required for the purpose of undertaking the QNI project, and the incremental capex for the remainder of the regulatory control period.

TransGrid's contingent project application includes proposed capex of \$222.8 million. We have examined TransGrid's proposed capex forecast and found that a prudent and efficient estimate of the forecast capex for the QNI minor project as proposed is \$212.9 million (\$2017-18). This is four per cent less than TransGrid's forecast capex in its application, which reflects a reduction in TransGrid's forecast corporate and network overheads allocated to the project.

However, we have also identified that the scope of the project can be prudently expanded to include \$4.8 million for an additional capacitor bank at the Armidale substation. TransGrid had previously proposed this capacitor bank as a NCIPAP project as part of the network capability component of the STPIS. We consider that this project is integral to delivering the benefits of the QNI minor upgrade, and is more appropriately treated as forecast capex within the QNI project instead of under the STPIS.

²⁵ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 11.

²⁶ NER, clause 6A.8.1(b)(2)(iii).

This means that our estimate of the total capex reasonably required for the QNI minor upgrade project is \$217.6 million (\$2017-18). This is \$5.2 million less than TransGrid's proposal. We consider that this allowance will enable TransGrid to deliver this investment, while also ensuring the costs incurred are prudent and efficient so that consumers do not pay more than necessary for this project.

Table 2 sets out our determination of the total capex for the project and the incremental capex for each year of the 2018-23 regulatory control period.

Table 2 AER estimate of forecast capex (\$m 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER forecast capex	1.0	70.9	107.2	38.7	-	217.6

Source: AER analysis

2.3.1 AER's assessment and conclusions on forecast capex

TransGrid's proposal

TransGrid's proposed capex forecast of \$222.8 million is comprised of separate project elements including of the procurement of equipment (e.g. SVCs, capacitor banks), construction and installation (e.g. substation works, transmission lines), and project overheads.²⁷ This is shown in Table 3.

Table 3 TransGrid's proposed capex forecast (\$m 2017-18)

Cost component	Total
Static VAR compensators (SVCs)	55.5
Substation works	80.6
Capacitor banks	14.6
Transmission lines	36.4
HV switchgear	6.2
Corporate and network overheads	28.7
Other costs	0.9
Total	222.8

Source: TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, Table 4, p. 13 and QNI Capex Model - Public 18 March 2020.

Note: 'Other costs' include labour cost escalators. Totals may not add up due to rounding.

²⁷ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 13.

The equipment (e.g. SVCs and capacitor banks) and installation (e.g. substation works) cost estimates are sourced from competitive tender processes. These tendered costs comprise 87 per cent of the total capex forecast. The remaining overhead forecasts are TransGrid's internal project delivery costs that have estimated using a bottom-up build cost methodology.²⁸

TransGrid's proposal also provided supporting reports produced by expert technical consultants. These included an independent verification and engineering assessment of the proposal (GHD) and an assessment of the consistency of its proposed capex costs with the NER requirements (HoustonKemp).²⁹

TransGrid's application concluded that its capex forecast for the QNI minor upgrade project is prudent and efficient because of:³⁰

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

TransGrid's proposal also explained the components of its capex proposal that had changed materially from earlier estimates (e.g. those used in calculating the costs and benefits in the RIT-T project assessment draft report). The key changes related primarily to increases in the costs of substation works and transmission lines due to the finalisation of the tender processes, and overheads due to a change in forecasting methodology.³¹

Our assessment of the proposal

In arriving at our estimate of forecast capex, we started by assessing TransGrid's contingent project application and supporting documents. We utilised our internal technical and engineering expertise to examine the technical scope of the project and identify key areas of TransGrid's application that required further analysis. This included examining the technical consultancy reports supporting the proposal.

Based on our analysis of the application, we sought further information to investigate the following matters:³²

²⁸ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 14.

²⁹ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020; HoustonKemp, *Consistency of TransGrid's proposed capital expenditure for the QNI minor upgrade with the NER requirements*, Final Report, 17 January 2020.

³⁰ TransGrid, *Capex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 5.

³¹ TransGrid, *Capex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 6.

³² AER, *QNI minor upgrade contingent project: Request for further information*, 5 March 2020.

- The proposed scope and costing for the substation works, including the tendering evaluation process. The \$80.6 million substation works comprised the largest single component of the capex forecast. We wanted to better understand the scope of the substation works and how the requirements of the works had been factored into the contracted prices. This information was not clear in the application documents.
- The approach to estimating project overheads costs. We wanted to better understand whether TransGrid's overhead forecasting methodology was reasonable and more likely to result in a prudent and efficient estimate of costs than alternative methodologies, including variations from TransGrid's earlier estimates and from its consultant GHD's estimate.
- The project risks and how these had been accounted for within the costs of the project. The application stated that TransGrid had not directly incorporated any contingency amount or risk allowance into its capex forecast. However, we wanted to better understand how project risks were reflected in the contracted prices with tenderers.
- Any updated estimates for cost elements that had not yet been competitively tendered at the time TransGrid submitted its application.

Based on the information provided from TransGrid, we were able to better understand the scope of the project and the actions and decisions taken by TransGrid in tendering and contracting for delivery of the various project components. However, we note that in parts this information was provided in high level statements and descriptions, rather than detailed evidence and cost build ups. For example, TransGrid did not provide details of the cost build up and the detailed scope of work that was reflected in the final contracted prices, but rather relied on a description of the process it went through with tenderers.

This lack of transparency in some areas limited our ability to scrutinize aspects of the basis of the forecast capex for some project components. Nevertheless, we were able to focus our assessment on the areas of the capex proposal where we considered there were likely to be material areas of concern.

Our conclusions on the forecast capex

Our view is that most of the proposed forecast capex is expenditure that would be incurred by an efficient and prudent operator to deliver this project. This is primarily for two reasons:

- **Reasonable scope of works.** The proposed scope of works generally reflects the necessary works that we would anticipate as being required to deliver and install the necessary equipment (e.g. SVCs) and transmission lines to increase capacity on the QNI in the near term. This was supported by advice from our Technical Advisory Group, and also by the independent verification and assessment report prepared by GHD.
- **Competitive tendering results in efficient prices.** The majority (87 per cent) of the capital cost estimates for the QNI project were based on contracted prices

derived from competitive market tendering entered into on arms-length terms. For example, the cost estimates associated with procuring and installing the SVCs, capacitor banks and transmission line works were based on tendered pricing. We reviewed TransGrid's procurement process and found that the resultant contracted costs are likely to reflect a realistic estimate of efficient costs. This is because TransGrid relied upon its existing panel of experienced engineering and equipment suppliers, received multiple submissions for each type of work, and chose multiple firms to complete the necessary works across the project on the basis of reasonable tender evaluation criteria. This suggests that the tendering processes were reasonably competitive.

In response to our information request, we also received an updated estimate from TransGrid of the costs of installing capacitor banks at the Tamworth substation. This reflects the final tendered costs for these capacitor banks.

We note that TransGrid's capex forecasts do not include any specific allowance for project risk or contingencies. However, because it has entered into fixed price contracts for the majority of its costs, this means that the risks of cost over-runs is borne by the contractors rather than TransGrid. This means that these risks are likely factored into these contracts through higher prices. It may be appropriate for TransGrid to share in project risk where it is better able to manage and control project risk (e.g. project timing and scope) and this may result in overall lower costs to consumers. However, we recognise that given the contracts were entered into following a competitive tender process, any risk premium included in the contracted prices reflects the lowest efficient amount that the contractors are willing to bear.

While we consider that the project scope and market tested pricing are likely to result in a reasonable estimate of the direct capex required, we consider that the amount of TransGrid's corporate and network overheads forecast for the QNI minor upgrade project is likely more than is reasonably required to deliver the project. Overheads reflect TransGrid's internal costs for project planning and delivery, and comprise 13 per cent of total capex. These costs are not competitively tendered.

We have calculated an alternative estimate of the efficient amount of overheads necessary to deliver the project. Our alternative estimate of overheads is \$19.4 million, or 32 per cent less than TransGrid's proposed overhead costs. This is based on benchmarking analysis we undertook and on our view on the network management requirements of the QNI minor upgrade project. This alternative estimate reduces TransGrid's total capex forecast by \$9.3 million, or 4 per cent. Our reasons for this adjustment are set out in detail below.

In addition, we have identified additional capex to install another capacitor bank at the Armidale substation that we consider should be included within the scope of the QNI project. TransGrid had previously proposed this capacitor bank as a NCIPAP project within the STPIS. We consider this project provides benefits and is an integral part of the QNI minor upgrade project, but that it is more appropriately treated as forecast capex within the QNI contingent project.

Table 4 sets out our alternative estimate of forecast capex, and how we arrived at it when compared to TransGrid's proposed forecast capex.

Table 4 AER estimate of forecast capex (\$m 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
TransGrid's forecast	1.4	74.5	112.1	34.7	-	222.8
Alternative overheads	-0.5	-3.5	-4.5	-0.8	-	-9.3
Updated Tamworth capacitor bank estimate	-	-0.1	-0.3	-	-	-0.4
Additional Armidale capacitor bank	-	-	-	4.8	-	4.8
AER forecast	1.0	70.9	107.2	38.7	-	217.6

Source: AER analysis.

Note: The alternative estimate of project overheads in this table does not include the application of labour cost escalators. To arrive at our forecast of total capex for the project, we have applied labour cost escalators to overheads. This is consistent with TransGrid's proposal.

Numbers may not add up due to rounding.

The remainder of this section explains:

- our assessment of corporate and network overheads (section 2.3.2)
- the addition of the Armidale capacitor bank project costs to the QNI minor upgrade project (section 2.3.3)
- the updated cost estimate for the Tamworth capacitor banks (section 2.3.4)
- the application of the capital expenditure sharing scheme (section 2.3.5)

2.3.2 Corporate and network overheads

TransGrid's proposal

TransGrid's forecast capex includes \$28.7 million (\$2017-18)³³ for corporate and network overheads, resulting in 14.8 per cent in additional capex above direct costs (or 12.9 per cent of total capex).³⁴

Table 5 details TransGrid's proposed overheads capex for the QNI minor upgrade project between 2018-19 and 2022-23.

³³ TransGrid's overheads refer to the proposed \$28.7 million overheads excluding \$0.6 million labour escalation. TransGrid's proposed overheads including labour escalation total \$29.3 million. We have assessed project overheads excluding labour escalations. We apply labour escalations when calculating total capex.

³⁴ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 14.

Table 5 TransGrid’s proposed overheads capex (\$m, 2017-18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Total overheads	1.42	10.80	13.95	2.53	-	28.70
Total project capex	1.42	74.51	112.11	34.72	-	222.77

Source: TransGrid, *Corporate and network overhead forecast for QNI Minor Upgrade Project*, 17 January 2020, p. 4, and TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, p. 13.

Note: Numbers may not add up due to rounding.

TransGrid's forecast overheads in this contingent project application is largely based on a bottom-up build of forecast additional staff for the project and individual wage rates and overtime.³⁵ TransGrid's \$28.7 million in overheads include \$25.4 million in forecast costs, and \$3.3 million in costs already incurred.³⁶

TransGrid's estimate of required overheads costs for the QNI minor upgrade project evolved over time. At the Project Assessment Draft Report (PADR) stage of the QNI RIT-T process, TransGrid estimated \$13.1 million in overhead costs, based on a top-down cost methodology.³⁷ It applied a percentage mark-up of 8.5 per cent on forecast direct project costs, using the percentage of overheads from TransGrid's 'business-as-usual' type projects.³⁸ TransGrid's application states that it changed methodologies because the top-down approach using historical projects is "not expected to provide an accurate forecast of indirect costs for QNI given its size."³⁹

TransGrid engaged consultants, GHD, in order undertake an independent verification and assessment of the QNI minor contingent project application, including the forecast project overheads.⁴⁰ The GHD report:

- identified a comparative estimate of \$20.9 million of overhead costs for the project (27 per cent lower than TransGrid's forecast).⁴¹ GHD's assessment involved reviewing TransGrid's bottom-up approach of estimating the costs based on the number of workers and hours required over the project duration.⁴²

³⁵ TransGrid, *Corporate and network overhead forecast for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, pp. 5-6.

³⁶ TransGrid, *Corporate and network overhead forecast for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 3.

³⁷ TransGrid, *Capex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 6.

³⁸ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 50.

³⁹ TransGrid, *Capex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 6.

⁴⁰ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 1.

⁴¹ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 35.

⁴² GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 49.

- reviewed a NSW project cost benchmarking study which found that overhead costs were typically within 8 per cent and 14 per cent of total construction costs for major road and rail projects, with an average of 11 per cent.⁴³

GHD concluded that TransGrid's overhead proportion of 12.9 per cent of total capex was at the higher end of comparable studies, but was within an acceptable range.⁴⁴

GHD's assessment also indicated that as projects increase in size the project development and management owner costs generally decreased as a percentage of the total project costs.⁴⁵

AER position

We examined TransGrid's overheads in detail because the costs were not subject to a competitive tender process, were substantially higher than GHD's estimate, and had materially increased as a result of a change in forecasting methodology from a top-down to a bottom-up approach.

We assessed TransGrid's overheads forecast methodology and inputs, and requested additional information from TransGrid in order to complete our assessment. We utilised our internal technical and engineering expertise to assist us in making this determination. We examined the basis and breakdown of cost estimates and identified some concerns with TransGrid's application, which we sought to address in our information request to TransGrid.

We compared TransGrid's forecast using top-down benchmarks of capitalised overheads from TransGrid and other TNSPs. We examined total overheads capex relative to total direct capex over a ten year period from 2008 to 2018. This reflects the average of overheads across all projects reported by each TNSP.

As shown in Table 6, the 10 year average overheads ranges between 5 per cent and 10 per cent. TransGrid's historical overheads across the entirety of its capital projects between 2009 and 2018 is 10.0 per cent of direct costs. In contrast, TransGrid's proposed QNI overheads are 14.8 per cent of its direct project capex.

Table 6 TNSP overheads relative to direct capex (10 year average)

TNSP	Overheads % of direct capex (10 year average)
AusNet	10.4%
ElectraNet	7.4%
Powerlink	5.5%

⁴³ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 49.

⁴⁴ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 51.

⁴⁵ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 49.

TasNetworks	7.9%
TransGrid	10.0%
QNI minor upgrade proposal	14.8%

Source: AER analysis derived from Category Analysis RIN data 2008-09 to 2017-18.

To assist us in understanding the difference between TransGrid's QNI forecast and the alternative TNSP benchmarks, we sought more information from TransGrid about its approach to estimating overheads costs and how the QNI minor project was different to TransGrid's previous transmission projects.⁴⁶

TransGrid stated that the QNI project presents a unique set of delivery challenges:⁴⁷

- It is a complex brownfield project (with energised transmission level substations).
- The overall delivery timeframes are compressed to achieve a September 2021 in service date.
- There are significant resource capacity and capability constraints in the infrastructure delivery market.

While we recognise these factors, we consider that the characteristics of the QNI overheads work are comparable to normal business operations for TransGrid's other capex projects and programs. This is because:

- Expanding a brownfield substation is an activity that TransGrid undertakes as part of its normal business. This project involves mostly equipment costs purchased from third parties and installation of this equipment into existing transmission sites. As it is confined to specific existing sites, there are limited environmental overheads or overheads related to the logistics of moving along a linear infrastructure build (e.g. a road or rail build, or a transmission line build).
- Transmission line works in the QNI project involve works on an existing line. Based on our review of the information provided by TransGrid, the project is not expected to involve building new access roads or erecting a new line which would have considerable environmental and land holder overheads. Rather the QNI project is expected to involve some restoration of existing access tracks, and modifications and replacements of some existing towers. Activities such as adding mid span poles, replacing towers or tower steelwork are works that would be expected to be part of business as usual capex for a TNSP.

We also examined the NSW road and rail project benchmark study used as supporting evidence in the GHD report. TransGrid's overheads costs are at the upper end of the 8 to 14 per cent range of total capex identified in the benchmarking

⁴⁶ AER, *QNI minor upgrade contingent project: Request for further information*, 5 March 2020.

⁴⁷ TransGrid, *QNI minor upgrade contingent project: Response to AER Request for Further Information*, 13 March 2020.

study.⁴⁸ Road and rail projects likely require a larger proportion of project management costs as they are mostly civil works that involve significant land and environmental management issues. In contrast, as noted above, electricity projects such as the QNI minor upgrade project have a large equipment cost component where the project management function involves procurement activity and project management of the installation and testing of purchased major plant. We therefore expect the QNI minor project overheads would more likely be at the lower end of such costs as the project is not a major new build involving extensive land works.

We recognise that the QNI minor project is a moderately large single project in capital terms, at \$222.8 million. However, this does not necessarily support a larger proportion of overhead costs given that the majority of the costs are for purchasing and installing equipment from third parties. We would not expect the project development and management costs to scale up significantly as the costs of the purchased equipment increases. This is supported by GHD's report which indicated that, as projects increase in size, the project development and management owner costs decreased as a percentage of the total project costs, rather than increased.⁴⁹

These considerations indicate that the amount of corporate and network overheads that TransGrid has proposed for the QNI minor upgrade project is likely more than necessary to efficiently deliver the project.

Our decision is to substitute TransGrid's proposed overheads for the QNI minor with an amount of \$19.4 million (\$2017-18). This reflects TransGrid's historical overheads proportion of 10.0 per cent of direct costs between the 2009 to 2018 period across a portfolio of projects. We consider that this is appropriate given the QNI minor project is a type of project that TransGrid should be accustomed to delivering as part of its normal business operations, and this estimate is more in line with GHD's comparative estimate overhead costs for the QNI project.

Table 7 shows our alternative estimate of project overheads and how it compares to TransGrid's proposal.

Table 7 AER estimate of overheads capex (\$m, 2017-18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Proposed overheads	1.42	10.80	13.95	2.53	-	28.70
AER alternative overheads	0.96	7.30	9.43	1.71	-	19.41
Difference	-0.46	-3.50	-4.52	-0.82	-	-9.29

Source: AER analysis.

Note: These estimates of overheads do not include labour cost escalation. As shown in Table 4, we applied labour cost escalation to arrive at our estimate of total capex. Numbers may not add due to rounding.

⁴⁸ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 51.

⁴⁹ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. p. 49.

2.3.3 Additional Armidale capacitor bank (STPIS project)

As part of TransGrid's transmission determination for the 2018–23 regulatory control period, we accepted the installation of a 330kV 120 MVar Shunt Capacitor Bank at Armidale as a project funded by the service target performance incentive scheme (STPIS).⁵⁰ The capital costs of the project are \$4.8 million (\$2017-18).⁵¹ We now consider this project should be included as part of the QNI minor upgrade project rather than funded through the STPIS.

STPIS scheme

The STPIS provides a financial incentive to TNSPs to maintain and improve service performance.⁵² The network capability component of the STPIS provides an incentive for TNSPs to reveal the capability of parts of their existing network and to identify measures that would provide greater value to generators and customers. The network capability incentive mechanism rewards TNSPs for increasing network capability where it is most beneficial to do so through a payment of 150 per cent of the cost of priority projects.⁵³

The scheme requires a TNSP to submit, as part of the STPIS component of its revenue proposal, a network capability incentive parameter action plan (NCIPAP).⁵⁴ The NCIPAP is the collection of projects or measures to improve network capability. To maximise consumer benefits, projects are ranked according to the benefit of the project versus its cost.

The TNSP must consult AEMO in developing the NCIPAP.⁵⁵ AEMO's role in the scheme reflects the complexity and lack of transparency surrounding the drivers for and potential solutions to address network limitations. This ensures AEMO has the necessary information to assess and provide advice on the projects a TNSP should undertake to ensure the objectives of the scheme are achieved.

TNSPs must report each year to confirm compliance with the STPIS.⁵⁶ In particular TNSPs must verify that the assumptions used to justify the benefit of undertaking a priority NCIPAP project have not materially changed resulting in the project no

⁵⁰ AER, *Draft decision*, TransGrid transmission determination 2018 to 2023 Attachment 11 – Service target performance incentive scheme September 2017, p. 11-17.

⁵¹ AER, *Final Decision TransGrid transmission determination 2018 to 2023*, May 2018, p. 15. We note that the project costs forecast in the AER's determination were presented in 2016-17 dollars as \$4.69 million.

⁵² AER, *Final - Electricity transmission network service provider Service target performance incentive scheme Version 5 (corrected)*, October 2015.

⁵³ AER, *Final - Electricity transmission network service provider Service target performance incentive scheme Version 5 (corrected)*, October 2015, pp, 12-19.

⁵⁴ AER, *Final - Electricity transmission network service provider Service target performance incentive scheme Version 5 (corrected)*, October 2015, p, 12.

⁵⁵ AER, *Final - Electricity transmission network service provider Service target performance incentive scheme Version 5 (corrected)*, October 2015, p, 13.

⁵⁶ AER, *Final - Electricity transmission network service provider Service target performance incentive scheme Version 5 (corrected)*, October 2015, pp, 15-16.

longer having a material benefit. This includes whether it sought verification from AEMO that the key assumptions on which the material benefit of undertaking the priority project is based are still valid.

Armidale capacitor bank project

The Armidale capacitor bank project was identified in 2016 for TransGrid's NCIPAP for the 2018-23 regulatory control period. This project involves installing a 120 MVar shunt capacitor bank at Armidale substation. When TransGrid submitted its revenue proposal for the 2018-23 regulatory control period, it identified that the capacitor bank would increase voltage stability limits over the QNI.⁵⁷ AEMO considered that it would deliver market benefits based on improved access to interstate low cost generation.⁵⁸

This project was identified and assessed as a priority investment prior to AEMO's 2018 ISP and the RIT-T process for the QNI minor upgrade project. However, there is a direct relationship between this NCIPAP project and the subsequent development of the QNI minor upgrade project. The overlap between the QNI minor upgrade project and the NCIPAP Armidale capacitor bank project has not been identified in TransGrid's annual NCIPAP compliance reports. In TransGrid's recent annual report in respect of this project, it stated that there were no changes in the assumptions used to justify the material benefit in undertaking this project.

The overlap between the Armidale capacitor bank NCIPAP project and the QNI minor upgrade project was made clear in GHD's independent technical report, which notes that the NCIPAP Armidale capacitor bank is included as part of the QNI project design diagrams and is planned to be constructed concurrently with the QNI minor upgrade project.⁵⁹

In response to our information request, TransGrid stated that the additional capacitor bank at Armidale is required in order to improve QNI voltage stability in addition to the QNI minor upgrade project. TransGrid acknowledged that this capacitor bank has been included in the base case for the QNI project RIT-T assessment (and similarly the AEMO ISP scenario analysis). The costs and the benefits of the QNI minor upgrade project options have been assessed as additional to the NCIPAP project, and assume that this asset is in service.⁶⁰

We consider that the construction of the QNI minor upgrade changes the assumptions underpinning the incremental benefits of the Armidale capacitor bank in terms of addressing network capacity and voltage stability over the QNI. The QNI

⁵⁷ TransGrid, *Revenue Proposal 2018/19 – 2022/23*, Network Capability Incentive Parameter Action Plan, September 2016, p. 14.

⁵⁸ TransGrid, *Revenue Proposal 2018/19 – 2022/23*, Network Capability Incentive Parameter Action Plan, September 2016, p. 24.

⁵⁹ GHD, *QNI - Independent Verification and Assessment TransGrid*, 17 January 2020. pp. 19, 27 and 39.

⁶⁰ TransGrid, *TransGrid, Expanding NSW-QLD transmission transfer capacity: Response to AER Request for Further Information*, 25 February 2020, pp. 8-9.

minor upgrade project includes investments which deliver similar network improvements as the NCIPAP project. In this context, it would have been reasonable for TransGrid and AEMO to re-examine the benefits of the Armidale capacitor bank as an NCIPAP project and consider whether it remained appropriate for TransGrid to be incentivised under the STPIS to deliver this investment.

We consider it appropriate that the expenditure for the installation of the Armidale capacitor bank be included as part of the QNI minor upgrade project, instead of as a NCIPAP project. This is because the benefits of the QNI project rely on the existence of the Armidale capacitor bank, and it is therefore a necessary part of the project. It is not necessary, or consistent with the purpose of the network capability incentive component of the STPIS, that consumers should pay an additional STPIS incentive payment for delivery of the Armidale capacitor bank. TransGrid has agreed that this capex be included in the QNI minor upgrade project instead of the STPIS.⁶¹

TransGrid has also identified a replacement priority project to be included in the NCIPAP, the Wagga to Jindera Smart Wires project identified in TransGrid's service standards submission dated 31 January 2019. This project would increase thermal and voltage stability limits for transfer from New South Wales to Victoria. The project was reviewed and endorsed by AEMO for TransGrid's service standards submission in 2019, but was not included at the time due to reaching the cap of the NCIPAP incentive. TransGrid considers that this project would be a suitable replacement priority project and the expected benefits remain as stated in its 2019 service standards submission.⁶²

For this decision, we consider an amount of \$4.8 million (\$2017-18) in capex for the installation of an additional 330kV 120 MVar shunt capacitor bank at Armidale reasonably reflects expenditure that would be incurred in respect of the QNI minor upgrade project by an efficient and prudent operator.

2.3.4 Updated costs for Tamworth capacitor banks

TransGrid's proposed capex forecast included \$5.9 million capex for the purchase of capacitor banks at the Tamworth substation. These proposed costs were based on an estimate rather than the outcome of a competitive tender. TransGrid noted:⁶³

We issued our tender for the Tamworth capacitor banks on 6 December 2019. This allowed the two suppliers sufficient time to respond to the Armidale and Dumaresq tenders, noting that the Tamworth capacitor banks are not on the critical path for the QNI Project. We expect to obtain best and

⁶¹ TransGrid, *Expanding NSW-QLD transmission transfer capacity: Response to AER Request for Further Information*, 25 February 2020, p. 9.

⁶² TransGrid, *Expanding NSW-QLD transmission transfer capacity: Response to AER Request for Further Information*, 25 February 2020, p. 9.

⁶³ TransGrid, *Capex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, p. 28.

final offers from the two suppliers for the Tamworth capacitor banks in mid-January 2020.

TransGrid completed its tender process for the Tamworth capacitor banks in March 2020. The finalised tendered cost for the Tamworth capacitor banks was \$5.5 million, a reduction of \$0.4 million from TransGrid's application.⁶⁴ We have applied this updated cost in our estimate of total capex required for the project.

2.3.5 Capital expenditure sharing scheme (CESS)

The capex approved in this determination will be added to the target capex for the capital expenditure sharing scheme (CESS). Under the schemes that apply to TransGrid over the 2018-23 regulatory control period, target capex and opex allowances are based on our approved allowance (as determined prior to the start of the regulatory control period), plus any adjustments we allow for contingent projects.⁶⁵ The CESS rewards or penalties are then applied as an additional building block adjustment to the TNSP's revenue over the next regulatory control period.

TransGrid's contingent project application proposed to exclude any reward or penalty it receives from the CESS for the QNI project, and all of TransGrid's other major ISP projects. Its application explains:⁶⁶

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.

We are not able to make a decision on whether the CESS will apply as part of the contingent project decision. The scope of contingent project decisions is limited to only varying the revenue determination to the extent necessary to adjust forecast capex, opex and revenue.⁶⁷

TransGrid's current revenue determination applies the current version of the CESS to expenditure in the 2018–23 regulatory control period, including contingent project capex. A decision on rewards and penalties to be applied in the next regulatory control period as a result of under or overspending in the current period will be made at the time of the next reset.

⁶⁴ TransGrid, *Expanding NSW-QLD transmission transfer capacity: Response to AER Request for further information*, 25 February 2020.

⁶⁵ AER, *Better regulation: Capital expenditure incentive guideline for electricity network service providers*, November 2013, p. 6.

⁶⁶ TransGrid, *QNI Minor Upgrade Project Contingent Project Application*, 17 January 2020, p. 15

⁶⁷ NER, cl. 6A.8.2(h).

We would give careful consideration to any proposal that the rewards and penalties calculated under the CESS not apply to specific capex. For example, it may be appropriate to not calculate any rewards or penalties for projects where the risk of forecasting error is particularly significant, such that material CESS rewards or penalties may arise which do not reflect efficiencies or inefficiencies achieved by TransGrid. Any such decision would be require departing from the current capital expenditure incentives guideline.⁶⁸

At this time, we consider that the CESS should apply to the capex we have determined for the QNI minor upgrade project. This is because the majority of the costs are competitively tendered and are largely fixed price contracts, and the upgrade is incremental to TransGrid’s existing network. This reduces the risk faced by TransGrid and its customers for the cost recovery of the project because:

- The fixed price nature of contracts means that cost overruns incurred by contractors will not be borne by TransGrid or its customers (except in limited circumstances such as force majeure and extreme weather).
- The QNI minor project is a type of project that TransGrid should be accustomed to dealing with as part of its normal business operations.

There may be potential for greater forecasting error and less manageable risk on future projects. This may depend on whether a project is substantially greenfields, the nature of the contracting arrangements with equipment vendors and land owners (e.g. are they fixed prices and is there scope for contract variations), and whether TransGrid includes a specific risk allowance within its proposed capex.

2.4 Operating expenditure

Table 8 summarises TransGrid's contingent project application incremental operating expenditure (opex) requirements. The proposed \$1.7 million incremental operating costs, over the 2018-23 regulatory period, represent approximately 0.8 per cent of the proposed capex costs.

Table 8 Proposed incremental opex forecast (\$m, 2017-18)

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

Source: TransGrid, QNI Minor Upgrade Project: Contingent project application, 17 January 2020, Table 7, p. 15.

Note: Numbers may not add up due to rounding.

TransGrid applied a bottom-up build approach to forecast incremental opex for the QNI minor upgrade project for the 2018–23 regulatory control period, which includes

⁶⁸ AER, *Capital Expenditure Incentive Guideline for Electricity Network Service Providers*, November 2013, p. 6.

inflation and real cost escalation assumptions.⁶⁹ This bottom-up forecast reflects TransGrid's existing maintenance and inspections costs for QNI, which have been applied to the additional assets proposed for the project (e.g. SVCs, additional capacitor banks, and transmission lines).⁷⁰ It has also forecast insurance costs based on market testing.

Given that the QNI minor upgrade reflects an incremental upgrade to TransGrid's existing substations and transmission lines, we consider that TransGrid's existing revealed maintenance costs on the QNI reflect the best estimate of the ongoing maintenance needs for a minor upgrade to the QNI. This is consistent with our approach to estimating the necessary corporate and network overhead costs for managing the project (as discussed in section 2.3.2).

On this basis, we are satisfied that TransGrid's proposed opex in this application reasonably reflects expenditure that would be incurred by an efficient and prudent operator for the proposed minor upgrade to the QNI.

2.5 Annual revenue allowance

In accordance with clause 6A.8.2(h), we have used the capex and incremental opex determined in sections 2.3 and 2.4 to amend TransGrid's 2018–23 revenue determination. This section sets out our calculation of TransGrid's revised annual building block revenue requirement, based on our determination on the forecast capex and forecast opex for the QNI minor upgrade project.

Table 9 shows the incremental annual revenue amount for the project. We determined the incremental contingent project revenue amount to be \$28.2 million (\$nominal). This is the additional amount that TransGrid will recover from customers over two years commencing 1 July 2021. This is slightly lower than the \$30.3 million proposed by TransGrid.

The overall outcome of this determination is to increase annual transmission charges by 1.7 per cent per year in 2021-22 and 2022-23. It is estimated that the delivery of the QNI minor project would result in an indicative increase of \$2 per year for an average residential electricity bill in NSW.

⁶⁹ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, Table 7, p. 16.

⁷⁰ TransGrid, *Opex Forecasting Methodology for QNI Minor Upgrade Project Contingent Project Application for QNI – Public version*, 17 January 2020, pp. 6-7.

Table 9 Incremental revenue calculation (\$m, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Return on capital	0.0	0.1	4.8	12.2	15.2	32.2
Return of capital (regulatory depreciation)	0.0	–0.0	–1.9	–4.8	0.1	–6.6
Operating expenditure	0.0	0.0	0.2	0.4	1.4	1.9
Revenue adjustments	0.0	0.0	0.0	0.0	0.0	0.0
Net tax allowance	0.0	0.0	0.1	0.2	0.3	0.6
Annual building block revenue requirement (unsmoothed)	0.0	0.0	3.2	8.0	16.9	28.1
Annual expected MAR (smoothed)	0.0	0.0	0.0	13.8	14.4	28.2
Increase to annual expected MAR (smoothed) (%)	0.0%	0.0%	0.0%	1.7%	1.7%	0.7%

Source: AER analysis.

Note: Numbers may not add up due to rounding.

In determining the incremental revenues, we have applied the same WACC as set out in the 2018–23 transmission determination. However, we have updated the WACC inputs to reflect the most recent annual trailing average cost of debt. TransGrid's application reflects the annual trailing average cost of debt for 2019–20.⁷¹ Our final decision includes the 2020–21 updated annual trailing average cost of debt which became available in late January 2020 after TransGrid submitted its contingent project application.

Finally, Table 10 shows the effect of the resultant incremental increase in revenues on TransGrid's total annual building block revenue requirement (unsmoothed), expected MAR and the X-factor for each regulatory year in the regulatory control period.

⁷¹ TransGrid, *QNI Minor Upgrade Project: Contingent project application*, 17 January 2020, pp. 18–19.

Table 10 Annual building block revenue requirement, expected MAR and X-factors (\$m, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Annual building block revenue requirement (unsmoothed)	734.3	775.7	785.0	823.0	845.1	3963.1
Expected MAR (smoothed)	734.3	759.5	779.5	828.2	865.2	3966.7
X-factors	n/a	–0.97%	–0.17%	–3.70%	–1.98%	n/a

Source: AER analysis.

Note: Numbers may not add up due to rounding.

We note that the inputs to the roll-forward model as determined in the 2018 final decision do not need to be amended for the contingent project. This is because the proposed contingent project only affects the forecast opening RAB for 2019-20, 2020-21, 2021-22 and 2022-23. The forecast opening RAB for these years is calculated in the PTRM and updated to reflect the approved capex for the contingent project.

TransGrid has updated the standard asset life for the 'Equity raising costs' asset class in its proposed PTRM from 'n/a' to 34.2 years. However, this input is not needed because there is no equity raising costs required as a result of the additional revenue approved for the contingent project. We have therefore removed this input from our final decision PTRM.⁷²

⁷² Similarly, we have removed the proposed standard tax asset life of 5 years from the final decision PTRM.