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Appendix 2b: Cost Estimate Reports - Fission

Covering Note

This note provides contextual information to assist readers to understand the purpose, scope and findings in the attached report.

1. Purpose and Background

By mid-2023, a confluence of issues on PEC - including program slippage and Elecnor Australia's cash flow challenges – indicated that additional steps were needed to understand the cumulative impact to the project. Transgrid was concerned that the contractor's performance, project delays and requests for additional payments were indicative of the challenges Elecnor Australia was facing in delivering PEC. Even though under the EPC contract Elecnor Australia was responsible for delivering the project according to the agreed terms, Transgrid felt it necessary to investigate the extent of the cost overruns.

Transgrid first engaged Fission to prepare report that provides a class three cost estimate for the Total Outturn Cost (TOTC) under different scenarios. A draft report, issued in June 2023, provided some initial data points indicating the scale of Elecnor Australia's potential cost overrun and indicated a need for further investigation.

In August 2023 Elecnor Australia provided open book access to Transgrid, with a program assessment and cost gap analysis being undertaken by Transgrid to better understand the possible cost overruns and program impacts to PEC.

The two final Fission reports issued in August account for the additional information gathered during this time to estimate the TOTC for PEC under two delivery scenarios:

- **Delivery under Elecnor Australia**[1]: The report dated 14th August estimates the cost of an 'open book cost plus margin' model in which Elecnor Australia completes PEC.
- **Delivery under an alternative contractor**: The report dated 17th August estimates the cost of terminating the EPC Contract and procuring an alternative contractor under a shared risk arrangement.

Both reports were relevant to Transgrid's understanding of the indicative TOTC for PEC, providing valuable data points on the estimated overrun Elecnor Australia may have to absorb under the EPC contract and the relative cost of pursuing an alternative contractor should Elecnor Australia be unable to complete PEC. It is important to note that although Fission's TOTC for PEC under an alternative contractor was higher than negotiating a new contract with Elecnor Australia, this pathway was not and could not be ruled out at that stage. While the cost assumptions adopted by Fission were considered reasonable, it signalled the need for further analysis to determine the cost overrun facing Elecnor Australia. The analysis by Fission alone was not sufficient to conclude that the contract had failed, or that engaging an alternative contractor was not a credible option. Instead, it supported the view that the scale of the cost overrun could impact the financial stability of Elecnor Australia and its parent company.

[1] *Whilst the Fission report refers to SEJV, Elecnor Australia is used for ease of reference in this covering note, being the only solvent member of SEJV at that time.*

2. Further details on the scenarios and assumptions

Fission was engaged to provide Transgrid with a TOTC for completing PEC under two hypothetical delivery scenarios.

Scenario 1

Under Scenario 1, Transgrid would negotiate with Elecnor Australia to complete PEC under a cost-plus model. Fission's estimate included best, most likely and worst cases, being linked to the timing of practical completion that Transgrid had forecast during its program review of PEC. The TOTC comprised:

(1) The original EPC contract price (i.e. the original contract price plus approved variations).

(2) Additional costs that Transgrid considered necessary to complete PEC, where either:

- No cost allowance had not been included in the EPC contract price; or
- An allowance had been included in the EPC contract price but was no longer considered adequate.

This scenario assumed that Transgrid's Owners Costs would vary according to the program dates, with increased costs for a later completion date.

Scenario 2

Under Scenario 2, Transgrid would terminate the contract with Elecnor Australia and procure an alternative contractor to complete the works under a shared risk delivery framework. This TOTC built on the initial work performed in June 2023 and included:

(1) Design and Construction (D&C) Target Cost at Completion, including a Class 3–4 (AACE) cost estimate for remaining works.

(2) Transgrid's Owner Costs.

(3) Additional commercial costs arising from contract termination, subsequent procurement and associated delays to project completion

3. Key Findings

There are two relevant sets of outputs from these estimates, being **A. the Total Contractor Costs**[2] and **B. the Total Out-turn Cost.**

[2] *In Scenario 1, this is described as the EPC Final Forecast Cost and in Scenario 2, this is described as the D&C Target Cost at Completion.*

Table 1: Fission Estimate Findings (14th and 17th August outputs combined)

	Scenario 1 – Delivered by Elecnor Australia			Scenario 2 – Delivered by alternative contractor
Case	Best Case (Jun 2025)	Most Likely (Feb 2026)	Worst Case (Sep 26)	N/A (Timing not specified)
A. Total contractor costs	**$2,398m***	**$2,750m***	**$3,135m***	**$3,343m**
Total Transgrid Owners' Cost	$513m	$541m	$583m	$1,209m
Total Additional Commercial costs	N/A	N/A	N/A	[redacted]
B. Total Out-turn Costs	**$2,911m**	**$3,290m**	**$3,717m**	[redacted]

Regarding the Total Contractor Costs, in Scenario 1 where Elecnor Australia would complete PEC, Fission estimated that the Design and Construction (D&C) Target Cost at Completion would range between $2,398m - $3,135m. This represents a cost overrun of $719m to $1,456m on a base of $1,679m.

The equivalent design and Construction (D&C) Target Cost at Completion for Scenario 2 indicated that an alternative contractor was likely to be more expensive (by $208m compared to Scenario 1 worst case). However, under Scenario 2 Transgrid would also incur costs associated with the termination of the EPC contract and prolongation of Transgrid costs. When these costs are considered in the Scenario 2 TOTC, the difference between scenarios becomes significantly more material ($1,211m compared to Scenario 1 worst case).

4. Explanatory Notes for the Reader

All costs are in nominal dollars.

The base of $1,679m is the initial contract price of the EPC contract plus approved variations and claims, including the pre-agreed Variation for the Line 3 upgrade from 330kV to 500kV and the Commitment Deed extension costs.

The EPC Contract Final Forecast Cost Sub-totals differ between the 14th and 17th August papers by $11.4m due to a transcription error in the 17th August report. For Scenario 1 in Table 1 above therefore, Transgrid has used the figures originally presented in the 14th August report.

* The amounts noted in attachments 2 and 4 of the application have been adjusted down by $41 million for payments made under the Commitment Deeds, to allow a like-for-like comparison with the Elecnor FFC, which excludes the Commitment Deeds.

fission

CLARITY FROM COMPLEXITY

Cost Estimate Report

PROJECT ENERGY CONNECT

14 August 2023

Prepared for: TRANSGRID

CONTENTS

MEMO	
Date	**14 August 2023**
To	[redacted]
CC	[redacted]
From	[redacted]
Subject	[redacted]**: PROJECT ENERGY CONNECT**
Job Reference	**F2315**

EXECUTIVE SUMMARY

TRANSGRID are currently delivering the Energy Connect Project with their delivery partner SecureEnergy JV. The project encompasses approximately 511km of 330kv double circuit, 24km of 220kV double circuit and 157km 500kV transmission lines. The project also includes four new and / or upgraded substations.

Due to changes within the SecureEnergy JV structure together with the evolving market conditions, TRANSGRID are undertaking a detailed review of the project progress to date and the forecast cost to complete.

fission have previously been engaged by TRANSGRID to develop cost estimates for a range of delivery scenarios. Refer to fission Cost Estimate Report 8 June 2023. The initial report was issued as a DRAFT report and subsequently placed on hold due to "project galvanise initiative" which is based on a strategy to assess the cost to complete using the cost forecast model prescribed here-in. TRANSGRID and SecureEnergy are continuing to hold discussions regarding potential delivery solution and commercial model.

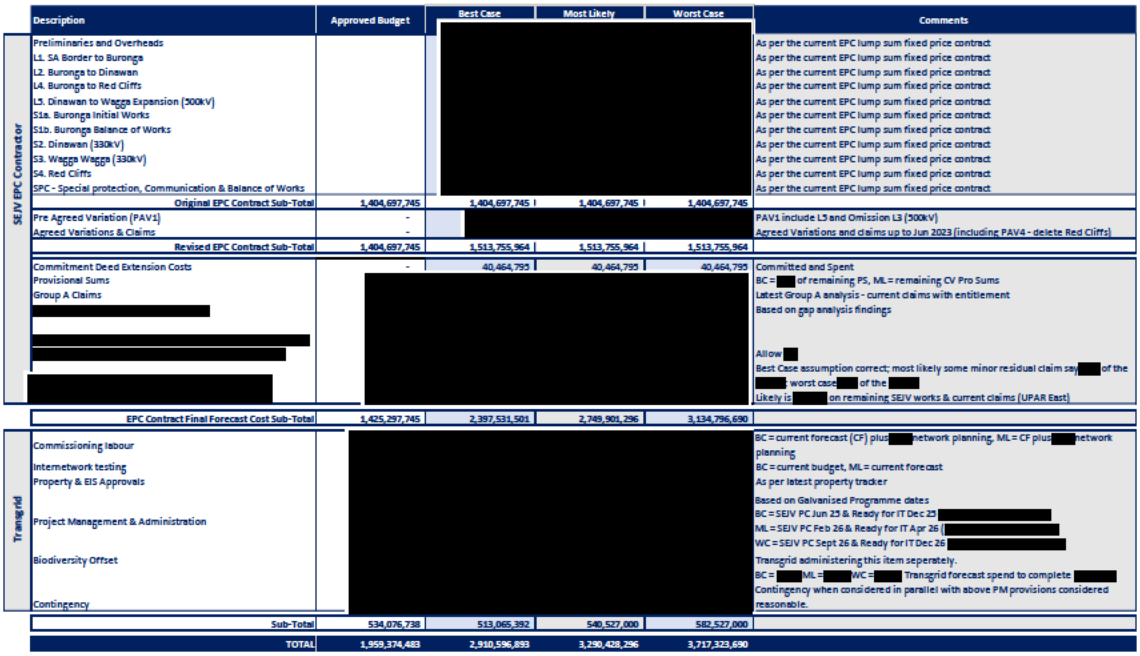
A scenario being considered is to continue to deliver the work through SecureEnergy through an open book [cost] plus [margin] reimbursable commercial model. TRANSGRID has prepared a cost plan model (**Appendix A**) and requested fission to undertake a review and assess the reasonableness of the TRANSGRID cost plan. The cost plan includes the Design and Construction Costs as well as TRANSGRID Owners Costs; and represents the Total Out-turn Cost (TOTC).

This Tech Memo provides a summary of **fission** assessment, including comparative benchmarking.

The following Report was prepared by **fission** for the sole use of its client, Transgrid, for the particular brief and on the terms and conditions agreed with its client on 12 August 2023. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other context.

TOTAL OUT-TURN COST (TOTC) SUMMARY

Table below provides a summary of the TOTC developed through the methodology described here-in:



	Description	Approved Budget	Best Case	Most Likely	Worst Case	Comments
SEJV EPC Contractor	Preliminaries and Overheads		[redacted]			As per the current EPC lump sum fixed price contract
	L1. SA Border to Buronga					As per the current EPC lump sum fixed price contract
	L2. Buronga to Dinawan					As per the current EPC lump sum fixed price contract
	L4. Buronga to Red Cliffs					As per the current EPC lump sum fixed price contract
	L3. Dinawan to Wagga Expansion (500kV)					As per the current EPC lump sum fixed price contract
	S1a. Buronga Initial Works					As per the current EPC lump sum fixed price contract
	S1b. Buronga Balance of Works					As per the current EPC lump sum fixed price contract
	S2. Dinawan (330kV)					As per the current EPC lump sum fixed price contract
	S3. Wagga Wagga (330kV)					As per the current EPC lump sum fixed price contract
	S4. Red Cliffs					As per the current EPC lump sum fixed price contract
	SPC - Special protection, Communication & Balance of Works					As per the current EPC lump sum fixed price contract
	Original EPC Contract Sub-Total	1,404,697,745	1,404,697,745	1,404,697,745	1,404,697,745	
	Pre Agreed Variation (PAV1)	-	[redacted]			PAV1 include L3 and Omission L3 (500kV)
	Agreed Variations & Claims	-				Agreed Variations and claims up to Jun 2023 (including PAV4 - delete Red Cliffs)
	Revised EPC Contract Sub-Total	1,404,697,745	1,513,755,964	1,513,755,964	1,513,755,964	
	Commitment Deed Extension Costs	-	40,464,795	40,464,795	40,464,795	Committed and Spent
	Provisional Sums		[redacted]			BC = [redacted] of remaining PS, ML = remaining CV Pro Sums
	Group A Claims					Latest Group A analysis - current claims with entitlement
	[redacted]					Based on gap analysis findings
	[redacted]					
	[redacted]					Allow [redacted]
	[redacted]					Best Case assumption correct; most likely some minor residual claim say [redacted] of the [redacted]; worst case [redacted] of the [redacted]
						Likely is [redacted] on remaining SEJV works & current claims (UPAR East)
	EPC Contract Final Forecast Cost Sub-Total	1,425,297,745	2,397,531,501	2,749,901,296	3,134,796,690	
Transgrid	Commissioning labour		[redacted]			BC = current forecast (CF) plus [redacted] network planning, ML = CF plus [redacted] network planning
	Internetwork testing					BC = current budget, ML = current forecast
	Property & EIS Approvals					As per latest property tracker
	Project Management & Administration					Based on Galvanised Programme dates BC = SEJV PC Jun 25 & Ready for IT Dec 25 [redacted] ML = SEJV PC Feb 26 & Ready for IT Apr 26 [redacted] WC = SEJV PC Sept 26 & Ready for IT Dec 26 [redacted]
	Biodiversity Offset					Transgrid administering this item seperately.
	Contingency					BC = [redacted] ML = [redacted] WC = [redacted] Transgrid forecast spend to complete [redacted] Contingency when considered in parallel with above PM provisions considered reasonable.
	Sub-Total	534,076,738	513,065,392	540,527,000	582,527,000	
	TOTAL	1,959,374,483	2,910,596,893	3,290,428,296	3,717,323,690	

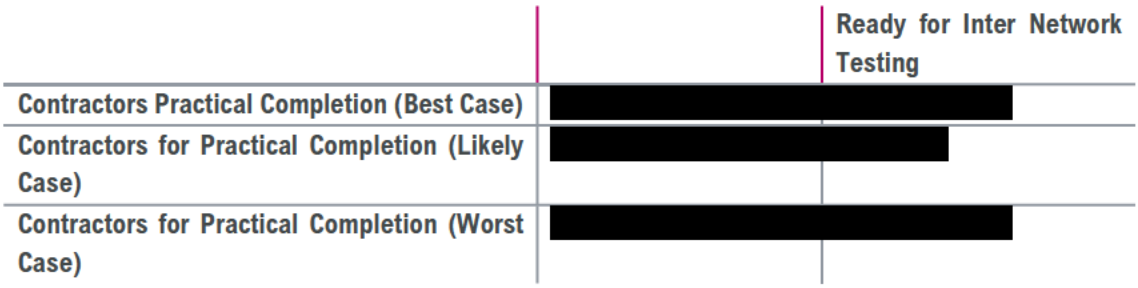
Refer to attached **Appendix A** Excel Workbook **TRANSGRID PEC SEJV FFC Scenario Analysis v06** – Pricing Schedule for a breakdown of respective scope and cost elements. When reviewing the TOTC value, the Basis of Estimate below should be considered.

Appendix A Tab "Monthly Delay Model" provides a high-level summary of potential time-based costs which TRANSGRID may incur should the SEJV not complete the works by September 2026. This is provided as an approximate indication of program prolongation costs to the Contractor and TRANSGRID Indirect Job Costs. A monthly cost of [redacted] escalated in 2026 is considered indicative.

TRANSGRID COST PLAN ESTIMATE METHODOLOGY

In developing their TOTC, the following methodology has been applied:

- TRANSGRID has completed a program review and through this process, has re-forecasted completion dates as below:



- The TOTC adopts the SecureEnergy approved Contract Value as the base case for the Design and Construction delivery and adjusts the primary cost centres for **(a)** revised program dates **(b)** anticipated price increases from initial contract award to Jul 2023 **(c)** revised labour resource plan provided by Secure Energy **(d)** fission review of SecureEnergy Contract Schedule of Rates, and adjustment where-in fission consider the rates are unusually low. In adopting this approach, TRANSGRID are seeking to pre-empt the anticipated cost at completion from SecureEnergy perspective where-in they have an existing contract and rates there-in, which under an open book [cost] plus [margin] reimbursable commercial model, some reliance upon the original contract rates and provisions would be retained, with other cost centres being adjusted.

- The TOTC should be viewed as a cost plan, developed from extrapolation of the existing Secure Energy contract. First Principles estimating has not been undertaken.

- TRANSGRID Project Management and Delivery cost to complete is derived from TRANSGRID forecast based upon their current project management and administration team; extended to match the revised completion dates.

- Draw down of some of the TRANSGRID contingency noting that the project has mobilised to site and commenced works; completed the majority of design; secured land access; procured long lead elements.

A detailed Basis of Estimate is provided below.

BASIS OF ESTIMATE

General overview	
Project	Project Energy Connect
Cost Estimate Report Base Date	30 July 2023
Project Risk	**SecureEnergy Risk:** SecureEnergy original contract includes provision for D&C risk within the progress claim price Schedule 10 (which refers to Schedule 21). TRANSGRID has allowed an additional [redacted] contingency on the EPC Contractor Gap Analysis value. In effect this approach retains the original D&C risk contingency provision, then allows for an additional (5%) contingency to the anticipated cost increase value. Additionally, a risk provision has been included in the event Risk Assumption 9(i) (refer **Appendix A**) is not realized. **TRANSGRID Risk:** TRANSGRID contingency is based upon a (%) to complete of their original risk provision, with the residual contingency representing approximately 10% of the TRANSGRID re-forecast cost to complete. This is considered reasonable noting **(a)** TRANSGRID has secured 100% of land access **(b)** design is complete **(c)** residual geotechnical risk is assumed to be included within the EPC Contractor Gap Analysis value **(d)** provision is made for unforeseen variations in the SecureEnergy cost to complete item "Current & Future unknown Claims (Outside Group A)".
Relied upon information	**fission review** is based on the TRANSGRID Cost Plan Template (**Appendix A**).
Program	TRANSGRID have completed a revised program, which the TOTC cost plan incorporates. It is assumed that the revised dates are inclusive of inclement weather and schedule risk assessment. Duration to complete based on most likely date = 34mths from Jul 23. TL Qty to complete @ 690klm. This equates to [redacted] (average). [redacted] TL is 330kv or 220kv. [redacted] per annum per 330kv TL Crew is benchmark; [redacted] for 500kv. Likely Program considered achievable with [redacted] crews and [redacted] crew (or partial transitioning). D&C Contractor proposing [redacted] TL Crews. TRANSGRID and SecureEnergy to confirm sufficient resources can be mobilized to meet the revised program dates.

1. Basis of TOTC Cost Plan

Assumptions	Refer to **Appendix A** – Tab "*Assumptions*".

	
Project Features	Scope encompasses: ▪ Buronga 330/220kV Substation ▪ Dinawan 330kV Switching Station ▪ Wagga 330kV Substation ▪ Red Cliffs Substation ▪ Special Protection and Communication and Balance of Works ▪ SA Border to Buronga (330kV double circuit) Transmission Line approximately 135km in length ▪ Buronga to Dinawan (330kV double circuit) Transmission Line approximately 376km in length ▪ Buronga to Red Cliffs (220kV double circuit) Transmission Line approximately 24km in length ▪ L5. Dinawan to Wagga Expansion (500kV) Transmission Line approximately 157km in length ▪ Access Roads
Delivery method	Design and Construct
Contract administration	TRANSGRID Contract Administrator. TRANSGRID internal costs developed by TRANSGRID. TRANSGRID Owners cost estimate is sitting [redacted] of the TOTC for the "likely" option, which is considered reasonable when assessed against other large infrastructure projects.
TOTC base date	July 2023
information	Information as transmitted by TRANSGRID
Risk methodology	Deterministic (no qualitative or quantitative risk modelling has been undertaken).
Labour Rates	Based on [redacted] (effective rate) as derived from recent large transmission projects.
Staff Rates	Adopted the SecureEnergy IJC contract rates and prorated them for the new program and completion scenarios.
Workforce Accommodation	Based upon the labour histogram provided by the SecureEnergy and charged at [redacted] (which covers messing, room hire, cleaning, camp management). Additional provision was made to mobile an additional construction camp noting the workforce labour increase.

Contractor Margin	[redacted]
Design Fee (% applied to DJC's)	Maintained SecureEnergy existing cost and increased for extended program.
Escalation methodology	Assumed [redacted] through to end new Dates for PC. Assumed triangular distribution to mid-point of respective revised completion dates.
Forex	Assumed included within revised SecureEnergy cost to complete.
Bill of Quantities	Not used for TOTC Cost Plan.

2. Scope assumption / battery limits / Interface Points

Scope of works	Contractor scope encompasses Approvals, Design, Procurement, Construction and Commissioning up to Systems energisation. Provision has also been included within the TOTC for pile rectification per TRANSGRID Briefing Note 27 July 2023.

3. Principal Costs

Escalation	Assumed included within the Owners costs provided by TRANSGRID.
Property	As per TRANSGRID TOTC Cost Plan.
Sunk Costs	Included based on information provided by TRANSGRID.
TRANSGRID Costs (development / delivery / finalisation)	As advised by TRANSGRID.
Project Works Insurance	Maintained SecureEnergy original valuation but increased for program extension.
Contract Administration	As advised by TRANSGRID. Contract delivery model will likely follow a cost reimbursable model.
Fringe Benefits Tax	Not assessed.

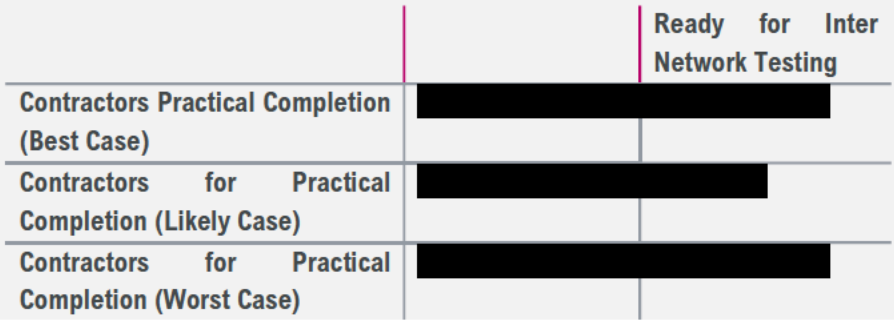
4. Risk assumption

Contractor Risk	Allowed [redacted] additional Contractor Contingency on TOTC over and above the original contract contingency value. Refer SecureEnergy Risk description above.
Principal Risks	Maintained SecureEnergy original Risk Provision but with draw down noting status of design and works. Refer TRANSGRID Risk description above.

5. Program assumption

Program

TRANSGRID have re-forecast the target dates for practical completion as follows:



BENCHMARKING

To provide TRANSGRID with context regarding the forecasted TOTC provided in **Appendix A**, the below table provides comparative benchmarking against recently tendered large transmission projects. The PEC TOTC forecast is lower than (3) benchmark projects. Project C and A are considered the more relevant project benchmarks.

PEC TOTC will likely be lower due to the assumptions on which this cost plan is based. This includes the TOTC incorporating certain scope, quantities and rates from the SecureEnergy base offer which will be below the current market rates.

D&c Cost Benchmarking: Reference Projects include (2) TRANSGRID Projects and (1) Powerlink Project.				
Project	**$M/KLM**			**Description**
PEC	[redacted]			692klm 550/330/220KV Transmission Lines & (4) Substations
Project A (P50)		[redacted]		500 KV Transmission Lines & (1) Substations
Project B (P50)		[redacted]		500KV Transmission Lines & (3) Substations. teep terrain for much of alignment.
Project C (P50)		[redacted]		Mixed 550/330/220KV (approx equal split) Transmission Lines & (5) Substations

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CLARITY FROM COMPLEXITY

Cost Estimate Report

PROJECT ENERGY CONNECT

17 August 2023

Prepared for: TRANSGRID

CONTENTS

MEMO	
Date	**17 August 2023**
To	[redacted]
CC	[redacted]
From	[redacted]
Subject	[redacted] **PROJECT ENERGY CONNECT**
Job Reference	**F2315**

EXECUTIVE SUMMARY

TRANSGRID are currently delivering the Energy Connect Project with their delivery partner SecureEnergy JV. The project encompasses approximately 511km of 330kv double circuit, 24km of 220kV double circuit and 157km 500kV transmission lines. The project also includes four new and / or upgraded substations.

Due to changes within the SecureEnergy JV structure together with the evolving market conditions, TRANSGRID are undertaking a detailed review of the project progress to date and the forecast cost to complete.

fission have been engaged by TRANSGRID to prepare a Total Out-turn Cost Estimate (TOTC) to complete the works based on a range of delivery models and scenarios. **fission** is presently the Independent Cost Advisor to TRANSGRID and Powerlink (Queensland). Accordingly, the **fission** forecast cost to complete is to incorporate current industry insights and benchmarking where practical.

The TOTC comprises two elements:

- **Design and Construction Cost Estimate** (developed by **fission** using combination of first principles estimating and benchmarking).
- **TRANSGRID Owners Cost Estimate** (including sunk and anticipated commercial risks associated with various delivery scenarios).

This Tech Memo provides a detailed summary of **fission** TOTC for **Scenario 2**:

- **Scenario 2** – Alternate Delivery Model – terminate existing Contractor and procure a replacement delivery partner and deliver the works through a shared risk delivery framework.

The assessed TOTC for Scenario 2 is **$4,927M** with a corresponding risk range [redacted] (blend of D&C Contractor and TRANSGRID risk contingency).

The following Report was prepared by **fission** for the sole use of its client, Transgrid, for the particular brief and on the terms and conditions agreed with its client on 17 August 2023. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other context.

DESIGN AND CONSTRUCTION COST SUMMARY

fission have prepared a Class 3-4 (AACE) cost estimate to complete Project Energy Connect. Inclusive of sunk costs to date, the Target Cost at completion for the D&C Contract is summarised below:

Ref	Item	fission	Comments
Design Fee			
	Investigations		
	Digital Engineering Model		
	Contractor's Independent Verifier		
	Vendor Support		
	Construction and Technical Support		
	Commissioning Support (FAT/SAT)		
	Concept and Detailed Design (including design management)		
	Risk Contingency		Induded Below
	Escalation		excluded
Substation Works Estimate			
	Buronga 330/220kV Substation		
	Dinawan 330kV Switching Station		
	Wagga 330kV Substation		
	Red Cliffs		
	Special Protection and Communication and Balance of Works		
	Risk Contingency		Induded Below
	Escalation		Induded Below
Tranmission Line Estimate			
	L1. SA Border to Buronga (330kV double circuit) @ 135km		
	L2. Buronga to Dinawan (330kV double circuit) @ 376km		
	L4. Buronga to Red Cliffs (220kV double circuit) @ 24km		
	L5. Dinawan to Wagga Expansion (500kV) @ 157km		
	Other Transmission Line Costs		
	Risk Contingency		Induded Below
	Escalation		Induded Below
Preliminaries Fee			
Subtotal			
Risk Contingency			D&C contractor P90 Contingecy. P90 adopted for Cost Plan purpose.
Margin Fee			11% adopted
Escalation			Allowance for 3% until FY25. To be modelled against cashflow curve.
Target Cost to Complete			
Provisional Sums			As per TRANSGRID advice
Work Completed			**:: $25.6M for Buronga SStn**
			::$14.4M for Tower Completed to date
			::$36.4M for Design completed to date
			::5% of Original Budget Indirects @ $478M = $23.9M
Sunk Cost to Date			
Group A Claims			
Target Cost at Completion		$ 3,343,366,720	

Refer to attached Excel Workbook **TRANSGRID PEC Pricing Schedule v00r07** – Pricing Schedule for a breakdown of respective scope and cost elements.

COST ESTIMATE METHODOLOGY

The cost estimate was prepared using the methodology prescribed below:

- **fission** prepared a high level BoQ commensurate with a Class 3 (AACE). Quantities were derived from combination of **(a)** April Contract Payment Schedule provided by TRANSGRID **(b)** Substation and Transmission Line Drawings. A detailed quantity remeasure has not been undertaken, and should be considered to further validate the cost estimate here-in.
- The transmission line cost estimate was developed using a combination of first principles estimating and application of benchmark data from recent transmission projects.
- Substation civil works cost estimate was developed using a combination of first principles estimating and application of benchmark data from recent transmission projects.

- The substation electrical works cost estimate was developed using combination of extrapolation of primary equipment pricing from the SecureEnergy JV contract rates and rates benchmarked from recent substation projects. SecureEnergy equipment rates were used as obtaining quotations from suppliers was not possible practical. Noting these rates were based on 2019/2020 base price date, **fission** has included escalation risk within the P90 risk model.
- Indirect Job Costs and design costs were developed using the application of [%] benchmarking from recent transmission line projects.
- The D&C Contractor contingency was derived using probabilistic assessment.
- Escalation has been included for the D&C cost estimate but not for the TRANSGRID owners cost estimate.
- The D&C Contractor cost estimate (base date 8 June 2023) was adjusted to incorporate the most recent project information including TRANSGRID costs and various commercial positions. These changes are listed below TOTC Table below.
- TRANSGRID Owners' costs were derived from **EnergyConnect Monthly May 23 Forecast FINAL InEight** report and or as advised by TRANSGRID. Adjustment was made for the TRANSGRID staff running costs using June 2023 data provided by TRANSGRID.
- **TRANSGRID Owners contingency has not been qualitatively assessed at this time**; rather a [16%] quantitative provision has been allowed which was derived from comparative recent transmission line projects. The **fission** cost estimate is commensurate with Class 3 (AACE) cost estimate, with accuracy range guide of -15% to +30%. The Energy Connect Project faces several material risks. **fission** recommend a qualitative and quantitative assessment be undertaken to inform a more robust contingency range.

A detailed Basis of Estimate is provided below.

BASIS OF ESTIMATE

General overview

Project	Project Energy Connect
Estimate Base Date	6 July 2023
fission Cost Estimate (AACE CLASS 3/4) for Design & Construction element (excludes TRANSGRID costs)	**Greenfield P90 Cost:**

Design and Construction	[redacted]
Risk P90	[redacted]
Preliminaries Fee	[redacted]
Margin Fee	[redacted]
Escalation	[redacted]
Target Cost to Complete	[redacted]
Provisional Sums	[redacted]
Cost to Date	$561,003,000
D&C Target Cost at Completion	**$3,343,366,720**

Project Risk	**fission** has completed a qualitative and quantitative risk assessment for the Unplanned Risks relevant to a Design and Construct Contract. The risk assessment excludes TRANSGRID (Owners) risks, which is captured in the TRANSGRID Owners cost estimate. These have been included separately in the scenario comparison. The Basis of Estimate below should be read in conjunction with the assessed project risk. [redacted] **Note:** The risk is reflective of those which **fission** anticipate a D&C Contractor will apply when pricing the works assuming the works are delivered under some form of relationship contracting. Contract risk allocation including application of liquidated damages would affect this risk modelling and should be considered by TRANSGRID.
Relied upon information	**fission** estimate is derived from the Reference information provided by TRANSGRID.
Program	A detailed program has not been completed for this estimate. There are several program metrics which TRANSGRID should consider. **fission** recommend that a detailed analysis of the program to complete be undertaken to better inform the cost to complete forecast and escalation modelling. The program will also likely be constrained by available market resources.

1. Basis of Estimate

Estimate methodology

fission is to prepare a Class 3-4 (AACE) Design and Construction Project Cost Estimate for Energy Connect Project. TRANSGRID Owners' costs, risk and escalation are not included.

For guidance, Class 3-4 (AACE) estimates should be considered with the following expected accuracy range:

	Primary Characteristic	*Secondary Characteristic*			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10

The approach used by **fission** to develop their cost estimate is outline below:

- Combination of first principles build-up and application of benchmarking for direct job cost elements including civils, electrical, tower erection, assembly, and stringing.
- The substation electrical works cost estimate was developed using combination of extrapolation of primary equipment pricing from the SecureEnergy JV contract rates and rates benchmarked from recent substation projects. SecureEnergy equipment rates were used as obtaining quotations from suppliers was not possible practical.
- Generally, Materials and equipment costs are derived from indicative recent project pricing from comparable projects or from the available project data provided by TRANSGRID.
- Indirect Job Costs and design costs were developed using the application of [%] benchmarking from recent transmission line projects.
- Probabilistic Risk modelling (Unplanned Risks). Planned Risk assessment is deemed to be included within the Unplanned Risk assessment for the purpose of the Class 3 estimate.

Basis of estimate assumptions

- Substation Primary Electrical Equipment pricing derived from the SecureEnergy current contract is a reasonable reflection of actual equipment costs. **fission** has not obtained check pricing for these elements.
- Sunk costs include approximately [redacted] of actual Contract Works (earned value) completed to date.

Project Features

Scope encompasses:

- Buronga 330/220kV Substation
- Dinawan 330kV Switching Station
- Wagga 330kV Substation
- Red Cliffs Substation
- Special Protection and Communication and Balance of Works

	▪ SA Border to Buronga (330kV double circuit) Transmission Line approximately 135km in length ▪ Buronga to Dinawan (330kV double circuit) Transmission Line approximately 376km in length ▪ Buronga to Red Cliffs (220kV double circuit) Transmission Line approximately 24km in length ▪ L5. Dinawan to Wagga Expansion (500kV) Transmission Line approximately 157km in length ▪ Access Roads
Delivery method	Design and Construct
Contract administration	TRANSGRID Contract Administrator. TRANSGRID internal costs developed by TRANSGRID.
Estimate base date	July 2023
Estimate information	Information as transmitted by TRANSGRID
Risk methodology	Probabilistic (Contractor only)
Labour Rates	Based on first principles build-up using Tier 1 EA.
Staff Rates	Included within the IJC [%] allocation.
Workforce Accommodation	Estimate assumes 100% DI DO. Assume establishment of Camp Accommodation
Contractor Margin	[redacted] on Total Cost for Transmission Line Scope and Substation scope.
Design Fee (% applied to DJC's)	[redacted] for investigation, [redacted] for design and [redacted] completions (% of Direct Job Costs)
Escalation methodology	A provision for escalation of the D&C cost estimate has been included. Annual escalation rate of [redacted] was adopted.
Forex	No allowance for Forex Hedging. Provision for some Forex is included in Risk. This is a notional provision and should be considered by TRANSGRID.
Bill of Quantities	Prepared by **fission** derived from the TRANSGRID information and commensurate with a Class 3 (AACE) estimate. To prepare the BoQ, **fission** relied on the drawing information provided in conjunction with the progress claim price schedule by SecureEnergy / TRANSGRID.

2. Scope assumption / battery limits / Interface Points	
Scope of works	Contractor scope encompasses Approvals, Design, Procurement, Construction and Commissioning up to Systems energisation.

3. Principal Costs	
Escalation	Not included
Property	As per TRANSGRID advice.
Sunk Costs	Included based on information provided by TRANSGRID.
TRANSGRID Costs (development / delivery / finalisation)	As per TRANSGRID advice.
Project Works Insurance	Assumed included in the D&C Contractors IJC provision. An additional [1%] has been included to account for anticipated increase under a newly procured Contractor Scenario.
Contract Project Management & Administration	As per TRANSGRID advice [increased to $5M/mth running cost]
Fringe Benefits Tax	Not included.

4. Risk assumption	
Contractor Risk	As per Unplanned Risk Registers attached. Refer **TRANSGRID PEC Pricing Schedule v00r07.**
Principal Risks	Deterministic @[redacted] based upon reference benchmark projects.

TOTC PRICE SUMMARY

fission have prepared a Class 3-4 (AACE) cost estimate to complete Project Energy Connect. Inclusive of **(a)** EPC cost estimate **(b)** TRANSGRID sunk costs to July 2023 **(c)** TRANSGRID owners' costs **(d)** TRANSGRID commercial position, the Total Out-turn Cost is summarised below.

Refer to attached Excel Workbook **PEC SEJV FFC Scenario Analysis v06** – Pricing Schedule for a breakdown of respective scope and cost elements.

	Description	Approved Budget	TRANSGRID cost to complete using SEJV under renegotiated Contract. Best Case	Most Likely	Worst Case	Comments	fission cost To complete (EPC based on 8/6/2023 report adjusted for July 2023 base date and TRANSGRID commercial position) fissions estimate @ 8 June 2023	Adjustments	fission estimate Adjusted @ 14 August 2023	fission comments @ 14 August 2023
SEJV EPC Contractor	Preliminaries and Overheads		[redacted]			As per the current EPC lump sum fixed price contract	[redacted]			IJC's reduced to Adjust to [redacted] of DJC (previously [redacted]) on basis that camp establishment is sunk and can be realised in this scenario.
	L1. SA Border to Buronga					As per the current EPC lump sum fixed price contract				Assumption that Tower Steel has been procured by SEJV and can be assigned to Transgrid at [redacted] original purchase price. fission had allowed [redacted] to peg. Revised price now [redacted] to peg.
	L2. Buronga to Dinawan					As per the current EPC lump sum fixed price contract				As above
	L4. Buronga to Red Cliffs					As per the current EPC lump sum fixed price contract				As above
	L5. Dinawan to Wagga Expansion (500kV)					As per the current EPC lump sum fixed price contract				As above
	S1a. Buronga Initial Works					As per the current EPC lump sum fixed price contract				fission first principles Class # 3 / #4 AACE estimate. Refer Report 8/6/2023.
	S1b. Buronga Balance of Works					As per the current EPC lump sum fixed price contract				
	S2. Dinawan (330kV)					As per the current EPC lump sum fixed price contract				fission first principles Class # 3 / #4 AACE estimate. Refer Report 8/6/2023.
	S3. Wagga Wagga (330kV)					As per the current EPC lump sum fixed price contract				fission first principles Class # 3 / #4 AACE estimate. Refer Report 8/6/2023.
	S4. Red Cliffs					As per the current EPC lump sum fixed price contract				
	SPC - Special protection, Communication & Balance of Works					As per the current EPC lump sum fixed price contract				fission first principles Class # 3 / #4 AACE estimate. Refer Report 8/6/2023.
	Original EPC Contract Sub-Total	**1,404,697,745**	**1,404,697,745**	**1,404,697,745**	**1,404,697,745**		**$ 2,607,315,961**	**-$ 221,441,077**	**$ 2,385,874,884**	
	Pre Agreed Variation (PAV1)	-	[redacted]			PAV1 include L5 and Omission L3 (500kV)	[redacted]			fission first principles Class # 3 / #4 AACE estimate. Refer Report 8/6/2023.
	Escalation	-				Agreed Variations and claims up to Jun 2023 (including PAV4 - delete Red Cliffs)				
	Sunk Cost	-				Agreed Variations and claims up to Jun 2023 (including PAV4 - delete Red Cliffs)				Incorporates SEJV July Progress Claim.
	Agreed Variations & Claims	-				Agreed Variations and claims up to Jun 2023 (including PAV4 - delete Red Cliffs)				Incorporates SEJV July Progress Claim.
	Revised EPC Contract Sub-Total	**1,404,697,745**	**1,525,189,464**	**1,525,189,464**	**1,525,189,464**		**$ 3,115,887,685**	**-$ 143,438,077**	**$ 2,972,449,609**	
	Commitment Deed Extension Costs	-	[redacted]			Committed and Spent	[redacted]			Adjusted to match TG Worst Case value, as anticipate new Contractor would reprice all Prov Items.
	Provisional Sums	[redacted]				BC = [redacted] of remaining PS, ML = [redacted] Sums				Worst Case pain subject to risk item below "SecureEnergy Contract Termination Fee"
	[redacted]	-				Latest Group A analysis - current claims with entitlement				
	EPC Contractor Gap Analysis Scenario A	-				Based on gap analysis findings				Incorparted in estimate above
	Risk / Contingency provision on EPC Contractor Gap Analsysis, [redacted] Provisional Sums, Commitment Deeds.					Allow [redacted]				D&C contractor P90 Contingecy. P90 adopted for Cost Plan purpose. Refer to Quantitative Risk Model.
	Risk Assumption 8(i) is not realised					Best Case assumption correct; most likely some minor residual claim say [redacted] of the [redacted]; worst case [redacted] of the [redacted]				Not applicable under this scenario.
	[redacted]	-				Likely is [redacted] on remaining SEJV works & [redacted] [redacted]				Incorporated in Transgrid Contingency below.
	EPC Contract Final Forecast Cost Sub-Total	**1,425,297,745**	[redacted]				[redacted]			
Transgrid Owners Costs	Commissioning labour		[redacted]			BC = current forecast (CF) plus [redacted] network planning, ML = CF plus [redacted] network planning				As per TG cost advice.
	Internetwork testing					BC = current budget, ML = current forecast				As per TG cost advice.
	Property & EIS Approvals					As per latest property tracker				As per TG cost advice.
	Project Management & Administration					Based on Galvanised Programme dates [redacted]				Based on TG run rate [redacted]
	Biodiversity Offset					Transgrid administering this item seperately. [redacted] Transgrid				As per TG cost advice.
	Contingency					forecast spend to complete [redacted]. Contingency when considered in parallel with above PM provisions considered reasonable.				Based on reference benchmarks of [redacted] from [2] recent Transmission Projects (NSW and Queensland].
	Sub-Total	**534,076,738**	[redacted]							
	TOTAL	**1,959,374,483**	**2,922,030,393**	**3,301,861,796**	**3,728,757,190**					
Transgrid Commercial Costs	SecureEnergy Contract Termination Fee									TG advise Elecnor has issued [redacted] in claims incl hyper escalation. Take-up [redacted] as likely they will purse these vigorously.
	Novation Risk / Costs of existing Contracts									Based on [redacted] uplift on Subcontract rates as there will be commercial variance which suppliers will claim.
	Procurement of new contract									2 ECI's at [redacted] for each contractor
	Transaction Advisor Fee									Transaction Advisor [redacted]
	Legal Advisor and draft new Contract									
	Margin Premium									
	12 Month procurement delay finishing Sep 27									
	PI continuity insurance									
	Owners Risk Contingency - Interim Site Management									[redacted] Provision to manage the alignment during new Contract procurement.
	Sub-Total	**-**	**-**	**-**	**-**					
	TOTAL OUT-TURN COST	**1,959,374,483**	**2,922,030,393**	**3,301,861,796**	**3,728,757,190**					