

An overview of Australia's policy journey for Solar PV

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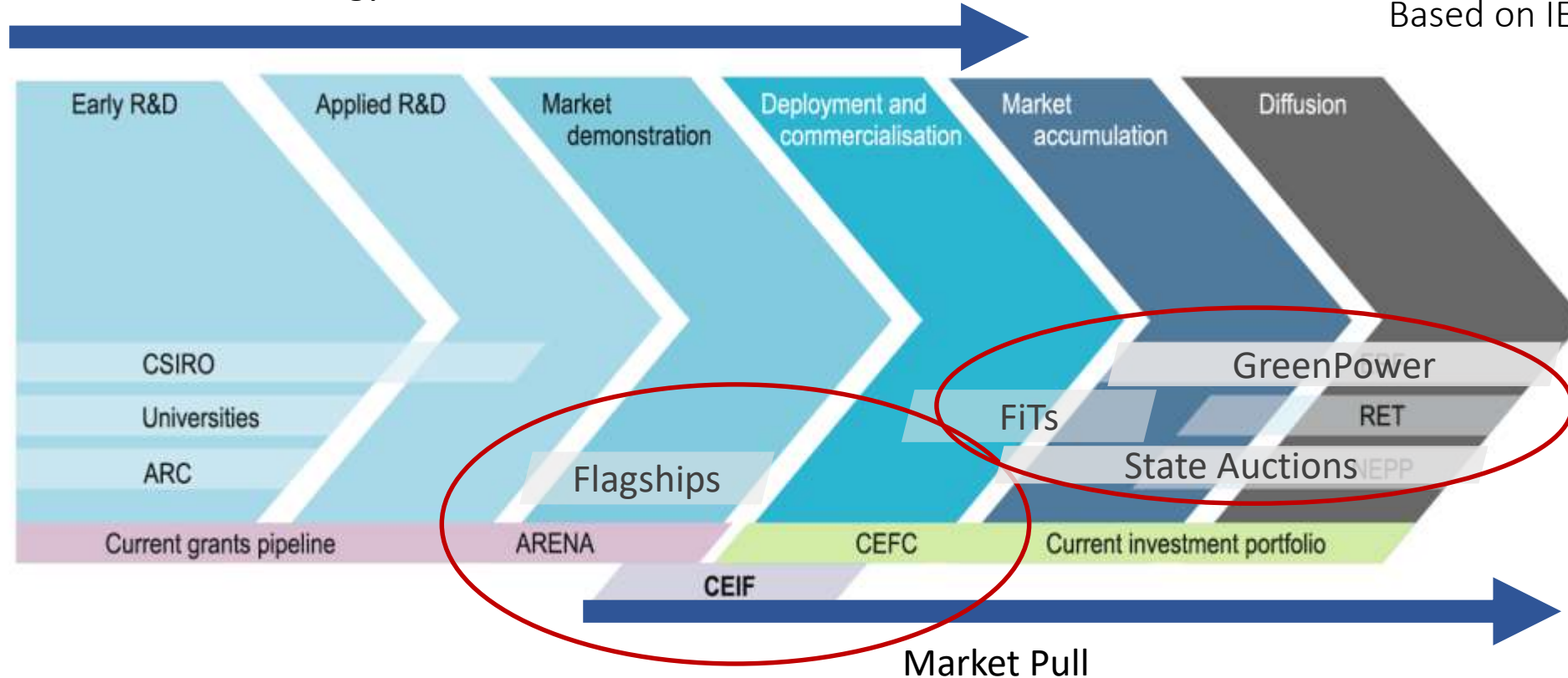
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Australian RE Policy Framework

Technology Push

Based on IEA 2018



←→
Lack of experience with the technology, first mover disadvantage
Capital market barriers

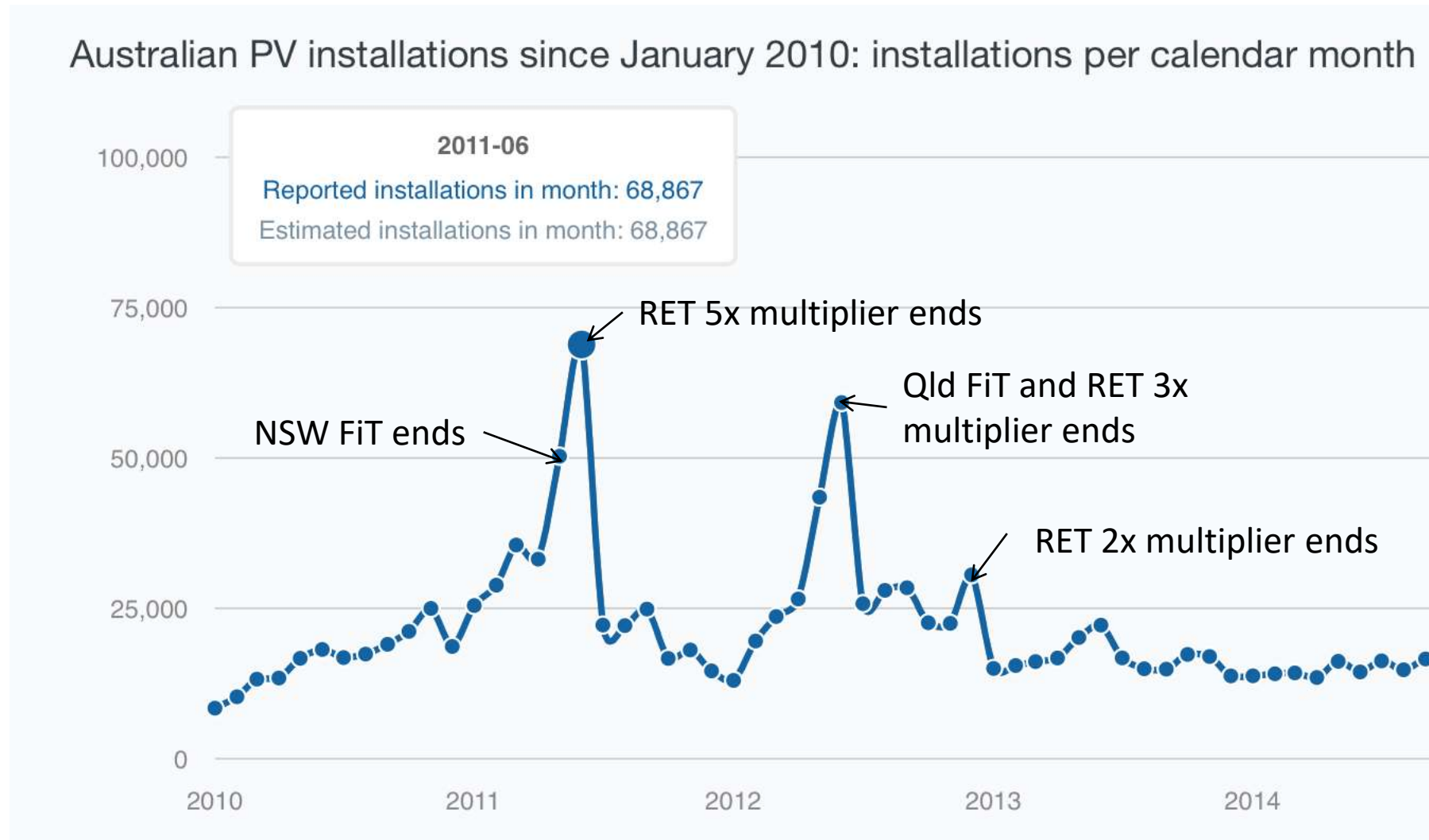
←→
Externalities
Regulatory/market distortions
Information barriers

Beginnings – Little Bay

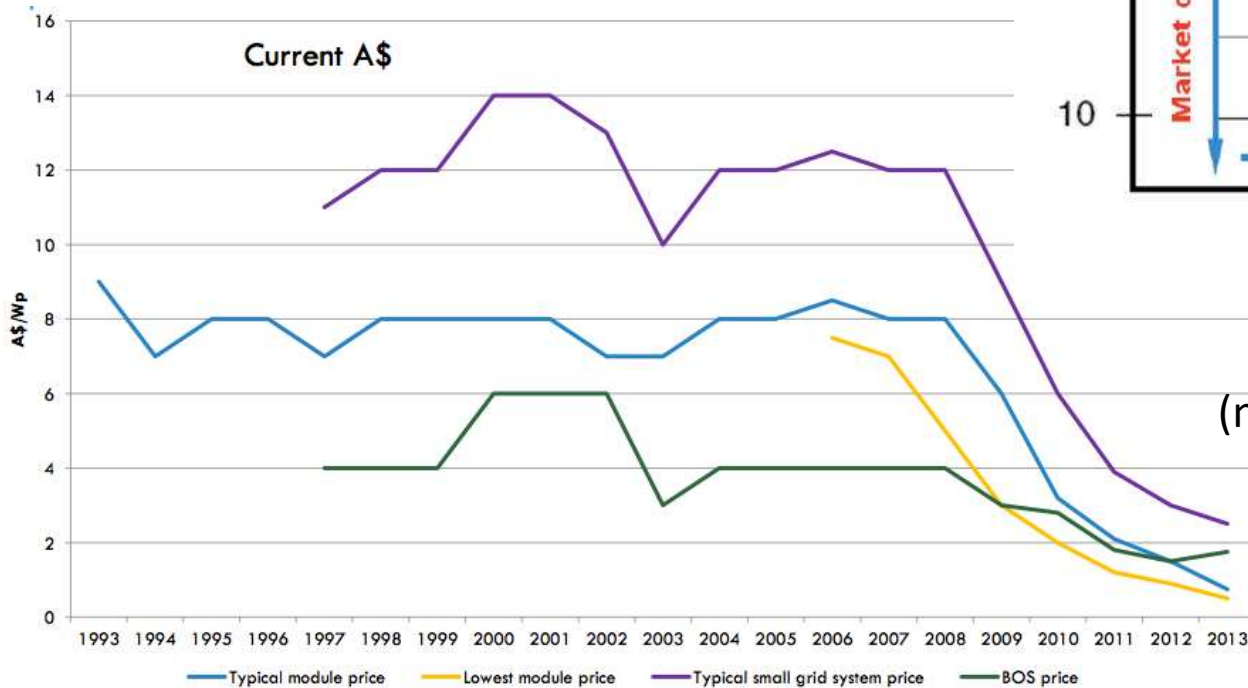


- 1994 The first licensed PV power generation facility in NSW connected to the grid
- Challenges
 - Grid connection
 - Generator registration
- 1996 Grid Connect Guidelines for PV
- Exemption for small generators

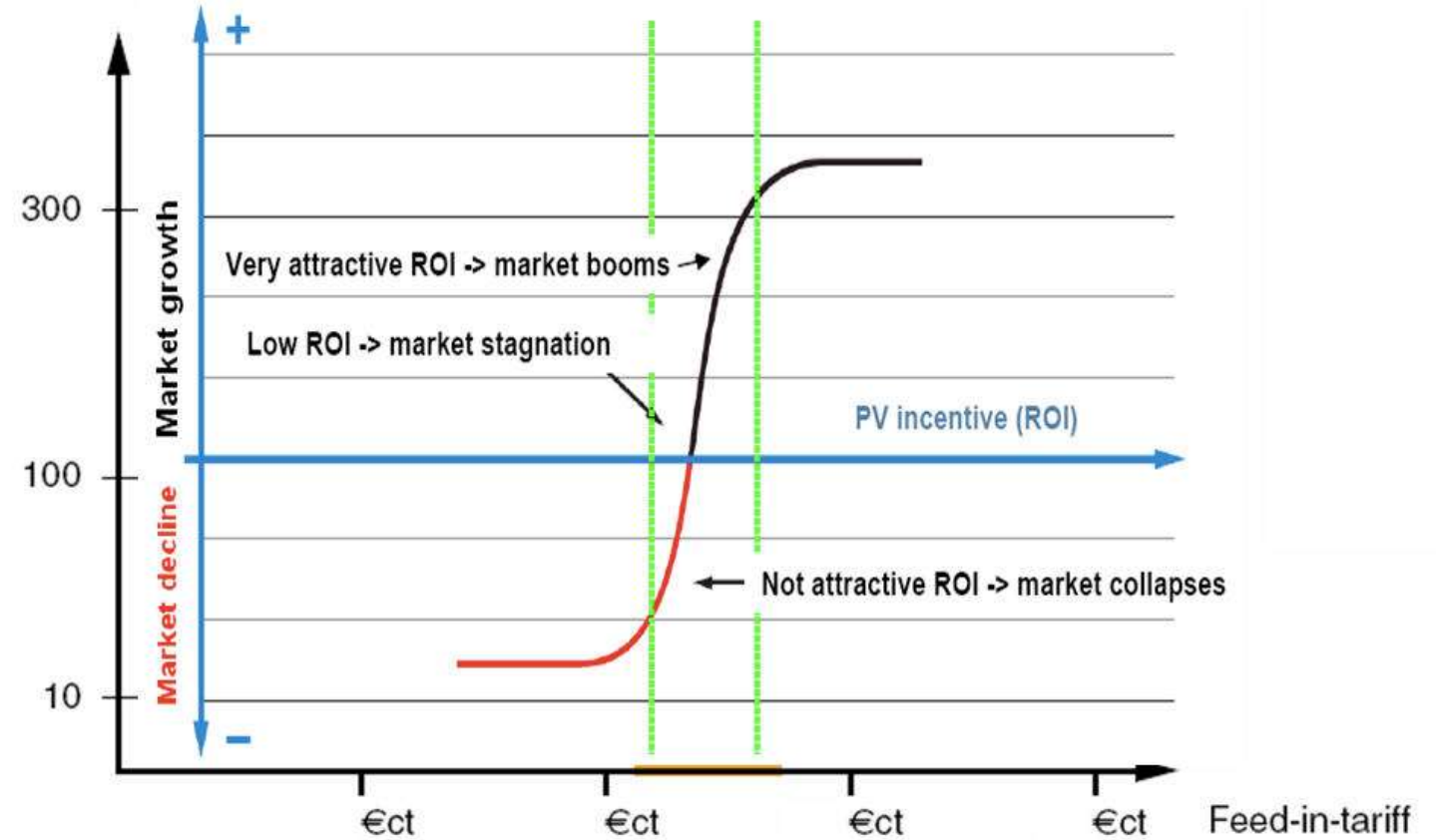
Boom & Bust: Impact of Scheme Ends on Market



Feed in Tariffs Impact of FiTs on Australian PV Market (APVA, 2012)



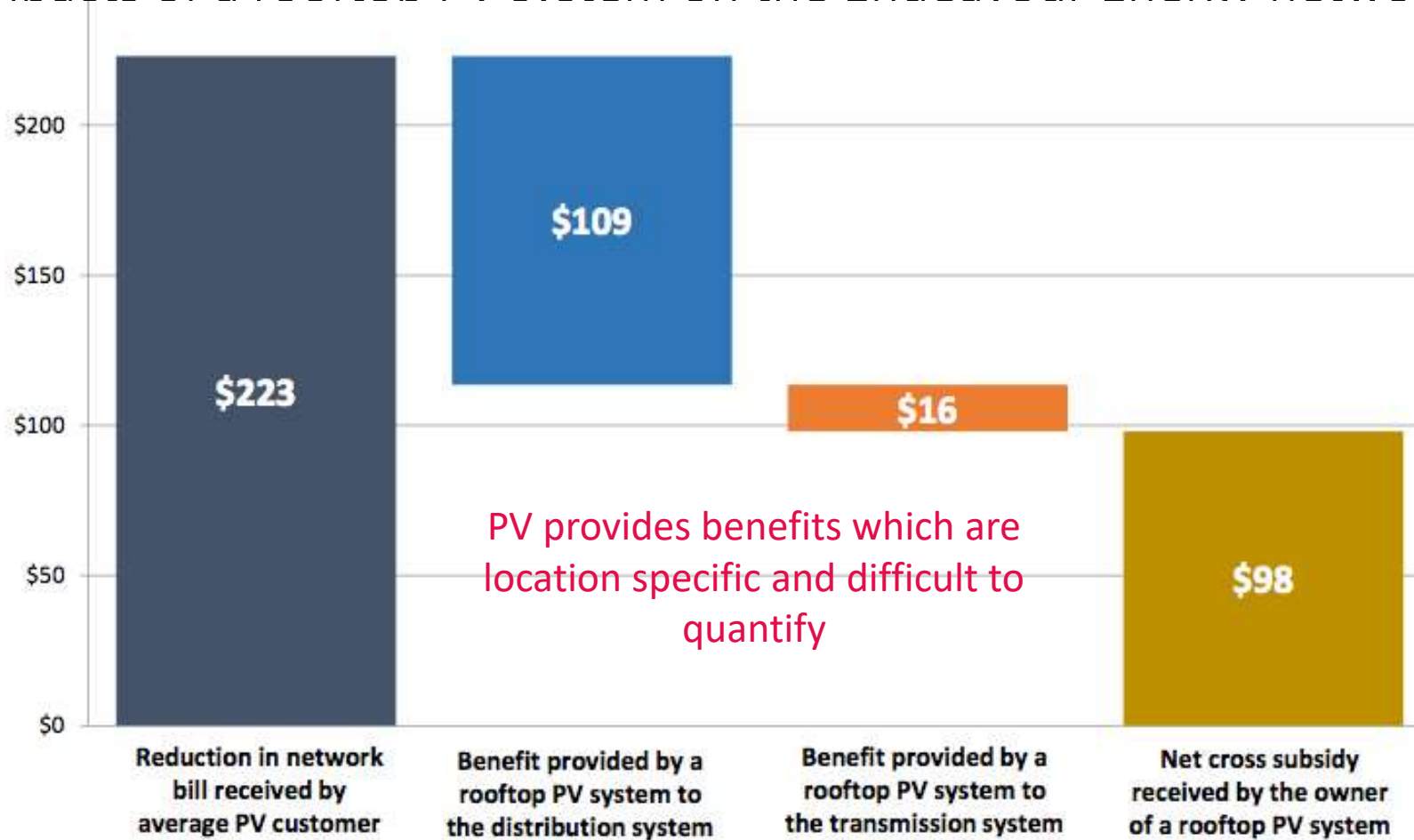
Derived from APVA, PV in Australia 1995 to 2013



A\$/Wp
(no REC's)

PV Network Tariff Cross Subsidy

Annual impacts of a rooftop PV system on the Endeavour Energy network and other customers

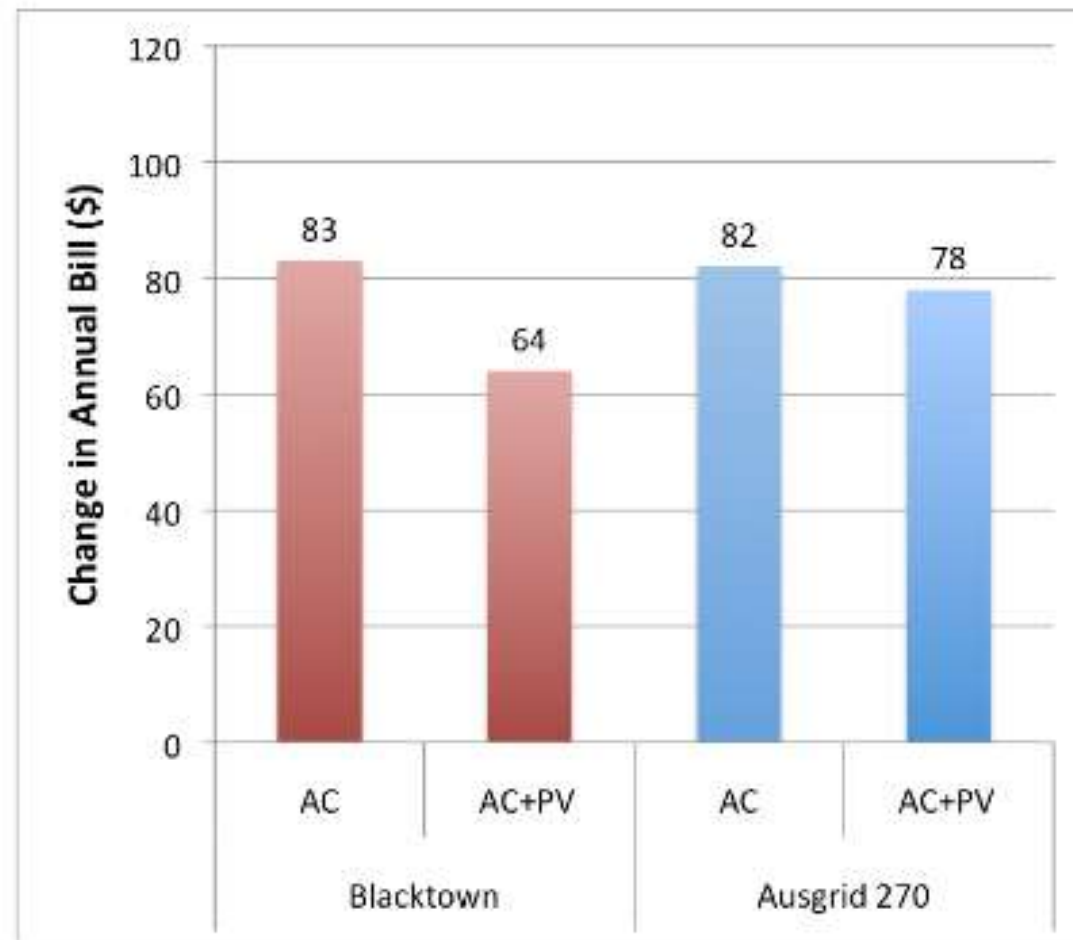


Other Cross Subsidies in Tariffs

- To consumers in different locations
- To consumers that use the network at peak times

Impact of owning air-conditioning (AC) and AC + PV on bills of other customers

CPD 2013



Network Tariff Changes and PV

- Likely that network peak load savings < value of tariff savings
- How much should PV owners pay to use the network?
- Proposals by DNSPs and others:
 - PV hosting limits
 - Increased fixed charges
 - High and non-transparent fees for network studies
- But at current penetration levels, most of the impact of PV on networks is revenue impact, not costs of managing technical issues

PV Tariffs in a Post 'Grid Parity' World

- What is the Value of PV?
 - To date, Australian FiTs have reflected energy value (avoided purchase of energy from the wholesale market by retailer) + avoided energy losses
 - Network value?
- Underlying network costs and benefits poorly aligned with tariffs
 - current Cost Reflective Tariffs
 - Do not incentivise DERs to provide services that are locationally and temporally aligned with grid needs
 - Do not compensate them for providing a range of network services and other values
- How to treat other distributed energy resource (DERs)?
- Need new business models for DNSPs and other key stakeholders that facilitate DERs

Victorian Time-varying FiT (2018)

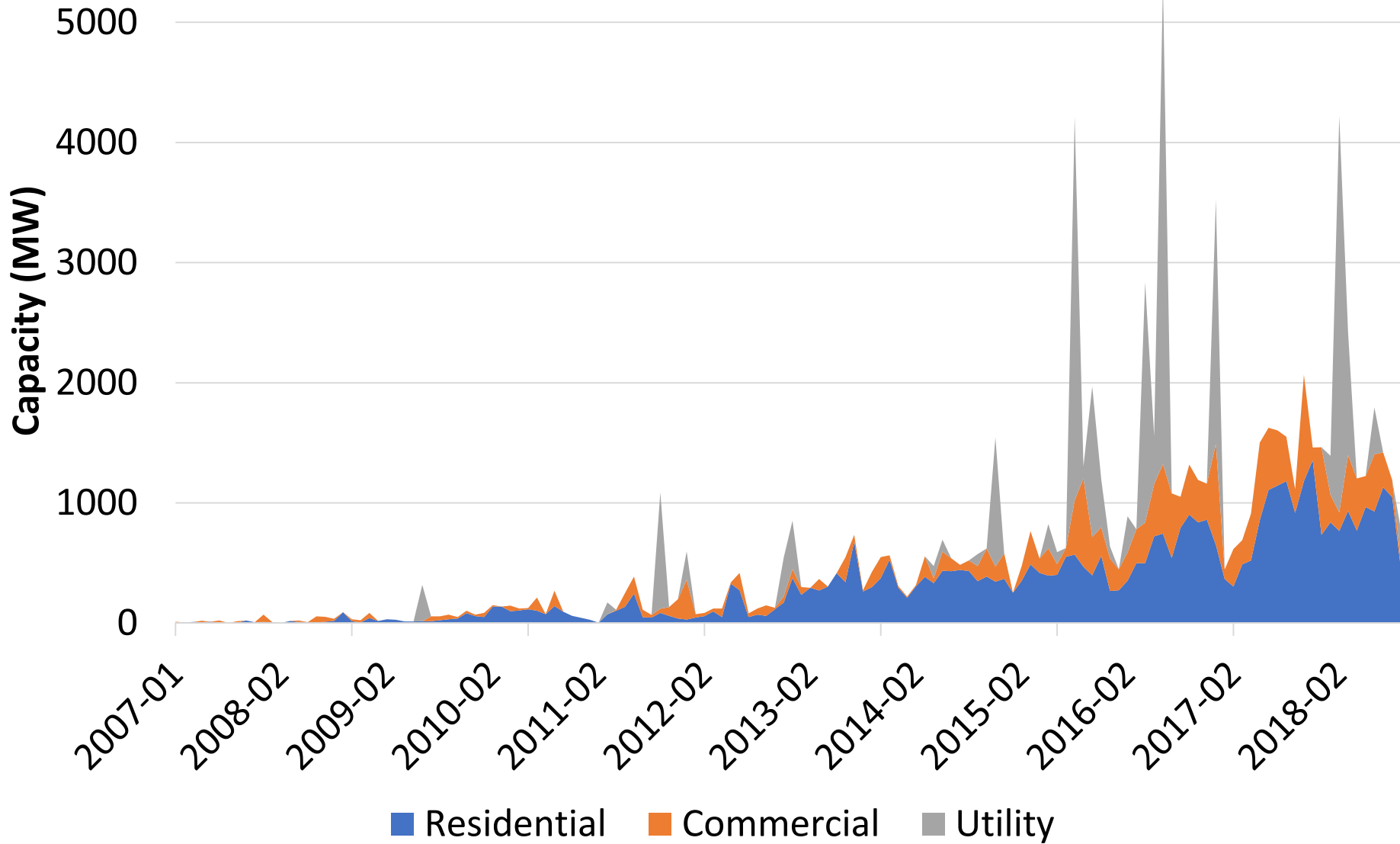
Single-rate minimum feed-in tariff – final rate

Tariff	Minimum rate to apply (all times) (c/kWh)
Single-rate minimum feed-in tariff:	9.9

Time-varying minimum feed-in tariff – final rates

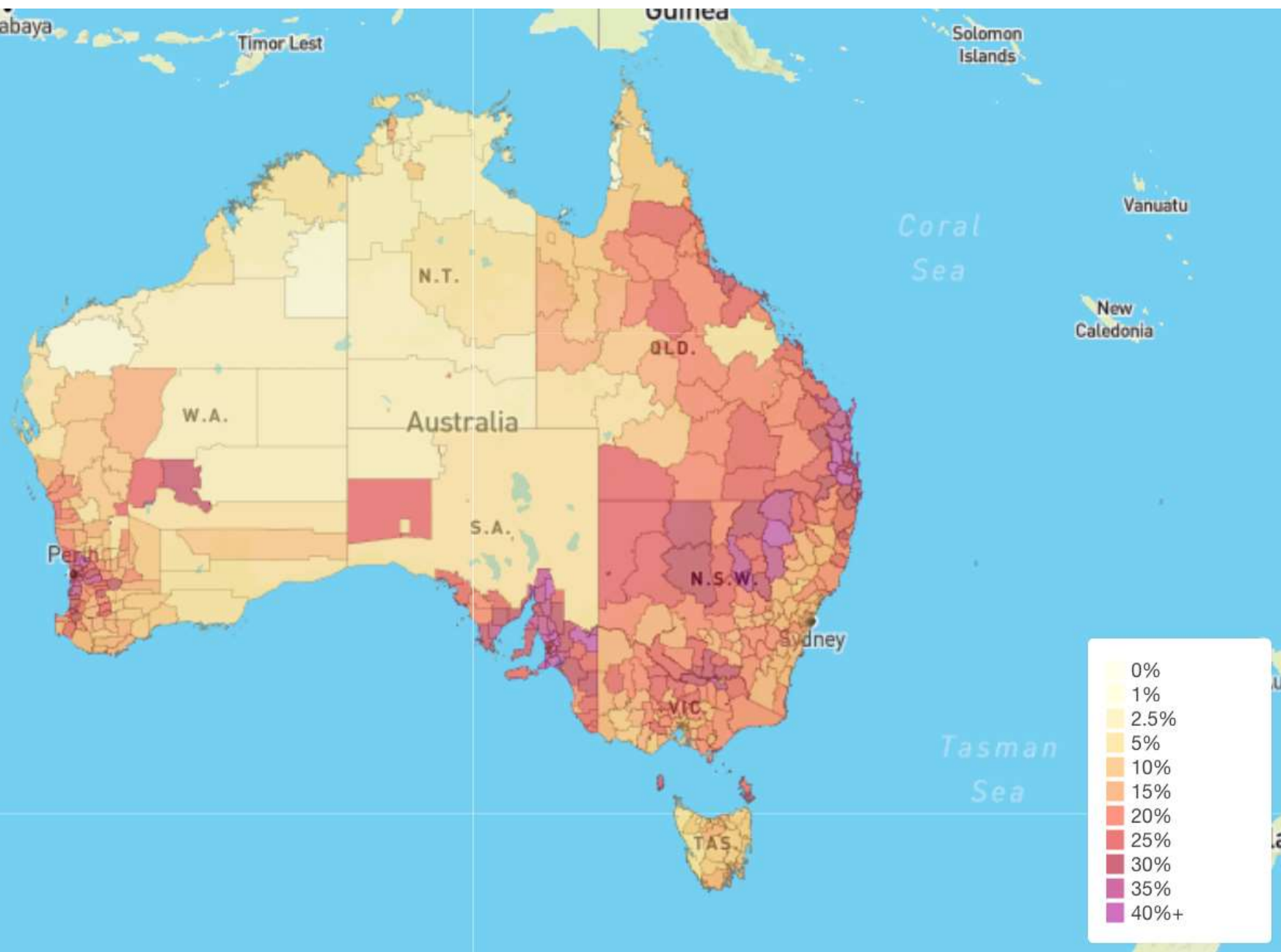
Period	Weekday	Weekend	Rate: cents per kilowatt hour (c/kWh)
Off peak	10pm – 7am	10pm – 7am	7.1 c/kWh
Shoulder	7am – 3pm, 9pm – 10pm	7am – 10pm	10.3 c/kWh
Peak	3pm – 9pm	n/a	29.0 c/kWh

PV Growth



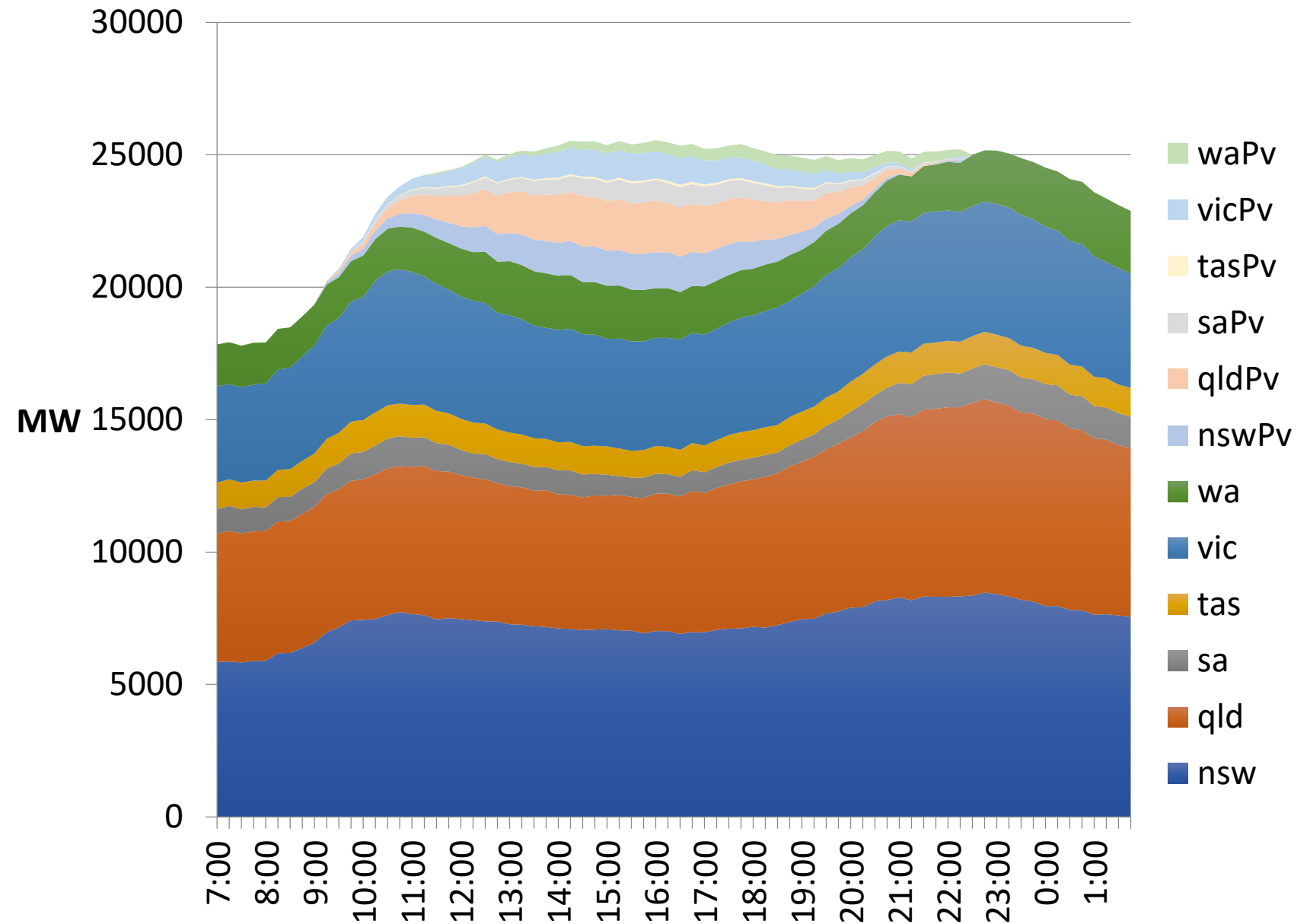


- PV density by postcode
- PV capacity by postcode
- PV density by LGA**
- PV capacity by LGA
- PV density by state electorate
- PV capacity by state electorate
- Power stations

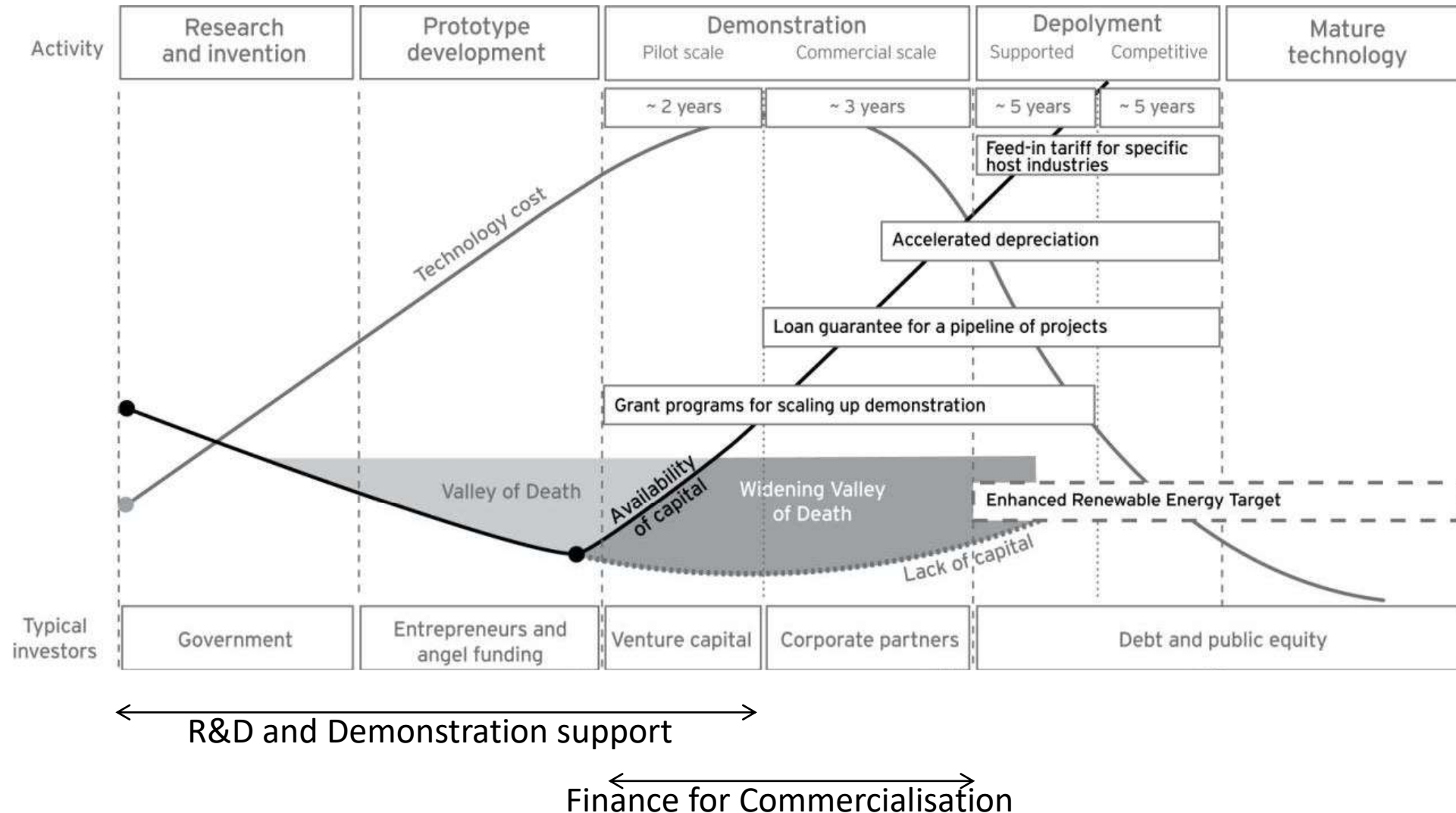


Distributed PV Generation

- 22nd October
2018



Commercialisation Support and Financing



Lareg Scale Solar Support

- Solar Flagships Demonstrations
- ARENA grants
- CEFC financing support
- State government Reverse Auctions



Demonstration Grants

Lessons Learnt

- Often require co-investment (e.g. 1:1 matching capital)
- Milestones problematic due to technology & institutional uncertainties -> much funding never gets disbursed
- Big grants are more risky
- High administrative costs
- Can damage public perception
- Does highlight regulatory & market issues and reduce risk for future projects
- Commercial interests reduce dissemination of learnings

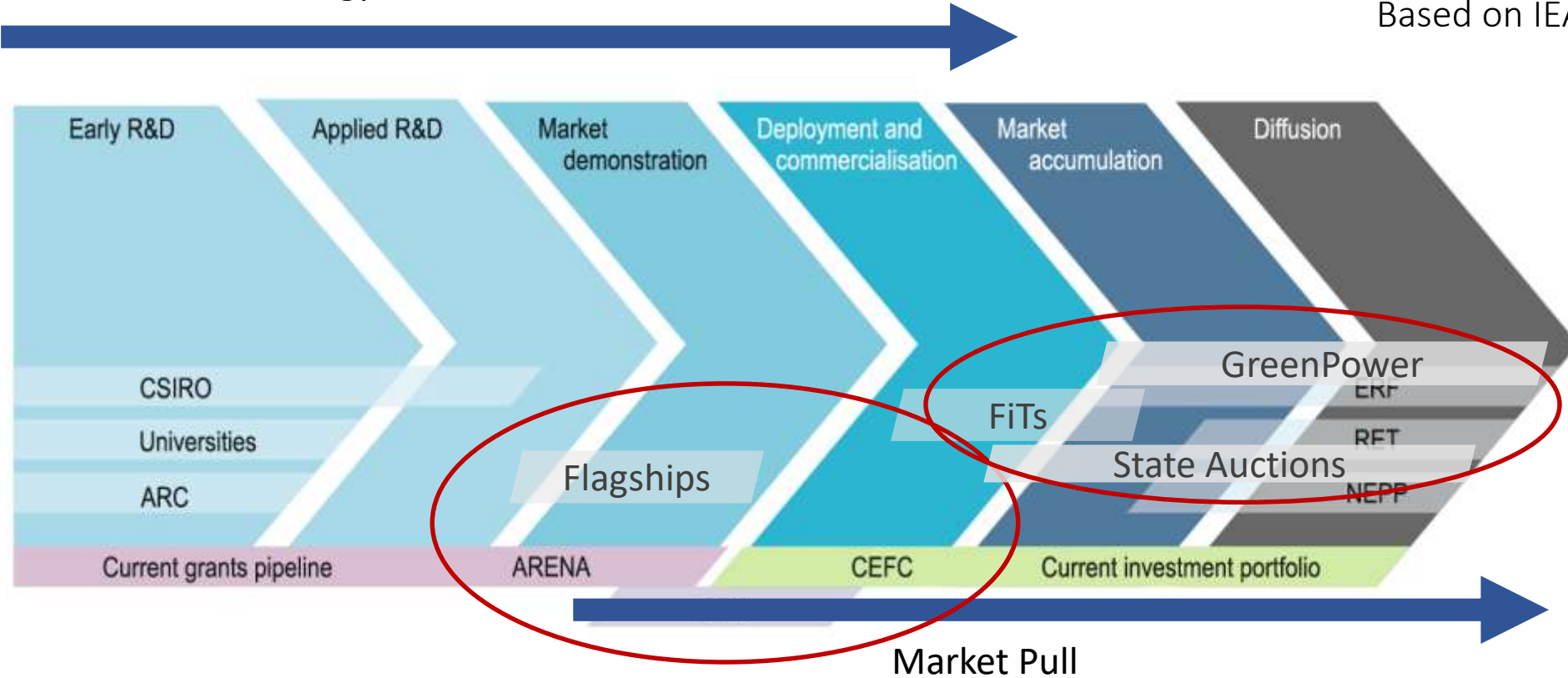
CEFC - Public Financing Support

- Projects in the capital intensive phase of technology development
- Tenor [timeframe] of debt suitable for renewable energy infrastructure projects
- Smaller scale renewable energy projects
- Institutional investor allocations to clean energy/technology fund managers
- Competitively priced long term debt finance for energy efficiency and low emissions technology
- Capital for enabling technologies, such as grid transmission, storage, and smart grid.

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State Auctions

- State RE Targets

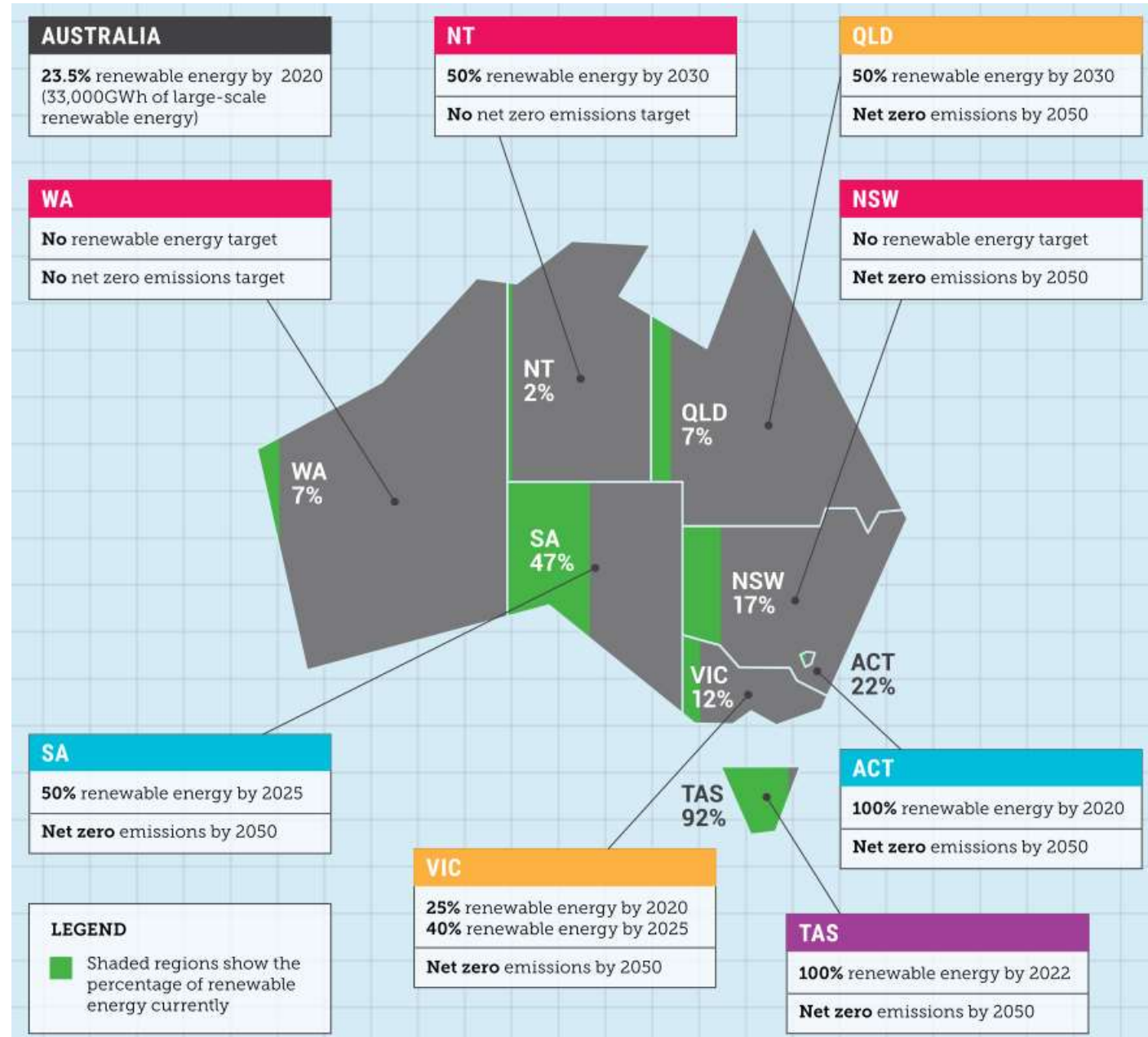
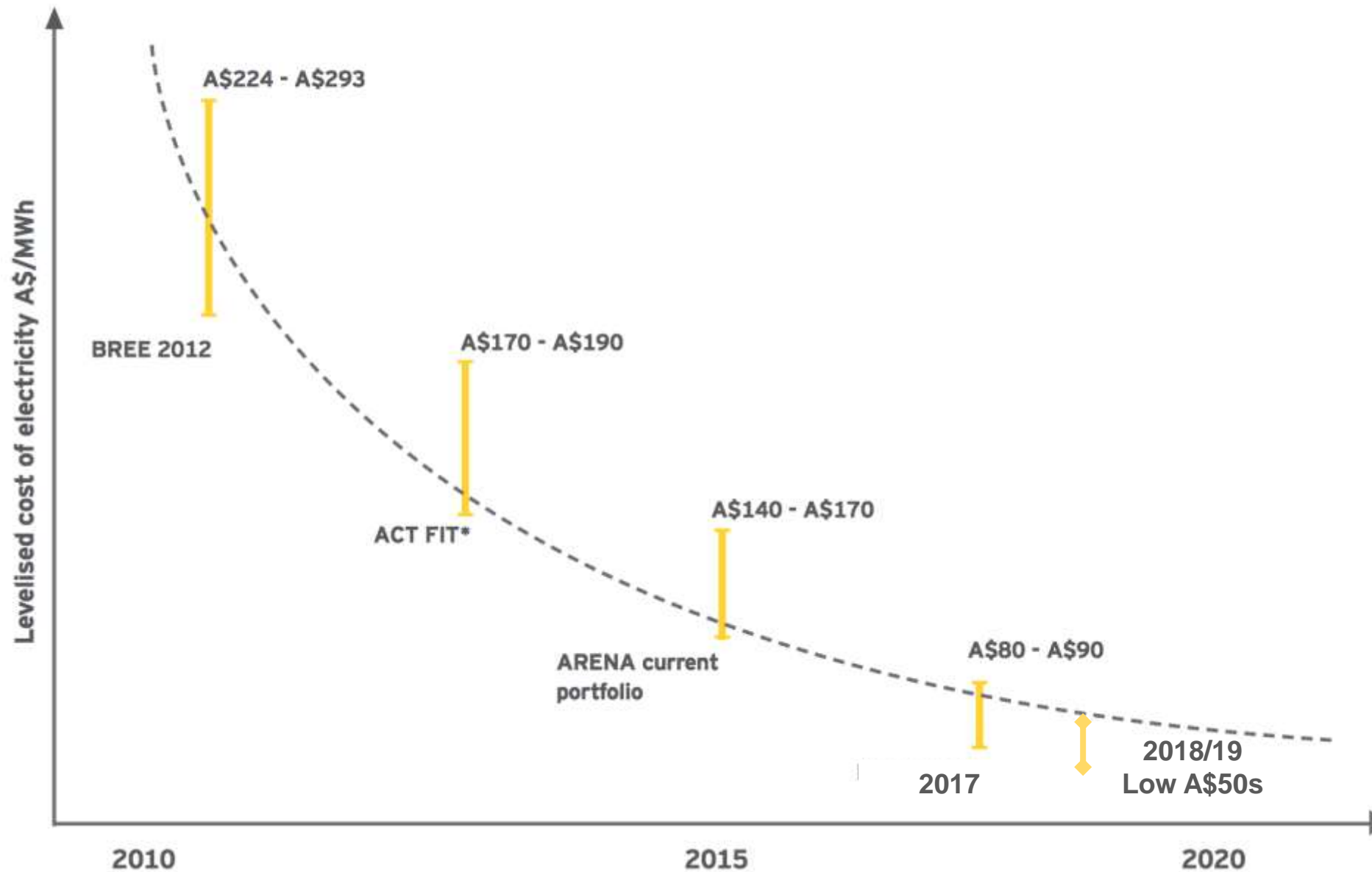


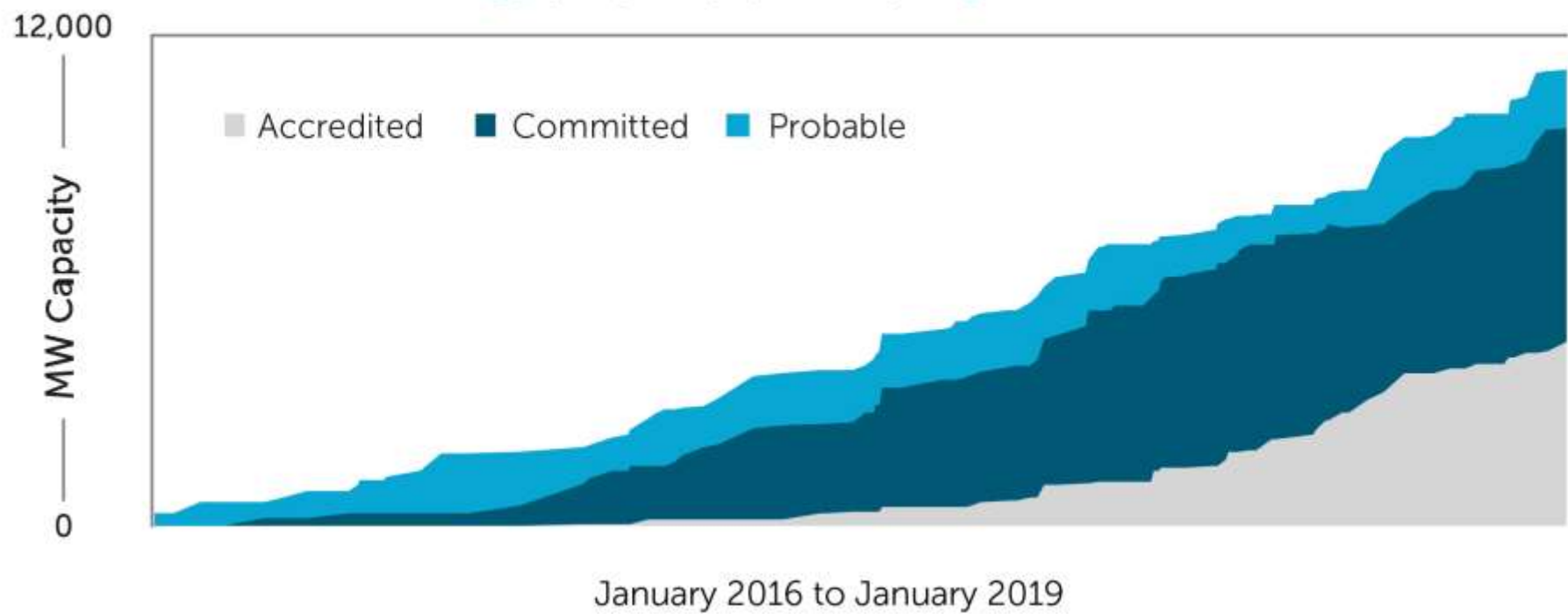
Figure 2 – Historical Levelised Cost of Energy
for Australian large-scale solar

EY for Clean Energy regulator 2017



RET

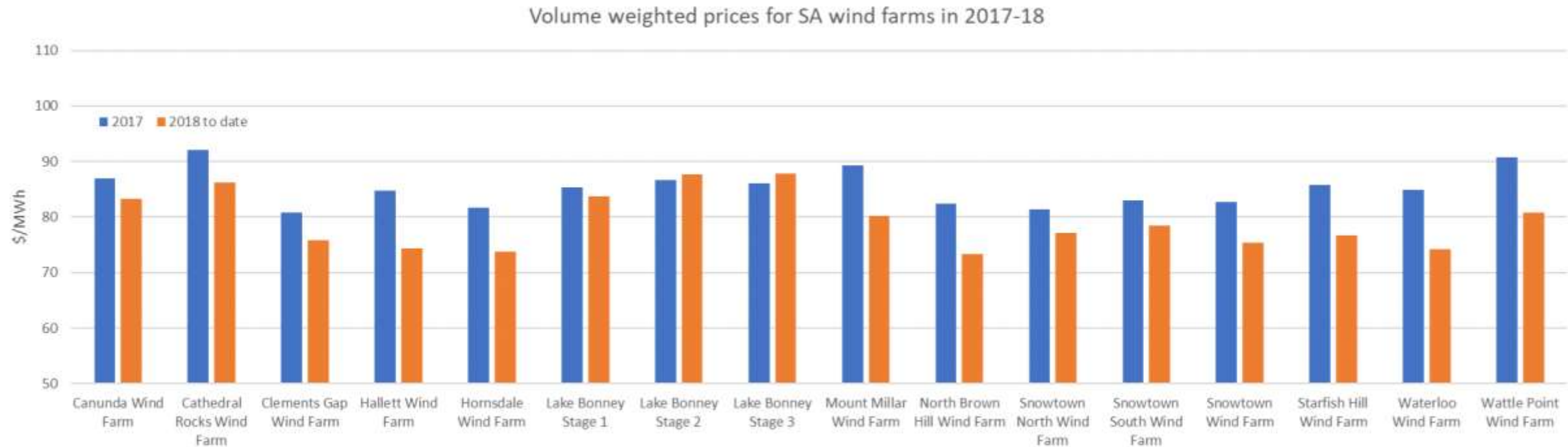
Renewable energy project pipeline progress



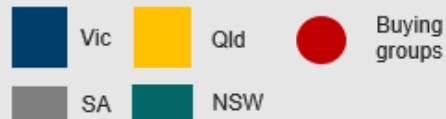
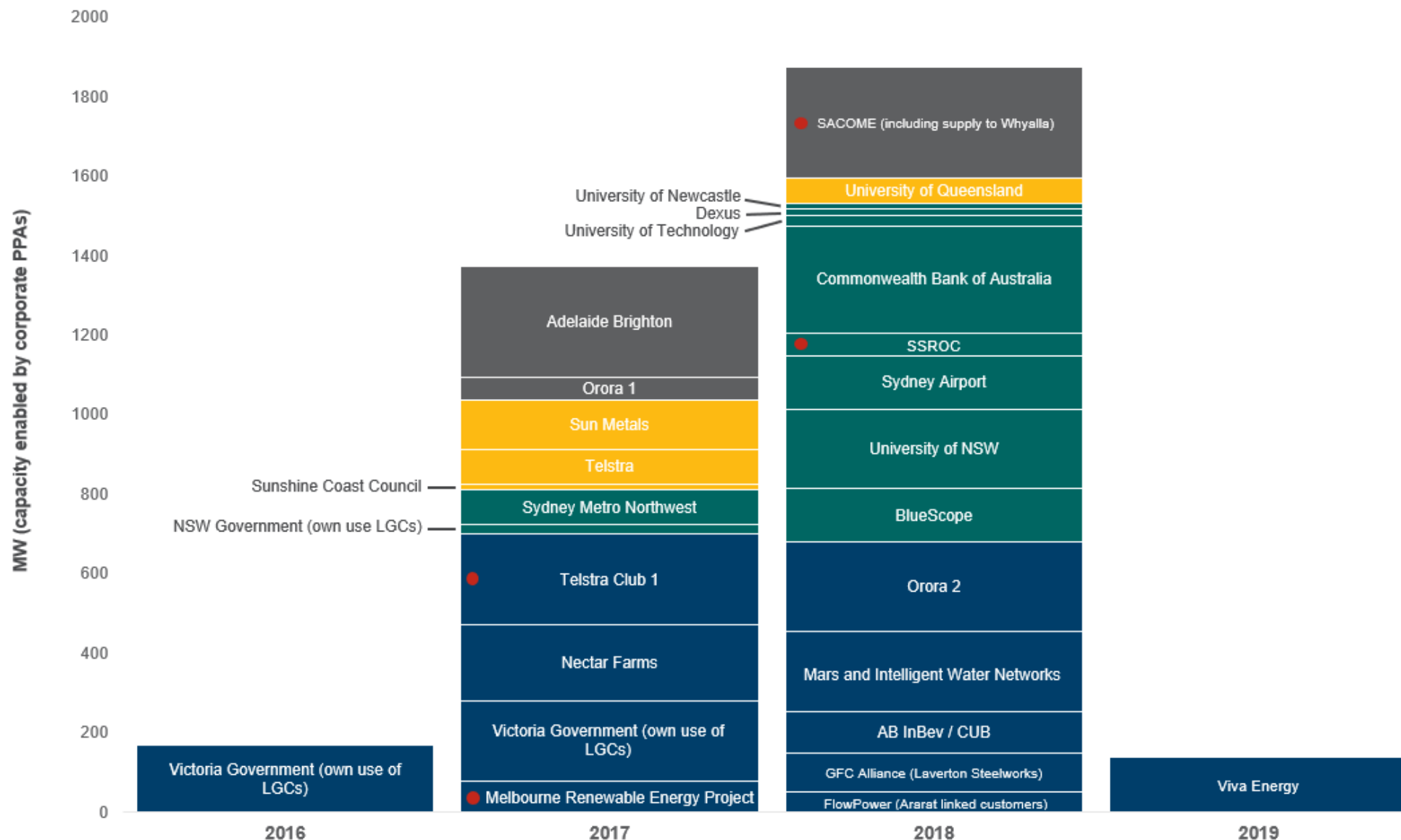
Progress towards 1



Auctions - Incentivising



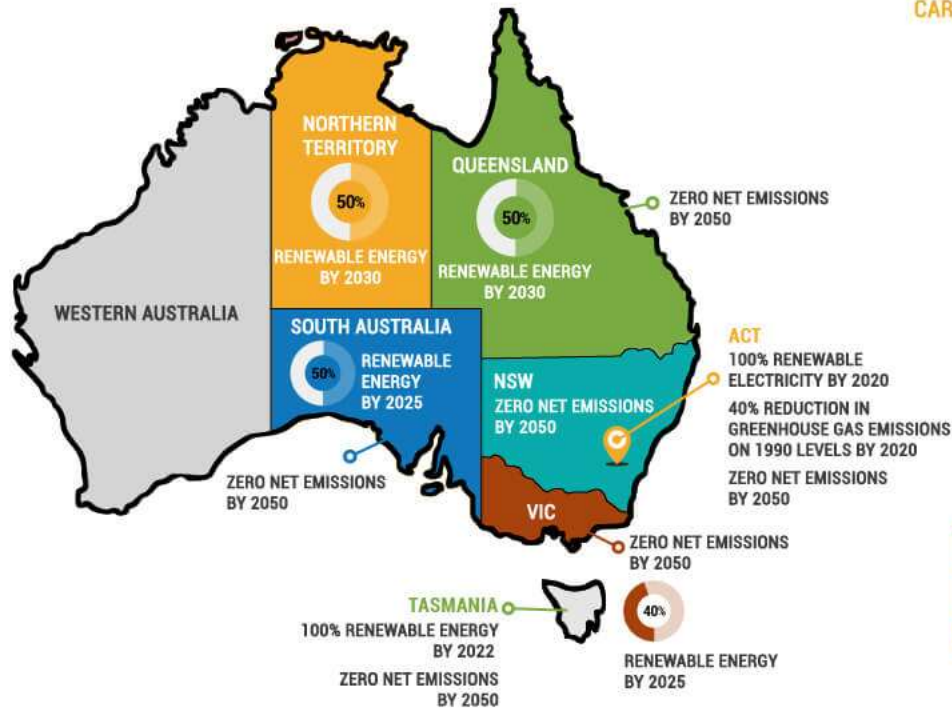
Corporate PPAs



The MW capacity reflects the size of the project, not the capacity of the PPA offtake. The revenue strategies of projects participating in the corporate PPA market include a mix of wholesale, policy-based and corporate PPAs; as well as other strategies.

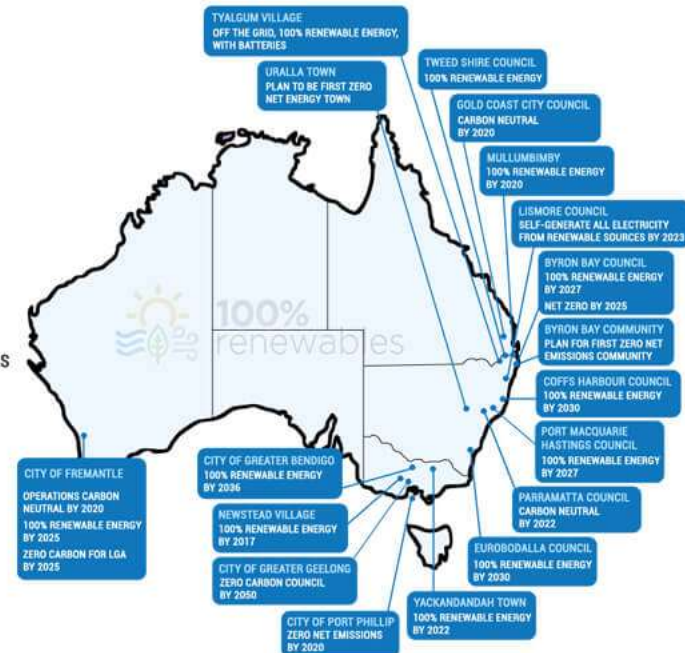
Listing based on year of contract announcement / signing





CARBON REDUCTION AND RENEWABLE ENERGY COMMITMENTS OF STATES AND TERRITORIES

CARBON REDUCTION AND RENEWABLE ENERGY COMMITMENTS OF CAPITAL CITIES



AMBITIOUS CARBON REDUCTION AND RENEWABLE ENERGY COMMITMENTS OF REGIONAL COUNCILS, TOWNS AND AREAS

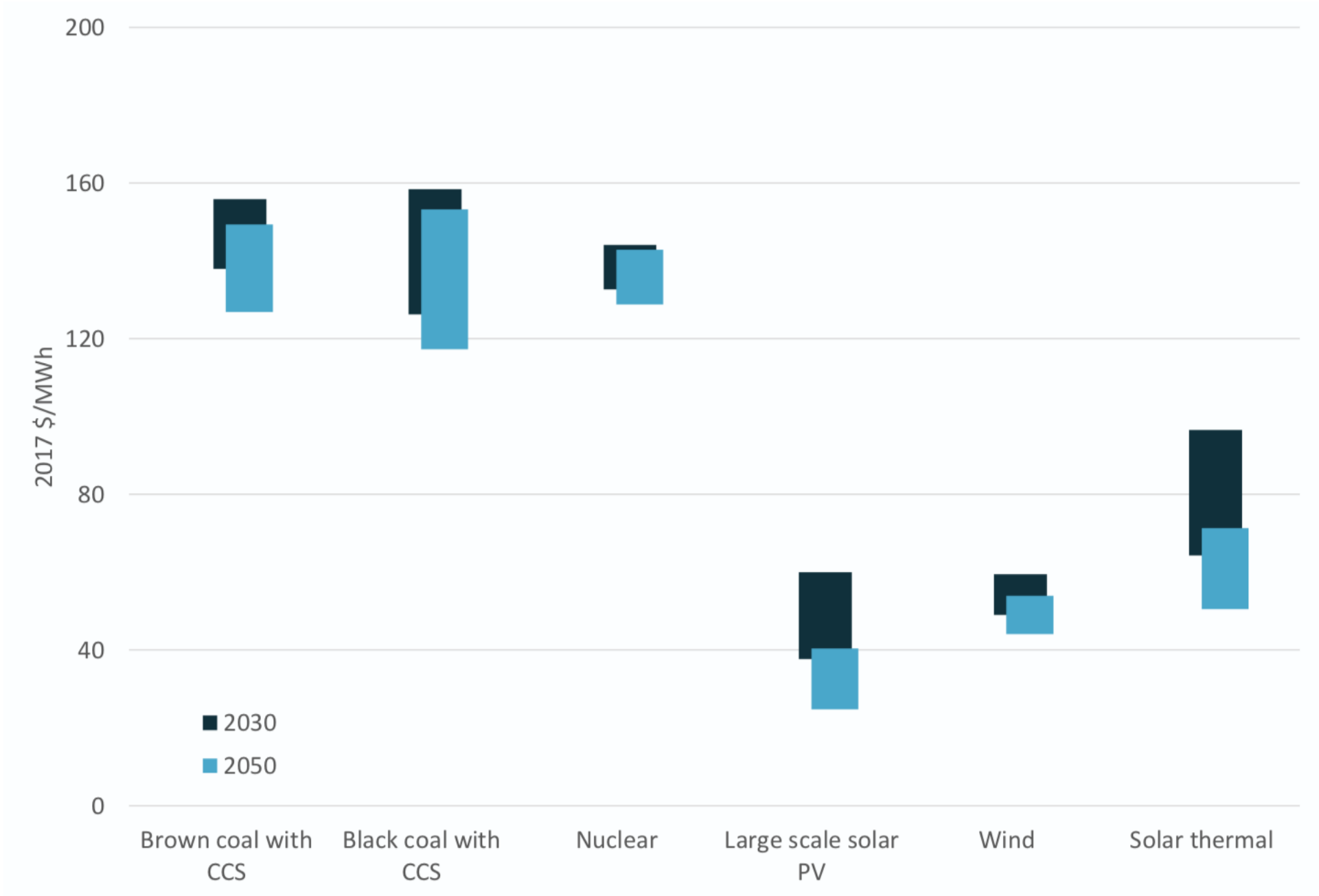
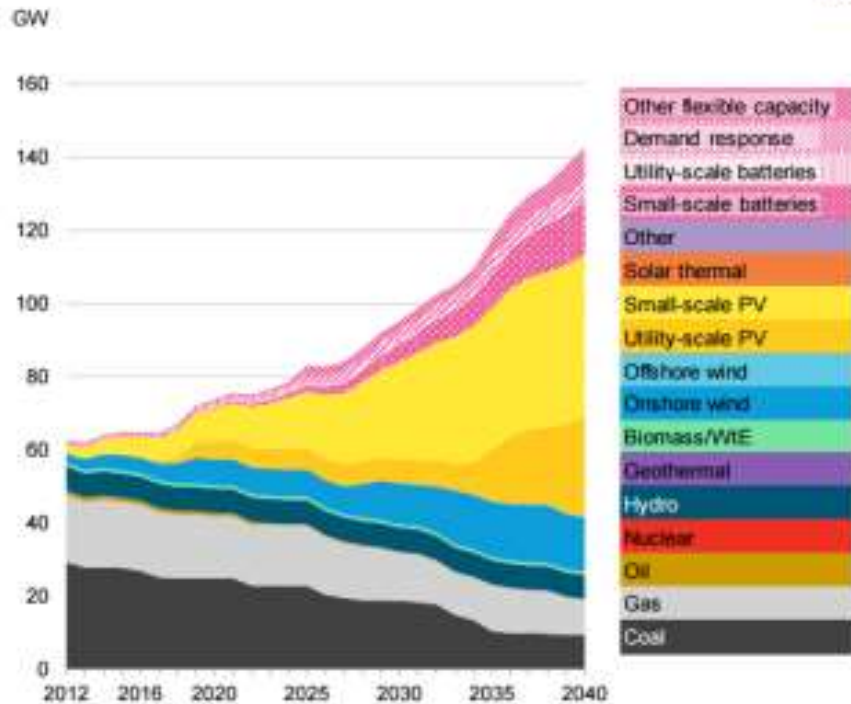


Figure 4-1: Conventional LCOE estimates for selected technologies

Australia – BNEF Forecasts

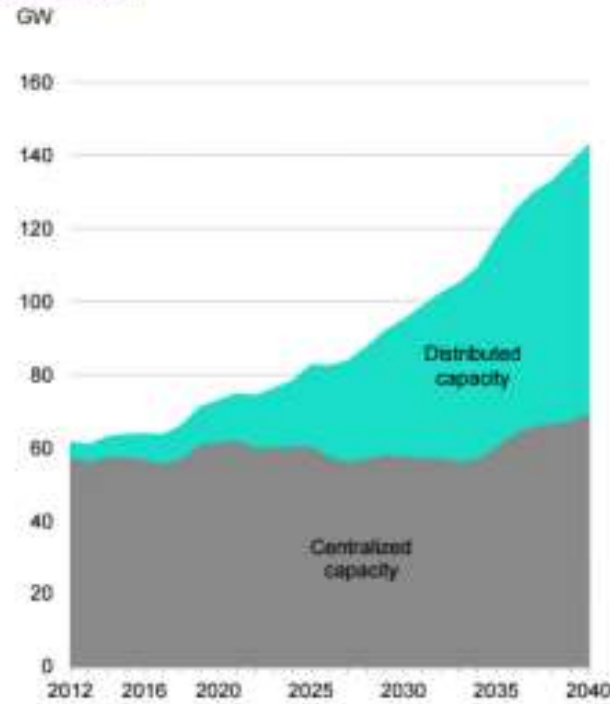
AUSTRALIA CAPACITY MIX

Cumulative installed capacity, by technology



Source: Bloomberg New Energy Finance

Distribution of capacity, centralized vs decentralized



Source: Bloomberg New Energy Finance

Figure 5 Projected change in generation resource mix (installed capacity) by NEM region over the 20-year plan horizon

