

Powerlink Customer Panel Meeting

15 June 2022



Acknowledgement

Powerlink acknowledges the Traditional Owners and their custodianship of the lands and waters of Queensland and in particular, the lands on which we operate. We pay our respect to their Ancestors, Elders and knowledge holders and recognise their deep history and ongoing connection to Country.

Agenda

01

Asset
Reinvestment
Review

02

System Security
EOI

03

Energy Charter
Disclosure
Overview/
Customer Metrics
Update

04

Borumba Pumped
Hydro Project

05

Enterprise
Resilience Review

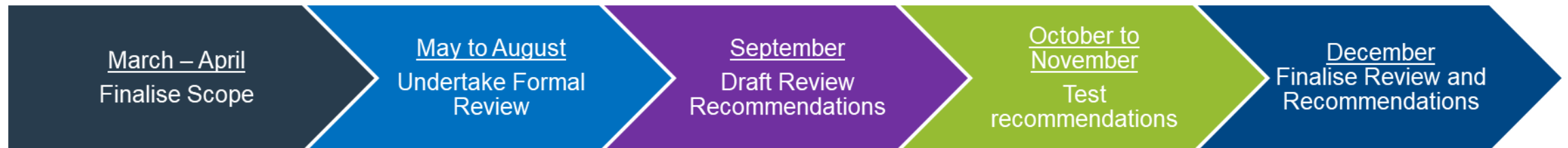
Asset Reinvestment Review



Asset Reinvestment Review

■ Update

- Review scope agreed to and endorsed by the group
- Site visit planned for 21 June to provide greater understanding of issues
- Strawman analysis of different built section definition options currently underway
- Next meeting 27 July.



Request for power system security services

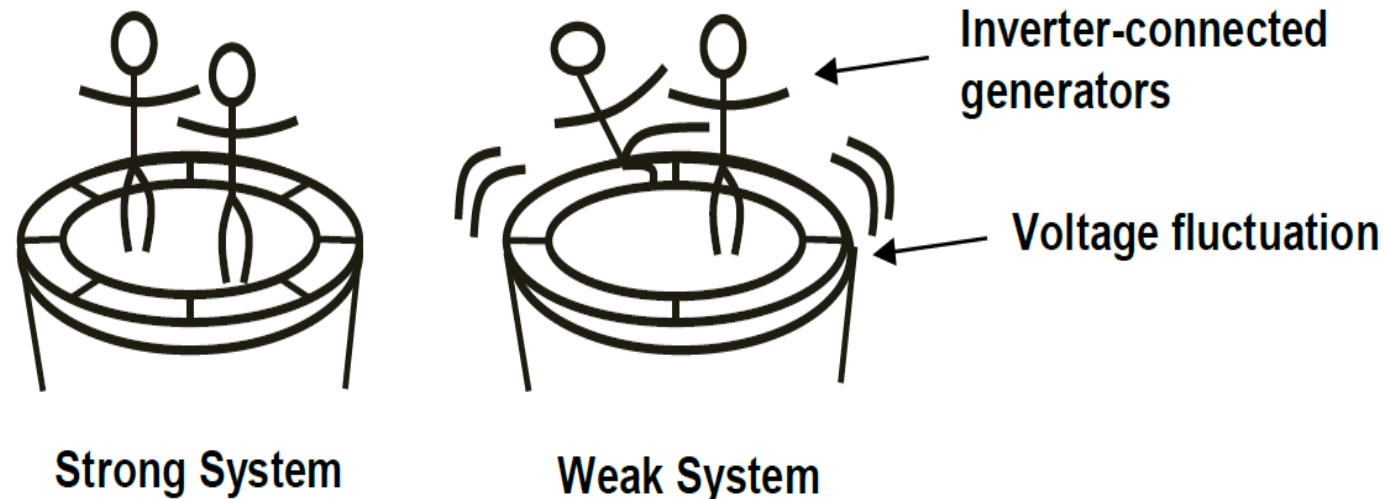
Nathaniel Dunnett, Manager Portfolio Planning and Optimisation

Background

- Powerlink issued an Expression of Interest (EOI) on 19th May 2022 to address required power system security services, declared by Australian Energy Market Operator's (AEMO's) system security reports:
 - [AEMO System Security Reports \(December 2021\)](#)
 - [AEMO Update to 2021 System Security Reports \(May 2022\)](#)
- As the Transmission Network Service Provider and jurisdictional planning body in Queensland, Powerlink has a responsibility to provide and procure system security services that address this need.
- Through the EOI process we will evaluate submissions for network and non-network options – the option or combination of options that enable us to meet our regulatory obligations with the lowest overall cost to customers will be recommended for implementation.
- Submissions on the EOI close on 24 June 2022 and we plan to publish our decision in September 2022.
- Further information via Powerlink's website ([Power System Security Consultations](#)) and networkassessments@powerlink.com.au

System Strength Requirements

- System Strength is a measure of the power system's resilience to disturbances (by maintaining the correct voltage waveforms).
- Low system strength can be caused by an outage of a synchronous generator or major power system element like a transmission line, causing instability for inverter-based resources (IBR), e.g. wind or solar.
- Services are required to meet a declared shortfall at the Gin Gin fault level node (up to 90 MVA) from 31st March 2023.
 - Note: This is a system-wide issue as opposed to a local issue at Gin Gin, which is caused by control interactions with IBR plant in North Queensland and lower synchronous generation in Central Queensland. As such, options will be analysed to assess where the problem can be most efficiently addressed e.g. in Central and/or North Queensland.



Reliability and Security Requirements

- Reliability and Security Ancillary Services (RSAS) maintain or increase the power transfer capability of the transmission network within acceptable technical parameters.
- During times of minimum system demand, reactive power generated by various system components is not absorbed and leads to high voltages on the network.
- Services are required to meet an immediate gap of 120 MVAR reactive power absorption in Southern Queensland, increasing to 250 MVAR by 2026.



Questions?



Energy Charter Update

Gerard Reilly, General Manager CCE

- Accountability process
- Content highlights of 2021/22 Energy Charter Disclosure Statement
- Maturity model update for 2021/22
- Customer & Stakeholder metrics update

Accountability process

- Disclosure Statement due for release by 30 September
- Following strategic review now using a decentralised accountability model where Powerlink's Customer Panel will play a key role in reviewing Disclosure Statement and provide feedback on areas doing well/improvement needed.
- Final Customer Panel meeting for 2022 is scheduled for 15 September (Transmission Network Forum held in November)
- Propose an additional session with Customer Panel in late October 2022 to present our Disclosure Statement and answer questions

“Would the Customer Panel support plans to have a combined session involving other Queensland GOC signatories?”

Disclosure Statement Contents

- Introduction from Chair/Chief Executive
- Our customers and communities – segments
- Customer scorecard
- Case Studies
- Activities under each principle

■ Case Studies

- Benefits of REZ - generator-pays model, cost-effective and coordinated, local benefits framework with Qld Govt
- Social licence to operate focus – BT initiative with Energy Charter on landholder engagement, community sentiment research, early engagement model, community grants program
- Actions to advance Reconciliation – RAP progress, naming of switching station by Traditional Owners, Guybal Munjan (pronounced guy-bel moo-wun), which means ‘fire mountain’ in local language

- Case Studies

- Working our network harder – Wide Area Monitoring Protection and Control (WAMPAC)
- Co-design customer metrics

- Principle 1 – We will put customers and the centre of our business and the energy system
 - Customer Voice@Board level implementation
 - Powering Ahead program
 - Customer Insights Forum
 - Engagement Survey results

- Principle 2 – We will improve energy affordability for customers
 - Revenue Determination
 - Asset Reinvestment Review
 - In-situ secondary systems replacement trial
 - Procurement strategies, local procurement focus, global supply chain management, relationship based procurement

Content Highlights

- Principle 3 – We will provide energy safely, sustainably and reliably
 - Integrated Electricity Pathways
 - Strategies to manage system strength
 - WAMPAC
 - Community Electrical Safety Plan

- Principle 4 – We will improve the customer experience
 - Customer relationship focus for BD team and direct-connect customers
 - Direct connect customer research
 - Early works agreements
 - Community engagement strategy

Content Highlights

- Principle 5 – We will support customers in vulnerable circumstances
 - Uniting Energy program
 - Indigenous Consumer Awareness Network scholarships
 - Country Universities Centre (CUC)


“Is there anything missing that you believe would add value if included?”

“Any other insights to improve our Disclosure Statement”

Maturity Rating Overview

EC Principle	Elementary	Emerging	Evolved	Empowered	Exceeding	Movement
	No formal approach to the majority of the principles in action.	Emerging and repeatable approach to the majority of the Principles in Action	Evolved and defined approach to the majority of the Principles in Action and implemented	Empowered and proactive approach to the Principles in action and customer outcomes and measured and managed.	Exceeding all principles in action and achieving optimal customer outcomes.	
1. We will put customers at the centre of our		Current Maturity Level published 2021				↑
			Draft Maturity Level 2021/22	Target Maturity Level 2022/23		
2. We will improve energy affordability for customers.			Current Maturity Level published 2021			—
			Draft Maturity Level 2021/22	Target Maturity Level 2022/23		
3. We will provide energy:						
			Current Maturity Level Published 2021			—
Safely			Draft Maturity Level 2021/22	Not applicable	Not applicable	
			Current Maturity Level published 2021			—
Reliably			Draft Maturity Level 2021/22	Target Maturity Level 2022/23		
			Current Maturity Level published 2021			—
Sustainably			Draft Maturity Level 2021/22	Target Maturity Level 2022/23		
4. We will improve the customer experience		Current Maturity Level published 2021				—
		Draft Maturity Level 2021/22		Target Maturity Level 2022/23		
5. We will support customers facing	Current Maturity Level published 2021					↑
		Draft Maturity Level 2021/22	Target Maturity Level 2022/23			



 Key focus area

Energy Charter Maturity Ratings Overview

Our maturity rating

- Propose a slight uplift for Principle 1 – We will put customers at the centre of our business and the energy system

Rating changed from Emerging/Evolved to Evolved

- Propose a slight uplift for Principle 5 – We will support customers in vulnerable circumstances

Rating changed from Elementary/Emerging to Emerging

- Maturity ratings for other principles to remain steady

Customer Metrics Overview

Post IAP approach to Powerlink's performance

- At March meeting there was agreement for Panel to step into the role previously occupied by the Energy Charter Independent Accountability Panel to review our Performance.
- Some of you were keen to be involved in reviewing and identifying potential measures that Powerlink could be assessed against as part of the Energy Charter Disclosure Statement.
- Initial meeting held on 26 May to review existing Energy Charter Disclosure Statement metrics, other options and feedback on potential gaps.

Key Insights

- Current Energy Charter Scorecard metrics were circulated to members as a starting point
 - Input from the session:
 - Metrics from QHES (customer view on affordability, reliability, trust and security of supply) were not at a power system level.
 - No value in Net Promoter Score (NPS) due to Powerlink's position as a regulated monopoly business
 - How can Powerlink show we are driving affordability through productivity measures?
 - Metrics demonstrating direct-connect customer satisfaction with network connection process
 - Landholder satisfaction with engagement processes associated with projects
 - Support for metrics on network security and generator constraints
 - Can Powerlink develop a metric to show how resilient the network is to future changes in climate?
 - How can we gain more immediate feedback from customers on Powerlink's responsiveness and the quality of our interactions?

Revised Metrics for Energy Charter Scorecard

What metrics will go

Name	Description	Source	Frequency
Customer view on affordability	The extent to which customers agree or disagree with the statement: 'These energy suppliers are working to make electricity more affordable'	Queensland Household Energy Survey	Annually
Customer view on reliability	The extent to which customers agree or disagree with the statement: 'These energy suppliers provide my household with a reliable energy supply'	Queensland Household Energy Survey	Annually
Customer view on security of supply	The extent to which customers agree or disagree with the statement: 'These energy suppliers give me a sense of security about my electricity supply'.	Queensland Household Energy Survey	Annually
Net Promoter Score	Asks directly-connected customers to rate Powerlink, on a scale of 1 to 10, how likely they are to recommend the organisation.	Stakeholder Perception Survey	Annually

Revised Metrics for Energy Charter Scorecard

What we are keeping

Name	Description	Source	Frequency
Staff understanding of customers	Extent to which staff know who their customers are.	Powerlink Engagement Survey (internal)	Annually
Renewable generator connections finalised	Renewable electricity generator connections completed into Powerlink's transmission network.	Powerlink	Annually
Future renewable generator connections	Renewable electricity generator connections committed for Powerlink's transmission network.	Powerlink	Annually
Social licence to operate	The level of acceptance granted to Powerlink by its stakeholders	Stakeholder Perception Survey	Annually
Reputation	How stakeholders perceive public sentiment towards Powerlink	Stakeholder Perception Survey	Annually
Trust	This is measured as a means of the promise keeping and listening scores	Stakeholder Perception Survey	Annually
Complaints closed to customer satisfaction	Measure indicating the complainant's satisfaction with the resolution	Powerlink	12 month rolling average

Revised Metrics for Energy Charter Scorecard

New metrics we can include from 1 July

Name	Description	Source	Frequency
Network Security Measure	This is a measure of the number of times AEMO issues market interventions to maintain system security during the equivalent of system normal conditions.	AEMO/Powerlink	Quarterly
% of renewable energy in Qld electricity capacity	As QLD moves towards achieving the QRET the % of renewable capacity will increase through the additional renewable energy plant Powerlink connects.	Powerlink	Annually
Bulk Electricity Price Trend (Forecast)	This Performance Indicator captures broader trends in actual and forecast real energy costs to ensure Powerlink delivers value for directly connected customers and the 5 million Queenslanders connected through distributors.	AEMO	Annually
Unsupplied system minutes	Transmission unsupplied system minutes is a measure of performance of the transmission network as experienced by consumers. It is an industry standard measure and is part of the Australian Energy Market Commission's (AEMC's) Annual Market Performance Review	AEMO	Annually

Revised Metrics for Energy Charter Scorecard

Potential new metrics that require further investigation

Name	Description	Source	Frequency
Network resilience	A measure of Powerlink's efforts to address climate change future impacts to our network	Still investigating the options in this space.	TBA
Non-regulated project delivery on time	Powerlink's performance in delivering on time project delivery to customer contracted commissioning date for non-regulated capital projects (<i>still assessing if there is a more suitable measure</i>).	Powerlink	TBA – potentially a 12 month rolling average
Affordability	An annual briefing outlining our actions and initiatives to help meet our regulated operating expenditure target for the 2023-27 regulatory period.	Powerlink	Annually

Revised Metrics for Energy Charter Scorecard

New stakeholder metric that requires further investigation

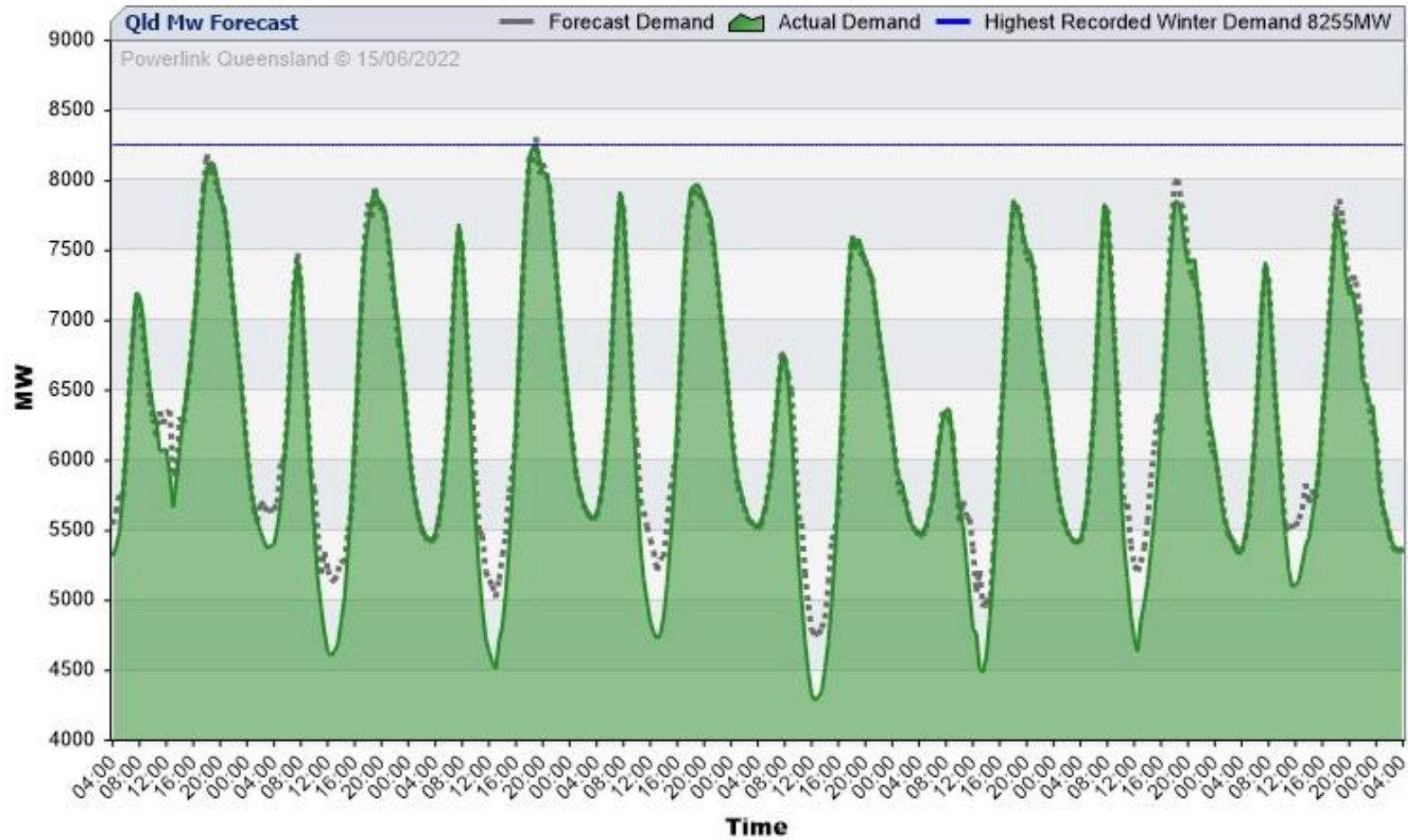
Name	Description	Source	Frequency
Landholder satisfaction rating	A measure of landholder satisfaction with Powerlink interactions associated with easement acquisition process and maintenance operations	Still under investigation to assess the best approach for gathering this data.	TBA

“Do these proposed metrics look like we are heading in the right direction?”

Energy Prices – current environment

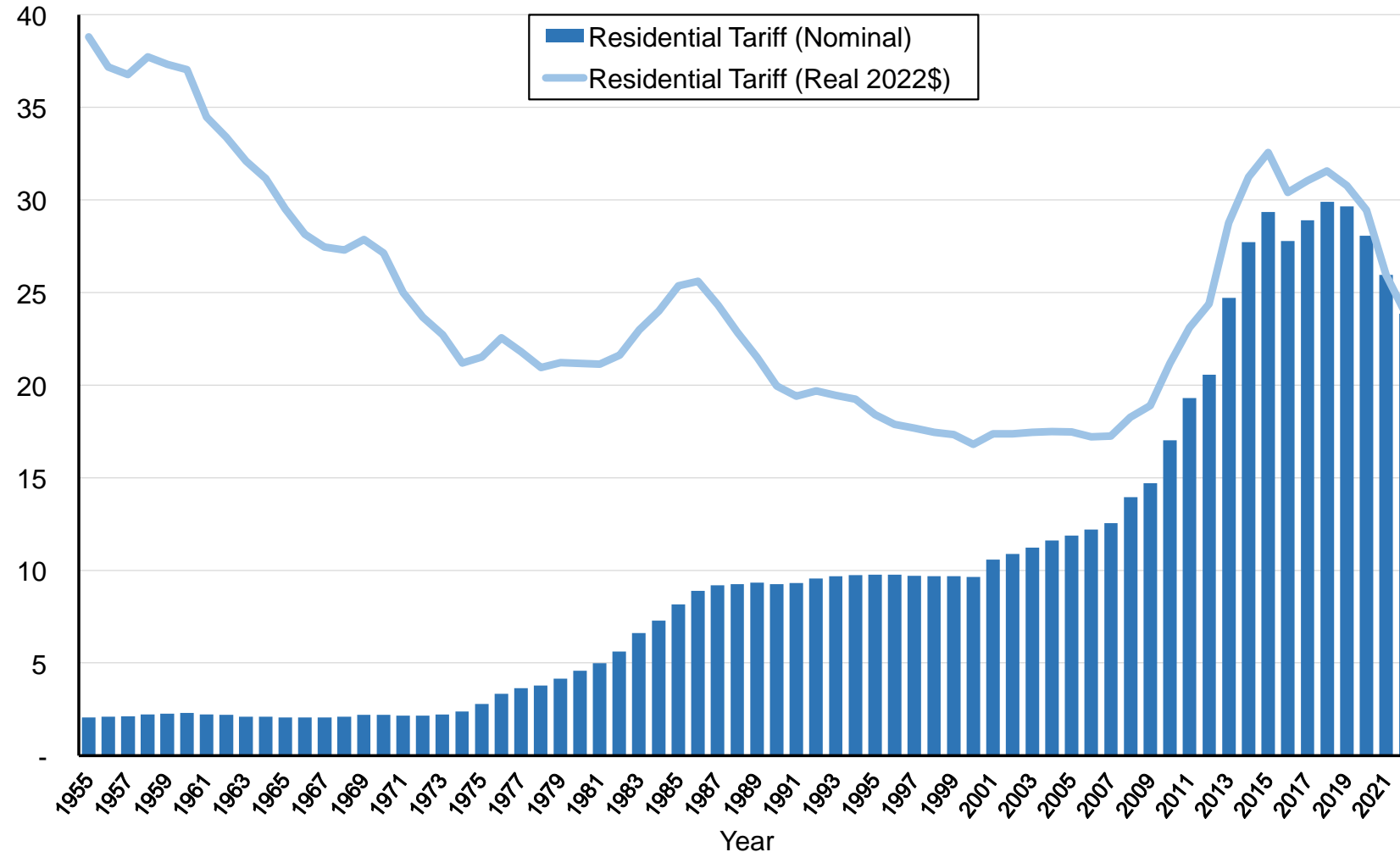
Paul Simshauser, Chief Executive

Winter Peak Demand

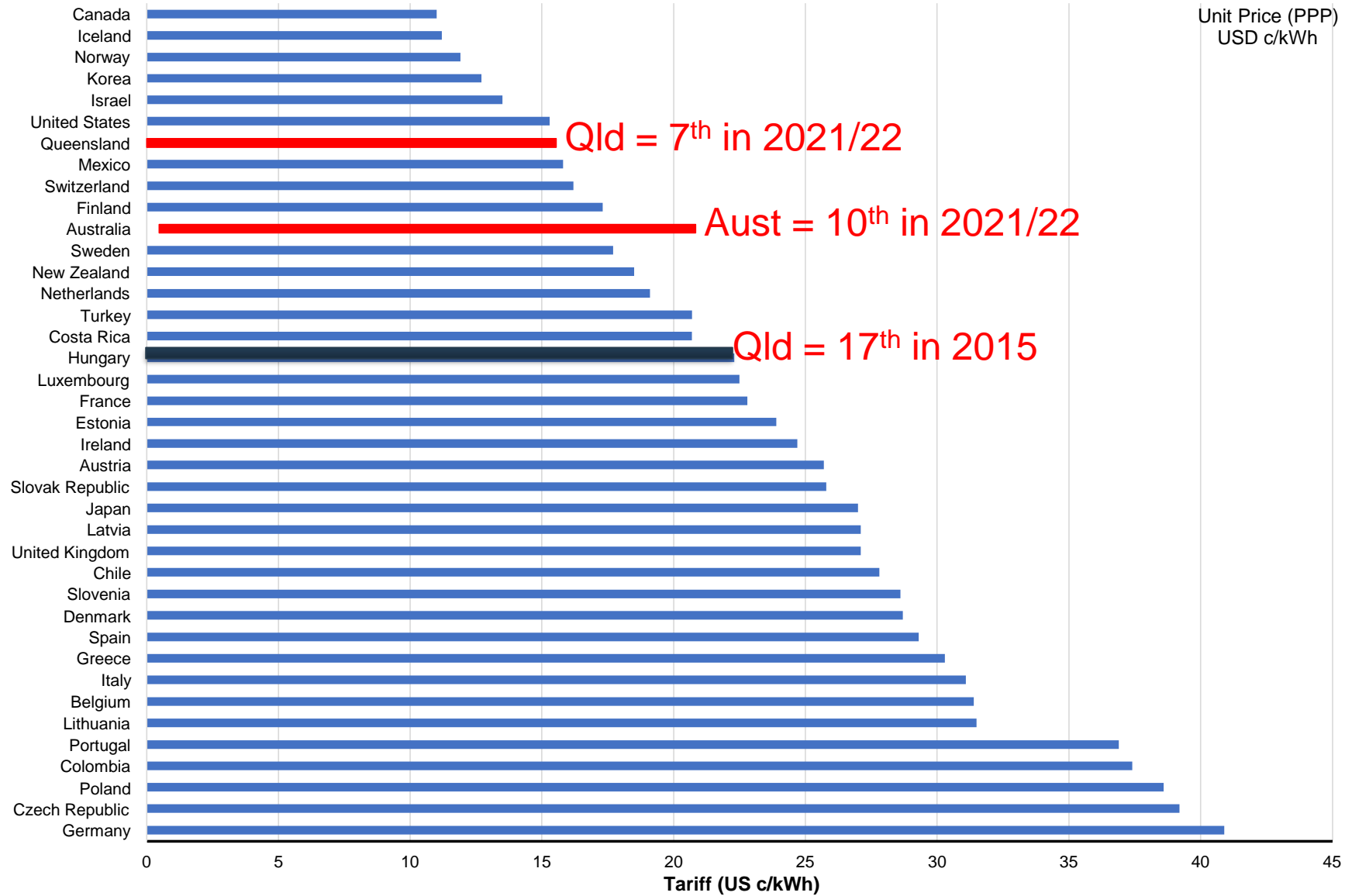


Queensland residential tariffs (average)

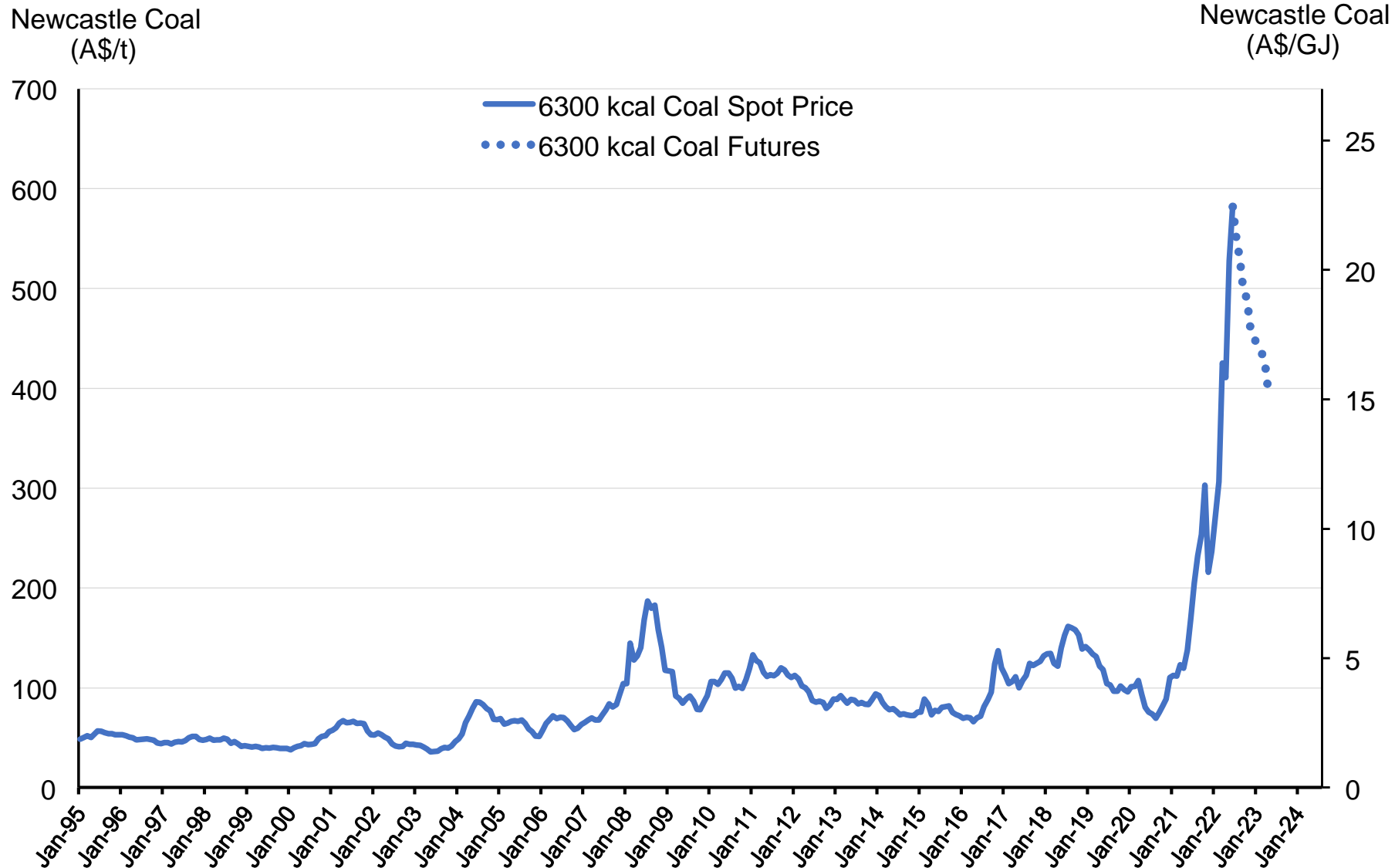
Average Tariff
(c/kWh)



International tariffs (residential)

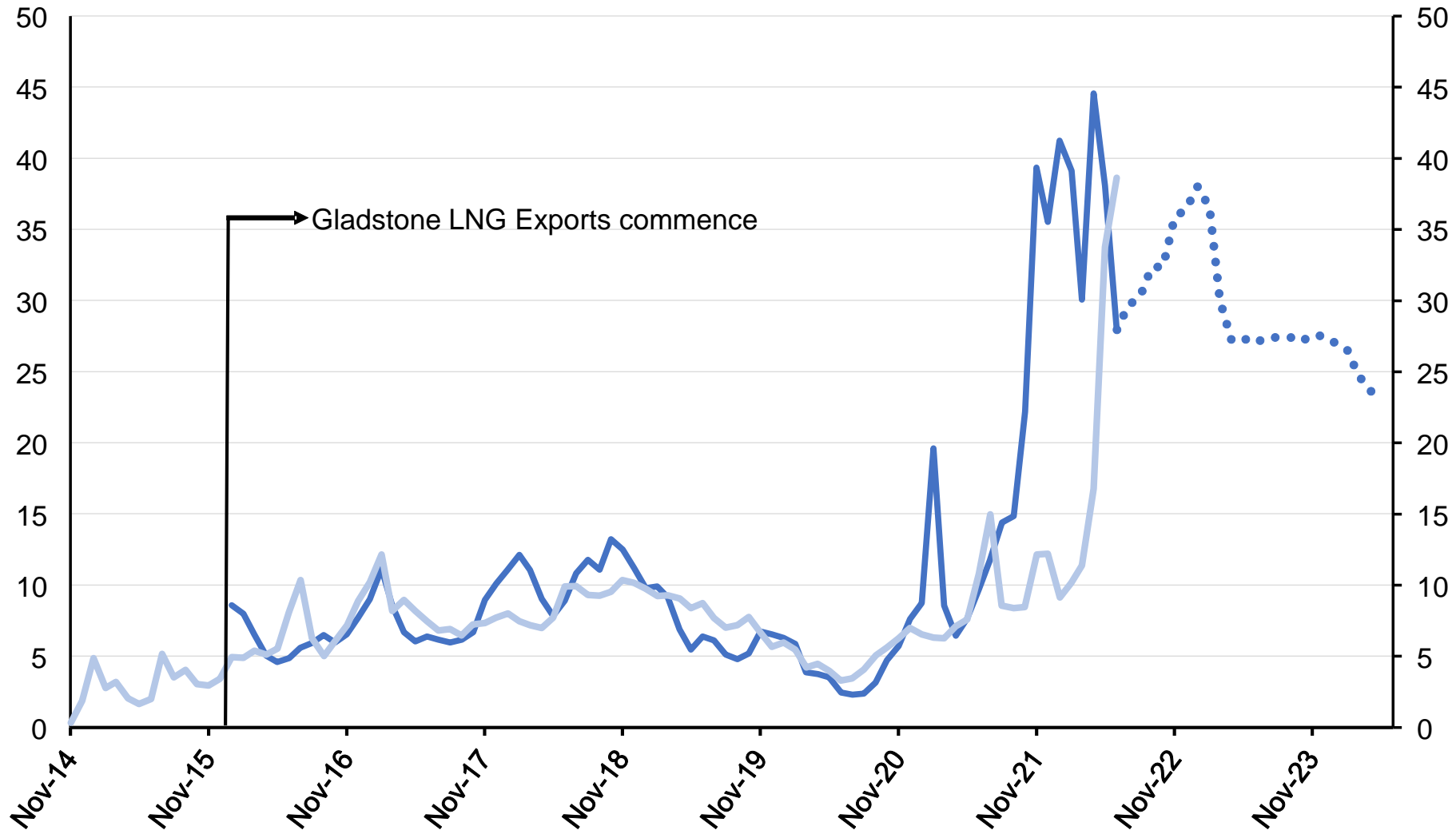


Newcastle Coal Futures

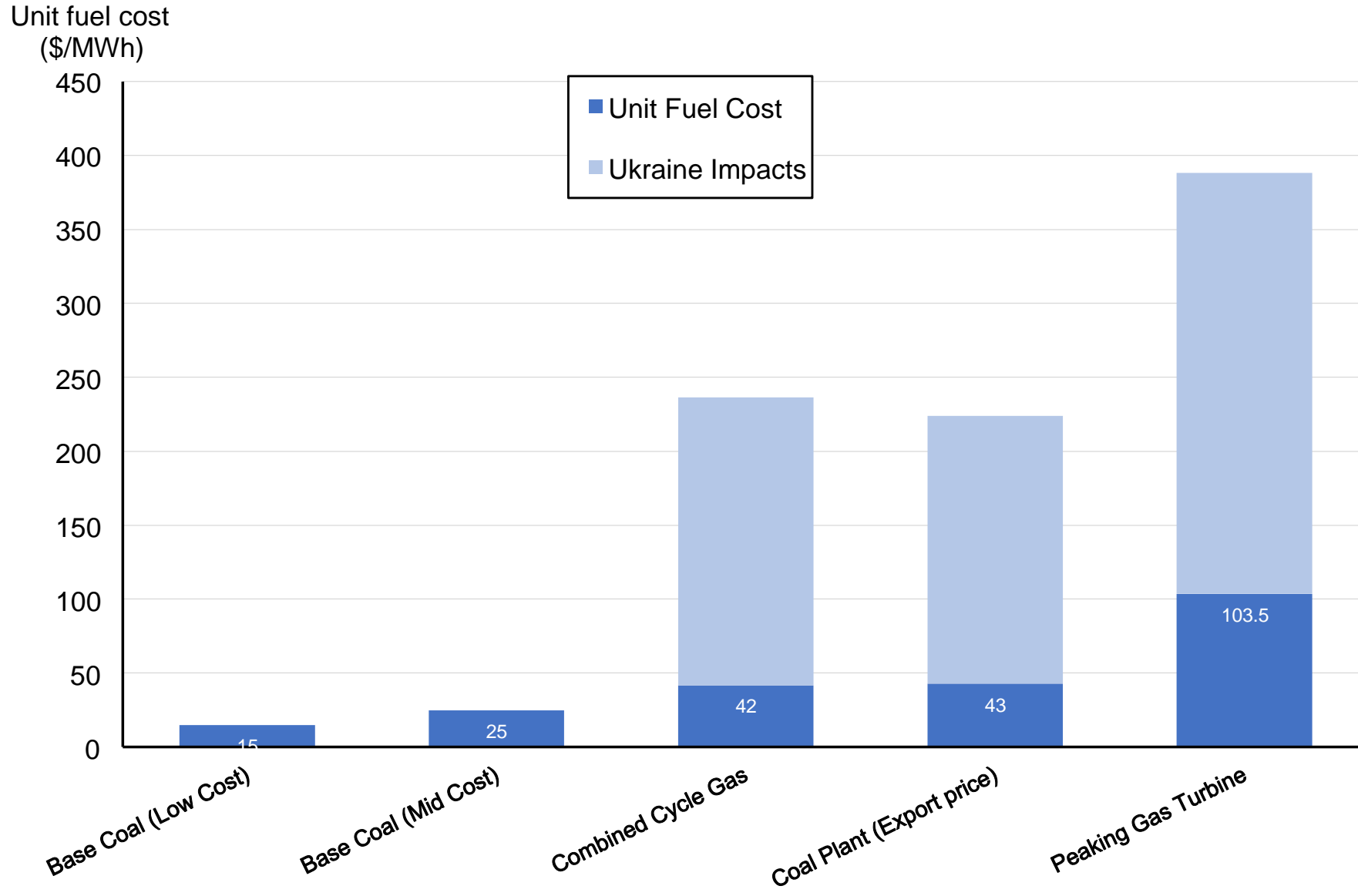


Brisbane STTM

Gas / LNG Netback
Price (\$/GJ)

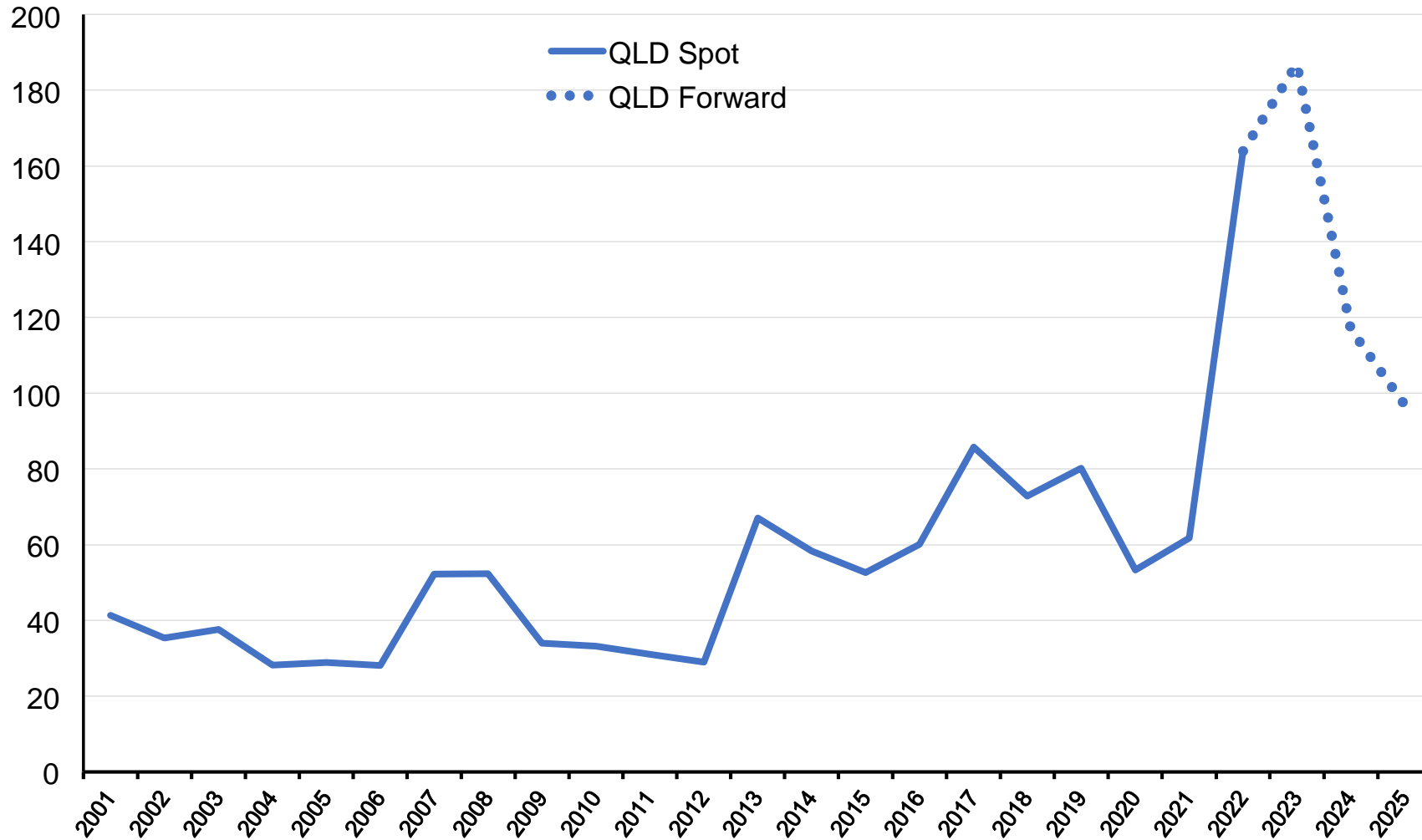


Coal & Gas Plant Marginal Costs



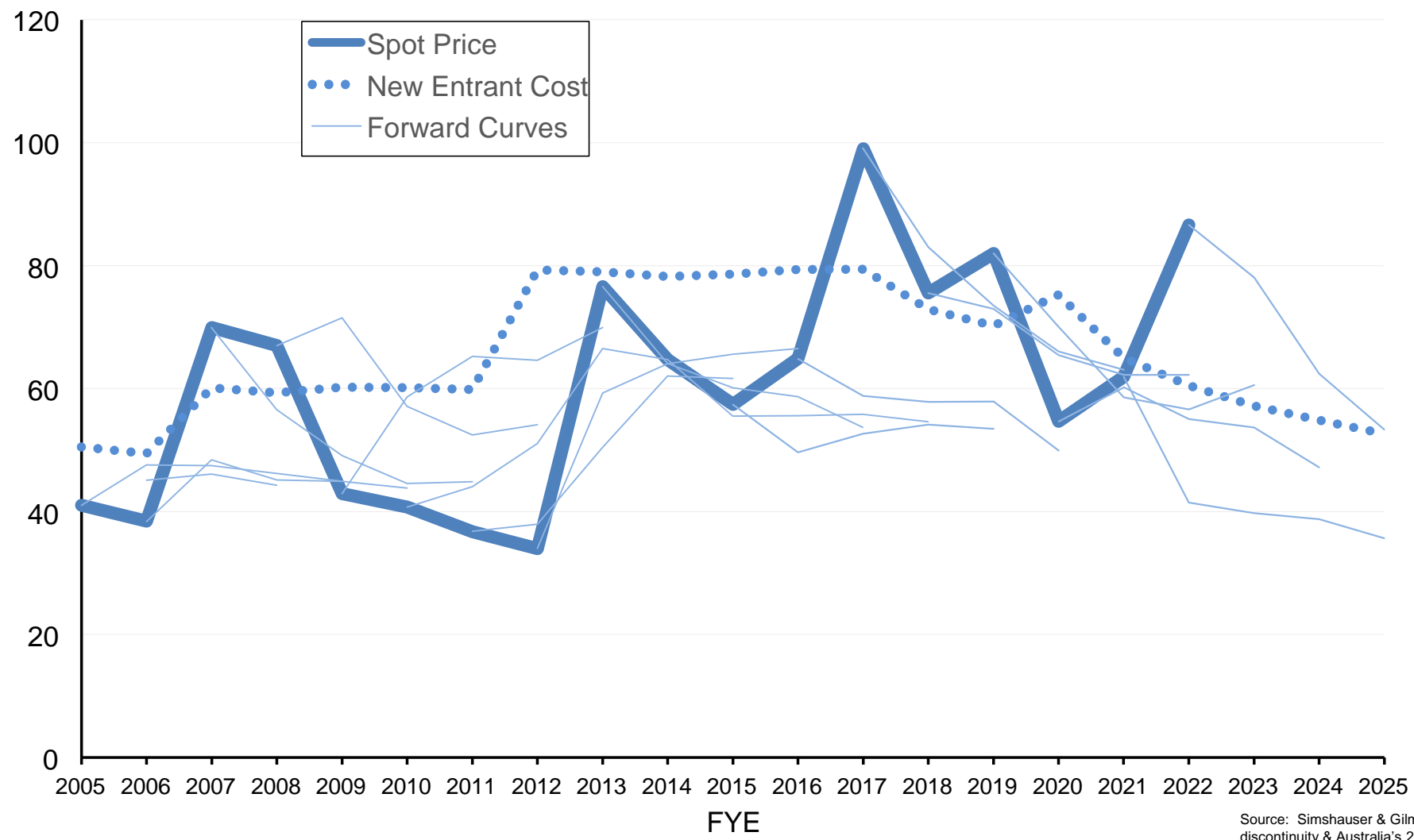
QLD Wholesale Prices – spot & forward

Wholesale Electricity Prices (\$/MWh)



Queensland Forward prices: mean reverting Real prices (2022\$)

Price (Real \$/MWh)



Afternoon tea

Borumba Pumped Hydro Energy Storage Project Update

Chris Evans, Project Director Pumped Hydro Developments

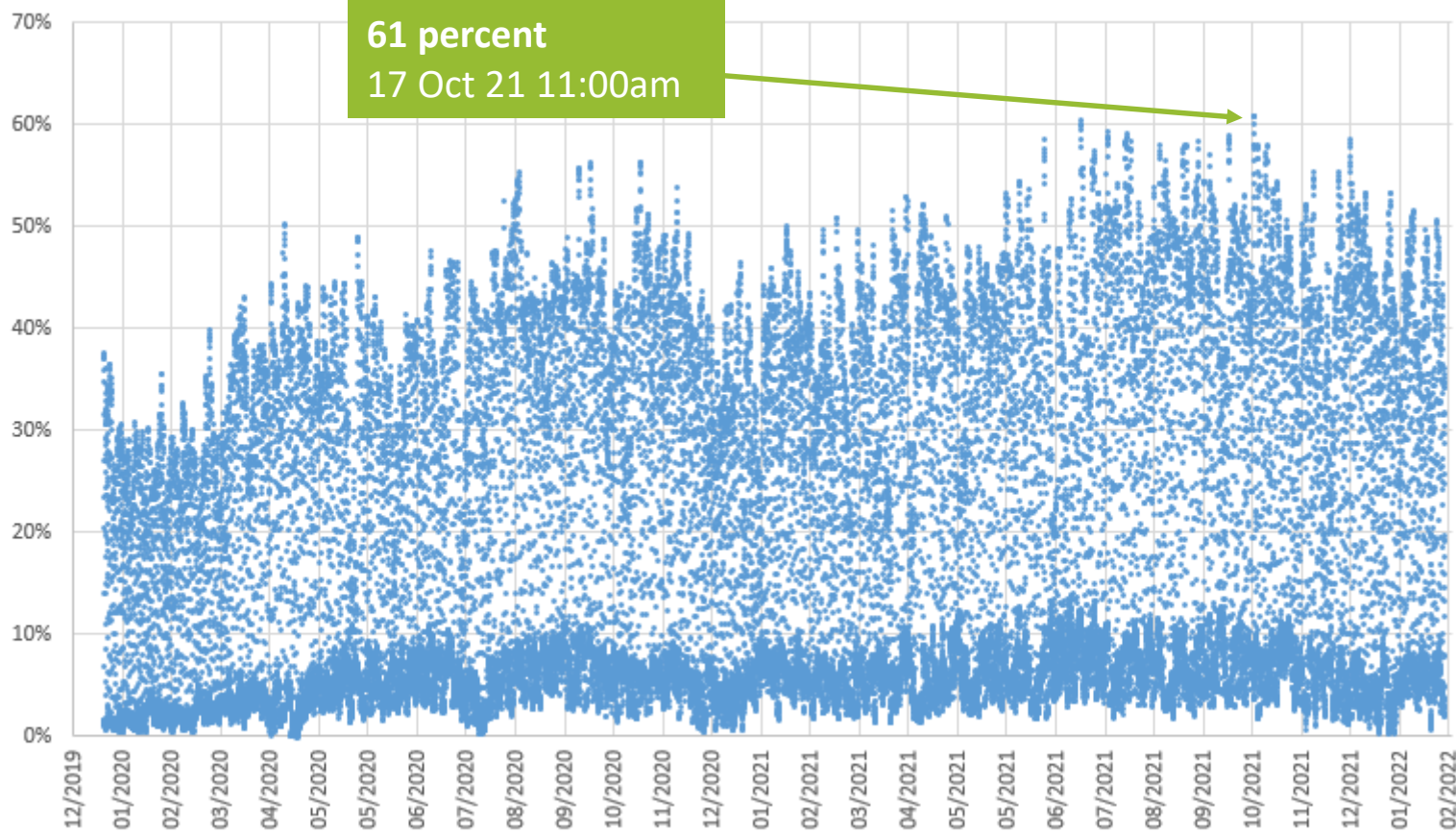
Presentation will provide an update to the Borumba Pumped Hydro Energy Storage (PHES) project

1. PHES Context
2. Borumba PHES reference project

Project Context



Why Pumped Hydro Energy Storage (PHES)?



We're doing well, but more is needed

Significant investment in Queensland in new renewable generation projects

- Strong solar resource
- Complimentary wind resource

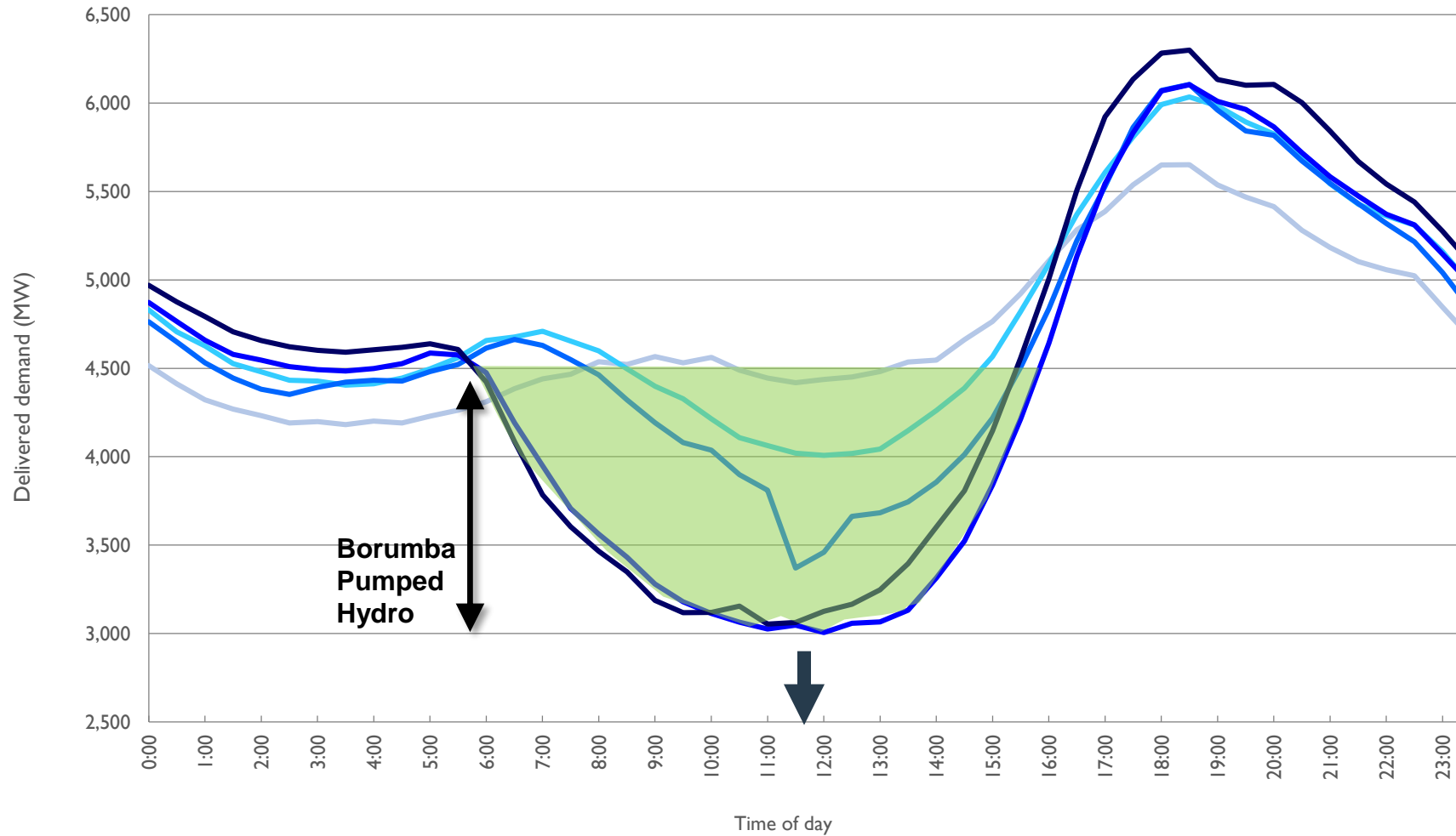
>60% renewable generation observed in Qld market

Significant periods when renewable generation <10% (predominantly when solar not generating)

Intermittent renewable generation requires firm dispatchable generation

Queensland Region renewable generation – percentage of total energy generated

Minimum demand and pumped hydro



Reference Project



Borumba Dam

- Owned by Seqwater
- Constructed 1964
- Rockfill embankment dam
- Raised by 2.5m (1998)
- 43 m high
- 343 m long
- 46.0 Mm³ storage
- Full supply level = 135.0m Australian Height Datum (AHD) (spillway height)
- Dam crest = 144.4m AHD
- Parapet wall = 147.2m AHD
- Recreation uses include boating (including power vessels), water-skiing, fishing (stocked), camping



Borumba Concept Study completed in May 2020, set minimum design requirement for project:

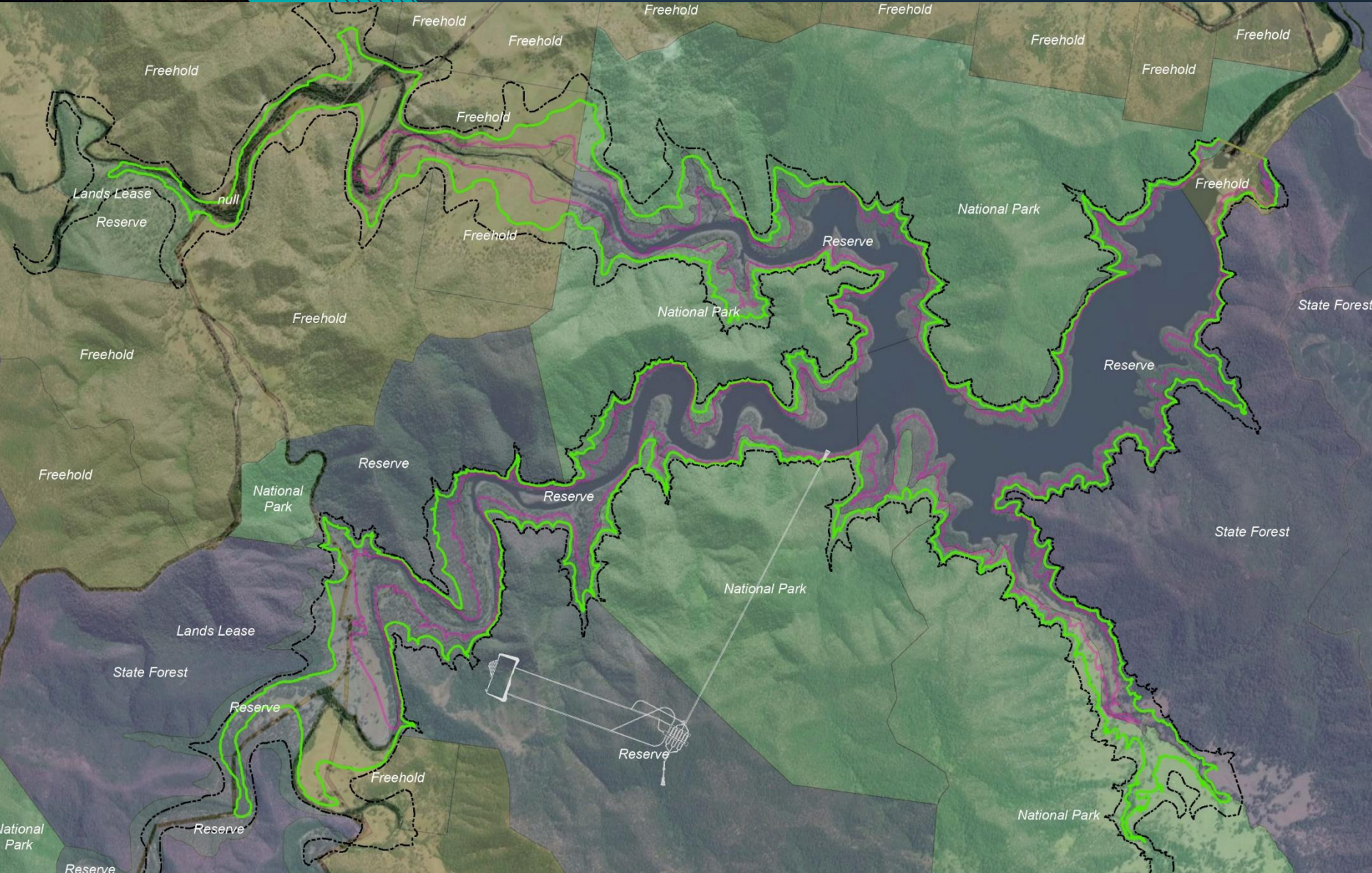
- 1000 MW generation capacity
- 24 hours storage (24,000 MWh)

Current phase of detailed analytical studies commenced in late July 2021, with SMEC joining Powerlink as owners engineer in Sept 2021

Optioneering occurred from Oct to Dec 2021, with a Reference Project defined. Key changes from the Concept Study include:

1. Refined height of the new lower Borumba Dam wall (at least 3m lower than identified the Concept Study – and presented in December)
2. Increased storage volume of the upper reservoir
 - Increased capacity to 1,500 MW to 2,000 MW
 - Duration 18-24 hours (36,000 MWh to 48,000 MWh)
3. Moved location of Powerhouse from under National Park to below Powerlink owned land

Optioneering: Borumba Pumped Energy Storage Project



Variety of heights for new dam wall considered, from 10m above current height (pink) to 35m above current height (dark blue).

Green line is approximately 20m above current height

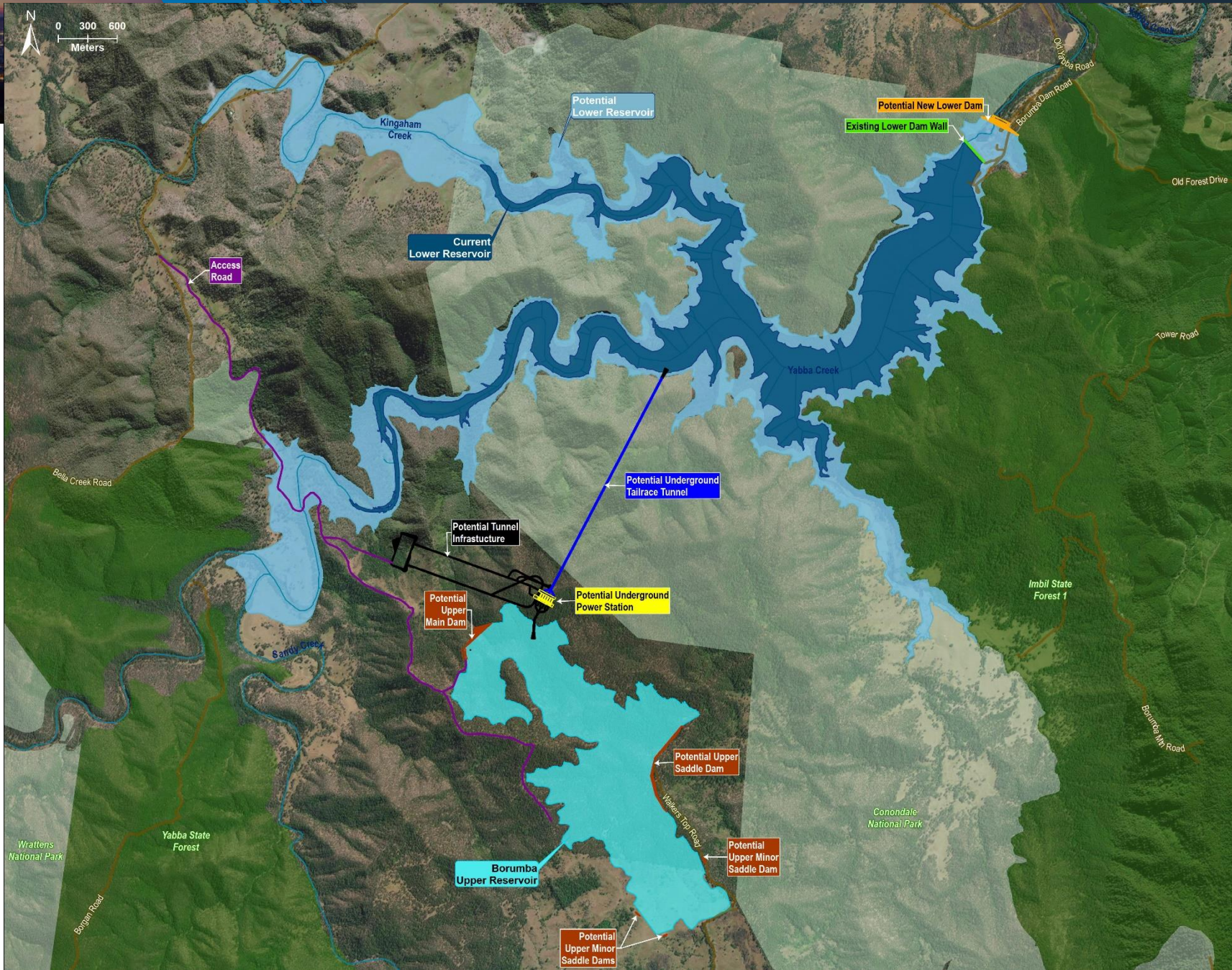
Balance between a higher dam wall

- PHES reliability
- reduced daily fluctuations
- potential to support additional water supply

With a lower dam wall:

- smaller inundation area
- lower cost

Reference Project



Height of 158m AHD identified in the Concept Study

Reference project proposes new dam height up to 20m above current dam height: 155m AHD

Area of National Park impacted reduces from approximately 145ha (at 158m AHD) to approximately 96ha (at 155m AHD)

- Concept level design was 1,000MW and 24 hours storage (24,000MWh)
- Aerial survey has identified greater storage available increasing MW (capacity) and MWh (storage)

For the upper reservoir full supply level (FSL) two options will be assessed

36,000 MWh storage (485m AHD full supply level)

- ~100 m high main dam + 2 saddle dams (800m in total length)
- 1,500 MW x 24 hours
- 2,000 MW x 18 hours

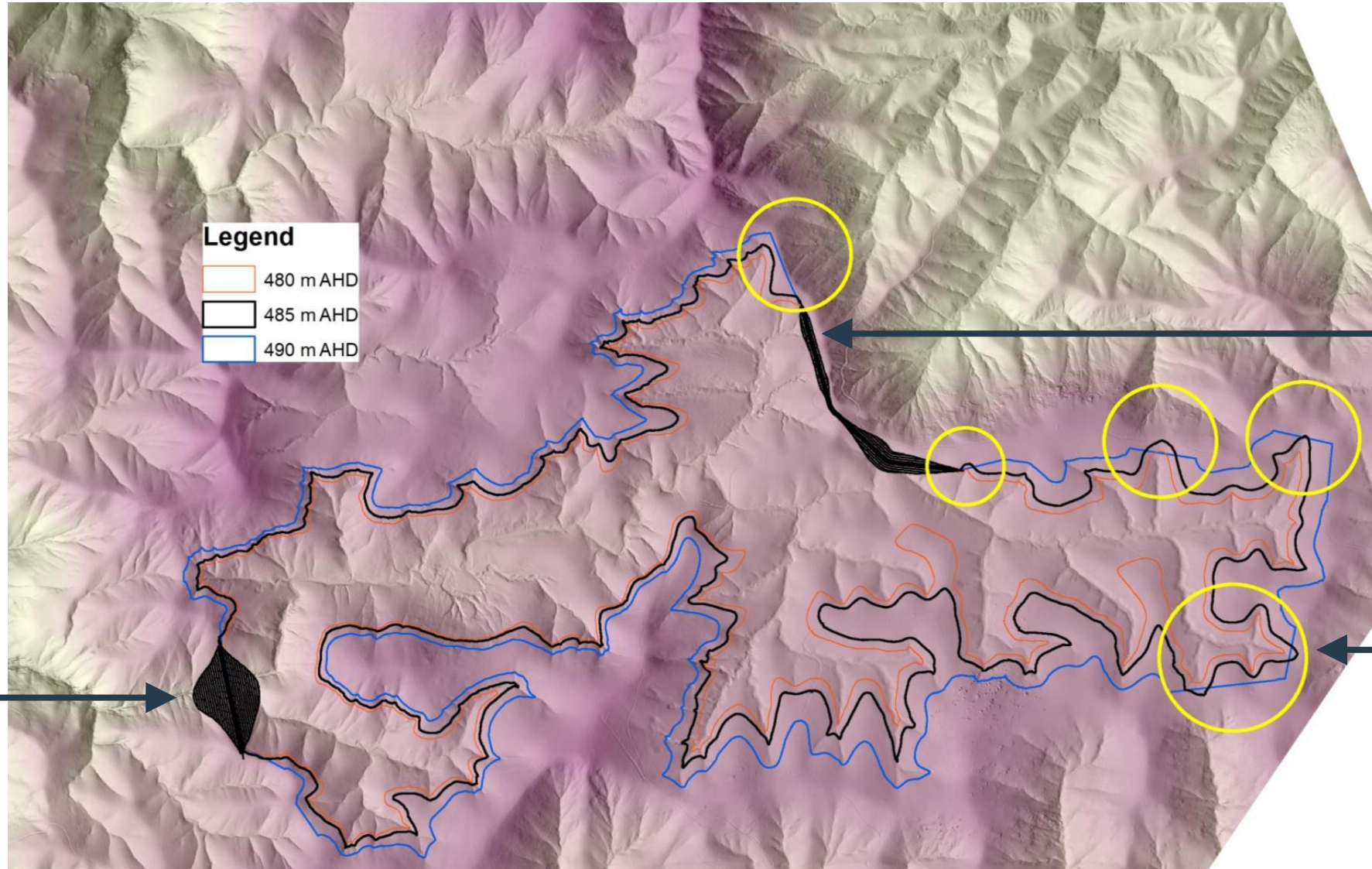
48,000 MWh storage (490m AHD full supply level)

- ~105 m high main dam + multiple saddle dams needed (2.3km in total length)
- 1,500 MW x 32 hours
- 2,000 MW x 24 hours

- The cost of additional storage will be considered against the value and network benefits of additional MWh



Optioneering: Borumba Pumped Storage Project



Main dam:
70m to 75m high

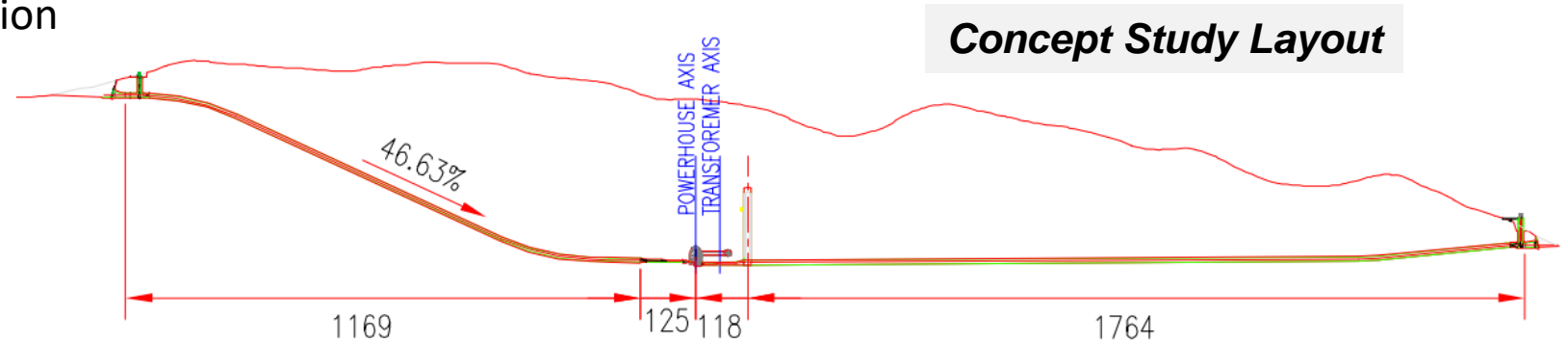
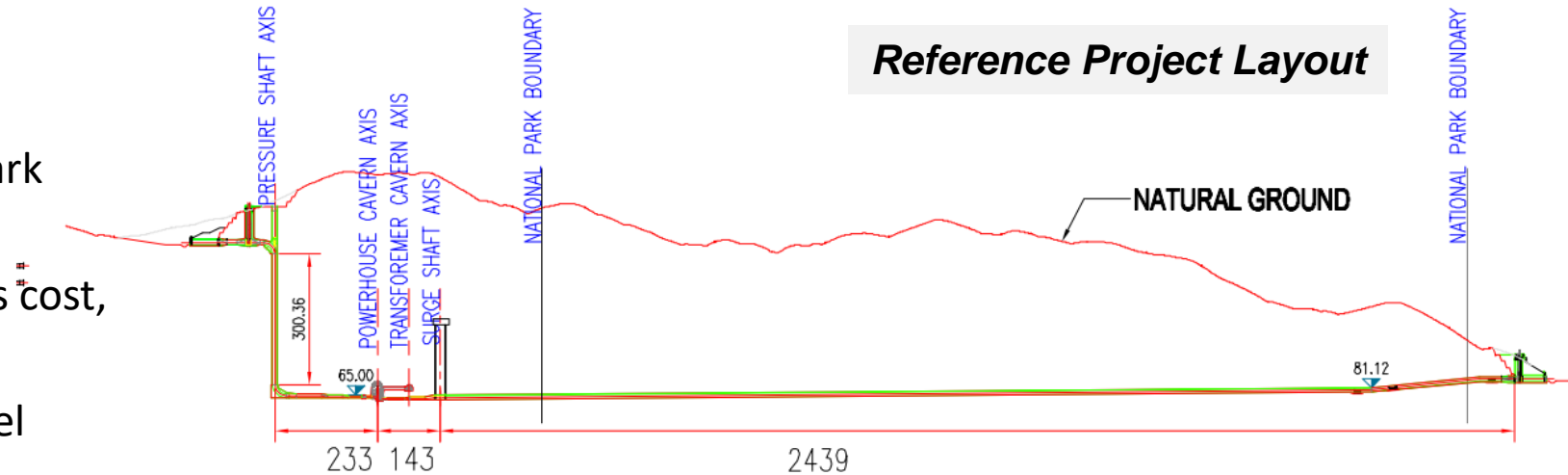
2nd saddle dam
(550m long)
485m+ AHD

Yellow circles are
multiple saddle
dams – extra 1.5 km
needed on 490m
AHD reservoir size

Powerhouse Location

Waterway, powerhouse arrangement:

- Main structures now outside National Park boundaries
- Vertical shaft – simpler construction, less cost, faster
- Excavated tunnel construction, not tunnel boring machine
- Better hydraulics for fast efficient operation



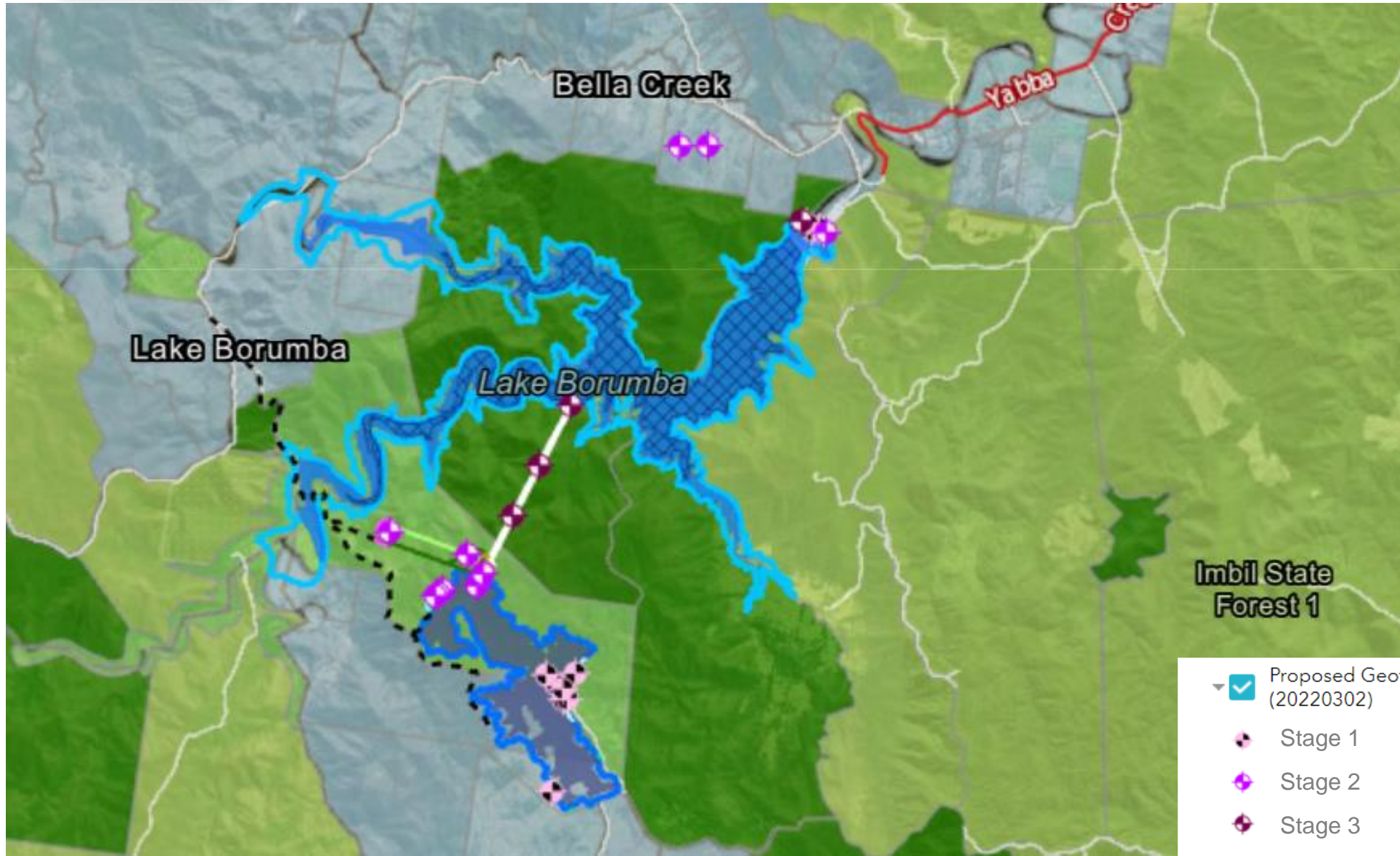
Transmission and Network Connection

- The engineering design package for the transmission line and associated network connection will be managed directly by Powerlink
- While the reference design is 2 x 275 kV transmission lines joining into the network at Tarong and Woolooga, Powerlink is investigating the potential for development of a 500 kV network. Utilising 500 kV connections has the potential to provide significant network benefits across southern and central Queensland. Allowance will be made for slightly taller structures in corridor identification and selection to support a broader transmission network strategy
- This configuration is expected to be able manage the likely power station configurations (1,500 MW to 2,000 MW)



Questions??

Geotechnical Studies – Stages 1,2,3



- Proposed Geotech Investigation Locations (20220302)
- Stage 1
- Stage 2
- Stage 3

Geotechnical Studies



Geotechnical Studies



Member of the Surbana Jurong Group

JOB 30-032677

CLIENT	POWERLINK	
SITE	BOAUMBA DAM	
HOLE	NB BK002	
RUN	DATE 01/02/22	
FROM	25.05 m	PHOTO
TO	30.0 m	1/5

0 50 100 150 200 MM

Enterprise Resilience Review

Linda Whatman, General Manager Strategy

Agenda

- Context for why Powerlink is looking to review its resilience activities
- Proposed broader definition for resilience
- Expansion of the domains covered by enterprise resilience
- Your feedback

Context

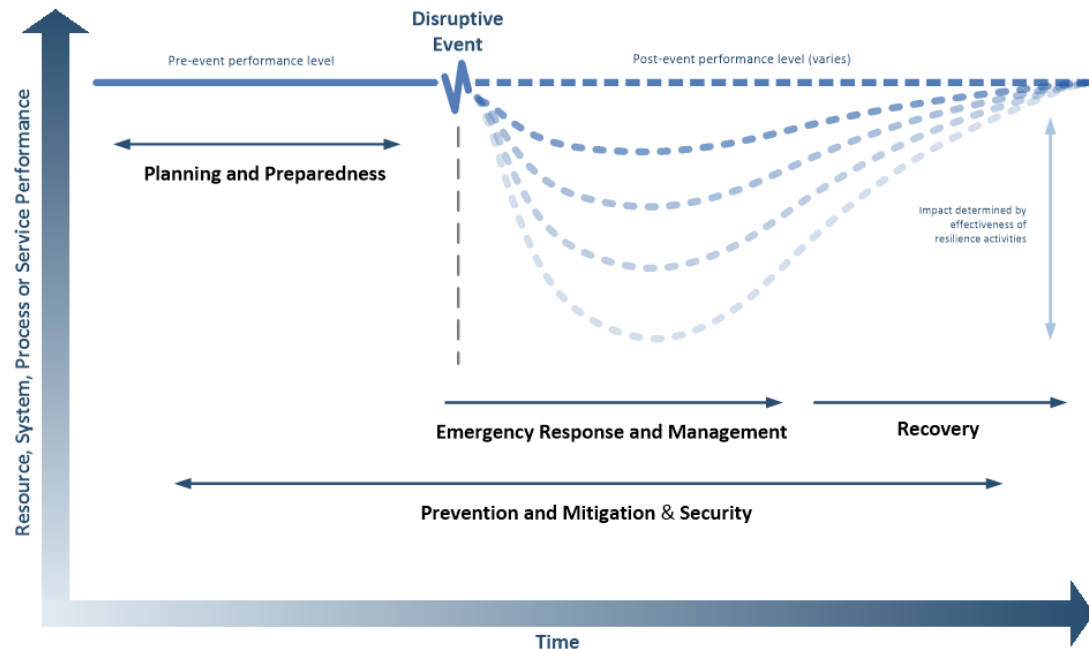
- The nature and scope of threats and opportunities networks need to consider continues to expand
- Some of these have legislative or regulatory drivers
 - Australian Energy Regulator Network Resilience Guidance Note
 - *Security of Critical Infrastructure Act 2018* legislative reforms
- Government stakeholders are requesting reports on a broader set of issues
- Expectations of what networks should deliver are increasing

Enterprise resilience requires a broader definition

Current State

Definition:

The ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruption



Future State

Definition:

The integrated approach to build and monitor capabilities across Powerlink to help achieve strategic objectives and keep pace with the changing business environment to strengthen our brand and reputation by delivering **financial**, **human**, **environmental** and **societal** value to our customers

Prepare

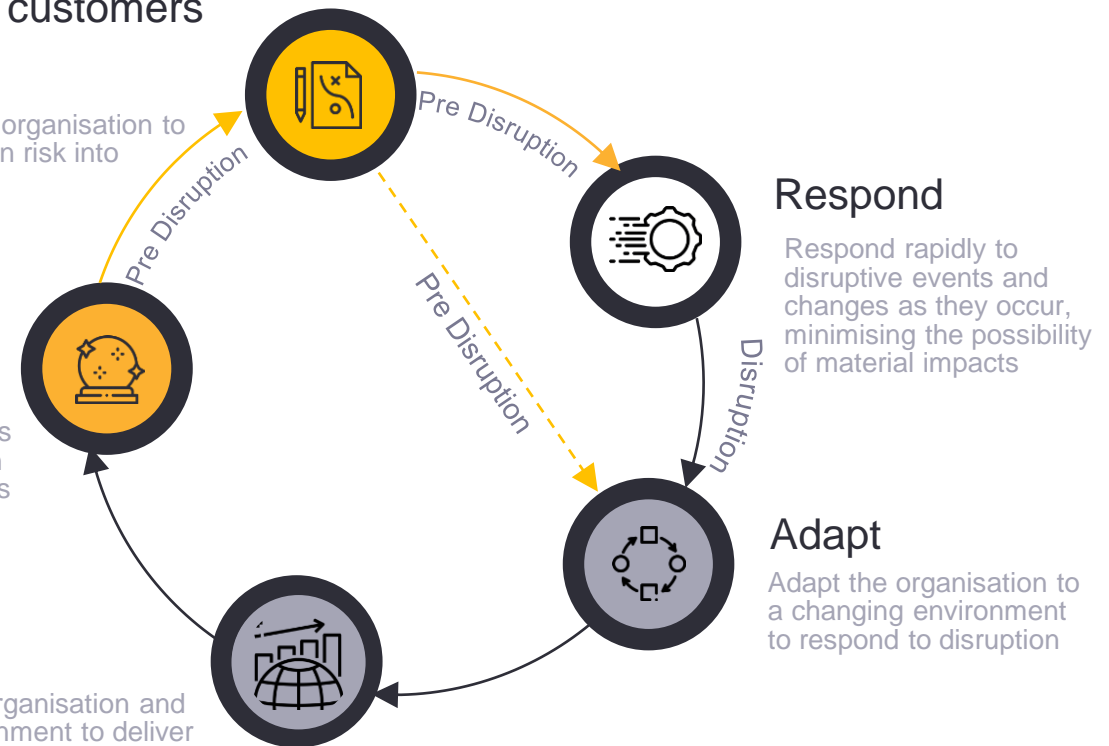
Prepare the organisation to evolve to turn risk into opportunity

Anticipate

Anticipate change, disruption and threats to have an impact on the organisation or its ecosystem

Reshape

Reshape the organisation and external environment to deliver sustainable long-term value to stakeholders, including customers



Respond

Respond rapidly to disruptive events and changes as they occur, minimising the possibility of material impacts

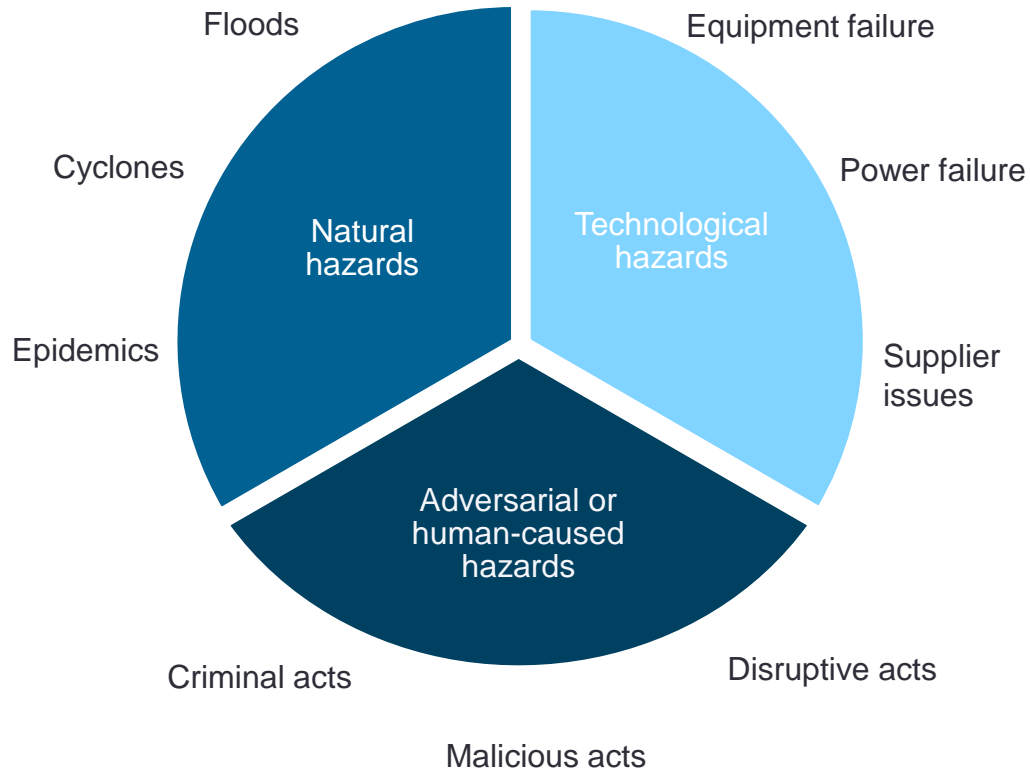
Adapt

Adapt the organisation to a changing environment to respond to disruption

Resilience requires reshaping for long-term value creation

Current State

Resilience activities = disruption response



Future State

Resilience activities = threat and opportunity forecasting

Market and government reforms

- AEMO Integrated System Plan
- Forthcoming Queensland Energy Plan
- ESB Post-2025 Electricity Market Design and associated work programs

Community and society interests

- Geographical belief system differences
- Growth of renewable focus

Supply chain management

- Economic collapse/recession in global markets
- Geo-political tensions between trading partners
- Shipping industry constraints

Information and cyber security

- Security of Critical Infrastructure Act amendments
- Increase in cyber crime threat for national infrastructure facilities
- Increased cloud storage capabilities

Opportunities

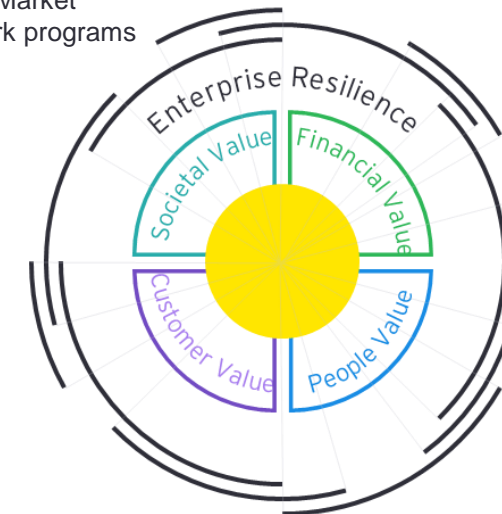
- Non-regulated business
- Regulated business
- Energy transformation
- Shifts in competitive landscapes

Operational

- Natural hazards
- Technological hazards
- Adversarial hazards

Talent and diversity

- Increasing skills gap around both capability and capacity with planning required now to meet future demand



Sustainability

- Climate Change targets
- Environmental Social Governance (ESG) framework

New technologies

- Green hydrogen

Your Feedback

- Do we have any gaps in what we are proposing to cover?
- How can we create better outcomes for customers through improving Powerlink's organisational resilience?