Project EnergyConnect Update

Stakeholder Webinar

20 August 2020

ElectraNet TransGrid

ProjectEnergyConnect.com.au

Webinar Outline

Agenda item	Lead	Organisation	Time
1. Welcome and context	Rainer Korte	ElectraNet	10 min
2. Project EnergyConnect in the 2020 Integrated System Plan	Craig Price	AEMO	10 min
3. Updated cost benefit analysis	Brad Harrison	ElectraNet	20 min
4. Developing capital expenditure forecasts	Chris Swann Ralf Ricciardi	TransGrid ElectraNet	10 min
5. Q&A	Rainer Korte	ElectraNet	30 min
6. Conclusion and next steps	Rainer Korte	ElectraNet	10 min

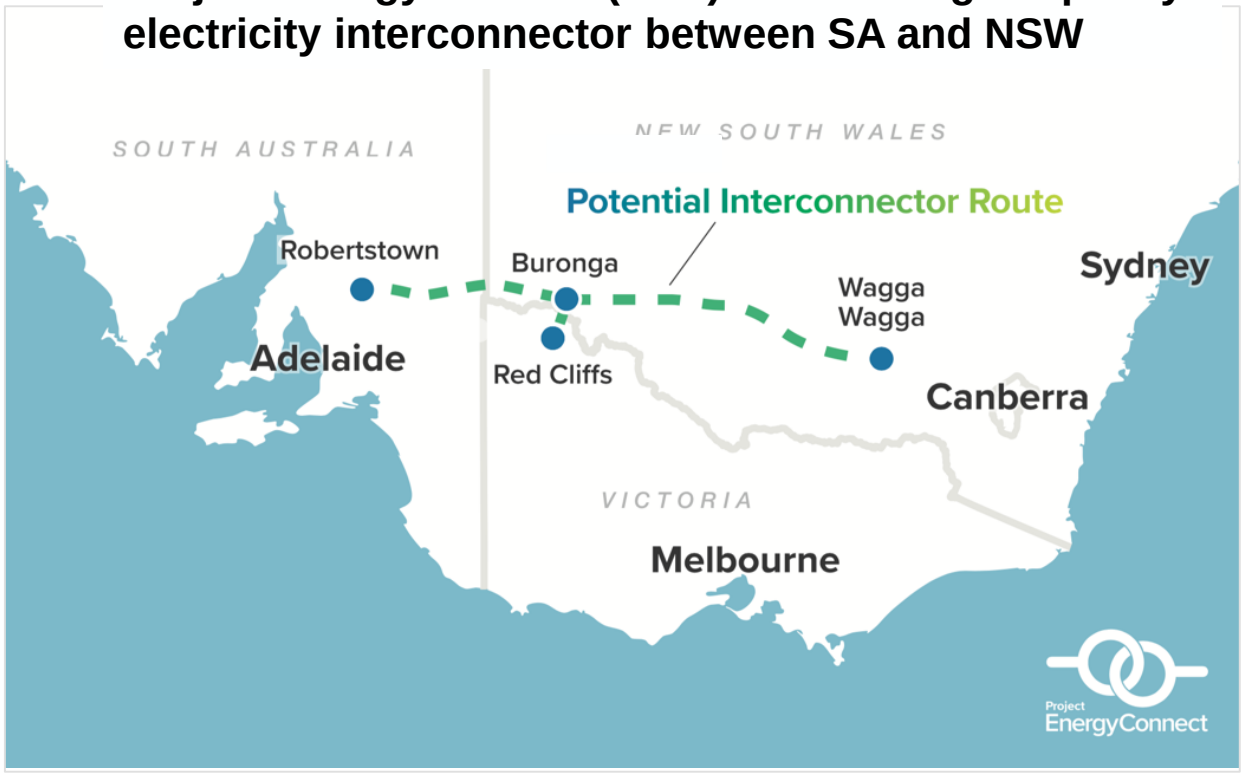
Context

Rainer Korte
Group Executive Asset Management
ElectraNet

What you will hear about today

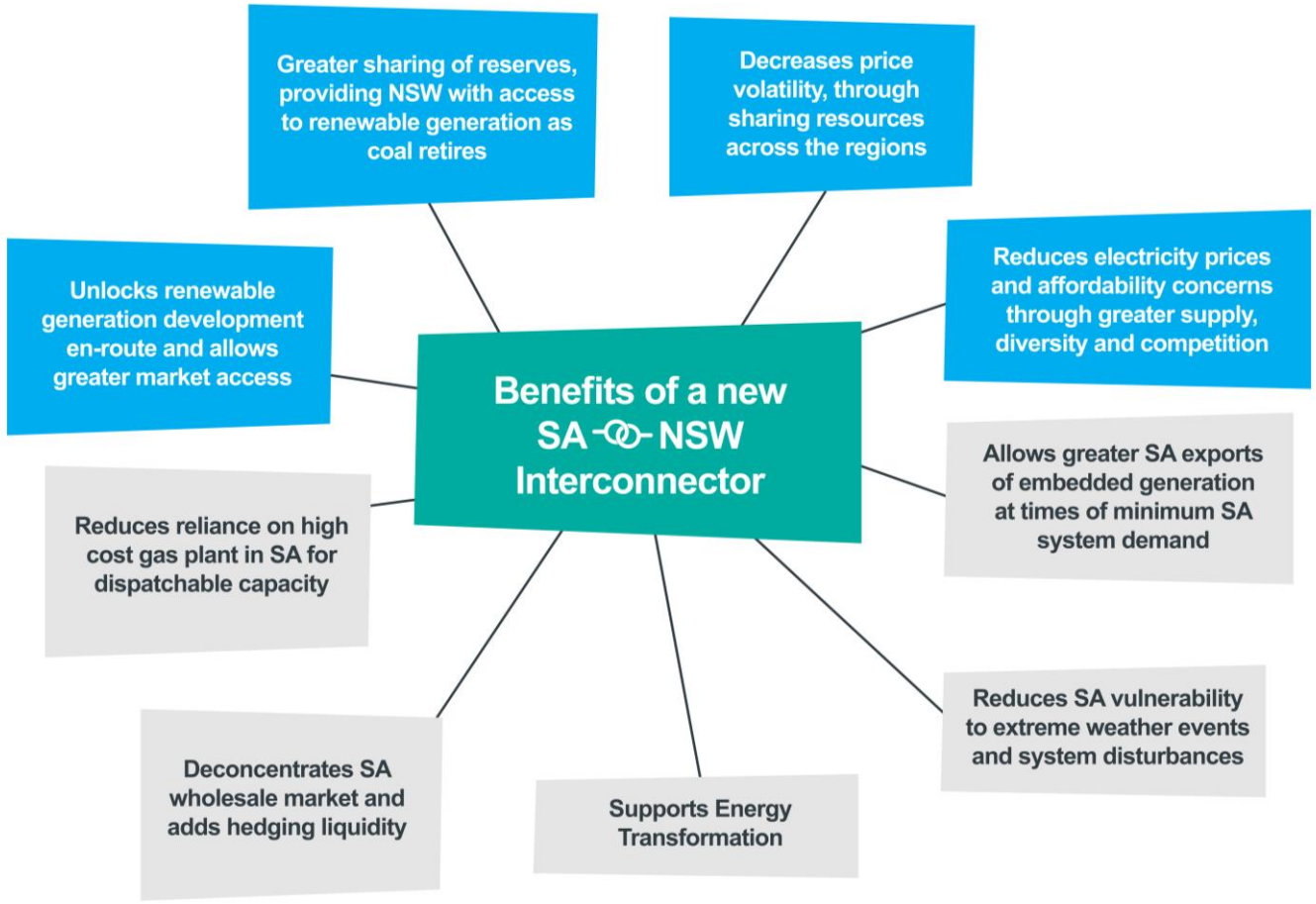
- Changes to PEC costs and benefits
- Why PEC is included in each of the AEMO Final 2020 Integrated System Plan (ISP) future scenarios and development paths
- Draft results of updated cost benefit analysis aligned to the 2020 ISP
- Additional risks and benefits addressed by PEC
- What we are doing to drive the lowest project delivery cost for customers

Project EnergyConnect (PEC) is a new high capacity electricity interconnector between SA and NSW



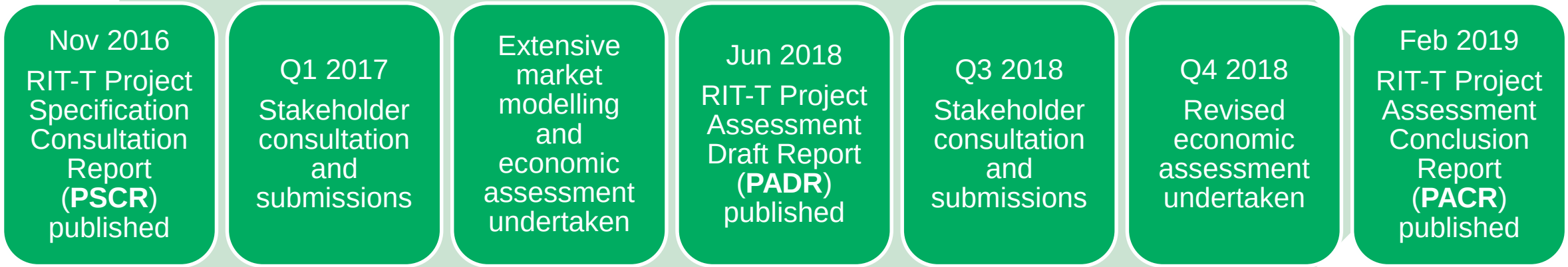
Benefits of Project EnergyConnect

- PEC is a central part of AEMO's roadmap in the ISP for the transition of the power system and is expected to deliver benefits across the NEM – this is reinforced by the RIT-T modelling
- For NSW customers, the interconnector improves diversity of supply and access to cheaper renewable energy sources as the coal fleet progressively retires – it also unlocks significant renewable energy development along the route
- For SA customers, the interconnector provides access to additional capacity when needed to replace expensive gas generation and improves the resilience and security of the power system
- Previous price impact modelling indicated price reductions are expected in both regions which outweigh the additional transmission costs to customers by a factor of 6 – 7 times or more



Background: Project economic assessment (the RIT-T)

The RIT-T* considered options to reduce the cost of secure and reliable electricity while facilitating NEM-wide transition to renewable energy

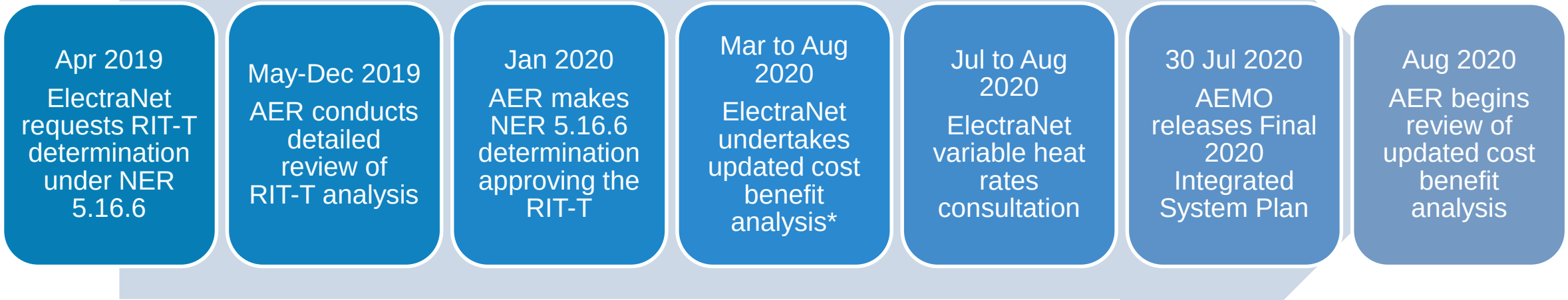


Customer and Stakeholder Engagement

* The Regulatory Investment Test for Transmission (RIT-T) is the economic cost benefit test overseen by the Australian Energy Regulatory (AER) and applies to all major network investments in the National Electricity Market (NEM)

Background: Post RIT-T economic assessment

In January 2020, the AER approved the RIT-T noting that “any significant changes to the costs of the preferred option could have a material impact on the outcome of the RIT-T”



Customer and Stakeholder Engagement

* The purpose of the updated cost benefit analysis is to investigate whether there has been a “material change of circumstances”, considering new information on both costs and benefits aligned with AEMO’s Final 2020 ISP

Variable heat rates stakeholder consultation

What we heard	How we are responding
General acceptance of variable heat rates, with some minor refinements and caution over ‘finessing’	We will apply variable heat rates as a more accurate representation of generator operating costs
Concerns over the economic case for the project given the changes in costs and benefits	We are undertaking an updated cost benefit analysis to examine whether a “material change in circumstances” has occurred, to be published and submitted to the AER for confirmation
Concern over the imbalance of benefits and costs between NSW and SA	AEMO’s 2020 ISP shows NEM-wide benefits. TransGrid is also securing updated information on NSW benefits.
EnergyQuest gas forecast advice should be released	We have applied the AEMO 2020 ISP gas price forecasts but will publish a summary of the EnergyQuest report
Analysis underlying AEMO’s 2-unit synchronous generator requirement should be published	Further information on the 2-unit requirement was released in the 2020 ISP, and a separate report has been published by AEMO with the latest information on SA system security risks
Proposed route through Dinawan does not address Darlington Point constraints	A separate RIT-T has been initiated by TransGrid to address the Darlington Point constraints – there is no material impact from the Dinawan route refinement on the current RIT-T

Project EnergyConnect and the 2020 Integrated System Plan

Craig Price
Group Manager System Planning
AEMO

ElectraNet TransGrid

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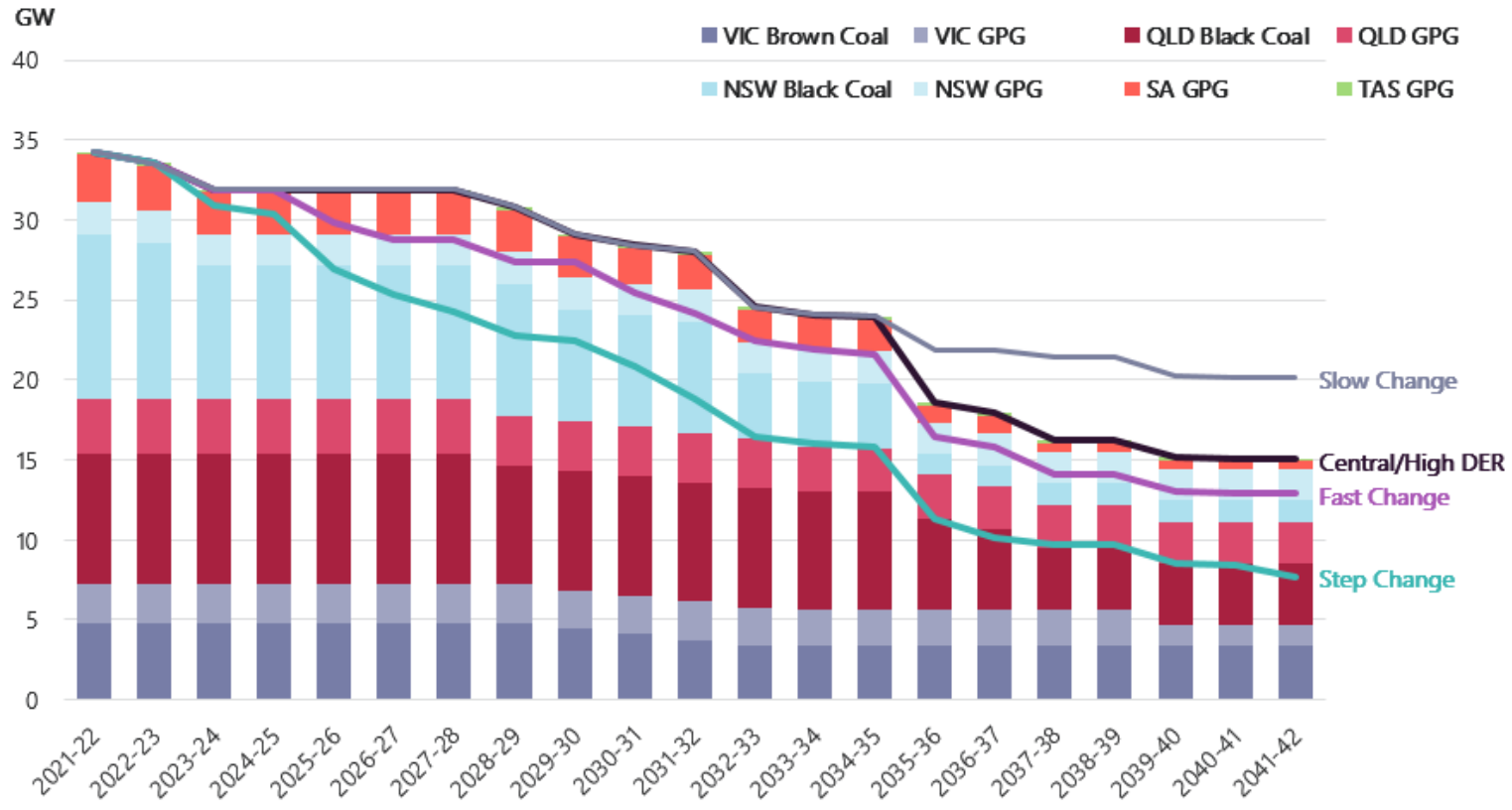
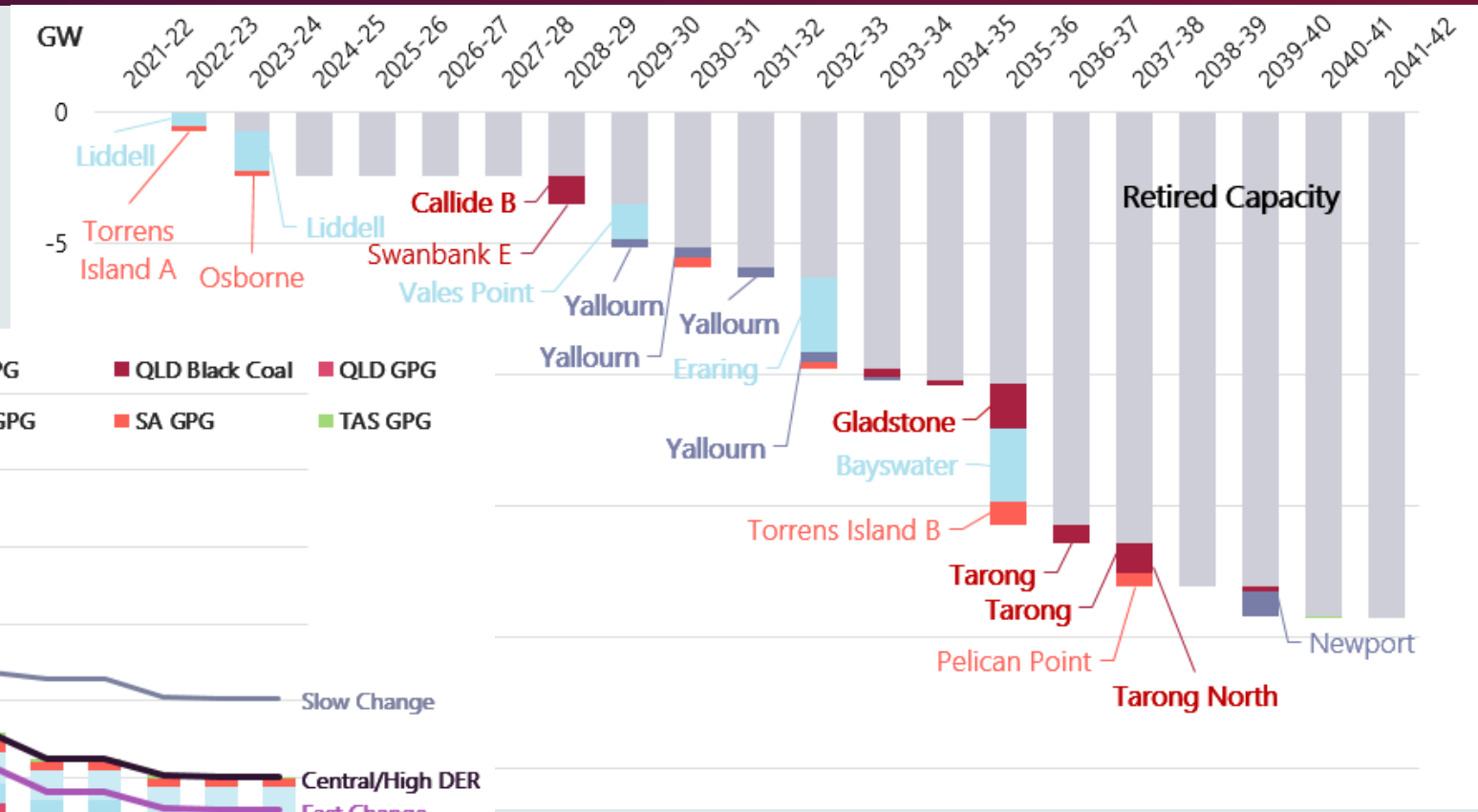
2020 ISP

Outline

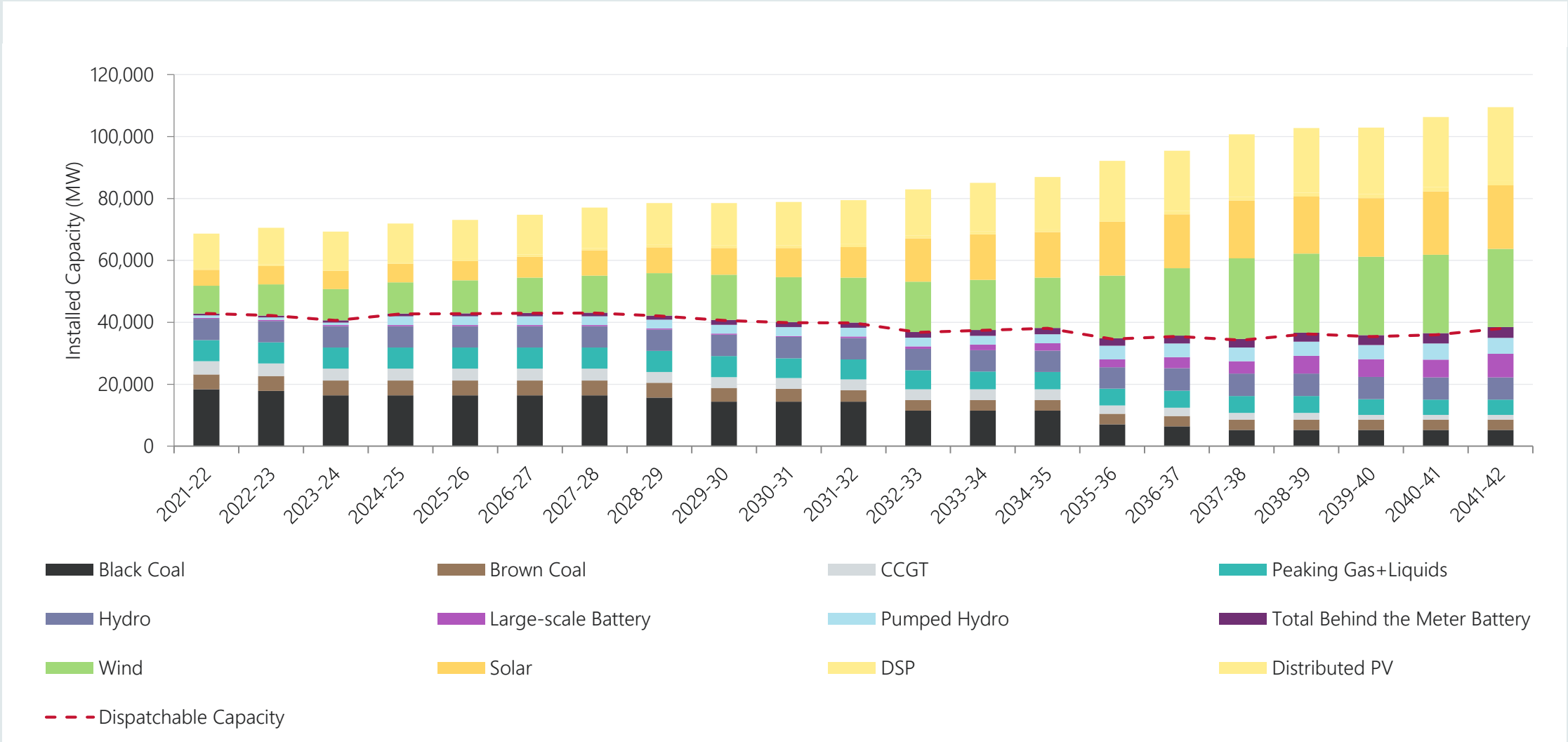
August 2020

Power station closures

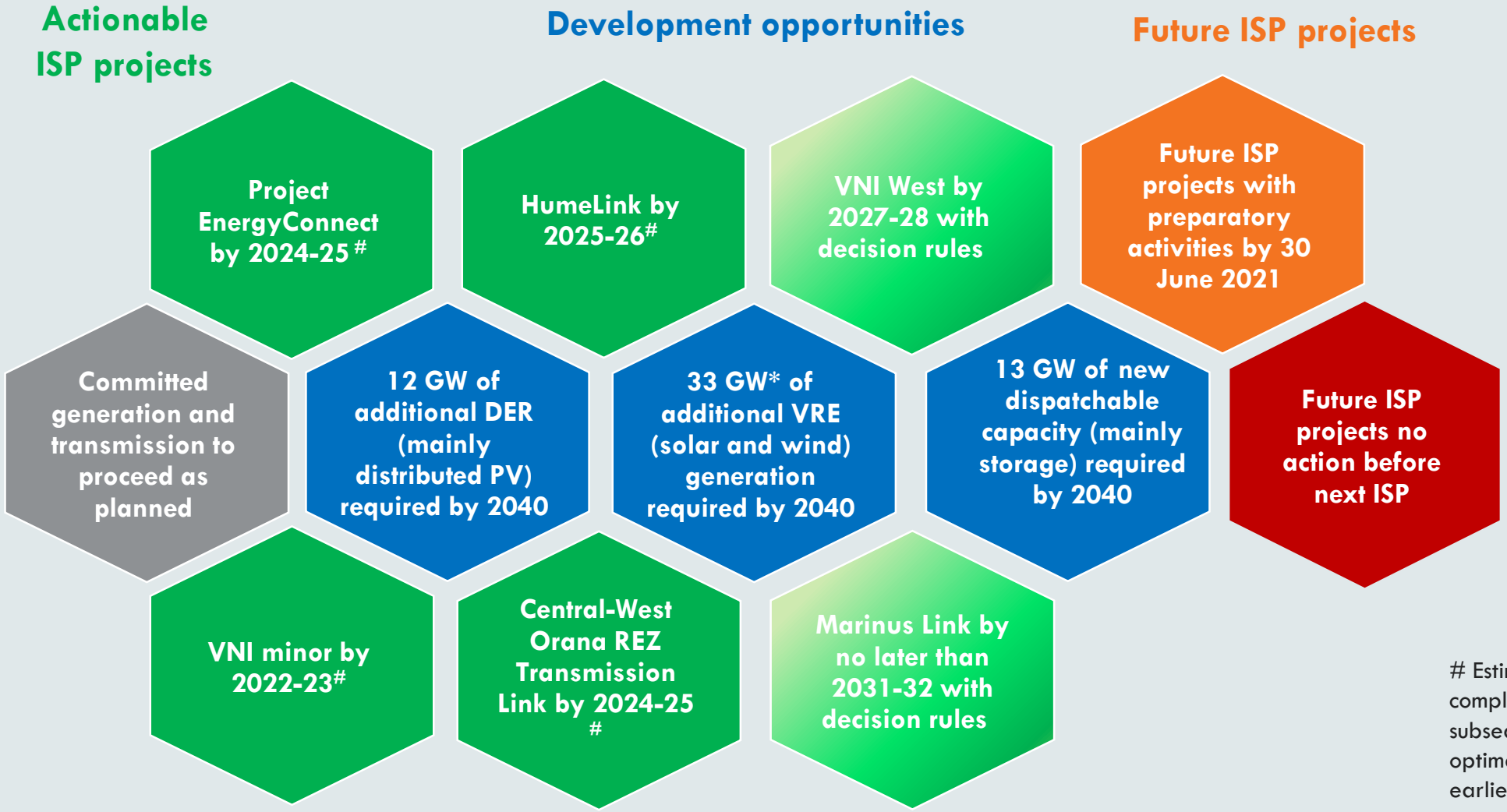




Across the NEM – Coal is replaced by VRE and DER...supported by firming resources (mostly storage, GPG operation)



The optimal development path (ODP) under Central scenario

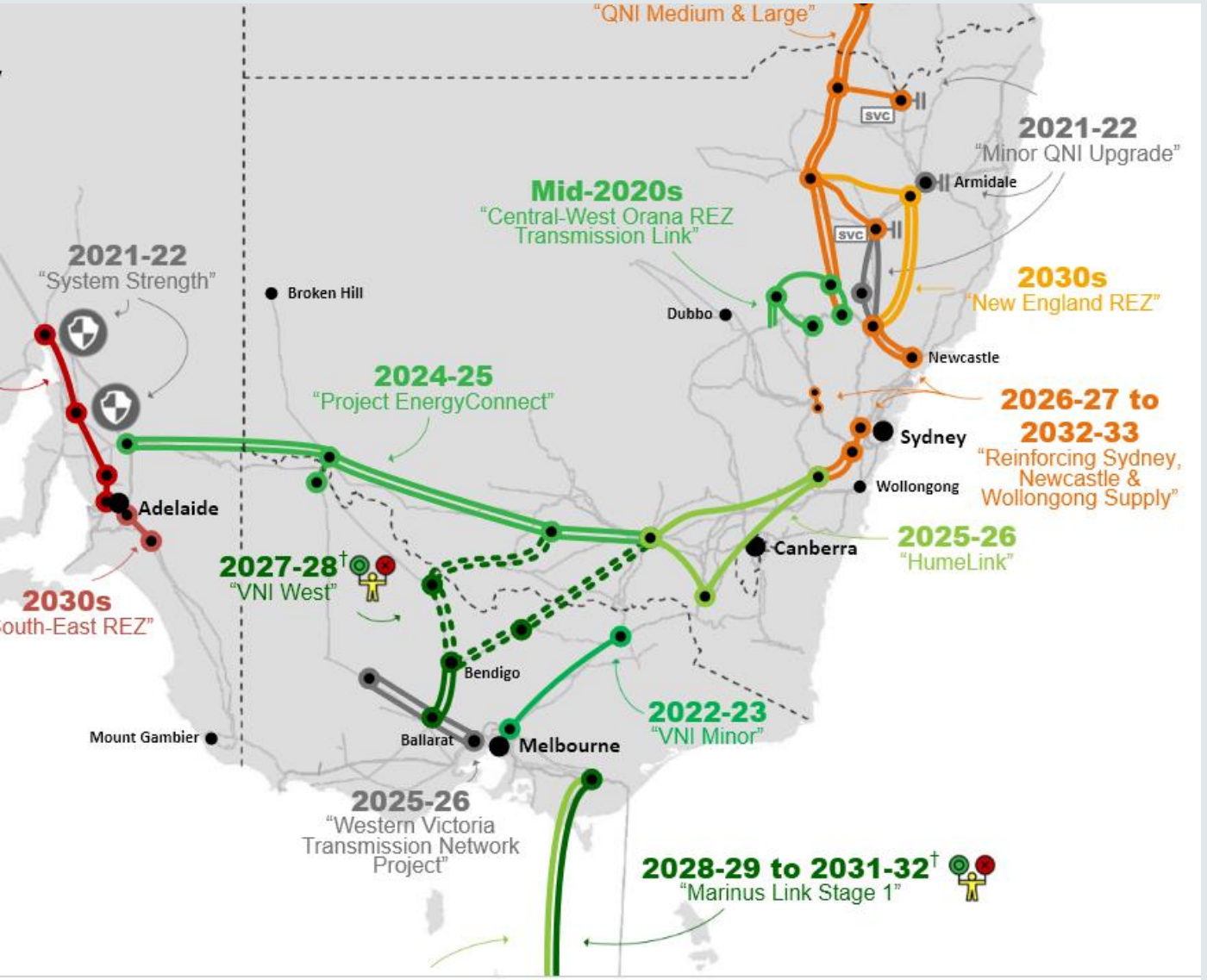


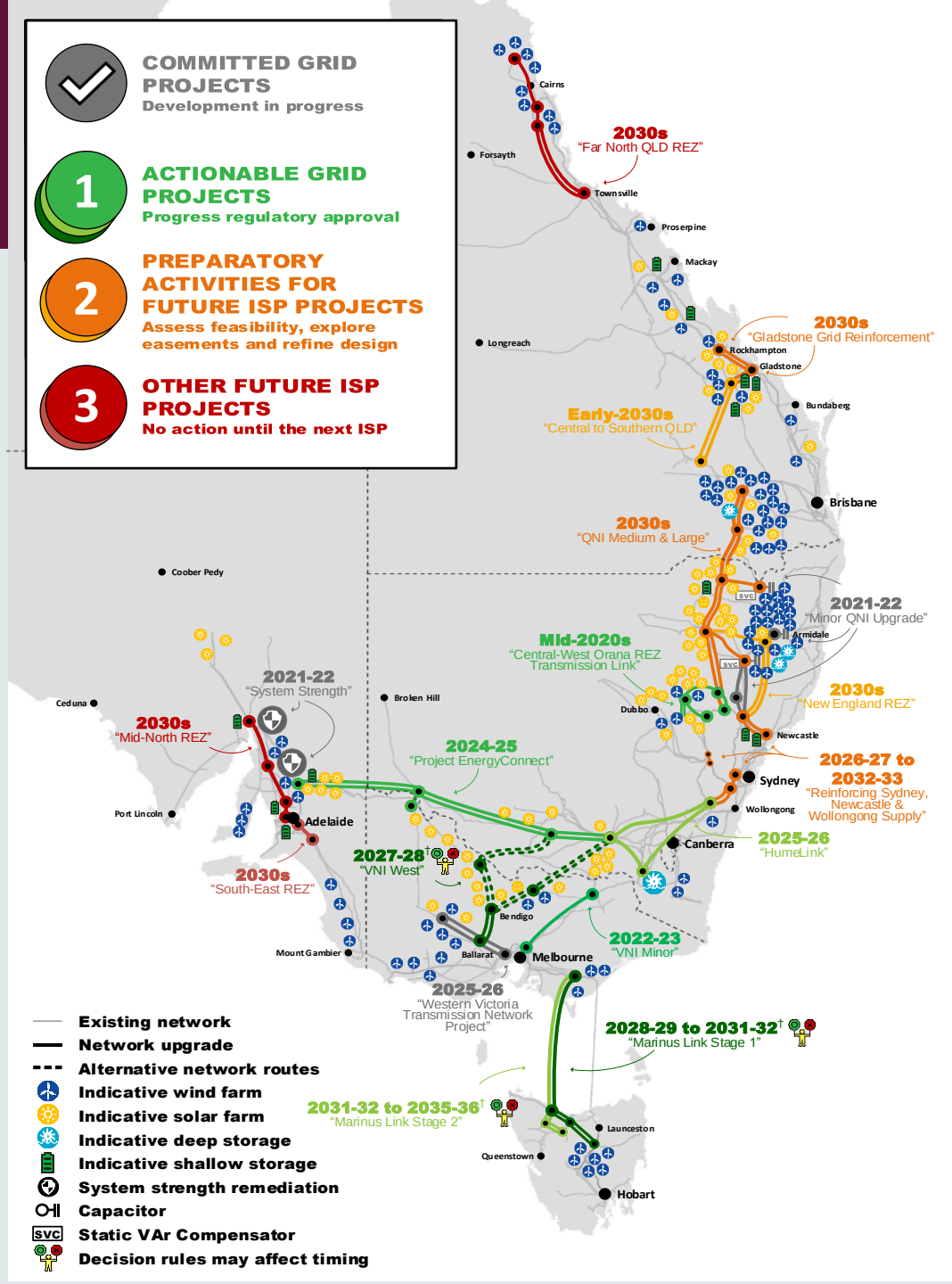
*Regional VRE split:

- 11 GW QLD
- 12 GW NSW
- 6 GW VIC
- 3 GW SA
- 1 GW TAS

Estimated practical completion including any subsequent testing, project is optimal if can be delivered earlier

Optimal development path





Emerging system security risks

- AEMO report "Minimum Operational Demand Thresholds in South Australia" (April 2020) identifies new emerging system security risks due to continuing growth in distributed PV and falling minimum demand levels
- Security risks are forecast to keep growing year on year until solutions are implemented
- AEMO report recommends Project EnergyConnect proceed as an "essential foundational measure" to address these risks
- The project would reduce the likelihood of SA "islanding" from the NEM and alleviate the most challenging of the system security issues identified by AEMO

Updated Cost Benefit Analysis (CBA)

Brad Harrison
Power System Planning Manager
ElectraNet

Project EnergyConnect

ElectraNet TransGrid

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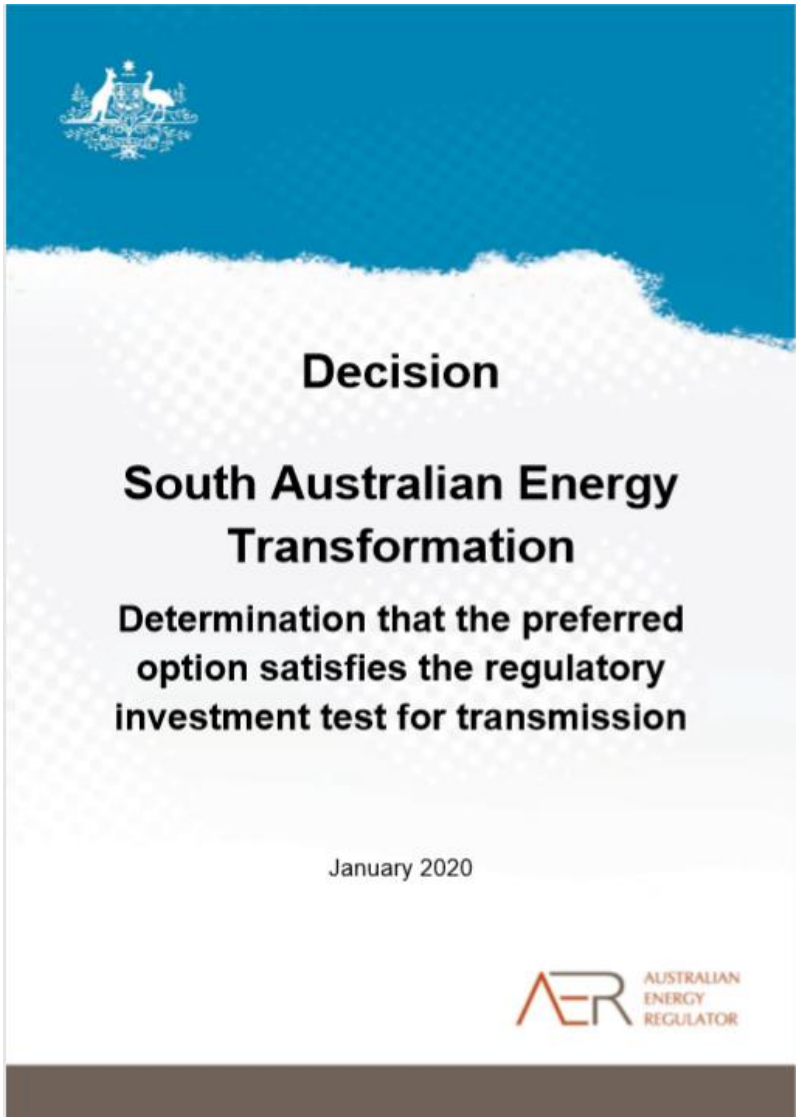
Contents

- AER RIT-T Determination
- Updates since the RIT-T Determination
- SA system security risks
- Indicative results
- Additional considerations

AER RIT-T Determination

- The AER approved the RIT-T, finding the business case to be “robust”
- The AER determined that the proposed interconnector remained the most “credible option that maximises the net economic benefit”
- It also noted that any significant change to the cost of the preferred option could have a material impact on the RIT-T outcome
- Our updated cost benefit analysis examines whether changes to inputs and assumptions aligned with the 2020 ISP would change the RIT-T outcome, using the same methodology reviewed and approved by the AER

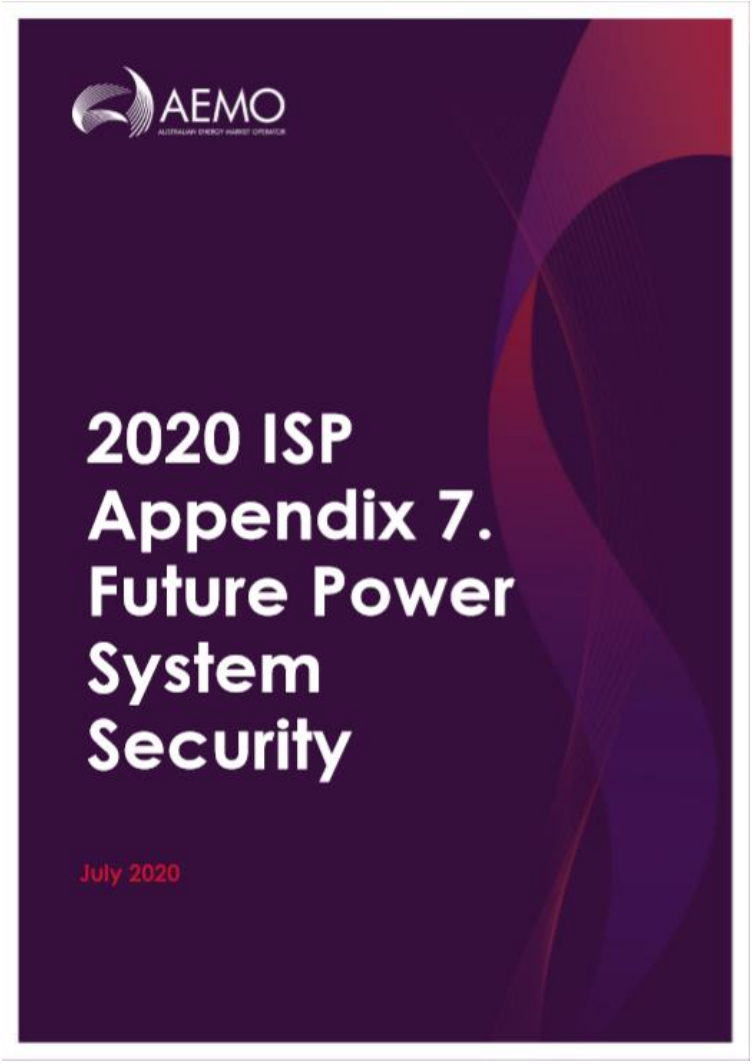


Updates since the RIT-T Determination

Key Changes	Description	Source
Variable heat rates for thermal plant	Variable heat rates applied (in place of minimum capacity factors) to more accurately model generator fuel costs	2020 ISP data
Gas prices	Gas price forecasts have increased ($12/GJ long-term), aligned to 2020 ISP central scenario assumptions and supported by independent advice from EnergyQuest	2020 ISP data
Energy storage costs	Pumped hydro storage costs have increased, while battery storage costs are 42% higher initially, but decline more rapidly to 2030	2020 ISP data
Committed generation projects	Committed generation projects throughout the NEM have been updated in line with the 2020 ISP	2020 ISP data
Generator retirements	Plant retirements have been updated based on dates announced under the Rules	2020 ISP data
New system security requirements in SA	New constraints have been modelled to manage increasing risks from distributed PV and new frequency response requirements to manage the risk of 'islanding'	2020 ISP (Appendix 7)
Actionable ISP projects	Updated to include the actionable ISP projects in the 2020 Final ISP including the accelerated timing of the VNI West project	2020 ISP

System security risks

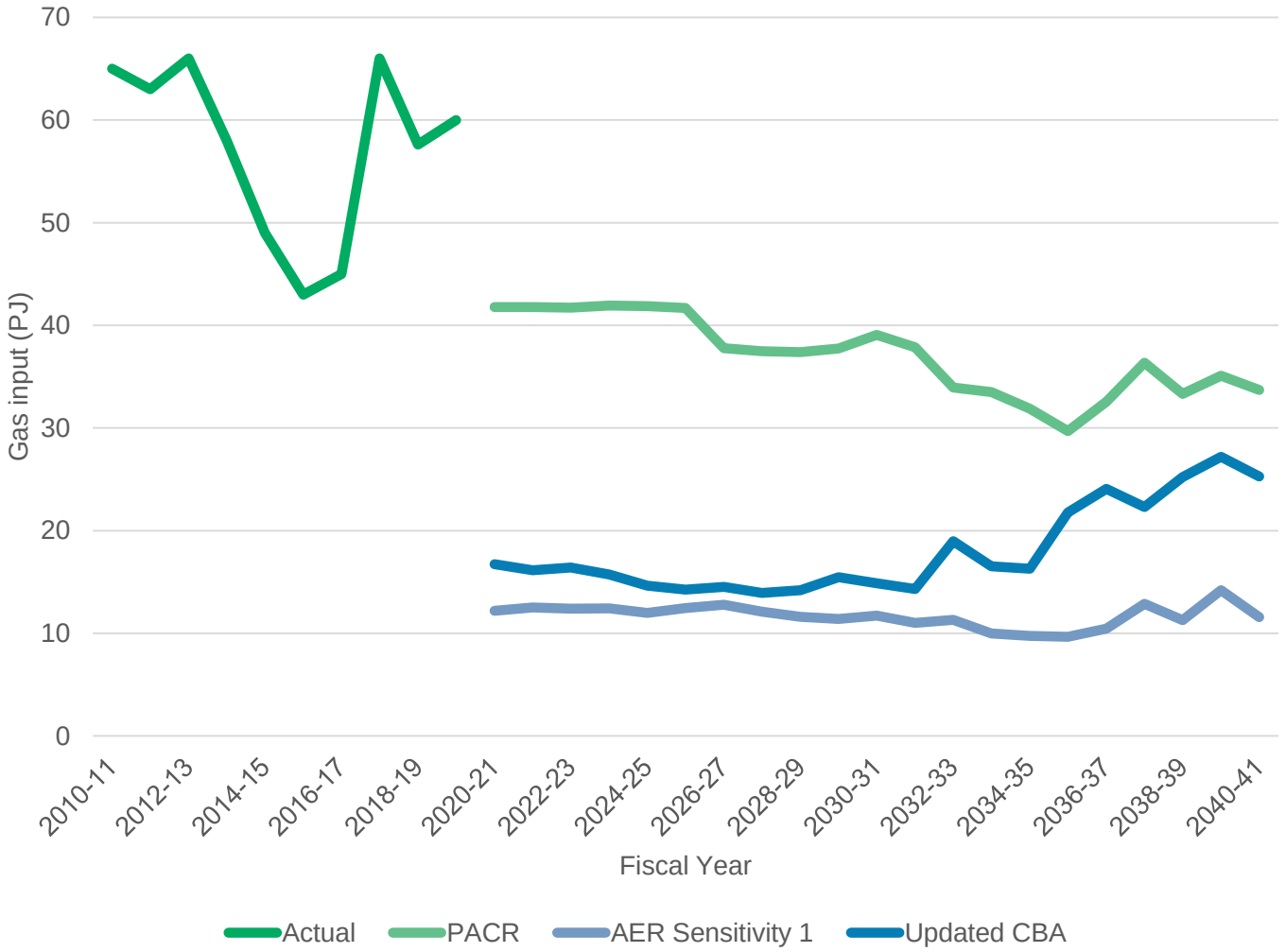
- Network constraints are modelled as recommended by AEMO in the 2020 ISP and its report to the SA Government to:
  - Ensure sufficient headroom on Heywood Interconnector for a credible contingency event
  - Manage the risk of separation where the loss of Heywood is high risk and high consequence
  - Allow for stable “islanded” operation through additional frequency response requirements



Draft modelling results – SA Gas Generation

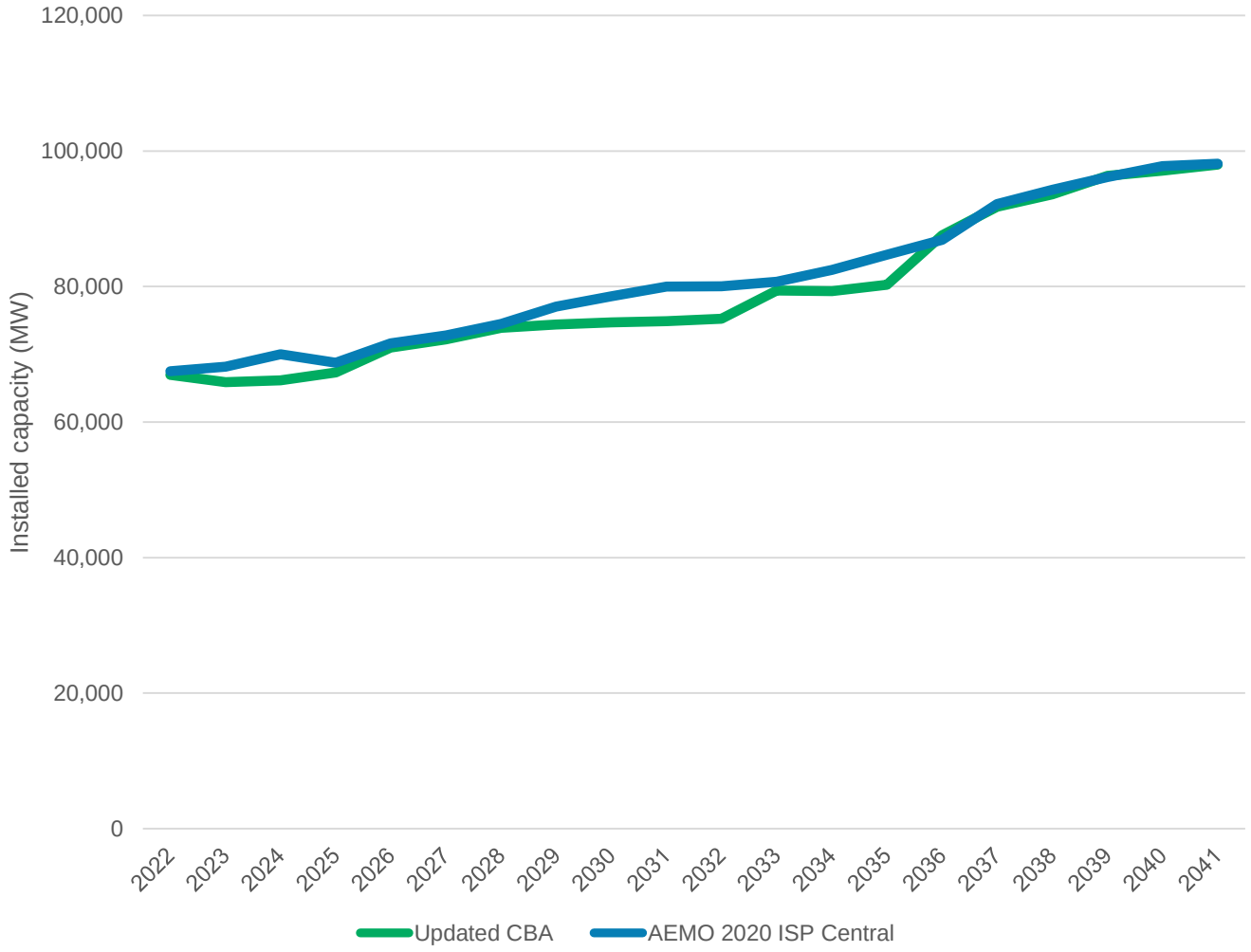
In the base case:

- Updated modelling shows higher gas usage than the AER sensitivity
- Benefits are calculated on much lower gas usage than has been observed historically, which is a conservative outcome
- Unused gas is available for alternative uses in the eastern states



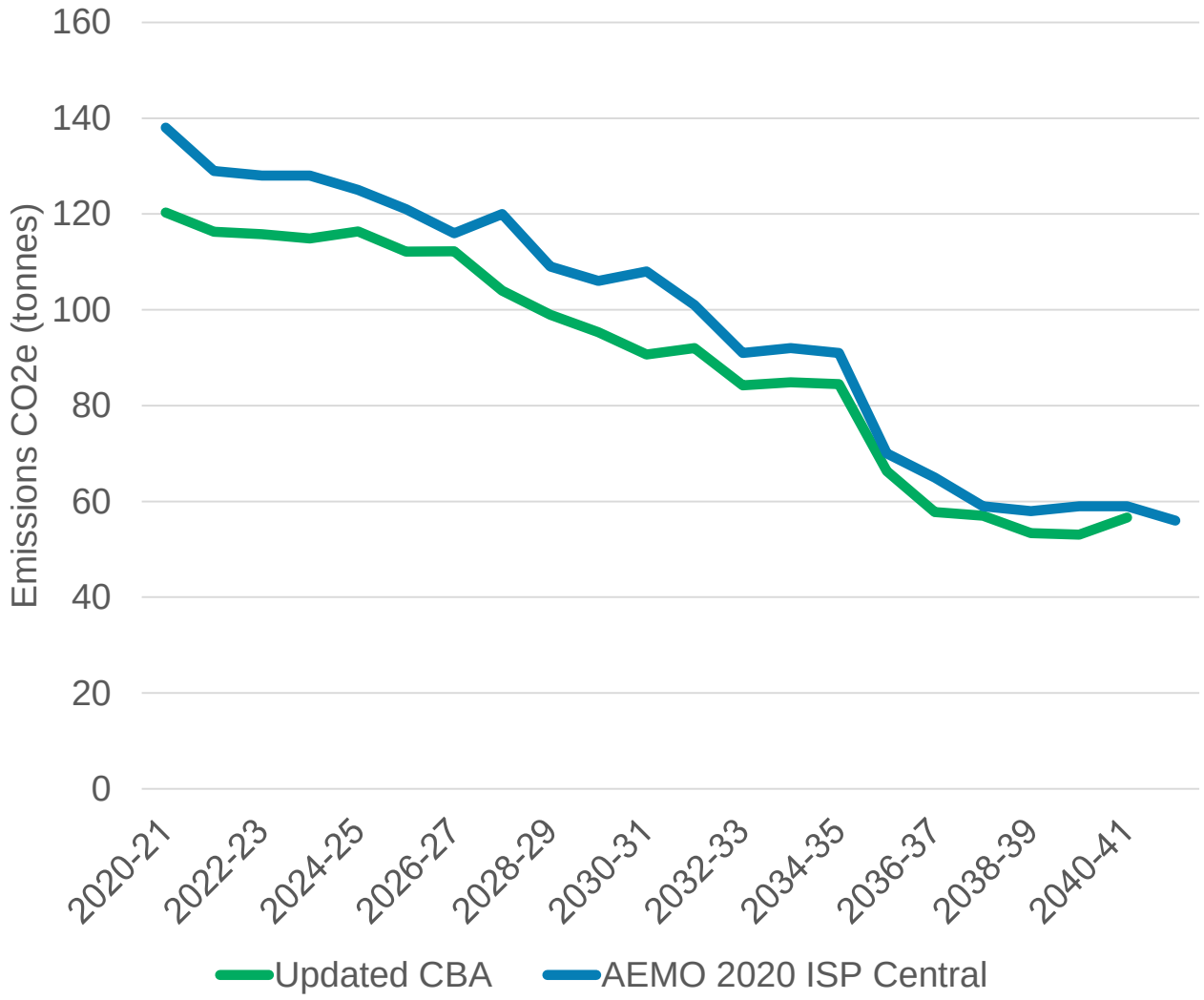
Draft modelling results compared to ISP – NEM investment

- Similar generation and storage investment profile across the NEM
- NEM wide outcomes of updated modelling are well aligned with ISP outcomes

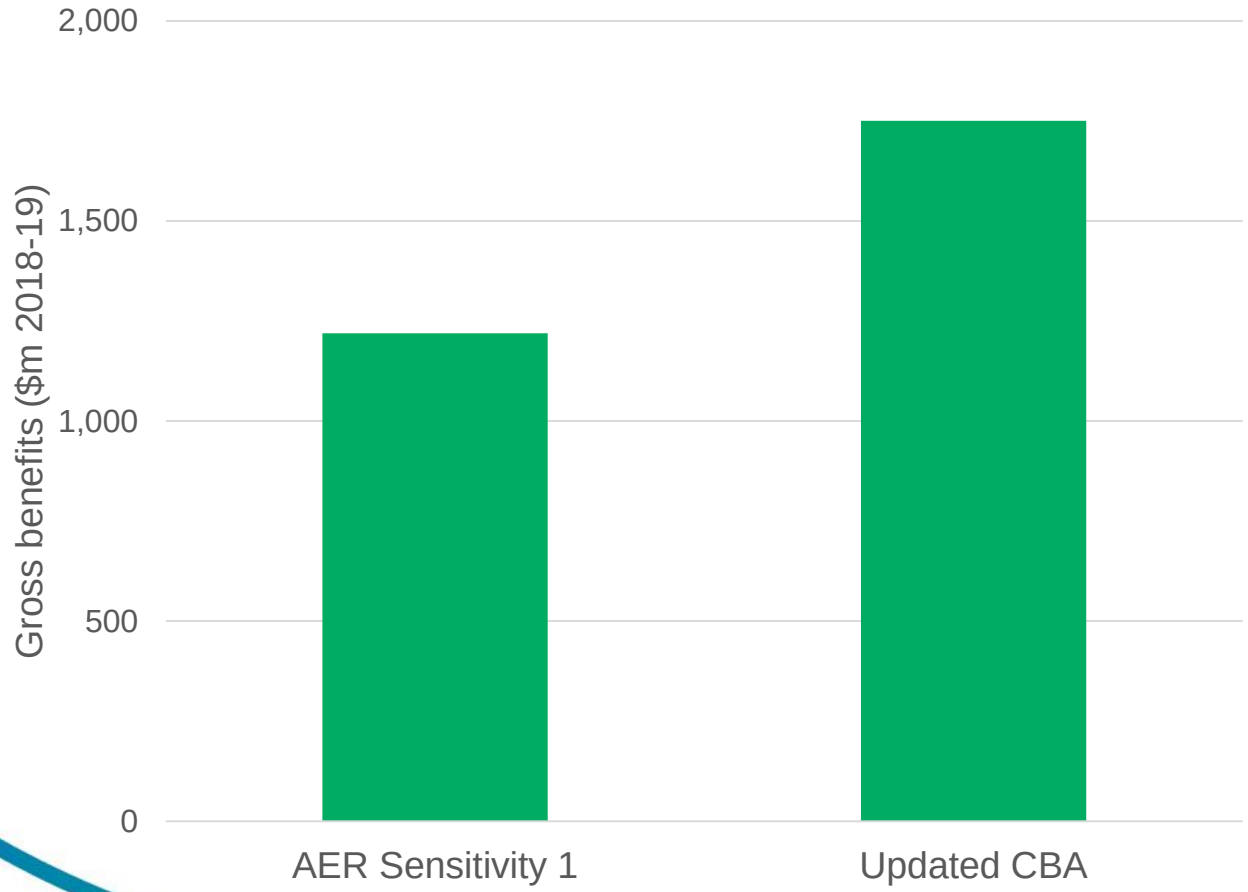


Draft modelling results compared to ISP – NEM Emissions

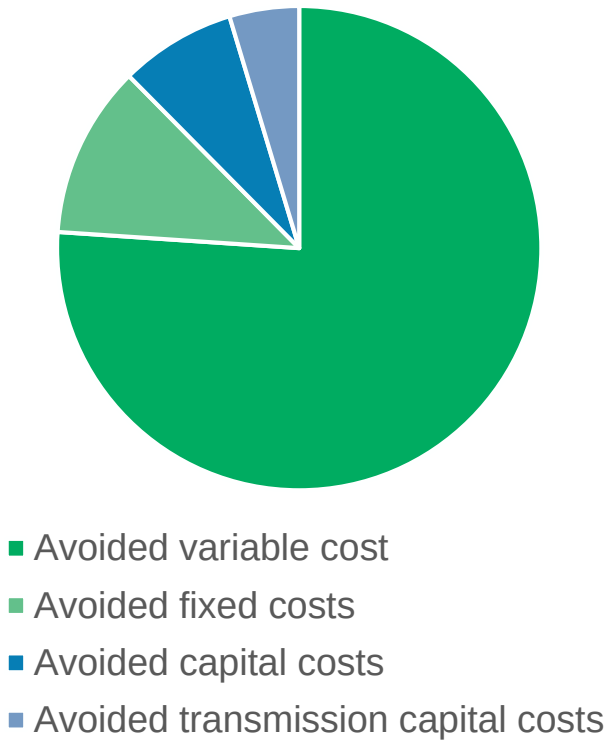
- Similar emissions profile in base case results
- NEM wide outcomes of updated modelling are well aligned with ISP outcomes



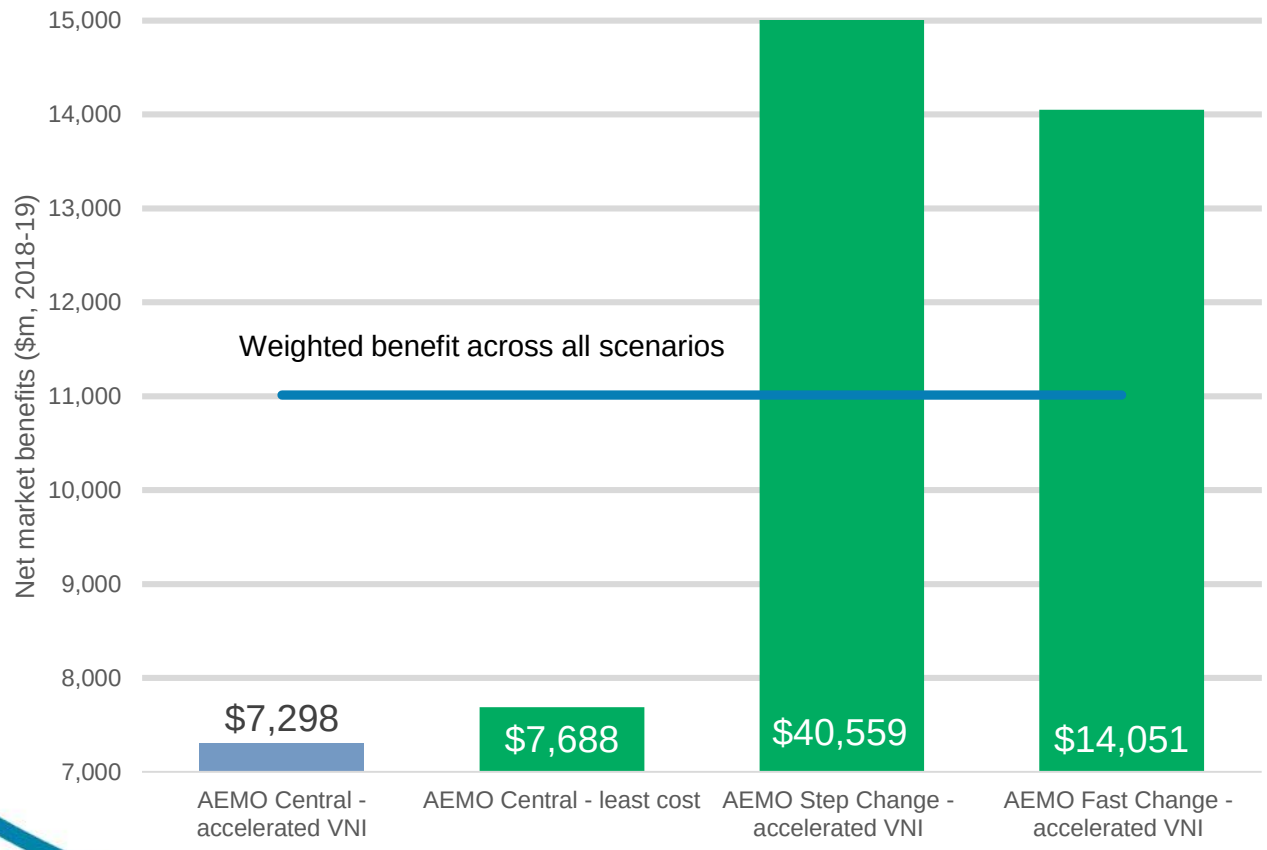
Draft updated gross benefits



Central scenario benefits have increased with updated inputs



Scenario weighted benefits

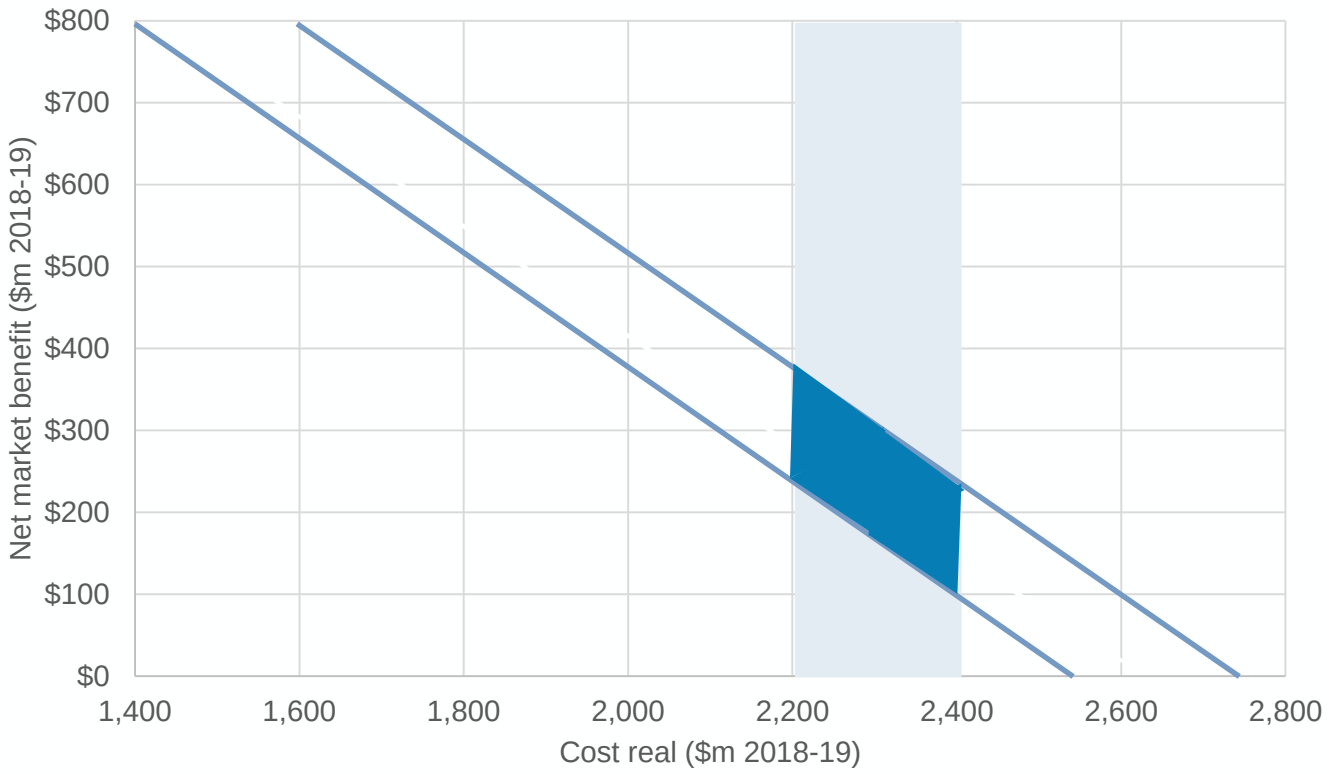


- Our updated CBA is based on the AEMO Central – accelerated VNI West development path
- Weighted benefits can be expected to be higher than central scenario
- AEMO's 2020 ISP demonstrates large increased benefits of transmission if the world moves quickly towards a renewable future
- Therefore PEC is considered to be a very low regret investment

Power system resilience

- Recent events demonstrate the need for additional and diverse interconnection to reduce the risk of islanded operation
- AEMO's minimum operational demand thresholds review states "Completion of the interconnector … should be considered crucial for the ongoing security of South Australia's power system"
- Improved resilience is built into the design and operation of the new interconnector
- The benefits of this improved system resilience have not been quantified in the CBA

Indicative results of updated cost benefit analysis



- Market benefits are being finalised in line with 2020 ISP
- Capex forecasts to be finalised in September 2020
- Indicative net benefits are in range $100m to $400m
- A weighted scenario approach would result in higher net benefits
- And system resilience benefits remain unquantified
- Again PEC is considered to be a very low regret investment

Developing capital expenditure forecasts

Ralf Ricciardi
Project Director
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Chris Swann
Major Projects Director
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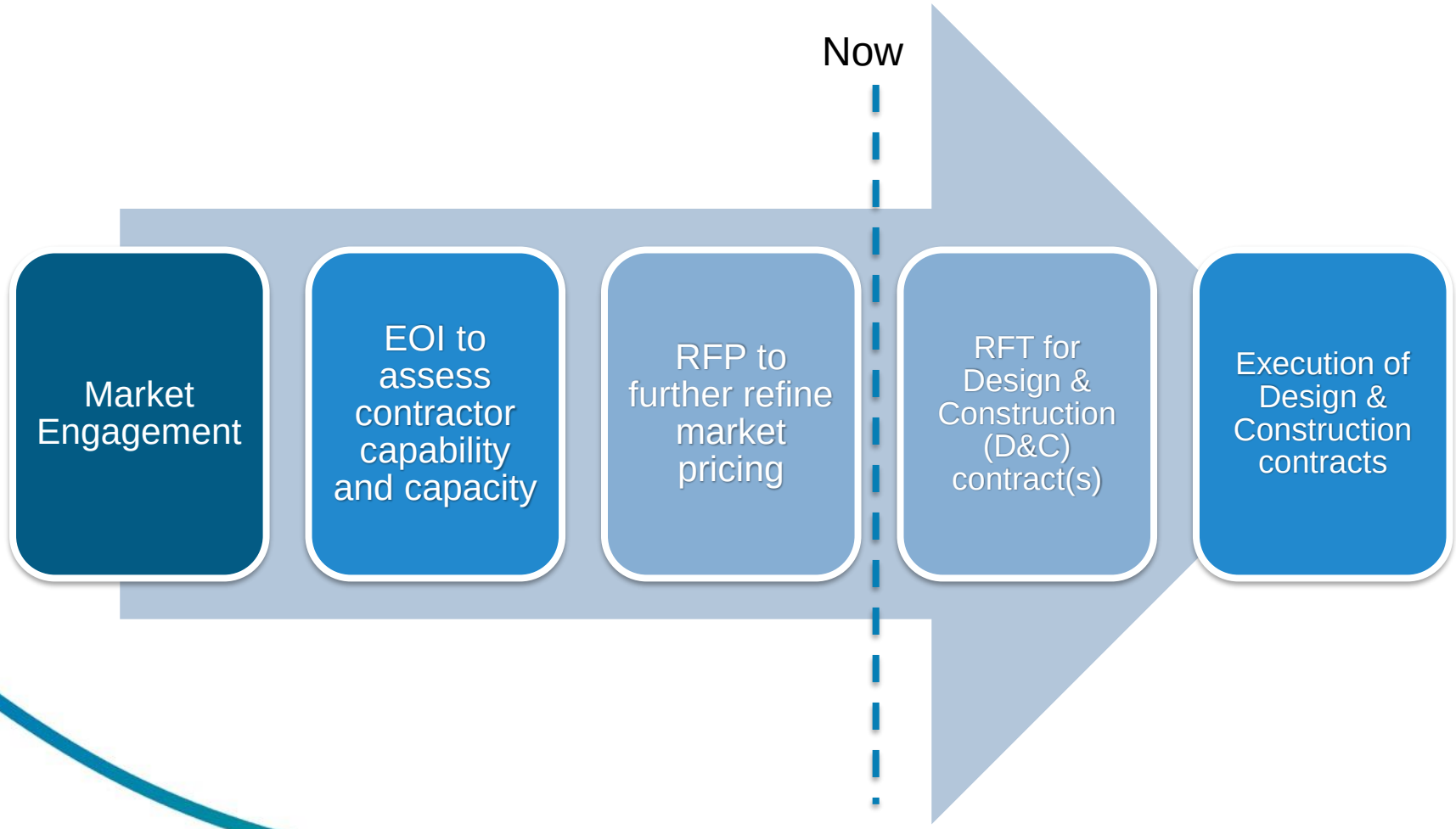
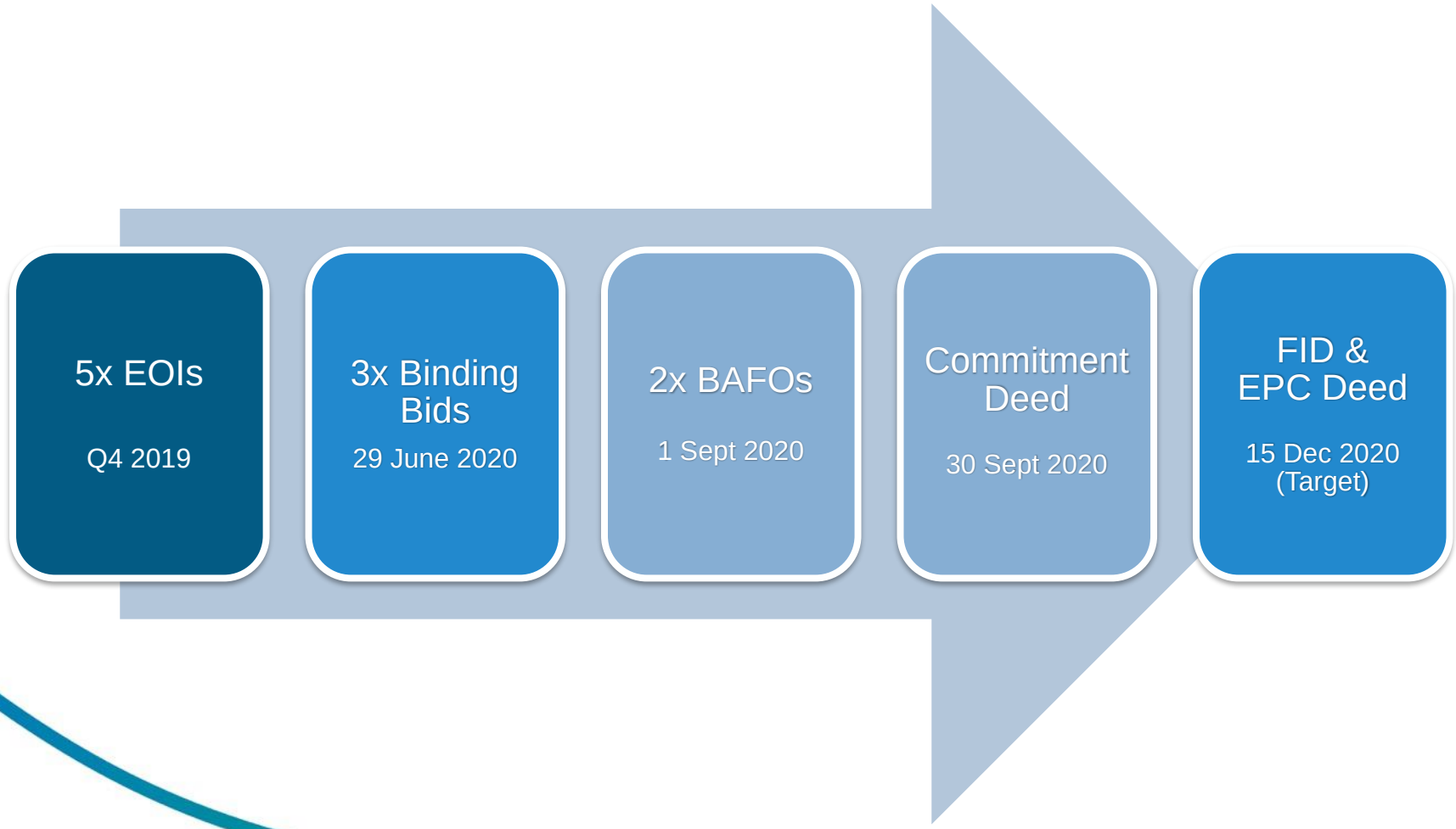
ElectraNet procurement process



- Strategy
  - Minimise risk related to:
    - Safety
    - Weather delays
    - Latent conditions
    - Environmental and Cultural Heritage issues
    - Technical/ Design
  - Early contractor involvement to reduce risk
  - Correctly allocate and price risks
  - Effective coordination of project delivery with TransGrid
- Majority of project costs will be covered by competitive market pricing (~ 75%)

TransGrid procurement process



- Strategy
  - Turnkey D&C solution
  - Output-based specification
  - Demonstrate value through competitive process
  - Three binding bids from CPB/UGL, Elecnor/Clough and Quanta
  - Residual risks relate to planning approvals, Covid-19 and extreme weather events
- ~75% of the project costs are covered by the procurement process
  - Remainder of budget covers property, biodiversity & “thin client” delivery

Drivers for project outturn costs

- PEC has a very different risk and cost structure to BAU projects
- Price discovery has been an important part of the development process

Value drivers	Cost drivers
Competitive tension	Technical standards
Pipeline of ISP projects	WH&S
New contractors & suppliers	Biodiversity & property impacts
Output-based specification	Congested infrastructure market
Scale economies	Specialist labour requirements

Q & A

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Conclusion and next steps

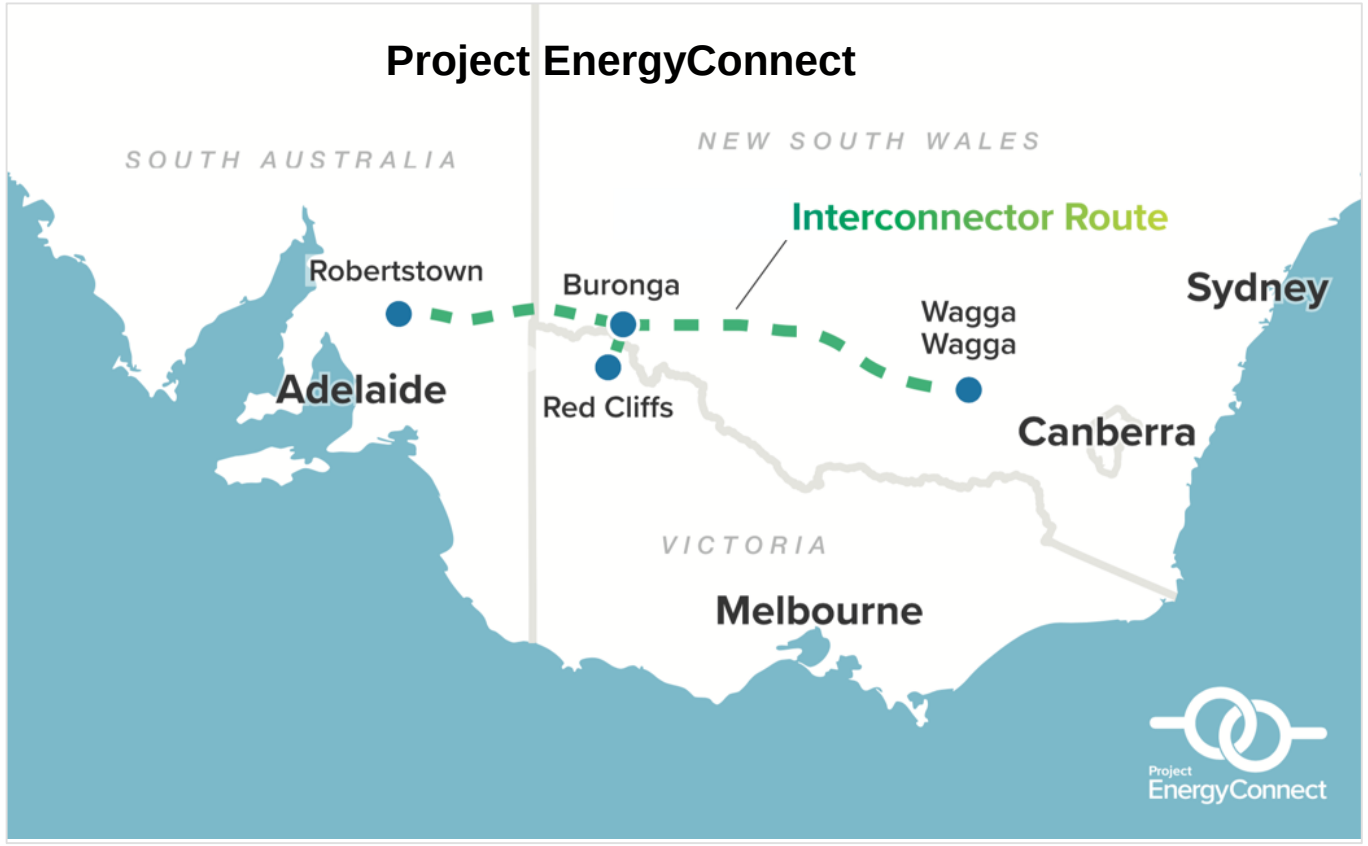
Rainer Korte
Group Executive Asset Management
ElectraNet

Conclusion

- While there have been significant changes in both costs and benefits, the preferred option remains unchanged and there has been no “material change in circumstances”
- This draft conclusion is based on updated market benefits modelling aligned with the 2020 ISP and updated project cost estimates to be confirmed in September 2020
- Additional unquantified benefits are also expected through improved system resilience
- The ISP includes PEC in all future scenarios and potential development paths for the NEM, including the optimal development path which is designed to deliver the greatest potential customer benefits and lowest costs over time
- AEMO has separately recommended PEC as as an “essential foundational measure” to address emerging system security risks that are growing year on year
- PEC is a very low regret investment essential to our energy future

Immediate next steps

- Conclude and publish the updated cost benefit analysis
- AER to review and confirm the outcomes of the updated analysis
- TransGrid and ElectraNet to finalise project cost forecasts and submit Contingent Project Applications to the AER (subject to AER acceptance of the updated CBA)
- AER to review, consult and make contingent project determinations



Project EnergyConnect

For additional information go to www.projectenergyconnect.com.au