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Reflections on the Road Ahead for the SWIS

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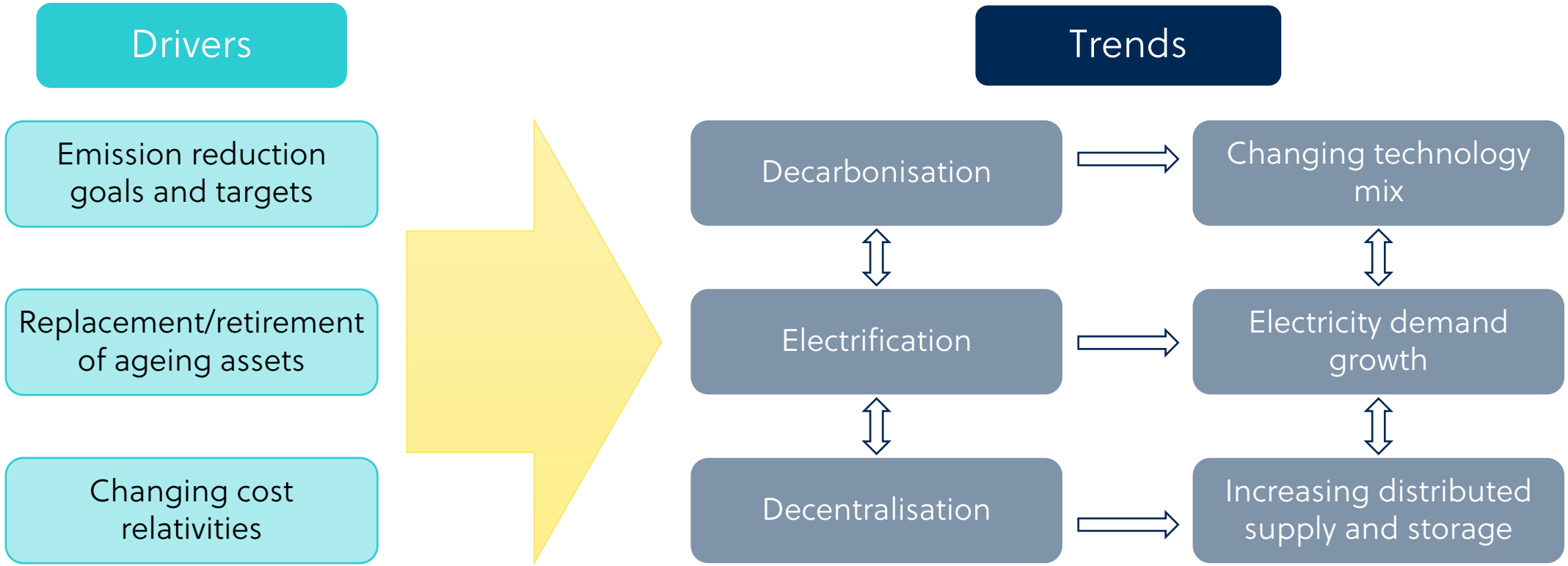
Our Mission

REDEFINING SUSTAINABLE SUCCESS

We help organisations navigate and optimise the transition to a net zero, sustainable future.

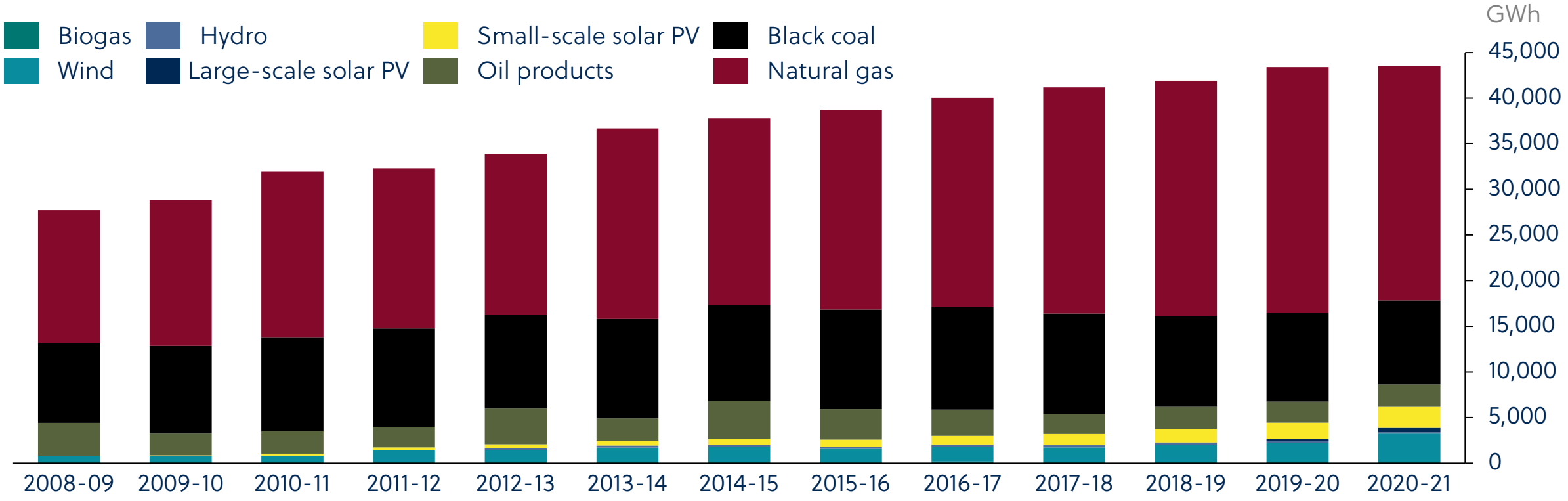
The ‘most profound transformation’ of our power systems involves multiple, linked drivers and trends



How did we get here?

WA has seen renewable growth over the last few years, however coal and gas still dominate the generation mix

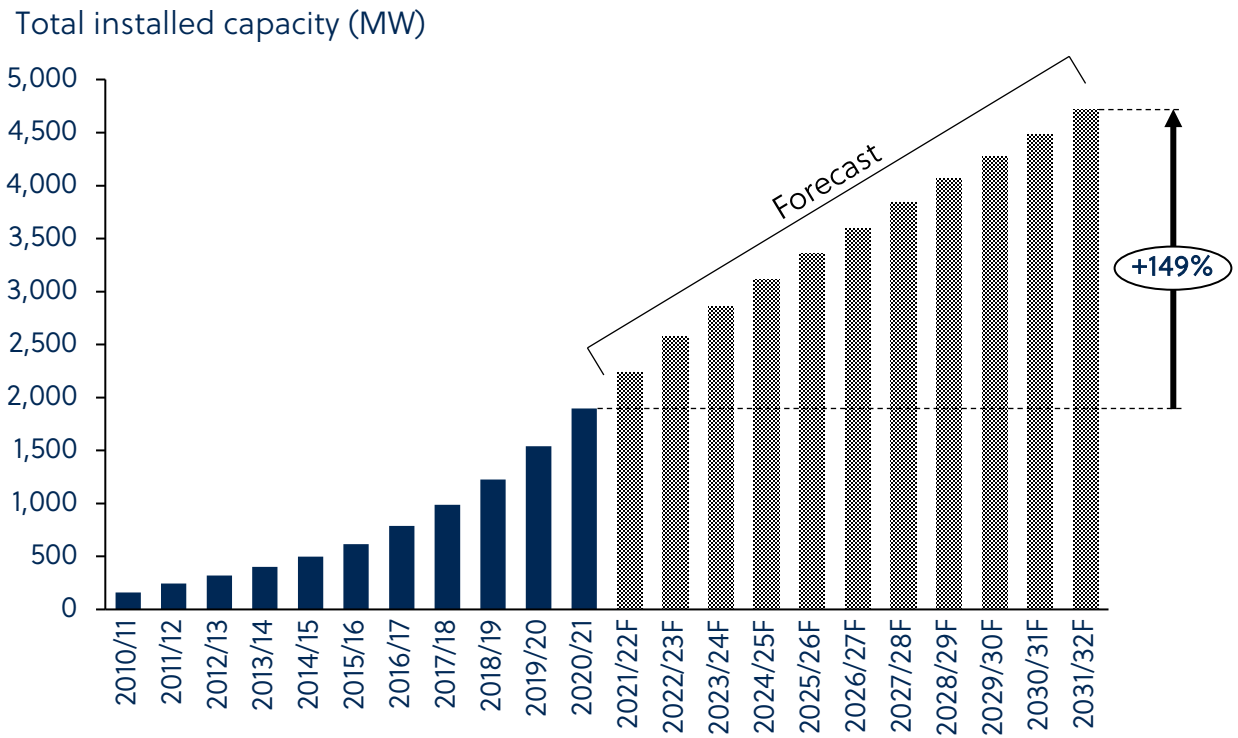
Electricity generation in Western Australia, by fuel type, 2008-2021



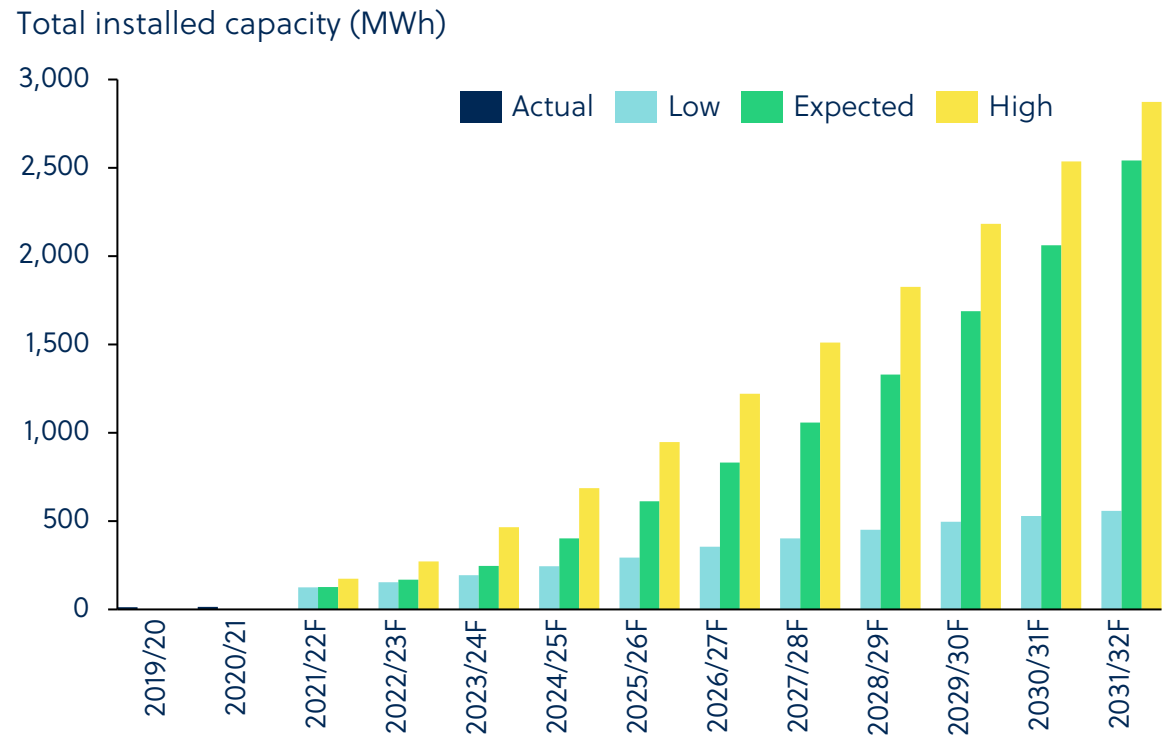
Source: DCCEEW - Australian electricity generation – fuel mix

There has been rapid growth of residential PV … this is forecast to more than double in the next 10 years, with batteries to follow

Actual and forecast total installed behind-the-meter PV, WEM 2010-2032 (by Capacity Year)



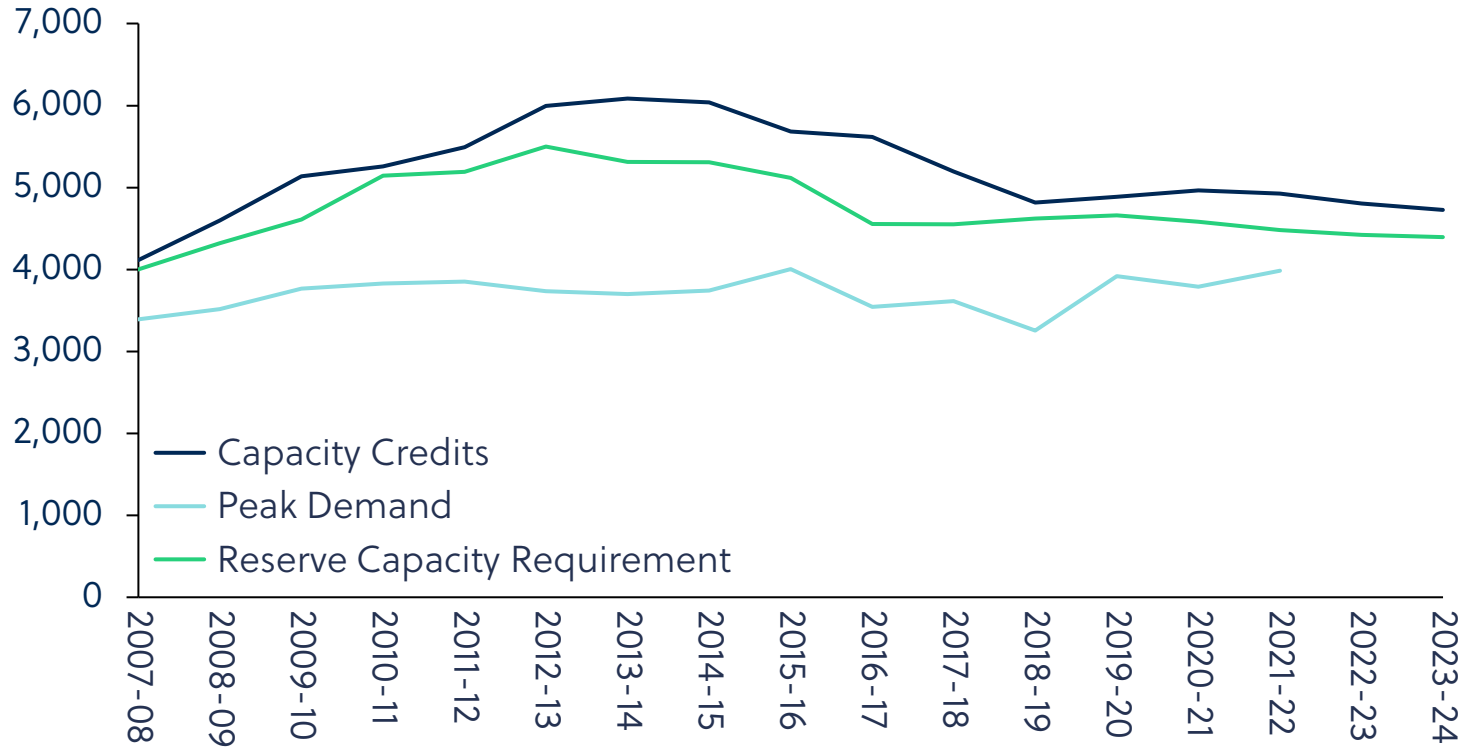
Actual and forecast total installed behind-the-meter storage, WEM 2019-2032 (by Capacity Year)



Sources: AEMO, Electricity Statement of Opportunities (WEM), June 2021 and June 2022.

Capacity investment has been influenced by the overall supply-demand balance

Peak demand, Reserve Capacity Requirement and Capacity Credits



Source: AEMO, 2021 WEM ESOO Data Register Databook; AEMO, Capacity Credits Assigned by Capacity Year notices, 2007 – 2023; AEMO, 2013 ESOO

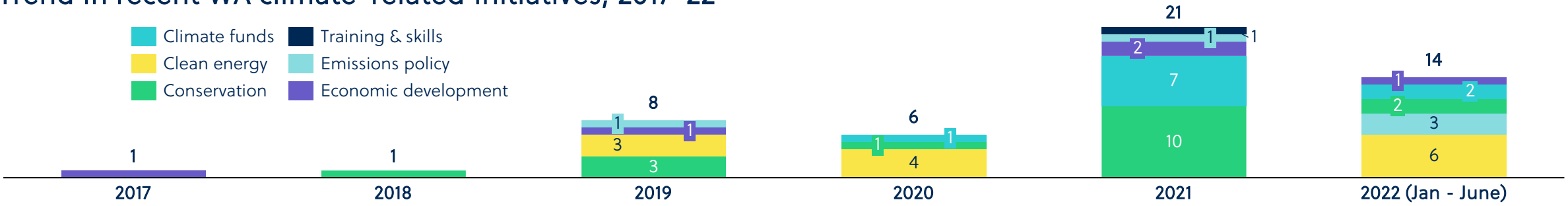
Commentary

- Build-up of excess capacity
- Correction in forecasts
- Decline in capacity (retirements and demand response)
- Investment drivers
  - LRET
  - Cost inversion
  - Future capacity gaps

What will guide the path forward?

The WA Government is taking steps to set the energy-intensive sectors on a pathway to net zero emissions

Trend in recent WA climate-related initiatives, 2017-22[1]



- Metronet

- Bushfire Centre of Excellence

- GHG Emissions Policy for Major Projects
- Diversify WA
- Future Battery Industry Strategy
- Renewable H2 Strategy
- Energy Transformation Strategy
- Plan for our Parks
- Climate Health WA Inquiry
- Carbon Farming for Pastoralists

- Distributed Energy Resources Roadmap
- Clean Energy Future Fund
- Renewable energy investment
- Carbon for Conservation
- Investment in renewable H2
- EV Strategy

- Aboriginal Ranger Program
- Fast-tracking the WA Plan for Plastics
- Investment & Trade Plan
- Investment Attraction & New Industries Fund
- Funding for the WA Advocacy for Consumers of Energy Program
- Climate Action Fund (x6)
- River health initiatives (x8)
- Permanent protection of the Beeliar Wetlands
- Native Logging Just Transition

- WA Government interim emissions target set
- First electric CAT bus service
- GHG Storage and Transport bill to be drafted
- Clean Energy Car Fund
- Boost to Climate Action Fund
- Climate Science Initiative partnership
- Boost to Carbon Farming and Land Restoration Program
- Collie Industrial Transition Fund
- State-owned coal power to be retired by 2030
- Investigated a Renewable Hydrogen Target
- Esperance Energy Transition Plan
- Native Vegetation Policy
- Amendments to Forest Products Act to allow FPC to trade carbon
- No new gas-fired power from 2030

Note: This representation of Government climate-related initiatives is non-exhaustive and indicative only of the increasing trend in Government focus on addressing climate change.

Global resource companies are showing greater decarbonisation ambition by setting their own NZE targets

Key company emissions reduction targets

	Alcoa	South32	Newmont	BHP	Woodside Energy
Net zero emissions targets	NZE by 2050	NZE by 2050	Carbon neutral by 2050[1]	NZE by 2050	NZE by 2050
Interim targets	50% reduction by 2030	30% reduction by 2030	By 2030: 32% reduction in absolute Scope 1&2 GHG emissions and intensity 30% reduction in absolute Scope 3 GHG Emissions	50% reduction by 2035	50% reduction by 2035

Notes: [1] It should be noted that this is a goal, rather than a target

Sources: Woodside Petroleum – Website; BHP Group – Website; South32 – Sustainable Development Report (2021); FMG – Website; Alcoa – Website; Rio Tinto - Website

"From the industrial revolution to the digital age, financial markets have been impacted by significant structural change. Each time it drives a reassessment of risk and value and, in turn, asset allocation. Climate change is no different. Financial markets are currently assessing a range of challenges and opportunities related to climate change and policy responses to it. ... It's a long-term shift, not a short-term shock"

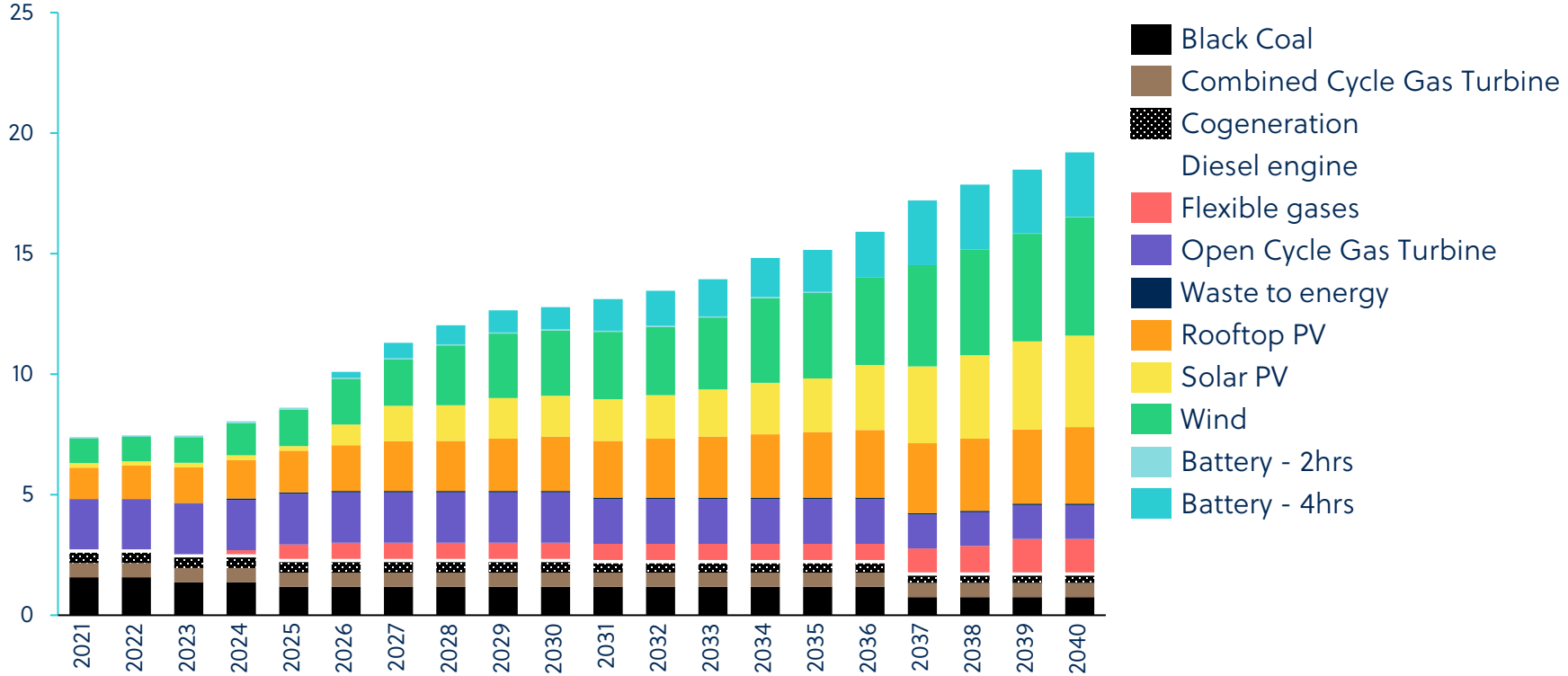
"Importantly, considerations around climate risks are now being hard wired into how global financial institutions allocate capital – at both a firm and country level – and how they engage with clients and companies. Disclosure of material financial risks facing firms is allowing investors and markets to obtain clearer information about the nature and extent of these risks. This is guiding the mobilisation of trillions of dollars in support of the transition"

Sources: Josh Frydenberg - speech to the Australian Industry Group (September 2021)

Where might we be heading?

The WoSP provided indications of the potential scale of new renewable generation investment in the SWIS

SWIS nameplate capacity (GW), 2021-2040F (Techtopia scenario)



Sources: EPWA - Whole of System Plan (2020)

Observations and speculation

Across the 4 scenarios:

- Renewable capacity: 71-78% (2040)
- Renewable energy: 61-76% (2040)
  Growth of 10-42 TWh (2021-40)
- Emissions reduction:
  -29% to 34% (2021-30)
  13% to 41% (2021-40)
- Limited network augmentation
- Investment: $550M to $15.8B

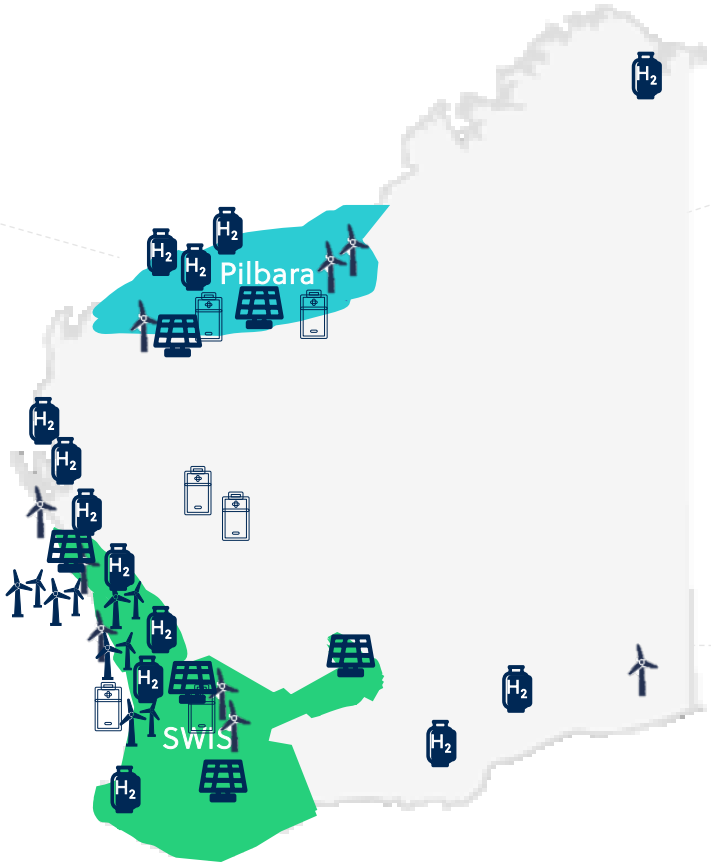
Potential changes to scenarios?

- Emissions reduction trajectory
- Updated closure/investment timelines
- Hydrogen electrolysis demand
- Offshore wind

To retire state-owned coal power stations by 2030, the WA Government is investing $3.8b in new renewables in the SWIS

Hydrogen projects:
- 9 announced
- 17 under development
- WA Gov target of 12% of global renewable hydrogen market by 2030

Large scale battery storage projects
200 MW under dev. on SWIS
~2 GW prospective



Wind farm projects:
- 1.7 GW onshore SWIS (+2.5 GW?)
- 4.5 GW offshore

Solar farm projects:
- 0.3 GW on SWIS (+2.5 GW?)
- 5 under development

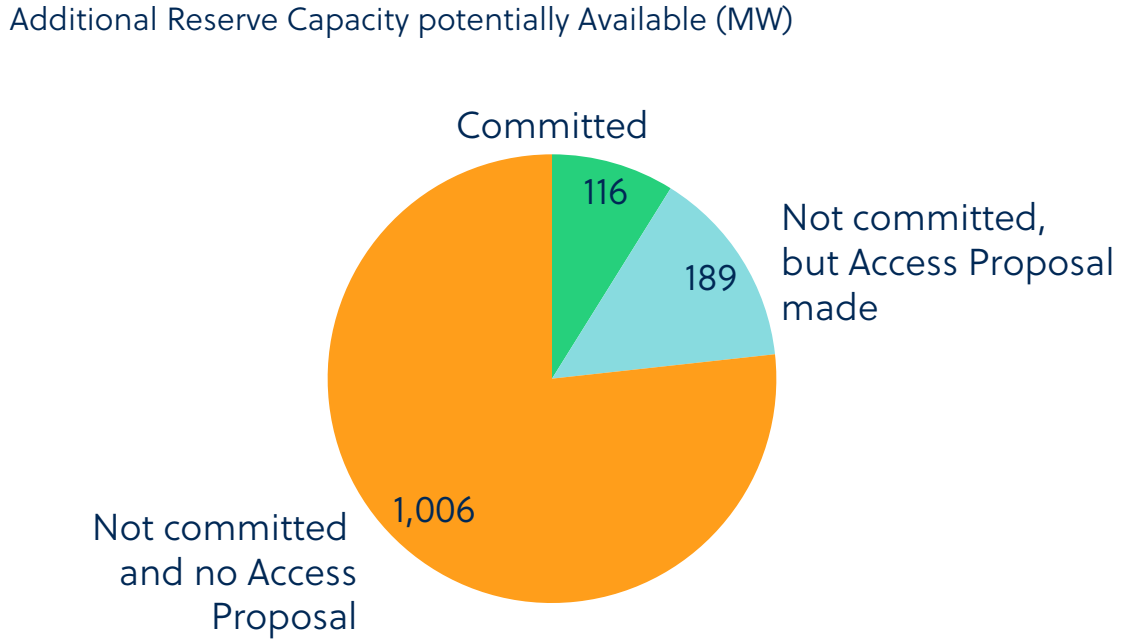
Notes: This map is non-exhaustive and includes projects that are under the status: *construction, development, announced and shelved.*

Source: Global Energy Monitor - Global Wind Power Tracker (2022); Global Energy Monitor - Global Solar Power Tracker (2022); CSIRO - Hysource Hydrogen Map (2022); CEC - Clean Energy Australia Report 2022; EPA website.

Expressions of Interest demonstrate focus on renewable generation and storage but further commitments required

Categorisation based on technology	Potential Reserve Capacity (MW)
Solar photovoltaic	227
Wind turbine	203
Biogas-powered generation	0.1
Electric storage system	817
Gas-powered generation	63
Distillate-powered generation	0.3
Total	1,311

There is a pipeline of 1300MW of new capacity, however >1000 MW is not yet committed



What's the big deal about network connections?

Investors repeatedly cite concerns around policy uncertainty and network connection and access

INFRASTRUCTURE PARTNERSHIPS AUSTRALIA

Allens Linklaters

*Despite the rapid growth of renewable energy asset attractiveness, some participants expressed **concern around misallocation in the Australian energy market, particularly around the lack of storage and transmission**, and the availability of energy offtakes.*

MinterEllison. Acuris

*Respondents point to **instability around incentives for renewables**, cited by 63% of investors …*

*While investors are attracted to Australia's stable regulatory systems, **regulatory complexity** is concerning to 59% of investors …*

__Grid access__ is a challenge and respondents say that it is getting more difficult.

Source: Infrastructure Partnerships Australia | Allens - Australian Infrastructure Investment Report 2022; MinterEllison | Acuris - Australian Renewables Report 2021; CEC - Clean Energy Outlook December 2019.

Improving the transmission investment and connection frameworks will be paramount to achieving the energy transition

There is a need to ensure that the transmission investment and connection frameworks are adapted to balance rigorous assessment with the necessary flexibility as the power system undergoes massive transition

Scale

- Benefits of investment may greatly exceed cost

Timing

- Overly rigorous regulatory processes may impede the timely delivery of these benefits, at a cost to consumers

Risk

- Unlocking the 'chicken-and-egg' problem requires consideration of the allocation of risk between networks, generators and consumers

> Western Power's network will be the backbone that supports decarbonisation in the south-west of Western Australia, helping connect industry to renewable energy sources.
>
> Industry has told us they need to decarbonise quickly and I'm pleased to explore how the network could support their ambition through the expedited SWIS Demand Assessment.

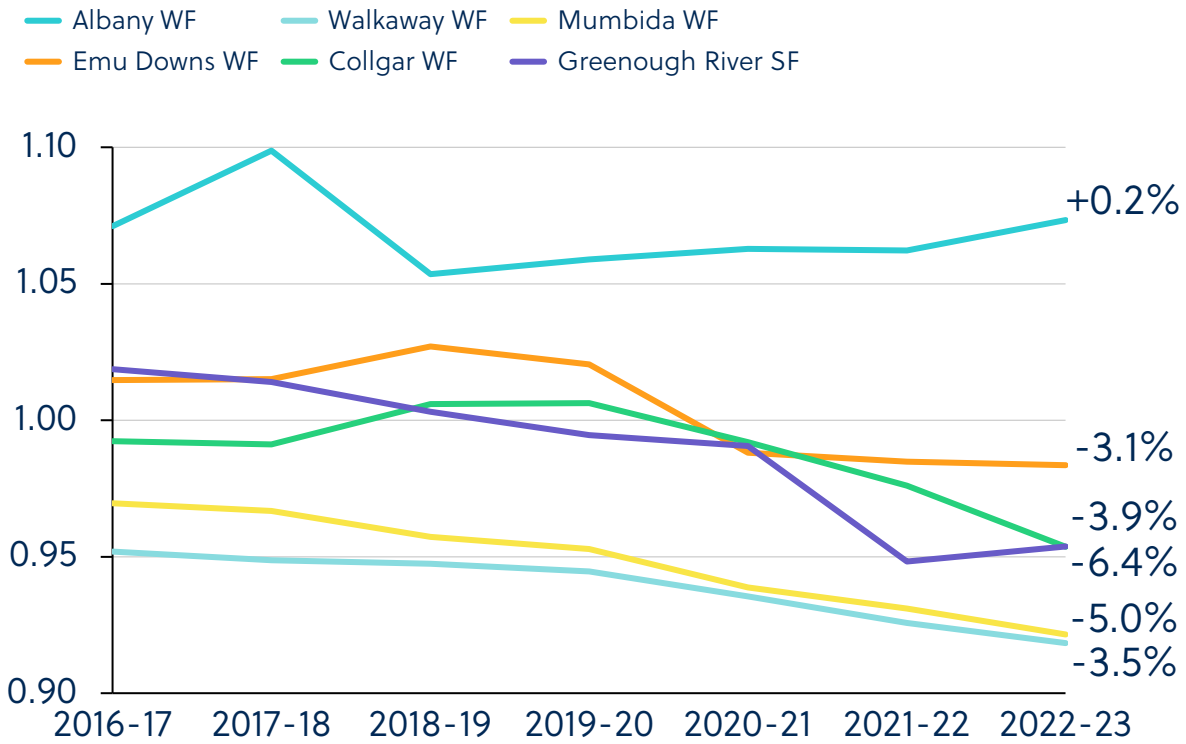
- Bill Johnston, August 2022 (media statement announcing the SWIS Demand Assessment)

> The ERA notes that some customers are currently experiencing extended waiting periods for applications to connect and this is likely to worsen as increased applications are received in response to decarbonisation initiatives ...
>
> [T]he applications and queuing policy framework under the Access Code will not be able to deal with the scale of change required for decarbonisation. A more strategic approach across industry and policy agencies will be needed to ensure transmission infrastructure is ready so that new generation and loads can be connected in a timely manner. The ERA will take this up with Energy Policy WA.

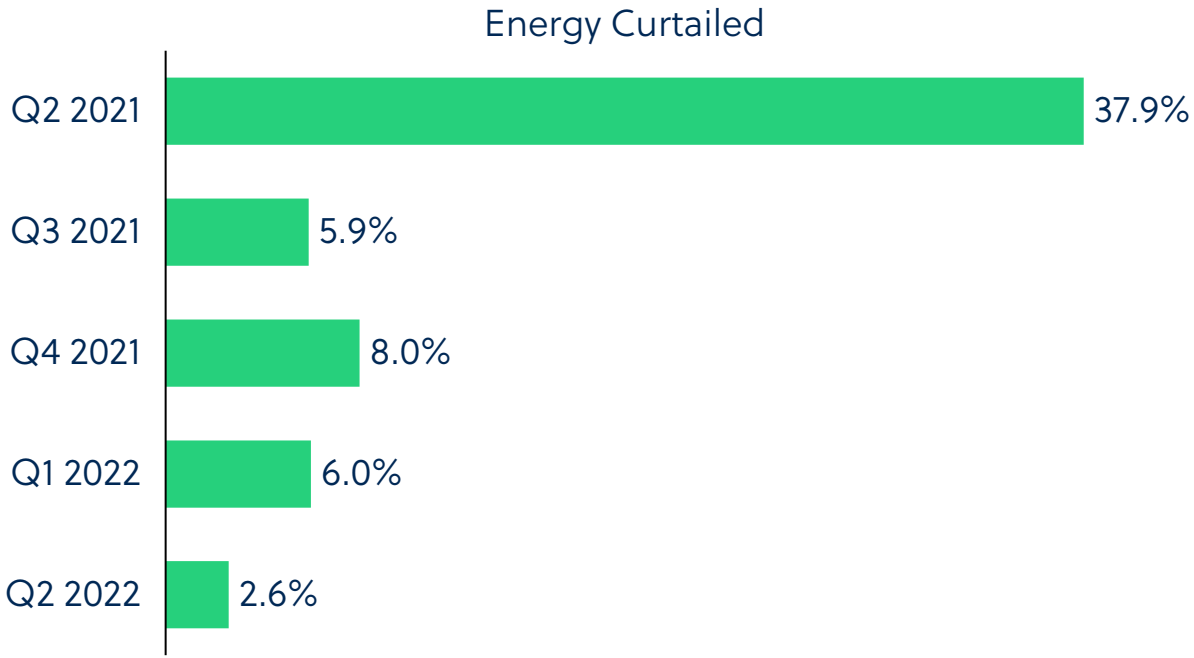
- Economic Regulation Authority, September 2022 (Western Power AA6 Draft Decision, Decision overview)

Aside from connection challenges, curtailment and loss factor risk are material for investors

Transmission loss factors for renewable facilities



Curtailment of GIA wind farms, Q2 2021 to Q2 2022



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