

2022 TRANSMISSION NETWORK FORUM

FRIDAY 4 NOVEMBER 2022

#PQForum





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

1. **Official address**
The Hon. Mick de Brenni MP
2. **State of the Network**
Paul Simshauser
3. **Industry Panel**
Moderated by Jacqui Bridge
4. **Morning tea (20 mins)**
5. **Queensland Energy & Jobs Plan**
6. **Chair address**
7. **Break (40 mins)**
8. **Technical Session on the Transmission Annual Planning Report**

STATE OF THE NETWORK

Paul Simshauser
Chief Executive

#PQForum



01 Operations

02 Prices

03 Investment

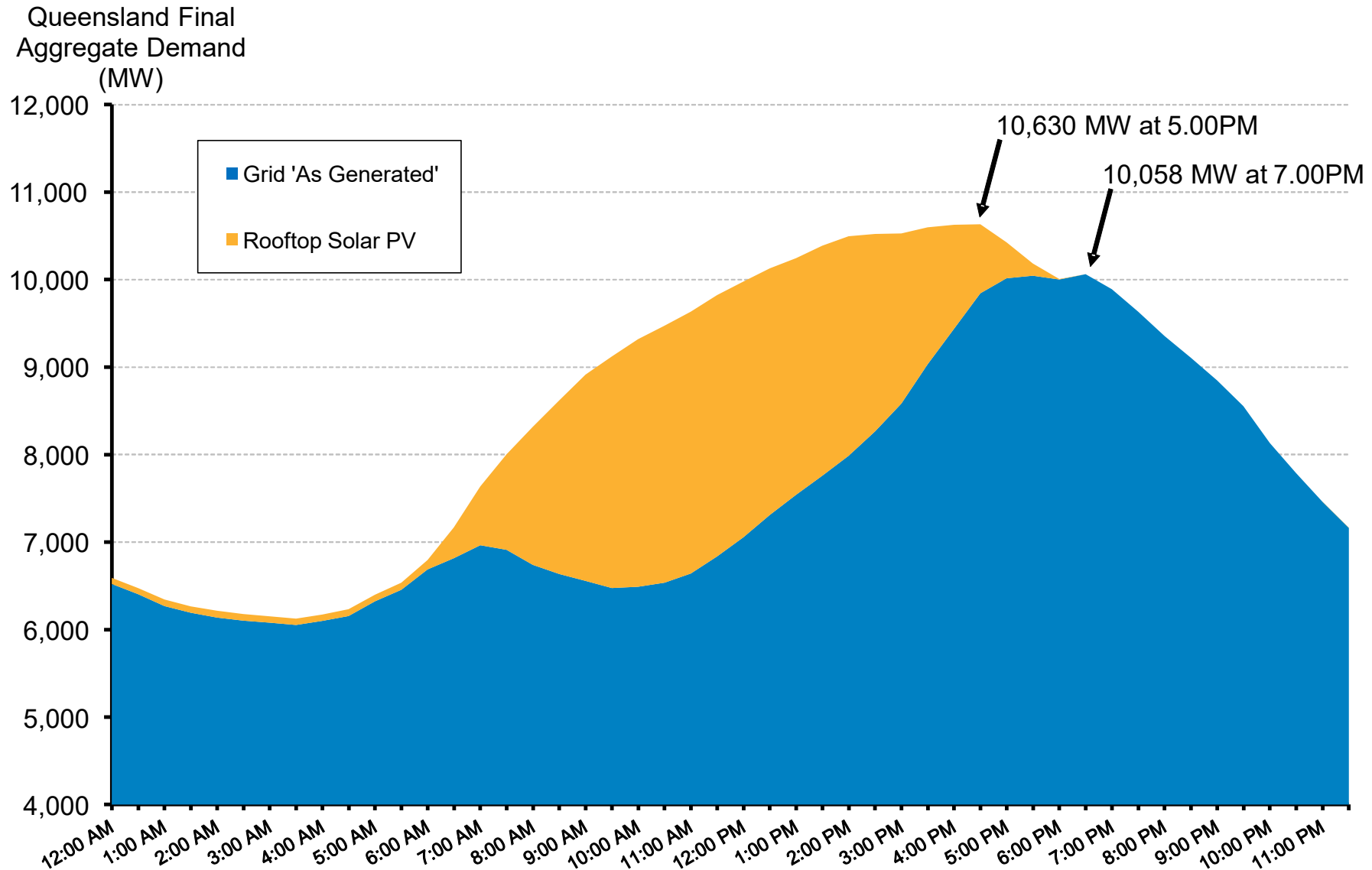
04 SuperGrid

05 System operations (in 2035)



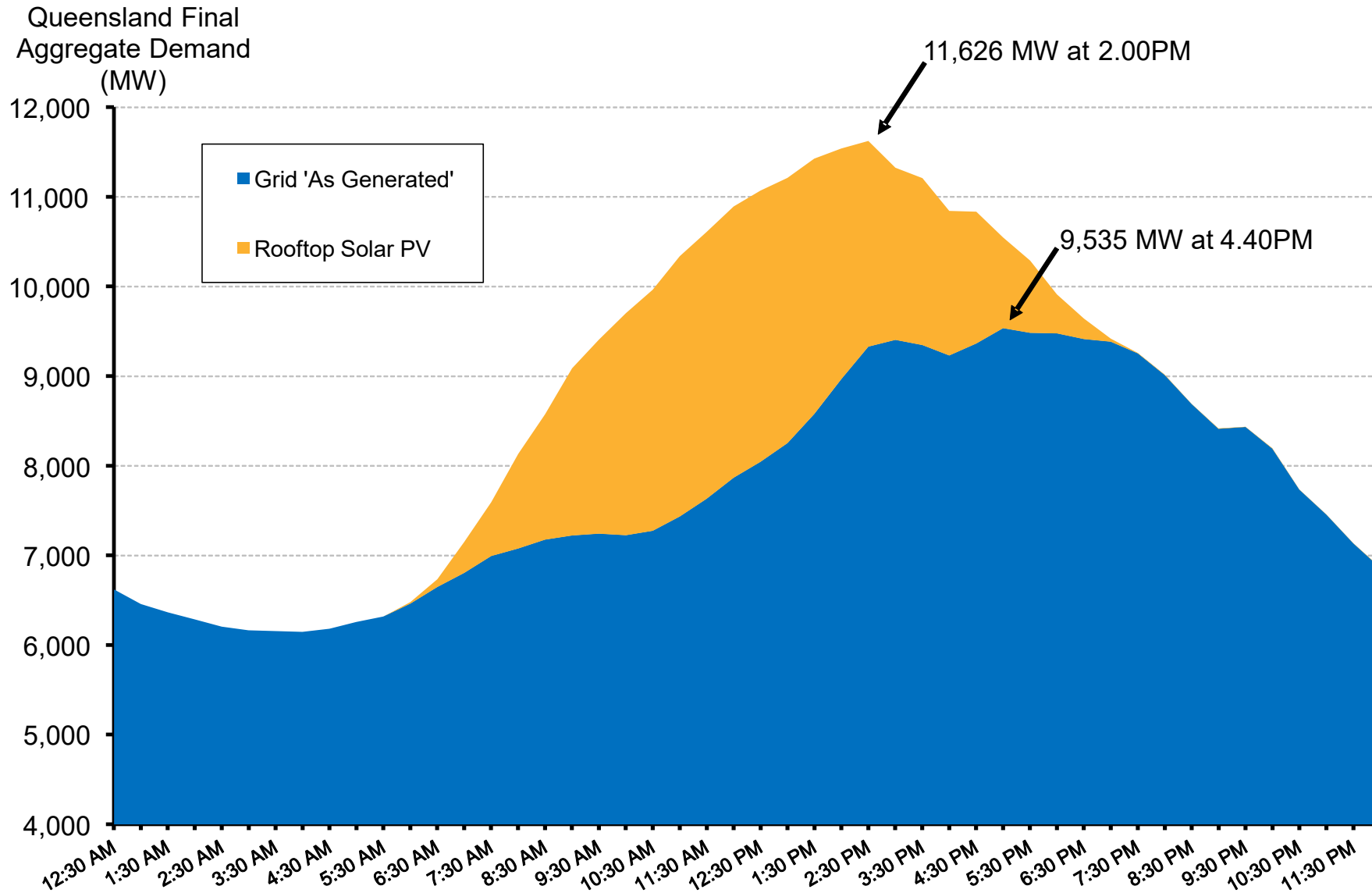
Operations

Final demand – grid maximum 8 March 2022

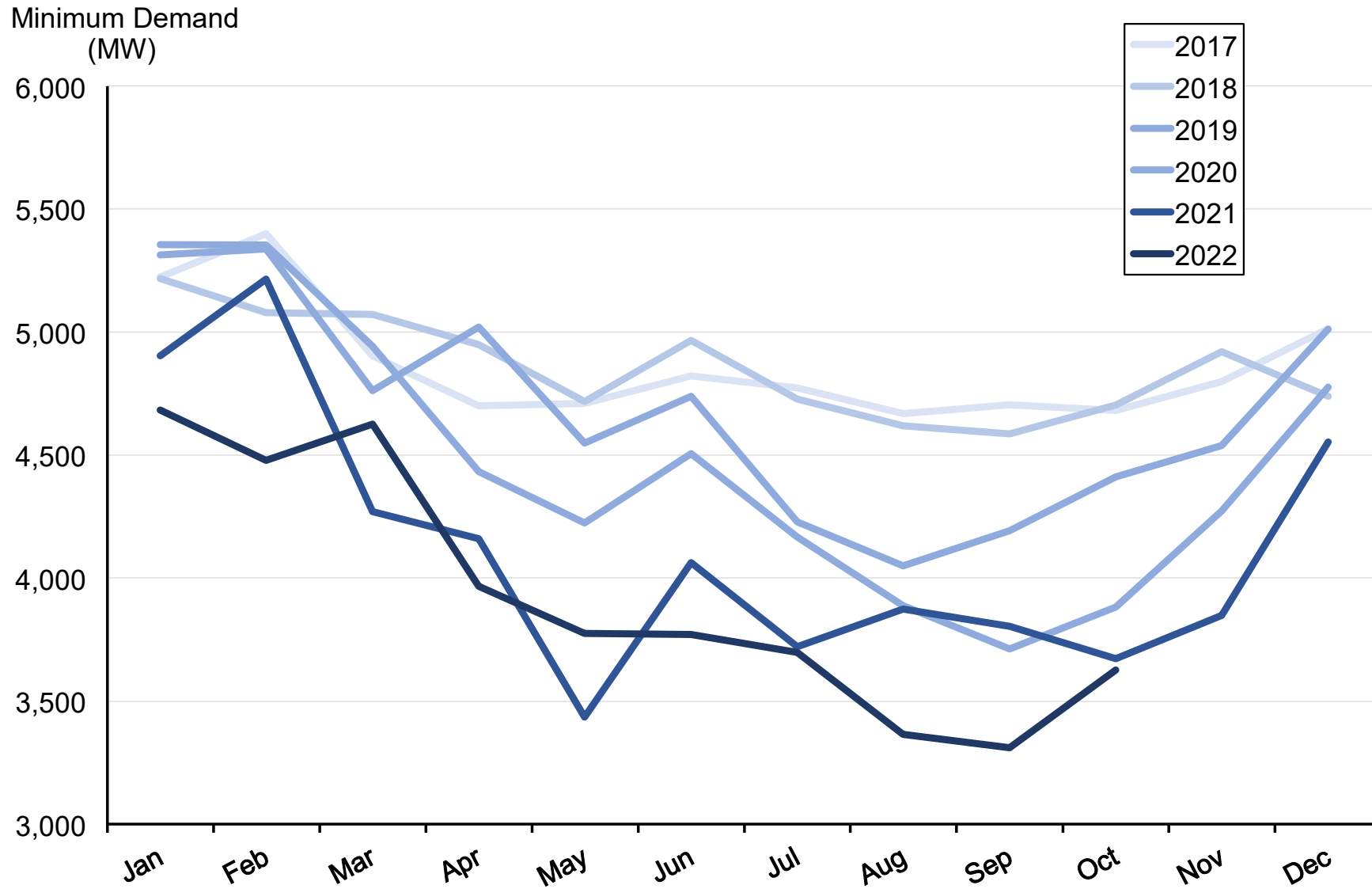


Final total demand – total maximum

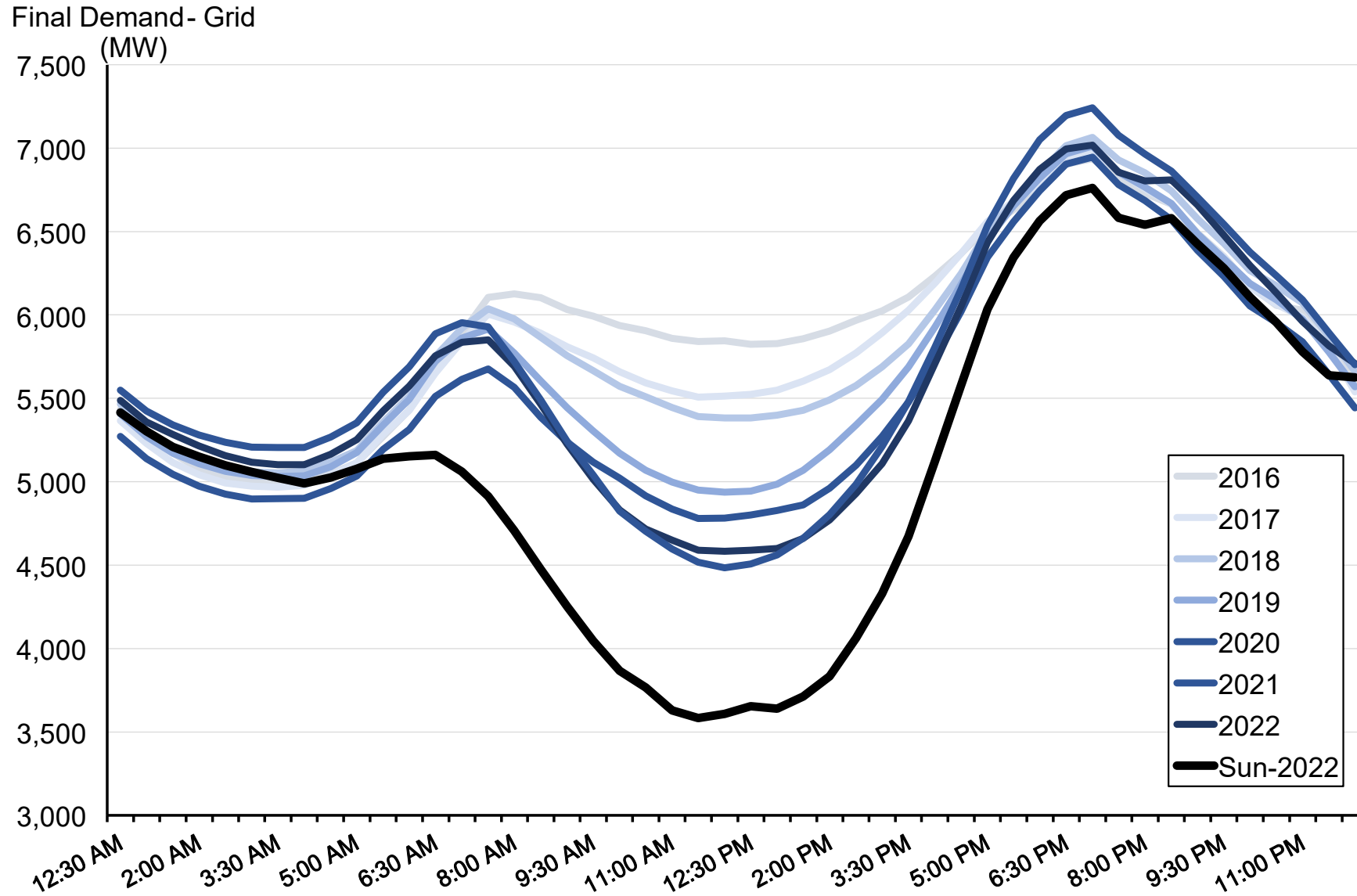
1 February 2022



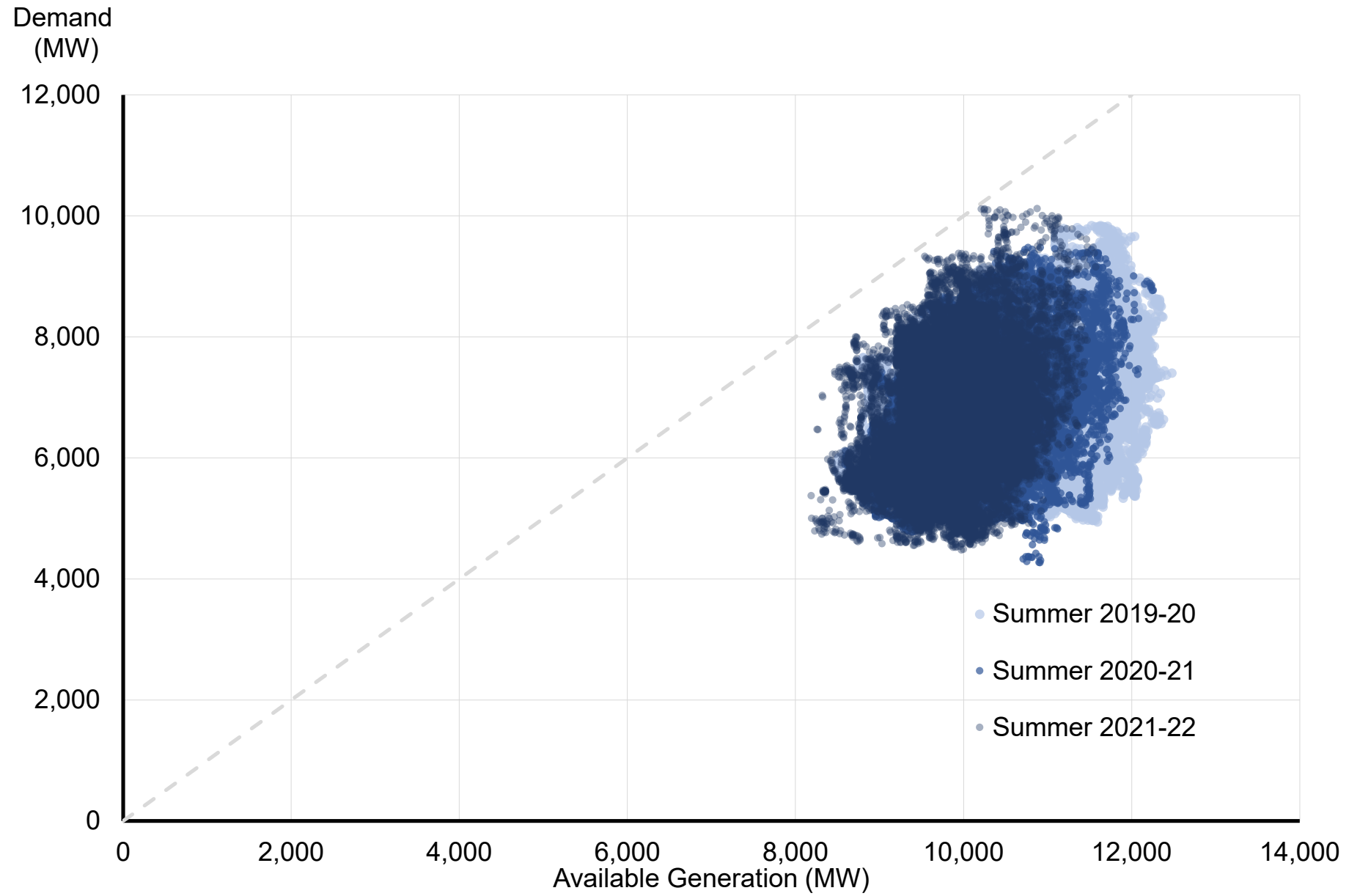
Minimum demand continues to fall



September average daily final (grid) demand



Generation plant reserve margin - falling

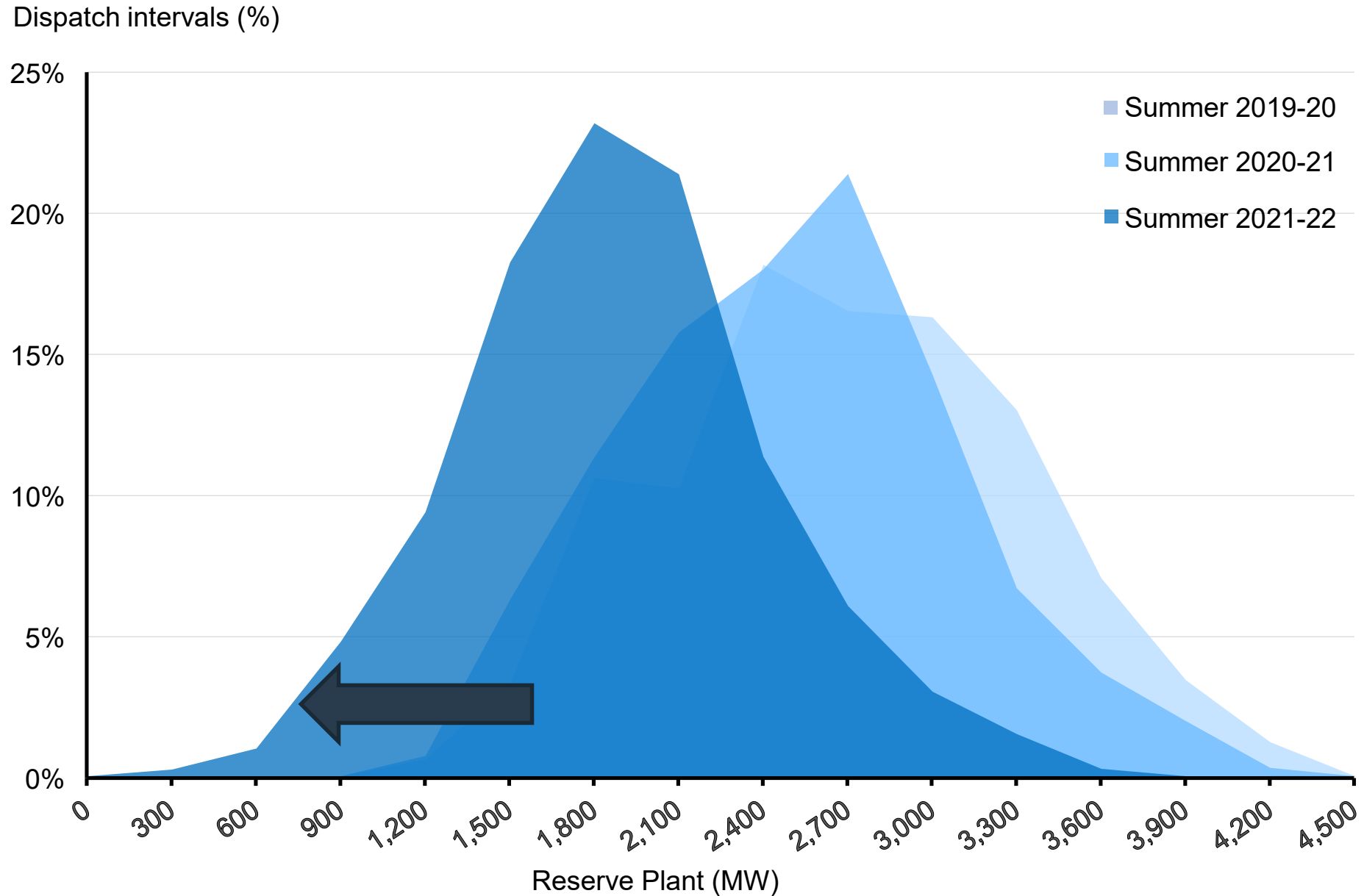


Prices

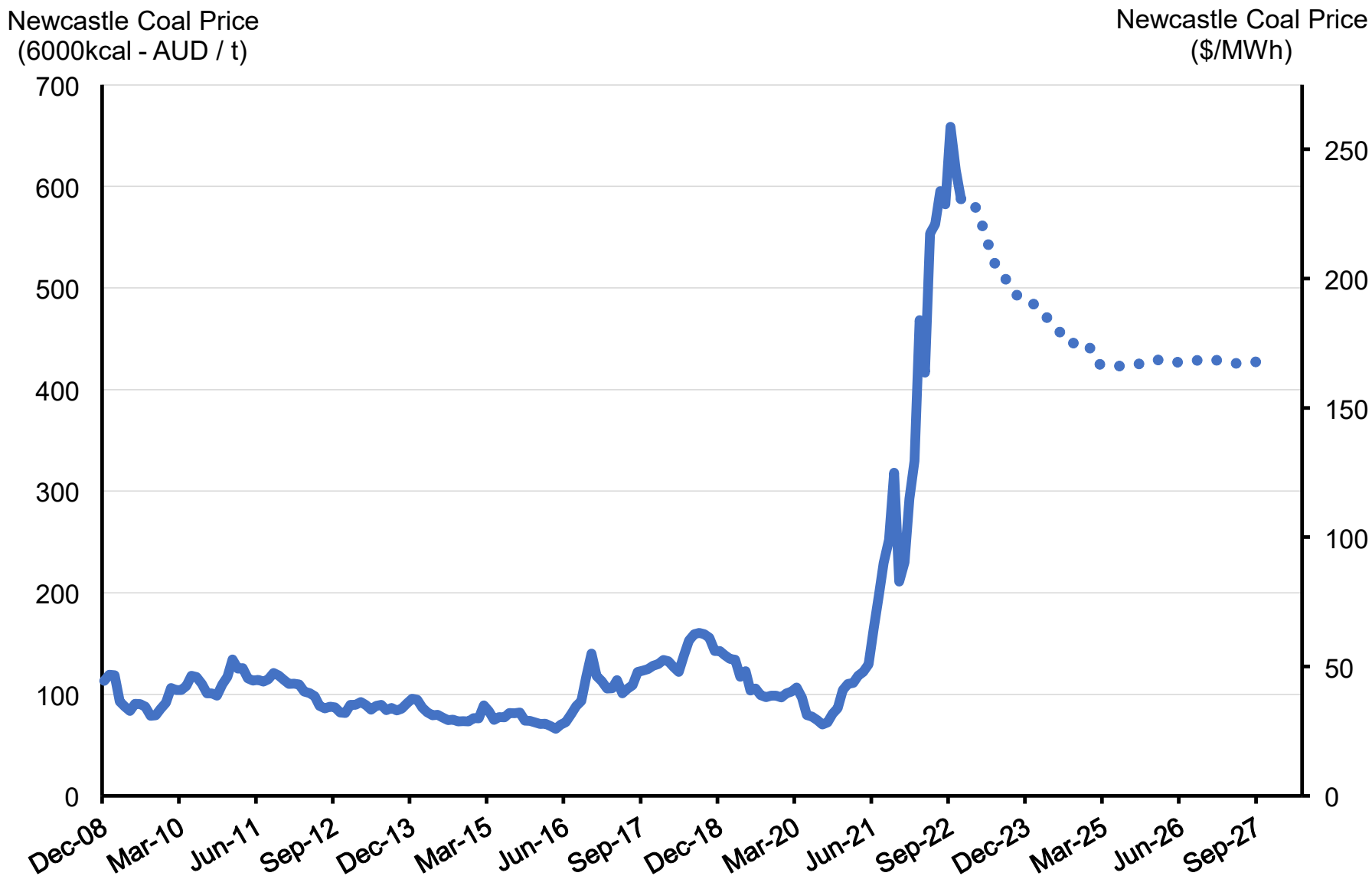
Transmission prices

- Powerlink exists to serve Queenslanders
 - Committed to minimising power system costs and prices
 - Continuously monitor & refine assumptions
 - The Queensland Energy & Jobs Plan is a point-in-time plan
 - Any transmission investment must facilitate a lowering of whole-of-system costs via Cost Benefit Analysis
 - Ongoing commitment to market-led, user-pays Renewable Energy Zone model
- Wholesale market conditions remain complex

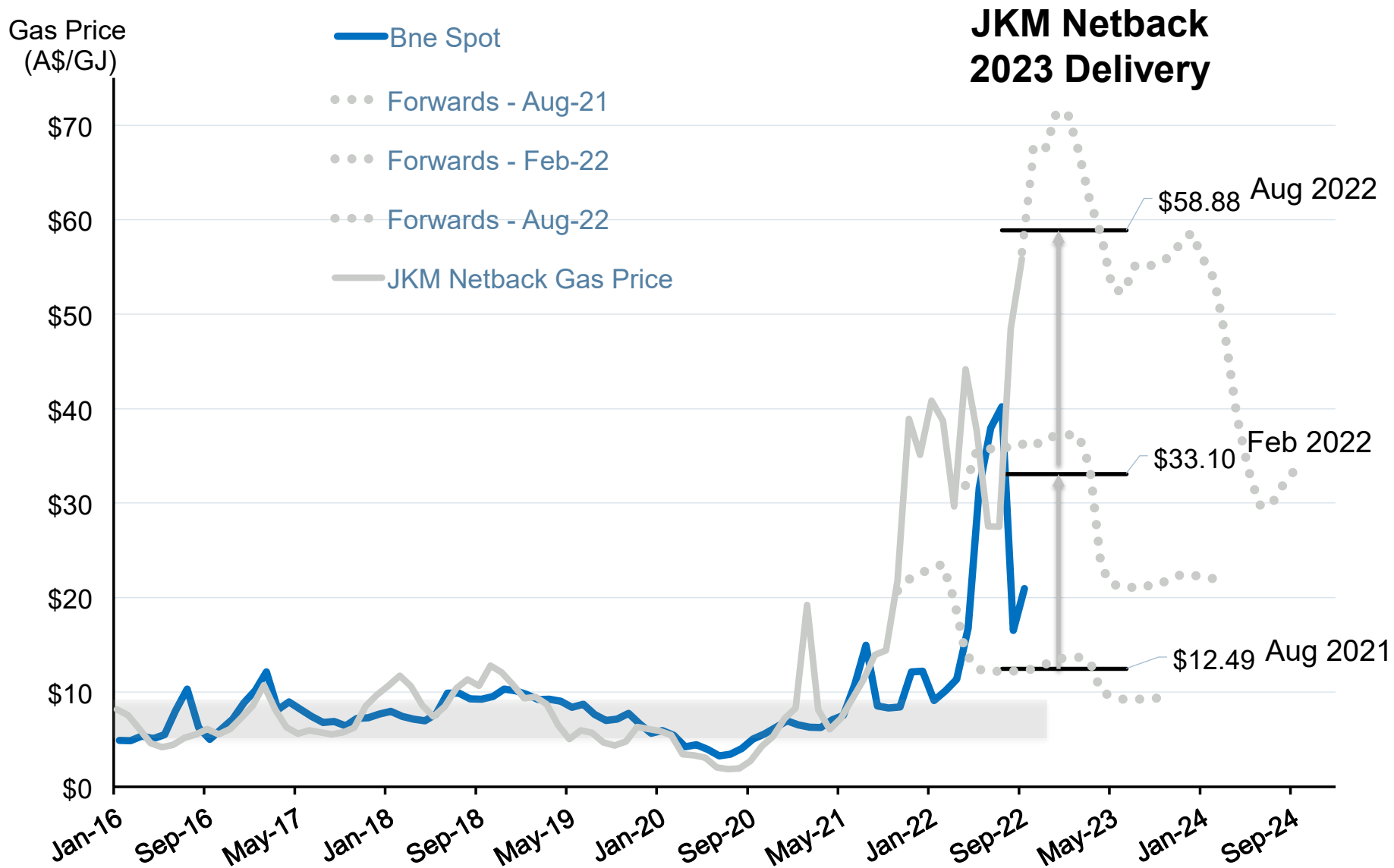
Generation reserve margins - falling



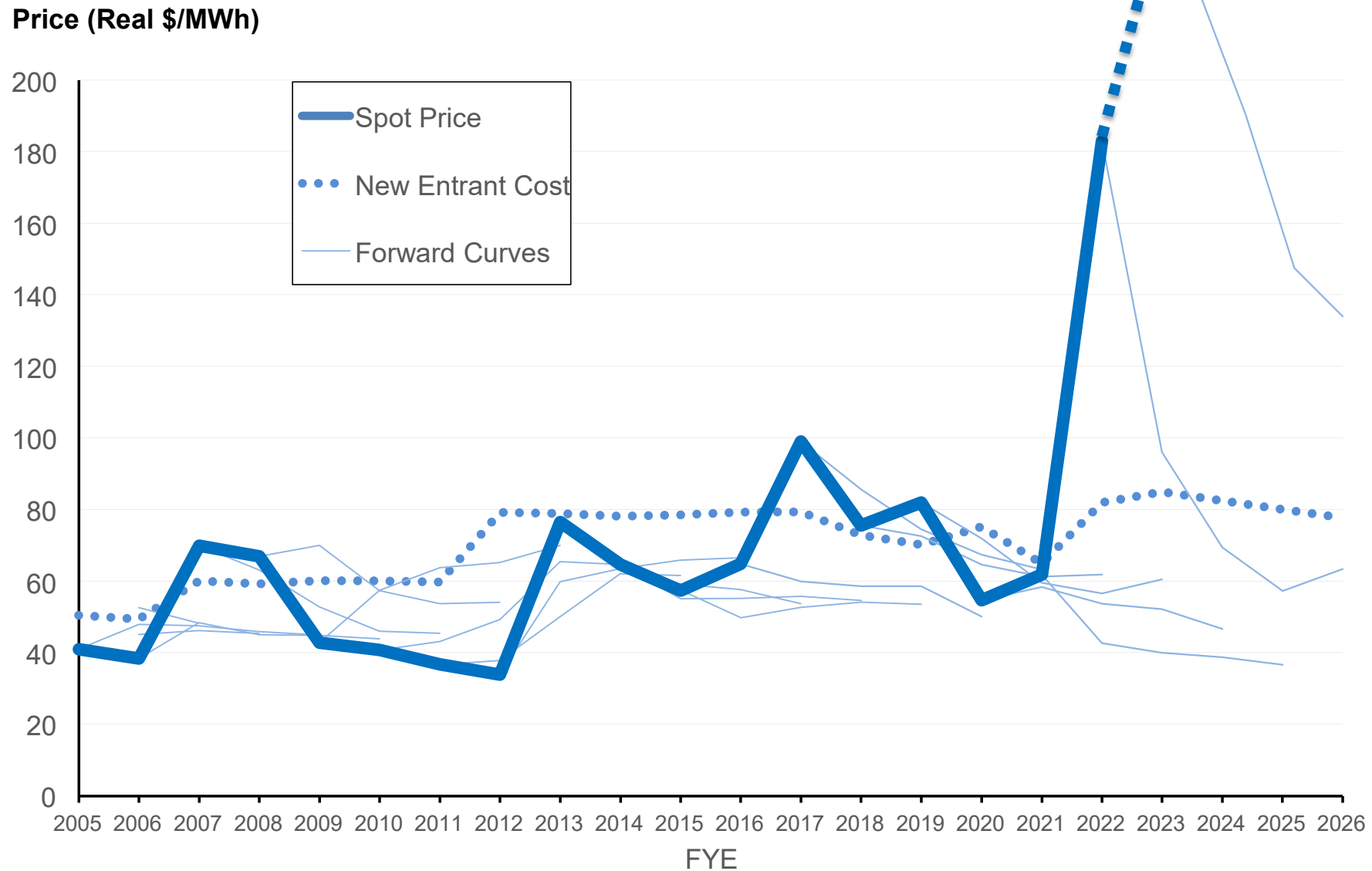
Thermal coal prices – record highs



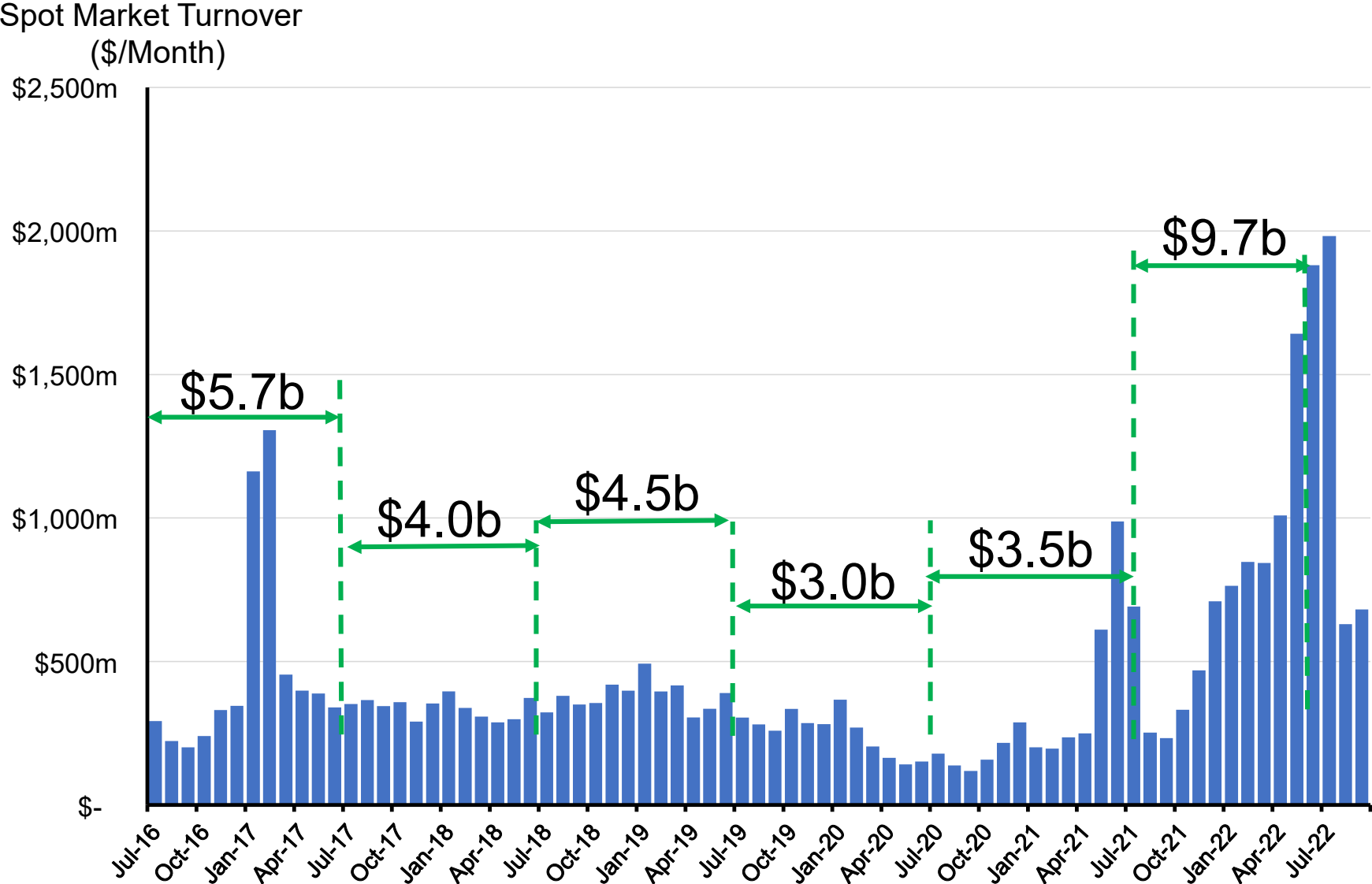
JKM Netback vs Spot Gas - high but structural break



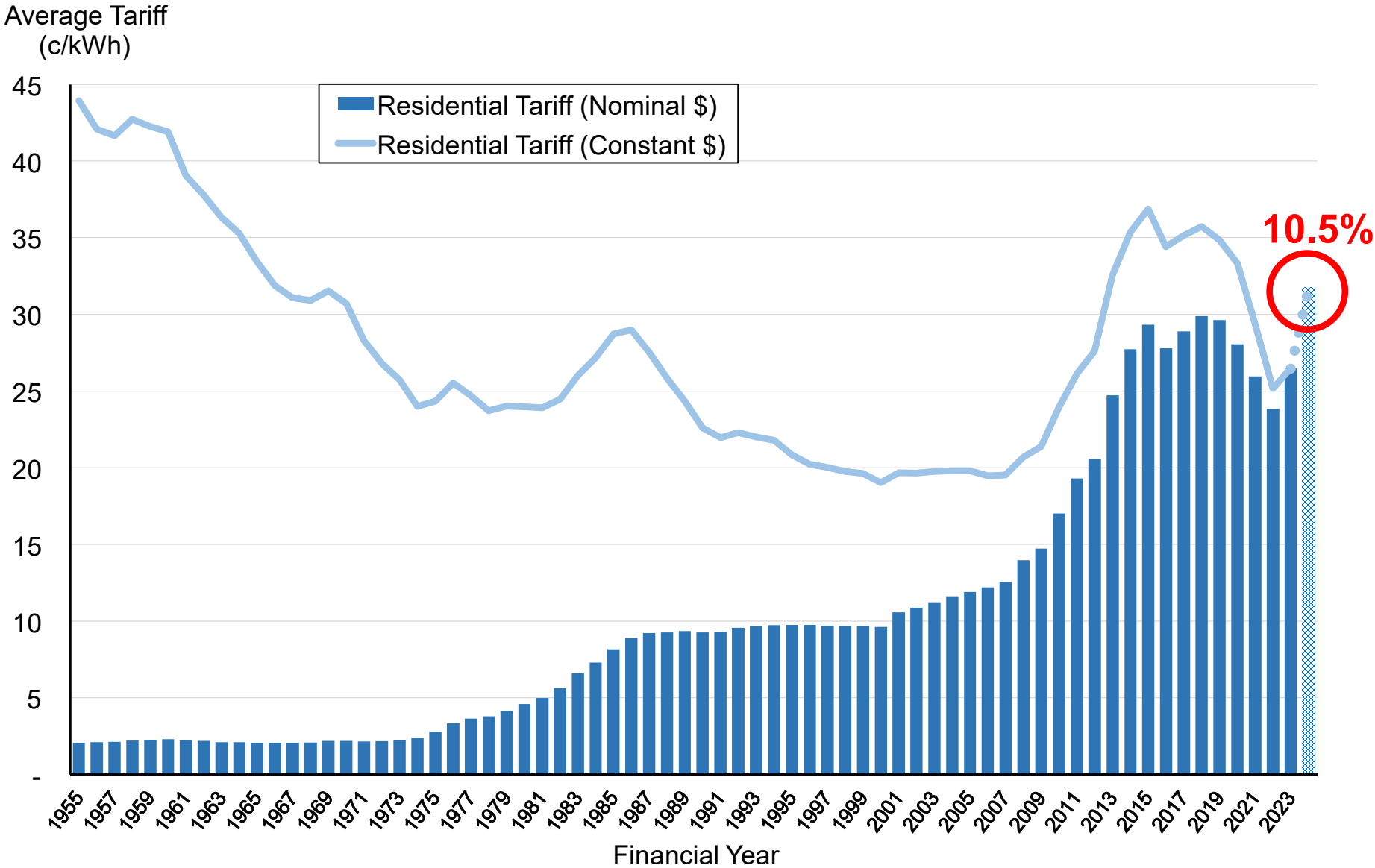
Queensland spot & forward prices – (Real 2022\$)



New highs - Queensland spot market turnover

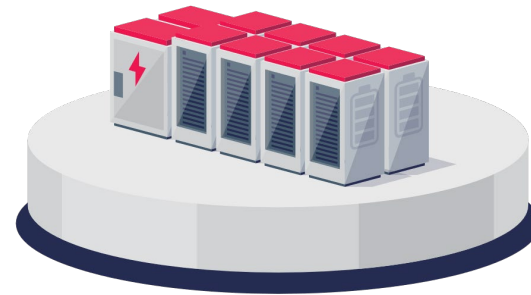
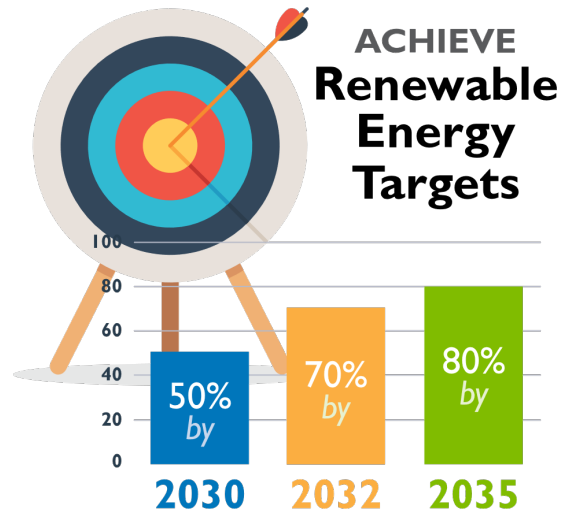


Queensland residential tariff (1955-2023 + 2024f)



Investment

QEJP key targets & objectives

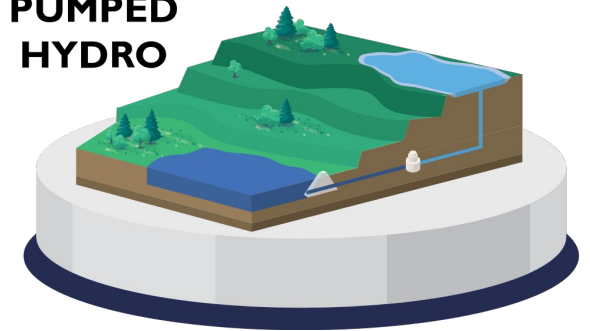


Support growth of utility scale **BATTERY STORAGE**

Develop at least

6GW

PUMPED HYDRO



Deliver a **climate positive**

Brisbane 2032

Olympic & Paralympic Games



NET ZERO Emissions
by **2050**

Connect an additional

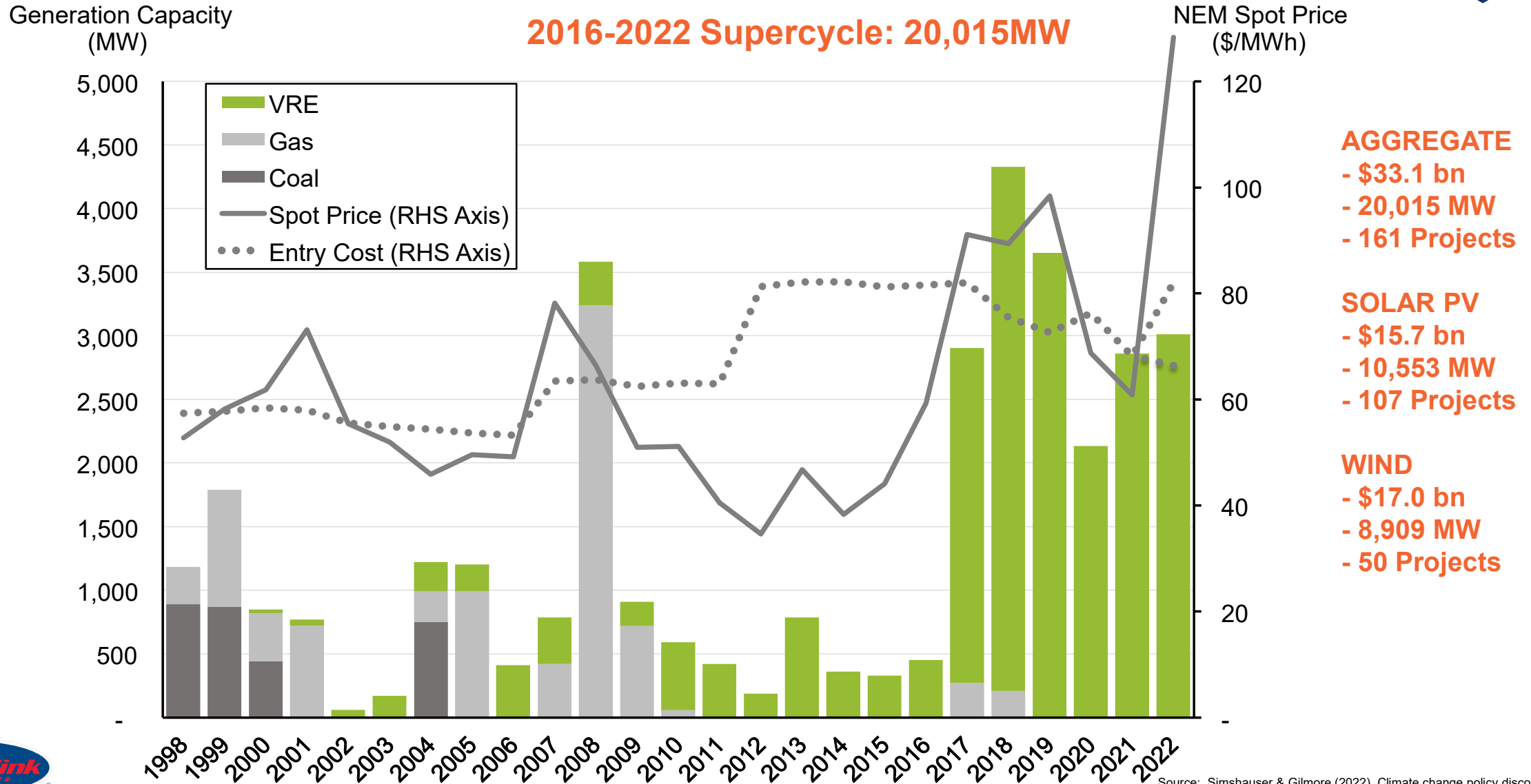
22GW

WIND & SOLAR

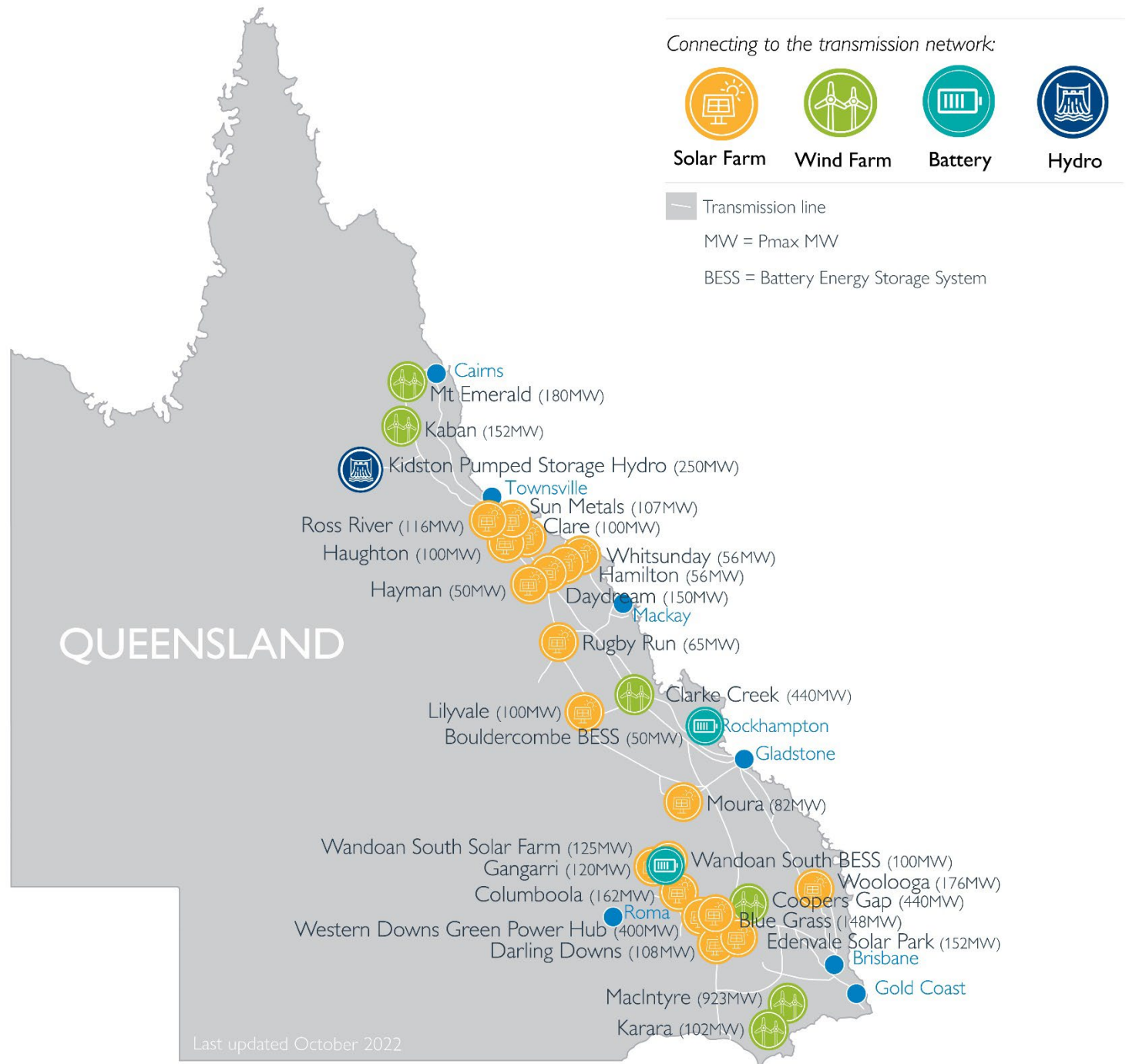
in Queensland Renewable Energy Zones by 2035



The NEM's RE Investment Supercycle continues

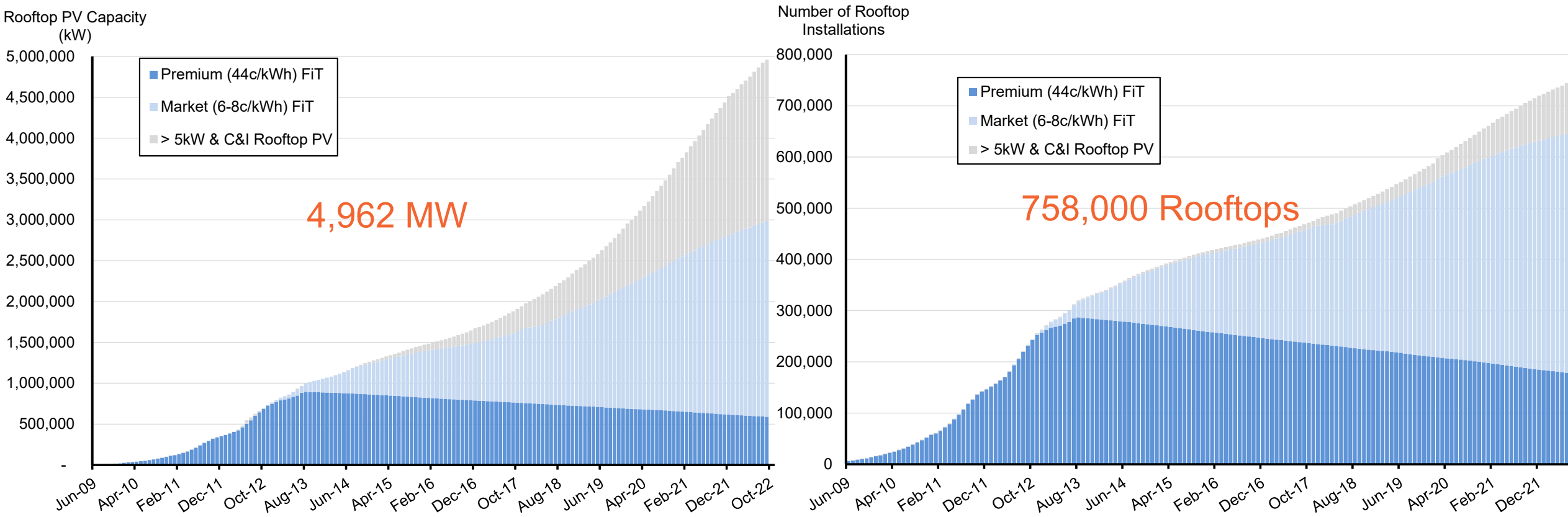


- **28 renewable projects** operational or under construction with combined maximum output of **5,020MW**
- **Projects approaching financial close in 2022** combined output 680MW
- As at September 2022, 32 renewable applications are being processed representing **~11,000MW**
- More than **30,000MW** of renewable generation projects in initial project development stage



Queensland Rooftop PV

Queensland household take-up rate = 43.5%. Highest in the world.

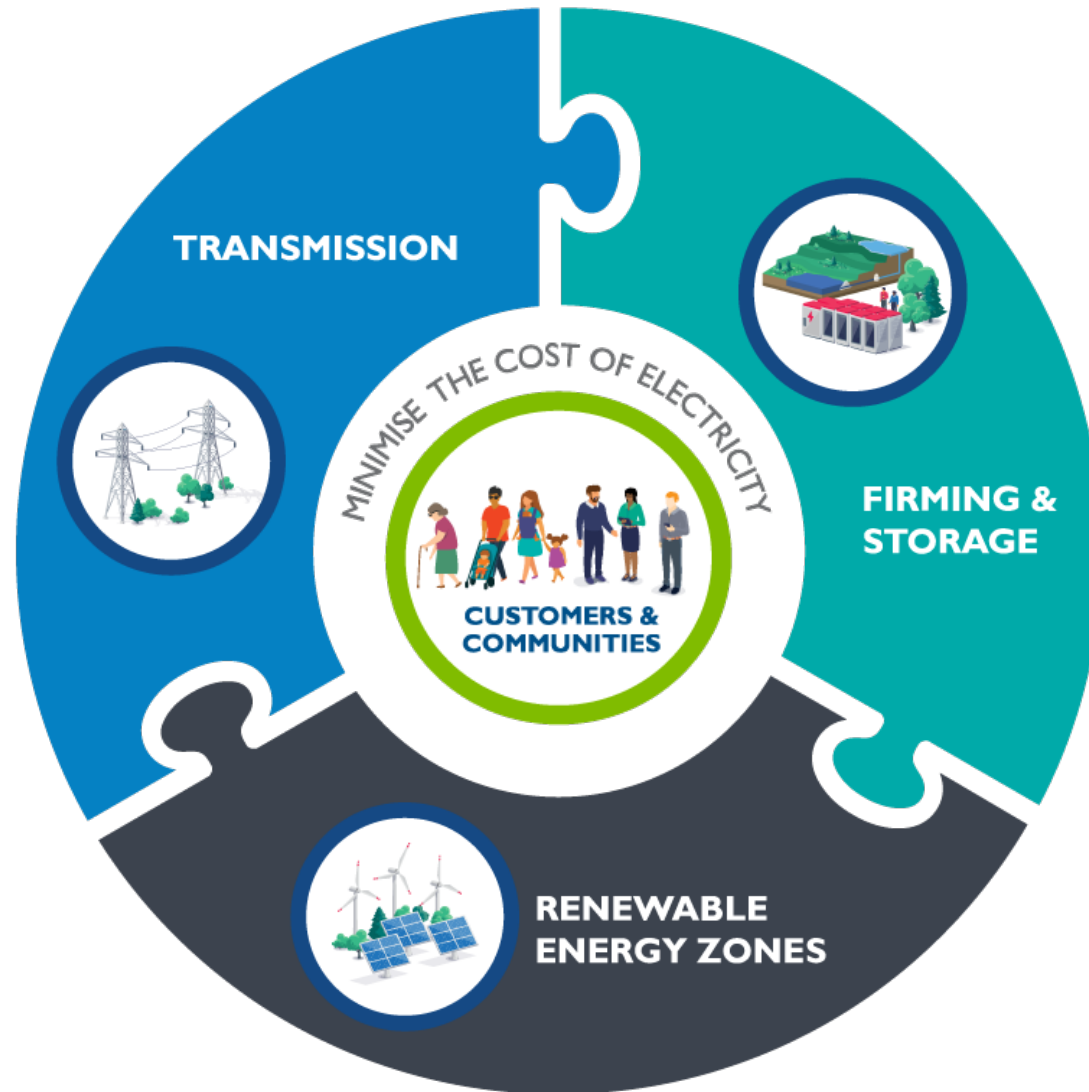


C&I = Commercial & Industrial

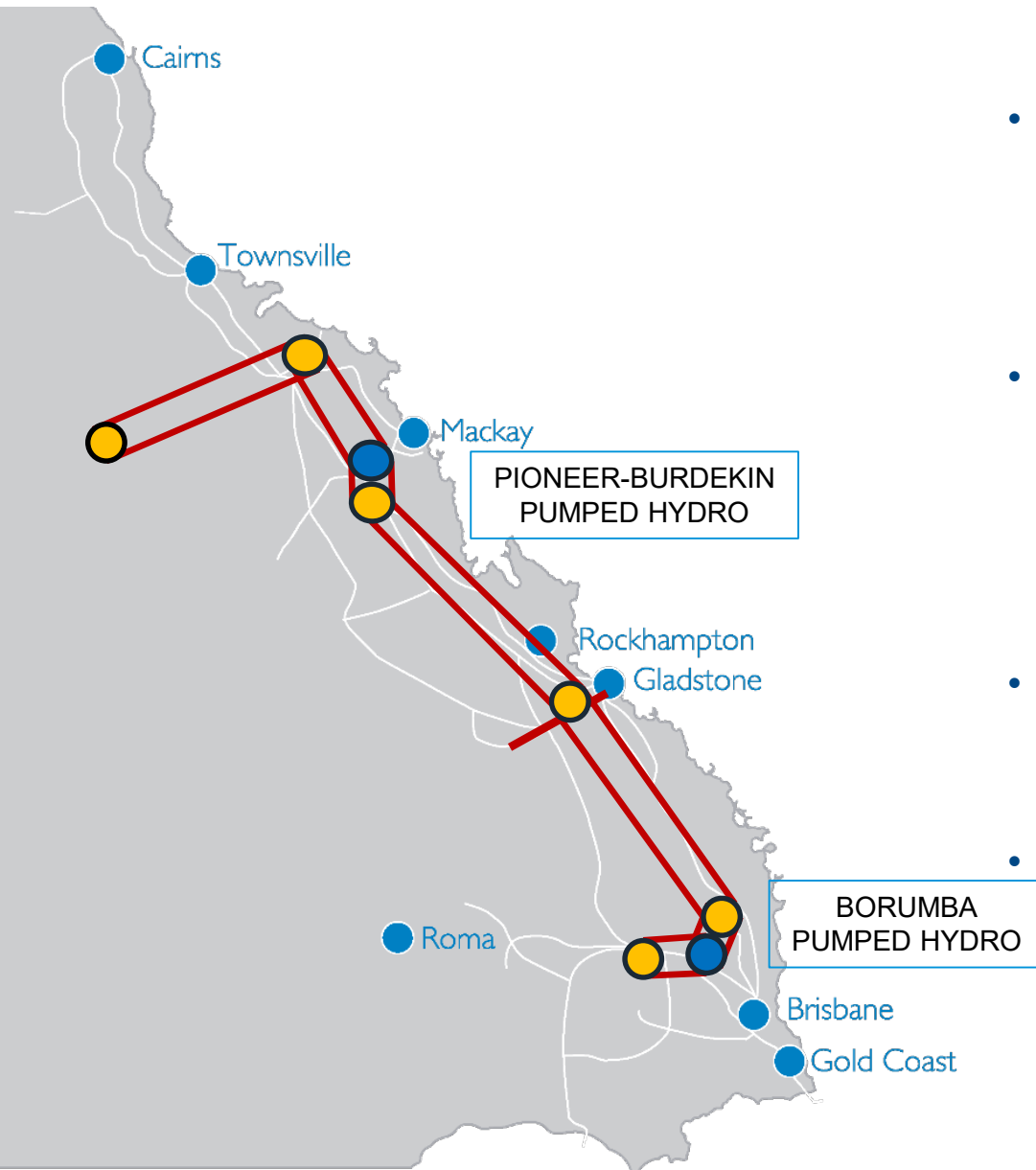


SuperGrid

Key interdependencies

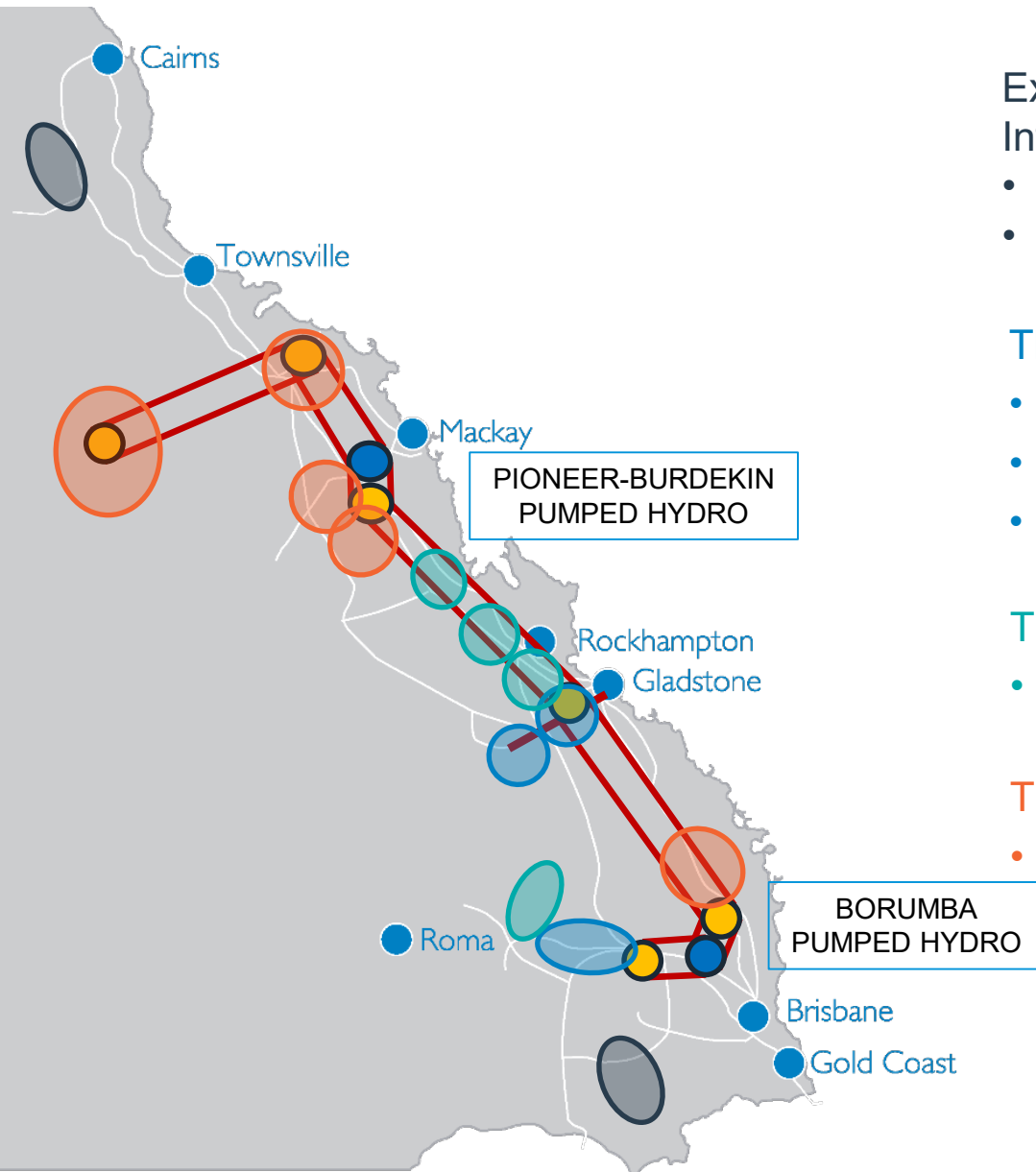


Development of Queensland's SuperGrid



- Stage 1: Borumba Pumped Hydro transmission connection
 - Planned capacity of up to 2GW
 - Two connection points ~\$800M
 - Commissioning works in 2029
- Stage 2: Central Queensland Connection
 - 290 kilometre connection
 - Support Central Queensland REZ renewable generation developments
 - Commissioning planned in 2031
- Stage 3: Pioneer-Burdekin Pumped Hydro and North Queensland connection
 - Operational date in 2032
- Stage 4: Connection to Hughenden Area (Clean Energy Hub)
 - Commissioning planned in 2036

Queensland REZs - Market Led!



Existing Renewables ~3,000MW

Inflight REZ

- North Queensland REZ ~500MW
- Southern Downs REZ ~2,000MW

The first horizon of REZs – 2022 to 2024

- Western Downs REZ ~1,850MW
- Banana Range REZ ~1,500MW
- Fitzroy REZ ~1,800MW

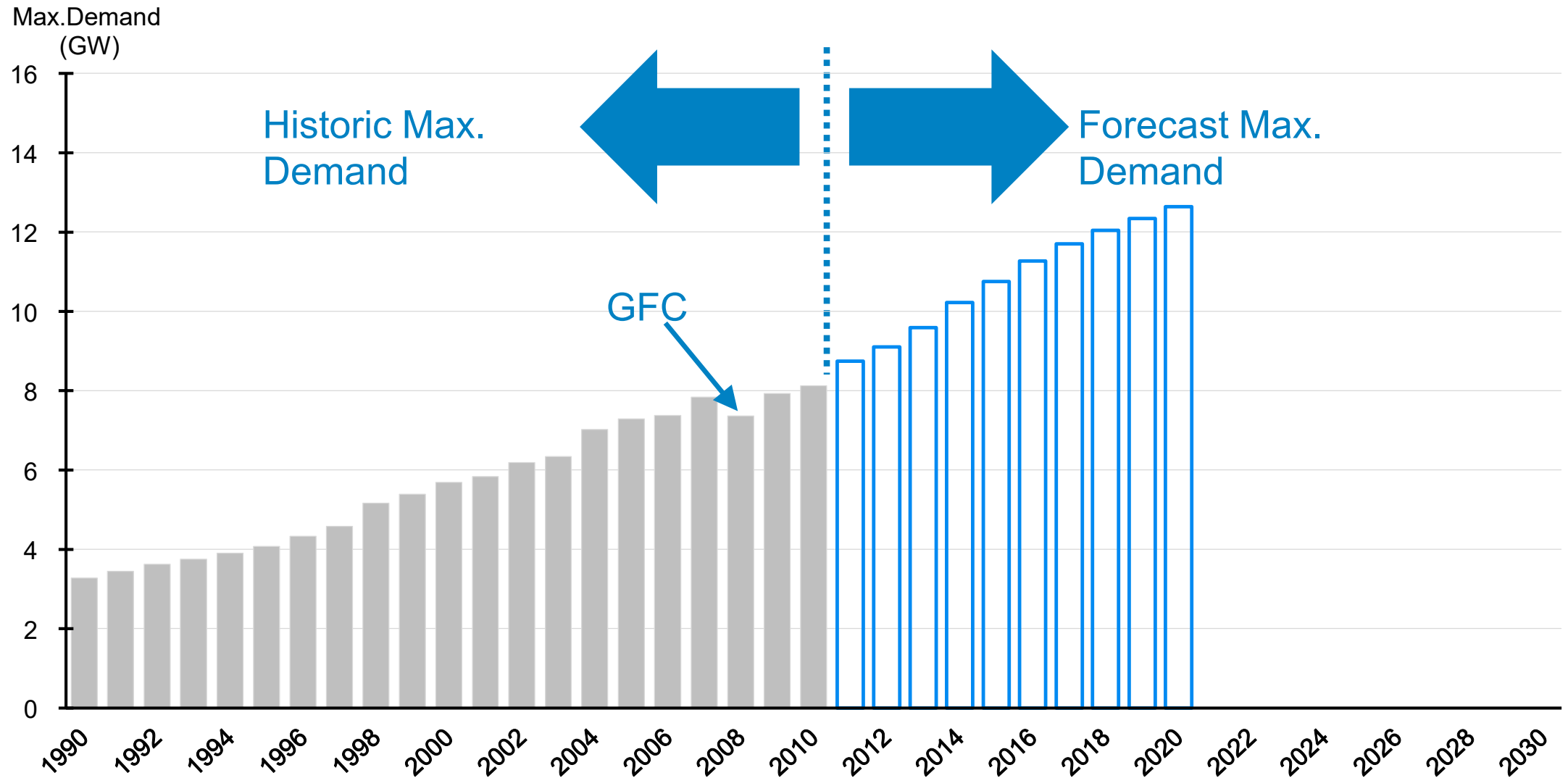
The second horizon of REZs – 2025 to 2029

- Total ~5,700MW

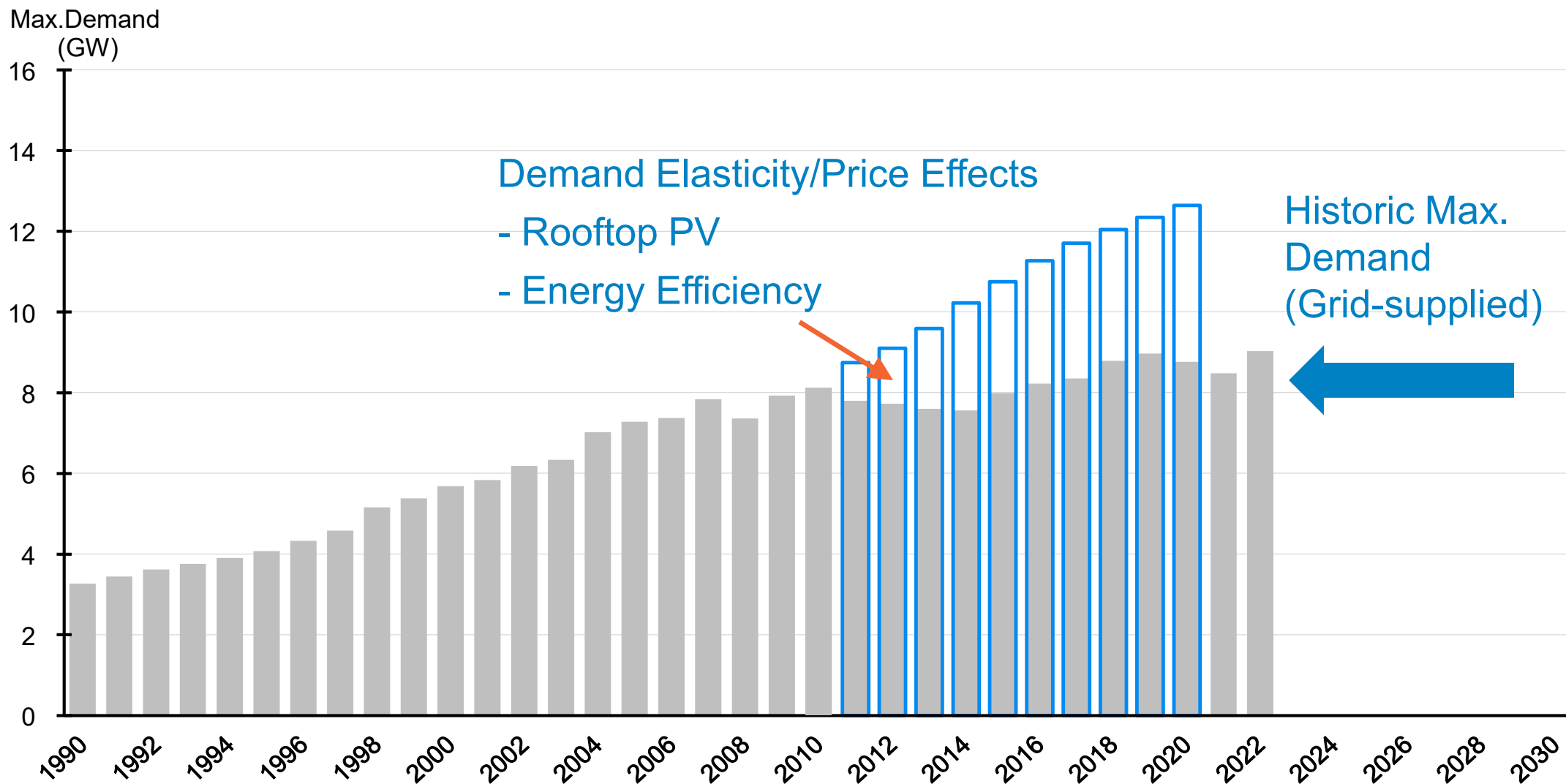
The third horizon of REZs – 2030 to 2035

- Total ~9,200MW

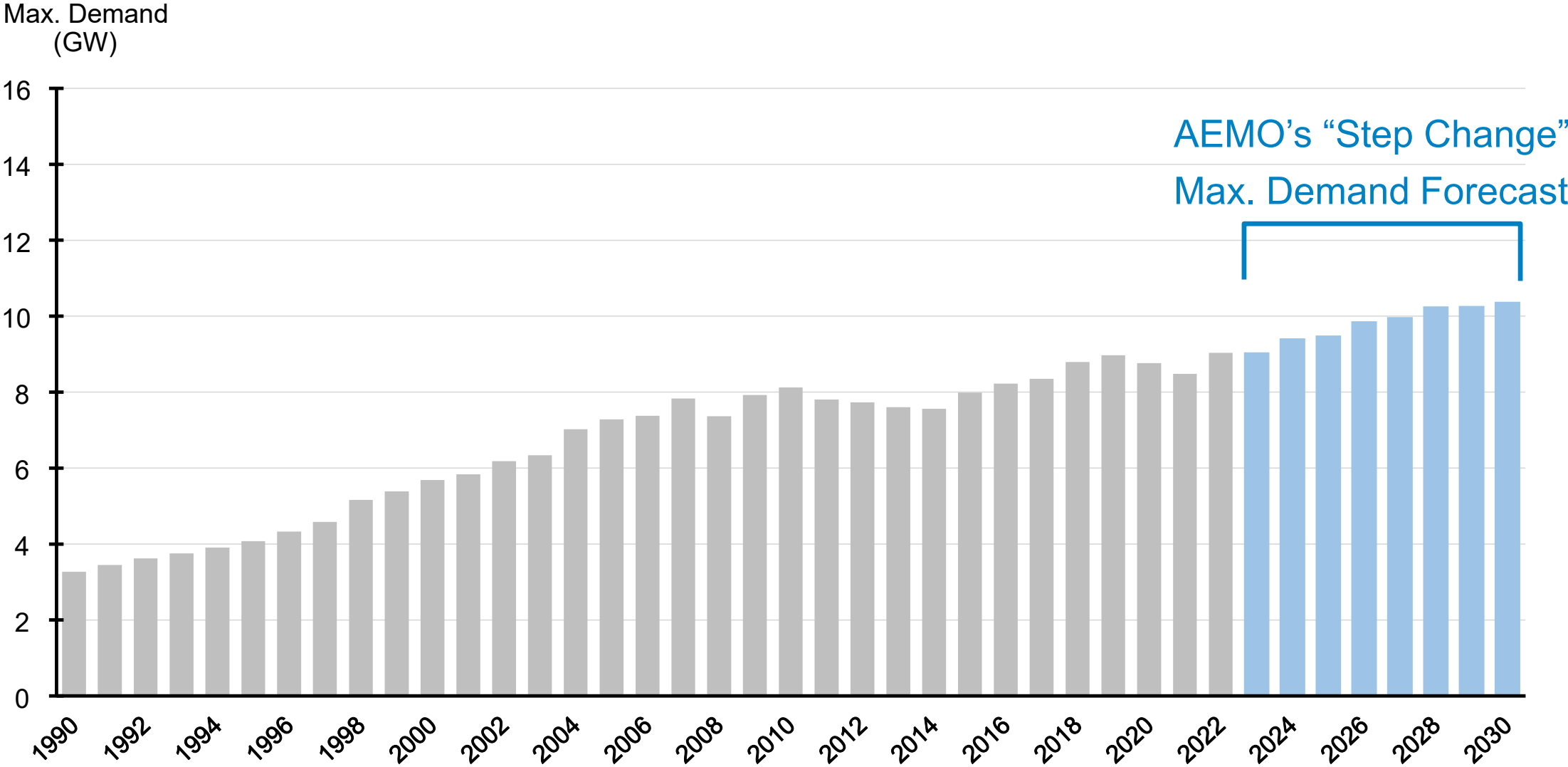
Challenges of load forecasting (2010 TAPR)



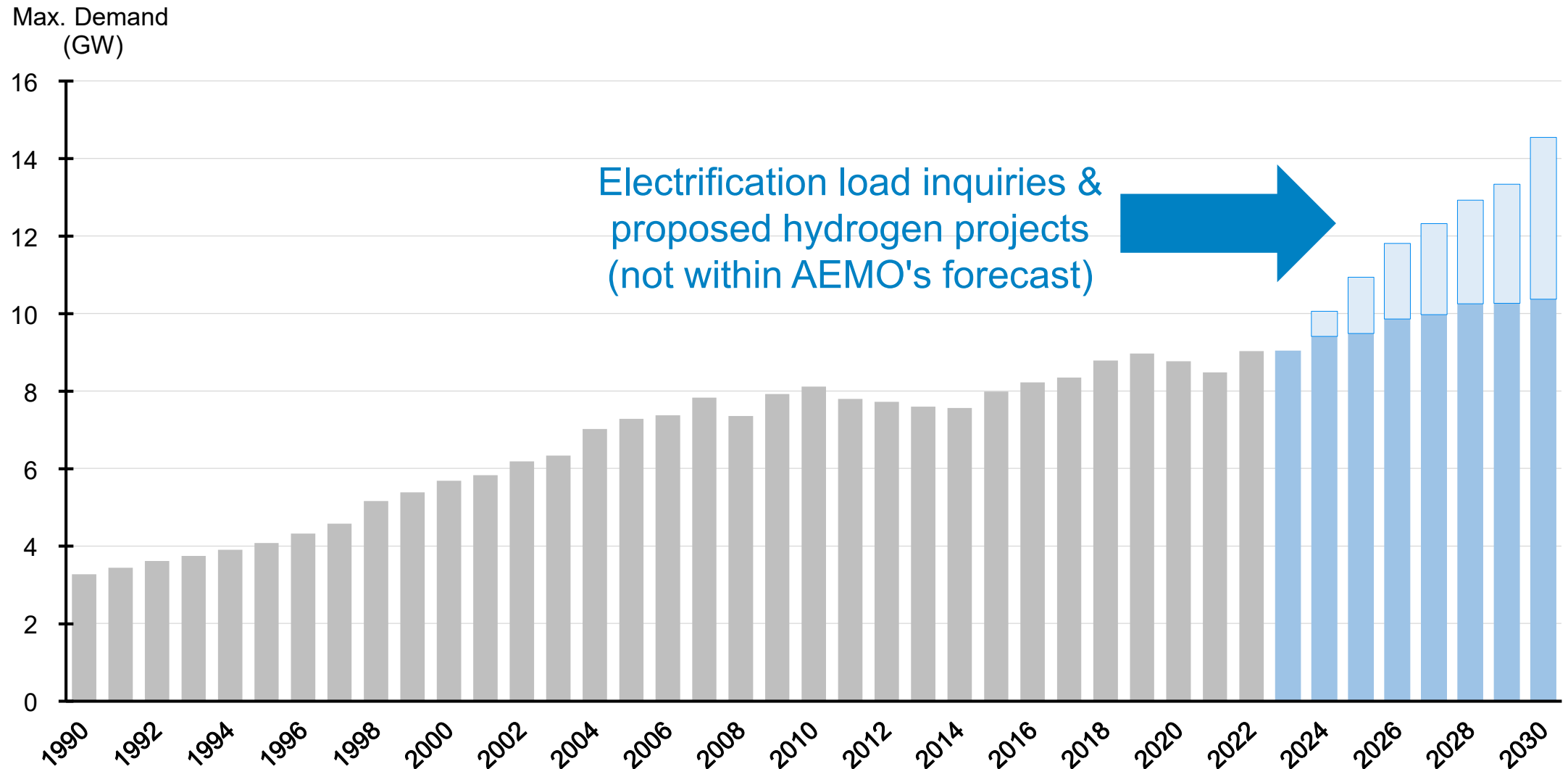
Actuals



2022 TAPR maximum demand forecast (grid-supplied)

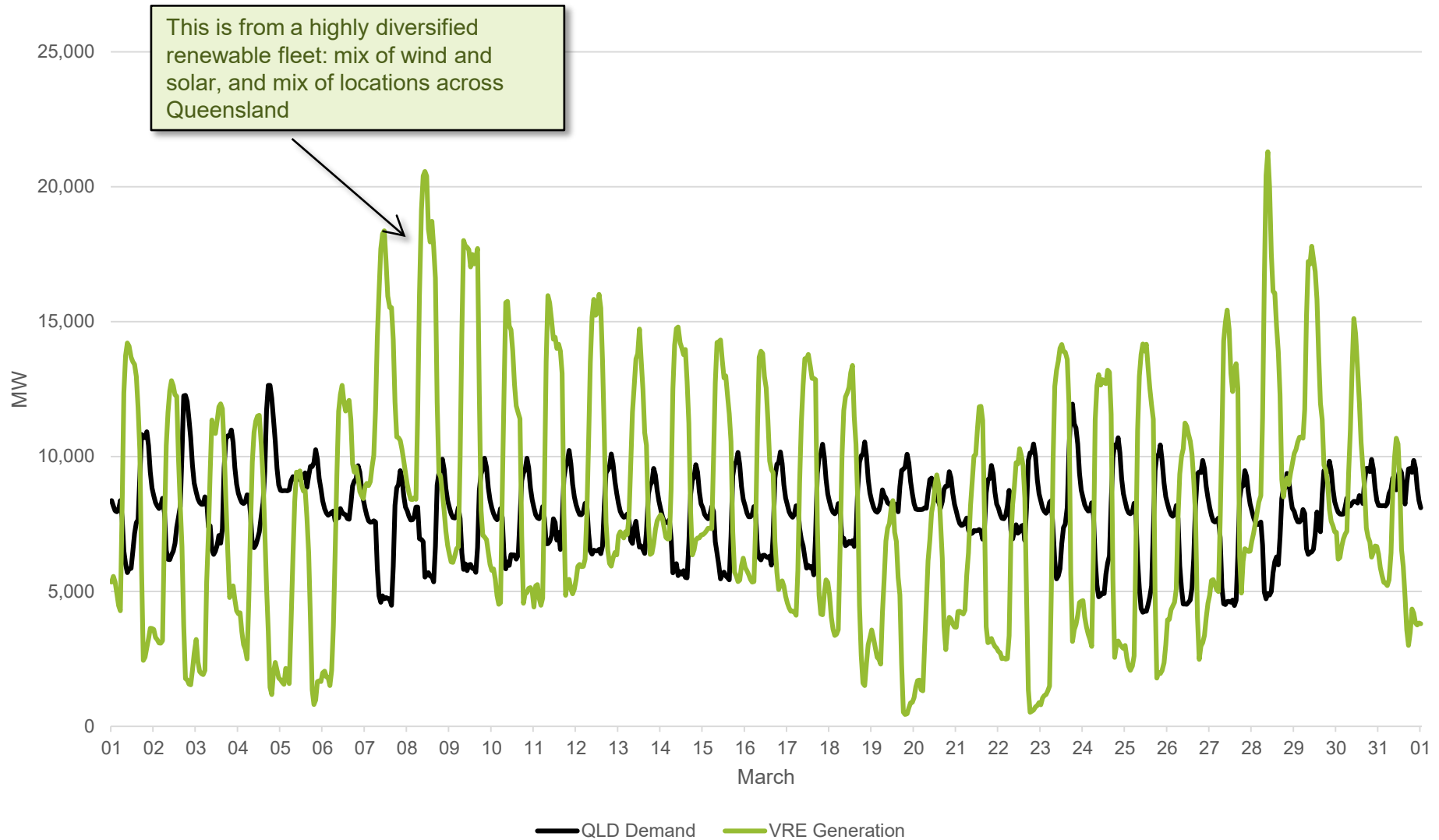


Electrification inquiries & hydrogen projects

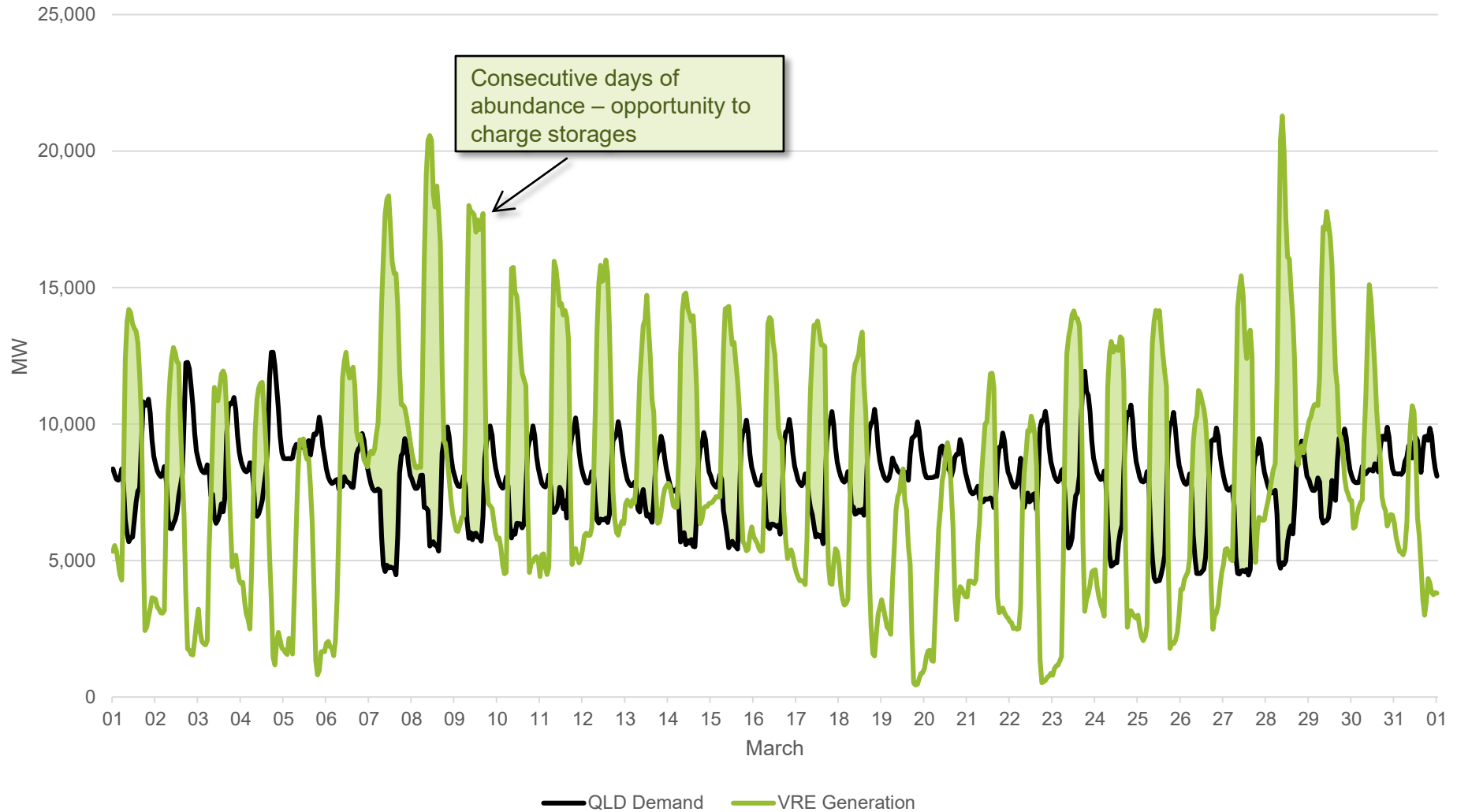


System operations in 2035

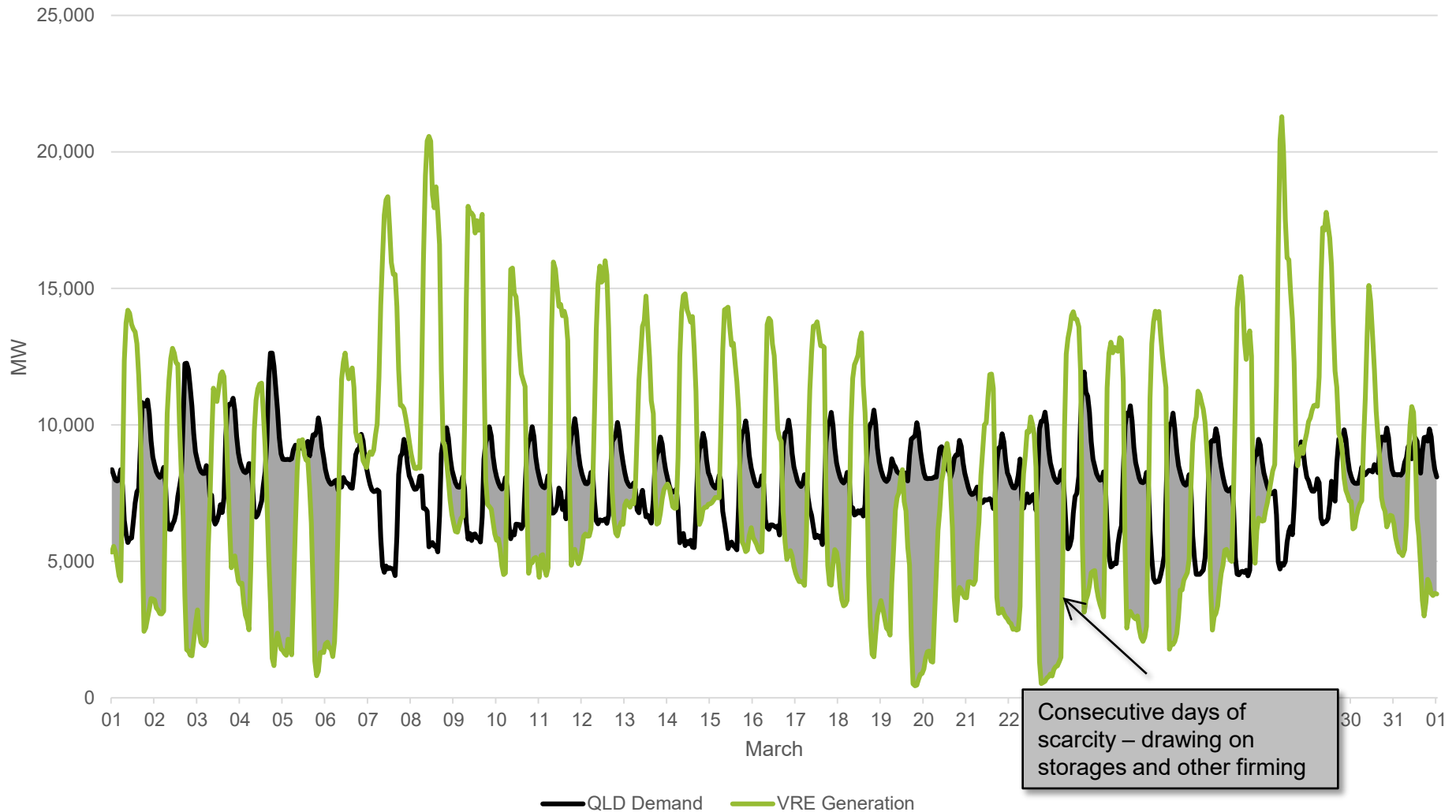
Queensland system operation: Effect of variability in supply (simulation of March circa 2035)



Queensland system operation: Effect of variability in supply (simulation of March circa 2035)

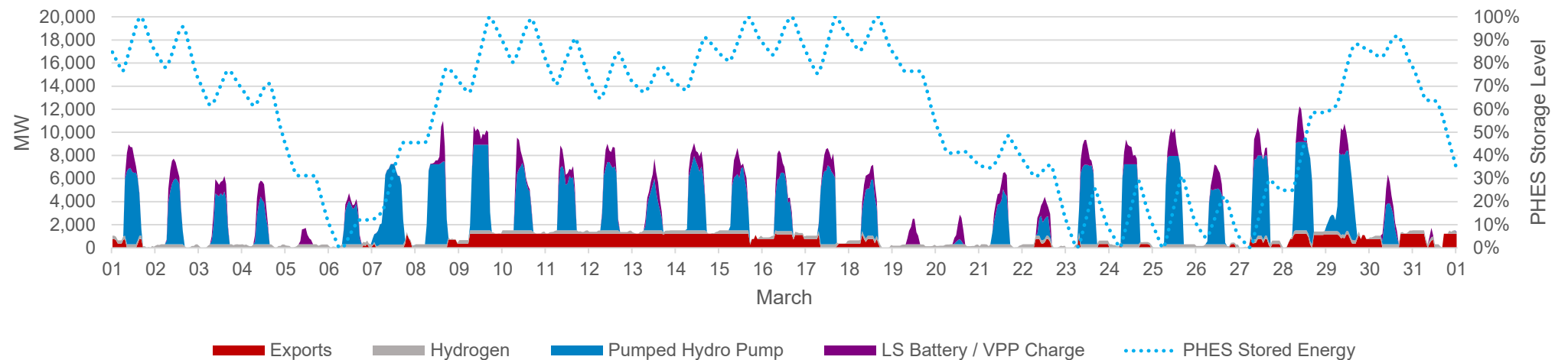
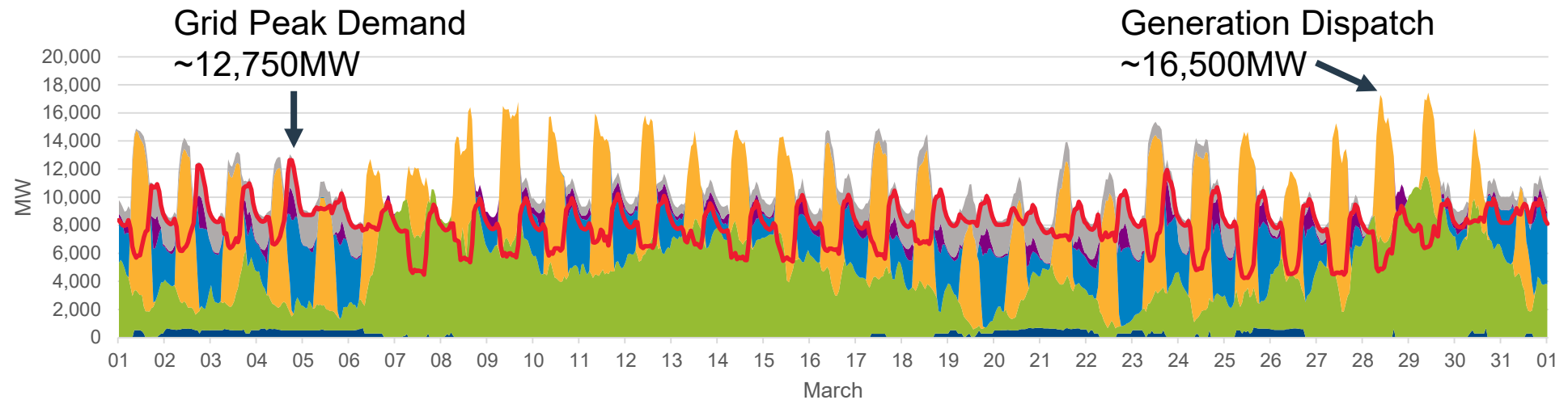


Queensland system operation: Effect of variability in supply (simulation of March circa 2035)



Queensland system operation:

Firming the supply to meet demand (simulation of March circa 2035)



Greenbank BESS 200MW – 2 hrs

Genex K2 PHES 250MW – 8 hrs

Wivenhoe PHES 500MW – 10 hrs

Borumba PHES

2,000MW – 24 hrs

Pioneer PHES

2 x 2,500MW – 24 hrs

INDUSTRY PANEL

Moderated by Jacqui Bridge
EGM Energy Futures

INDUSTRY PANEL



Lynne Gallagher
CEO
Energy Consumers
Australia



Andrew Bills
CEO
CS Energy



Andrew Bray
National Director
RE-Alliance



Andrew Richards
CEO
Energy Users
Association of
Australia



ACTIONING THE QUEENSLAND ENERGY AND JOBS PLAN

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DELIVERING THE FUTURE TRANSMISSION NETWORK

Daniel Andersen
General Manager Energy Markets

Queensland's future power system



2022



2035

4GW renewable generation

8.1GW coal generation

Firming & storage mainly
comes from coal & gas

Low demand growth

High amount of rooftop solar

25GW renewable generation

Some coal-fired generation remains,
repurposed for system strength & inertia

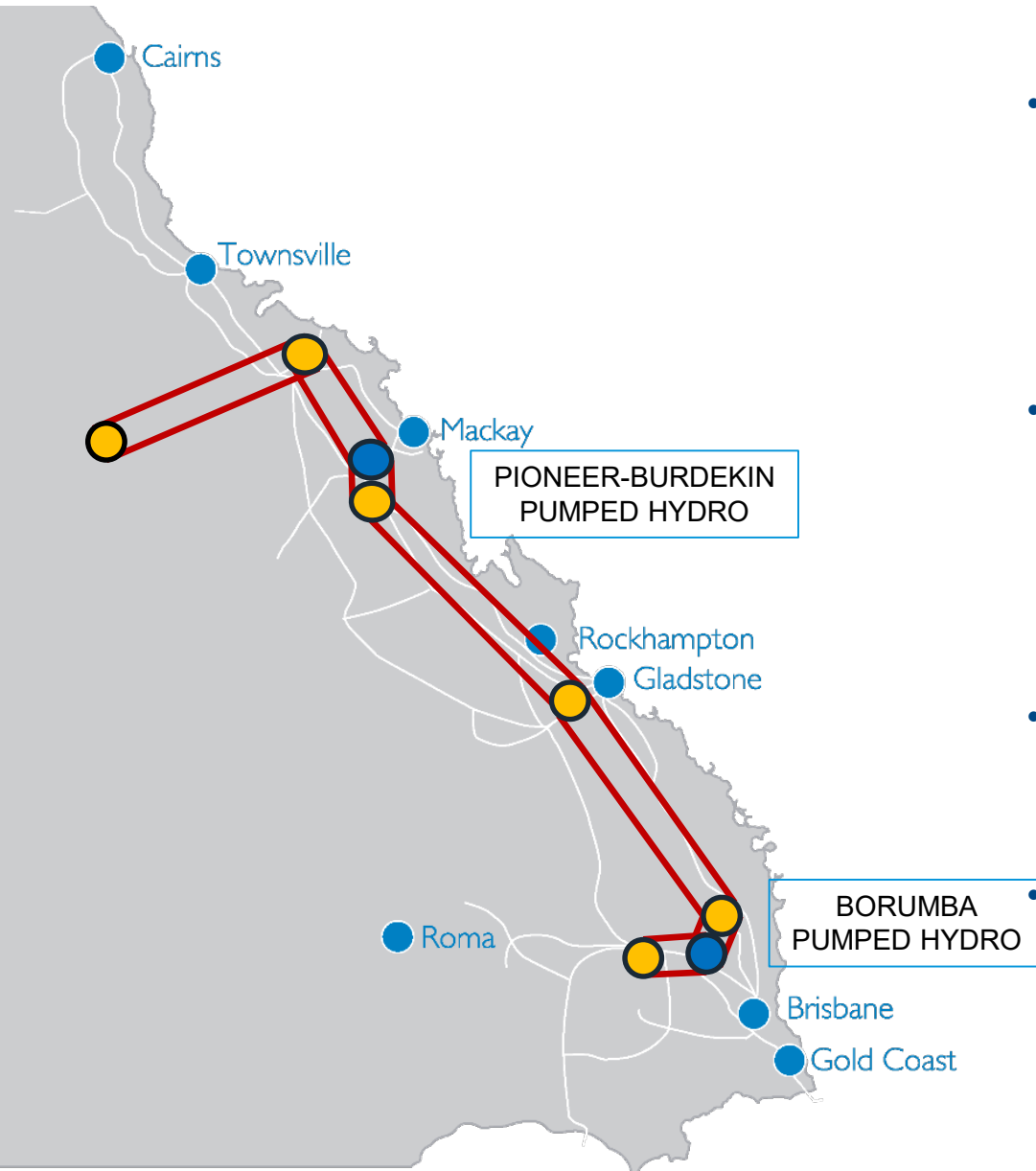
Firmed by at least **6GW** of long-duration
storage, **3GW** of utility-scale batteries,
3GW of hydrogen-ready gas-fuelled plant

Electrification of heavy industry

Opportunities for greater flexibility
on the demand side

Continued rooftop solar growth

Upgrading the transmission network



- Stage 1: Borumba Pumped Hydro transmission connection
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 - Commissioning planned in 2036

Question

How can Powerlink best plan the development of its network to ensure an integrated approach that delivers whole-of system benefits?

DEVELOPING RENEWABLE ENERGY ZONES

Leanne Caelers
Executive Director Transmission and
Transformation, Department of Energy &
Public Works



Queensland
Government



QREZ Roadmap development

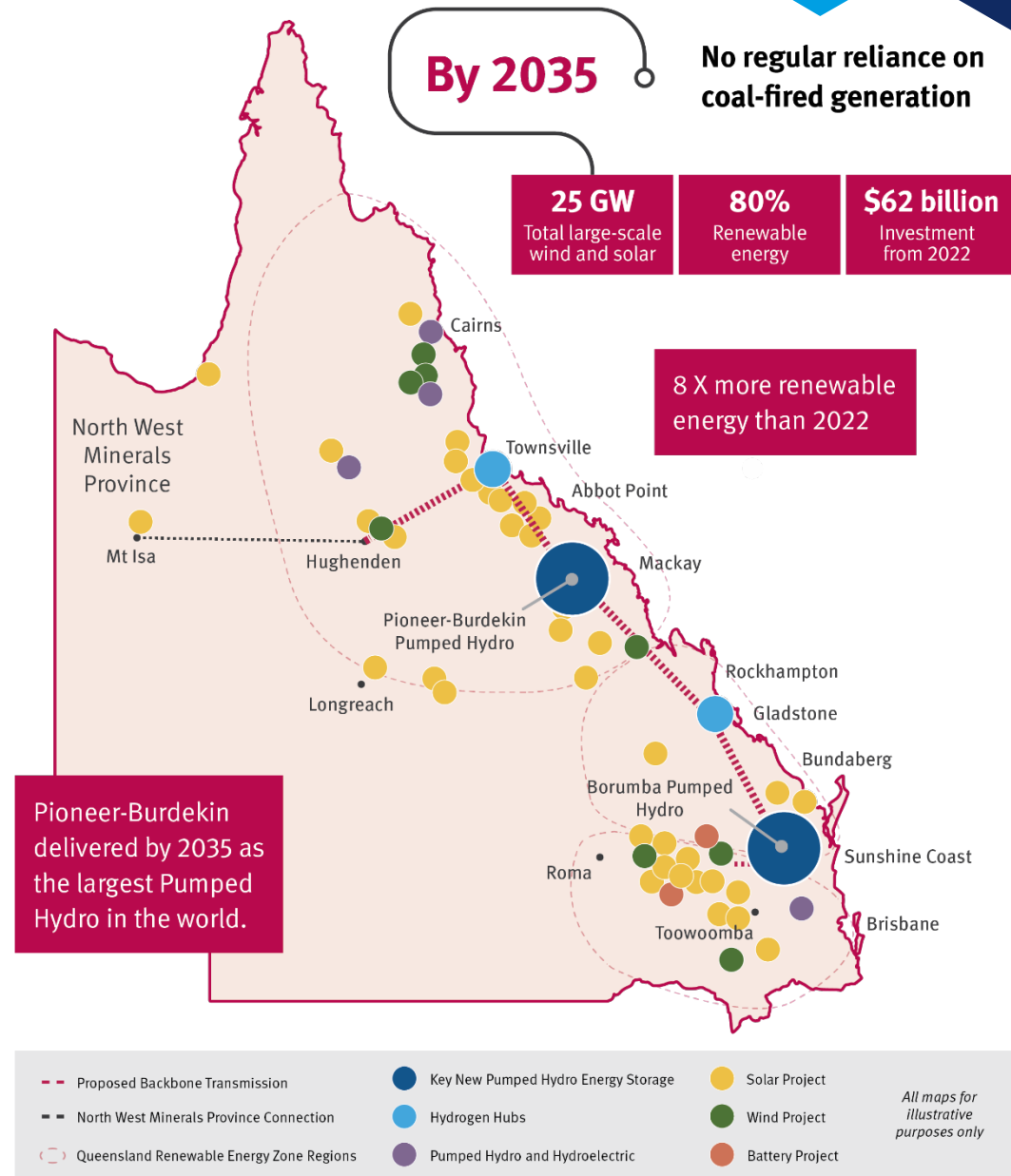
Infrastructure Blueprint



QREZ Roadmap



REZ Management Plans



Principles

Principles to maximise benefits from the clean energy transformation in Queensland

Principle 1: Drive genuine and ongoing engagement

Principle 2: Share benefits with communities

Principle 3: Buy local, build local

Principle 4: Increase local jobs and secure work

Principle 5: Preserve Queensland's environment

Principle 6: Empower First Nations peoples

Principle 7: Build local capacity

Partnering with industries and community

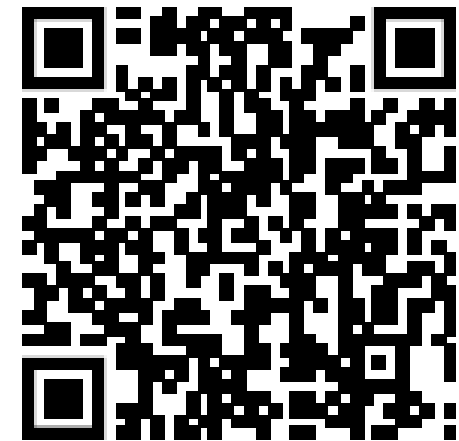


The draft **Regional Energy Transformation Partnerships Framework** outlines our approach to:

- partnering with community, local government, First Nations people and industry
- delivering improved community outcomes from government initiatives and investment
- encouraging best practice from private investment into clean energy infrastructure.

Have your say

Complete the online survey at:
qld.gov.au/energyandjobsplan



QREZ Legislative Framework



Renewable **Transformation Bill**

To be prepared in 2023 to legislate the new renewable energy targets, governance framework, the Job Security Guarantee and key enabling mechanisms like the Queensland Renewable Energy Zones framework.

- Legislation currently under development
- Will include QREZ framework to support delivery of QREZ and SuperGrid
- Consultation on proposed legislative approach anticipated to commence in 2023

DEVELOPING RENEWABLE ENERGY ZONES

Mahesh Narotam

Project Director, Renewable Energy Zones

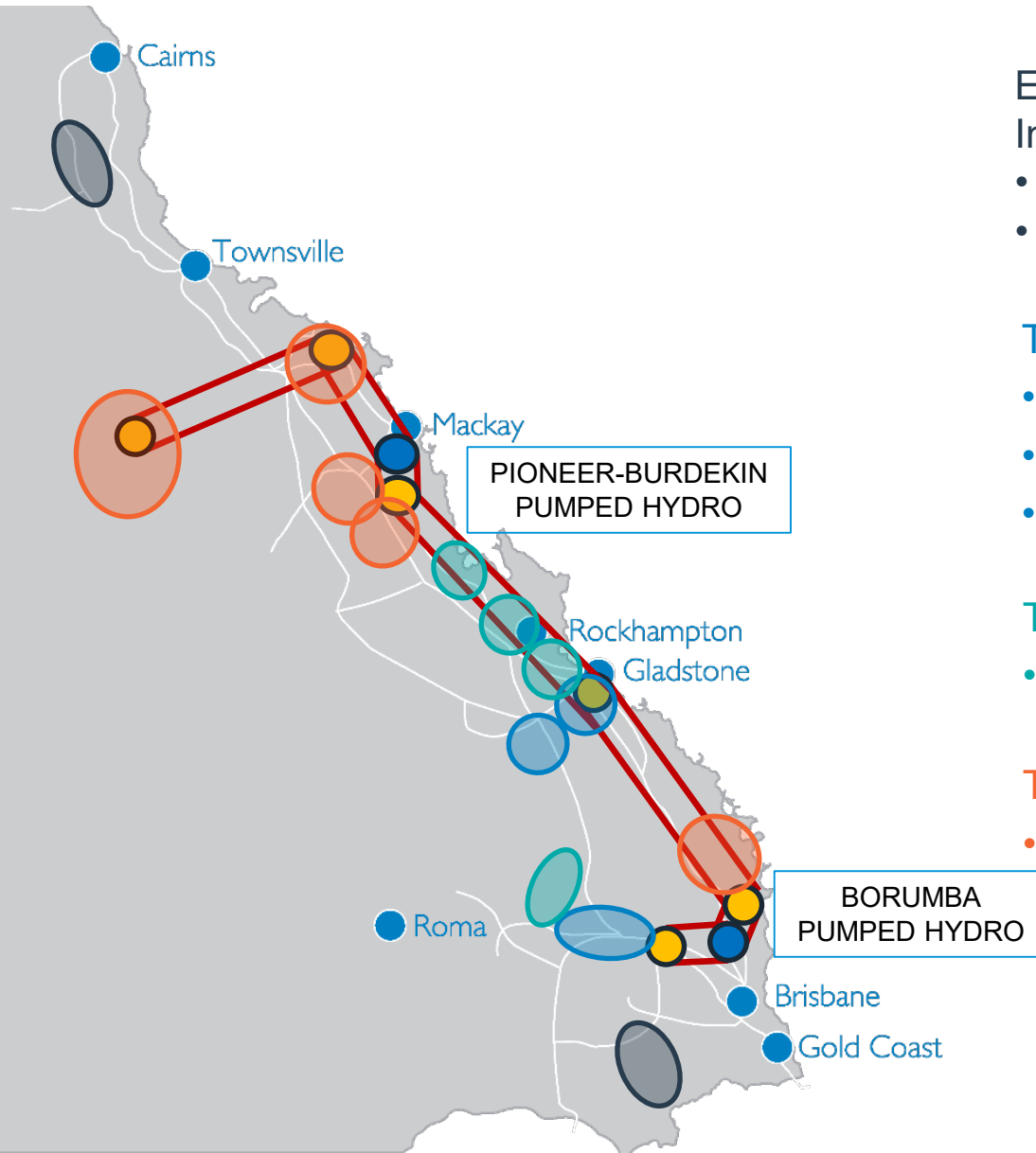
Powerlink's approach to REZs

PRINCIPLES

STRATEGIC CRITERIA



Queensland Renewable Energy Zones



Existing Renewables ~3,000MW

Inflight REZ

- North Queensland REZ ~500MW
- Southern Downs REZ ~1,500MW

The first horizon of REZs – 2022 to 2024

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- Fitzroy REZ ~1,800MW

The second horizon of REZs – 2025 to 2029

- Total ~5,700MW

The third horizon of REZs – 2030 to 2035

- Total ~9,200MW

Question

How can Powerlink best deliver REZs to provide investment certainty and speed-to-market for renewable developers?

ENGAGING WITH QUEENSLAND COMMUNITIES

Gerard Reilly
General Manager Communications,
Customer & Engagement

Drivers of trust

TOP THREE DRIVERS OF TRUST



So how are we building trust?

- Use research insights to improve our engagement approaches
- Early engagement model
- Review of Network Development Process & compensation framework
- Industry collaboration through The Energy Charter
 - Co-existence Guideline
 - Improved biodiversity outcomes



Community benefits



GRANTS & SPONSORSHIPS

Can be delivered quickly & broadly to communities

1



COMMUNITY FUNDS

A more tailored approach designed to build community capacity & resilience

2



BROAD SCALE INVESTMENT

Associated with large-scale infrastructure projects to deliver longer-term economic and social benefits.

3

Question

What are the key areas that Powerlink needs to focus on to improve the way our infrastructure co-exists with Queensland communities?

CHAIR ADDRESS

Kathy Hirschfeld AM

Transmission Annual Planning Report (TAPR)

Stewart Bell
Executive General Manager
Network and Business Development

Paul Ascione
General Manager
Asset Strategies and Planning



Acknowledgement

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Transmission Annual Planning Report

2022 Introduction

Stewart Bell

Executive General Manager

Network and Business Development

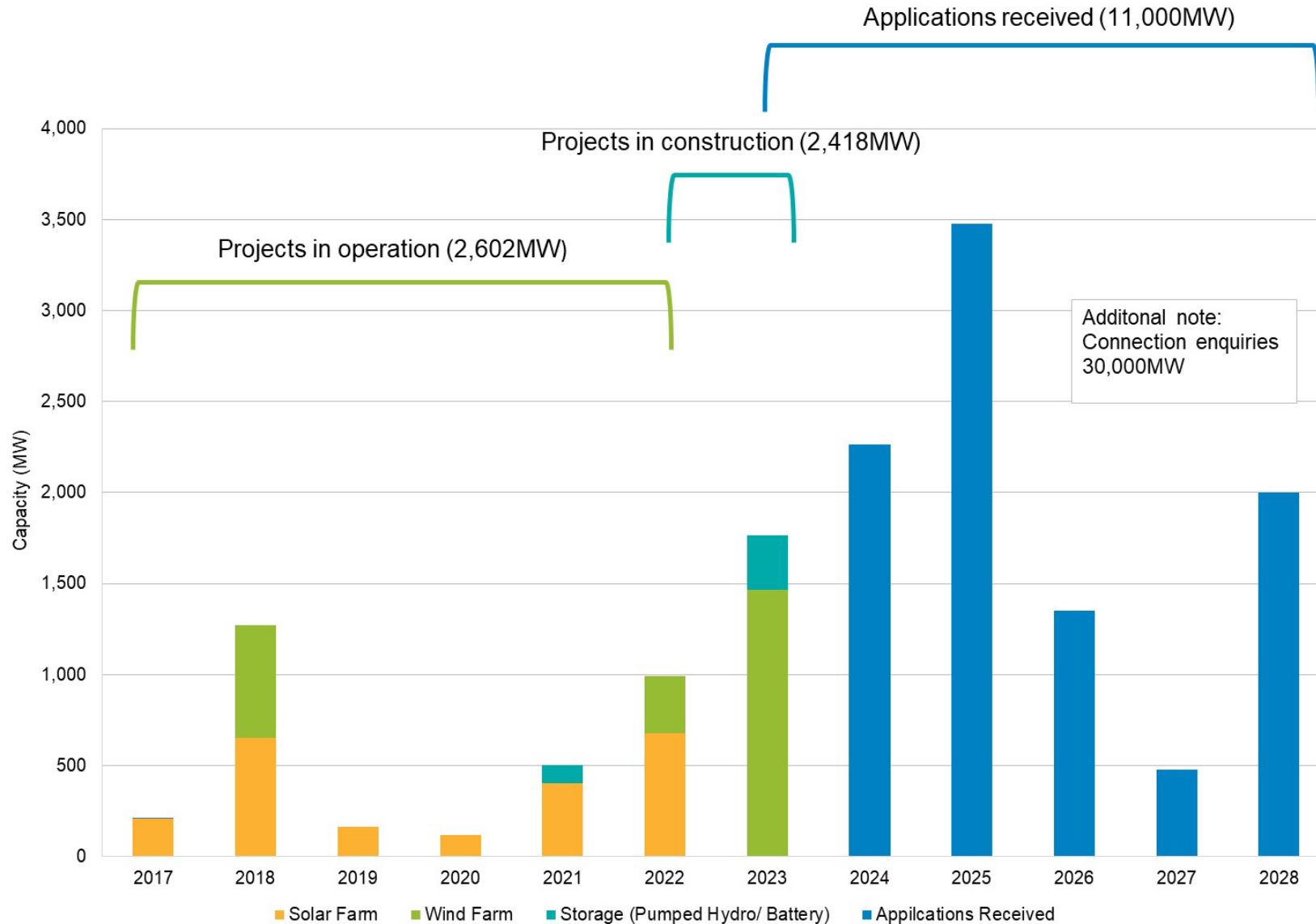
Guiding the market

- Playing an active role in the energy transformation, consideration of the potential for significant hydrogen development, decarbonisation through electrification, and strategically planning for the future
- Continuing to work with the Queensland Government in relation to the Queensland Energy and Jobs Plan (QEJP) and establishment of Queensland Renewable Energy Zones (QREZ) as well as AEMO in the development of the Integrated System Plan (ISP)
- Undertaking early and authentic engagement, working closely with communities to deliver additional benefits for those impacted by the need for the development of new energy infrastructure

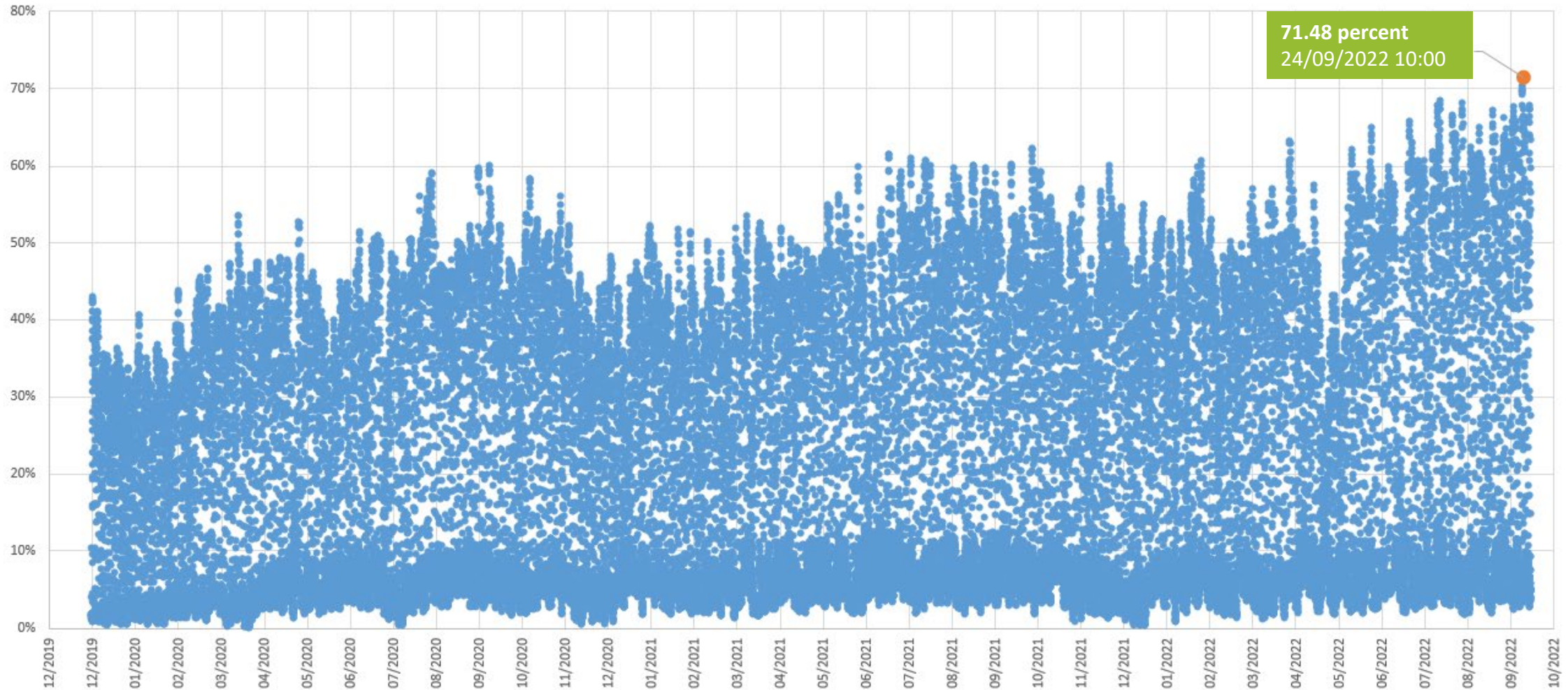


Transformation well on its way

Current and Future Renewable Connections



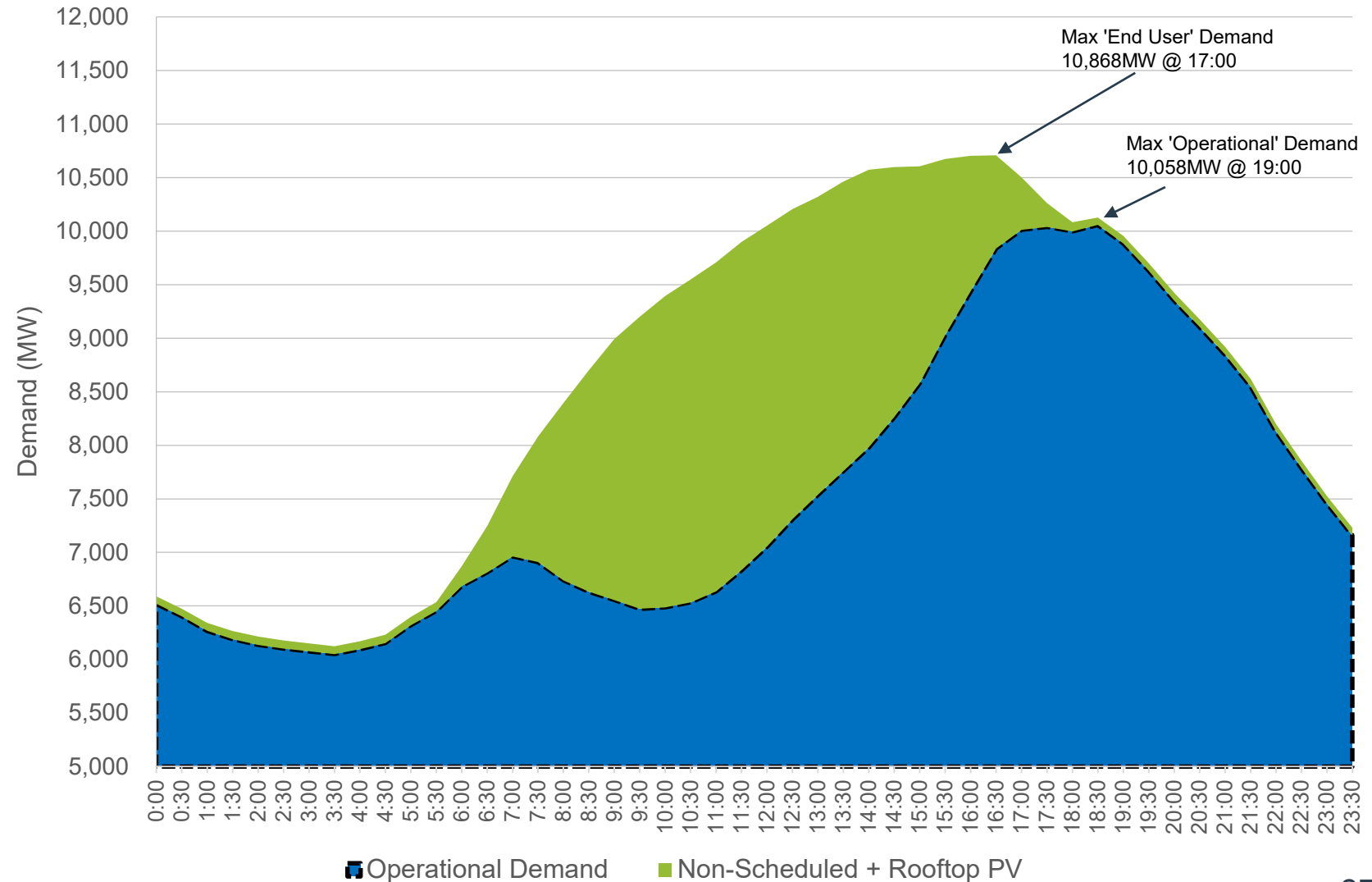
Record renewable generation



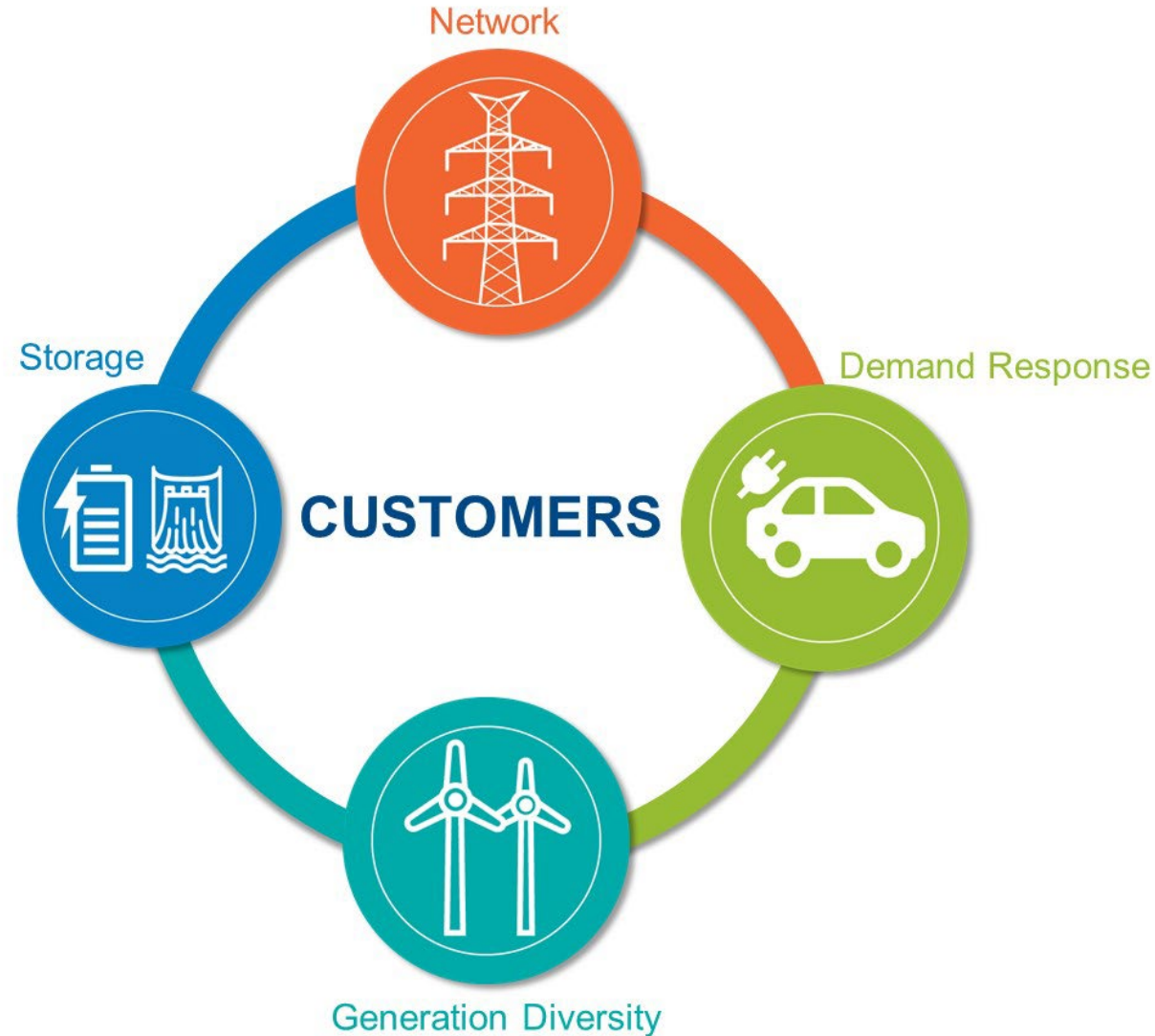
Why we need storage to firm renewables

- End user demand ~800MW higher than operational demand
- At the time of max operational demand:
 - Solar PV – 0MW
 - Large scale wind – 0MW
 - Large scale battery – 5MW
 - NSW import – 250MW

Observed Demand on 8 March 2022



Balancing the energy system transformation



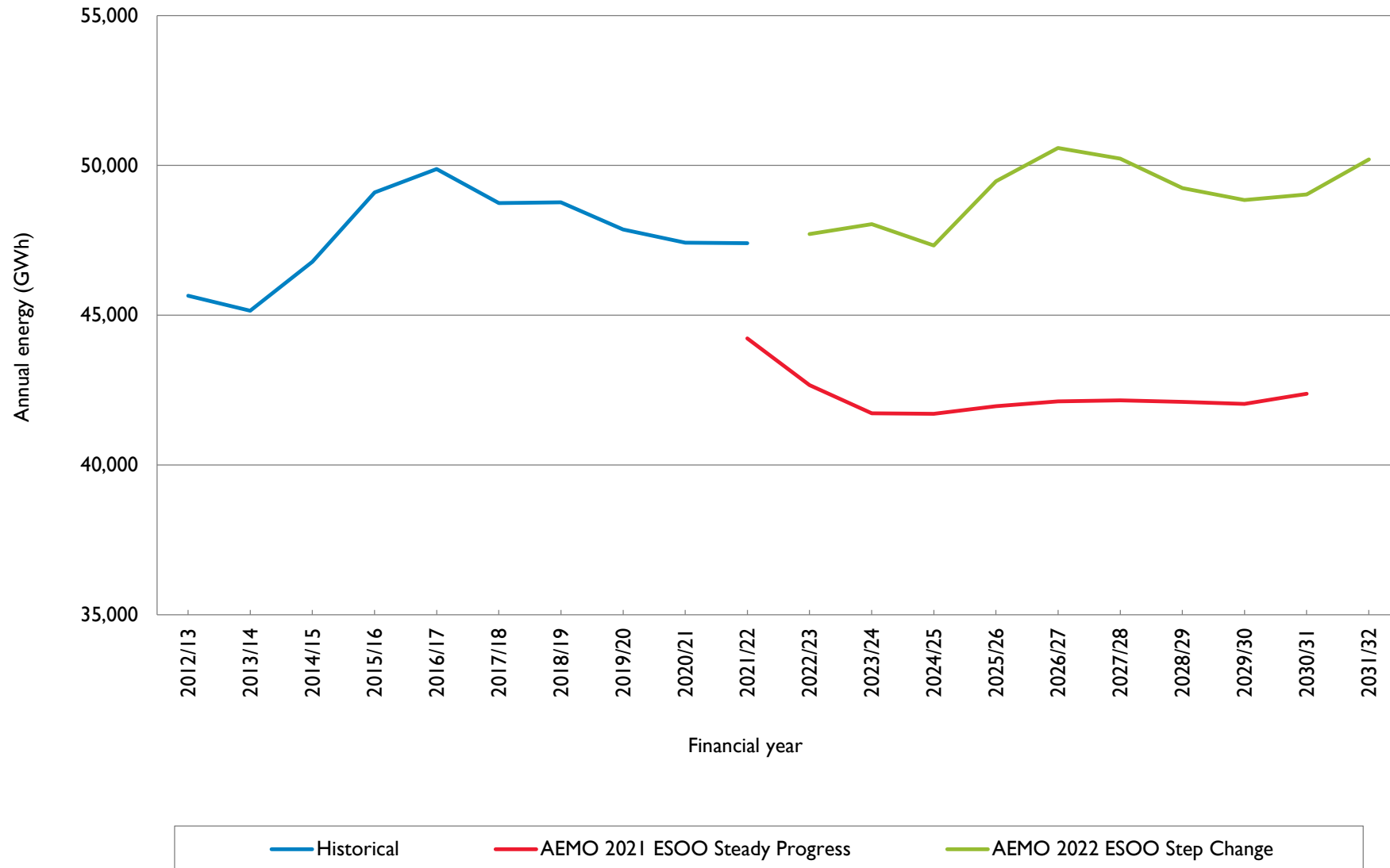
Transmission Annual Planning Report 2022 Technical Presentation

Paul Ascione

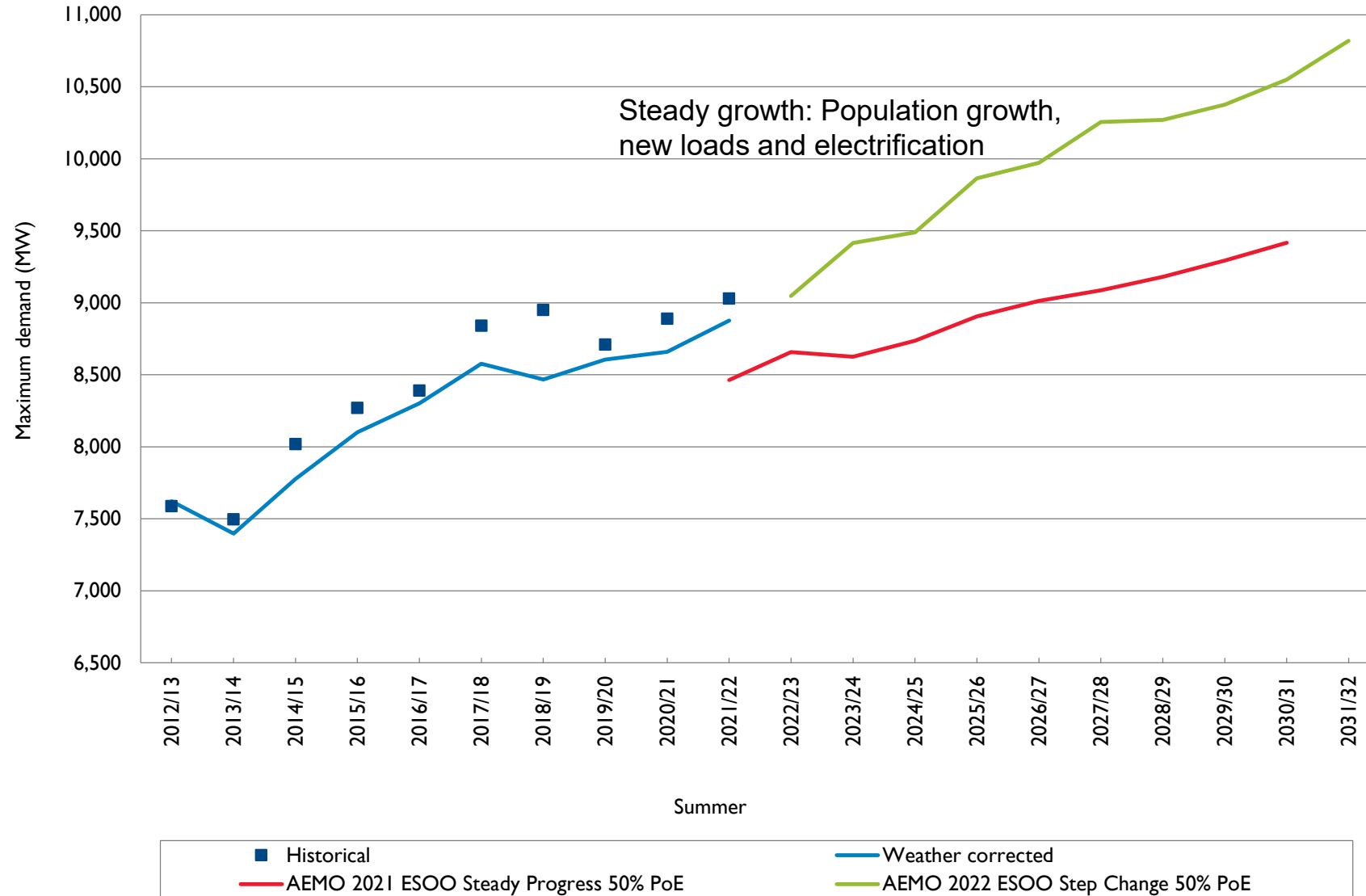
General Manager

Asset Strategies and Planning

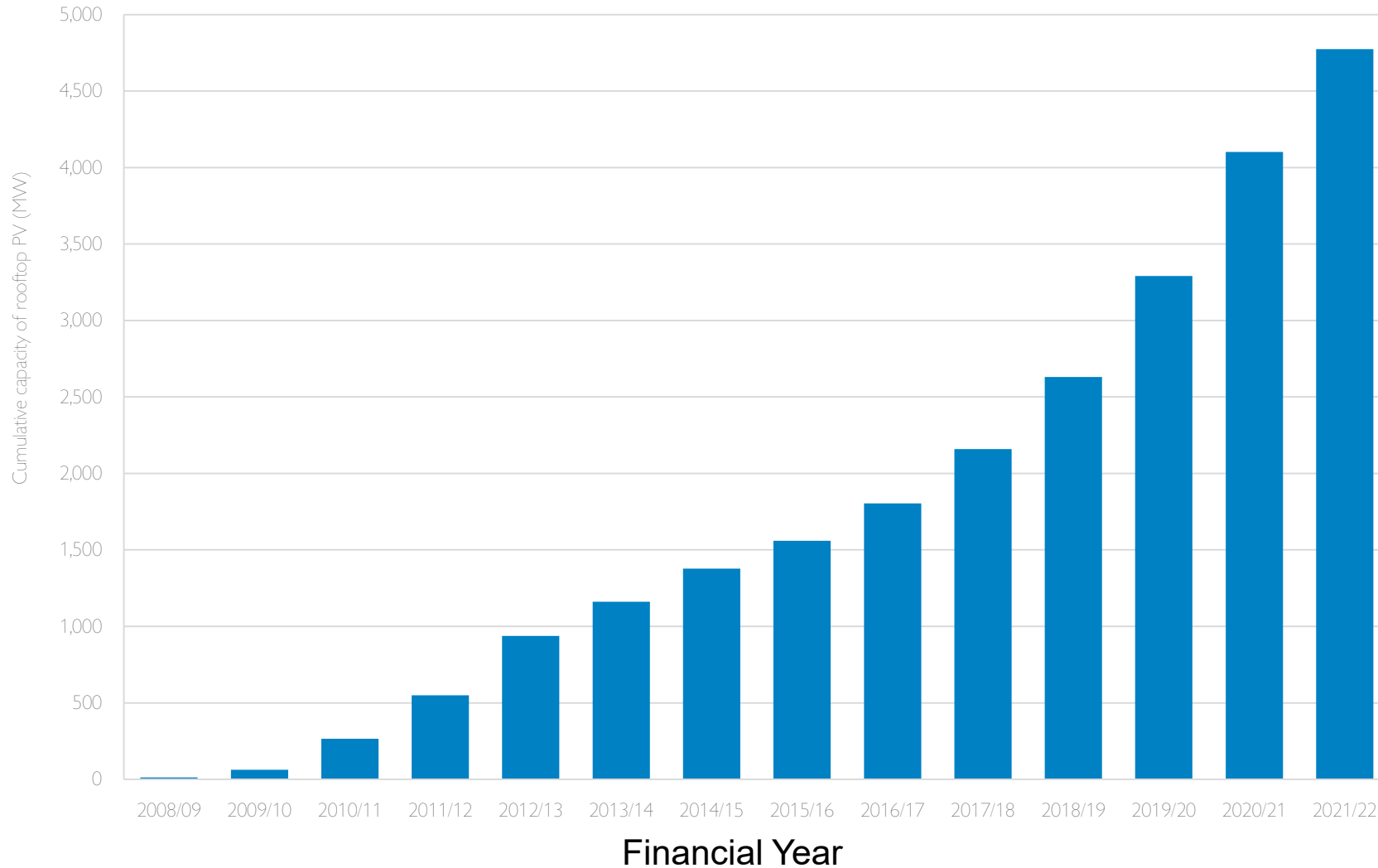
Queensland energy forecast



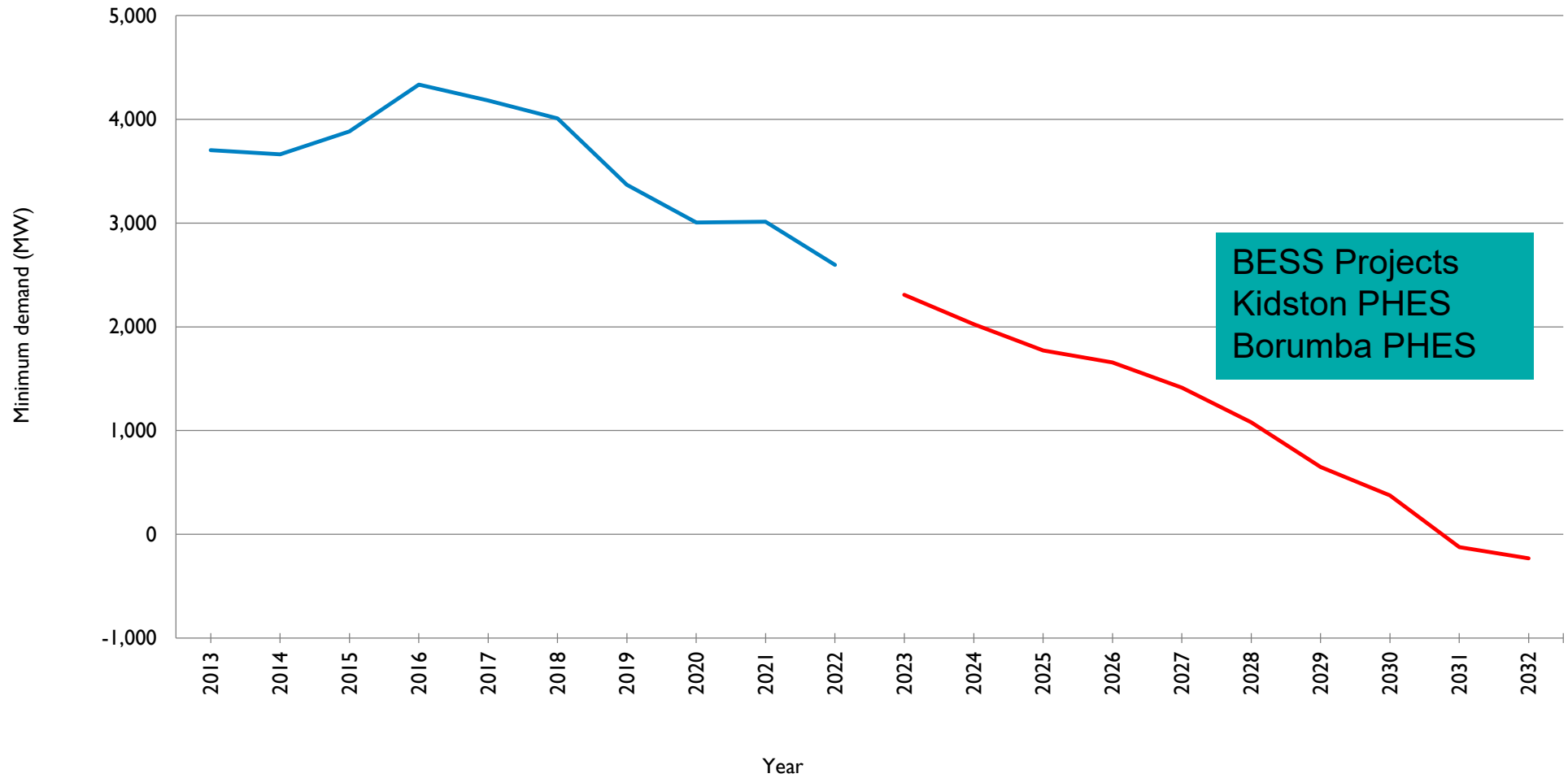
Queensland maximum demand forecast



Queensland rooftop solar capacity



Queensland minimum demand forecast



- Transmission network performed reliably over 2021/22
- Record minimum and maximum transmission delivered demands for multiple zones
- Queensland grid sections were largely unconstrained



Projects completed and underway



Major projects completed

- Line refit works between Egans Hill and Rockhampton Substation
- Gin Gin Substation Rebuild
- Ashgrove West Substation Replacement

Projects underway

- Establishment of a 3rd 275kV connection into Woree (Stage 1 Northern QREZ)
- Broadsound bus reactor
- Line refit works between Townsville South and Clare South substations
- Primary plant replacements at Nebo, Lilyvale and Bouldercombe
- Various secondary system replacements across the state

Completed RIT-T consultations

- Maintaining reliability of supply in the Cairns region - Stage 1 (Davies Creek to Bayview Heights refit)
- Maintaining reliability of supply in the Tarong and Chinchilla areas

Current RIT-T consultations

- Managing voltages in South East Queensland
- Managing power transfer capability and reliability of supply at Redbank Plains
- Addressing the secondary systems condition risks at Tangkam

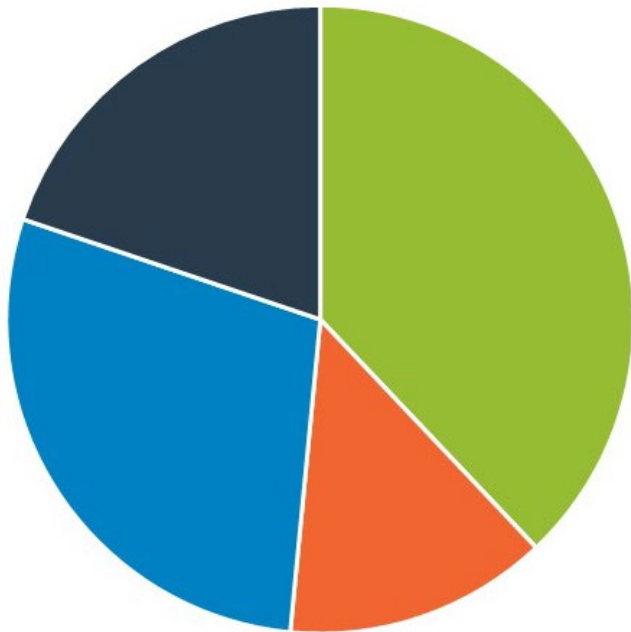
Power system security services consultation

- Currently working through submissions with proponents of non-network solutions



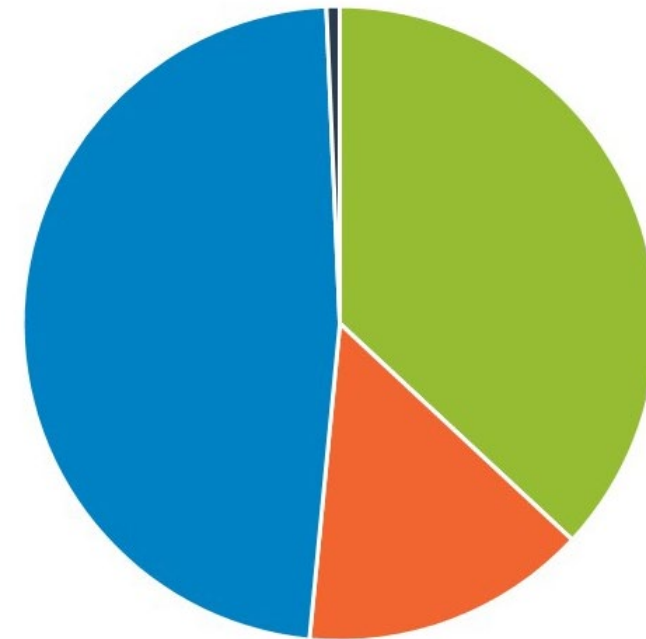
Future network development

2023-2027 Regulated capital expenditure



- Transmission Lines
- Substations & Transformers
- Secondary Systems
- Other

2028-2032 Regulated capital expenditure



- Transmission Lines
- Substations & Transformers
- Secondary Systems
- Other

Load flexibility / non-network solutions

Load flexibility provides system, network and customer benefits

- New flexible load:
 - reduces minimum demand
 - does not require network augmentation
 - improves network utilisation



Panel discussion



Enrique Montiel
Principal Engineer
Network Planning



Monan Higgs
Business Development
Manager



Peta Starkey
Senior Market
Specialist



Sachin Goyal
Manager Power
System Performance
and Connection

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