2021 Transmission Network Forum

Monday 15 November 2021

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Powerlink Transmission Network Forum

The Hon. Mick de Brenni MP

Minister for Energy, Renewables and Hydrogen

Minister for Public Works and Procurement

15 November 2021

Queensland Government

State of the Union & State

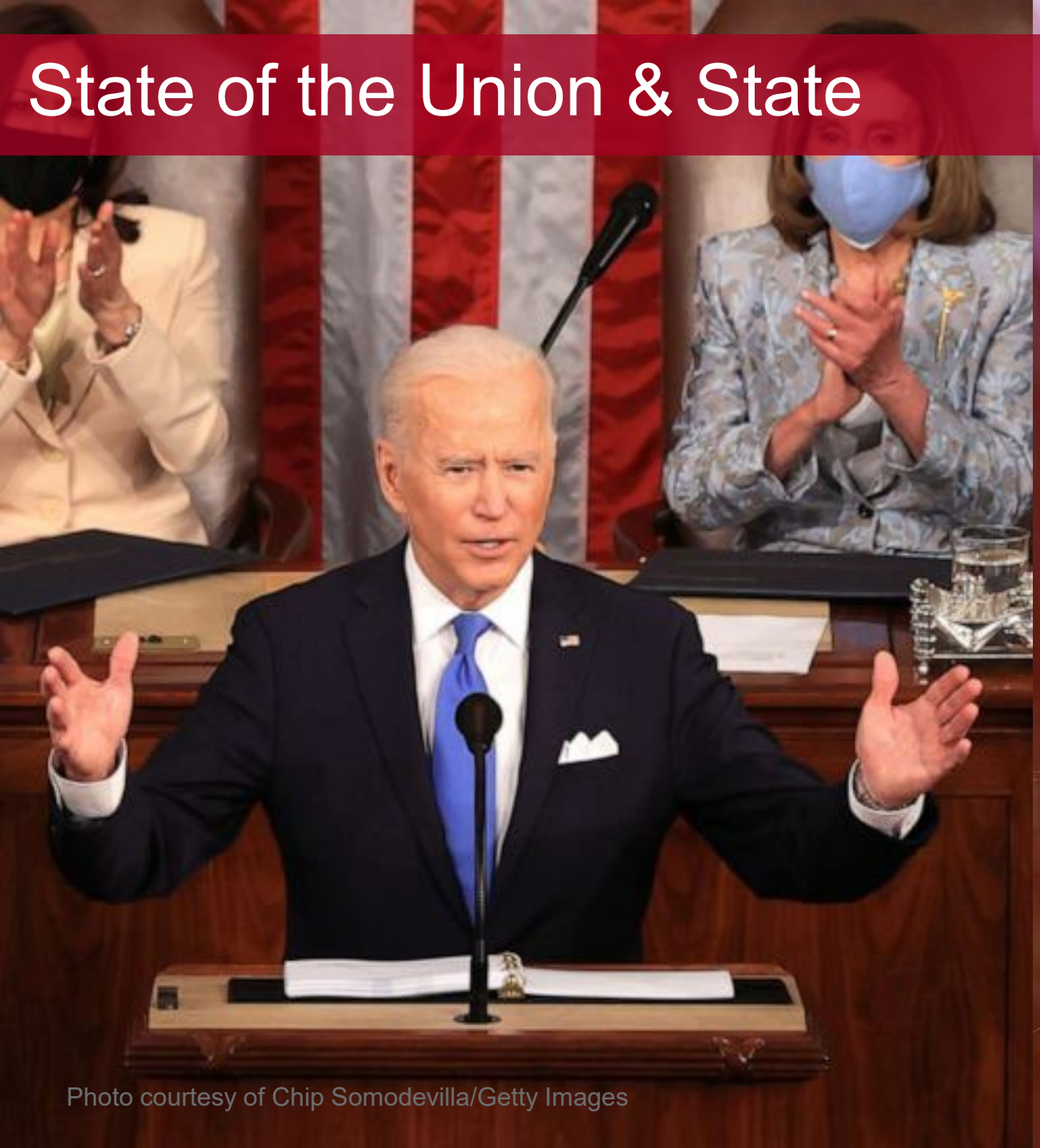


Photo courtesy of Chip Somodevilla/Getty Images

State of the Network

Cleaner, cheaper energy

Jobs for Queenslanders

20% renewable energy supply now

50% by 2030

A renewables and hydrogen superpower

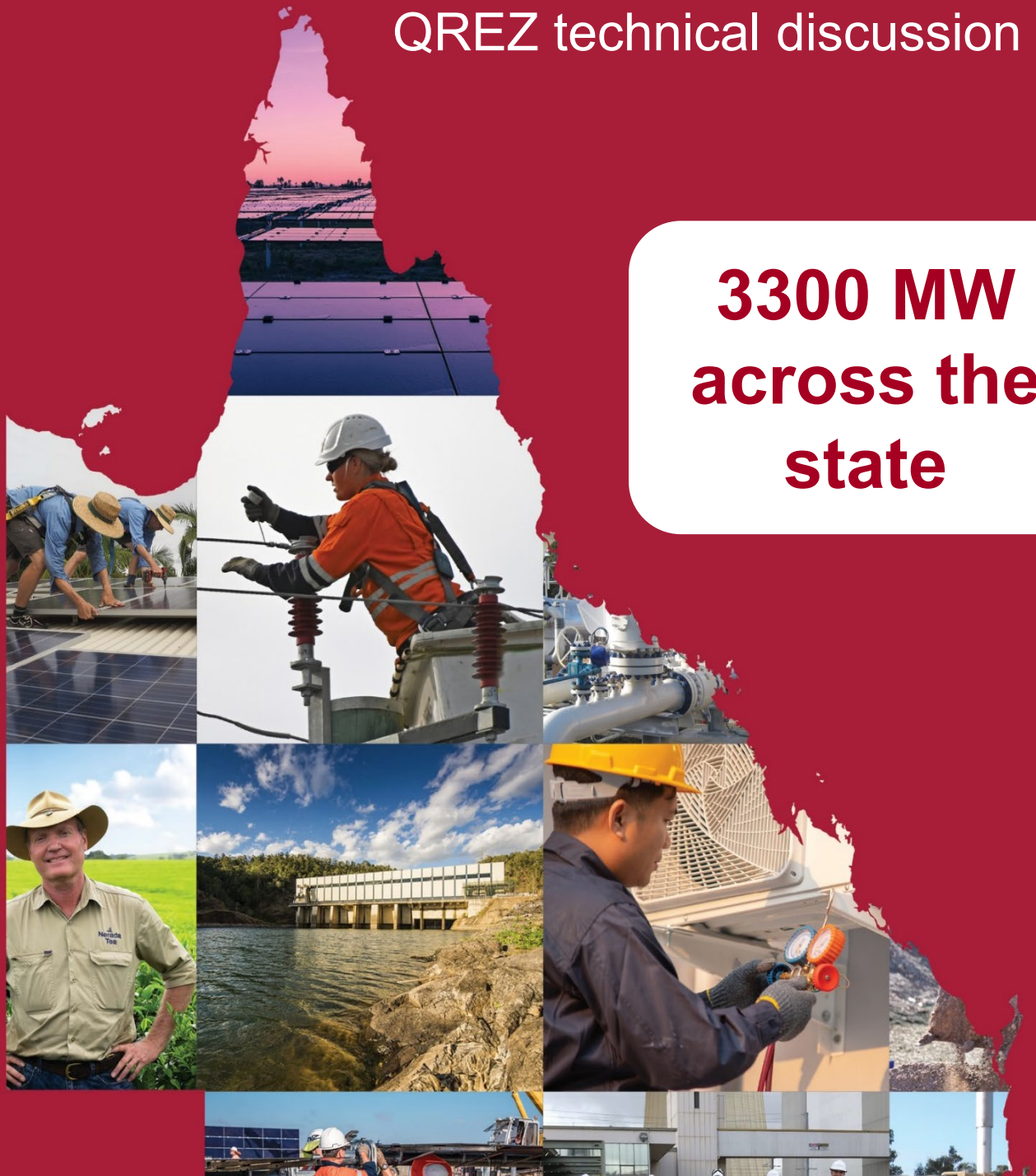
Northern QREZ – Kaban and Genex

Genex Clean Energy Hub, Kidston. Image credit, Genex Power

Southern QREZ – MacIntyre, Wandoan South

Wandoan South BESS Image credit: Vena Energy

QREZ technical discussion paper



3300 MW across the state

QREZ

Consultation on the model for QREZ design and access

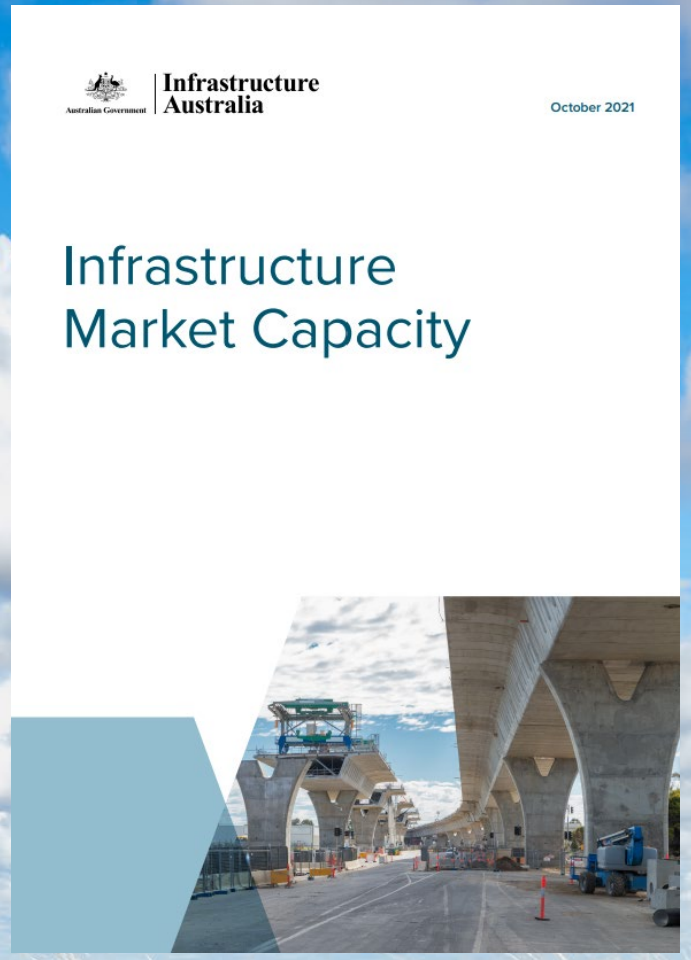
Delivering Queensland Renewable Energy Zones

TECHNICAL DISCUSSION PAPER

November 2021

Queensland Government

Infrastructure Australia Report



Transmission lines
Image credit: Powerlink

Achieving together

Image credit: Genex

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

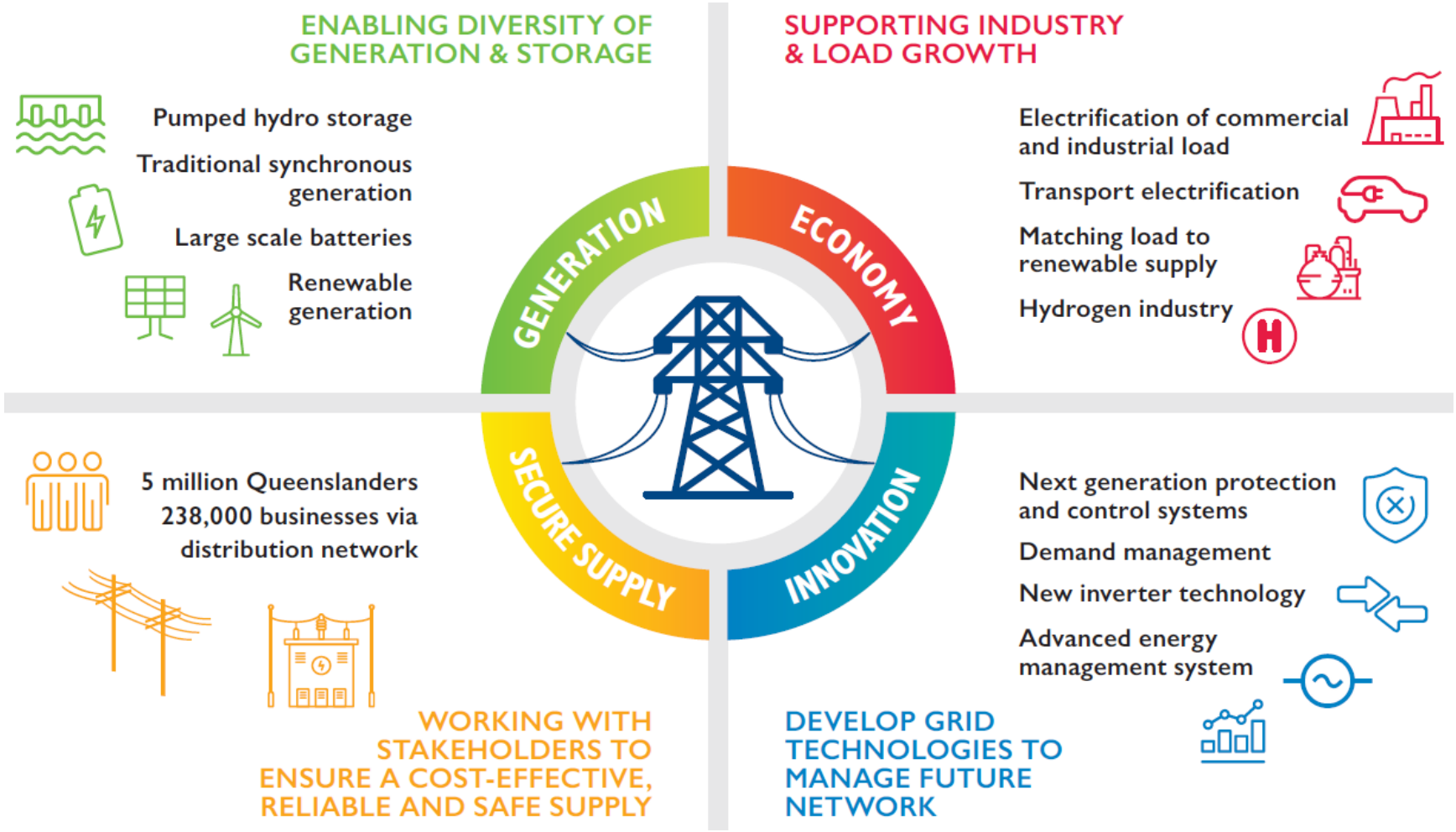
State of the Network

Paul Simshauser
Chief Executive

Monday 15 November 2021

Powerlink Queensland

Transmission at the centre of the power system

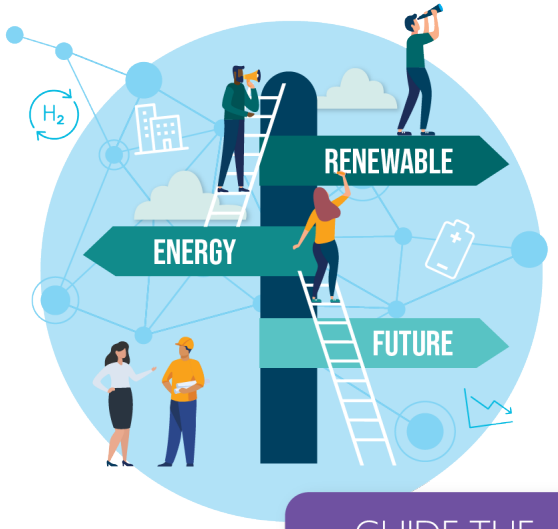


POWERLINK PLAYS A CENTRAL ROLE IN THE ENERGY TRANSFORMATION

Powerlink strategy

BE THE RENEWABLE SUPER GRID

UNLEASH OUR POTENTIAL

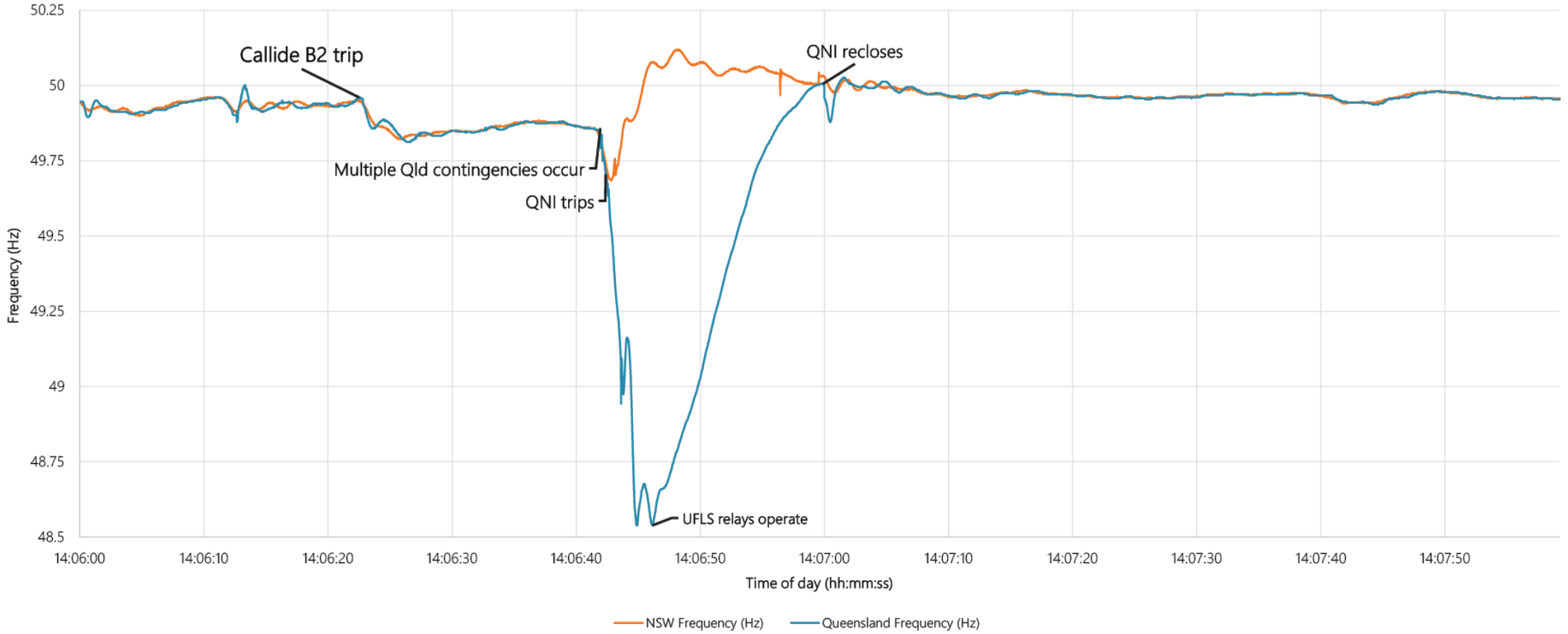


GUIDE THE MARKET

DRIVE VALUE FOR CUSTOMERS

Callide outage – 25 May

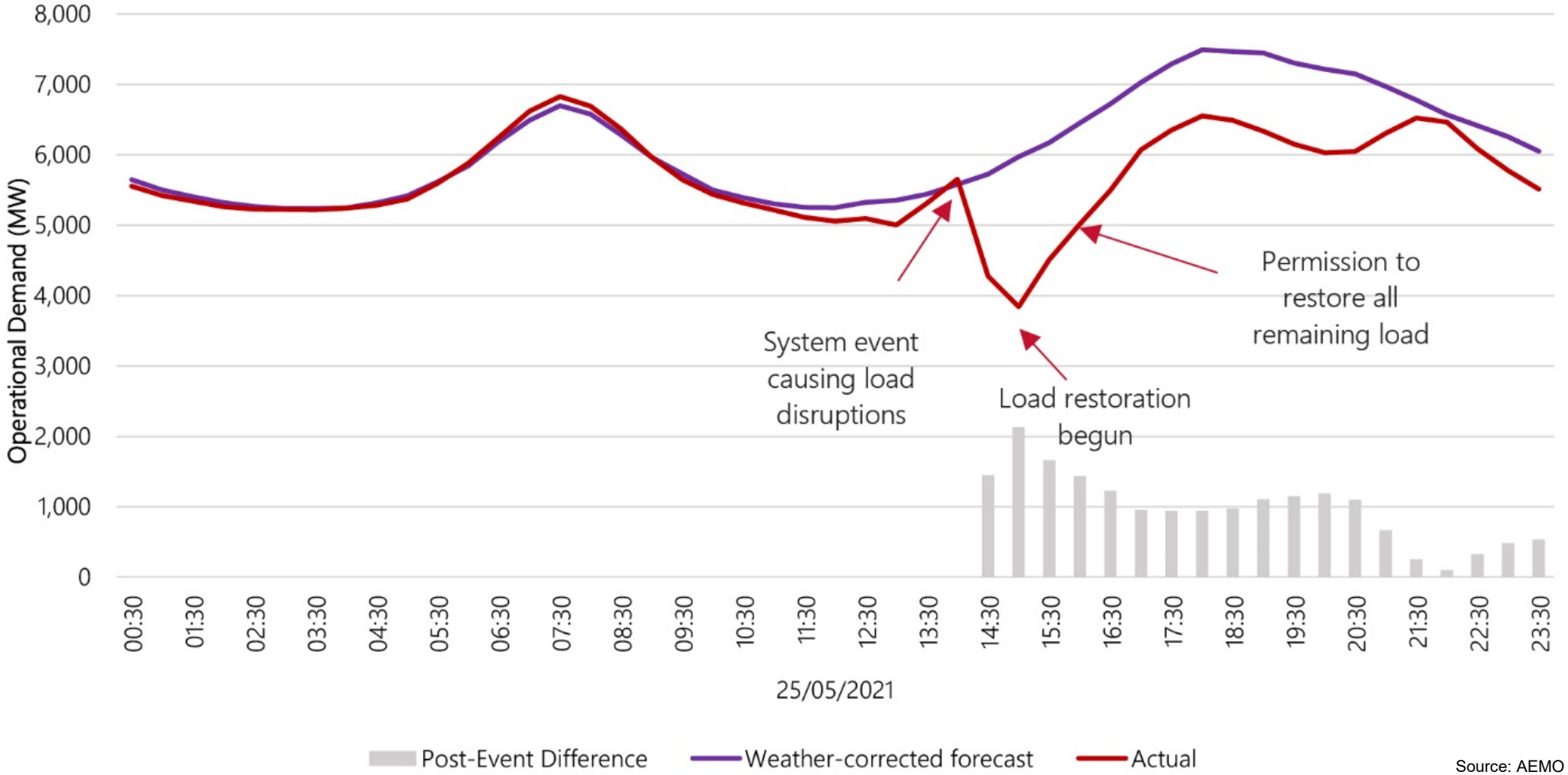
Queensland and New South Wales Interconnector frequency during multiple contingencies



Source: AEMO (2021)

Callide outage – 25 May

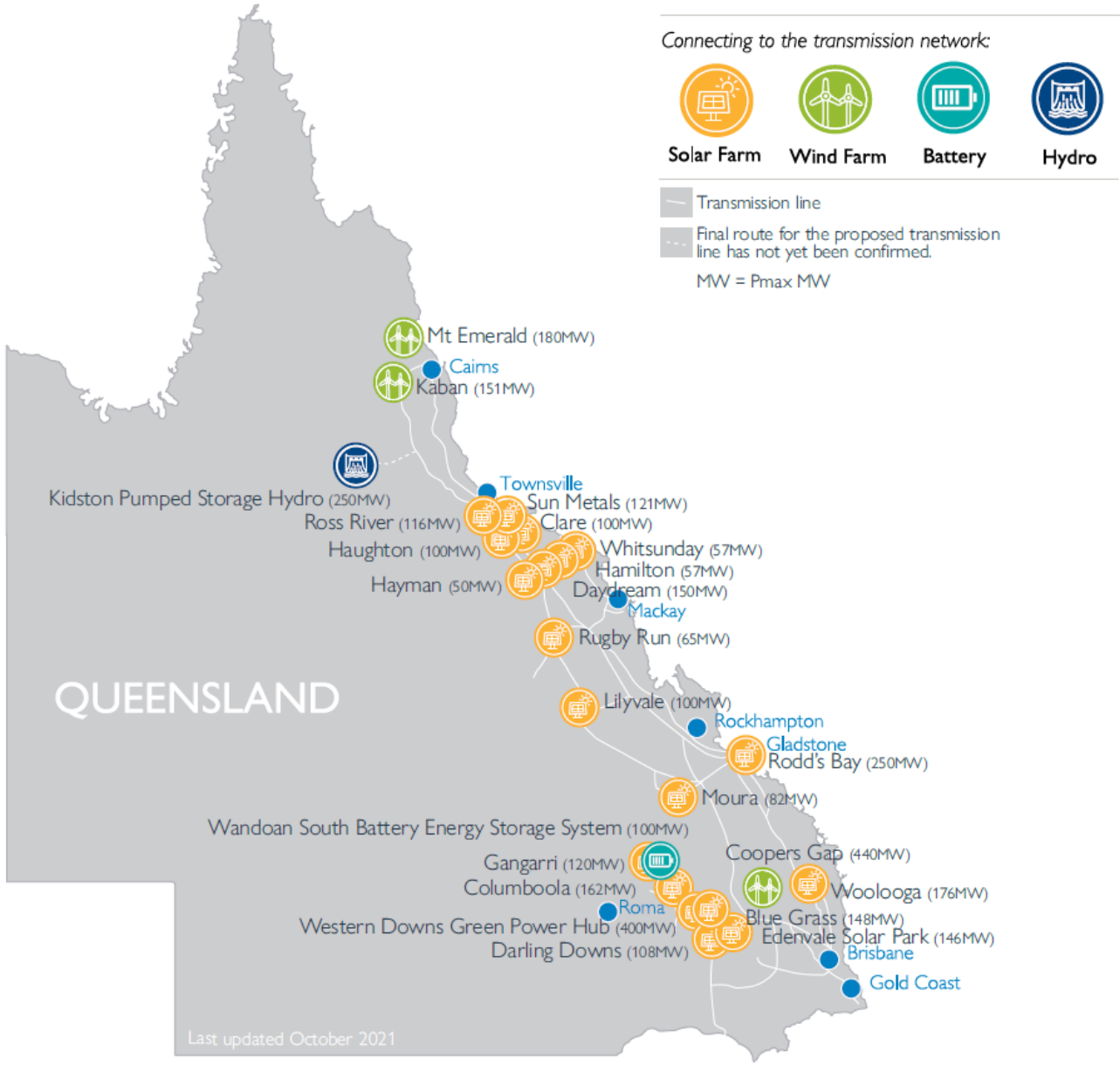
Operational demand reductions estimations



Source: AEMO (2021)

Transmission connections

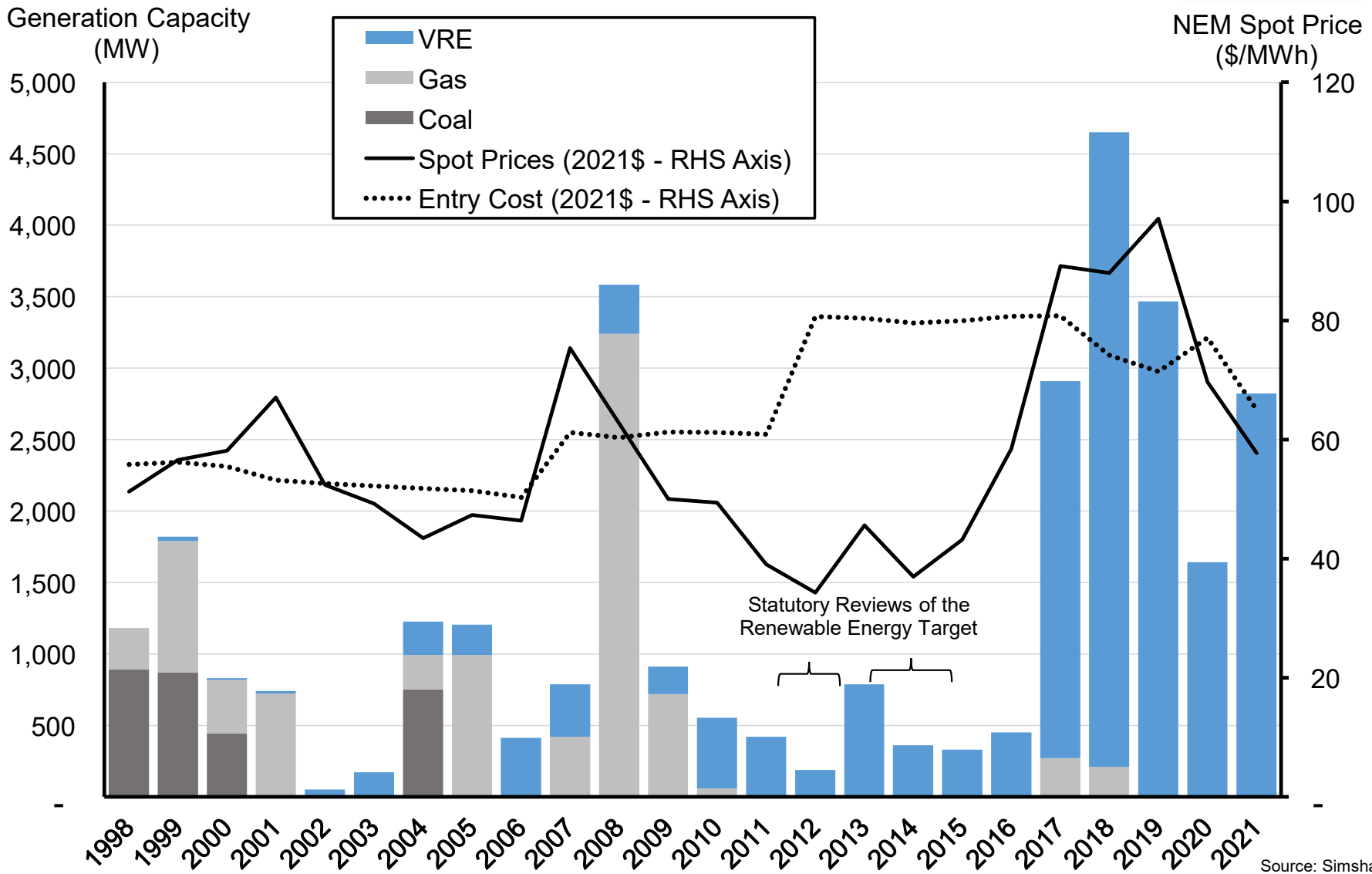
- **Connected 24 renewable projects** with combined maximum output of approximately 3,600MW
- As at September 2021, **23 renewable project applications are being processed** representing approximately 6,700MW of generation
  - Wind – 4,400MW
  - Solar – 2,000MW
  - Battery – 300MW



Major project update

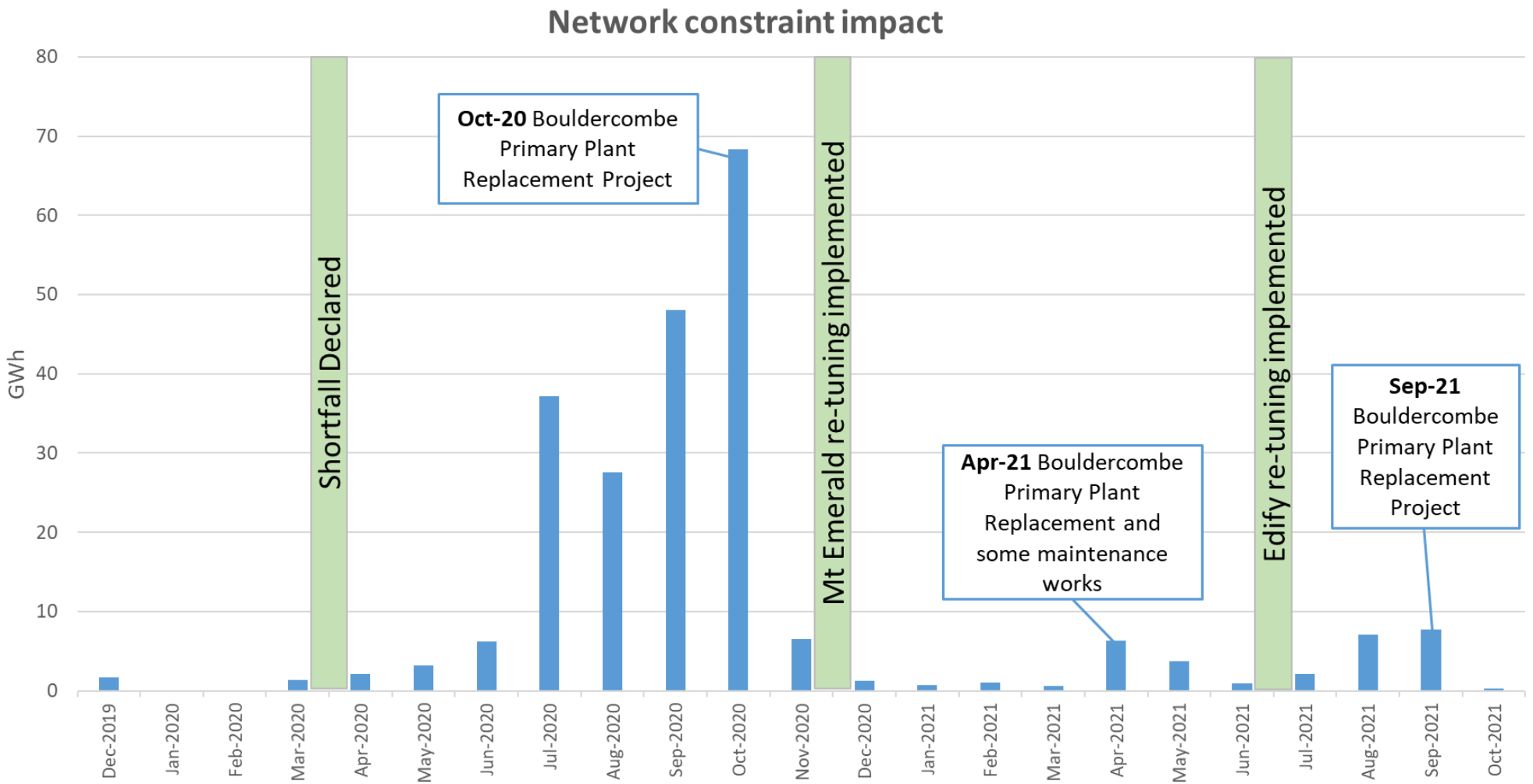
- **Genex Kidston Connection Project**
  - building around 186km of 275kV transmission line, including 340 transmission towers.
  - Local supplier briefing conducted in conjunction with UGL
- **Wandoan South Battery Energy Storage System (BESS)**
  - Queensland first large-scale battery owned by Vena Energy
  - Powerlink component of works completed
  - lithium ion battery will have a capacity of 100MW and store 150MWh of energy, which could power up to 57,000 homes
- **Borumba Pumped Storage Hydro**
  - Queensland Government and Powerlink undertaking Detailed Analytical Assessment over two years to determine the site's suitability for a pumped hydro facility.

NEM supply-side dynamics



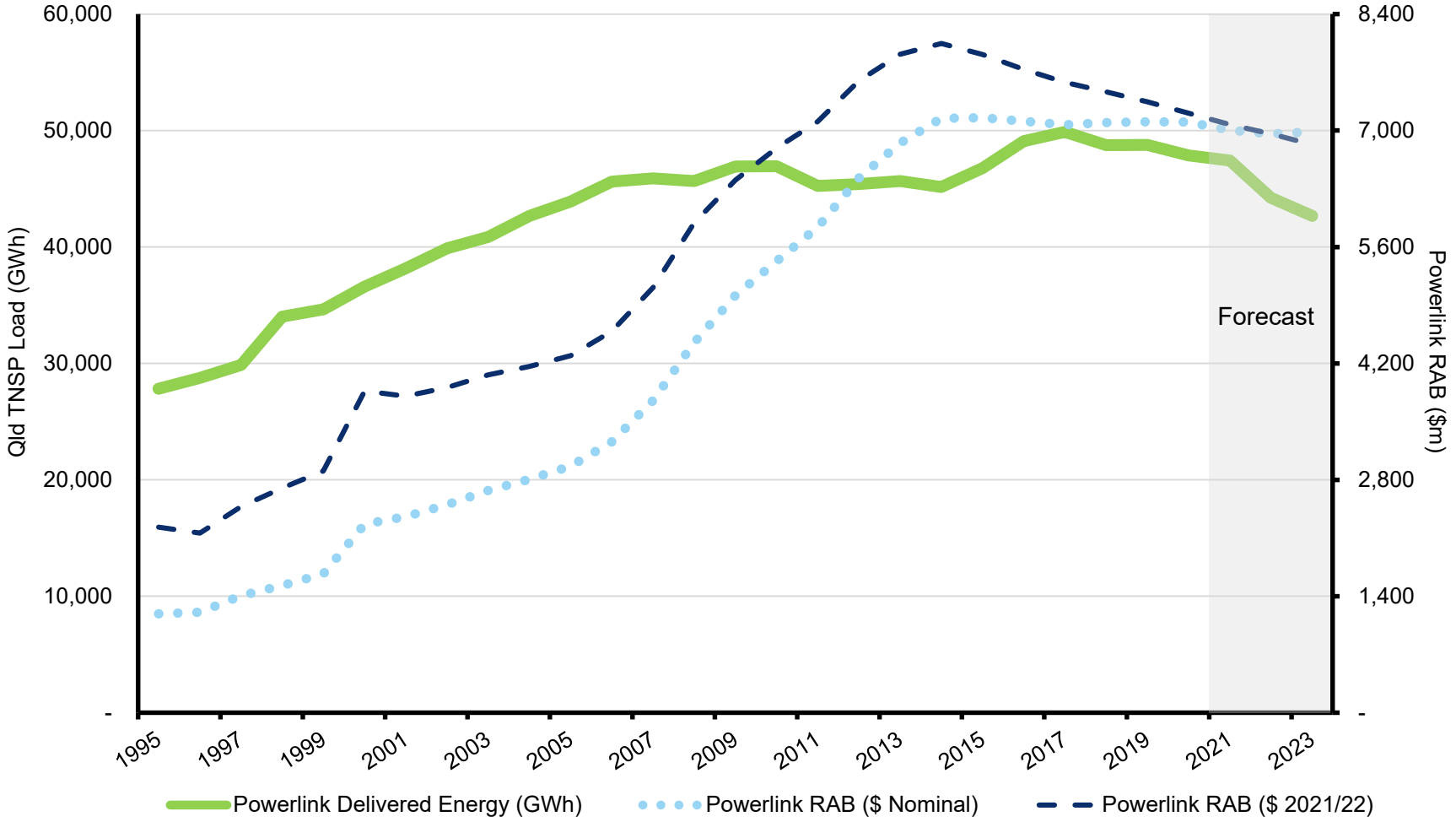
Source: Simshauser & Gilmore (2022)

Retuning inverters

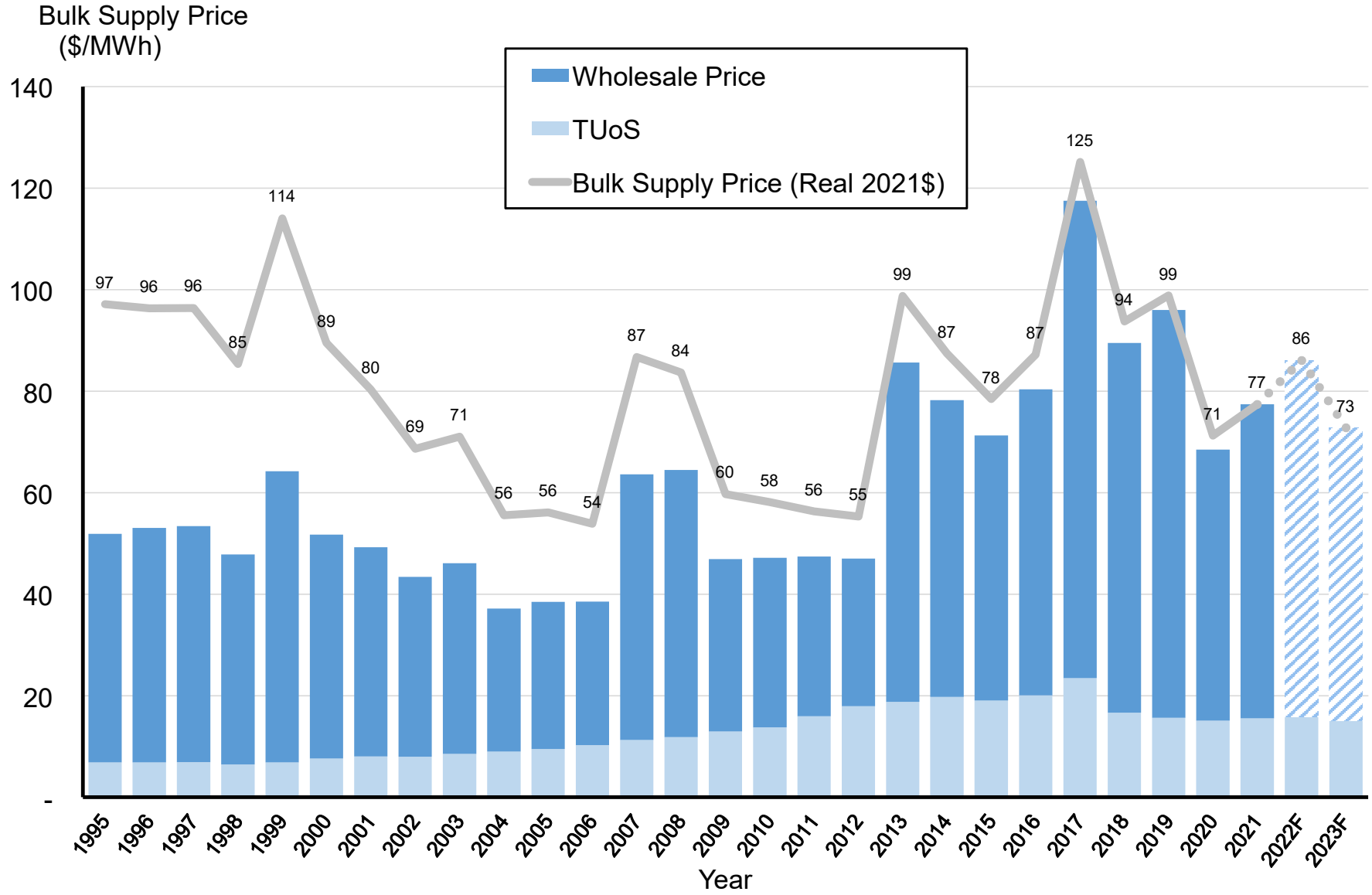


Regulatory Asset Base

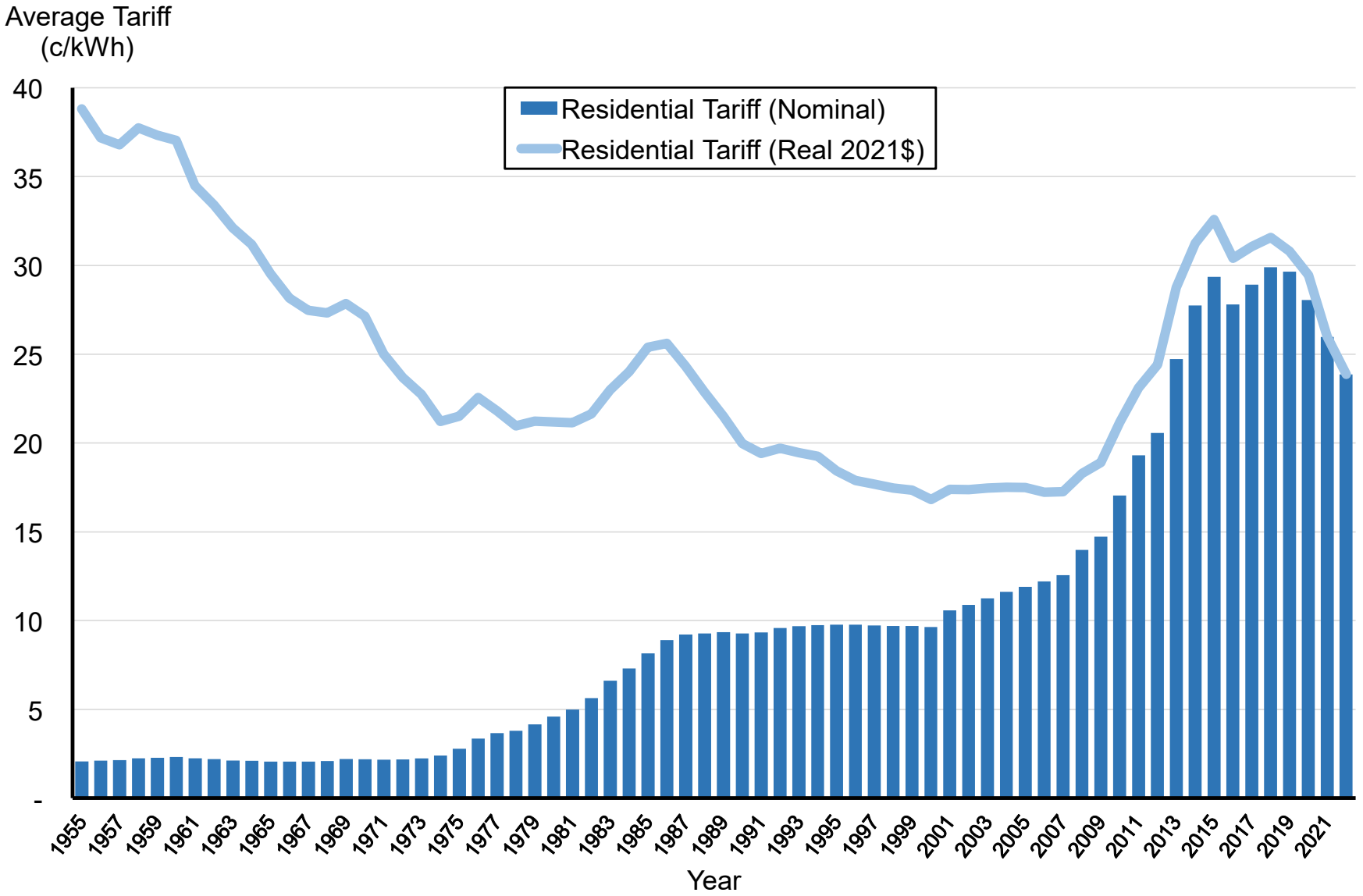
Powerlink forecast delivered energy (GWh) versus RAB



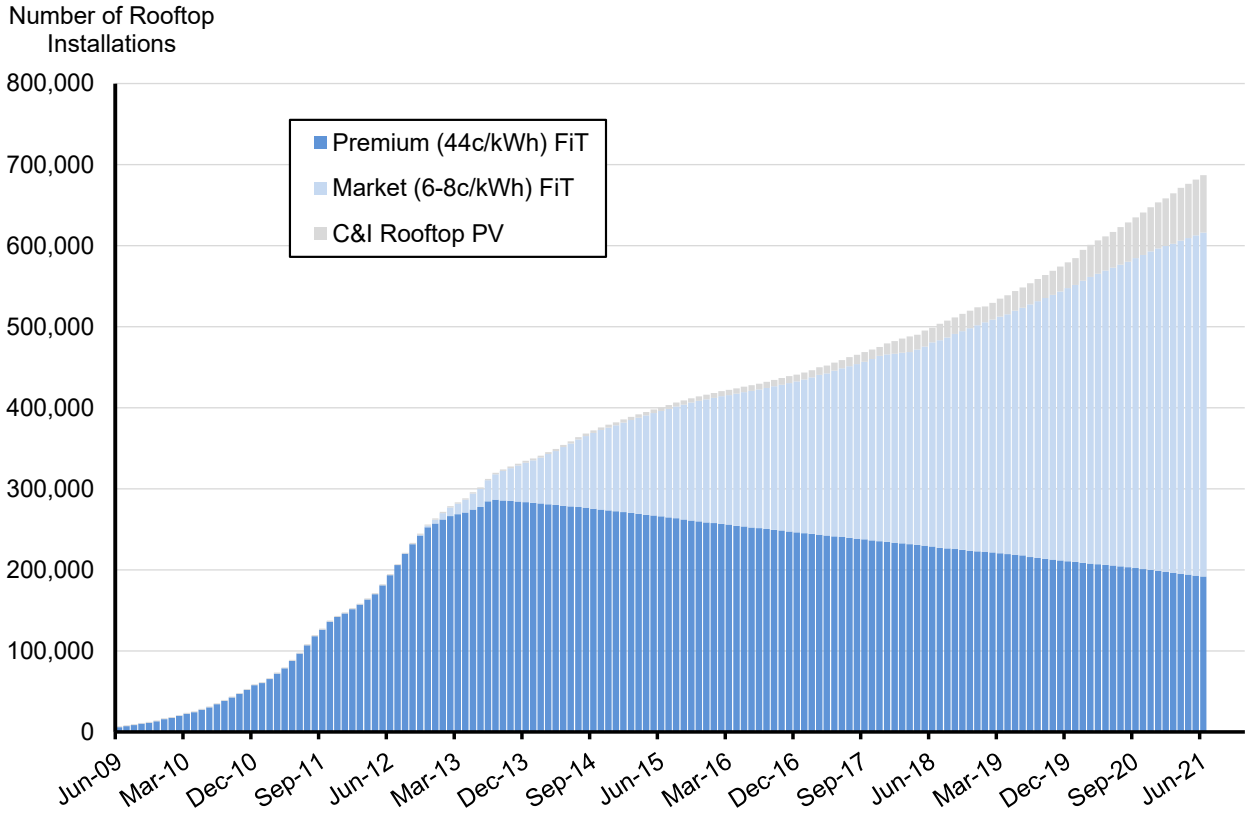
Queensland bulk supply price (1995-2023F)

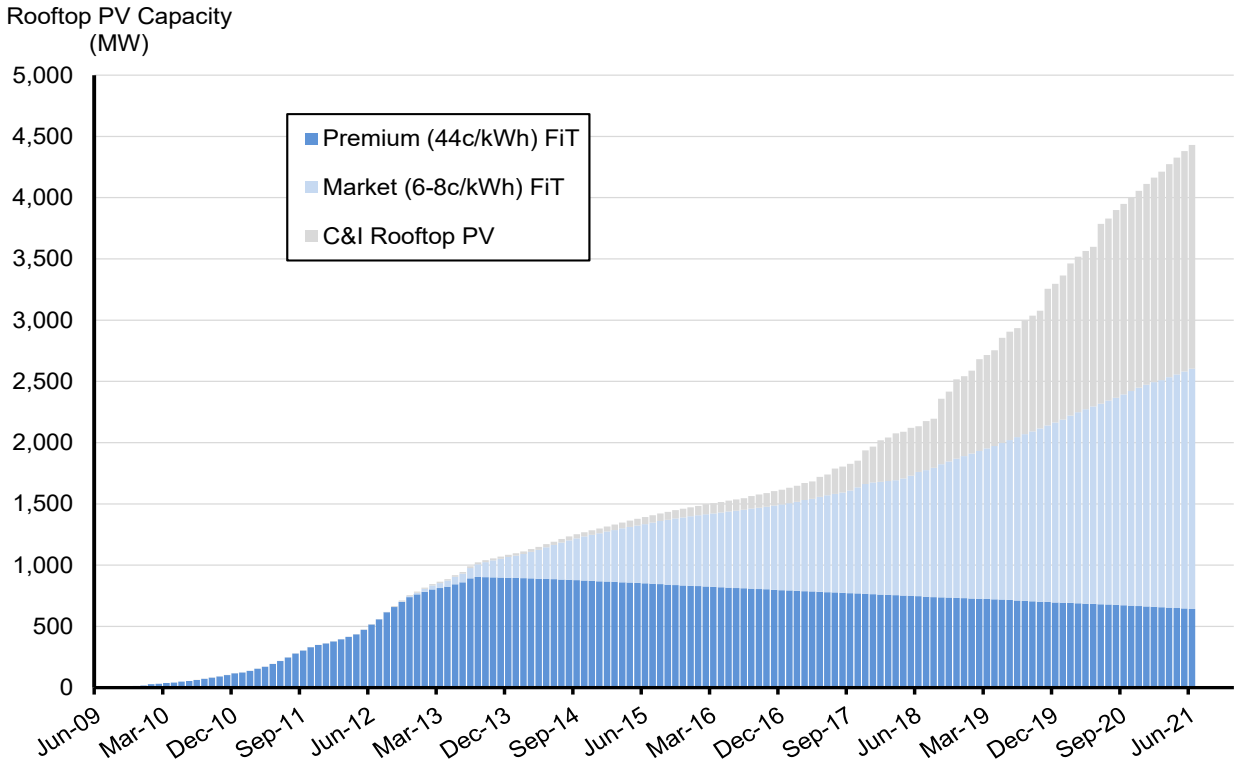


Queensland residential tariffs (1955-2022)

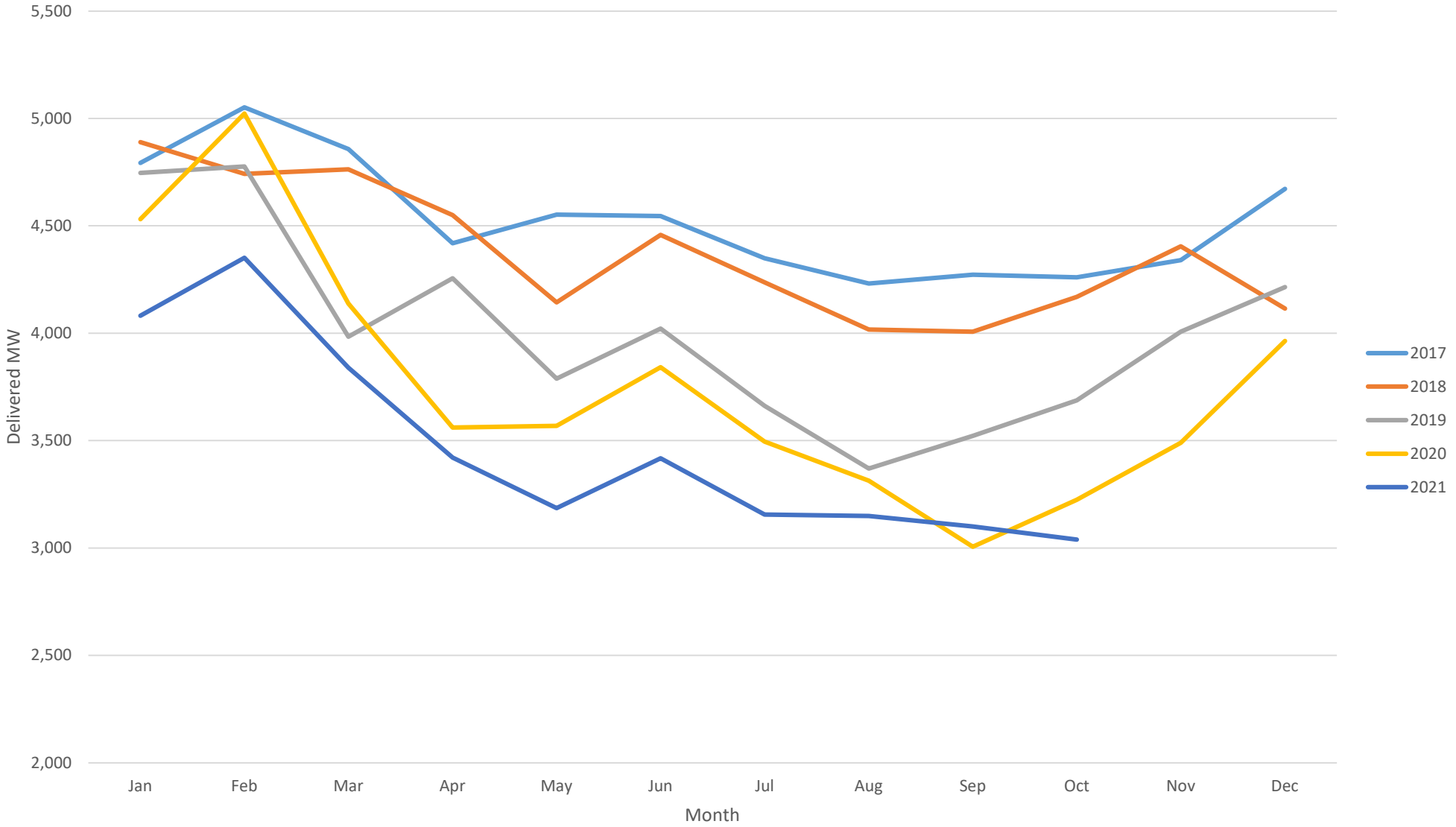


The solar effect



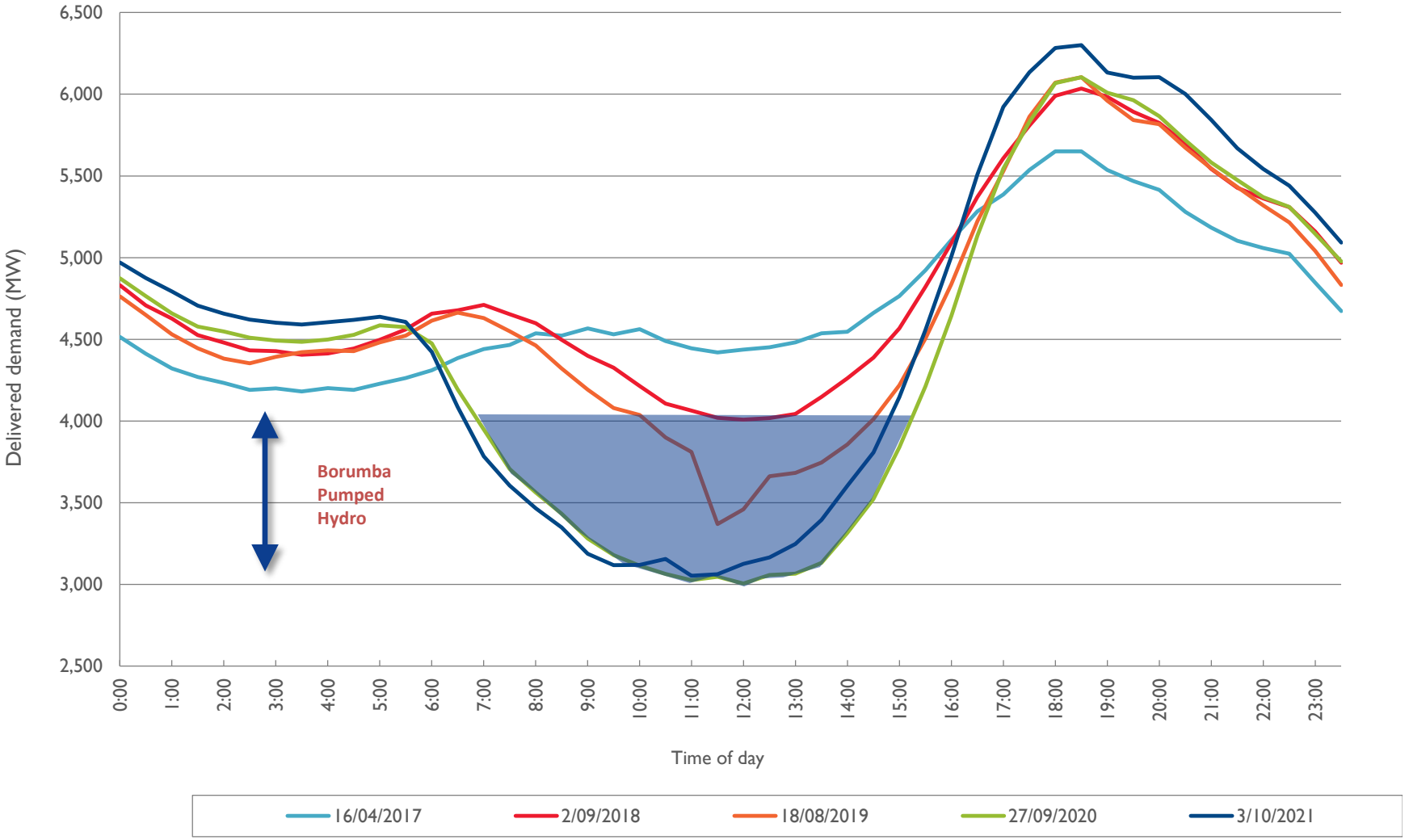


Queensland minimum demand (MW)



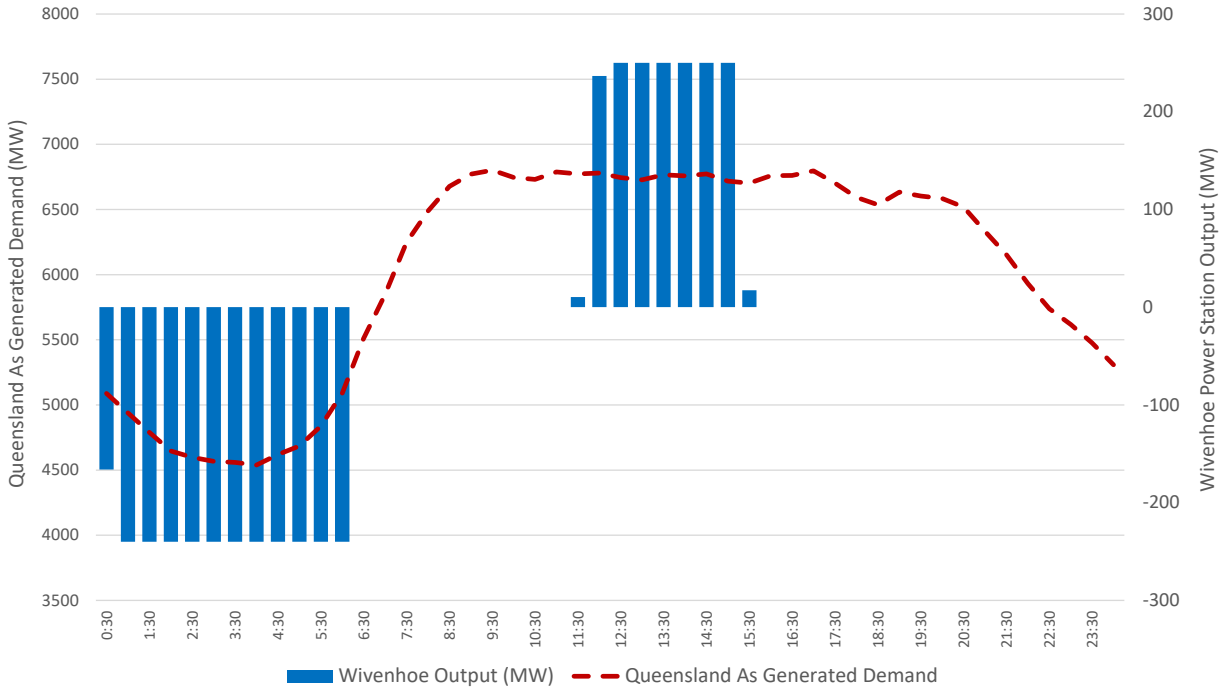
Source: AEMO (2021)

Required energy offsets



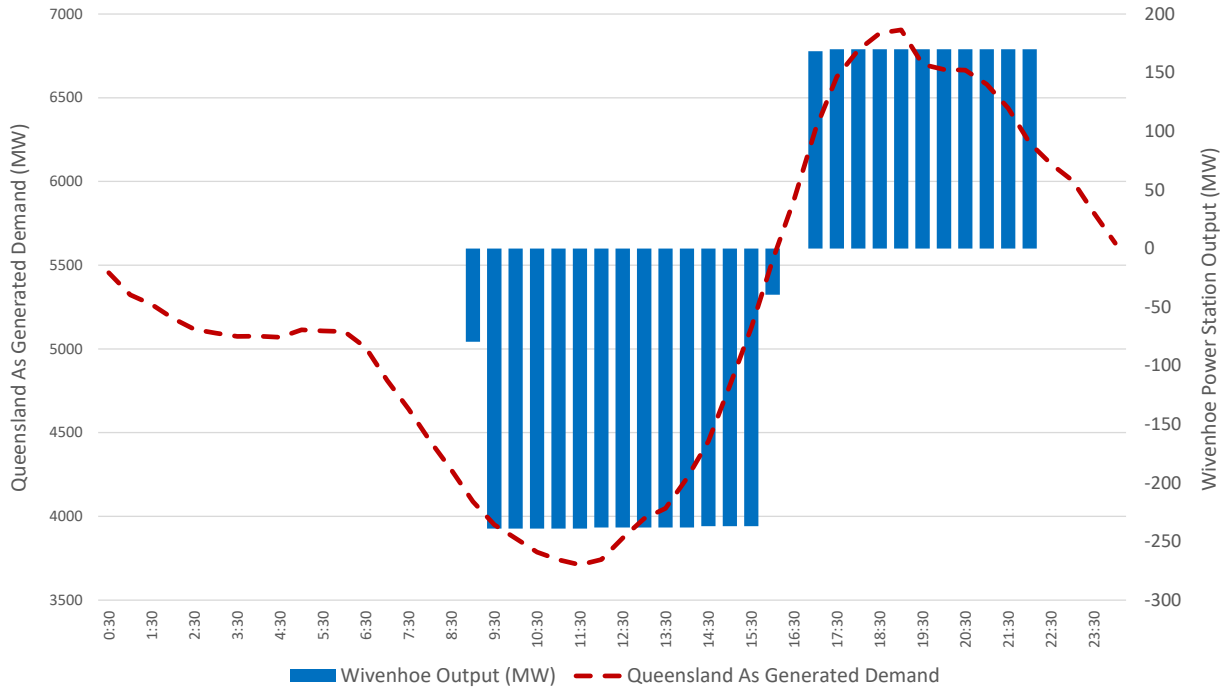
Impact on pumped hydro storage

2010 Wivenhoe Typical Summer Day



Snapshot for 1 December 2010. Note Queensland As Gen Demand > QLD Delivered from the Grid Demand.

2021 Wivenhoe Typical Spring Day



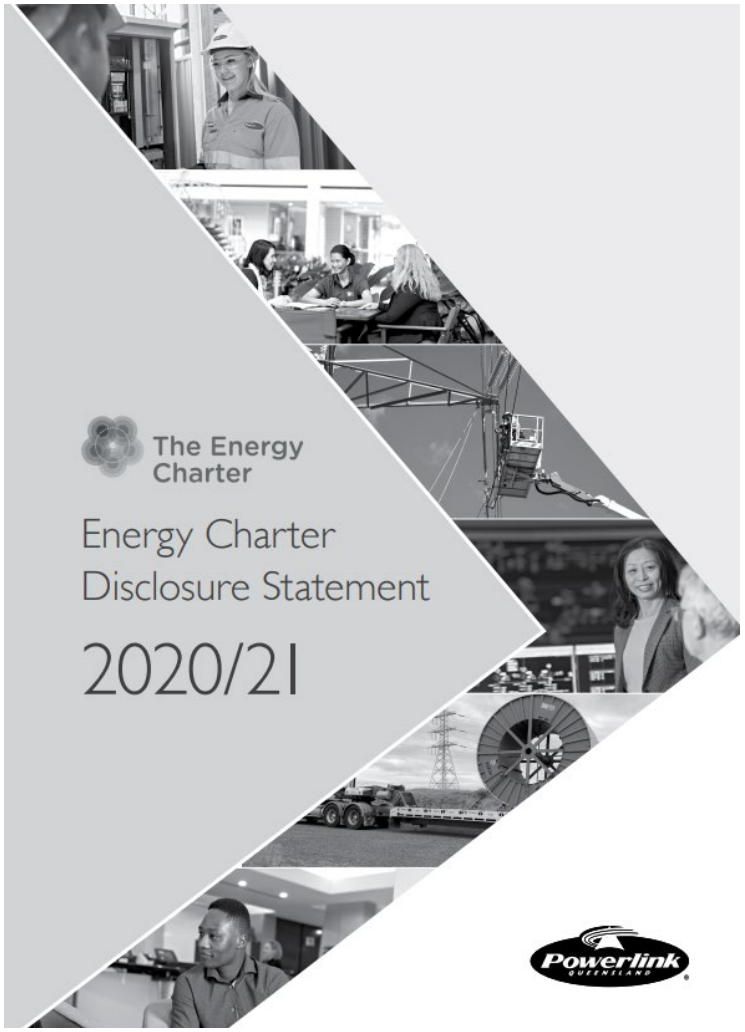
Snapshot for 3 October 2021 (ie: day with lowest day time minimum demand)..

2023-27 Revenue Proposal update

	Capital Expenditure	Operating Expenditure	Rate of Return	Regulatory Asset Base	Maximum Allowed Revenue	Electricity prices
Revenue Proposal	$863.9m	$1,046.4m	4.44%	$6,958.4m	$3,333.9m	11% decrease
Draft Decision	$863.9m	$1,046.4m	4.65%	$6,983.4m	$3,414.9m	9% decrease
Revised Revenue Proposal	$882.4m	$1,071.4m	4.65%	$7,140.4m	$3,427.6m	5% decrease

Consumer engagement Award

The Energy Charter initiatives



Community engagement focus

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

2021 Transmission Annual Planning Report
Key Insights

Stewart Bell

Executive General Manager Network and Business Development

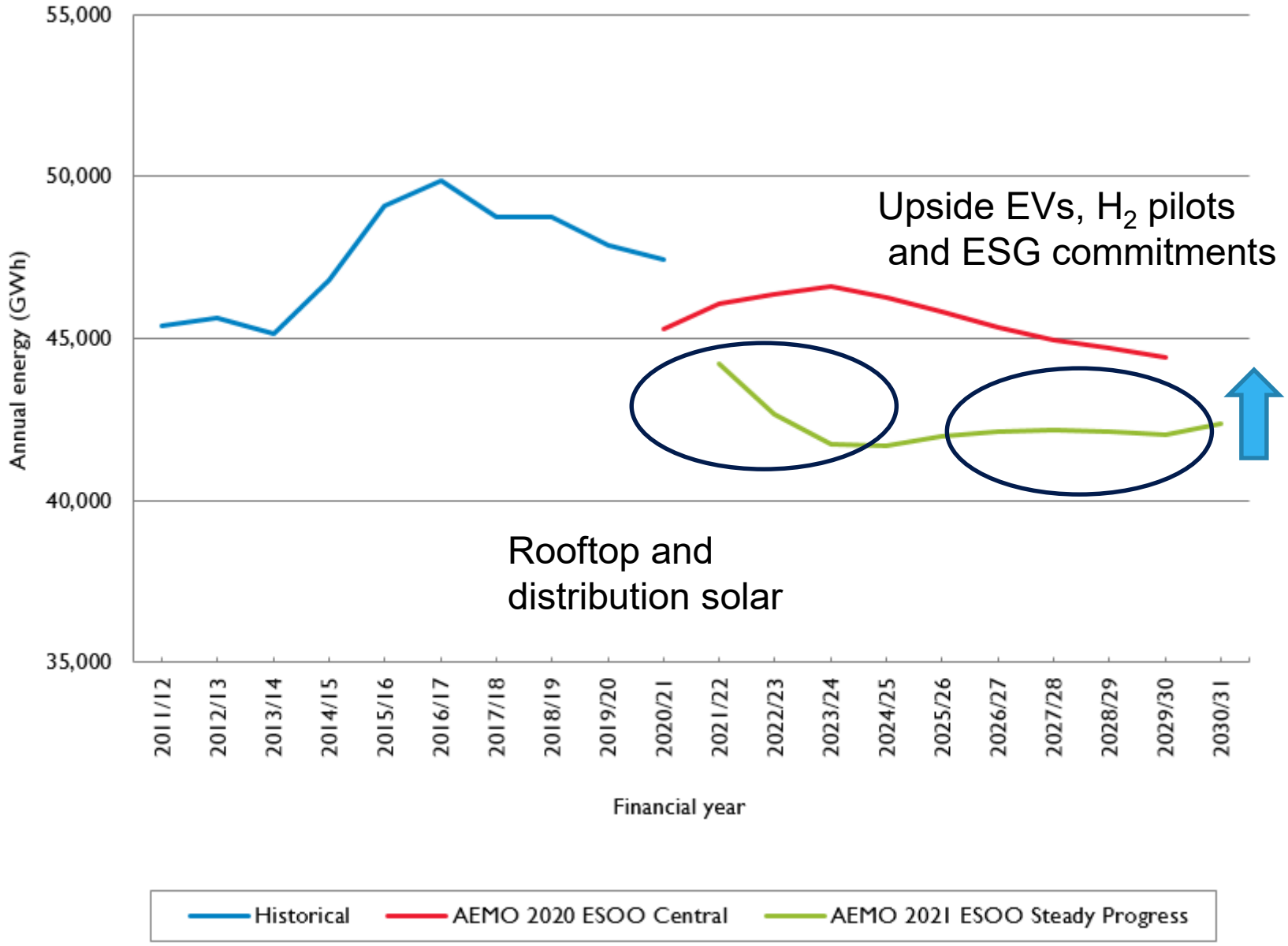
TAPR Overview

Electricity demand and energy forecasts

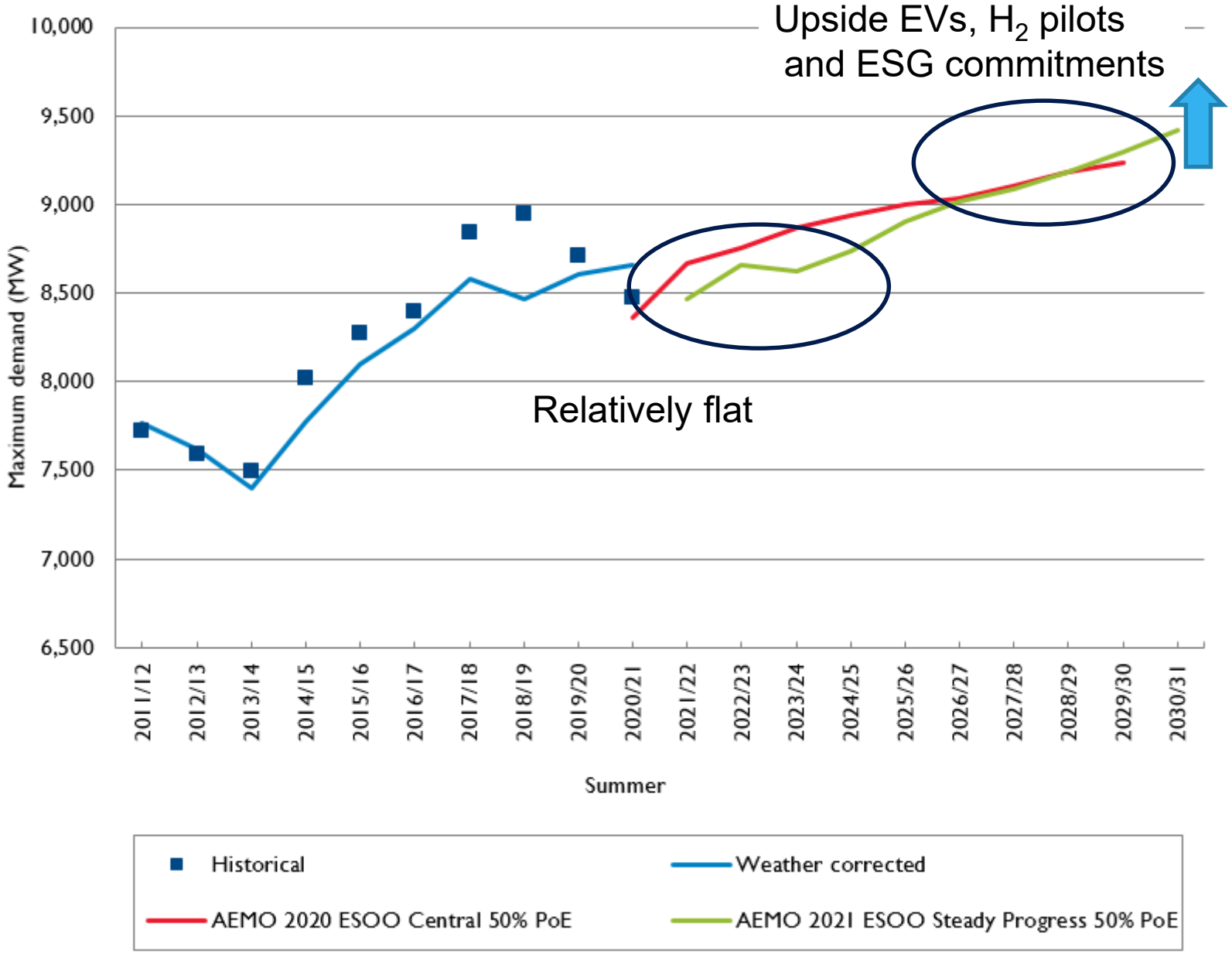
Generation outlook

Improving performance of the transmission network

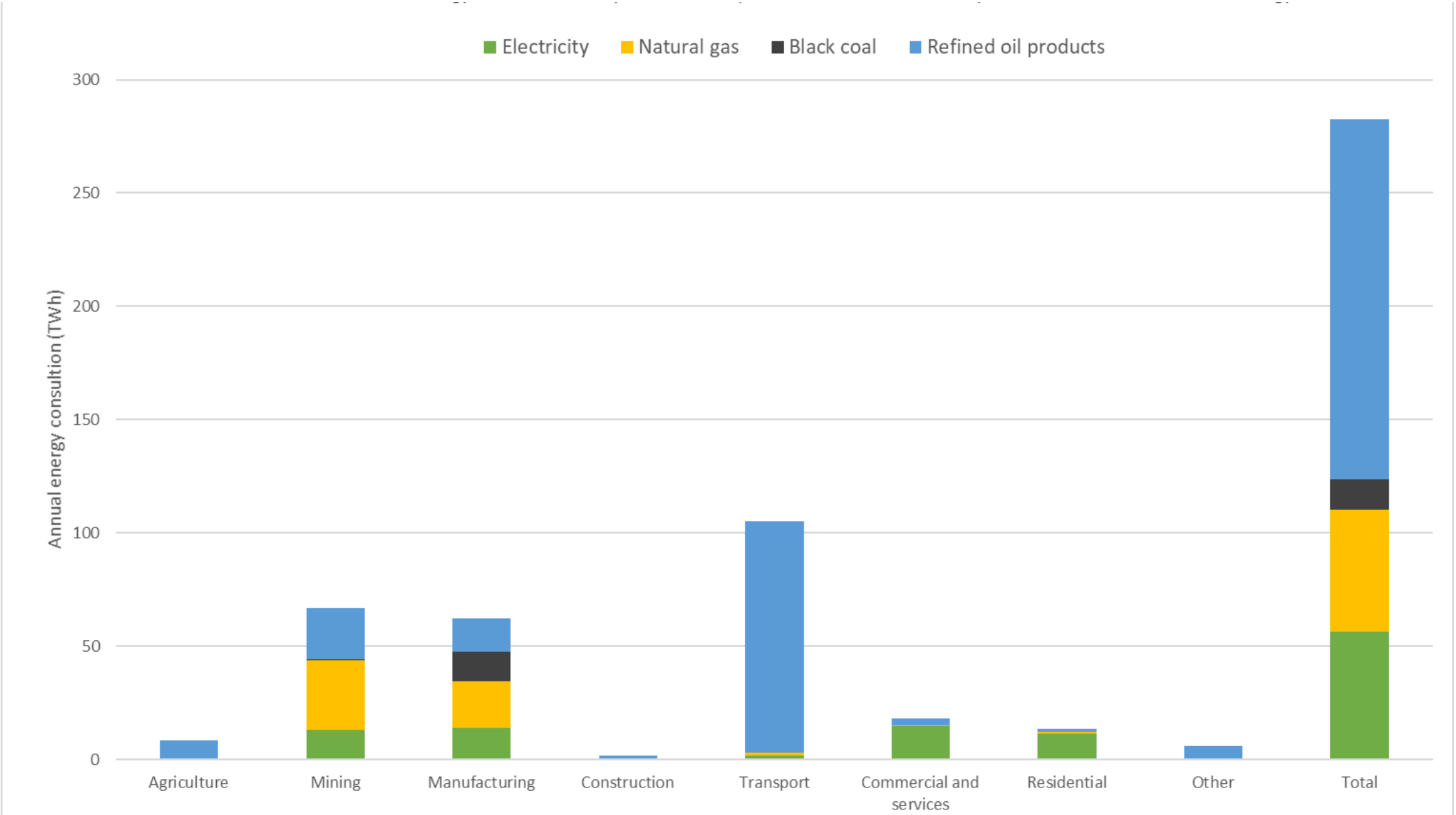
Comparison of AEMO's 2020 ESOO Central scenario energy forecast with the 2021 ESOO Steady Progress scenario forecast



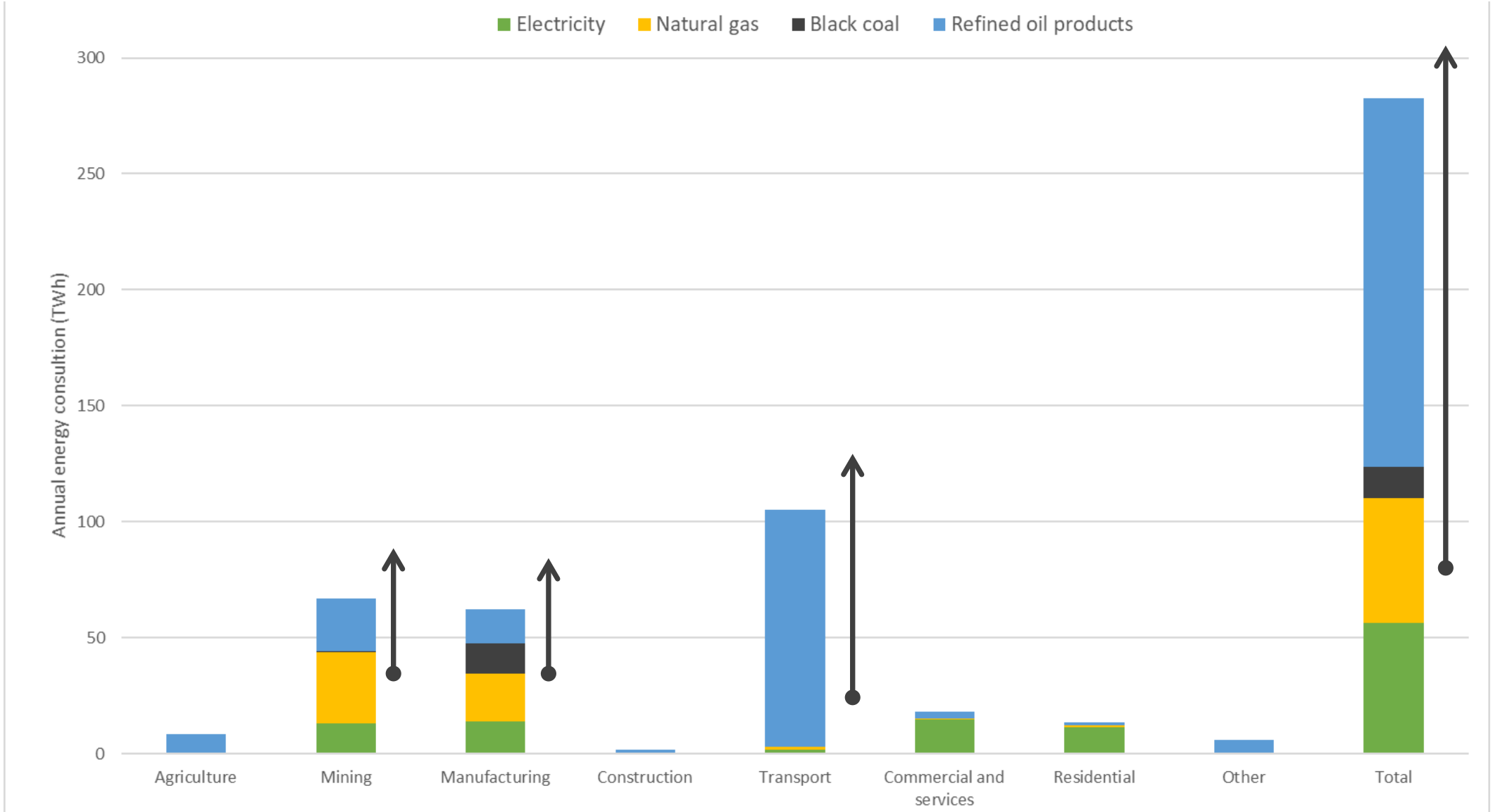
Comparison of AEMO's forecast delivered summer maximum demand based on the 2020 ESOO Central scenario forecast with the 2021 ESOO Steady Progress scenario forecast



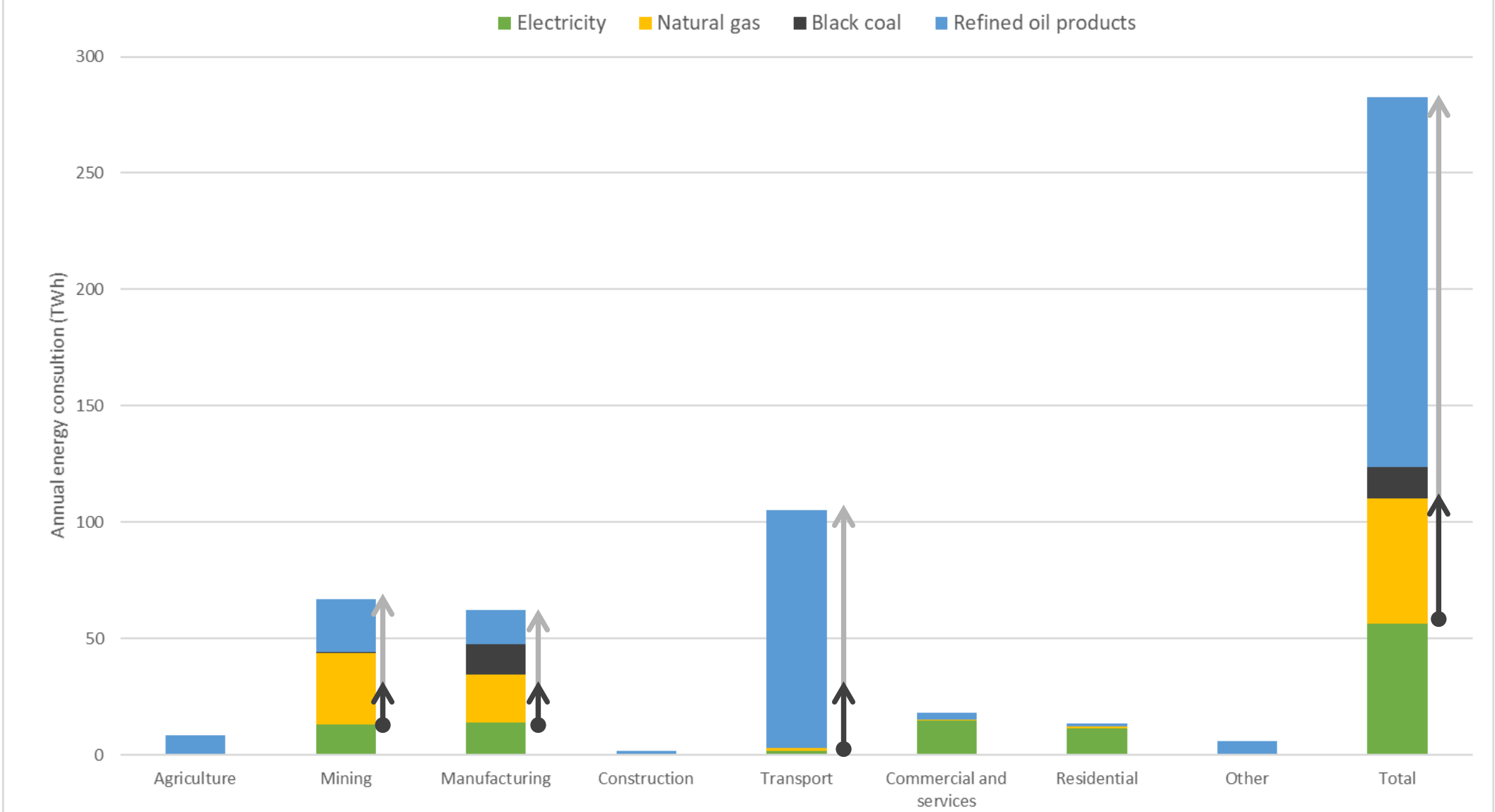
Annual energy consumption in Queensland



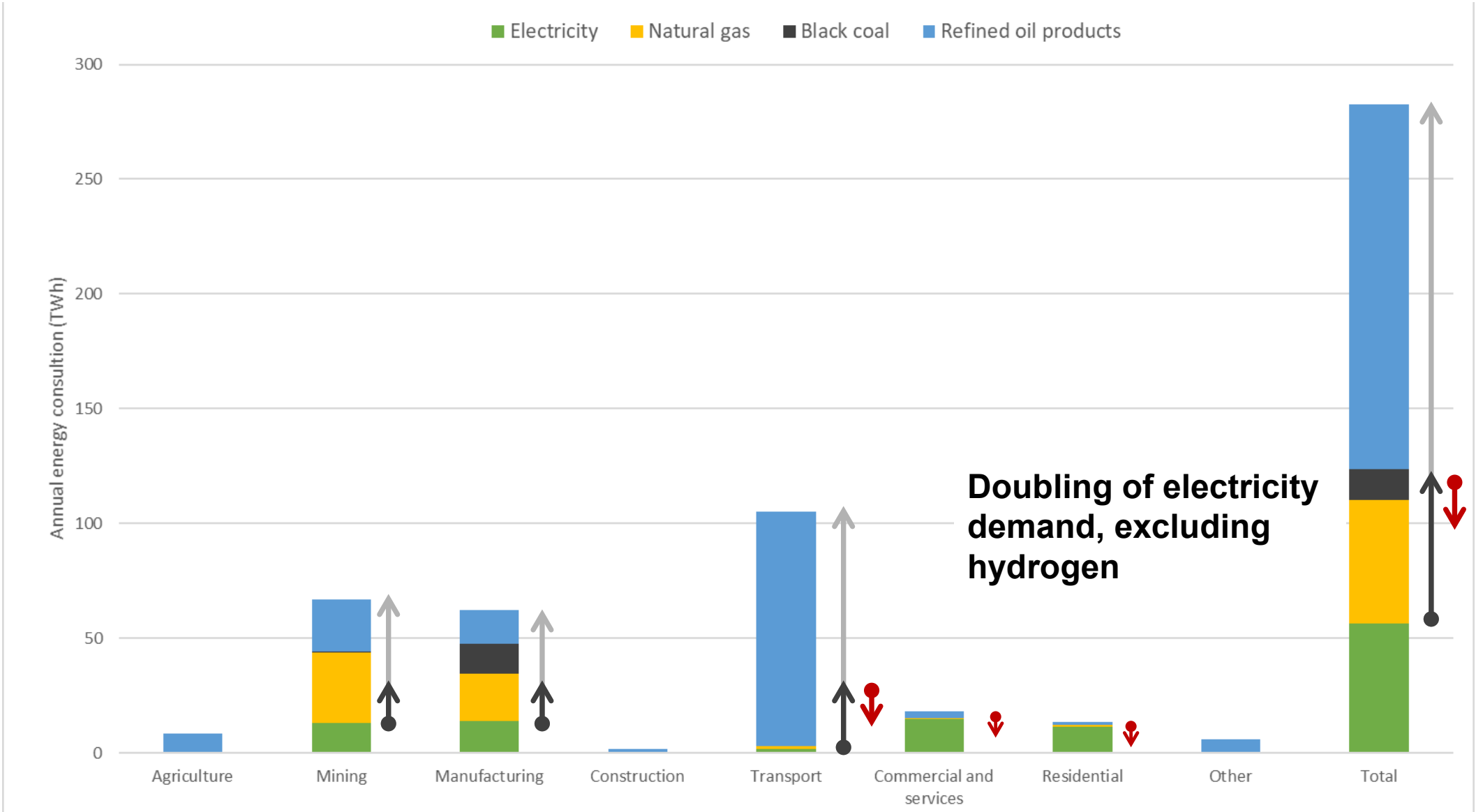
Annual energy consumption in Queensland



Annual energy consumption in Queensland



Annual energy consumption in Queensland



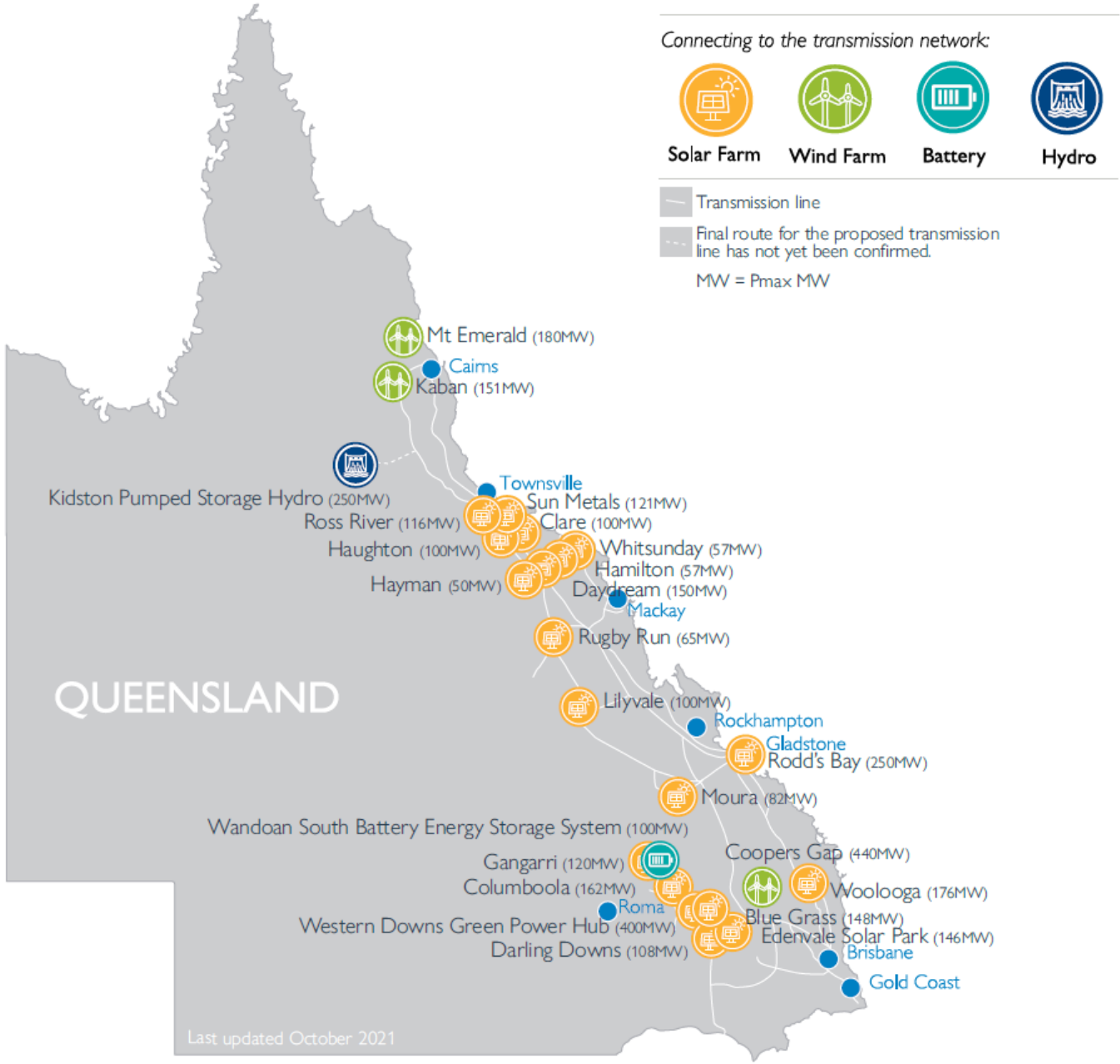
Network hosting capacity for new loads

Port	Nearest 275kV node	Available capacity at node (MW)	Potential capacity with additional renewable generation (MW)
Bundaberg	Gin Gin	800	1,200
Gladstone	Larcom Creek	400	1,300
Hay Point	Nebo	400	2,000
Mackay	Nebo	400	2,000
Abbot Point	Strathmore	400	2,700
Townsville	Ross	400	1,400

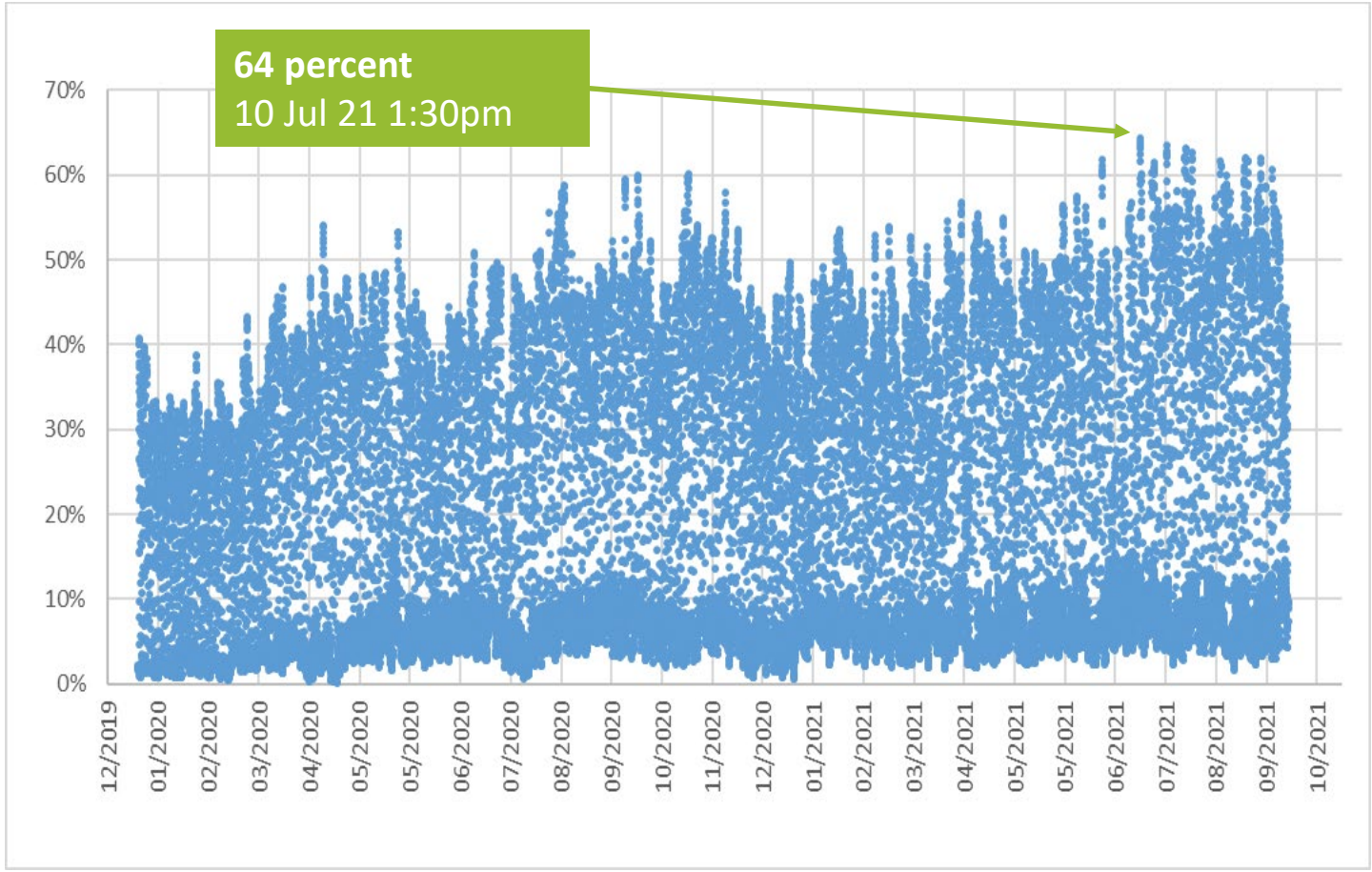
Connection projects since 2018

During 2020/21, 470MW of renewable generation capacity was committed in the Queensland region, taking the total to 4,444MW

In addition rooftop solar in the Queensland Region exceeded 4,074MW in July 2021

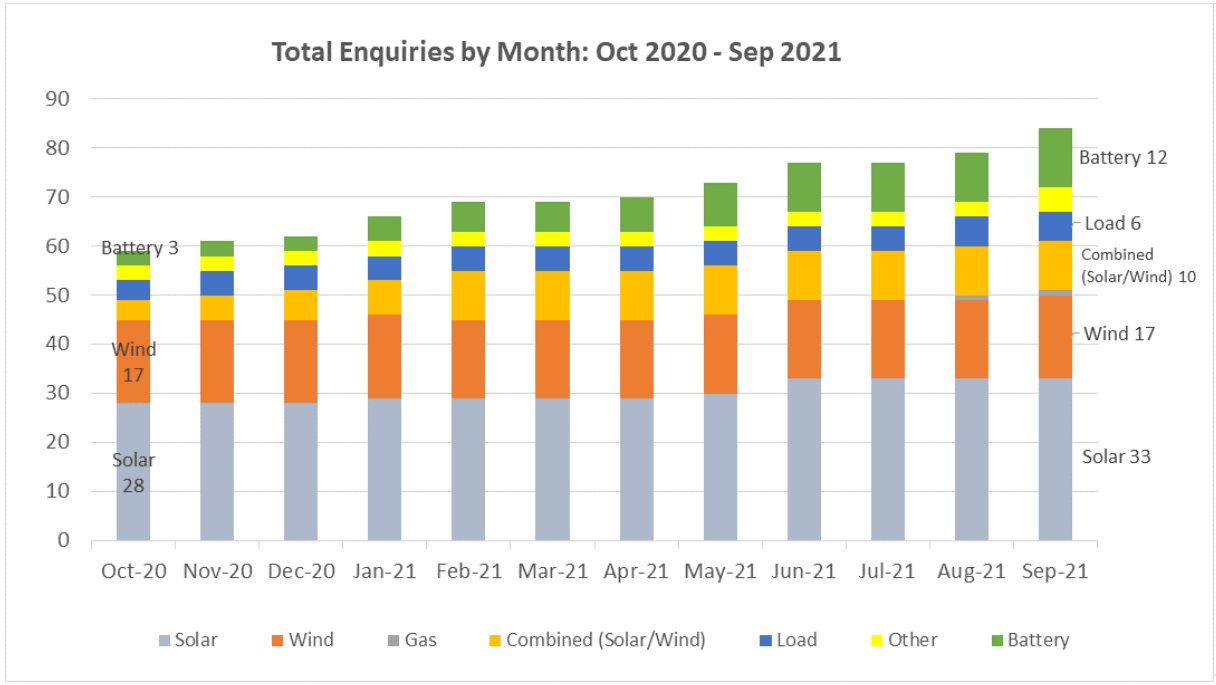


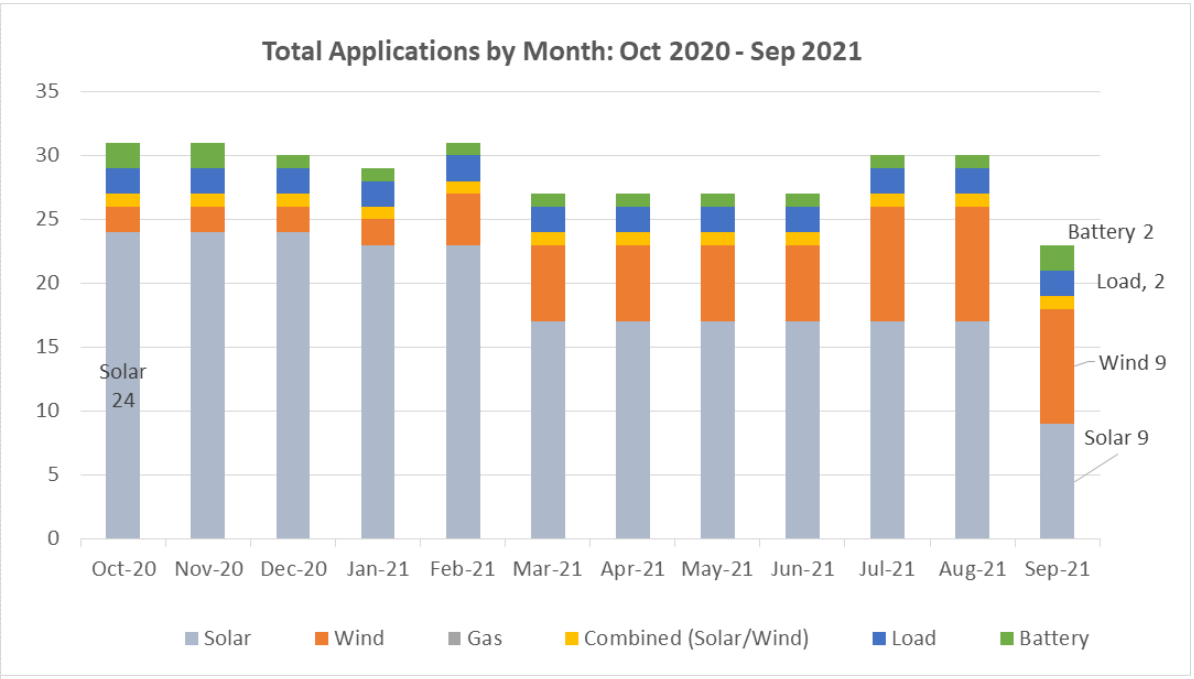
Record renewable generation



Queensland renewable generation – percentage of total energy generated

Generation outlook

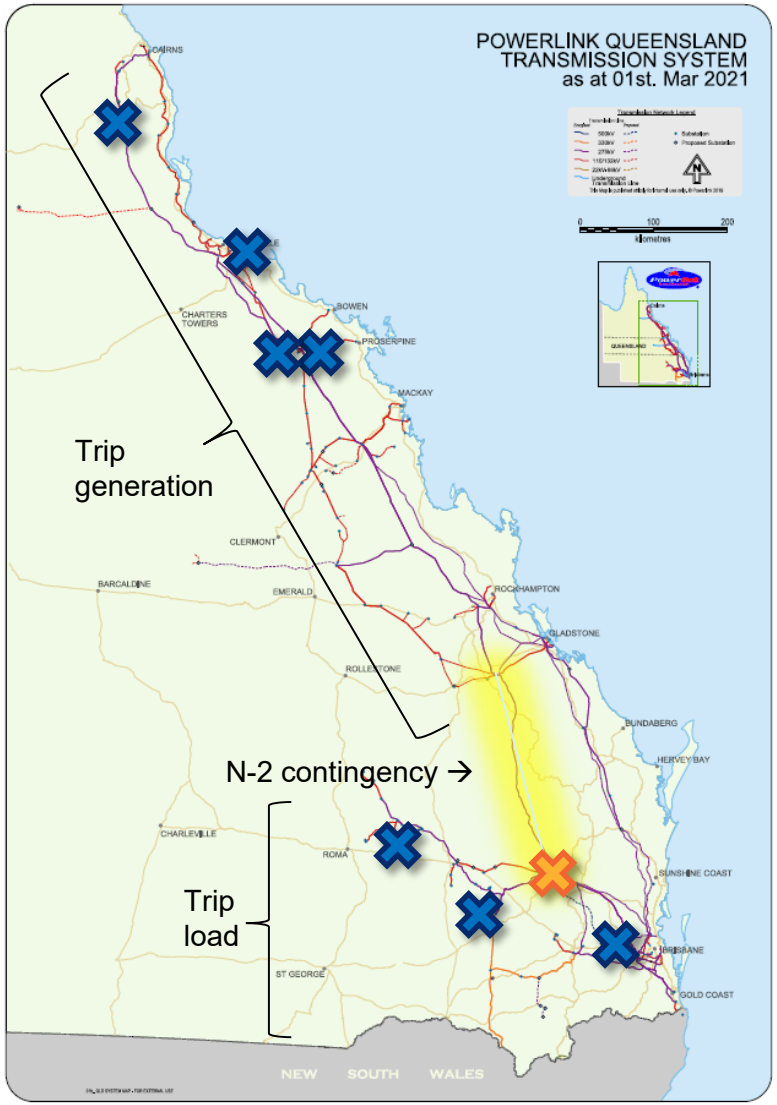




- Strong continued interest in Queensland for renewable connections
  - >20,000MW of enquiries, 6,700MW of applications and ~800MW of rooftop solar p.a.
- Significant interest in battery projects
- Large scale wind more prevalent moving forward

Increasing network utilisation

Wide Area Monitoring, Protection And Control (WAMPAC)



Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Questions

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Enjoy a short break - we will be back in 20 minutes

2021 Transmission Network Forum

15 November 2021

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Concurrent breakout session

Stream 1: Creating a robust Renewable Energy Zone framework for Queensland

Mahesh Narotam

Project Director Renewable Energy Zones, Powerlink

&

Leanne Caelers

A/ Executive Director, Renewables, Department of Energy and Public Works

Why QREZ?

- The future energy development plans for Queensland is undergoing significant change
- Development of REZs is pivotal in the transformation to a decarbonised future
- Helps to deliver QRET of 50% renewable energy by 2030
- Fully exploits critical renewable resources in known areas
- Scale efficient integrated approach to transmission development – lower cost connections for proponents
- Proactive approach to system strength planning – lower cost
- REZ developments provide a known path to renewables – this would help with the coal plant transition and renewable investor confidence
- Minimises cost of transmission upgrades through better aligning generation and demand
- Involve strong community engagement to maximise benefits and regional economic outcomes

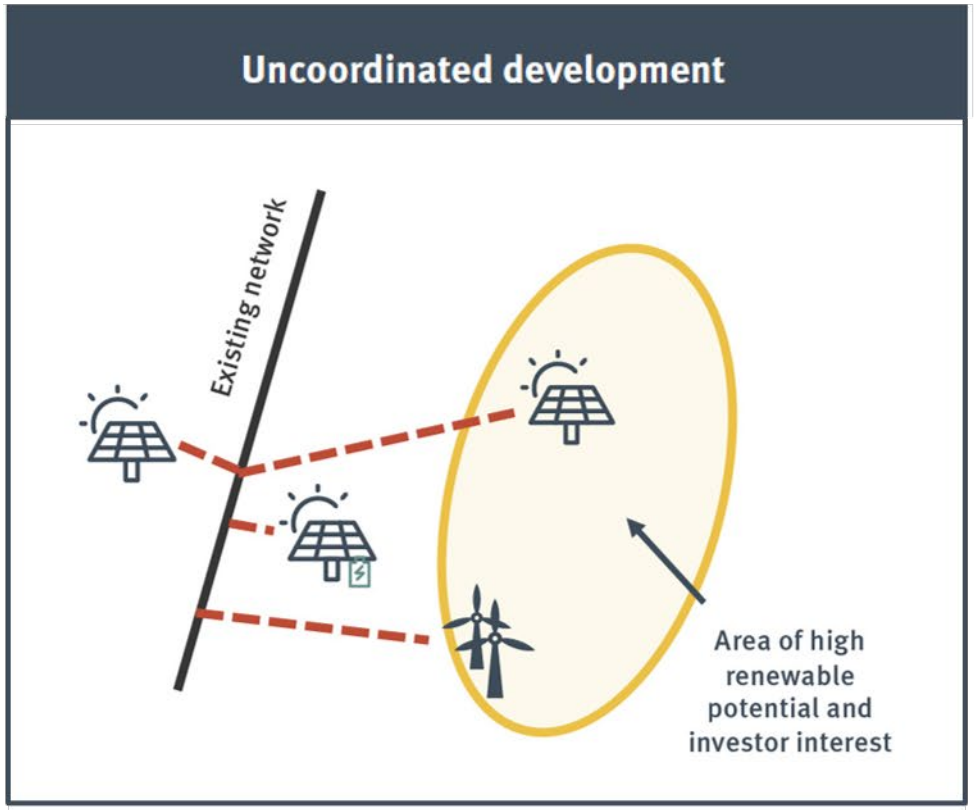
Context

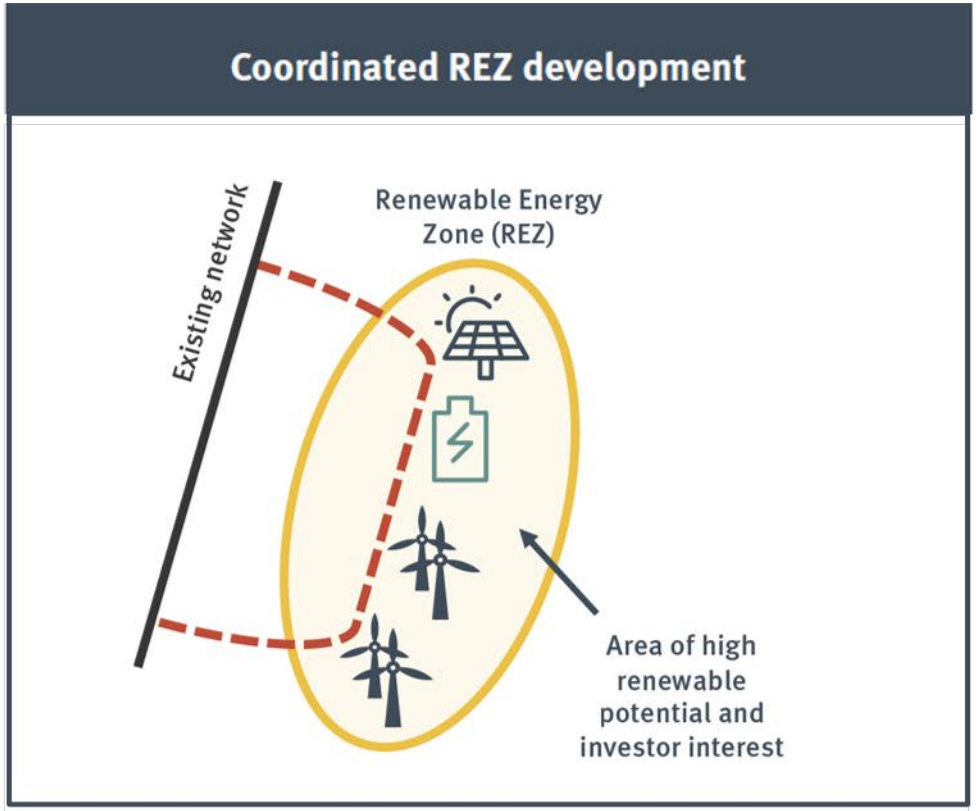
Coordinating renewable generation and transmission investment requires bespoke policy framework

- The current Rules have limited flexibility to exploit the renewable resources and fully utilise transmission assets
- Every REZ is unique and requires different approaches to realise the benefits
- Coordinating renewable generation and transmission investment thus requires bespoke policy framework
- The Technical Discussion Paper presents the proposed QREZ design and access framework to stakeholders
- The Paper is targeting informed stakeholders in the energy industry sector expected to participate in QREZ
- Feedback gathered from stakeholders will inform further design of the QREZ model

Addressing existing limitations

The paper outlines how the QREZ model will address existing limitations that are preventing coordinated development

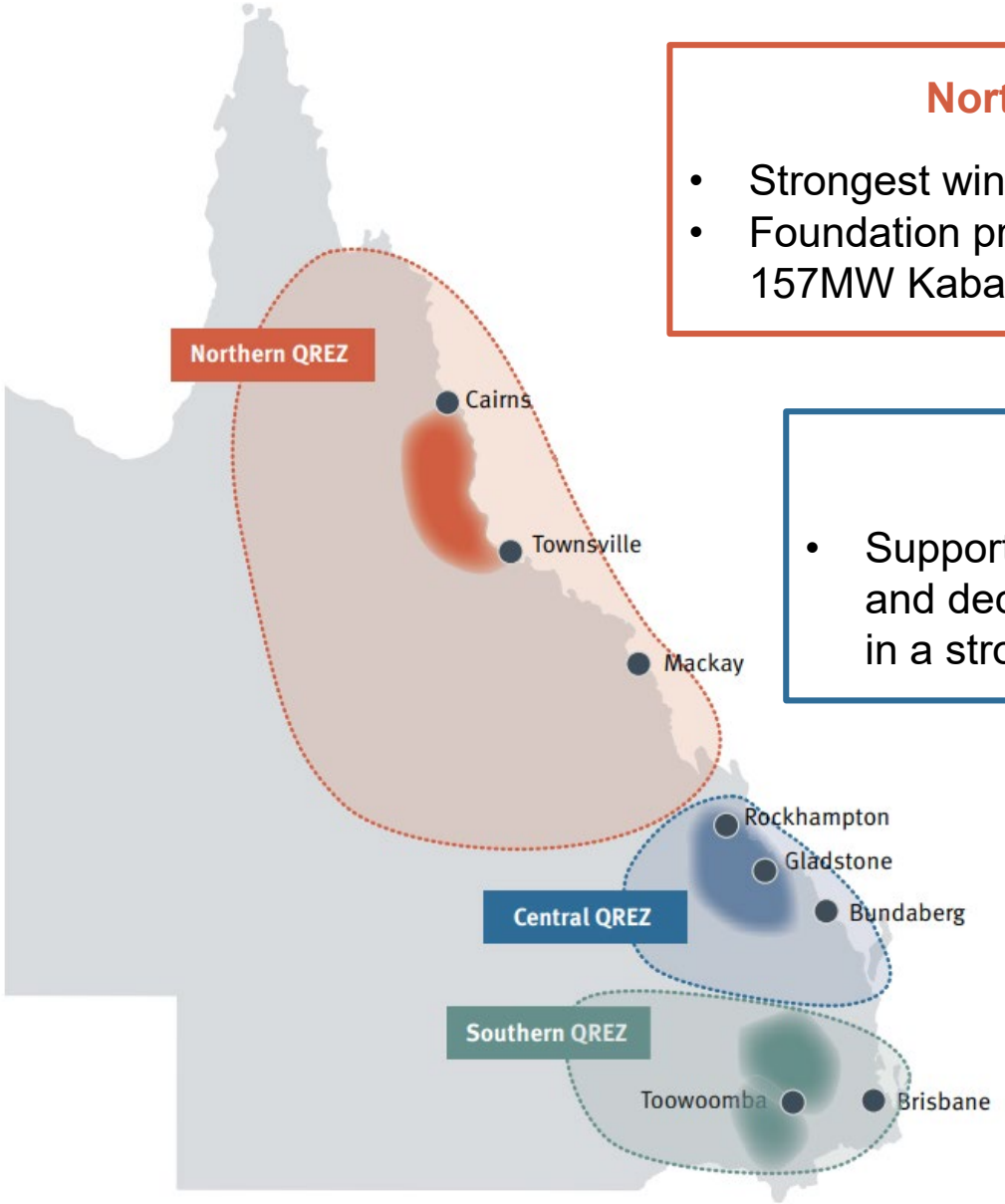




QREZ initial investment

Other aspects

- Battery coordination with REZ developments
- Technical transition analysis
- Large scale solar requires deep storage. In the meantime exploit limited wind resources to meet QRET targets at least cost
- Legislative framework development to guide investment and development of future REZ



Northern QREZ

- Strongest wind resources in the state
- Foundation project under construction 157MW Kaban Wind Farm in FNQ

Central QREZ

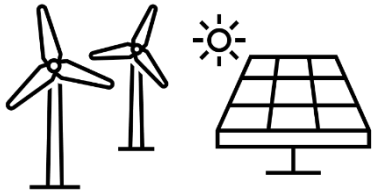
- Supporting emerging hydrogen sector and decarbonisation of heavy industry in a strong part of the network

Southern QREZ

- Strong renewable resources including wind
- Close to load centres

Powerlink Queensland
Queensland Government

An integrated approach



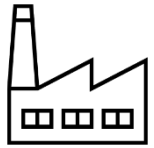
Energy Infrastructure

Coordinating transmission and generation creates economies of scale and optimises network expansion.

Focus of the Technical Discussion Paper

Community Benefits

Delivering local benefits from renewable energy opportunities is critical for maintaining social licence.



Industry Demand

Cheap, clean and reliable energy supports Queensland's industries, and matching supply and demand improves system outcomes.

Powerlink Queensland

Queensland Government

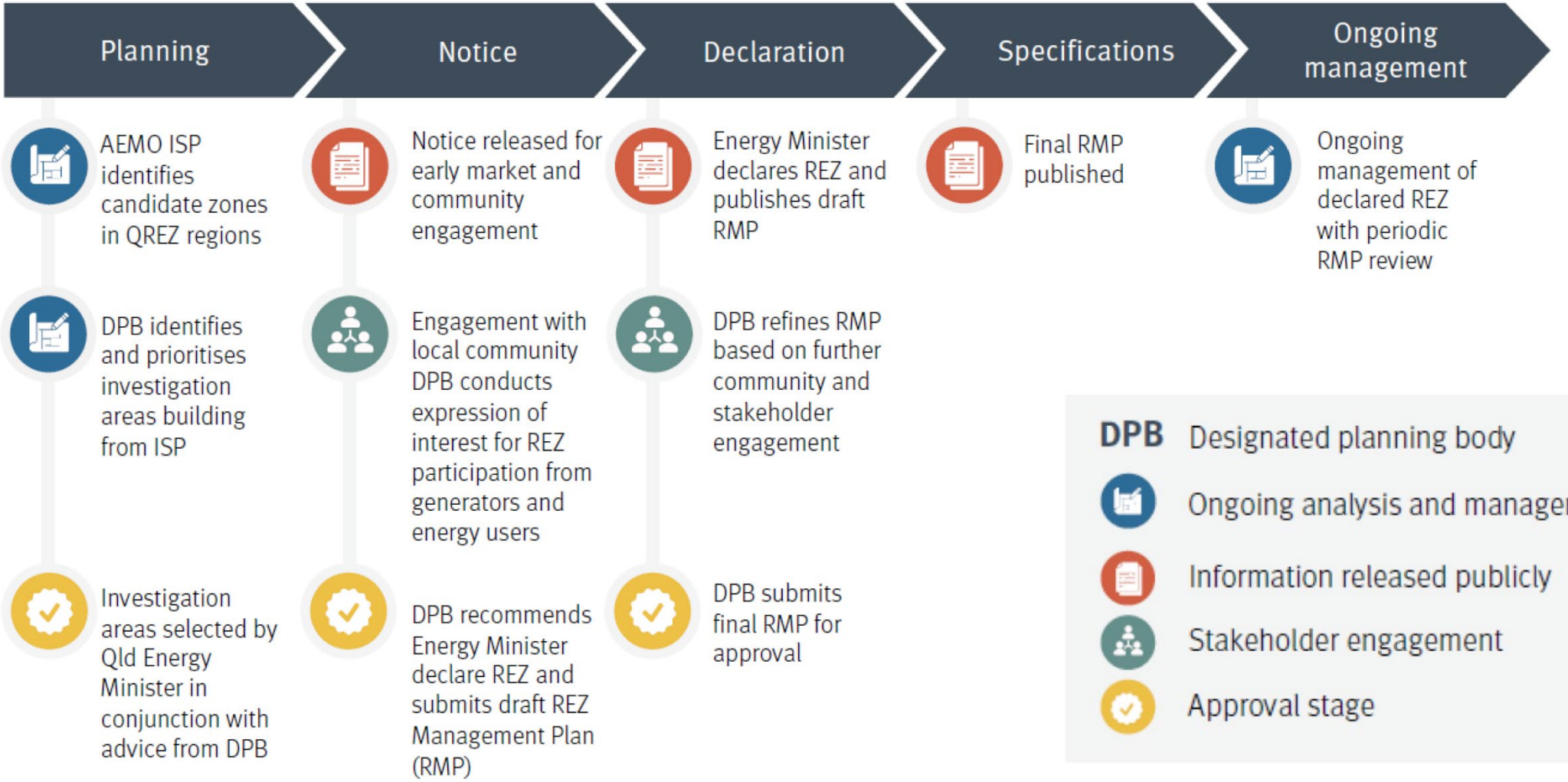
QREZ attributes

1. Simple transparent, and timely
2. Community and industry partnered
3. Commercially and technical prudent
4. Scale efficient and highly utilised
5. Competitive and equitable
6. Adaptable and complementary
7. Improves investment certainty

Powerlink Queensland

Queensland Government

Outline of proposed QREZ framework



Powerlink Queensland

Queensland Government

Jurisdictional approaches

	Queensland	New South Wales	Victoria
REZ	Three QREZ in Northern, Central and Southern Queensland	Five REZ with Central-West Orana first	Six REZ as identified in the ISP
Planning	Proposed to be designated planning body	Newly established Energy Corporation NSW	Newly established VicGrid
Declaration	Minister declares REZ	Minister declares REZ	AEMO ISP
Specifications	Outlined in REZ Management Plan	Determined by Energy Corporation NSW	Planning coordinated by VicGrid
Connections	Connection to REZ assets as set out under the RMP (not open access)	Enabled through Energy Corporation NSW (not open access)	To be determined
Access	Physical access rights	Financial access rights (time-weighted)	To be determined
Funding	QREZ $145M funding and $2 billion QREHJF	Bespoke transmission efficiency test, LTESA & $380M funding	Supported by recently established $540M REZ Fund

Powerlink Queensland

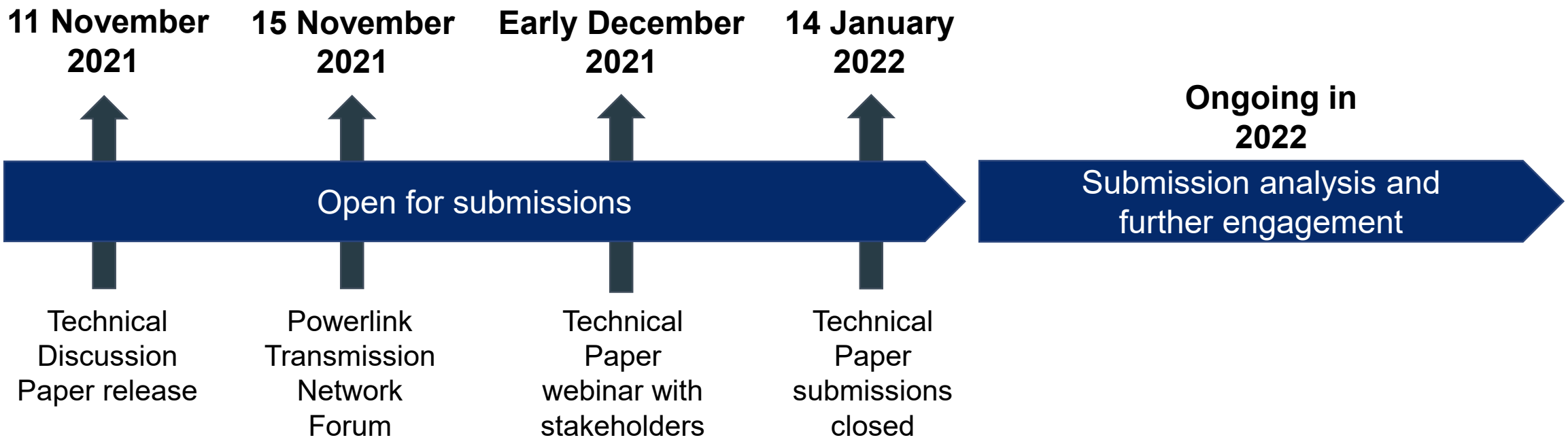
Queensland Government

Jurisdictional approaches

To progress with REZ developments, jurisdictions have applied state-based legislation that enables them to modify application of the open access framework

New South Wales	Victoria
The *Electricity Infrastructure Investment Act 2020* (NSW) expressly includes a head of power to make regulations under this legislation which override the NEL and NER to the extent necessary to enable the operation of a REZ access scheme and achieve the objective of the legislation.	Under the *National Electricity (Victoria) Act 2005*, the Victorian energy minister or the Governor in Council (as relevant) has the power to disapply or modify the application of the NER and the NEL for certain purposes. The Victorian Govt has indicated use of these powers in delivering REZ.

Timeline of engagement



Questions

- Stream 1
  Creating a robust Renewable Energy Zone framework for Queensland

Workshop Questions

- What does Powerlink and the Queensland Government need to consider to deliver REZ now and into the future?
- What should a REZ framework in Queensland look like? How should this differ from other jurisdictions, if at all?
- How does Powerlink best utilise the network we have to deliver REZs?

Concurrent breakout session

Stream 2: Navigating the industry's pathway to electrification and decarbonisation

Jacqui Bridge

Executive General Manager Energy Futures, Powerlink

&

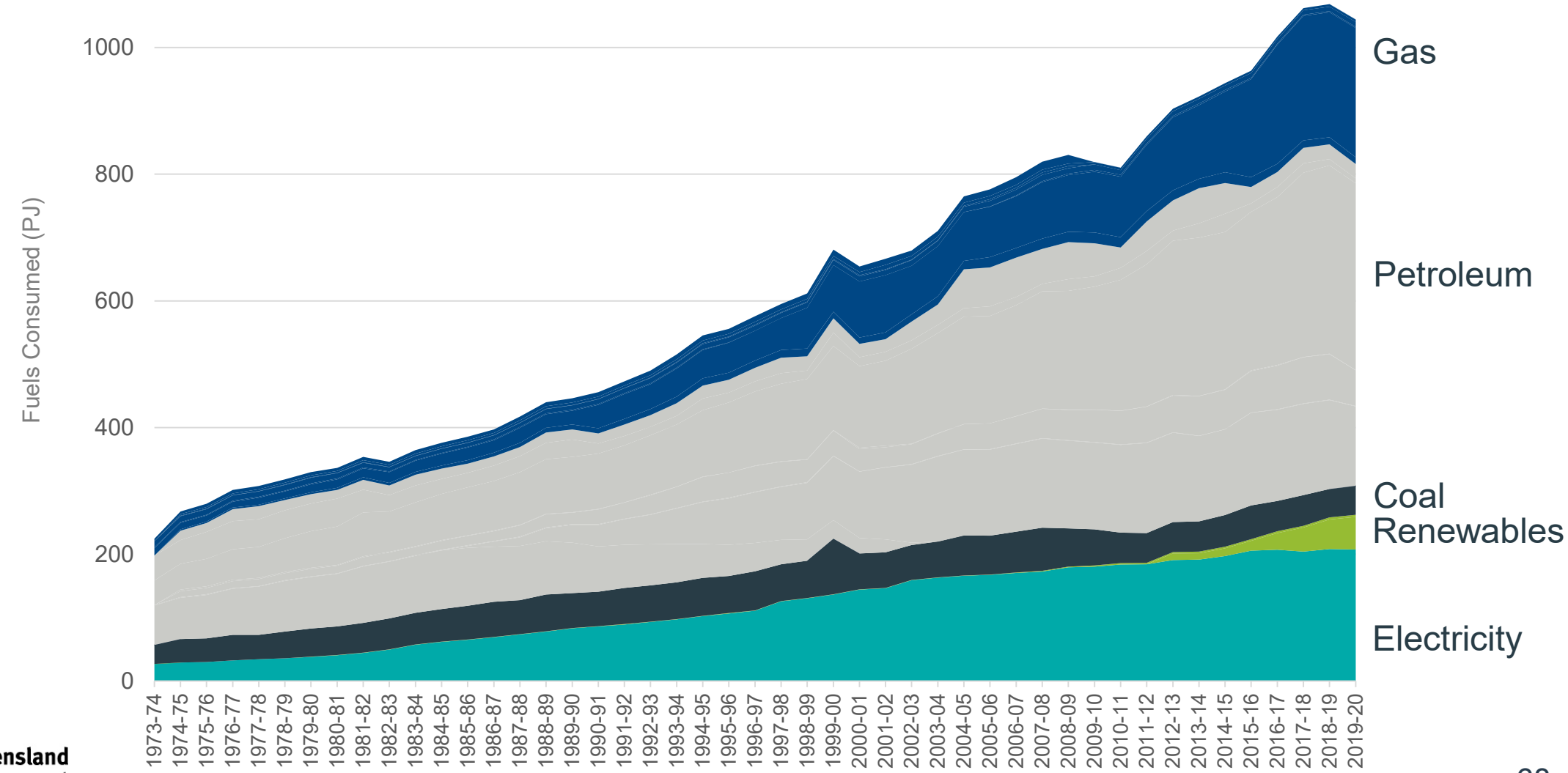
David Shankey

Deputy Director-General, Energy

Overview

- Electrification of existing demand
  - Existing load to be electrified
  - Future industry to be supplied
  - Load Flexibility requirements
- Queensland Renewables
- Queensland Energy Plan
  - Outline and overview

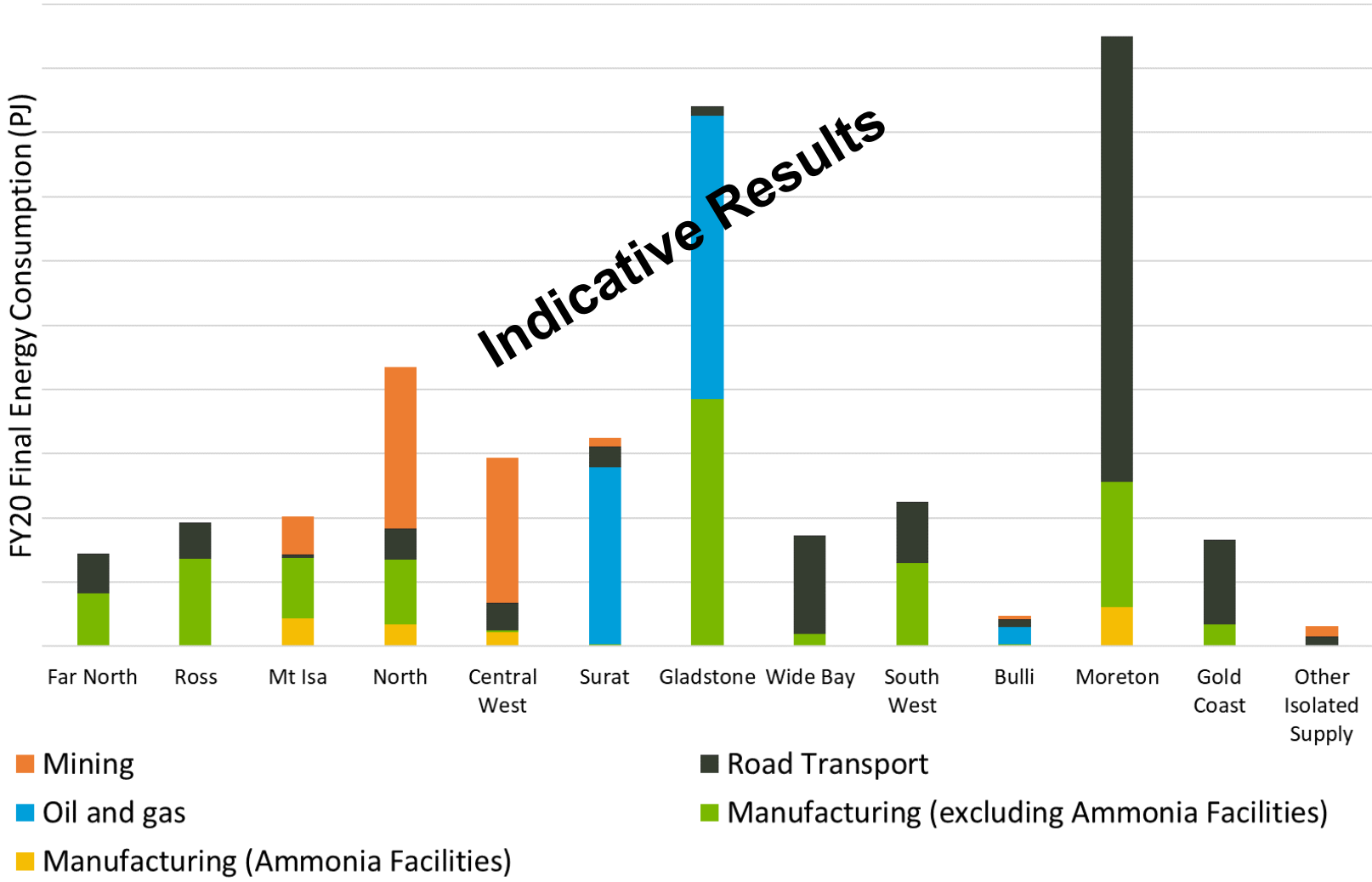
Queensland historical fuel consumption



Source: Australian Energy Statistics 2021

Regional and industry comparison

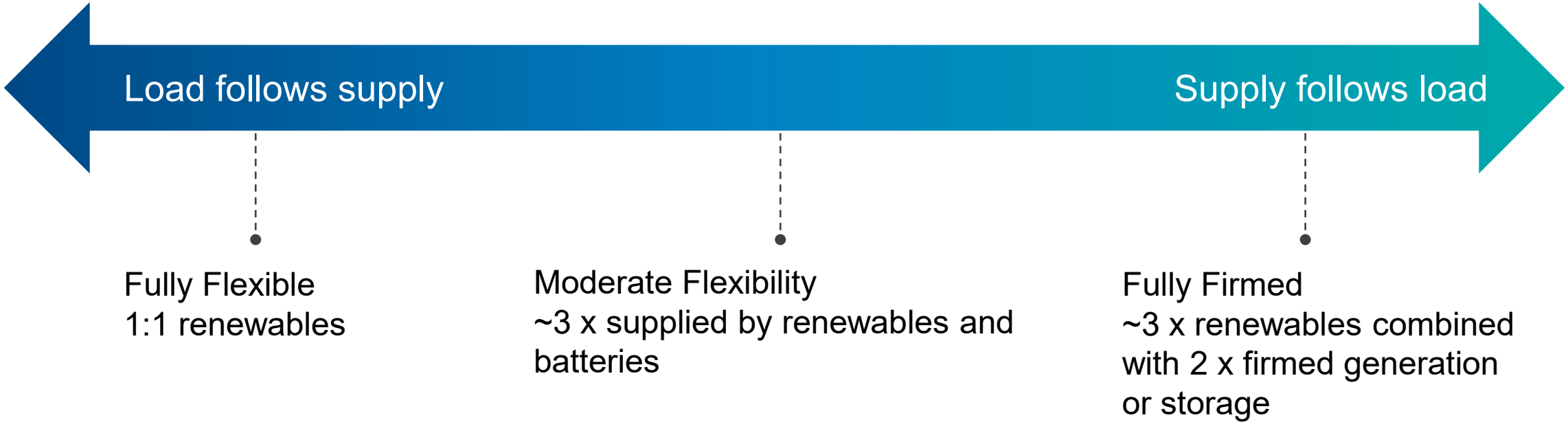
- Queensland regions have distinct energy consumption characteristics that result in different implications for the transmission network when electrified
- 85% of current consumption comes from Mining, Road Transport, Oil and Gas and Manufacturing.



Source: Aurecon Analysis, 2021

Load flexibility requirements

- Low cost, high capacity factor electricity supply requires firming provided by storage, interconnection and renewables overbuild to be implemented as inexpensively as possible.
- The impact of additional load in the power system depends on the load's location, size and flexibility.



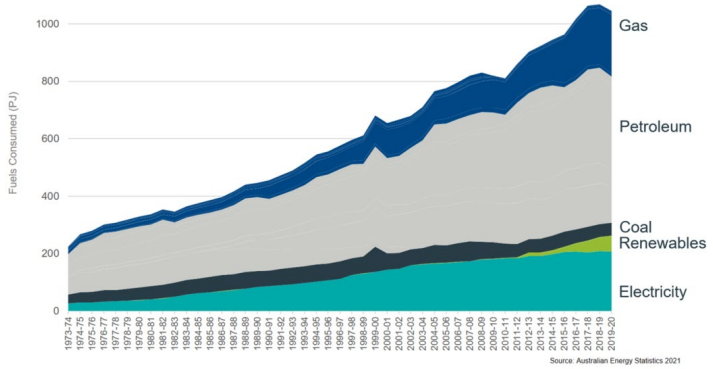
Queensland renewables

3.5 GW
4 GW rooftop

1GW

1GW

100MW



Powerlink Queensland

Queensland Government

Summary

- Significant opportunities for future energy and industry within Queensland
- Flexibility of the future load will determine the capacity of new generation and firming required
- Characteristics of new load will be different and specific to regions.
- Queensland has high renewable energy potential, the mix of solar, wind and firming must be suitable for supplying load
- Optimising Queensland's wind and deep energy storage opportunities is critical
- Electrification of other energy loads will increase demand for electricity
- Future demand will grow significantly to accommodate new industries
- Coordination of the transformation with emerging industries is critical to ensure sustainable, reliable and low cost electricity

Powerlink Queensland

Queensland Government

Queensland Energy Plan

Queensland Energy Jobs Forum

TOWNSVILLE 10 JUNE 2021

$2 Billion Queensland Renewable Energy and Hydrogen Jobs Fund

10-year energy plan for Queensland

Powerlink Queensland

Queensland Government

Queensland Government commitments

50% renewable energy by 2030

30% emissions reduction on 2005 levels by 2030

Net zero emissions by 2050

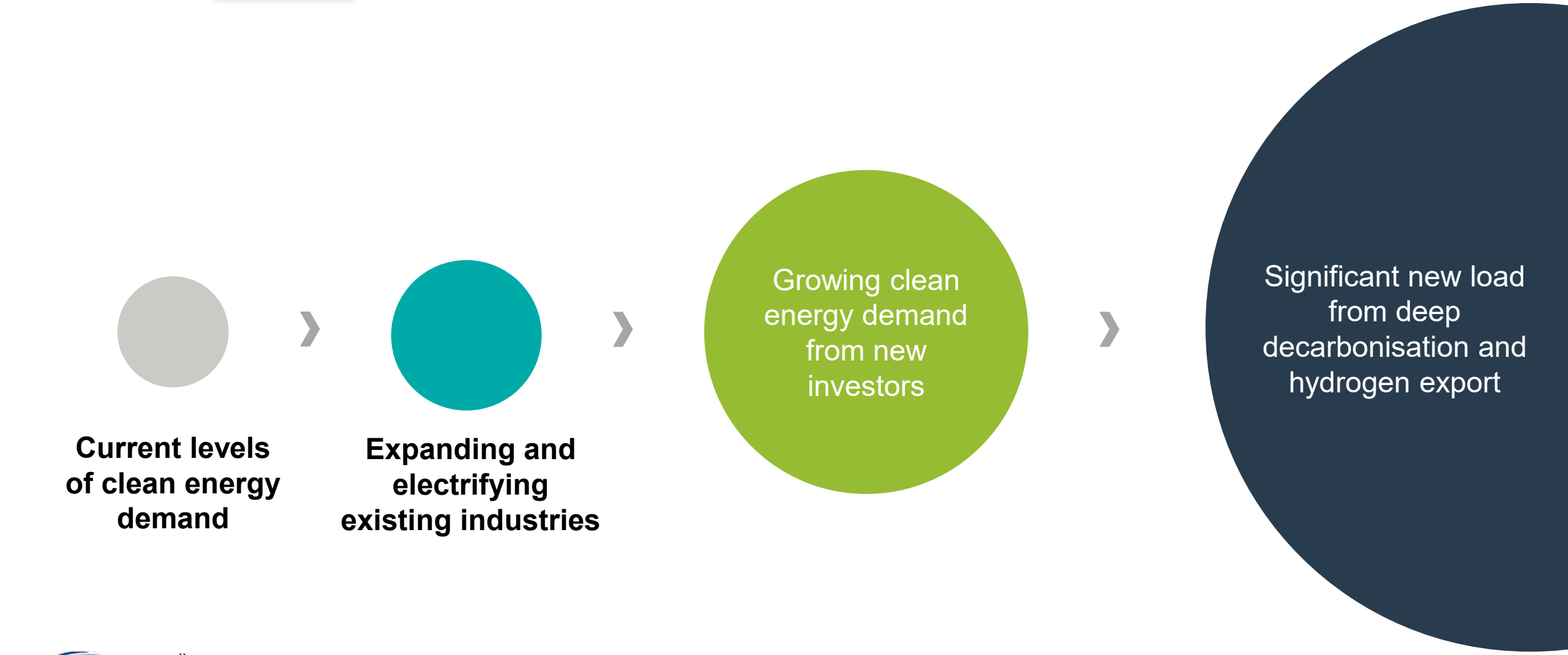
Powerlink Queensland

Queensland Government

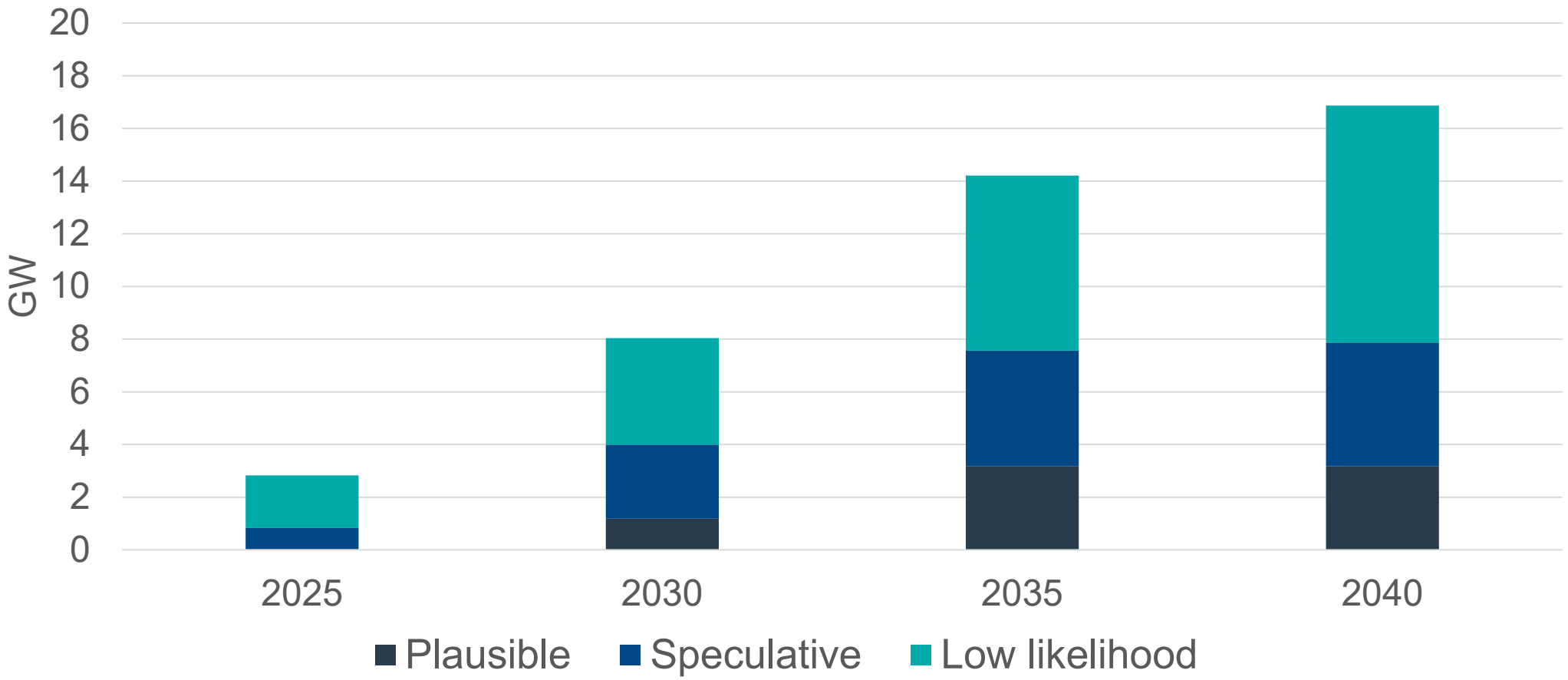
Queensland strengths

- Strong economy
- Public ownership
- Renewable resources
- Network capacity

Future growth in demand



Managing uncertainty in the outlook

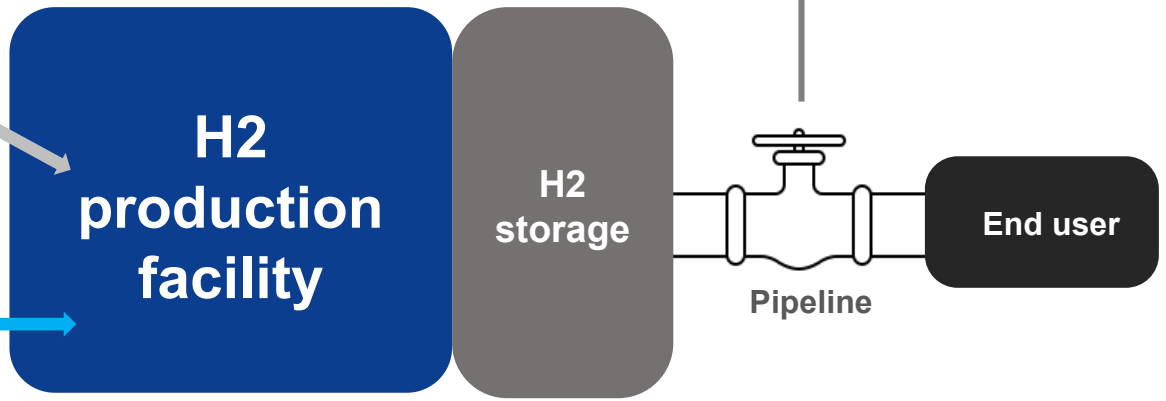


Commercial hydrogen pathways emerging

Social licence and adequacy of resource to meet demand

How much electricity transmission vs. how much hydrogen pipeline

Behind the meter, dedicated infrastructure or grid-connected



Significant commitments already underway

$2 Billion Fund

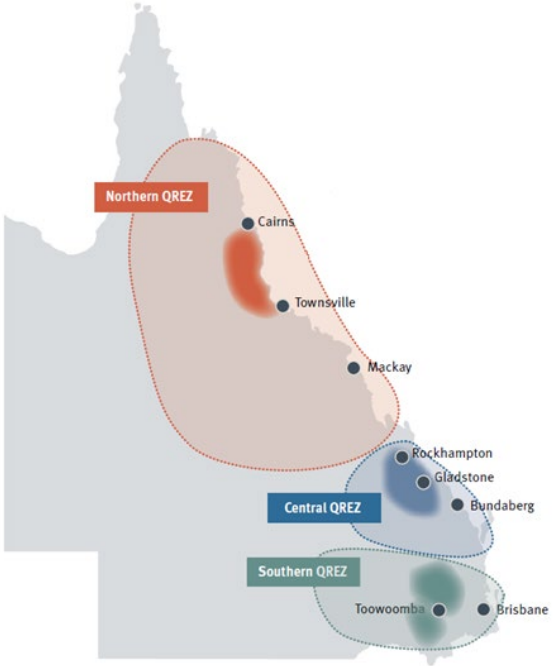
Borumba Pumped Hydro Energy Storage

QREZ developments

QUEENSLAND RENEWABLE ENERGY AND HYDROGEN JOBS FUND

The government has established a Queensland Renewable Energy and Hydrogen Jobs Fund with up to $2 billion for government investments in partnership with private sector.

The Queensland Government has committed $22 million for a detailed design and cost analysis of the project to support future decisions.



Powerlink Queensland
Queensland Government

Key challenges and opportunities to consider

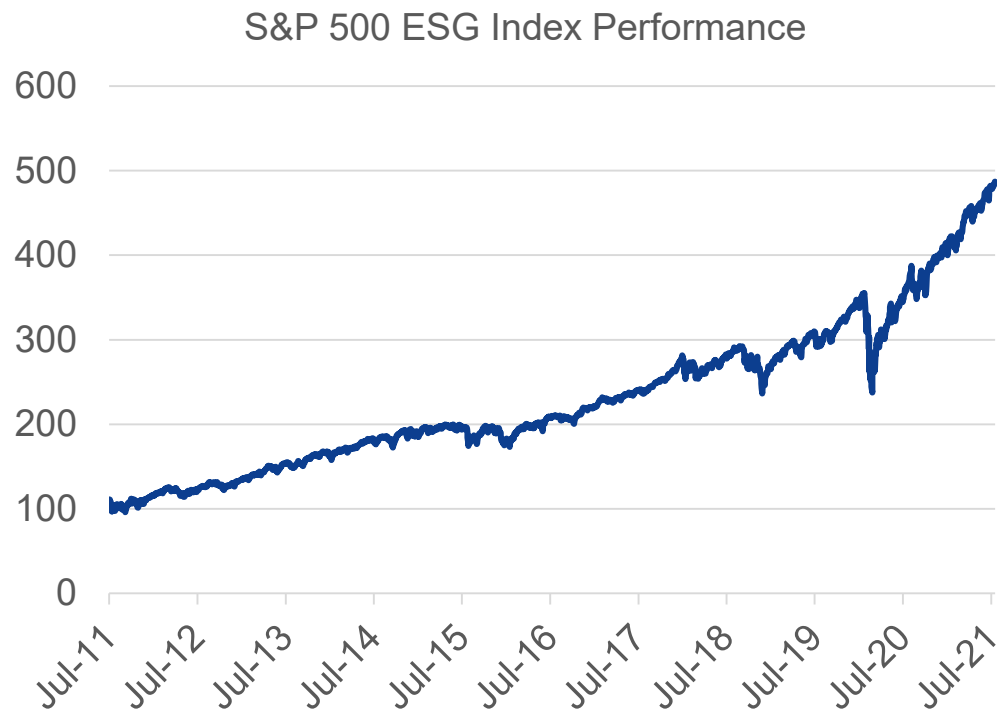
Challenges

- Technical challenges for integrating higher levels of renewable energy
- Disruption as the generation mix in Qld changes
- Keeping downward pressure on prices essential for globally competitive energy

Opportunities

- Attract new industries, creating more jobs
- Investment in the renewables sector creates a pipeline of jobs to regional Queensland
- Support existing industries to remain competitive as they decarbonise

ESG (Environmental, Social and Governance) investment significantly ramping up over the last 10 years



Powerlink Queensland
Queensland Government

Questions

- Stream 2
  Navigating the industry's pathway to electrification and decarbonisation

Workshop Questions

- How should Powerlink deal with uncertainty of the pace and scale of change when planning its network?
- What are the key elements that should be included in the Queensland Energy Plan?
- What is the role of Government in the energy transformation?

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Summary of breakout sessions

Agenda

01 Official address
The Hon. Mick de Brenni MP

02 State of the Network
Paul Simshauser

03 TAPR
Stewart Bell

04 Q&A

05 Morning tea

06 Breakout sessions

07 Summary

08 Closing address

Closing address

Alan Millis, Powerlink Board Director

Official closing

Nicole Maguire, Manager External Communications

CONTACT

33 Harold Street Virginia
Queensland 4014 Australia

PO Box 1193 Virginia
Queensland 4014 Australia

+61 7 3860 2111
(during business hours)

pqenquiries@powerlink.com.au

www.powerlink.com.au

#pqforum