EMCa

energy market consulting associates

Project EnergyConnect - South Australia component

REVIEW OF ASPECTS OF ELECTRANET'S CONTINGENT PROJECT APPLICATION

Report prepared for:

AUSTRALIAN ENERGY REGULATOR

December 2020

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ABBREVIATIONS

Term	Definition
AACE	Association for the Advancement of Const Engineering
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Application	Contingent Project Application
BAFO	Best and Final Offer
capex	Capital expenditure
COVID-19	Coronavirus disease 2019
D&C	Design and construct
ECI	Early Contractor Involvement
EIS	Environmental Impact Statement
EOI	Expression of Interest
FID	Final Investment Decision
ISP	Integrated System Plan
km	kilometre
kV	kilo-volt
NEM	National Electricity Market
NSW	New South Wales
opex	Operating expenditure
PACR	Project Assessment Conclusions Report
PEC	Project EnergyConnect
PERT	Program Evaluation and Review Technique
RCP	Regulatory Control Period
RFP	Request for Proposal
RFT	Request for Tender
RIT-T	Regulatory Investment Test – Transmission
SA	South Australian
VIC	Victoria

EXECUTIVE SUMMARY

Project overview

1. ElectraNet submitted a Contingent Project Application (Application) to the AER on 30 September 2020 for the South Australian component of Project EnergyConnect (PEC). This followed a determination by the AER in January 2020 that PEC satisfied the requirements of the Regulatory Investment Test for Transmission (RIT-T).
2. PEC forms a central feature of the roadmap for the transition of the power system developed by the Australian Energy Market Operator (AEMO) in its 2020 Integrated System Plan (ISP). The primary purpose is to enhance system security, provide net market benefits and support the transition of the energy market to a lower carbon emissions future.
3. PEC involves the construction of a new 900km, 330kV transmission line connecting Robertstown in SA to Wagga Wagga in NSW via Buronga in NSW, with an added connection to Red Cliffs in north west Victoria.
4. The South Australian component, to which the Application relates, includes a new 190 km 330 kV double circuit line from Robertstown to the SA/NSW border; a new 330kV substation at Bundey; additional substation and line works to connect into the existing transmission network; and a new Special Protection Scheme and associated studies, commissioning, and testing.

Project scope

5. The AER has requested that EMCa review two aspects of the capital cost forecast to support its determination of the prudency and efficiency of the estimated project cost:
   - the transmission lines and substations cost as determined by competitive tender; and
   - the reasonableness of the Project Delivery Costs to be incurred by ElectraNet.

Basis for our assessment

6. Since submitting its Application to the AER, ElectraNet has made a number of changes to the capital cost estimate within our scope of review. We have considered each of these proposed changes, including those in response to questions asked of ElectraNet by the AER and ourselves as part of this review.
7. At the time of the Application, ElectraNet stated that it did not have an early works agreement in place, and this was the primary reasons for the proposed completion dates differing from those proposed by TransGrid for the NSW component of PEC.
8. In addition to the changes to capital cost, ElectraNet has since submitted a revised project plan to the AER, and which aligns with the project delivery dates proposed for the NSW component of PEC. However, the absence of an early works agreement has resulted in TransGrid's procurement process being further advanced than ElectraNet's. Accordingly, the cost estimate relied upon by ElectraNet remains subject to additional competitive testing and should be considered to lie within a wider accuracy tolerance than can be assumed for TransGrid.

Summary of our assessment of transmission and substation line cost estimate

9. We consider that the process that ElectraNet has followed has assisted with determining a reasonable estimate of the costs. ElectraNet has not concluded its procurement process for each of its major scope items, and therefore cannot with a high degree of confidence, determine the efficient level of cost.
10. We consider that the method applied by ElectraNet to generate a cost estimate for the transmission line and substation works is reasonable, as it has:

- based its cost estimate on a reasonable interpretation of the information made available to it at this time, including as a result of the market responses received;
- applied a [redacted], to reflect a reasonable estimate of the likely final price;
- [redacted] level of costs to be incurred; and
- provided a sound basis for, and method of, deriving the cost estimate for additional scope items identified since the RIT-T assessment.

11. The procurement model and processes will allow ElectraNet to continue to apply competitive pressure to the bidders and thereby to optimise the outcome for consumers for the transmission lines and substations work packages. We expect that these processes will achieve the project objectives relating to delivery of an efficient cost.

Summary of our assessment of Project Delivery Cost

12. Based upon the application of our top-down review methods, ElectraNet appears to have improved on previous benchmarks for its Project Delivery Cost. This is consistent with what we would expect to see for a larger project that offers scale economies regardless of the added complexity associated with PEC.

13. From our bottom-up review, we have identified a number of areas which suggest to us that the cost estimate may be higher than an efficient level of resourcing, however adjustments for these factors are not material to the overall cost estimate.

14. ElectraNet have also proposed a small number of adjustments to its cost estimate since its original Application.

15. Overall, when considering the estimating accuracy associated with the transmission and substation works cost estimate, representing 78% of the project cost the estimate for project delivery costs will be subject to a similar level of estimating accuracy.

Implications of our findings

16. As ElectraNet's procurement process has not concluded, and specifically final negotiations are yet to occur, there remains potential for further reductions in the cost estimate. The nature of the cost reductions, whilst likely in the form of design optimisation and construction efficiencies, cannot be accurately known at this time.

17. We consider that ElectraNet has not sufficiently accounted for the magnitude of efficiencies that may be reasonably achieved, and are more likely than not, to moderately exceed those currently included in the cost estimate.

18. However, whilst we consider that opportunities for cost reductions remain throughout the process, the current level of project definition also suggests that some additional costs may be incurred. This should be considered as a part of the separate review of the risk allowances captured in the register.

19. Based on information provided, including adoption of the adjustments proposed by ElectraNet, we consider that:

- The transmission line works cost estimate of $258.4m is reasonable;
- The substation works cost estimate of $108.3m is reasonable; and
- The project delivery cost estimate of $34.4m is reasonable.

1 INTRODUCTION

1.1 Scope

20. ElectraNet submitted a Contingent Project Application (the Application) for the South Australian component of Project EnergyConnect (PEC) to the Australian Energy Regulator (AER) on 30 September 2020. The AER has requested EMCa to provide advice and assistance in determining:
    - whether the proposed costs represent a reasonable forecast of the capex and required for undertaking the contingent project, both overall and in each year in the current regulatory control period;
    - a substitute forecast, in the event that the proposed costs do not represent a reasonable forecast; and
    - whether the information provided in the Contingent Project Application is sufficient to make the above determination/s, and if not, what additional information the AER should request from ElectraNet.
21. By agreement with the AER, we focussed on two areas of the capex forecast:
    - the transmission lines and substation cost, as determined by competitive tender; and
    - the reasonableness of the Project Delivery Costs forecast by ElectraNet.
22. The purpose of this report is to provide AER with our assessment of the aspects of expenditure set out above, and the basis for our findings.
23. We have not been asked to review the proposed opex, or other components of the forecast capex costs including:
    - Actual incurred costs to date;
    - Risk allowance included in the risk register;
    - Costs associated with land access, environment approvals and Environmental Impact Statement (EIS) approvals;
    - Costs associated with the design and development of the Special Protection Scheme (SPS); and
    - Costs associated with inter-network testing.
24. References included in relation to the above are done where we have identified an issue or concern that is likely to be material and which we consider warrant closer examination by the AER as part of its separate review of the proposed costs.

1.2 Structure of this report

25. In section 2 we provide an overview of the PEC and the expenditure that we have been asked to assess. We first present an overview of the PEC comprising the South Australian (SA), New South Wales (NSW) and Victorian (VIC) components, thereafter all references to PEC refer to the SA component only, as included in the Application submitted by ElectraNet.
26. In the subsequent sections, we provide our assessment of the two areas of scope:
    - In section 3, we provide our assessment of ElectraNet's procurement process and commercial arrangements used to achieve what it claims to be an efficient price from an external service provider for the transmission line and substation works, and our assessment of the proposed capital cost for the transmission line and substation works; and
    - In section 4, we provide our assessment of ElectraNet's proposed Project Delivery Cost.

1.3 Presentation of expenditure amounts

27. Expenditure is presented in this report in $2017-18 dollar terms, unless stated otherwise.

1.4 ElectraNet provided information to inform our review

1.4.1 Contingent Project Application

28. In addition to the Contingent Project Application document, ElectraNet has provided additional information and data to the AER which we have drawn from for our review of aspects of the project cost estimate. The information we have taken into account includes:

- Scope of Work;
- Cost estimate report; and
- Project Expenditure forecasts worksheets.

1.4.2 Information requests

29. In addition to the above, the AER and ourselves have sought further information from ElectraNet through written information requests. ElectraNet provided responses to each of the information requests and we took relevant information into account in our assessment. This information includes:

- Detailed responses to our questions;
- Supporting worksheets containing cost and resource information; and
- Other supporting information relating reviews, reports and tender-related documents.

1.4.3 Initial review workshop with ElectraNet

30. We held a virtual meeting with ElectraNet to discuss specific issues that we considered had not been adequately covered in the information and documentation provided. ElectraNet engaged positively in these discussions and provided additional material that we requested to support the explanations given at the meeting.

2 BACKGROUND INFORMATION

In this section we provide an overview of PEC, then describe the scope of the SA component of PEC, including the proposed capital expenditure included in ElectraNet's Application.

2.1 Project overview

2.1.1 Project drivers

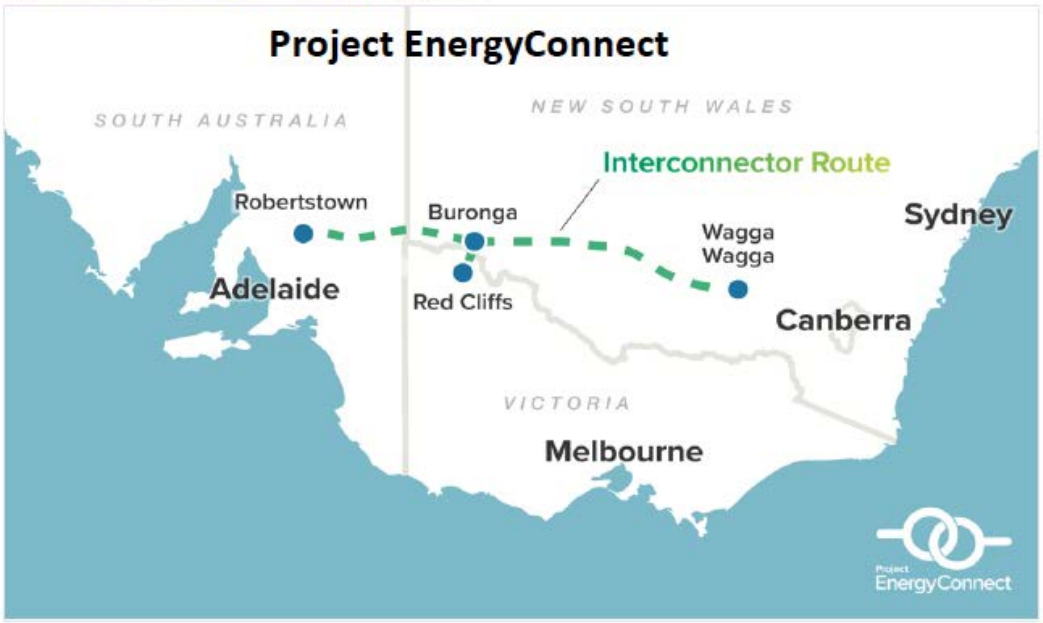
31. PEC forms a central feature of the roadmap for the transition of the power system developed by the Australian Energy Market Operator (AEMO) in its 2020 Integrated System Plan (ISP). The ISP classified PEC as an 'actionable ISP project' which will deliver net market benefits and support energy market transition through:[1]

- Lowering dispatch costs, initially in SA, through increasing access to supply options across regions;
- Facilitating the transition to a lower carbon emissions future and the adoption of new technologies, through improved access to high quality renewable resources across regions; and
- Enhancing security of electricity supply in SA.

2.1.2 Project scope of works

32. As depicted in the figure below, PEC involves the construction of a new 900km, 330kV transmission line connecting Robertstown in SA to Wagga Wagga in NSW via Buronga in NSW, with an added connection to Red Cliffs in north west Victoria.

Figure 2.1: Line route for Project EnergyConnect



Source: ElectraNet, Project EnergyConnect Contingent Project Application for the South Australian component, 30 September 2020

[1] AEMO, 2020 Integrated System Plan, July 2020

33. We understand that the SA and NSW Governments have provided support for ElectraNet and TransGrid to progress preliminary work for the PEC to allow the interconnector to be delivered sooner if it is approved by the AER.[2] The preliminary work was initially focused on narrowing the route corridor.

34. Since that time, the nature of the early works arrangements for ElectraNet and TransGrid has diverged, and which is reflected in the SA and NSW components of the PEC being at differing stages of development at the time of this Application.

2.1.3 Project delivery

35. PEC will be delivered by ElectraNet and TransGrid as the respective transmission network operators in SA and NSW, subject to receiving all necessary environmental and regulatory approvals.

36. As the final step in the regulatory approval process, a Contingent Project Application has been submitted to the AER by ElectraNet and TransGrid for their respective scopes, and which seeks approval of the capital expenditure and revenue required.

37. The capital costs have been updated since the time the RIT-T report was released by ElectraNet in February 2019, to reflect the outcomes of detailed project planning and competitive procurement processes undertaken to date.

2.2 South Australian component

2.2.1 Overview

38. The capital expenditure forecast for the South Australian component of the Project as set out in ElectraNet's Application is $470.7 million ($2017-18). Competitive market pricing makes up a large component of these costs.

2.2.2 Project scope of works

39. The scope of works includes:

- A new 190 km 330 kV double circuit line from Robertstown to the SA/NSW border;
- A new 330 kV substation at Bundey near Robertstown including 275/330 kV transformers;
- A new 275 kV line between Bundey and Robertstown and associated augmentation works at Robertstown substation, including static and dynamic reactive plant;
- Turning the existing 275 kV line between Robertstown and Para in to Tungkillo;
- A Special Protection Scheme to detect and manage the loss of either of the alternating current interconnectors from SA; and
- Associated power system studies, commissioning works and inter-network testing.

2.2.3 Project timing and status

40. Subject to securing relevant approvals and approval by its Board, ElectraNet's Application includes a proposed completion date for construction by 31 December 2023. ElectraNet has stated that it will continue to look for opportunities to deliver the Project earlier, if feasible.

41. In its Application, the commencement and completion dates are listed as:

- Commencement of the contingent project – 1 July 2018
- Final Investment Decision (FID) – Sep 2021

[2] ElectraNet, Project EnergyConnect Contingent Project Application for the South Australian component, 30 September 2020, page 9

- Environmental Impact Statement (EIS) Approved – Jan 2022
- Construction Commences – Feb 2022
- Anticipated date for completing construction – 31 December 2023

42. Following construction completion, ElectraNet includes a period of commissioning and inter-network testing.

43. In our discussion during the onsite review meeting, ElectraNet stated that it did not have an early works agreement in place at the time of its Application. ElectraNet also advised that it continues to explore opportunities to deliver the project earlier, which has an implication for the forecast capex and revenue recovery.

44. When asked why the proposed completion dates differ from TransGrid for the NSW component of PEC, ElectraNet referred to an early works agreement that it understood was in place for TransGrid for the NSW component and which likely explains the more advanced state of negotiations with its contractor and earlier planned completion for the corresponding scope when compared with ElectraNet.

2.2.4 Forecast capital expenditure

45. ElectraNet's forecast capex for the PEC is $470.7m (real 2017/18, excluding prior period costs incurred).[3] The table below summarises the major components of the cost estimate.

Table 2.1: ElectraNet's Contingent Project Application - forecast capex and basis by capex item - $m 2017/18

Capex item	Cost estimate (excl prior period expenditure)	Cost estimate (incl prior period expenditure)
Transmission line works	258.7	258.7
Substation works	108.3	108.3
Land access & approvals	21.3	21.3
Project delivery costs	33.7	37.0
Special Protection Scheme	18.9	18.9
Inter-network testing	13.4	13.4
Project risk	16.3	16.3
Total	**470.7**	**474.0**

Source: ElectraNet, Contingent Project Application, Table 4-1

46. The table below summarises the cost estimate by year.

Table 2.2: ElectraNet's Contingent Project Application - forecast capex and basis by year - $m 2017/18

	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Project total
Total capex	**5.0**	**4.1**	**7.2**	**74.1**	**143.9**	**236.4**	**470.7**

Source: ElectraNet, Contingent Project Application, Table 4-2

47. The expenditure profile reflects delivery schedule of construction by 31 December 2023. The total capex proposed to be incurred during the current Regulatory Control Period (RCP) 2018-19 to 2022-23 is $234.3m

[3] Prior period expenditure of approximately $3.3m

2.2.5 Changes since PACR

48. In its Application, ElectraNet has increased the capital forecast relative to the total project capex submitted to the AER as part of the PACR and RIT-T.

49. ElectraNet stated that:[4]

> *'Since publishing the PACR in February 2019, we have updated the capital cost estimates to reflect the market pricing outcomes of the competitive procurement and contracting process. Capital costs have also been revised to account for a range of other factors identified through the course of our detailed project planning, including assessment of project risks, line route diversions to avoid environmentally sensitive areas, inter-network testing requirements, additional substation works and environmental approval requirements.'*

50. As shown in the table below, the changes result in a capital expenditure forecast that is approximately 27% higher than the estimate included in the RIT-T and approved by the AER.

Table 2.3: ElectraNet's Contingent Project Application - forecast capex and comparison with PACR - $m 2017/18

	PACR	Contingent Project Application
Total capex forecast	**374.0**	**474.0**

Source: ElectraNet, Contingent Project Application, Table 4-3

51. ElectraNet stated that the increase is[5]

> *'consistent with the assumptions of AEMO's 2020 ISP which assumes an increase of 30% in the costs of ISP projects compared with previous estimates based on prevailing transmission costs.'*

52. Also that[6]

> *'In particular, a general increase in transmission costs is being experienced across the NEM, with AEMO incorporating a 30% increase in costs in its 2020 ISP for transmission projects. A range of key input assumptions contributing to market benefits have also changed.'*

53. We reviewed AEMO's 2020 ISP to ascertain the basis of this statement. In the ISP plan, AEMO states that:[7]

> *'Changes in input costs: each major transmission project identified in the ISP that had gone through the RIT-T process had at least a 30% increase in cost from initial estimates, due to a range of factors. As a consequence, AEMO, in collaboration with the responsible TNSPs, increased the capital cost estimates by approximately 30% and adjusted for the specific project circumstances for each ISP projects.'*

54. There are no further references to the cost increases, nor any reference material to review. We consider that whilst interesting to note the potential correlation between these two

4 ElectraNet, Project EnergyConnect Contingent Project Application for the South Australian component, 30 September 2020, page 22

5 ElectraNet, Project EnergyConnect Contingent Project Application for the South Australian component, 30 September 2020, page 23

6 ElectraNet, Project EnergyConnect Contingent Project Application for the South Australian component, 30 September 2020, page 13

7 AEMO. 2020 Integrated System Plan, viewed at https://aemo.com.au/-/media/files/major-publications/isp/2020/final-2020-integrated-system-plan.pdf?la=en&hash=6BCC72F9535B8E5715216F8ECDB4451C on 11 November 2020, page 31

statements, the information provided by AEMO is insufficient to justify the basis of any increases to the proposed capital expenditure.

55. We reviewed the drivers for the changes in the subsequent section, as part of our assessment.

Table 2.4: ElectraNet's Contingent Project Application - forecast capex and basis and variance analysis with PACR, by capex item - $m 2017/18

Capex item	PACR Cost estimate	CPA Cost estimate	Variance
Transmission line works	235	259	24
Substation works	91	108	17
Project delivery costs	17	36	19
Special Protection Scheme	20	19	-1
Land & easement acquisition	12	11	-1
Inter-network testing	-	14	14
Environment, stakeholder & cultural heritage	-	10	10
Risk allowance	-	16	16
Total	**374**	**474**	**98**

Source: ElectraNet Project Energy Connect Contingent Project Application Pre-lodgement briefing September 2020, slide 19. Values include prior period expenditure. Values may not add due to rounding

56. As shown in the table above, a total of $98m was added to the cost estimate since submission of the PACR, comprising adjustments to existing components and inclusion of components not previously included. We review each of the components of the cost estimate within our scope in the following section.

57. The total used for the basis of our assessment is $470.7m which excludes $3.3m associated with prior period expenditure and already included in ElectraNet's Regulatory Asset Base.

2.3 Changes since submission of the Contingent Project Application

58. In November 2020, ElectraNet provided notice to the AER of an agreement with the SA Government to undertake early works. ElectraNet has revised its Application to the AER, which includes:

- earlier completion date of June 2023;
- adjustments to the project delivery costs as a result of the earlier completion date, including changes to the resource schedule;
- adjustments to the project delivery costs as a result of changes proposed in response to our requests for information (as discussed in section 4); and
- adjustments to the design and construction cost estimate as a result of changes proposed in response to our requests for information (as discussed in section 3).

59. The changes are summarised in the table below.

Table 2.5: ElectraNet's Contingent Project Application - forecast amended capex and variance - $m 2017/18

Capex item (excl prior period expenditure)	Original Cost estimate Sep 2020	Amended Cost estimate Nov 2020	Variance
Transmission line works	258.7	258.4	-0.3
Substation works	108.3	108.3	-
Land access & approvals	21.3	21.3	-
Project delivery costs	33.7	31.9	-1.8
Special Protection Scheme	18.9	18.9	-
Inter-network testing	13.4	13.4	-
Project risk	16.3	16.3	-
Total	**470.7**	**468.6**	**-2.1**

Source: ElectraNet_Project EnergyConnect Contingent Project_Expenditure Forecasts - CONFIDENTIAL – Sept2020, ElectraNet_Project EnergyConnect Contingent Project_Expenditure Forecasts - CONFIDENTIAL - Nov2020 - Draft

60. We consider the changes proposed by ElectraNet, including the reduced capex forecast relative to its Application in the sections that follow.

3 ASSESSMENT OF TRANSMISSION LINES AND SUBSTATIONS

We have reviewed ElectraNet's procurement process used to derive the cost estimate for the transmission line and the substation works.

We consider that the tender evaluation process that ElectraNet has followed to-date has assisted it with determining a reasonable estimate of the costs for the components of work where ElectraNet is seeking market prices. ElectraNet has not concluded its procurement process for each of its major scope items, including for transmission lines and substation works, and therefore cannot with a high degree of confidence determine the efficient level of cost.

Based on our top-down and bottom-up analysis, we consider that the cost estimate provided by ElectraNet in its adjusted Application dated November 2020 is within a reasonable range given the estimation accuracy consistent with the complete stage of the procurement process.

3.1 Overview

61. In this section we provide a summary of the forecast capital expenditure included for the transmission lines and substation works and provide the results of our assessment of the forecast expenditure.

62. We consider the information provided in the Application and compare that with the information provided in the PACR. We have not undertaken a review of the reasonableness of the cost estimate included in the PACR, nor of the individual scope items provided. Any such review should be taken alongside a review of the benefits that are forecast to arise from the proposed investment and is beyond the scope of our review.

3.2 ElectraNet's proposed cost estimate

3.2.1 Overview

63. ElectraNet's revised forecast capex includes $366.7 million ($2017/18) for transmission line and substation works, as shown in the table below.

Table 3.1: Transmission line and substation works - $m, 2017/18

	Cost estimate Sep 2020	Cost estimate Oct 2020	Cost estimate Nov 2020	% of total PEC costs Nov 2020
Transmission lines	258.7	258.4	258.4	55%
Substation works (Tunkillo, Robertstown, Bundey)	108.3	108.3	108.3	23%
Total	**367.0**	**366.7**	**366.7**	**78%**

3.2.2 Procurement process and selection of delivery model

Procurement objectives

64. ElectraNet has developed key objectives informing its procurement process are:[8]

- *Ensure a safe, efficient and cost-effective project*
- *Provide for a collaborative contracting model, encapsulating:*
  - *Early contractor design involvement*
  - *Price certainty*
  - *Aim for zero variations*
  - *An efficient and fit for purpose project design*
  - *A cost effective and fixed price* [redacted]
  - *Opportunity for innovation in design and delivery models and practices to drive efficiencies in project costs*
  - *Improved interface between design and construction*
  - *Schedule certainty*
- *Consider the security and continuity of contractor resources, noting the extensive energy market activity both planned and currently underway*
- *Deliver an appropriate, best for customer procurement approach with the engagement model and contractor costs independently verified as required*

Establishment of a Buying Team

65. ElectraNet established a cross-functional Buying Team comprising senior project management, engineering, and commercial specialists from across the business in early 2019.

66. The Buying Team developed a commercial framework to:[9]

- *Allow for individual work packages that enable contractor scale and efficiency, ensuring best value for money outcomes;*
- *Cater for competitive early contractor involvement, with early design facilitating an accurate quantification of risk, and competitive tension to ensure best-for-project pricing; [and]*
- *Ensure an appropriate allocation of risks.*

67. The commercial framework precipitated the selection of three key work packages:

- New and existing substation works;
- Procurement of long lead item major plant for free issue; and
- Transmission line works.

8 ElectraNet, Project EnergyConnect: Cost Estimate Report, page 7

9 ElectraNet, Project EnergyConnect: Cost Estimate Report, page 8

Procurement process completed to date

68. The procurement process commenced in early 2019 with a joint market engagement with TransGrid to identify potential contractors. The key milestones completed include:

- April 2019: Expression of Interest (EOI) to a select group of both domestic and international contractors for transmission lines and/or substations works;
- May 2019: capability assessment of received responses and invitation to a select number of contractors to a Request for Proposal (RFP). Following receipt of submissions, ElectraNet undertook engagement with contractors including briefings, presentations, and issuance of RFP addendums;
- July 2019: assessment and evaluation of RFPs;
- March 2020: ElectraNet undertook a refresh of the market pricing previously submitted in July 2019 as part of the RFP to capture any market changes:[10]

  'Of particular relevance was the impact of COVID-19 on China and associated markets, with a significant proportion of plant, equipment and construction materials being sourced from Asia and India.'

- July 2020: shortlisting of two transmission line contractors. Further 'site clarification' activities were then undertaken with these preferred contractors to better understand the proposed logistics of how to build the transmission line, and basis for cost estimate.

69. The procurement process completed to date has focussed on the delivery of the transmission line works, comprising the largest component of the PEC project.

Remaining procurement process milestones

70. The three primary work packages will be procured and delivered as follows:

- Substation works;
- Primary plant; and
- Transmission line works.

71. In the table below, we provide a summary of the current status, next steps and final contract award planned by ElectraNet.

Table 3.2: Status of procurement activities

	Current status	Next steps	Final contract award
Substation works	• EOI completed	• Issue tender to select group of contractors • Negotiation process • Provision for BAFO	• Award a Design and Construct contract to either one or two contractors to provide most efficient outcome
Primary plant	• Not started	• Issue tender for the free issued plant [redacted] • Negotiation process • Provision for BAFO	• Award is subject to decision on substation tender, where ElectraNet may elect to procure primary plant from successful contractor(s)

[10] ElectraNet, Project EnergyConnect: Cost Estimate Report, page 12

	Current status	Next steps	Final contract award
Transmission line works	• Site clarification activities with two preferred contractors completed	• Dual, competitive Early Contractor Involvement (ECI) process • Negotiation process • Provision for BAFO	• Design and Construct contract to one contractor

Source: EMCa

72. ElectraNet advised that the ECI process applied for the transmission line works is intended to identify, quantify and allocate this risk to the party best able to manage the risk in a competitive environment, ensuring best for customer outcomes. This is specifically appliable to the areas of greatest risk in terms of cost variations [redacted]

3.2.3 ElectraNet's process to establish the transmission line and substations cost estimate

Overview

73. Due to the current status of the procurement process, ElectraNet does not have firm contract prices on which to base the cost estimate. ElectraNet has therefore based the cost estimate on the indicative market pricing received to date that formed part of the price response schedules submitted as part of the RFP process.

74. [redacted]

Risk assessment

79. ElectraNet has included a probabilistic assessment of known risks (costs) and opportunities (savings) in a risk register included with the Contingent Project Application as a means to capture the uncertainty of the items listed above and other key risks and opportunities. . Review of the risk register is beyond the scope of our review.

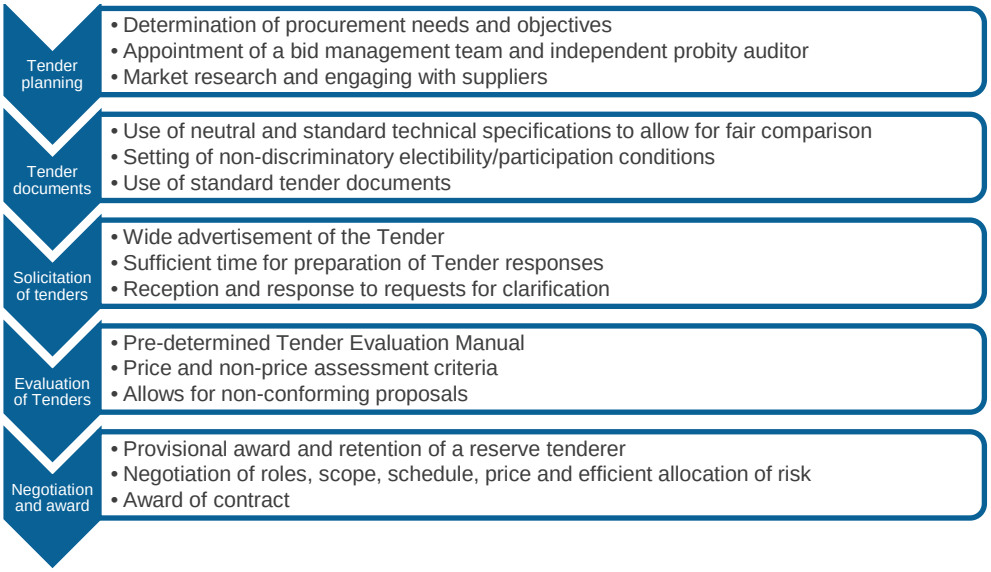
3.3 Our assessment

3.3.1 Application of procurement process

Features of a competitive tender we looked for

80. In assessing the competitiveness of the tender and the likelihood that the tendered price is likely to be competitive we applied the assessment framework as shown in the figure below.

Figure 3.1: EMCa's competitive tender assessment framework



Source: Based on Government of South Australia, State Procurement Board, Acquisition Planning Policy version 10.8

Tender Planning

ElectraNet's procurement objectives are appropriate

81. We consider that ElectraNet's procurement objectives provide an appropriate balance of risk and cost elements to achieve a fit-for-purpose solution.

ElectraNet created a dedicated Buying Team

82. In addition to a bid management team, we would expect for a project of this size and importance that ElectraNet would have appointed an independent probity auditor for the duration of the project through to award of contract. When we asked if ElectraNet had appointed a probity auditor, ElectraNet confirmed this did not form part of its standard practice.

83. Whilst absence of a probity auditor does not necessarily undermine achievement of a competitive price and other terms and conditions, we consider appointment of a probity auditor to be consistent with good practice for a project of this nature.

ElectraNet's choice of delivery model is likely to be appropriate

84. In response to the AER's request for more information about the process ElectraNet is following to select its delivery model, ElectraNet advised that it had considered several commercial models. A Design and Construct Contract had been identified as the option best suited to address the project objectives and drive greatest value for money.

85. ElectraNet describes its delivery model as having the following attributes:[13]

- *'… Design and Construct Contract for both the Transmission Line and Substation work packages, with suitable terms and conditions to be negotiated during the remaining stages of the competitive procurement process to manage project risks, warranties and liabilities and variations.*
- *The Contractors are best placed to undertake the detailed design, with skilled personnel and experience providing for efficiency, innovation, value-add and price competitiveness,*
- *All risks (both commercial and technical) will be allocated to the party best placed to efficiently manage those risks, including agreement to any variations.*

[13] ElectraNet Response to AER Information Request dated 9 October 2020, page 14

- *Contract award (both ECI and substations) will be determined through a competitive procurement process, ensuring best outcomes for customers.'*

86. We consider that the delivery model selected by ElectraNet is a conservative approach to contracting, however should allow for greater efficiencies to be realised by extending the competitive process for the transmission lines component, representing the largest cost.

87. The two-stage approach, culminating in the ECI stage provides opportunities for ElectraNet and the Contractor to each efficiently allocate their design and delivery risk through a collaborative approach and price negotiation.

88. There is likely a premium in terms of project delivery cost that is incurred in dealing with multiple contractors throughout the ECI stage and detailed design, and associated ECI payments. We assume from ElectraNet's decision to pursue a multiple contractor model, that ElectraNet expects that the benefits in delivery of an efficient design and cost will outweigh the additional risks and costs.

89. Based on the information provided, the selected D&C/fixed-price delivery model should satisfy ElectraNet's project objectives and offers the potential to deliver the project at an efficient cost with an acceptable balance of risk between ElectraNet and the Contractor.

Tender-related documents

The transmission line cost is the major cost component

90. The transmission line cost represents approximately 55% of the total project cost, and if the costs of internetwork testing and environment-related approval costs are also included then this increases to around 60%. It represents the greater component of the cost, and the area where the greatest potential savings are also likely to exist - through a combination of design and construction optimisation.

91. We therefore reviewed whether ElectraNet's approach has sought to ensure that the cost estimate reflects the best possible fit-for purpose line design and that it is likely to be achieved at the least cost and at an acceptable balance of risk.

92. The major components of the transmission line costs are the structure and footing designs. To a large extent the structure and footing designs determine the construction costs and the easement requirements. We have therefore focussed on ElectraNet's line structure and footing design process and the opportunities included or progressively excluded for innovative (but technically prudent) means of achieving a prudent and efficient transmission line cost.

Initial pricing is based on ElectraNet's design

93. Design and construction standards for overhead line construction and substation design are relatively consistent across transmission utilities in Australia, which is important to ensure safety and long-term reliable performance of critical infrastructure.

94. However, within this framework there are different transmission structure designs and footing designs which may be deployed to prudently reduce cost. Factors to be considered include the characteristics of the transmission line electricity supply voltage/rating, route topography, cultural heritage, soil type, and ease or otherwise of obtaining easements/access for maintenance. Depending on the combination of the selected line route, structure, and footing designs, there is the potential for faster construction, cheaper construction, less environmental and cultural heritage impact, and/or less easement width required – all of which reduce overall cost.

95. To this end, we asked ElectraNet to explain what investigations of alternatives to its standard tower design and construction techniques it carried out. In response, ElectraNet described the basis of the preliminary design concepts provided to contractors in the RFP stage, and provision for greater optimisation to occur in the ECI stage for transmission lines and RFT for substations.[14]

[14] ElectraNet, Response to AER Information Request dated 9 October 2020, page 17

Solicitation and evaluation of proposals

Good evaluation practices appear to have been followed

96. ElectraNet advised that the RFP submissions received were evaluated against a set of assessment criteria that were developed in advance. The assessment criteria included a greater number of non-price criteria than price criteria. The evaluation was managed by the buying team, and additional discussions held with contractors. ElectraNet selected two preferred transmission line contractors to participate in the ECI phase.

97. ElectraNet undertook a refresh of the market pricing with the two preferred contractors, against what was previously submitted. For this purpose, the contractors were asked to review and update their previously provided RFP pricing and schedules to capture the impact of any market changes since the RFP process in July 2019.

98. The two transmission line contractors were invited to a site-clarification task, to confirm the assumptions made on scope and cost items. ElectraNet stated that the capital cost was not adjusted at this stage, however the steps assisted build confidence in the capital forecast.[15]

Basis for separation of work scopes was not adequately explained

99. Following the EOI phase and subsequent capability assessment, ElectraNet invited a list of six contractors to respond to the RFP stage, with four contractors invited for substation works and four contractors for transmission lines works, including two contractors common to both. ElectraNet has not adequately explained why the works scopes had been split into the transmission line works and substation works at the RFP stage.

100. Similarly, whilst we understand that the Buying team has separated the work packages to deliver efficient project outcomes, we were not provided with the analysis of options undertaken or the information relied upon to confirm that will be the case.

101. Due to the smaller scope of transmission substation works, relative to the transmission line works, the opportunity to realise efficiencies between the transmission lines and substation works is likely to be reduced. However, ElectraNet's decision to separate the scope of works potentially limits the possible efficiency to be investigated further by proponents. Equally, should one of the two preferred transmission line contractors also be successful for the substation works, there is potential for a cost reduction to be realised due to lower project overheads by the successful contractor.

Negotiation of efficient risk allocation is provided for in subsequent procurement stages

102. ElectraNet's ECI stage presents an opportunity for both the transmission line contractors and ElectraNet to determine an efficient allocation of risk and to finalise other contractual matters (such as the scope for both parties, schedule, and cost). This phase is yet to be undertaken.

103. ElectraNet has, however, identified risk allowances for itself which it maintains represent a reasonable basis for inclusion in the total project cost. Assessment of these risk allowances is beyond the scope of our review.

The remaining process aim to continue competitive pressure on pricing

104. ElectraNet plans to undertake the ECI process with its two transmission line contractors, resulting in competitive tension and BAFO process. The substation works will also be subject to a competitive tender with a single preferred contractor.

105. We consider that the remaining procurement process steps to be undertaken will continue to place competitive pressure on bidders, and which should result in an efficient level of pricing.

[15] Response to AER Information Request dated 9 October 2020, page 5

3.3.2 Reasonableness of cost estimation methodology

Cost estimate provided with PACR is of a preliminary nature

106. ElectraNet states that the cost estimate is based on:

> *'the source of all pricing in the estimate is from a range of cost intelligence resources including our own corporate cost database, industry vendors, industry subject matter experts in infrastructure and utilities sector, cost modelling, and our own capital infrastructure pricing experience.'*

107. The cost estimate is considered to be Class 4, in accordance with the AACE International Recommended Practice and Estimate Classification, being that it is preliminary in nature. This means that the project scope definition is low, being 1% to 15% of full project definition. The cost estimation accuracy can vary within a wide range, typically in the order of +/-30%.

Cost estimate has been updated based on market pricing

108. ElectraNet states that the cost estimate provided with the Application is based on market pricing from the nominated delivery model, using:[16]

> *'information obtained from prospective vendors, current delivered costs and prevailing market rates. This information is drawn from a range of sources, including competitive tender responses, market information, current and historical projects.'*

109. We have considered the market pricing information, along with ElectraNet's methodology for developing its cost estimate in our assessment of an efficient level of cost.

The accuracy of the cost estimate is a function of the state of available information

110. [redacted]

111. Whilst comparisons to the original cost estimate provided with the PACR, and against which the benefits have been assessed, is provided as a guide, the changes to the cost estimate that have occurred since that time should be considered in the context of the estimation accuracy.

[redacted]

[16] ElectraNet, Project EnergyConnect: Cost Estimate Report, page 15

[redacted]

115. Based on the status of the procurement process, and specifically the negotiations with the lead contractors, the process to identify, quantify and allocate risk to the party best able to manage the risk has not been completed. Accordingly, whilst this process has not concluded it is reasonable to ensure that an efficient level of cost that can be reasonably expected to be incurred by either party be included in the estimate. This is specifically appliable to the areas of greatest risk in terms of cost variations [redacted]

[redacted]

[redacted]

117. In other cases, where a level of uncertainty still remains over the full extent of the costs to be agreed through the outcomes of commercial negotiations, additional cost components have been captured in the risk register and a probabilistic assessment has been applied. As noted in our report, assessment of the risk allowances included in the risk register is beyond the scope of our review.

118. We review each of the allowances and adjustments for transmission lines and substations works separately below.

3.3.3 Reasonableness of cost increases for transmission lines

Summary of cost estimate

119. The cost estimate build-up against the components described in section 3.2.2 above is shown in the figure below for the transmission line works. We have used the adjusted Application provided to the AER in November 2020.

17 [redacted]

[redacted]

[redacted]

120. Since the PACR, ElectraNet stated that it had increased the cost estimate for transmission line works by $24m, from a value of $235m included in the PACR.

121. We were unable to verify the basis of the $235m estimate provided by ElectraNet, rather the value included in the PACR is $226m in $2017-18 (when converted from $230m $2018-19).[18]

122. As a result, assuming the PACR cost estimate of $226m for transmission line works, the changes included by ElectraNet to the transmission line cost estimate reflect a net increase of $32.7m.

Changes arising from updated market pricing

123. The cost estimate for the transmission line from Robertstown to the border (totalling 190km) to which the PACR relates, has been re-estimated through the market pricing available from the procurement process. This has resulted in an increase to the cost estimate to $236.5m, [redacted]

124. Further to our assessment of the application of this method above, we consider that the base cost estimate is reasonable.

[redacted]

18 SA Energy Transformation RIT-T Project Assessment Conclusions Report, 13 February 2019

[redacted]

Proposed adjustment	Cost estimate	Assessment of the forecasting method
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Proposed adjustment	Cost estimate	Assessment of the forecasting method
		the transmission lines works cost, we consider that the cost [redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	

[redacted]

[redacted]

[redacted]

[redacted]

Allowance	Cost estimate	Summary of assessment
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Allowance	Cost estimate	Summary of assessment
[redacted]	[redacted]	

[redacted]

3.3.4 Reasonableness of cost increases for substation works

Summary of cost estimate

130. The cost estimate build-up against the components described in section 3.2.2 above is shown in the figure below for the substation works. We have used the adjusted Application provided to the AER in November 2020.

[redacted]

131. Since the PACR, ElectraNet stated that it had increased the cost estimate for substation works by $17m, from a value of $91m included in the PACR.

132. We were unable to verify the basis of this estimate, rather the value included in the PACR is $88m in $2017-18 (when converted from $90m $2018-19).[19] Assuming the PACR cost estimate is $88m for substation works, the changes included by ElectraNet to the substation works cost estimate reflect a net increase of $20.3m.

Changes arising from updated market pricing

133. The cost estimate for the works at Bundey substation, to which the PACR relates and which comprise most of the substation works on the Project, has been re-estimated through the

19 SA Energy Transformation RIT-T Project Assessment Conclusions Report, 13 February 2019

market pricing available from the procurement process [redacted].

134. Further to our assessment of the application of this method above, we consider that the base cost estimate is reasonable.

[redacted]

Item	Cost estimate	Assessment of the forecasting method
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Item	Cost estimate	Assessment of the forecasting method
[redacted]	[redacted]	

137. Based on the information provided we consider [redacted] in the cost estimate are reasonable.

Primary plant cost estimate

138. ElectraNet has not provided a separate cost estimate for primary plant, including for free issue plant. All primary plant items are included in the cost estimates for transmission lines and substations works.

139. ElectraNet stated that:[20]

[redacted]

Allowance	Cost estimate	Summary of assessment
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

20 [redacted]

Allowance	Cost estimate	Summary of assessment
[redacted]		[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	

141. [redacted]

3.3.5 Opportunity for innovation and value to be released

Comparison of transmission line unit rates

142. We asked ElectraNet to describe the steps it has undertaken to assure itself that the cost increases are reasonable, and reflective of an efficient cost. In summary, ElectraNet advised that:

- Risk mitigation activities, [redacted] the procurement process to date together with its detailed risk assessment combine to provide a high level of confidence in this forecast;
- Market pricing comprises over 75% of the total project cost; and
- It benchmarked unit cost information for transmission lines to TransGrid.

143. We have commented on the first two points above. In terms of the benchmarking comparison with TransGrid, we were not able to replicate the transmission line cost [redacted].[21]

144. In a subsequent response,[22] ElectraNet refers to a calculated line cost [redacted] has achieved through its competitive tendering process.

145. In comparing the 330kV transmission line design between TransGrid and ElectraNet, we observe that:

- The 275kV line section for TransGrid should be removed from any cost comparison as it is based on a different design and includes additional cost that is not present for the 330kV line sections.
- The provisional sum for 330kV line changes included by TransGrid should also be removed.
- TransGrid has adopted shorter span lengths in the NSW component,[23] ranging from an average of 450m to 471m for the 330kV line sections, assuming a high proportion of guyed tower structures for suspension towers. This compares with ElectraNet's assumption of 530m, using predominantly self-supporting lattice structures for suspension towers. This suggests to us that TransGrid has a higher number of

21 [redacted]

22 ElectraNet, Response to AER assessment of Risk Allowance 6 November 2020, page 5

23 Based on its preferred bidder

structures per unit km included in the design when compared with ElectraNet. The trade-off of a higher number of structures, and a lower tower cost (when using a guyed structure) is not known, or whether any of all of the possible design changes are similarly applicable to ElectraNet which currently employs a much longer span length in its base design, and which is associated with taller structures.

- There are a number of economic and labour conditions that are likely to differ between NSW and SA, as reported by TransGrid and ElectraNet respectively.
- The contracting model adopted by TransGrid is conservative, where a greater risk margin is likely to be present in the tendered cost.

146. Accounting for differences in the scope, contracting model and local conditions we were able to generate a similar line construction cost per km for the 330kV transmission line sections. Whilst we had expected that the economies of scale for the NSW component would result in a lower line construction cost per km than evident from ElectraNet's cost estimate for the SA component, other cost factors were present in TransGrid's costs.

Transmission line design and construction efficiency

147. We observed that ElectraNet has made some provision for savings in its risk register associated with transmission line design and construction efficiency. Detailed review of the risk register does not form part of the scope of our review.

148. We would expect that the remaining steps in ElectraNet's procurement process will identify further design and construction efficiencies supported by additional competitive tension between two preferred bidders with a BAFO and negotiated price outcome.

149. Based on our understanding of the outcomes from TransGrid's procurement process, design and construction efficiencies could reasonably be expected to be achieved for the SA component of PEC from the balance of ElectraNet's competitive procurement process. These options could include tower spacing, tower height, tower design, type of structure used, tower construction, line construction and line stringing, along with other aspects of design and construction such as footing type and design.

150. We note that:

- TransGrid and ElectraNet have relied on the same structure selection study[24] detailing the outcome of the collaborative assessment of structure types, and which was also provided to bidding contractors as part of ElectraNet's procurement process;
- The terrain across the two states is similar in sections of the transmission line, particularly close to SA/NSW border. We understand that for the NSW component, TransGrid is proposing to use a guyed tower design in place of a self-supporting structure, with approximately 81% of towers from the SA border to Buronga, and 93% of towers from Buronga to Dinawan making use of this design. Guyed tower structures typically are of lower capital cost due to the reduction in volume of steel and concrete in foundations required for the design; and
- Similarly, TransGrid reported that it was able to realise cost reductions associated with its line stringing costs, relative to its original assumptions.

151. We recognise that the same efficiencies may not be present for a range of factors given the status of design, local conditions, etc and therefore all efficiencies gained by TransGrid may not be realised to the same magnitude by ElectraNet.

152. However, the assumptions included by ElectraNet in the risk register are likely to under-estimate the level of design and construction efficiency for transmission lines that may be achieved. Whilst we have not reviewed the risk register in detail, we observe that ElectraNet has included two risk/opportunities that it refers to as representing the likely design and construction efficiency for transmission lines as shown in the table below.

[24] Beca, SAET Interconnector – Structure Selection Study, May 2019

Table 3.7: Summary of assessment of normalisation allowances for substation works - $m, 2017/18

Risk ID	Risk description	Causes	Impact
143	The opportunity to use structures other than free standing towers for the transmission line	The use of poles and guyed structures in the construction of the line	Reduce steel tonnage and costs
144	The opportunity to optimise the design through tower heights and span lengths	Existing designs and line routes do not take into account the local conditions	Reduce the overall tonnage of steel

153. We note that:

- The opportunity presented by ElectraNet is limited to the potential for reduction in steel as a result of a different tower design or lower number of towers;
- Opportunities relating to broader line design parameters including footing design do not appear to have been considered; and
- Similarly, opportunities for construction efficiency may also be present – for both transmission lines and substations works.

154. We asked ElectraNet to explain the process that it will use to evaluate and optimise design options and to select the preferred design option. In response, ElectraNet stated that:

- *'The optimised line route is now largely settled and will not be open for further variation. The route will be provided to the contractors based upon agreements ElectraNet is putting in place with landowners and traditional owners.*
- *A preliminary line design including structures, sizes, footings and span lengths was provided to the contractors as a basis for the RFP. Structure types, sizes, footing designs and span lengths can be optimised by the contractor during the ECI. As it is a dual contractor ECI it is in the best interest of the contractor to provide the most competitive offer. The proposed optimisation by the contractor will be evaluated against ElectraNet Asset Design Manuals and functional requirements (as prescribed in the Engineering Contract Specification, still to be developed), total asset lifecycle assessment, environmental and cultural heritage impacts, industry best practice and cost.*
- *ElectraNet has undertaken a conductor selection process and nominated the conductor to the contractor. The contractor can offer an alternative conductor, for assessment by ElectraNet but must have the same or better physical, mechanical and electrical performance data as the nominated conductor.'*

155. We also acknowledge that there are a small number of issues that are not completely resolved and despite providing direction to contractors, may continue to impact transmission line prices.

156. We consider that ElectraNet's response, and the provision already made in the risk register by ElectraNet, confirm that an opportunity exists for the contractors in the ECI phase to identify further cost reductions through the ECI phase. For substations, the subsequent RFT phase may also identify further costs reductions, although this reflects a smaller scope than the transmission line cost, and likely a smaller opportunity.

157. Accordingly, we do not agree with ElectraNet's statements, and which appear in conflict with other responses that the line is already optimised:[25]

> *'The line scope and estimate for the SA line section has already been optimised. Preliminary design and tower spotting information was provided to tenderers, together with the results of the structure selection study undertaken with TransGrid. ElectraNet has not mandated a particular design and tenderers were free to optimise the line design and delivery as already reflected in their pricing;'*

[25] ElectraNet, Response to AER assessment of Risk Allowance 6 November 2020, page 5

158. We observe that ElectraNet has provided preliminary design and spotting information to contractors, and which included an option for guyed lattice structures[26] at the RFP phase. Whilst contractors may have been invited to consider these designs and identify opportunities for value-add to the Works in their RFP response, detailed consideration of alternate designs are more likely to occur during the ECI phase as ElectraNet suggests.

Consideration of guyed tower designs

159. We observe that [redacted]

160. This figure is similar to that included in the Structure Selection study, however it assumes a much lower adoption of guyed towers than is present in the NSW component by TransGrid. We note ElectraNet's comments on the suitability of guyed towers to the SA component, namely:

- Environmental requirements, including the adoption of a constrained construction footprint for Environmentally Sensitive Areas; and
- Land-use considerations, and stakeholder engagement

161. We consider that the location of environmental sensitive areas is likely to provide the most significant barrier to adoption of alternate structures by ElectraNet. Based on the information presented by ElectraNet, the adoption of constrained construction and operational footprints for the transmission line largely inhibits adoption of guyed-towers in these areas.

162. The land use considerations should be similar to those present in NSW, particularly in areas closer to the SA/NSW border and we do not consider that this is likely to present a similar level of constraint on the use of alternate structure types, as is presented by environmental constraints.

163. A lower proportion of guyed-towers for the SA component than is possible in the NSW component is the likely outcome of a design optimisation process. Where guyed-towers are feasible, and considered a technical and economical alternative by ElectraNet, they may lead to lower span lengths than would otherwise be possible using a self-supporting structure. A more detailed review of the cost implications will be required as a part of the ECI phase.

164. Specifically, we understand that the ECI phase will allow the contractors to refine the indicative pricing submitted as part of the RFP. ElectraNet expects that the competitive process of involving two contractors in the ECI phase, will drive a best priced solution.[28] As noted previously, this is likely to identify possible cost reductions for the project that are more likely than not, to moderately exceed those currently included in the cost estimate.

3.4 Summary of our findings

165. We have considered whether ElectraNet has implemented a procurement process to inform a prudent and efficient forecast of required capex, and that is likely to support competitive prices and terms and conditions for the transmission line and substation components of Project Energy Connect.

The procurement process has not yet concluded

166. We firstly reviewed ElectraNet's procurement process used to develop the cost estimates for the transmission line and the substation works.

26 ElectraNet, Engineering Concept Specification

27 [redacted]

28 Response to AER Information Request dated 9 October 2020, page 17

167. We consider that the process that ElectraNet has followed has assisted with determining a reasonable estimate of the costs. ElectraNet has not concluded its procurement process for each of its major scope items, and therefore cannot with a high degree of confidence, determine the efficient level of cost.

The method applied by ElectraNet to generate a cost estimate is reasonable

168. [redacted]

169. The market responses received by ElectraNet have been effectively reviewed [redacted]

170. ElectraNet has based its cost estimate on a reasonable interpretation of the information made available to it at this time. This has involved engagement with prospective market participants and ElectraNet has sought to clarify understanding of key cost components of the transmission line cost contractors.

171. [redacted]

172. [redacted]

173. [redacted]

174. [redacted]

The remaining procurement process will maintain competitive pressure on bidders

175. The staged evaluation and selection of the preferred contractors for the lines work should allow ElectraNet to achieve its project objectives. As outlined, the process for the substations work, once executed, should similarly achieve the project objectives.

176. These processes allow for ElectraNet to continue to apply competitive pressure to the bidders and therefore to optimise the outcome for consumers.

[redacted]

177. However, as ElectraNet's procurement process has not concluded, and specifically final negotiations are yet to occur, there remains potential for further reductions in the cost estimate. [redacted]

178. We consider that ElectraNet has not sufficiently accounted for the magnitude of efficiencies that may be reasonably achieved, and are more likely than not, to moderately exceed those currently included in the cost estimate.

The estimation accuracy is an important consideration

179. We have given consideration to the likely level of estimation accuracy that can be attached to the project cost estimate. We consider that the project is best defined as being at a pre-tendered contract stage, with an estimation accuracy of around +/-20%.

180. However, whilst we consider that opportunities for cost reductions remain throughout the process, the current level of project definition also suggests that some additional costs may be incurred. This should be considered as a part of the separate review of the risk allowances captured in the register, alongside a determination of an efficient level of design and construction efficiencies.

ElectraNet's cost estimate is a reasonable estimate of an efficient cost

181. We consider that the procurement model and processes will allow ElectraNet to continue to apply competitive pressure to the bidders and thereby to optimise the outcome for consumers for the transmission lines and substations work packages. We expect that these processes will achieve the project objectives relating to delivery of an efficient cost.

4 ASSESSMENT OF PROJECT DELIVERY COST

We have reviewed ElectraNet's estimated Project Delivery Costs, focussing on the internal labour costs. Based on our top-down and bottom-up analysis of the adjusted cost estimate proposed to AER in November 2020, we consider that the forecast project delivery cost is within a reasonable tolerance of the estimation accuracy expected.

4.1 Overview

182. In this section we review components of the Project Delivery Costs (or overheads) that ElectraNet has included in its project cost estimate to manage its responsibilities, including project management, throughout the ECI stage and D&C stage.

4.2 ElectraNet's proposed project delivery cost

4.2.1 Overview

183. ElectraNet's revised forecast capex includes $34.4 million ($2017/18) for project delivery costs, representing a decrease from $35.5m included in the Application, as shown in the table below.

Table 4.1: Comparison of Project Delivery Cost estimates - $m, 2017/18

	Cost estimate Sep 2020	Cost estimate Oct 2020	Cost estimate Nov 2020	% of delivery costs Nov 2020
Actuals to date	8.8	8.8	8.8	25
Internal delivery costs	22.9	22.2	21.9	63
Contracts Works insurance	1.8	1.8	1.8	5
External legal services	0.7	0.7	0.7	2
Travel and accommodation	1.3	1.3	1.3	4
Total	**35.5**	**34.8**	**34.4**	**-**

184. When removing prior period expenditure of $3.3m and adding labour cost escalation of $0.7m, the total of $34.4m is reduced to $31.9m, and which reconciles with the figure reported by ElectraNet.

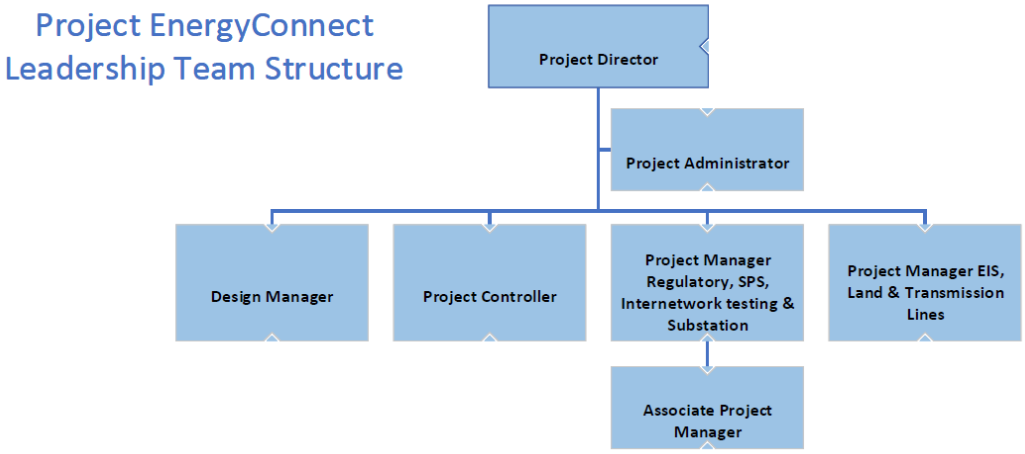
185. As indicated in the table above, the major components of the project delivery cost are associated with internal delivery costs (63%) and actuals to date (25%) collectively comprising 89%[29] of the forecast capex. We provide our assessment of the internal delivery costs (or labour) in the following sections. The assessment of the actuals incurred to date is beyond the scope of our review.

[29] Numbers may not add due to rounding

4.2.2 Project organisation

186. ElectraNet has established a project organisation chart as shown in the figure below, with sub-ordinate roles in a matrix reporting relationship.

Figure 4.1: Project org chart



Source: Attachment 18 Project Organisation Charts

4.2.3 Forecasting method

187. ElectraNet's project delivery costs have been forecast from a bottom-up build of resource requirements for the duration of the project, being labour and non-labour components.

188. At the time of the PACR, project delivery costs were estimated at a rate of $50k/km for the purposes of the RIT-T assessment. ElectraNet states that this method was used for the entire project, inclusive of the ElectraNet and TransGrid components of the work. ElectraNet states that the forecasting method for the PACR adopted a simplifying assumption applied for a different purpose, to obtain a consistent cost rate across the various network options being assessed. ElectraNet describes that the:[30]

> *'RIT-T assessment was necessarily undertaken on the basis of top-down desk-top cost estimates based on information available at that time, prior to any detailed project planning. The nature of a RIT-T assessment requires clarity over the ranking of options and overall magnitude of costs rather than an accurate detailed cost breakdown.'*

189. ElectraNet has now developed its estimate on a bottom-up basis from resource assessments based on individual functions and roles with effort estimated based on the project schedule and phases of activity. ElectraNet describes a number of factors that are not present in the application of the rate applied for the PACR:[31]

> *'The resource costs reflect the information now available on the complexity involved in the delivery of the project, including:*
>
> *• Dual competitive Early Contractor Involvement (ECI) for the line works*
>
> *• A commercial framework with 3 key packages of work with the potential management of multiple contractors*
>
> *• Outage management at the brownfields substations*

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• Special Protection Scheme design, delivery and implementation

• Inter-network testing requirements

• An interface to the NSW works which includes interface committee meetings, stakeholder forums, design reviews and construction and commissioning coordination.'

190. The bottom-up estimate is $24m above the level proposed in the PACR.

191. In response to our request for ElectraNet to confirm the use of any benchmarks used in determining the project delivery costs, ElectraNet referred to a number of aspects of the AER's Final Decision on the Eyre Peninsula Reinforcement project, namely:

- The AER accepted a project delivery cost of 8.9% of total project costs;
- ElectraNet considers that a more representative substation example to compare project delivery costs to Eyre Peninsula project than the project used by the AER in its Final decision, is ElectraNet's Munno Para Contingent Project. This included approved project delivery costs of 10% of the total project cost.
- ElectraNet stated that the AER analysis indicating historical project delivery costs of 6.9% is not correct, and once corrected is typically over 15% reflecting the large number of small scale and complete projects
- ElectraNet disagrees with comments relating to internal benchmarks and considers that the Adelaide Central Reinforcement contingent project in 2009 remains the most comparable completed project of similar scale and complexity to both the Eyre Peninsula and Project Energy Connect. The Adelaide Central Reinforcement contingent project in 2009 had project delivery costs of 12%.

192. ElectraNet stated that:[32]

'The above benchmarks all consistently support the forecast project delivery cost of 7.2% as a prudent and efficient estimate of the costs reasonably expected to be required for the successful delivery of Project EnergyConnect.'

4.3 Our assessment

4.3.1 Approach to our assessment

193. In assessing the efficiency of the project delivery cost, we looked at three perspectives:

- The efficiency of the assumed labour costs, specifically the unit rates and composition of the unit rates (remuneration, on-cost and overheads). Our assessment is based on review of the estimated labour unit costs (i.e. cost per FTE) proposed by ElectraNet in the provided resource estimate, including information provided in response to our request for information on the on-cost and overheads rates. We based our assessment on the description of roles provided by ElectraNet, which was supplemented with our own experience where information was not provided to adequately support a proposed unit rate;
- The efficient level of resourcing, specifically the size of the project team, scope, and organisation of the proposed roles; and
- The efficient level of forecast expenditure, arising from the above factors including any other assumptions. We included a top-down assessment using benchmarking where practicable, based on information provided by ElectraNet and the AER, on the application of a reasonable level of project delivery costs for similar projects.

194. We describe each of these three perspectives in the sections that follow.

[32] ElectraNet Response to AER Information Request received 28 October 2020, page 4

4.3.2 Assessment of efficient labour costs

Methodology applied by ElectraNet

195. ElectraNet states that the delivery cost for internal labour has been developed in accordance with ElectraNet's approved Cost Allocation Methodology (CAM). The hourly rates calculated through this process reflect the balance between the direct allocation of labour costs (typically through timesheet bookings) and indirect allocation of costs through corporate overheads. This balance can vary significantly between cost allocation models, such that burdened hourly labour rates cannot be directly compared between businesses in isolation. Under ElectraNet's methodology the booking of time to projects is principally performed by operational staff, while corporate costs are reflected in the hourly rate. Consequently, these hourly rates may be comparatively high compared with a business that allocates a greater proportion of costs directly.

196. In response to our request to provide an explanation of the basis for the labour rates used in the forecast, ElectraNet described the components of the labour costs by reference to a total weighted average hourly labour rate for the internal resources involved in the delivery of Project Energy Connect of approximately [redacted]

197. ElectraNet states that approximately 88% of the internal resources required on Project Energy Connect are at the equivalent of grade 6 or above given the senior and experienced roles required on a project of this scale and complexity, and which includes over 30% of roles being above grade 8. As a result, the average salary costs are skewed towards the upper end of ElectraNet's salary range.

Labour costs comprise three elements

198. ElectraNet advised that the total hourly rate is made up of three components, with percentages based on the proportion of total weighted average hourly labour rate:

- Salary and other remuneration (52%)
- Employment on-costs (12%); and
- Overhead costs (36%).

Overhead rates included by ElectraNet are at the high end

199. Employment on-costs and overhead costs comprise 48% of the labour cost based on the total weighted average hourly rate. When expressed as a percentage of the salary and other remuneration costs, this totals a further 91%, meaning that 91% of the salary and other remuneration costs is included as on-cost and overhead.

200. The overhead rate as a percentage of the salary and other remuneration costs, is 69%. Based on our experience, the level of overheads included by ElectraNet is at the higher end of the range typically applied by electricity companies in Australia.

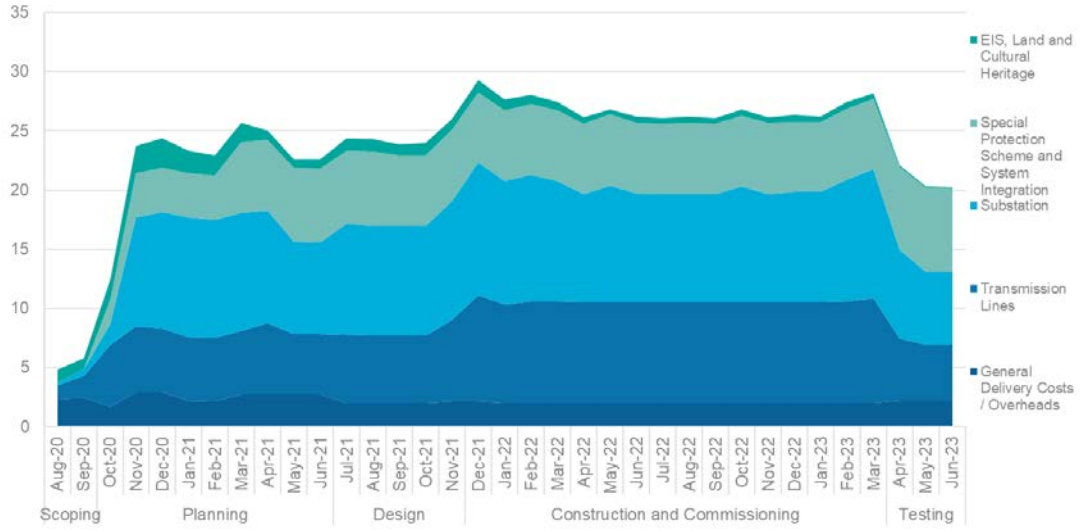
201. For on-costs, ElectraNet are proposing approximately 26% of base salary which is in line with what we would expect.

4.3.3 Assessment of an efficient level of resourcing

Resource by activity

202. In the figure below we show the resource profile by major activity included in the adjusted Application, aligned with a project completion date of June 2023.

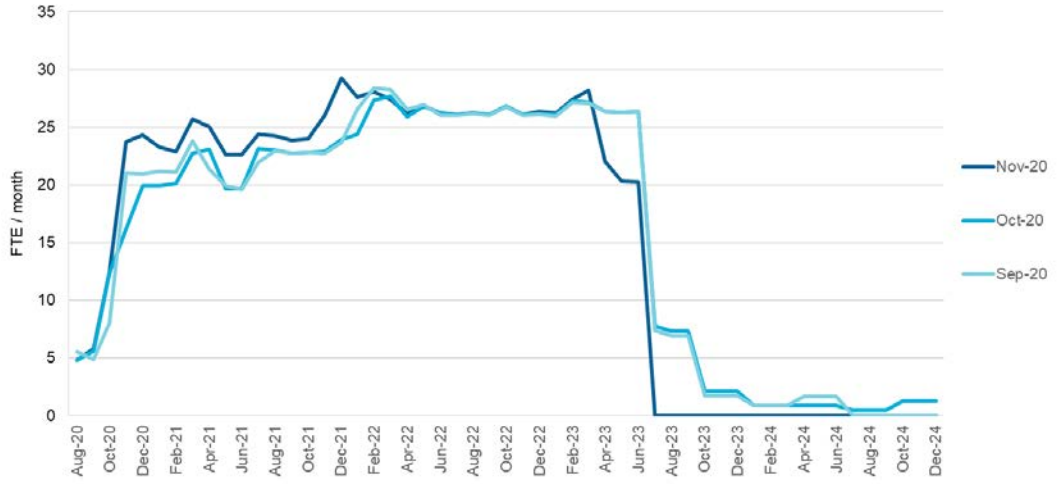
Figure 4.2: Profile of resource effort by activity, Nov 2020 – FTE/month



Source: EMCa analysis of ElectraNet_Project EnergyConnect Contingent Project_FTE Breakdown - PUBLIC - Nov2020 - Draft

203. In the figure below we show the change in resource profile applied by ElectraNet since the Application in September, the amended profile received in October and finally the adjustments to reflect an earlier completion date in November.

Figure 4.3: Comparison of resource effort – FTE / month



Source: EMCa analysis of FTE Breakdown (Attachment 17 – FTE Breakdown Aug 2020, Attachment 1 – FTE Breakdown Oct 2020, and ElectraNet_Project EnergyConnect Contingent Project_FTE Breakdown Nov2020)

204. It is clearly evident from the above charts, that the resource effort has been shifted forward with a greater amount of time incurred in the early phases of the project – including the planning and design phases. Of most significance is the change in resource profile in the final stages of the project. Previously ElectraNet retained a smaller project team over a longer period associated with the inter-network testing tasks whereas in the latest adjustments, this work is completed within 3 months whilst a large part of the project team is retained.

205. ElectraNet has proposed a slightly reduced cost estimate, that does not include any acceleration costs to achieve the earlier completion date.

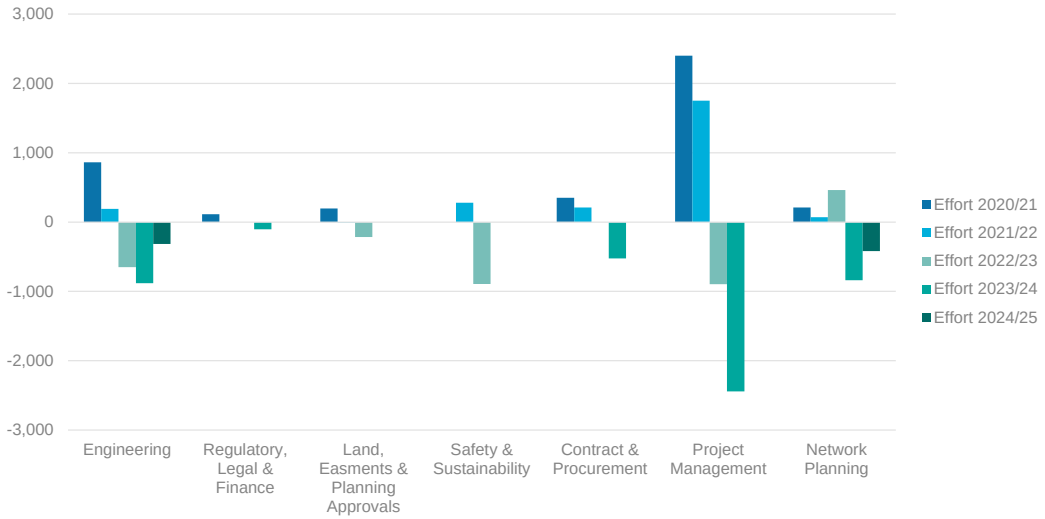
206. In addition to the change in resource profile illustrated in the above figures, consistent with undertaking early works, we also observe:

- Overall reduction in hours across the project compared with its original Application;

- Overall reduction in resource/labour cost; and
- Change in resource mix, where a different combination of resources has been assumed compared to that in the original Application.

207. We have not been provided with sufficient information to review in any detail the basis for the change in resource mix provided, or the implications to the project structure. We provide an overview of the changes to resource effort in the figure below. As expected, the changes to resource cost follow a similar profile.

Figure 4.4: Summary of changes to resource hours between Oct and Nov 2020 submissions - Hours



Source: EMCa analysis of ElectraNet_Project EnergyConnect Contingent Project_FTE Breakdown , dated Oct2020 and Nov 2020

208. The major changes are to reduce the Engineering, Safety & Sustainability, and Network planning hours across the project. For project management, significant effort has been brought-forward with a net increase of 812 hours over the project. As a result of changes in the resource mix, the increase in resource hours results in a net cost reduction for the project compared with the original application.

209. On balance, we consider that the steps included in the adjusted resource profile are indicative of ElectraNet seeking to optimise the composition of the project team to meet the project objectives.

Phases of resourcing

210. As a part of our review of the resource phasing, we observe the advancement of the tasks identified in the table below.

Table 4.2: Project phases

	Start	Finish	Description of change from original application
Early Works Phase	Aug-20	Jun-21	Reduction of 1 month duration, from 12 to 11 months
Design Phase	Jul-21	Nov-21	Commence 1 month earlier, and duration reduced from 6 months to 5 months
Construction & Commissioning	Dec-21	Mar-23	Commence 2 months earlier, and duration reduced from 17 months to 16 months
Project close-out and testing	Apr-23	Jun-23	Commence 3 months earlier, and duration reduced from 18 months to 3 months

211. Whilst the original estimate was likely to be in excess of what was required, we remain concerned that the resource profile at the end of the project may not reflect the effort to complete the SPS and Inter-network testing that ElectraNet is likely to need to undertake.

Sustained design involvement

212. On review of the resource profile, we observe what appears to be a sustained level of 'design-related' functions maintained throughout all phases of the project. We asked ElectraNet to explain the rationale included in the original application, and which is largely maintained in the adjusted resource profile.

213. In response to our request, ElectraNet stated that:

> *'There will be some design related functions undertaken by ElectraNet engineering resources throughout the project, which will mainly focus on reviewing the contractors design to ensure it complies with the scope, specification and standards detailed in the contract.'*

214. ElectraNet also referred to an owner's engineer function, which is present for the during of the project to confirm that the work is fit for purpose and built to all relevant laws, regulations and standards. ElectraNet advised that the due diligence related tasks are:

> *'…undertaken by our internal engineering resources and take place both in the office and on site.'*

215. Due to the complexity associated with this project, we consider that the roles and level of resource effort by design functions described by ElectraNet are reasonable.

Specific and intensive focus on SPS

216. ElectraNet has included dedicated resources to the design, development and testing of the SPS, and which includes significant time from network planning functions. We requested further detail of the activities supporting the SPS and System integration task which increases to approximately 6 FTE in Mar-21 and continues at that level until Jun-23 in the original application.

217. In response to our request, ElectraNet stated that:

> *'The System Integration task and implementing a Special Protection Scheme (SPS) is critical to ensure that PEC can effectively be used in the National Electricity Market (NEM) after energisation. In order to assist this body of work a System Integration Steering Committee (SISC) has been established to ensure collaboration across AEMO, ElectraNet and TransGrid so that PEC is integrated into the NEM to deliver the expected benefits of the project.'*

218. We understand that the resourcing includes:

- two FTEs to lead the two main streams of work (SPS and System Integration) for the length of these tasks
- six FTEs to undertake
  - SPS Modelling and Design and Construct,
  - Constraint Equation Development and
  - Generator Performance Standards Assessments/Review and Implementation tasks

219. We consider that the proposed level of resourcing appears high, particularly given that the resourcing is maintained throughout the project lifecycle. However, this is a critical and unique task that has not been undertaken previously.

4.3.4 Assessment of forecast expenditure

Treatment of inflation

220. ElectraNet appeared to be applying escalation twice in its development of labour costs. We asked ElectraNet to describe its approach to applying inflation and labour cost escalation to understand whether this was indeed the case. In response to our request, ElectraNet stated:[33]

> *'It appears that inflation has inadvertently been applied a second time as CPI is then automatically applied to the total expenditure profile in the PTRM. The expenditure forecast workbook has therefore been updated to remove the annual escalation of hourly labour rates as provided with this response in attachment Expenditure Forecasts Oct 2020.'*

221. Based on our review of the provided attachment, the changes proposed by ElectraNet resulted in a reduction of $1.1m to the project delivery costs as shown in the table below.

Table 4.3: Summary of changes to the Project Delivery costs since Application - $m, 2017/18

$m 2017-18	Original	Adjusted by ElectraNet	Variance
Total project delivery costs (including actuals to date)	35.5	34.4	1.1

Top-down review of project delivery costs

222. To assist us in understanding an efficient level of project delivery costs, we sought to compare ElectraNet's proposed project delivery costs to its previous performance and benchmarks used by the AER. We also sought more information from ElectraNet as to how it has estimated its project delivery costs, and why the cost estimate differed from:

- the original estimate provided in the PACR; and
- previous cost estimates, including the Eyre Peninsula Reinforcement project.

223. Our assessment of previous projects is included in the table below.

Table 4.4: Comparison of ElectraNet project delivery costs $m, 2017/18

Project	Project Delivery cost	Total cost estimate	Percent of total project costs	Percent of direct capex[34]
10-year average	n/a	n/a	n/a	7.4%
Eyre Peninsula Reinforcement Project	25.0	280.0	8.9%	9.8%
Project Energy Connect (CPA, September 2020)	35.5	472.5	7.5%	8.1%
Project Energy Connect (CPA, October 2020)	34.8	471.5	7.4%	8.0%
Project Energy Connect (Amended CPA, November 2020)	34.4	471.1	7.3%	7.9%

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34 Based on analysis undertaken by the AER as published in the decision on QNI project viewed at https://www.aer.gov.au/system/files/AER%20-%20Final%20Decision%20-%20TransGrid%20-%20QNI%20minor%20upgrade%20contingent%20project%20-%20April%202020.pdf

224. The above analysis is based on total project costs inclusive of prior period expenditure. If the prior period costs are removed for PEC, and labour cost escalation is included[35] as presented by ElectraNet, the percentage of total project costs reduces to 6.8% consistent with what has been reported by ElectraNet.

225. We observe that the project delivery costs for PEC have been reduced by ElectraNet from those originally proposed in its original Application and reflect a lower level than (i) it has historically achieved; and (ii) was approved by the AER for the Eyre Peninsula project. We note ElectraNet's comments on the suitability of comparison to the calculation of a 10-year average by AER used for the historical analysis, as it considers that the historical level is much higher than the AER analysis would suggest.

226. In making a comparison with previous projects and historical experience, the scale of the project is also relevant to consider. PEC is the largest project ever undertaken by ElectraNet, and overall, the largest line project undertaken in the NEM for many years. For a project of the size and scale of PEC, we would expect to see economies of scale realised for the project that should, all things being equal, result in a reduced level of project delivery costs when compared with historical performance. For example, as projects increase in size, the project development and management related costs typically decrease as a percentage of the total project costs.

227. Against this, we recognise the differences and the challenges presented by PEC when compared with historical projects such as an increased level of consumer and stakeholder engagement, provision for a unique special protections scheme and inter-region network testing, and which are likely to result in additional costs. Also, that decisions taken by ElectraNet regarding early works, project development and procurement processes have a bearing on the costs incurred in project delivery.

228. The top-down benchmarks of project delivery costs suggest to us that ElectraNet has proposed a project delivery cost at a level that is lower than its historical performance, and this is in part due to the likely economies of scale of a large project.

Changes to expenditure profile

229. In the original application, we observed that costs were forecast to be incurred in 2024/25 and included in the project total cost. Due to the expenditure profiling approach applied by ElectraNet in its cost allocation model, these costs (which represent less than 1% of the project labour costs) were profiled to 2023/24 only.

230. As a result of the most recent adjustments proposed by ElectraNet, all project delivery costs are expected to be incurred by June 2023.

Non-labour cost items

231. The non-labour cost items account for 11% of the project delivery costs, comprising:

- Insurance;
- External legal services; and
- Travel and accommodation.

232. We have not been provided with an explanation of the methods used by ElectraNet in developing its forecast for these items. The travel and accommodation costs account for approximately 6% of the labour costs (excluding actuals to date). We were provided with a detailed composition of the travel and accommodation costs to confirm that they reflect a reasonable estimate of the resource assumptions and project delivery requirements. We did not find any material issues.

233. Absent details of the methodology used for forecasting these items, we considered whether the total amount is a reasonable forecast for a project of this size and complexity based on our experience. The non-labour items account for less than 1% of the total forecast capex,

[35] Real labour escalation only applied to forecast project delivery costs, from FY2021 only

and given the current stage of the project, are within a reasonable range of the expected estimation accuracy.

4.4 Summary of findings

234. We have reviewed ElectraNet's proposed project structure and associated project delivery costs by considering a combination of top-down and bottom-up review methods, including by comparison to recent decisions including the Eyre Peninsula Reinforcement project. Using our top-down methods, ElectraNet appears to have improved on previous benchmarks which would be expected for a larger project that offers scale economies regardless of the added complexity associated with PEC.

235. We have identified a number of areas which suggest to us that the cost estimate may be higher than an efficient level of resourcing, however adjustments for these factors are not material to the overall cost estimate. Specifically, we note that the level of overheads used in the development of the labour costs are at the high end of what we would expect to be incurred by a similar business. We understand that the assumptions applied by ElectraNet in its cost allocation methodology, and specifically for the derivation of its overheads are consistent with the most recent revenue determination.

236. Overall, when considering the estimating accuracy associated with the balance of the project, the likely accuracy of the estimate for project delivery costs falls within similar bounds.

237. ElectraNet has made adjustments to the cost estimate for project delivery costs since the application, to account for concerns expressed through our questions and discussions and based on its own modelling for early completion of the project.

238. Based on information provided, including adoption of the adjustments nominated by ElectraNet, we consider that the project delivery cost estimate of $34.4m (2017-18) is reasonable.