ISP Transmission Cost Consultation Webinar 10 June 2021

Facilitator: Oliver Derum, ISP Stakeholder Engagement Lead

Presenters: Natasha Sinclair, Principal - ISP Energy Systems Lead

Chris du Plessis, Senior Engineer – System Planning

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.
We pay our respects to their Elders past, present and emerging.

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Introduction

- Introductions – speakers and panel
- Today's session will be recorded and published on our website
- We will be using Slido to facilitate questions:

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Agenda

1.	Introduction	(5 mins)
2.	Purpose & background	(10 mins)
3.	Draft Transmission Cost Report Overview	(15 mins)
4.	Review of TNSP estimates	(10 mins)
5.	Q&A session 1	(30 mins)
6.	Transmission Cost Database	(20 mins)
7.	Q&A session 2	(25 mins)
8.	Next steps	(5 mins)

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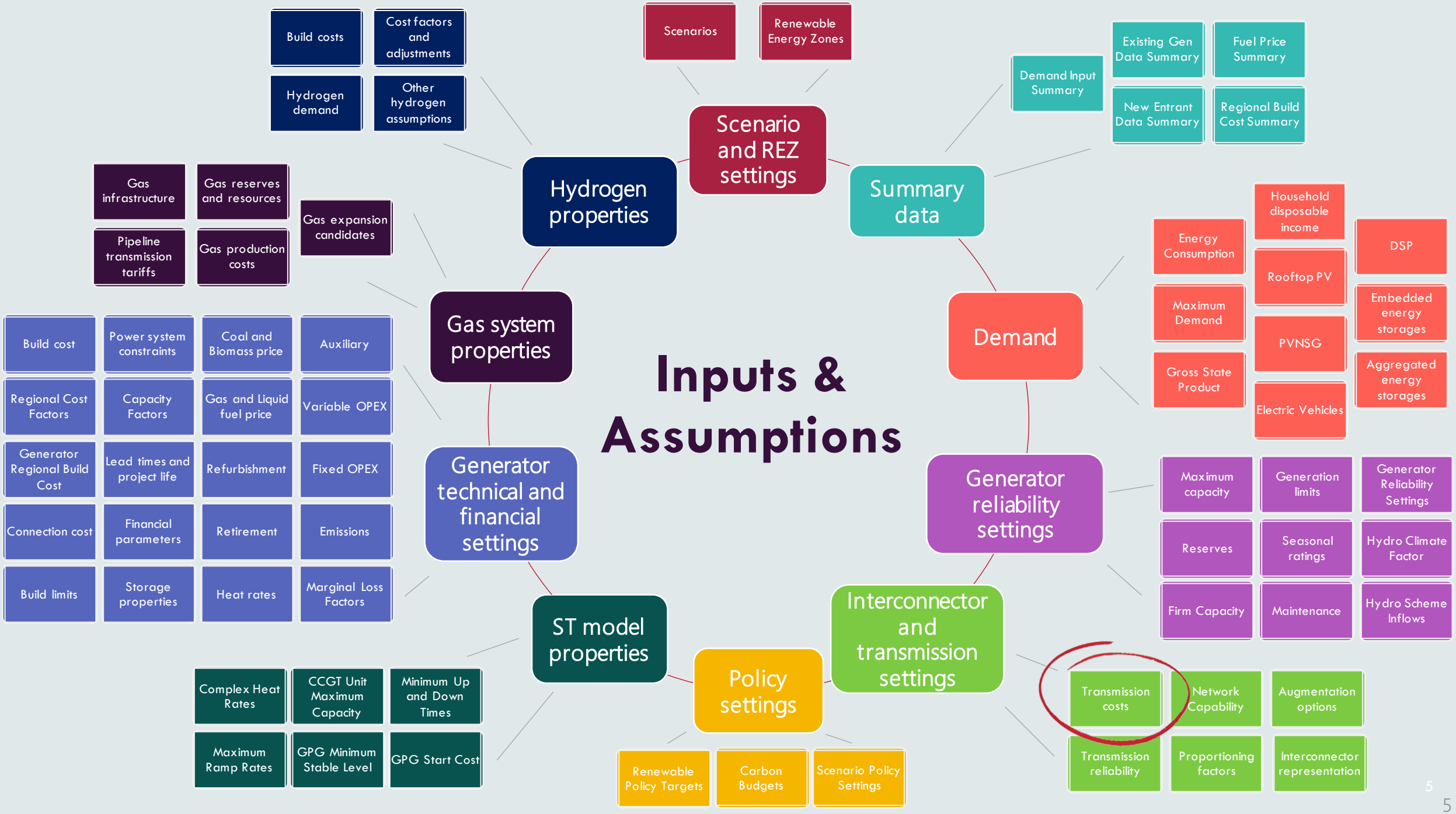
Inputs & Assumptions



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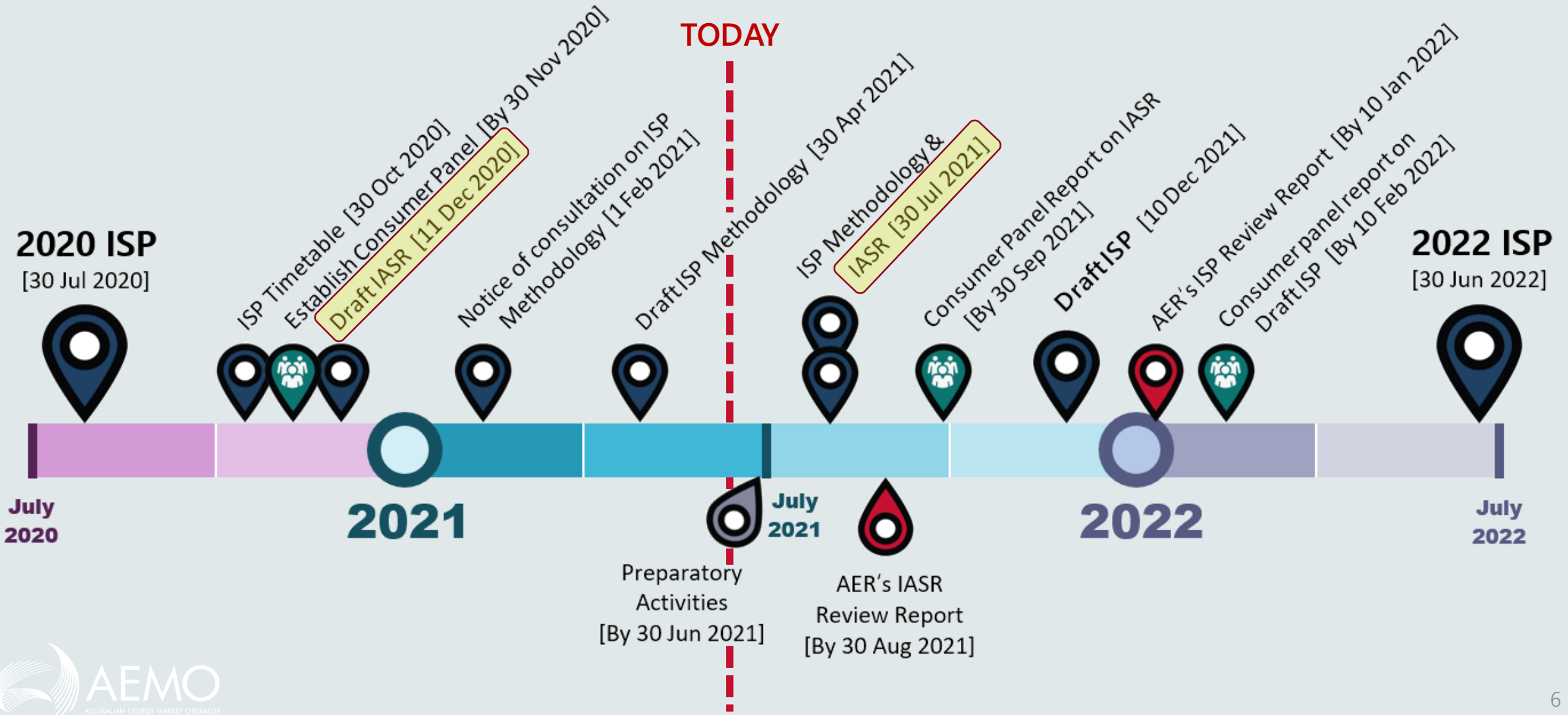
2022 ISP Timeline



Background

Transmission projects in the ISP

Committed and anticipated transmission projects	Project is assumed in the ISP as part of the future network, so costs are not estimated.
RIT-T projects (transmission)	AEMO adopts TNSP estimates from transmission projects undergoing RIT-Ts.
Future ISP projects with preparatory activities	AEMO requested TNSPs to estimate costs for some projects from the 2020 ISP.
AEMO estimates	AEMO estimates costs using Transmission Cost Database for projects where TNSP estimates are not available.

Transmission Cost Report – Overview

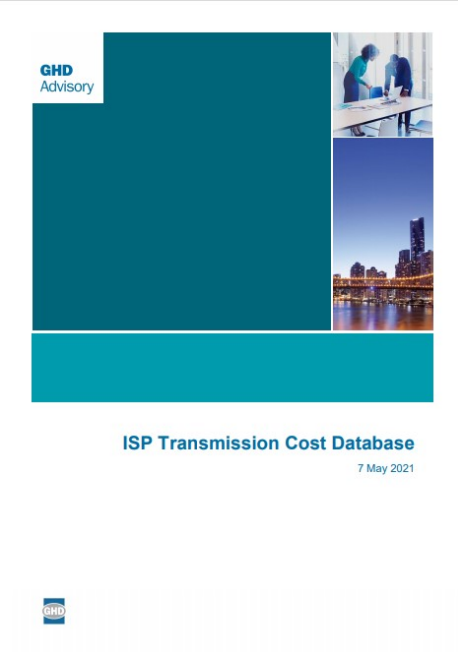
Purpose of report

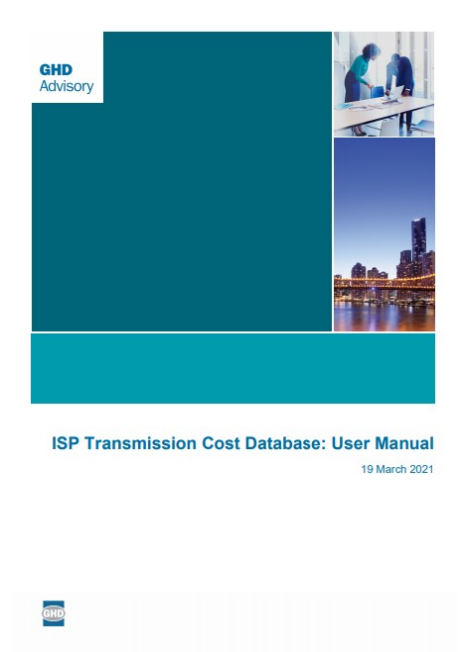
This *Draft Transmission Cost Report* forms part of the 2021 *Inputs, Assumptions and Scenarios Report* (IASR)

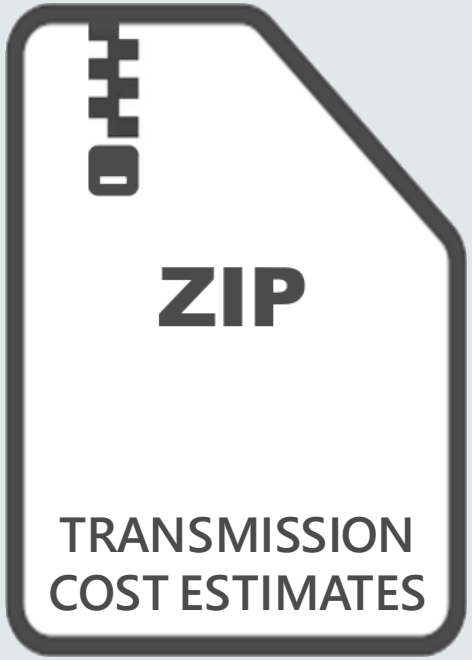
It presents a summary of the design, capacity and cost estimate for candidate transmission projects for the 2022 ISP.

It describes and seeks feedback on AEMO's proposed approach to transmission cost estimation for the 2022 ISP.

Summary of documentation







Link: Consultation web page

Summary of report

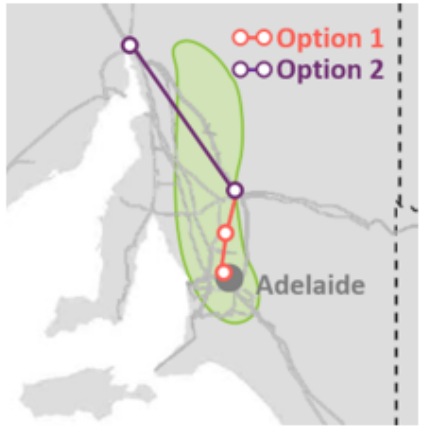
- Methodology
  - Cost estimate stages and risk approach – presented at April webinar
  - Transmission Cost Database – development and structure
  - Review of TNSP estimates – presented today
- Project data:
  - Augmentation options
  - Network capacity
  - Project cost
- Generator connections

4.4.3 Mid-North SA (S3)

Summary

The Mid–North SA REZ has moderate quality wind and solar resources. There are several major wind farms in service in this REZ, totalling > 950 MW installed capacity.

Four 275 kV parallel circuits provide the bulk transmission along the corridor from Davenport to near Adelaide (Para) which traverse this REZ. This transmission corridor forms the backbone for exporting power from REZs north and west of this REZ in South Australia.



Existing network capability

This REZ can accommodate approximately 1,000 MW of additional generation along the 275 kV corridor. However, due to the network configuration, any generation north and west of this REZ also contributes to this 1,000 MW limit. For this reason, an aggregate limit for South Australia of 1,000 MW applies to S3, S4, S5, S6, S7, S8 and S9 (see MN1 Group Constraint in Section 4.4.10).

Augmentation options

Description	Additional network capacity (MW)	Expected cost ($ million)	Cost classification	Lead time
Option 1 • 275 kV double-circuit lines between Robertstown, Templers West and Para.	1,000†	270	Class 5 (±30%)	Long
Option 2 • 275 kV double-circuit lines between Davenport and Robertstown.	1,000	540	Class 5 (±30%)	Long

Adjustment factors and risk

Option	Adjustment factors applied	Known and unknown risks applied
Option 1	• Delivery timetable: Long • Land use: Grazing • Project network element size: 10-100 km, no. of bays 11-15 • Proportion of environmentally sensitive areas: 0% • Location (regional/distance factors): Regional • Terrain: Flat/farmland (except Para to Templers West which is Hilly/undulating)	• Known risks: BAU • Unknown risks: Class 5
Option 2	• Delivery timetable: Long • Land use: Grazing • Project network element size: Above 200 km, no. of bays 1-5 • Proportion of environmentally sensitive areas: 0% • Location (regional/distance factors): Remote • Terrain: Flat/farmland	• Known risks: BAU • Unknown risks: Class 5

† Additional network hosting capacity is South of Robertstown towards Adelaide. This option does not alleviate the MN1_SA group constraint.

Review of TNSP estimates

The objectives of this engagement are as follows:

- Improve transparency of how TNSPs develop estimates for ISP projects, including the different stages of cost estimation, inclusion of risk allowances, and accuracy that is achieved at each stage.
- Develop a common definition of work required to meet each estimate class for transmission projects.
- Develop a process to align TNSP estimates and enable a consistent approach for inclusion of risk.

TNSP Estimate Review Process

1. Classification and preliminary screening of estimates

- TNSP provides checklist responses for each project option.
- AEMO approximates the class of the estimate and reviews unknown risk allocations.
- AEMO works with TNSP to resolve any missing components or risk allocation discrepancies.

2. Review of cost estimates

- TNSP provides estimate for each project option.
- AEMO independently estimates cost with Transmission Cost Database.
- AEMO compares estimates and works with TNSP to resolve significant differences.
- TNSP reviews and updates cost estimate where appropriate.

3. Final alignment of cost estimates

- AEMO carries out final review of updated TNSP estimate.
- Where sufficient information has not been provided to AEMO, or where missing or insufficient allowance has been made for cost components or risk, AEMO may add an offset to the TNSP estimate.

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TNSP Project Checklist

	Class 5	Class 4	Class 3	Class 2/1
Scope of Works - line, station, cable				
Voltage defined?	Yes	Yes	Yes	Yes
Rating (MVA, MW, MVAr) defined?	Yes	Yes	Yes	Yes
Conductors specified?	Yes	Yes	Yes	Yes
Connection locations (substation, terminal station, converter) defined?	Yes	Yes	Yes	Yes
Which option best describes the maturity of the routing?	Preliminary Corridor	High Level Route	Detailed Route	Detailed Route
Has gas network avoidance measures been included?	No	No	Yes	Yes
Which option best describes the consideration of national parks?	None	High Level	Detailed	Detailed
Which option best describes the consideration of cultural heritage?	High Level	High Level	Detailed	Detailed
Which option best describes the consideration of environmentally sensitive areas?	High Level	High Level	Detailed	Detailed
Underground lines defined?	No	No	Yes	Yes
Which option best describes the maturity of the design?	Concept/High Level	Preliminary	Detailed/Complete	Detailed/Complete
Which option best describes the documentation prepared?	Conceptual Single Line Diagram	Detailed Single Diagram	For Construction/Civil Diagrams	For Construction/Civil Diagrams
Level of site investigation for stations/substations/converters/terminal stations?	Desktop	Desktop	Preliminary Site Investigation	Detailed Investigation
Has site remoteness been incorporated into the scope of works?	Yes	Yes	Yes	Yes
Which option best describes the georaphical location of any stations/substations include	Assumed	General Area Defined	Actual Location Defined	Actual Location Defined
Which option best describes the tower design progress?	Assumption Based	Preliminary Design	Final Design	Final Design
Sites				
Are there any environmental offsets included based on past experience?	Yes	Yes	Yes	Yes
Strategy/approach developed to refine environmental offsets complete?	Yes	Yes	Yes	Yes
Are outage restrictions (specific to line diversions and cut ins) considered?	No	No	Yes	Yes
Which option best describes the consideration of brownfield works across the project?	None	Indicative	Indicative	Detailed/Complete
Terrain assessment	Desktop	Detailed	Detailed	Detailed
Which option best describes the current level of engagement with landowners?	None	None	Community Level	Land Owner Level
Project Management and Delivery				
Which option best describes the level of geotech assessment?	None	None	Desktop Assessment	Detailed Assessment
Which option best describes the source of cost estimate for equipment and construction	Previous Projects	Single In-house Price	Multiple Quotes	Fixed Contract
Which option best describes the identification and assessment of risk progress?	Concept/High Level	Preliminary	Preliminary	Detailed/Complete
Has macroeconomic influence been factored into the assessment of risk?	Yes	Yes	Yes	Yes

Stakeholder Q&A

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- Do you have questions on the methodology used for cost estimation or the review of TNSP estimates?
- Is the level of option description, capacity and cost data presented suitable?
- What else can AEMO do to improve the transparency of transmission cost estimation in the ISP?
- Any other questions?

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Transmission Cost Database

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Development of the database

Structure – 2 Excel files:

- Cost and risk data workbook
- Cost estimation tool

Development:

- Developed by GHD with input from AEMO, TNSPs and the AER.
- Cost data from completed projects and calibrated against recent advanced projects.

Intended Users:

- The database has been built for AEMO use. It is shared for transparency, and may be used by any individual with sufficient knowledge of transmission design and project estimation.

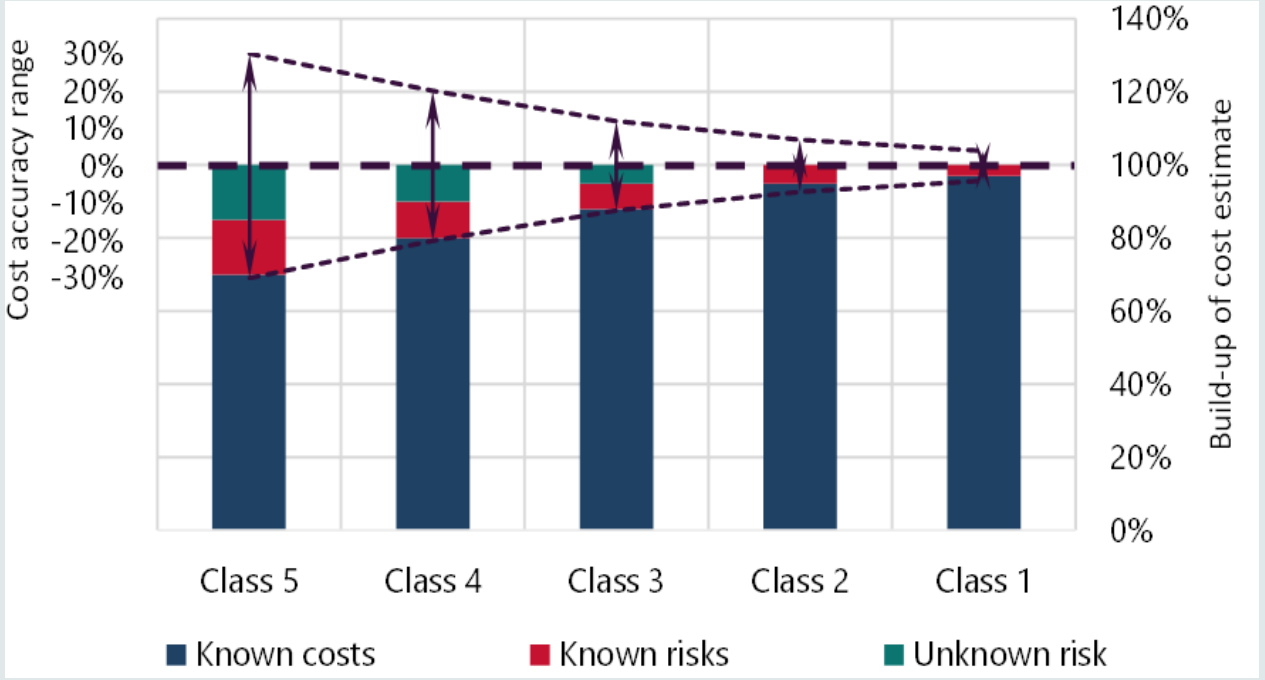
Ongoing updates:

- Intended to be reviewed approximately every two years.

Building up a cost estimate

- Develop **baseline** estimate using building blocks (e.g. $/km of transmission line).
- **Adjustment of baseline** estimate to account for defined scope (e.g. brownfield, geography, etc.).

- **Known Risks allowance** – where risks are identified but not quantified.
- **Unknown Risks allowance** – for risks that are not yet identified.
- **Indirect costs –** other factors such as insurance, corporate overhead and stakeholder engagement.

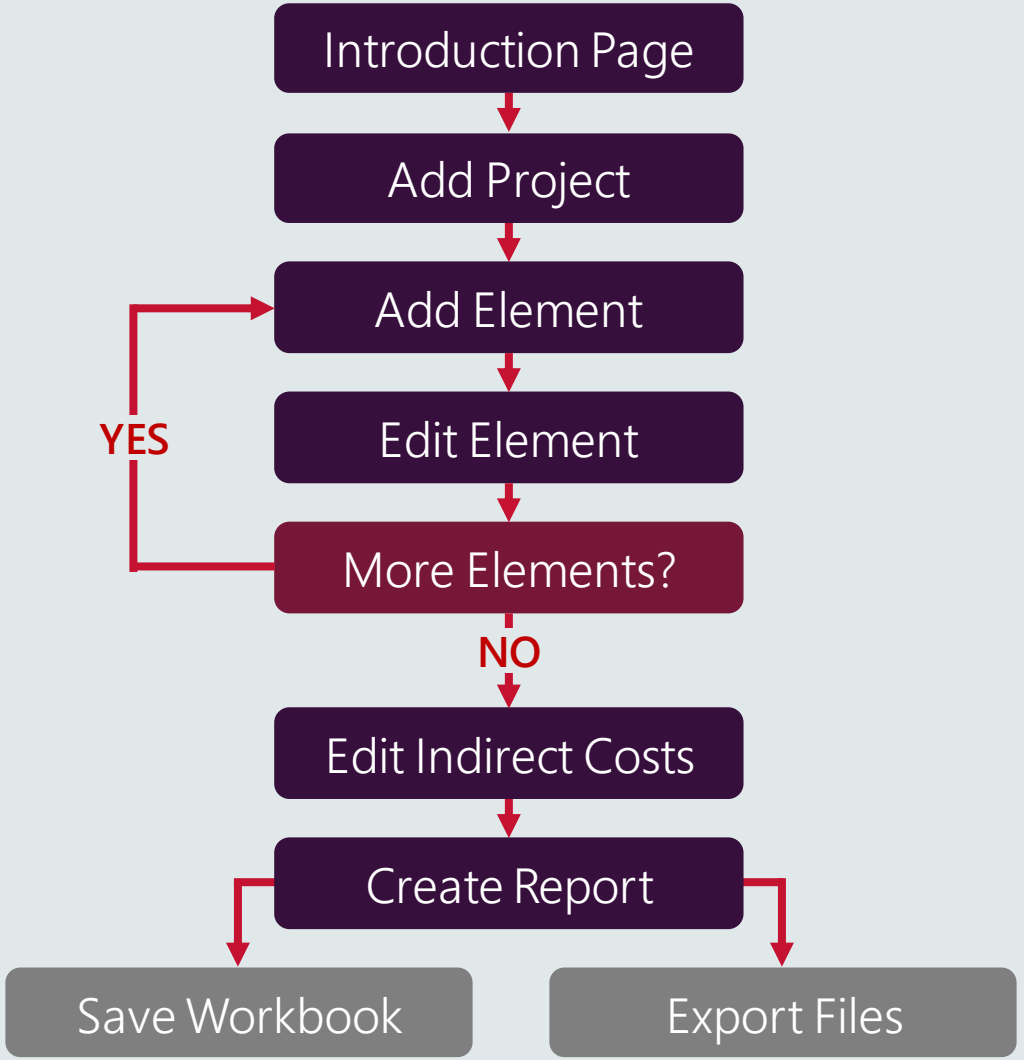


$$Adjusted\ baseline_{\$} = \sum base_{\$} * factors_{\%}$$

$$Total\ Expected\ Project\ Cost_{\$} = \sum Adjusted\ baseline_{\$} * [Risk_{known,\%}, Risk_{unknown,\%}] + Indirect\ Costs$$

Preparation and Use of the Database

- Prior to using the database, the user defines the scope of the network project.
- Network elements are grouped into the following areas:
  - Station
  - Overhead line
  - Underground cable



Live demo

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Stakeholder Q&A

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- Do you have any questions about the transmission cost database?
- Are there any aspects of the database that need further clarification?
- Any other questions?

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Next Steps

Consultation Timeline