

WINDS OF CHANGE:

STATUS & OUTLOOK FOR WIND ENERGY IN AUSTRALIA

Kane Thornton

CHIEF EXECUTIVE

May 2020



**CLEAN
ENERGY
COUNCIL**

900+
MEMBERS



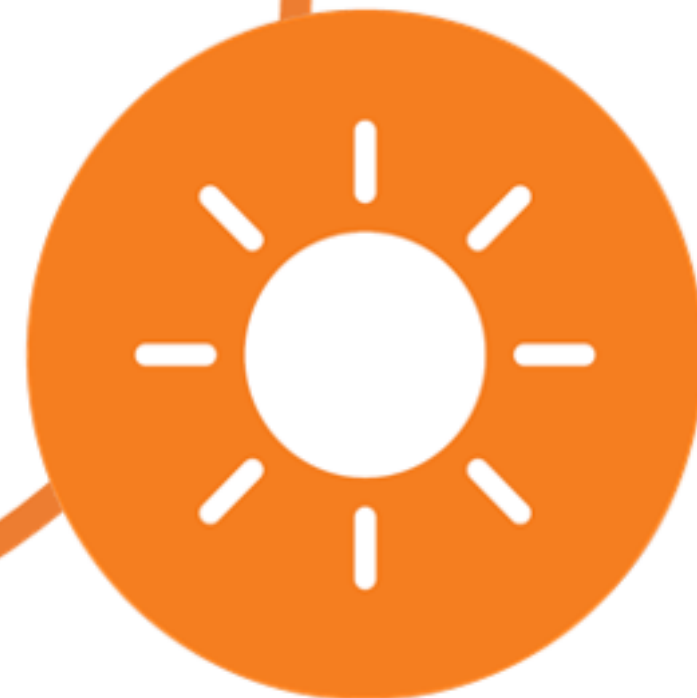
7700+
ACCREDITED
INSTALLERS



6900+
APPROVED
PRODUCTS



1100+
APPROVED
SOLAR
RETAILERS



SPONSORING MEMBERS



CORPORATE MEMBERS



CORPORATE MEMBERS



CORPORATE MEMBERS



CORPORATE MEMBERS

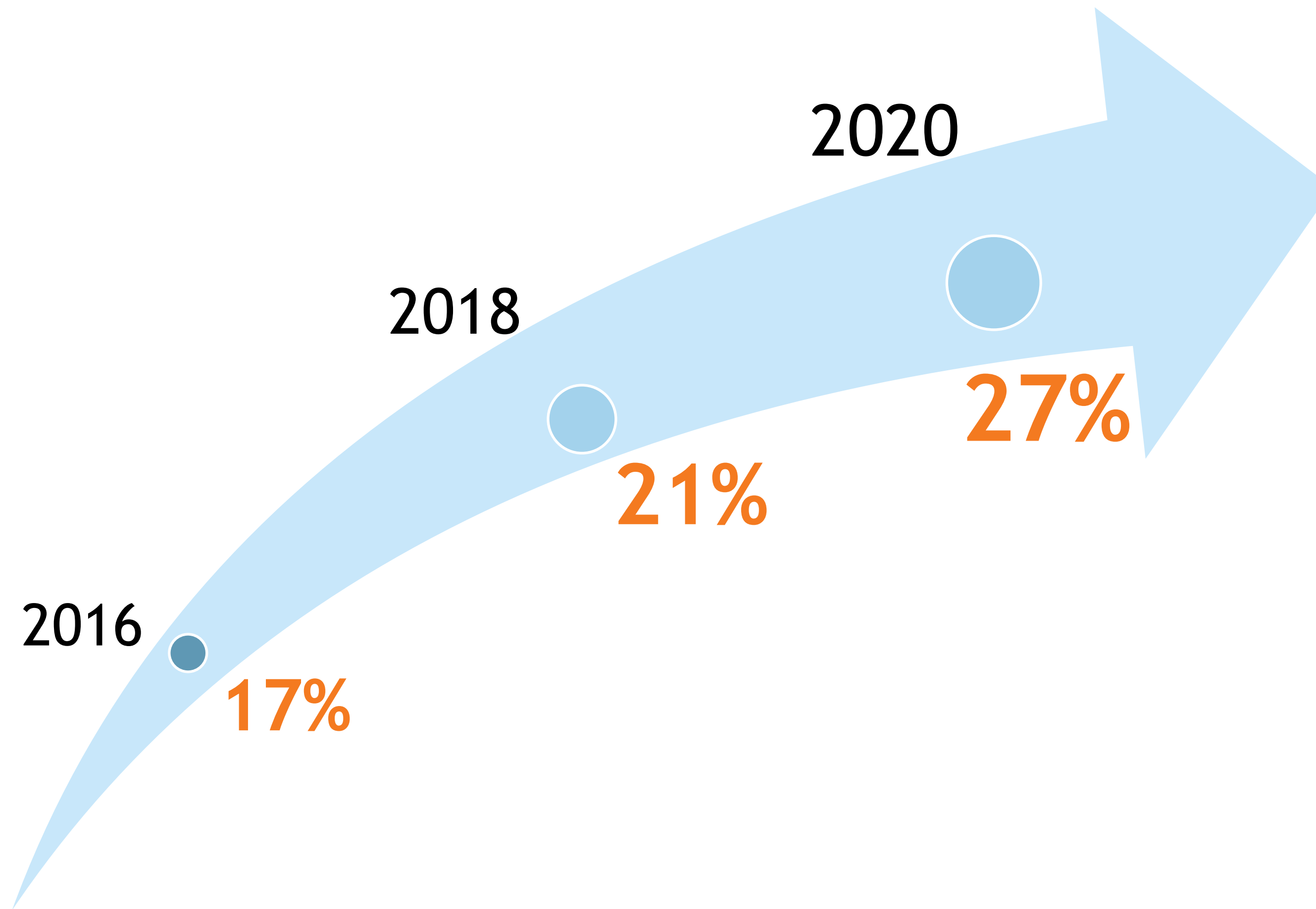


KEY MESSAGE #1

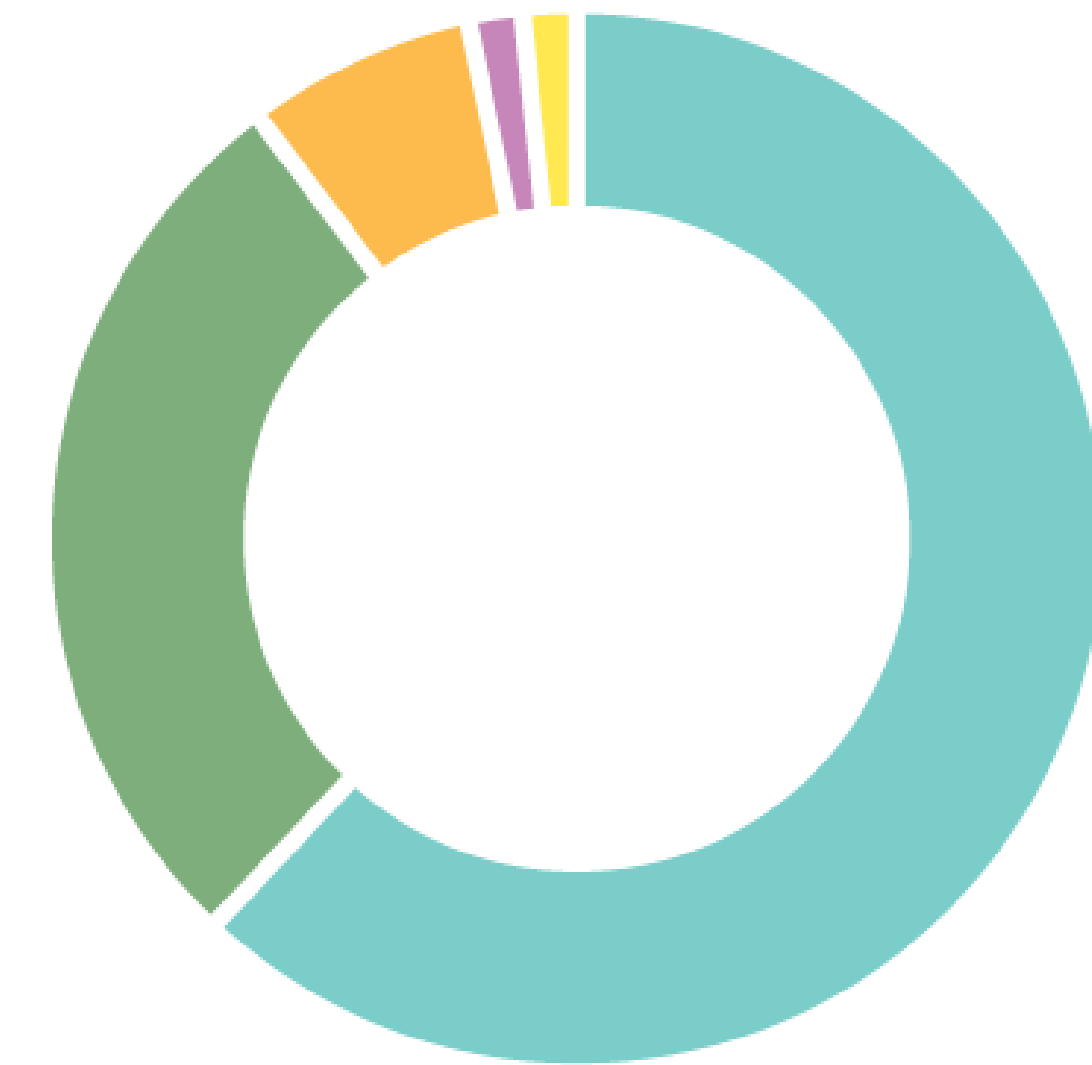
Renewable energy
deployment is
growing rapidly,
off a low base



WE HAVE COME A LONG WAY IN FIVE SHORT YEARS



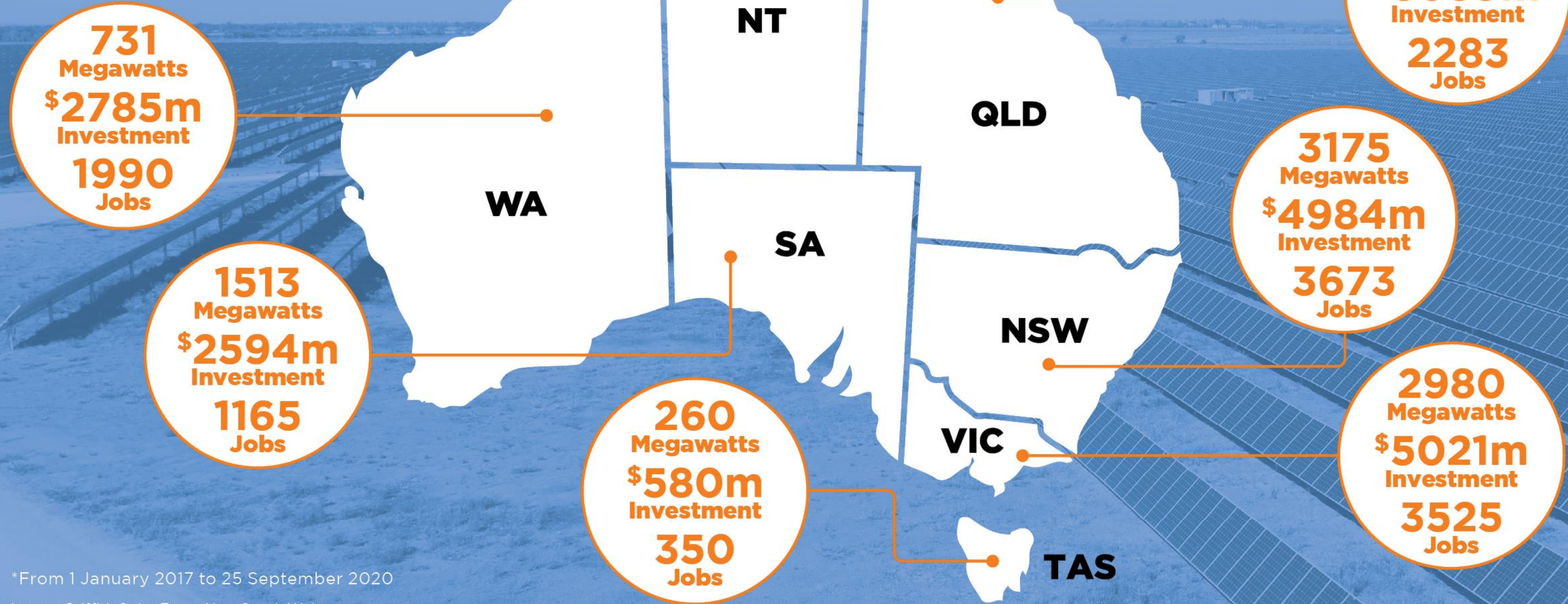
ANNUAL ELECTRICITY GENERATION IN 2020



Coal	62.0%
Renewables	27.7%
Gas	9.9%
Waste coal mine gas	0.4%
Liquids	0.1%

CONSTRUCTION OF LARGE-SCALE RENEWABLE ENERGY PROJECTS

(Projects that have reached financial close and not yet commissioned)

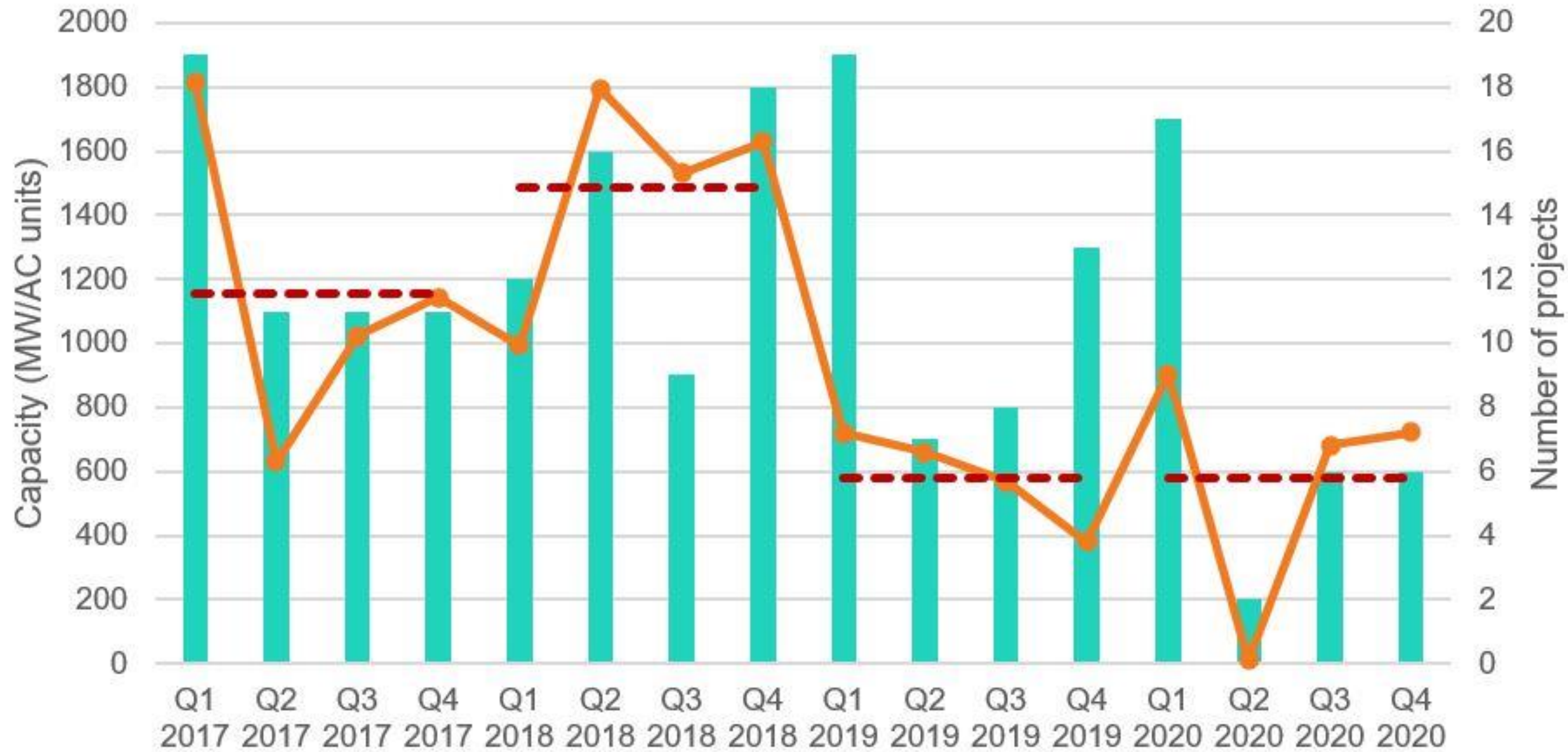


*From 1 January 2017 to 25 September 2020
Image: Griffith Solar Farm, New South Wales

TOTALS **10,531** Megawatts **\$19b** Investment **13,175** Jobs

For more information visit cleanenergycouncil.org.au/project-tracker

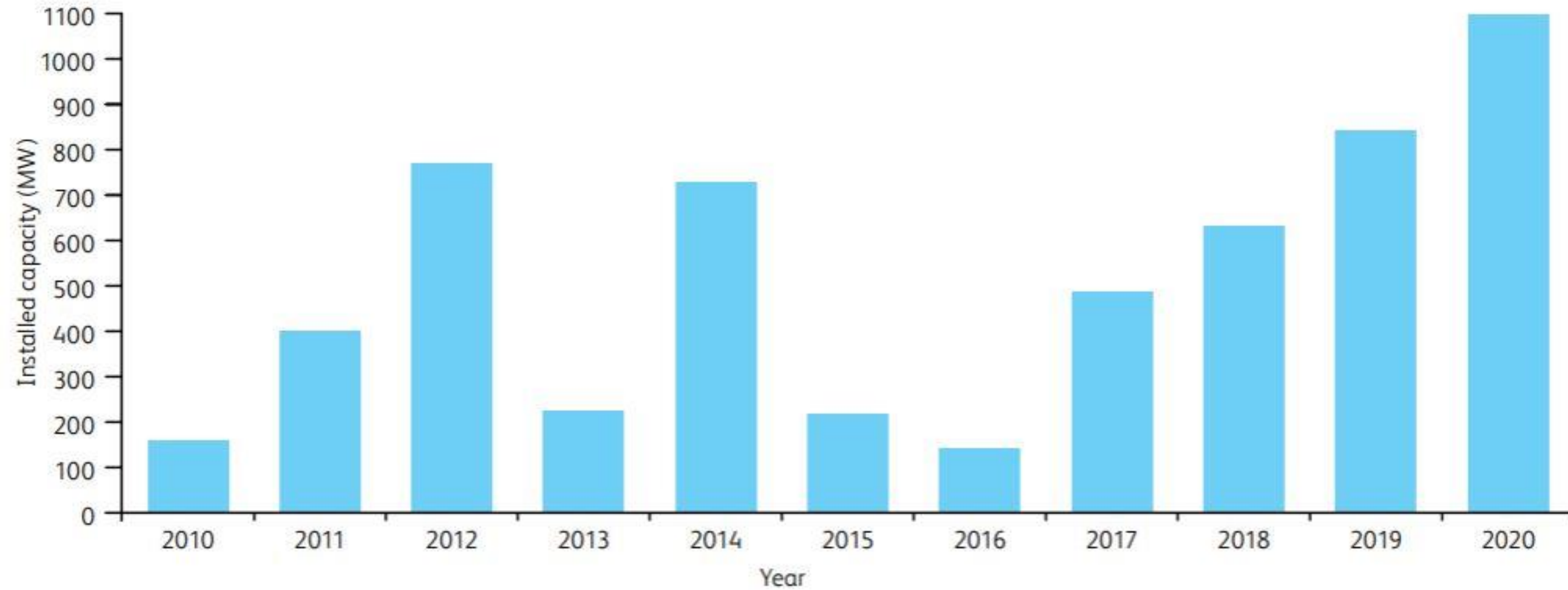
UTILITY-SCALE PROJECT COMMITMENTS



- Number of projects
- Total capacity financially committed projects (MW)
- - - Quarterly average capacity by year (MW)

RECORD 2020 FOR WIND IN AUSTRALIA

ANNUAL INSTALLED WIND CAPACITY IN AUSTRALIA¹⁰²



YEAR	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ANNUAL INSTALLED CAPACITY (MW)	159	401	768	225	728	220	41	590	631	837	1097

The first offshore wind farms for Australian waters are on the drawing table

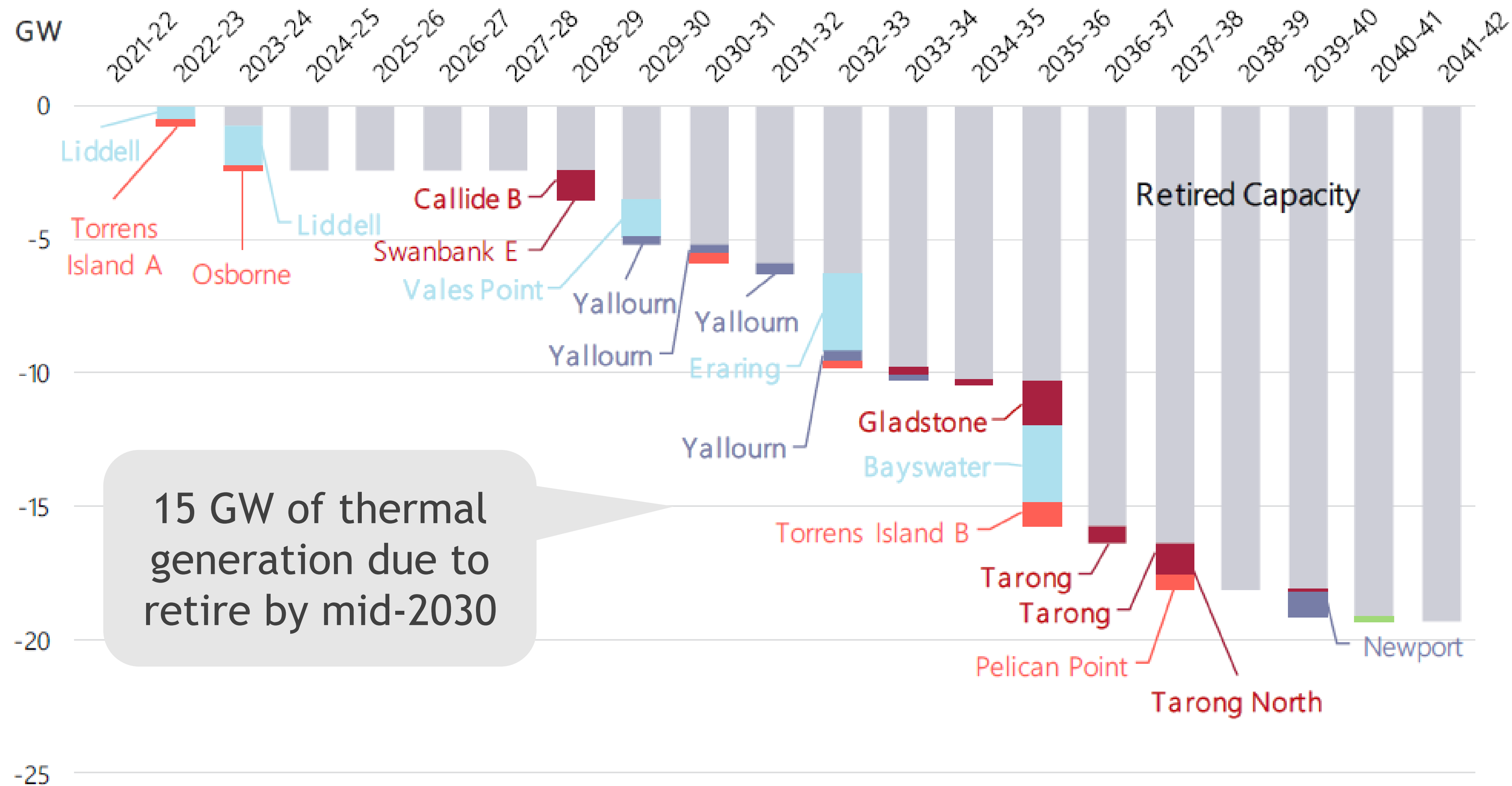


KEY MESSAGE #2

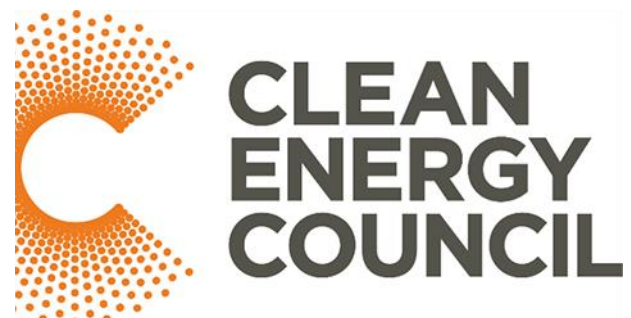
The medium to long-term market outlook is bright



EXPECTED COAL-FIRED POWER STATION RETIREMENTS IN AUSTRALIA



15 GW of thermal generation due to retire by mid-2030



Source: Australian Energy Market Operator, Integrated System Plan, 2020

2020 Integrated System Plan



The Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) provides a 20-year roadmap for the National Electricity Market (NEM) through the energy transition period to 2040.

Consultation

AEMO facilitated an 18-month consultation program in developing the draft and final ISP, along with the Forecasting and Planning Scenarios, Inputs and Assumption Report, including:

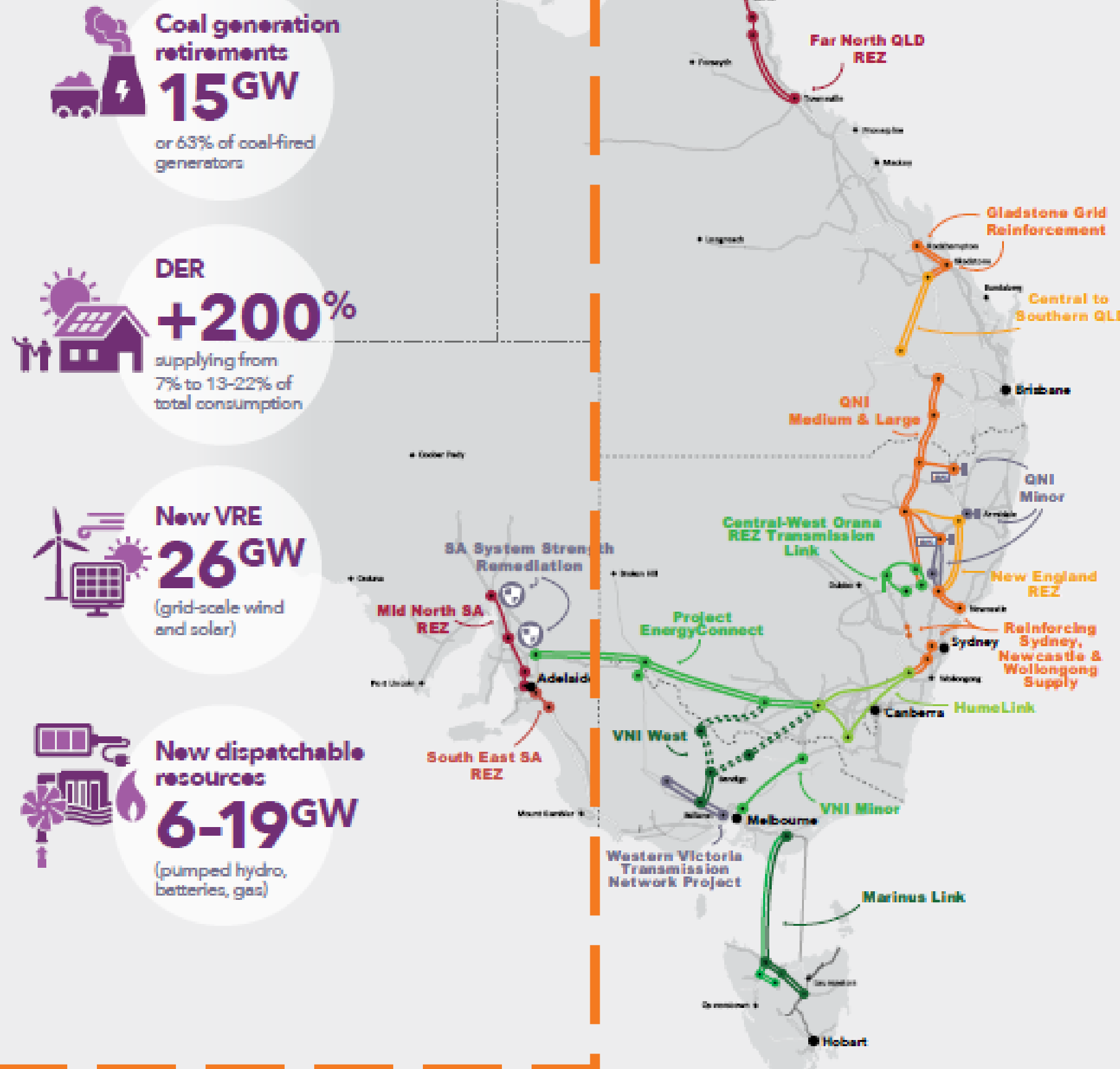
- 200+ stakeholders consulted
- 8 workshops held
- 3 webinars hosted
- 85 written submissions provided

Considerations

- Market reforms
- Government policies
- Economic growth
- Emissions reductions
- Grid technologies and services
- Consumer investment in DER

Expected changes to 2040

The ISP modelling confirms that the least-cost, least-regret transition of the NEM is from a *centralised* coal-fired generation system to a *highly diverse* portfolio dominated by distributed energy resources (DER) and variable renewable energy (VRE), supported by dispatchable resources and enhanced grid and service capabilities, to ensure the power system can reliably meet demand at all times.

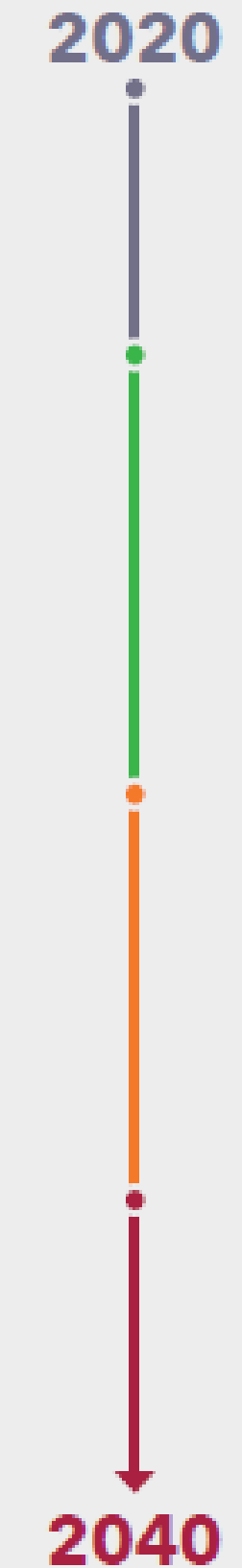


Optimal development path and net benefits

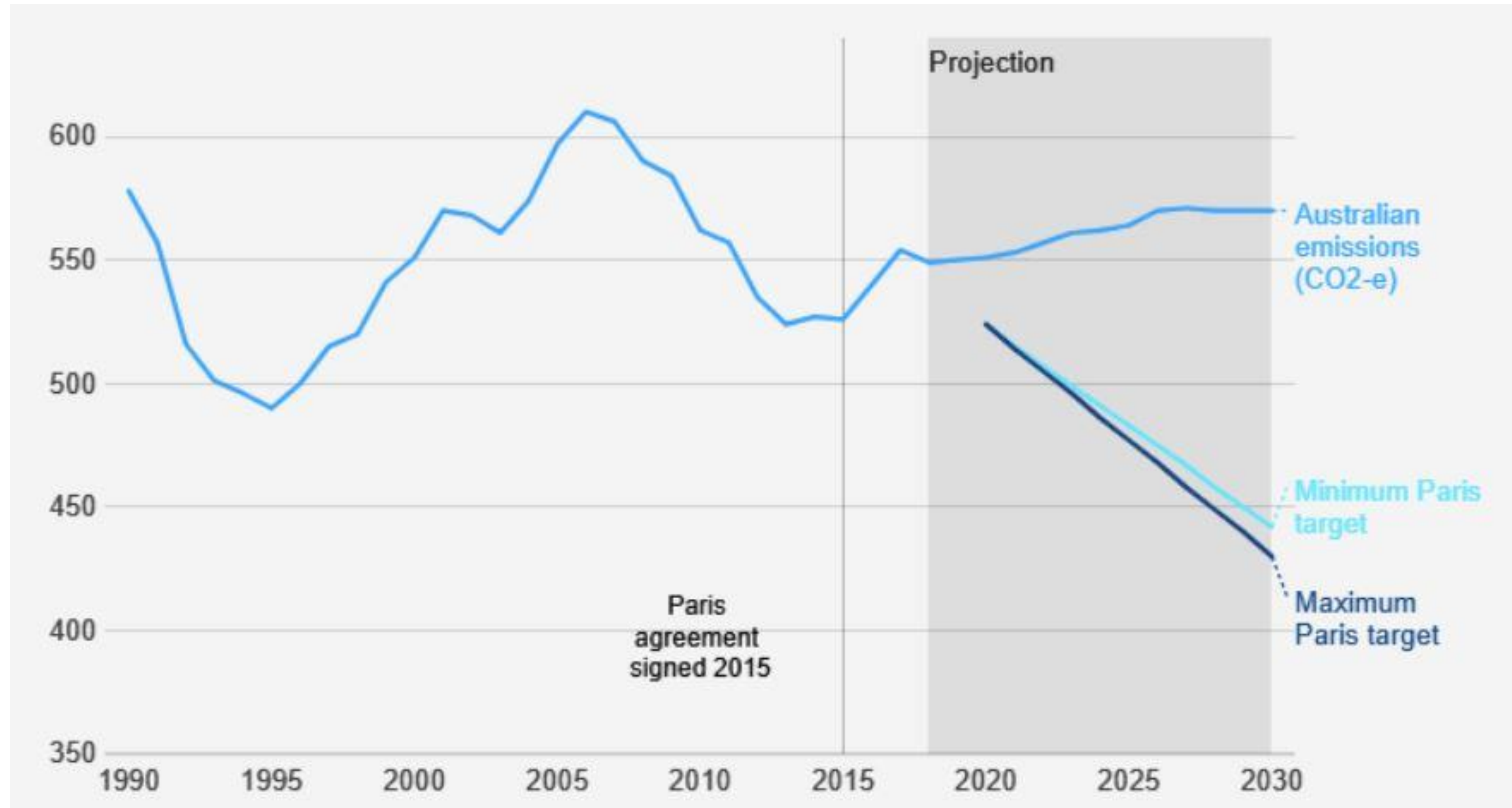
The ISP sets out the optimal development path needed for Australians to enjoy an affordable, secure and reliable energy future. If implemented, these investments would deliver \$11 billion in net market benefits, while meeting the security, reliability and emissions expectations of energy consumers.

Classification	Project	Indicative timing
Committed	SA System Strength Remediation	2021-22
	QNI Minor	2021-22
	Western Victoria Transmission Network Project	2025-26
Actionable ¹	VNI Minor	2022-23
	Project EnergyConnect	2024-25
	HumeLink	2025-26
	Central-West Orana REZ Transmission Link	Mid-2020s
	VNI West ²	2027-28
Preparatory Activities Required	Marinus Link ² - Cable 1	2026-29 to 2031-32
	Marinus Link ² - Cable 2	2031-32 to 2035-36
	QNI Medium & Large	2030s
	Central to Southern QLD	Early-2030s
	Reinforcing Sydney, Newcastle and Wollongong Supply	2026-27 to 2032-33
	Gladstone Grid Reinforcement	2030s
	New England REZ Network Expansion ³	2030s
	North West NSW Network Expansion ³	2030s
	Far North QLD REZ	2030s
	South East SA REZ	2030s
Mid North SA REZ	2030s	
Future ISP Projects		

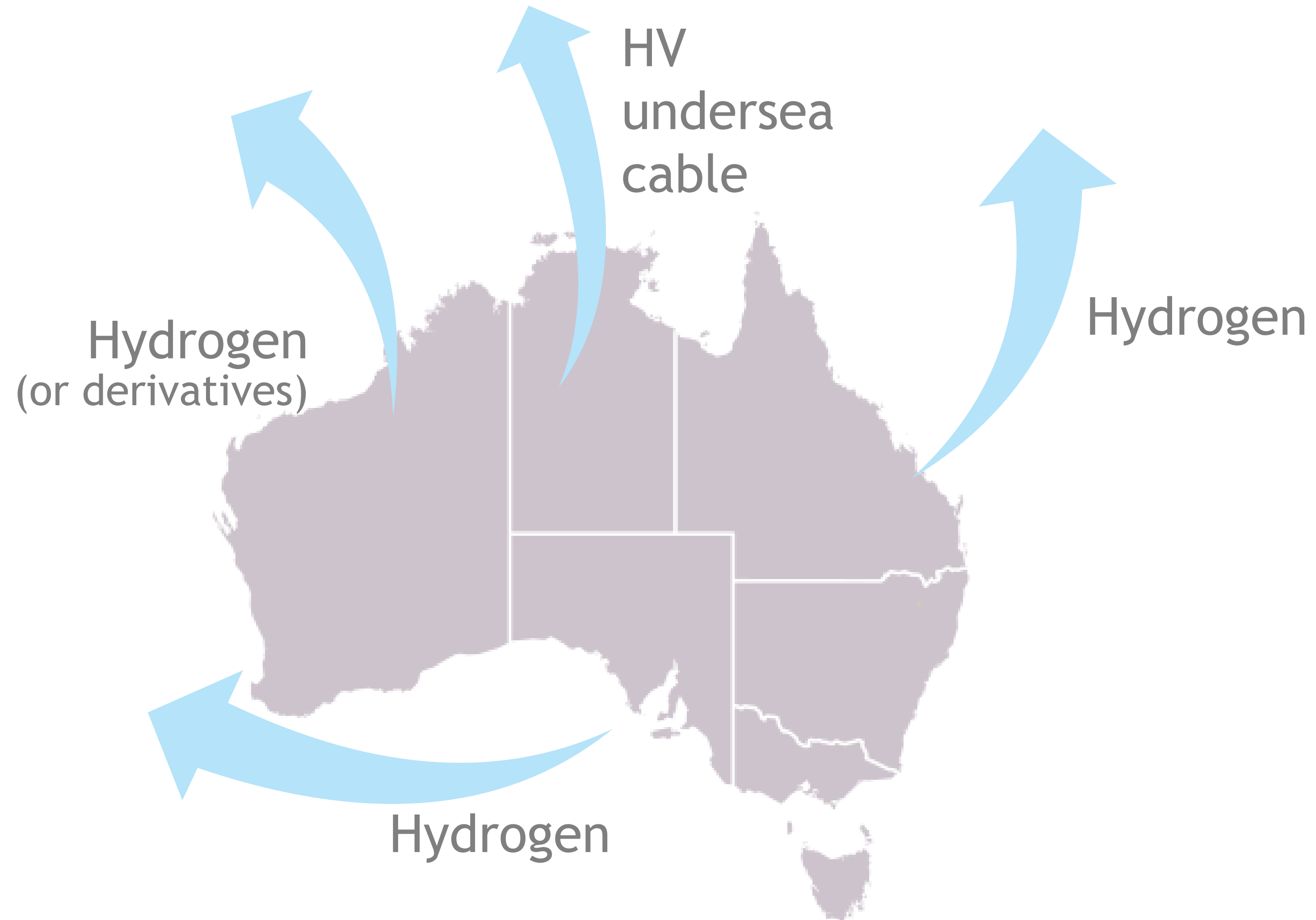
¹ Estimated practical completion including any subsequent testing - projects may be delivered earlier
² Decision rules may affect timing
³ May be accelerated by government initiatives
⁴ Not shown on map. AEMO requires that preliminary engineering designs be completed by 30 June 2021



AUSTRALIA'S ABATEMENT CHALLENGE



LEVERAGING OUR CHEAP RENEWABLES TO BECOME A CLEAN ENERGY SUPERPOWER



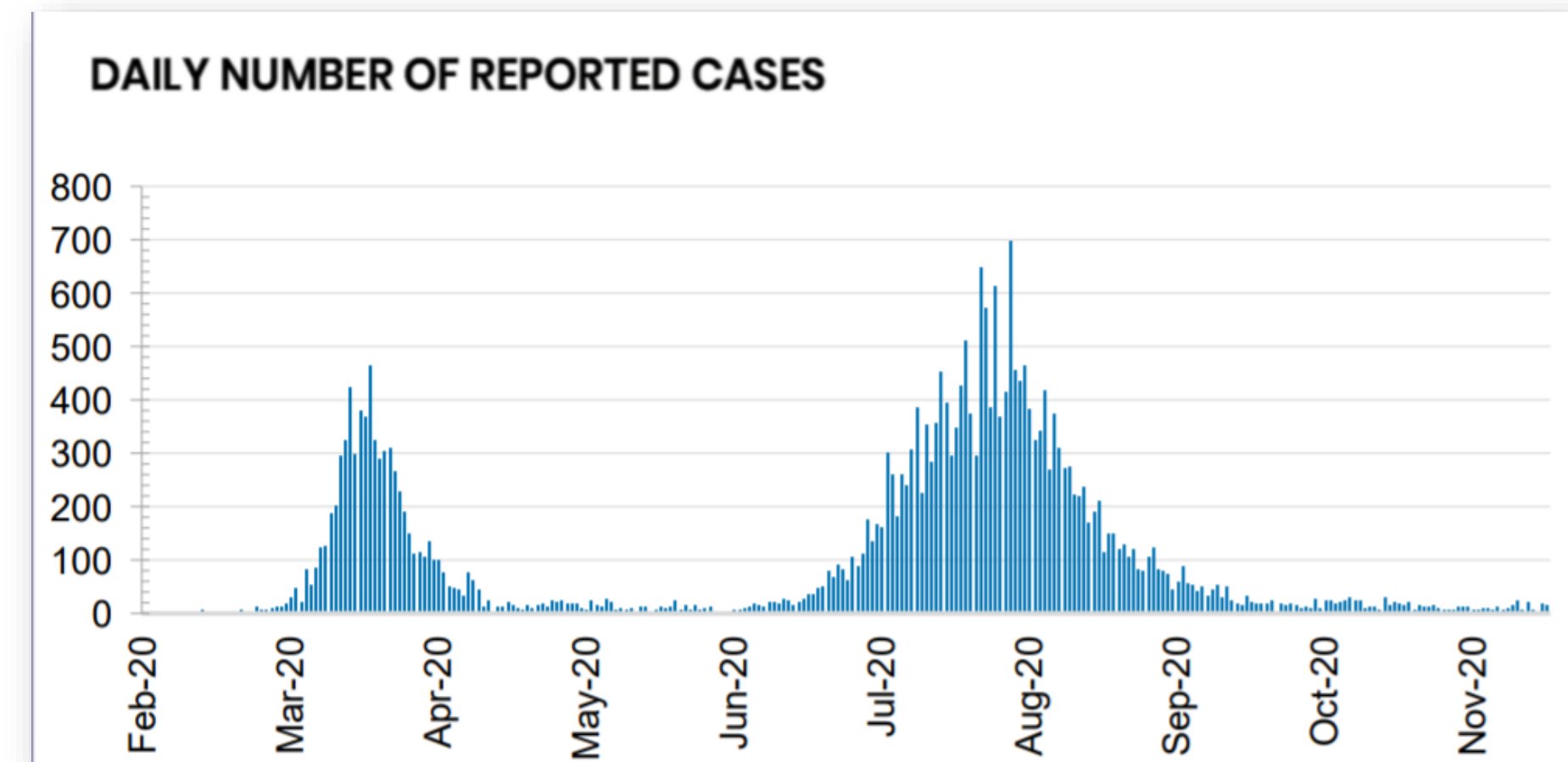
KEY MESSAGE #3

**Market dynamics
are changing
rapidly**



AUSTRALIAN WIND INDUSTRY HAS WEATHERED COVID STORM

- A number of localised outbreaks throughout the course of 2020
- Relatively low number of active cases in Australia at present time
- Strong safety response from wind industry
- Restrictions have been just a bump in the road to date



DRAMATIC STRUCTURAL CHANGE

Energy giant AGL is planning to split the company into two

Michelle Slater

News

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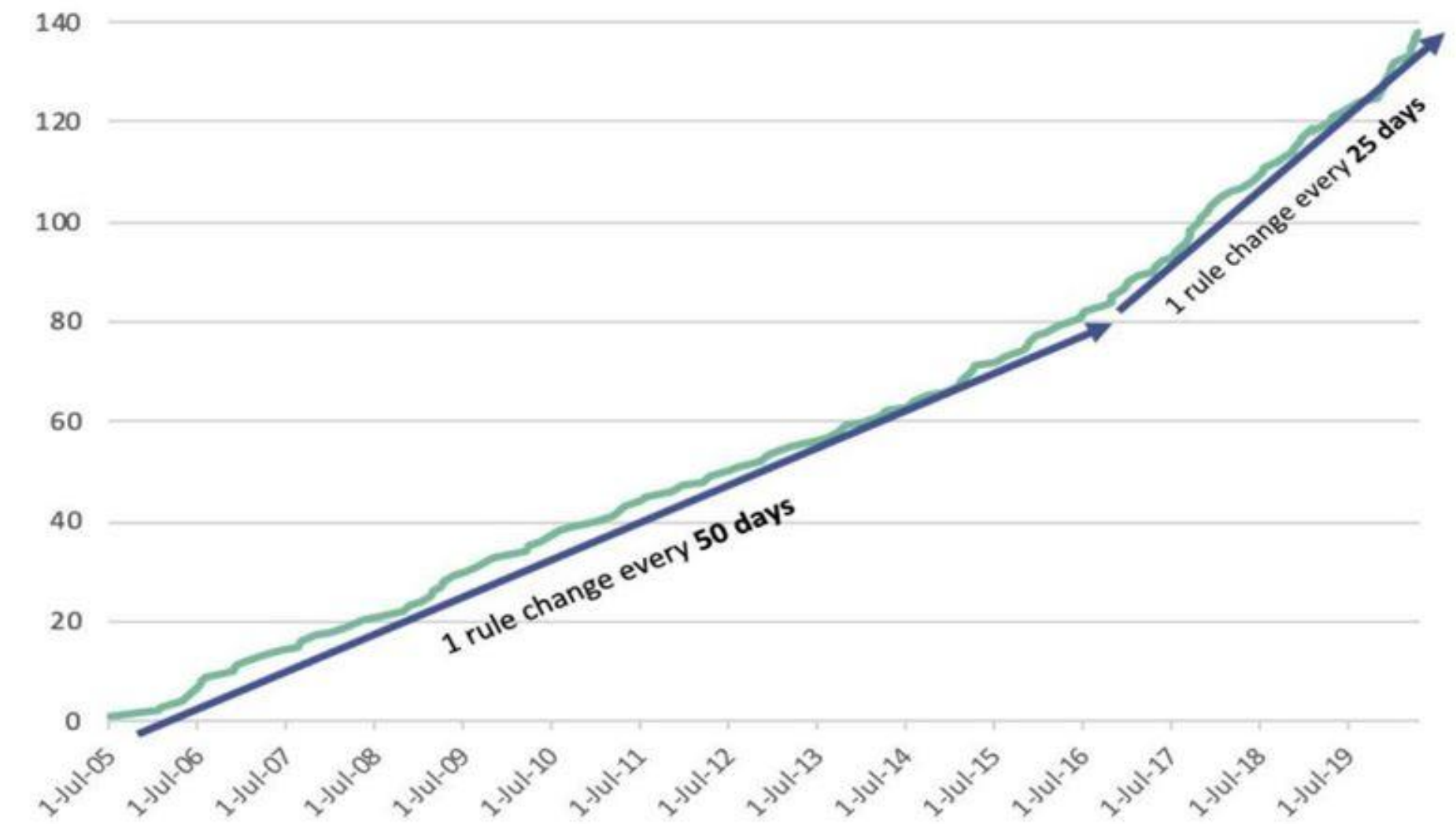
LOCAL NEWS

- 1 Council endorses submission for the Morwell Solar Farm
- 2 New Valley brewery taking shape
- 3 Moechella set to rock for worthy cause
- 4 The pros and cons of Valley housing boom

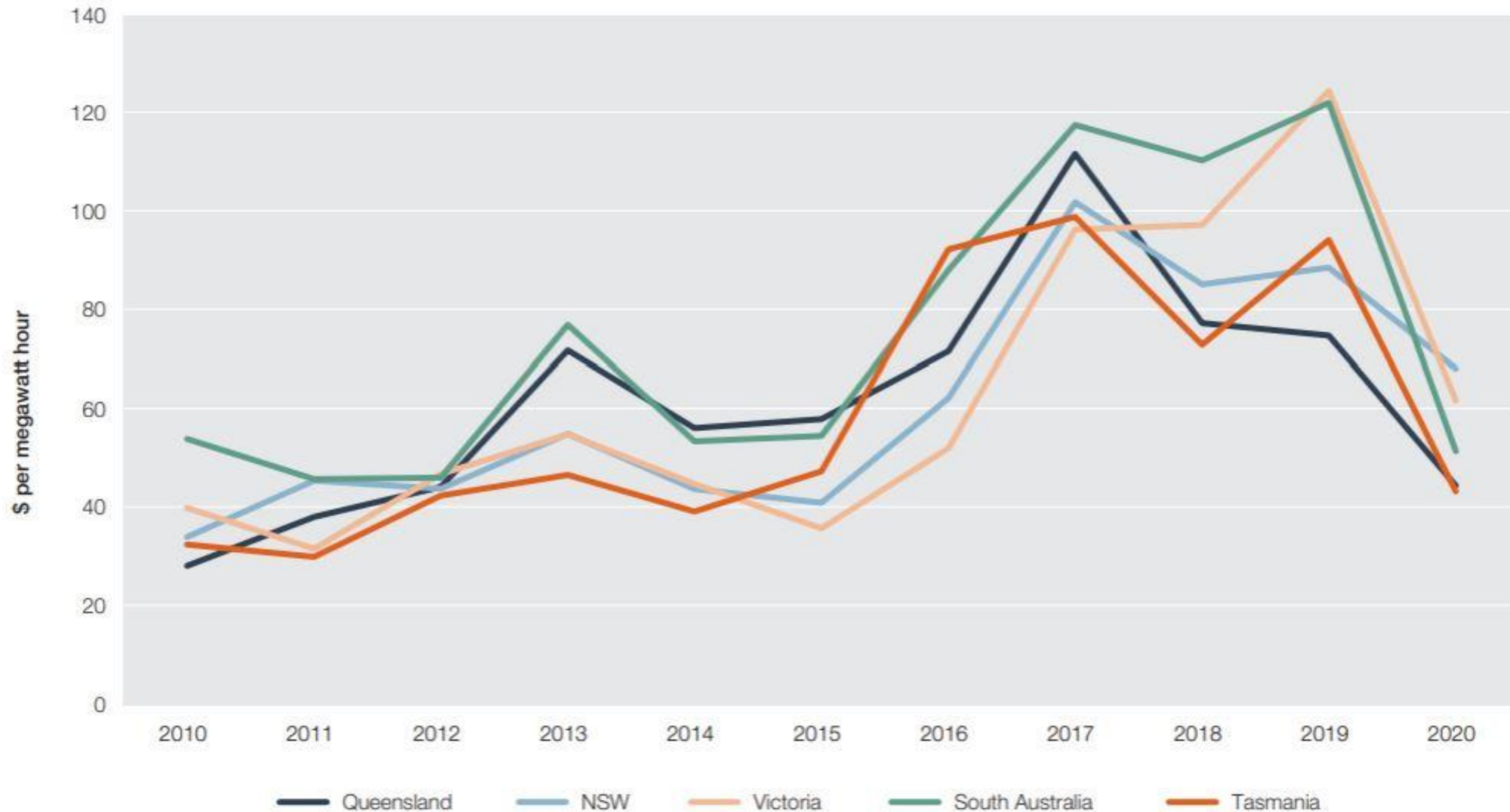


INTENSE MARKET REFORM

- Intense and high levels of engagement in market reform
- Major review of energy market post-2025 by Energy Security Board
- System strength & Do No Harm requirements are doing a lot of harm. AEMC system strength work is heading in the right direction and can't come fast enough.
- New leadership at AEMO & AEMC, concern about ESB future



SOFT WHOLESALE ELECTRICITY PRICES



KEY MESSAGE #4

Short term
challenge: grid,
grid & grid



CLEAN ENERGY OUTLOOK CONFIDENCE INDEX



TOP BUSINESS CHALLENGES

FOR DEVELOPING CLEAN ENERGY PROJECTS IN AUSTRALIA

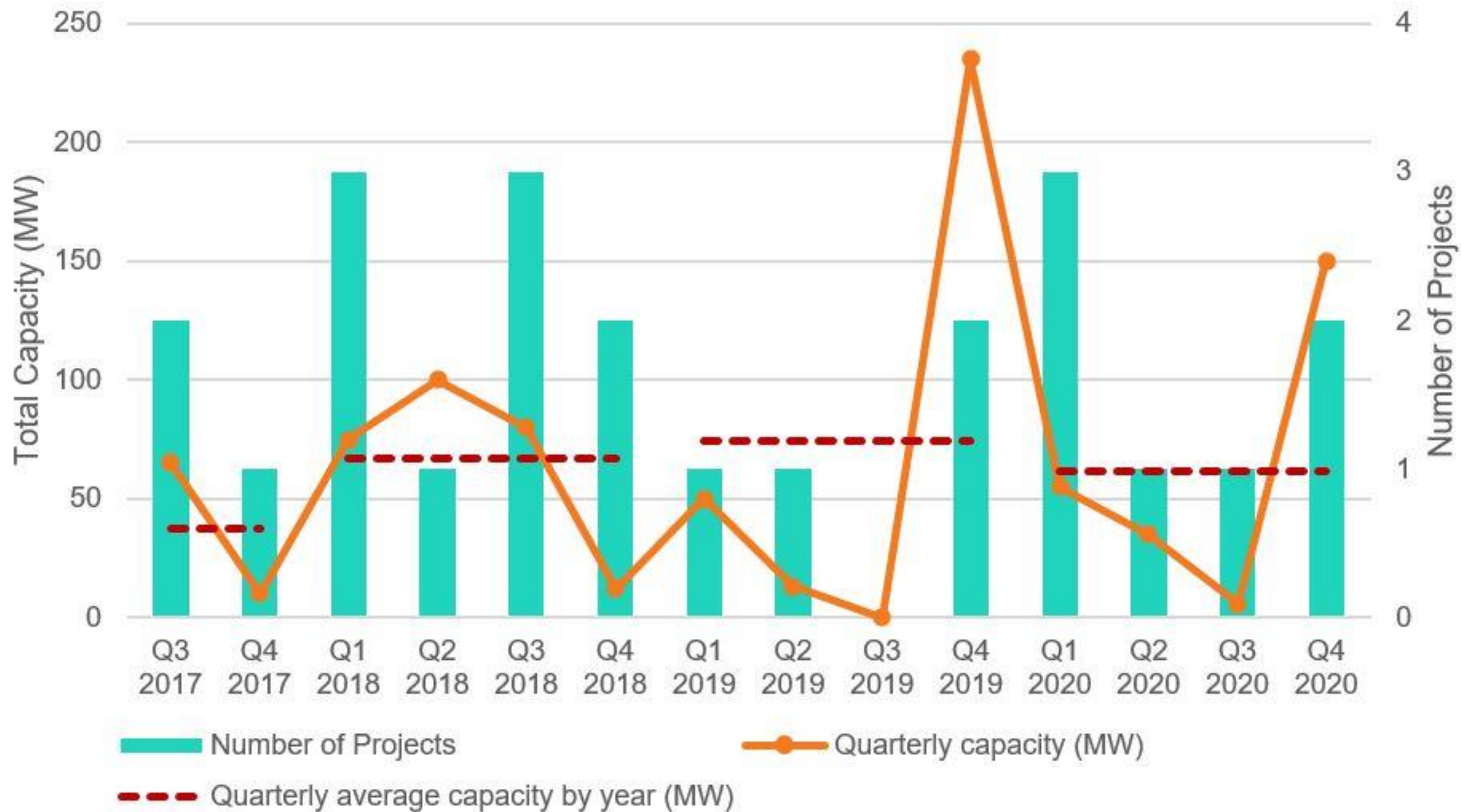
- 1 Concerns and challenges related to grid connection process and technical requirements
- 2 Unpredictable or unhelpful government intervention in the energy market
- 3 Under-investment in network capacity to address congestion and constraints
- 4 Lack of long-term integrated federal energy and climate policy
- 5 Future market design uncertainty
- 6 Concerns and uncertainty around marginal loss factors (MLFs)

For more information visit cleanenergycouncil.org.au/index

TRANSMISSION SYSTEMS NEEDS INVESTMENT



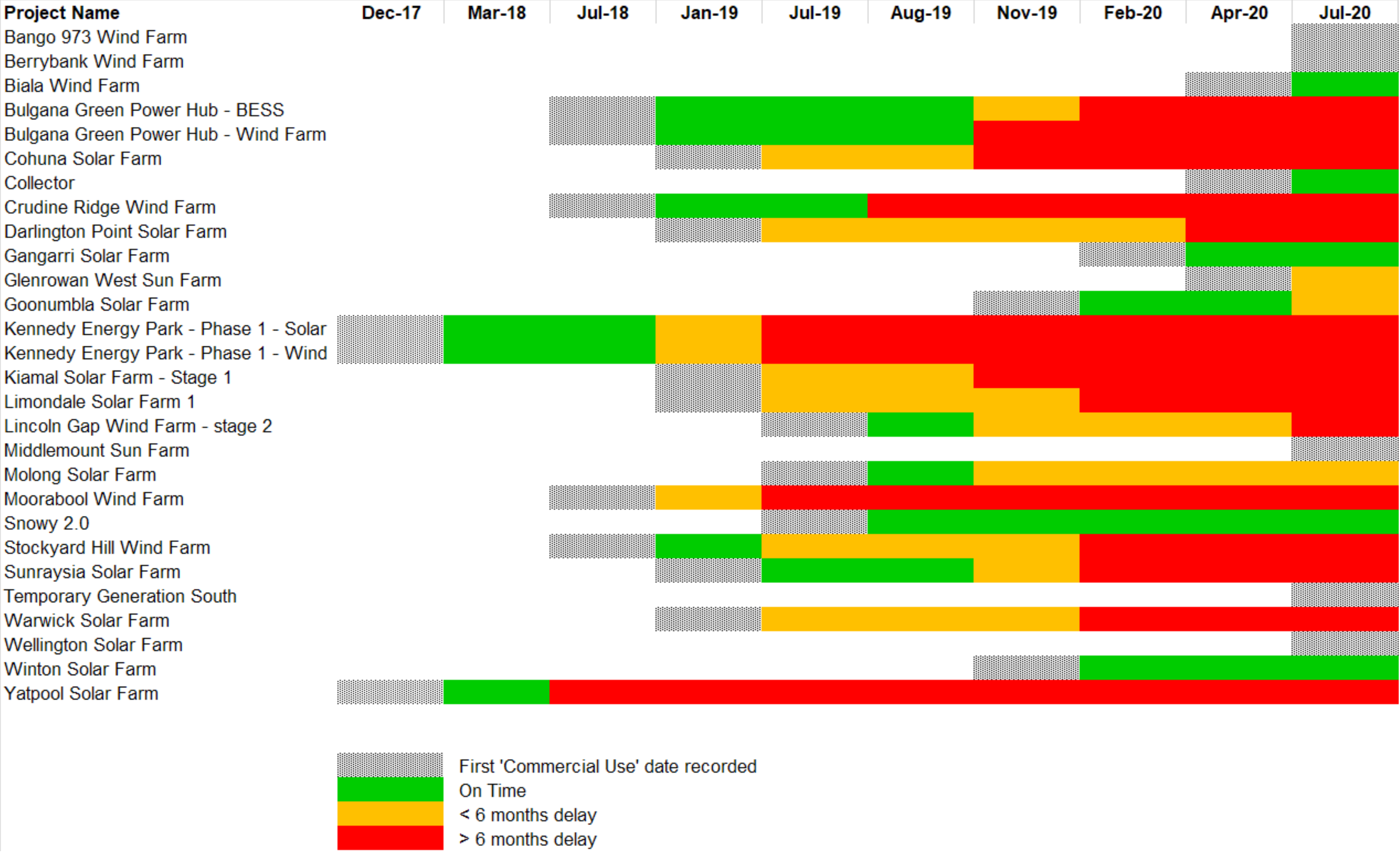
GRID CONSTRAINTS DRIVING BATTERY INVESTMENT



GRID

- Major challenges in grid connection process overseen by AEMO/TNSPs. CEC working closely with AEMO on reform of connection process.
- Growing concern about commitments to transmission investment. RIT-T and cost sharing arrangements are problematic. Growing community concerns about new infrastructure.
- REZ design will be critical for existing and prospective generators.
- DER integration remains complex and challenging. Zero-export limits unnecessary relative to dynamic and smart limits.

SIGNIFICANT PROJECT DELAYS AND COSTS



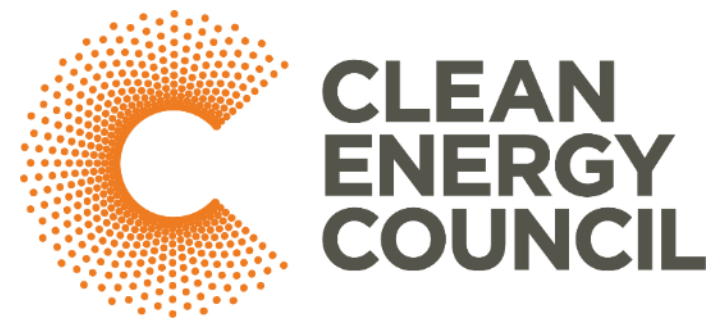
Average delay is 9.3 months

Currently approximately 2GW of projects are being delayed in Victoria alone, costing many millions of dollars per week.



CONTINUOUS IMPROVEMENT OF WIND ENERGY INDUSTRY

- **Workforce development** - reform of training, diversity in workforce, developing best practice approaches
- **Safety** - developing best practice approach for wind industry & large-sale solar
- **Social license** -planning policy reform, community consultation, contractor behaviour, Agrisolar guide.



THANK YOU



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