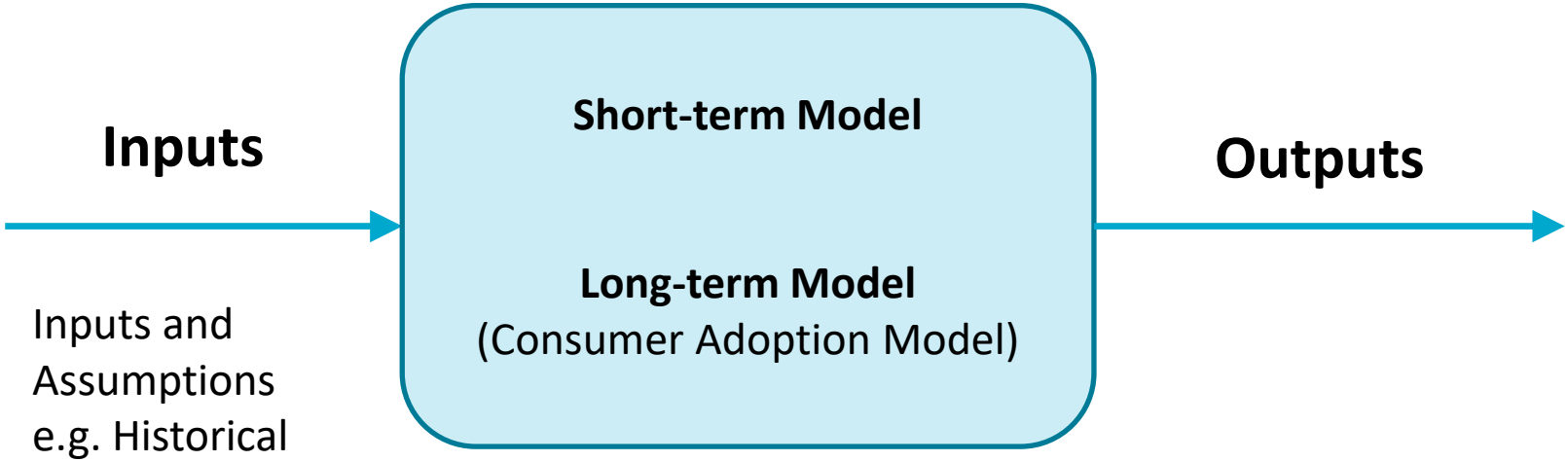
Australia's National Science Agency

Draft method and assumptions

Small-scale solar PV and battery projections

Paul Graham | 31 March 2021

Overview of CSIRO's solar/battery model



Inputs and Assumptions e.g. Historical installations, system sizes, degradation, scenario settings.

- New and replacement sales
- Capacity by segment
- Battery operation profiles

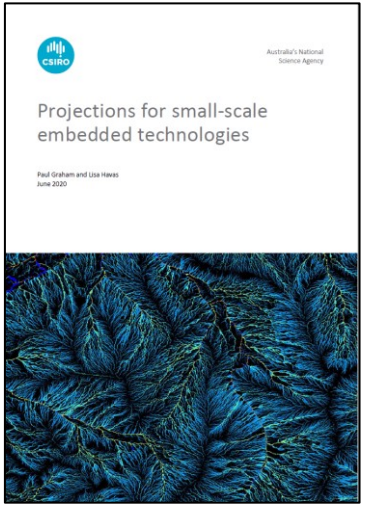
Projections methods

Short term projections

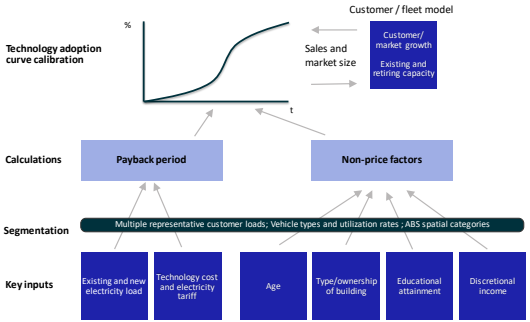
- Period: monthly to two years
- Method: Regression analysis (trend)

Long term projections

- Period: 2 to 30 years
- Method: Consumer technology adoption model



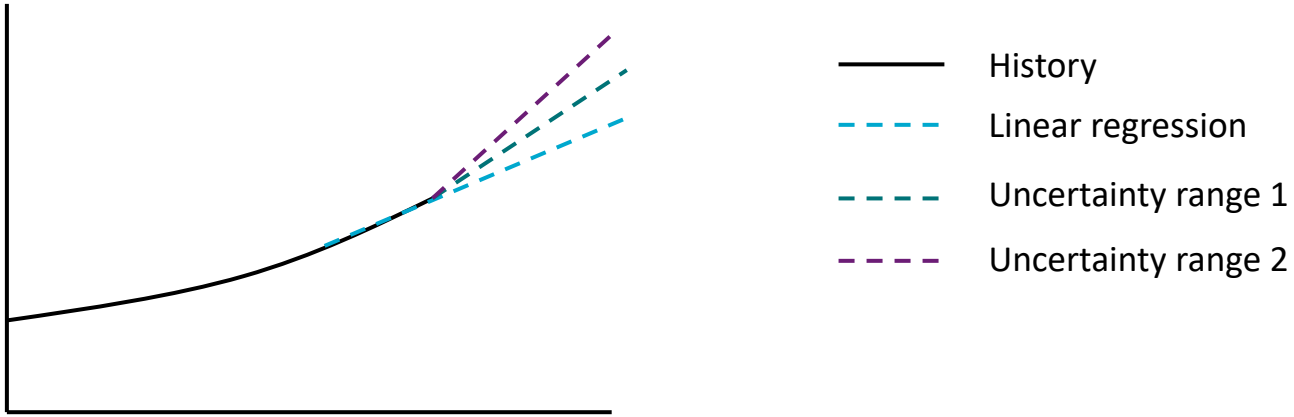
Microsoft Word - CSIRO draft report_02-06-2020.docx (aemo.com.au)



Key methodological changes

Short term forecasting has needed most attention

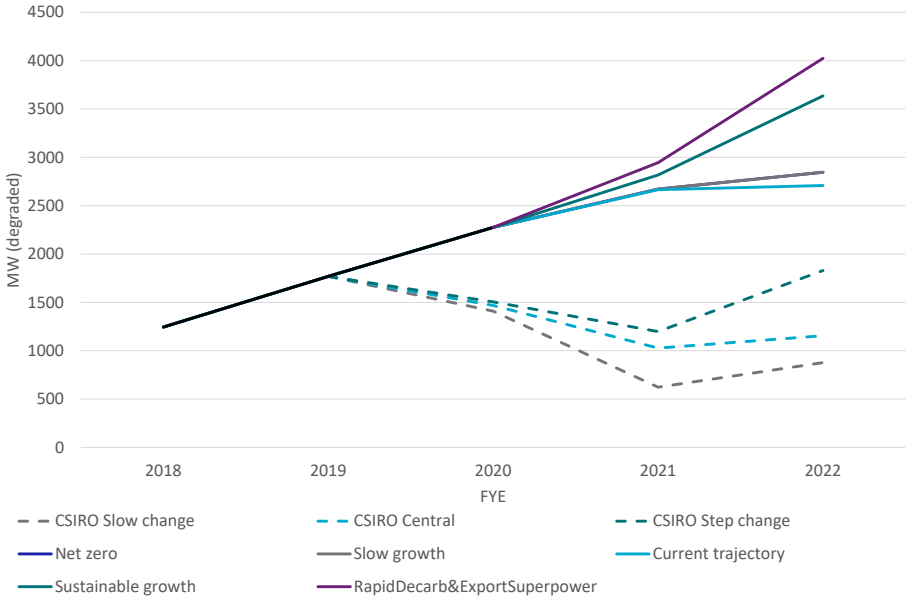
- COVID impacts removed
- Shorter regression period (last two years only) to more closely follow recent rends
- Most recent months of CER data discarded
- Use of an uncertainty range to capture non-linearities



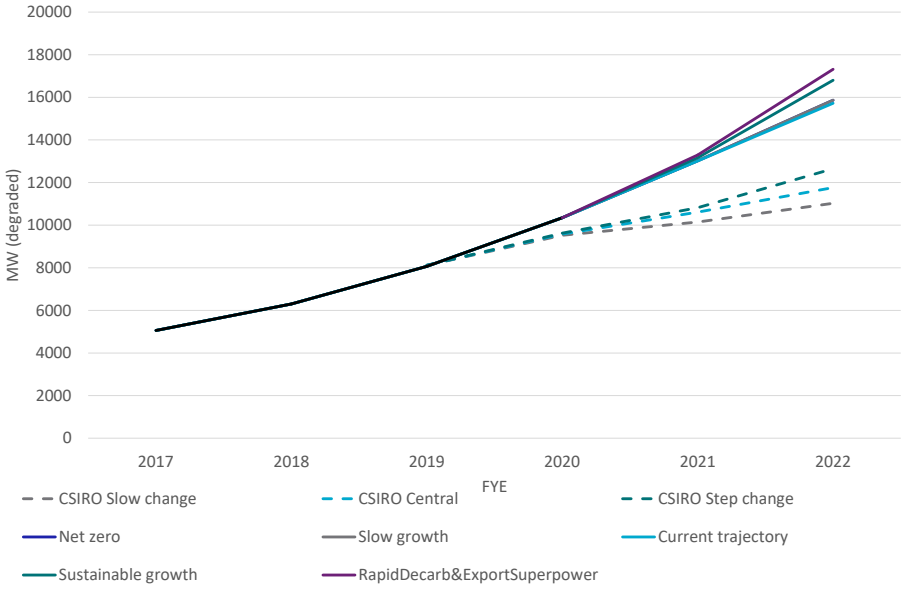
Impact of methodological changes on projections

Residential PV: Significant short term upward revision

Annual capacity additions



Annual capacity



Input data and draft assumptions

Input data

Key sources:

- CER data on PV installations and capacity
  - Also determines trends in system sizes

- Batteries sources are mixed
  - Sunwiz Battery report assumed to be correct on installations and system sizes
  - DER register is used for postcode locations and filling in some gaps on commercial system sizes

- AEMO provides connections, population and economic growth

Key assumptions of the modelling

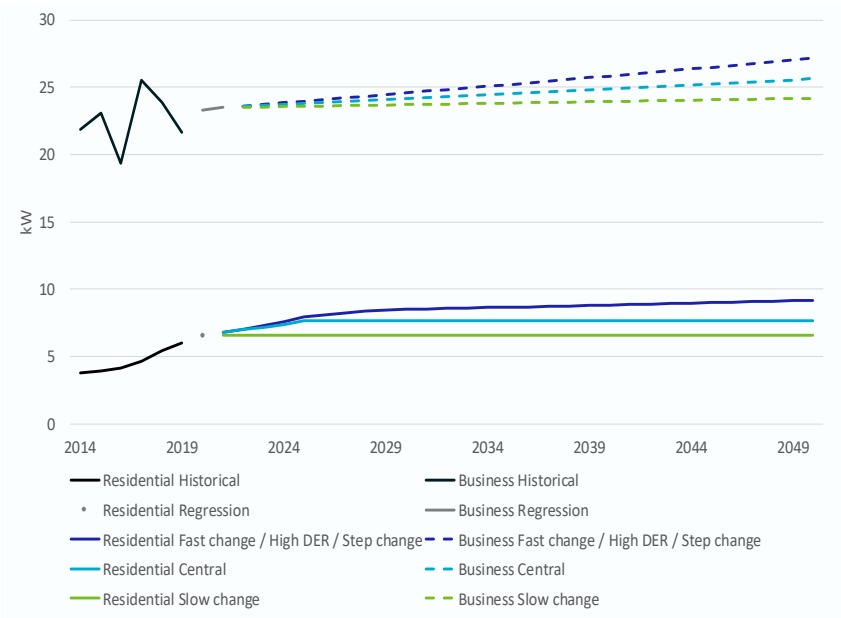
- Maximum market share
  - Roof space / separate dwellings / home ownership
  - Broad national assumption but allow for significant variation by SA2 region
- Battery operation assumptions
- System size trends and non-scheduled generation build rates
- Costs and subsidies (policy)

Market share and battery operation

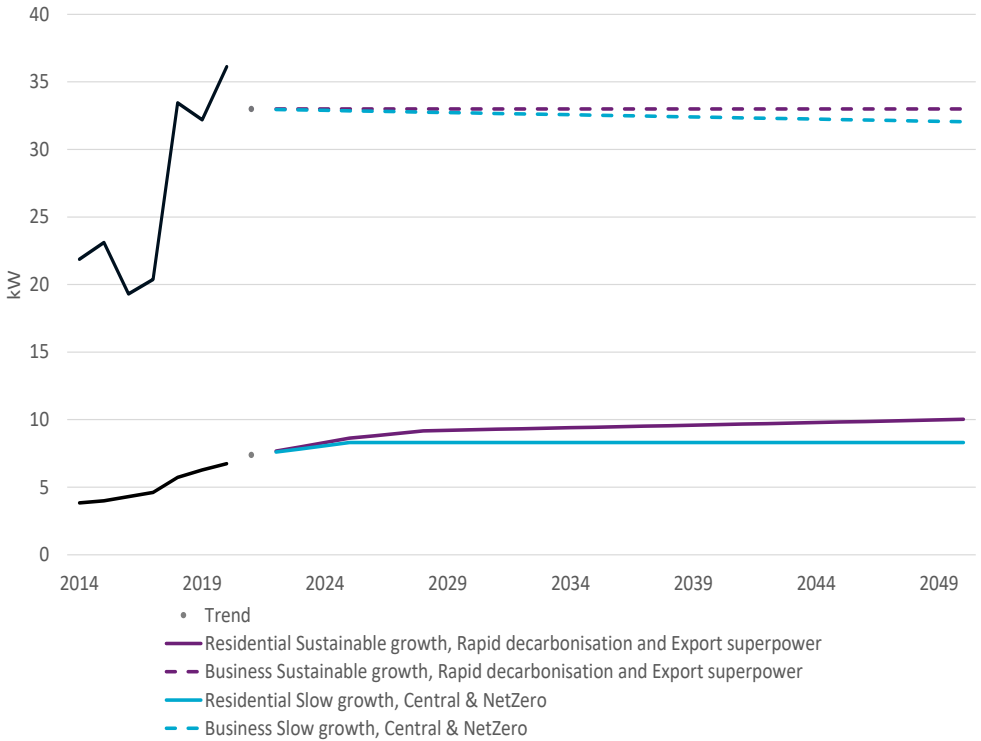
	Maximum market share(+/-25%)		Battery operation (by 2050)					
	Residential	Business	Residential			Business		
ESOO 2021			Solar shift	TOU	VPP	Solar shift	TOU	VPP
Current trends	42%	17%	68%	2%	30%	12%	48%	40%
Slow growth	42%	17%	84%	1%	15%	16%	64%	20%
Net zero	45%	20%	44%	4%	53%	6%	24%	70%
Sustainable growth	50%	24%	36%	4%	60%	4%	16%	80%
Export superpower	61%	34%	32%	4%	64%	3%	12%	85%
Rapid decarbonisation	61%	34%	32%	4%	64%	3%	12%	85%
ESOO 2020								
Central	42%	17%	68%	2%	30%	12%	48%	40%
Slow change	34%	11%	84%	1%	15%	16%	64%	20%
Step change	61%	34%	36%	4%	60%	4%	16%	80%

Change in system size trends

2020 assumption

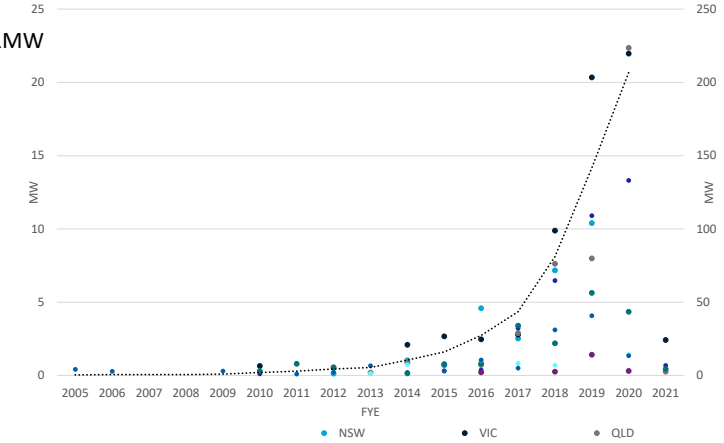


2021 assumption

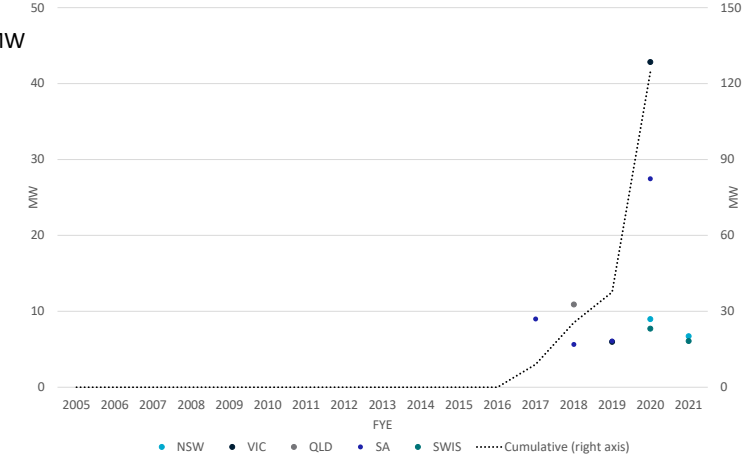


Non-scheduled generation is accelerating

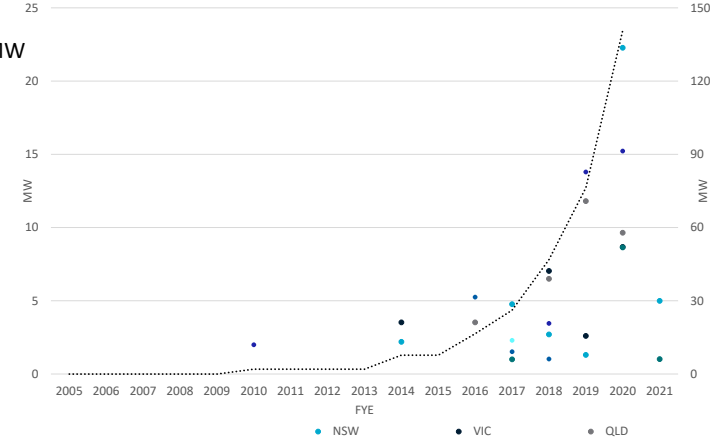
100kW to 1MW



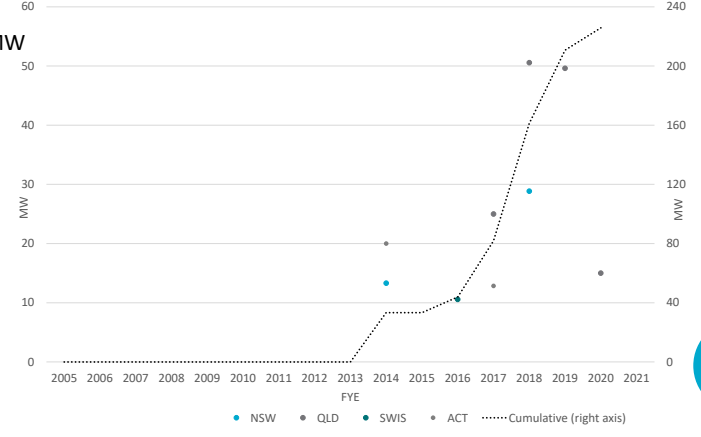
5MW to 10MW



1MW to 5MW



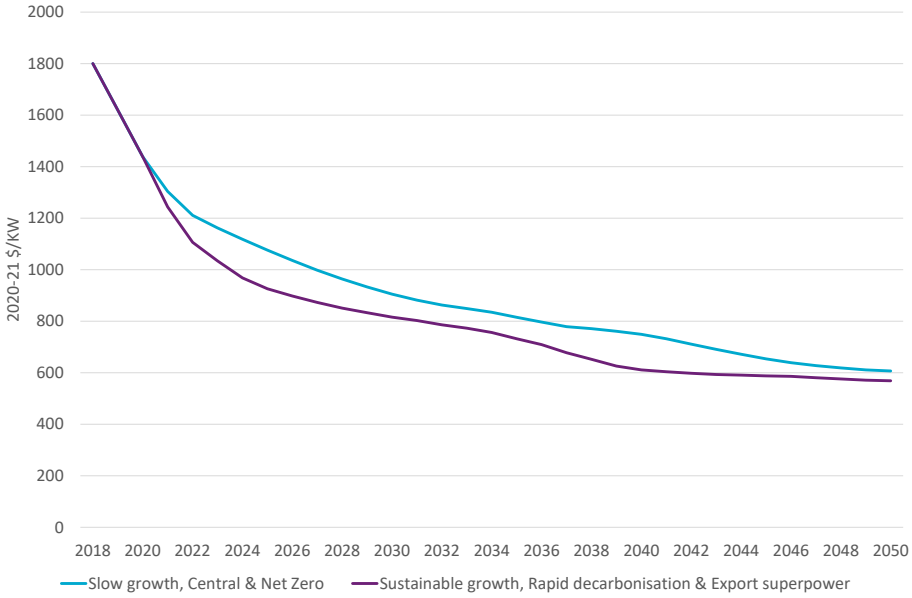
10MW to 30MW



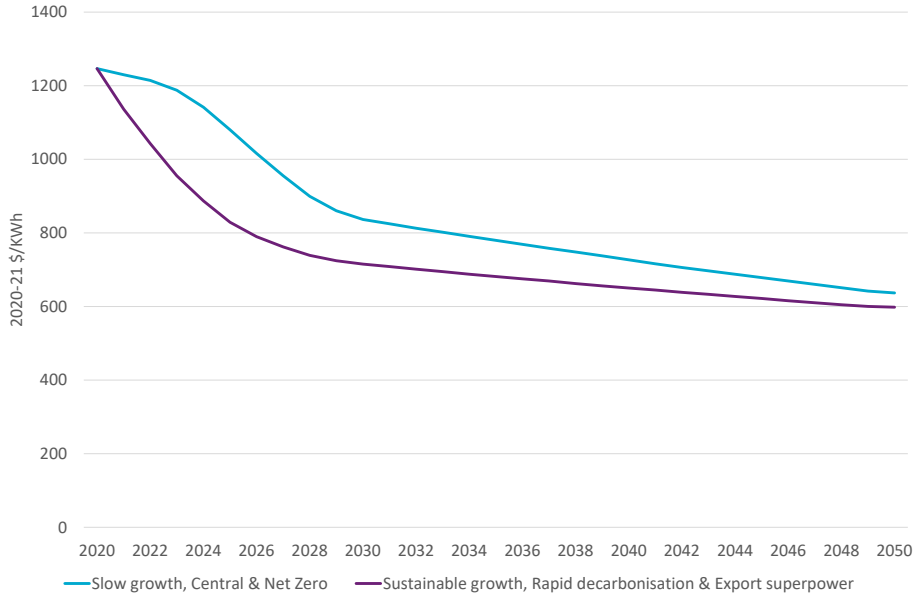
CSIRO

Costs

Rooftop solar before subsidies



Batteries

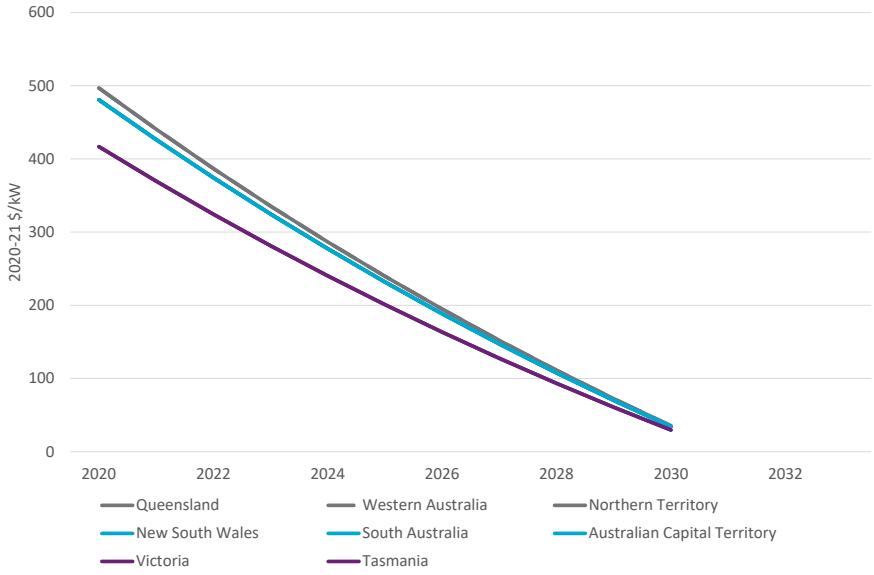


Source: GenCost 2020-21 consultation draft

Policies

	Policy	Approach to including across all scenarios
NSW	Interest-free loans of up to $9,000 for a rooftop solar and up to $14,000 for solar plus storage through a 10-year Empowering Homes program that will target up to 300,000 households. Eligible households must be owner-occupiers and have an annual household income of up to $180,000	Not included. Assumed that low interest loan funds non-additional activity since the benefit of avoided interest is not large enough to be the original motivation
NSW	3000 3kW solar systems to low income groups already receiving the Low Income Household Rebate	Not included. Assumed non-additional design is targeted at customers already receiving bill relief.
NSW	The proposed Peak Demand Reduction Scheme may offer additional revenue for batteries once installed	Not included due to lack of detail on scheme at present but partially covered under more general virtual power plant tariff considerations
VIC	Renewable energy target of 50% by 2030	Not included. These subsidies are not targeted at small scale solar PV.
VIC	650,000 home solar systems over ten years. Policies include a subsidy of half the cost of solar (up to a value of $1,888) to 140,000 systems in next two years including means-tested interest free loans. Another feature is a landlord-tenant agreement whereby renters can also access the scheme.	Minimum addition of 70,000 residential solar systems per year the next two years with balance of 650,000 evenly distributed to 2028-29
VIC	The Solar Homes policy includes battery subsidies for up to 17,500 homes (Victorian premier, 2018). Rebates of up to $4,838 are available.	Minimum addition of 5,000 residential battery systems the next three years, not falling below that rate thereafter.
QLD	Renewable energy target of 50% by 2030	Not included. These subsidies are not targeted at small scale solar PV.
SA	Subsidies are to be provided to 40,000 homes to install batteries. The subsidy will be scaled with the size of the battery and capped at $3000.	Minimum addition of 20,000 residential batteries over the next three years
ACT	The ACT government is making available an $825/kW subsidy targeting deployment of 36MW of battery storage under it Next Generation Energy Storage scheme.	Minimum addition of 5000 batteries by 2023
All	State feed-in tariffs	Varied over time to converge towards generation price which is varied by scenario and outlined in Section 4.3.1

Small-scale technology certificate subsidy

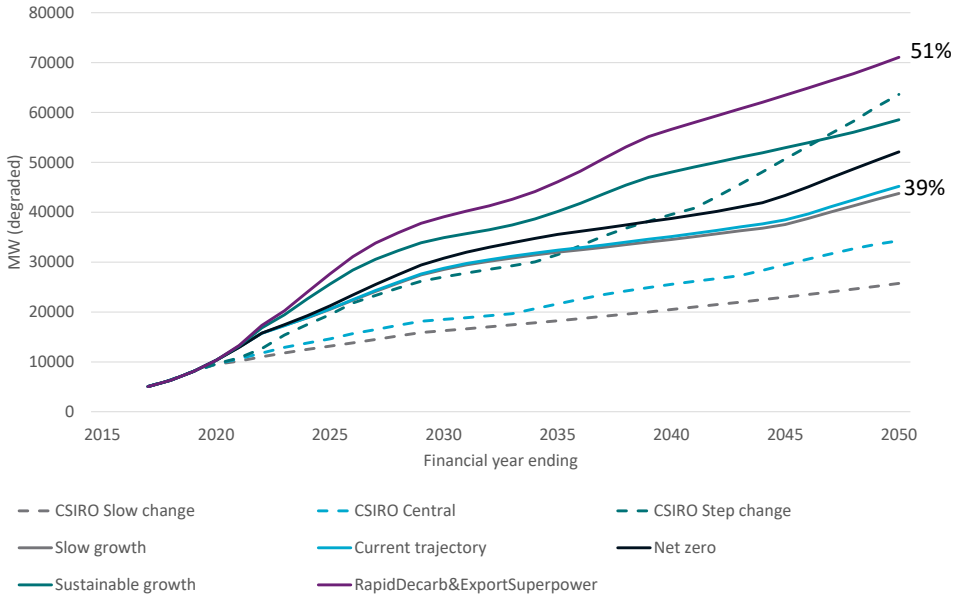


Preliminary results

Solar PV capacity: preliminary projections

Market share%

NEM

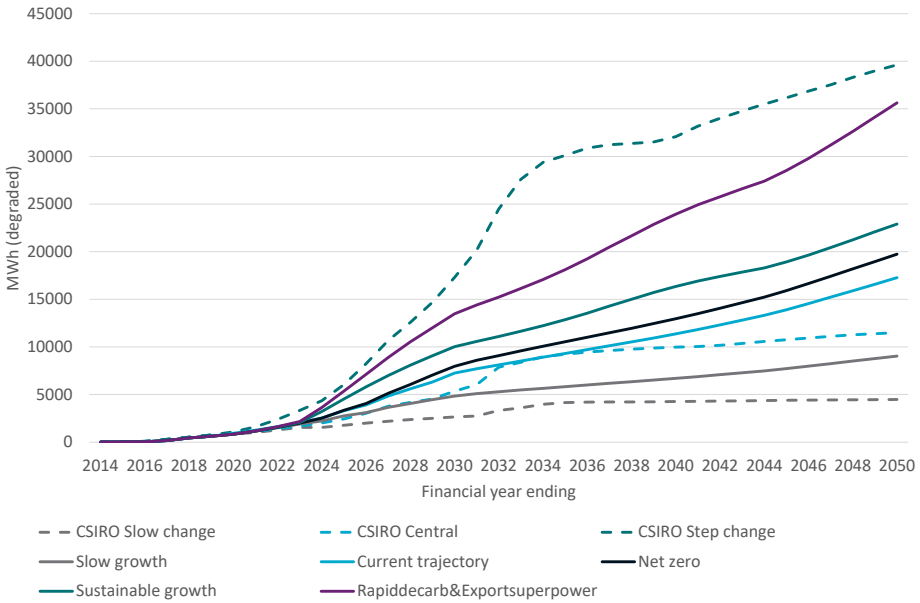


Market share%

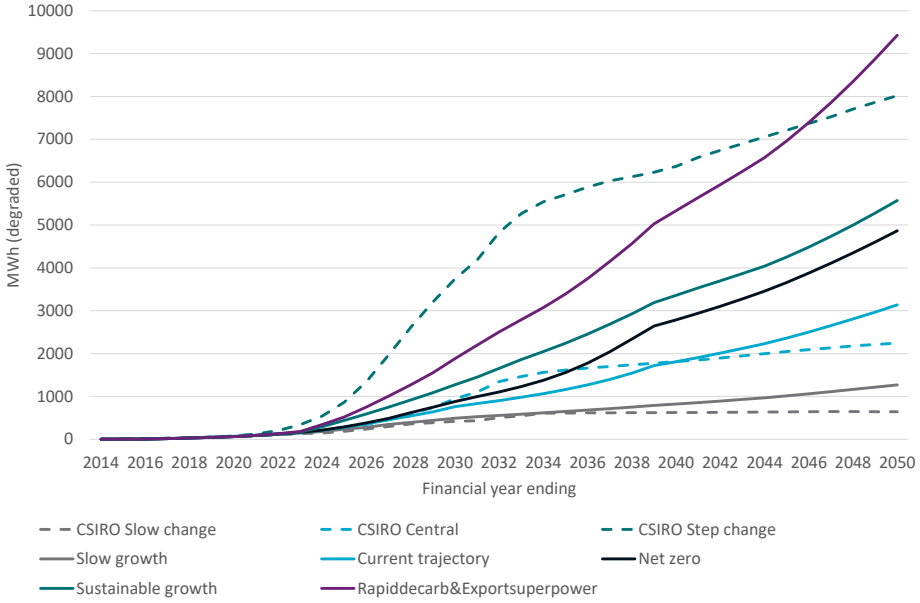
SWIS

Battery capacity: preliminary projections

NEM

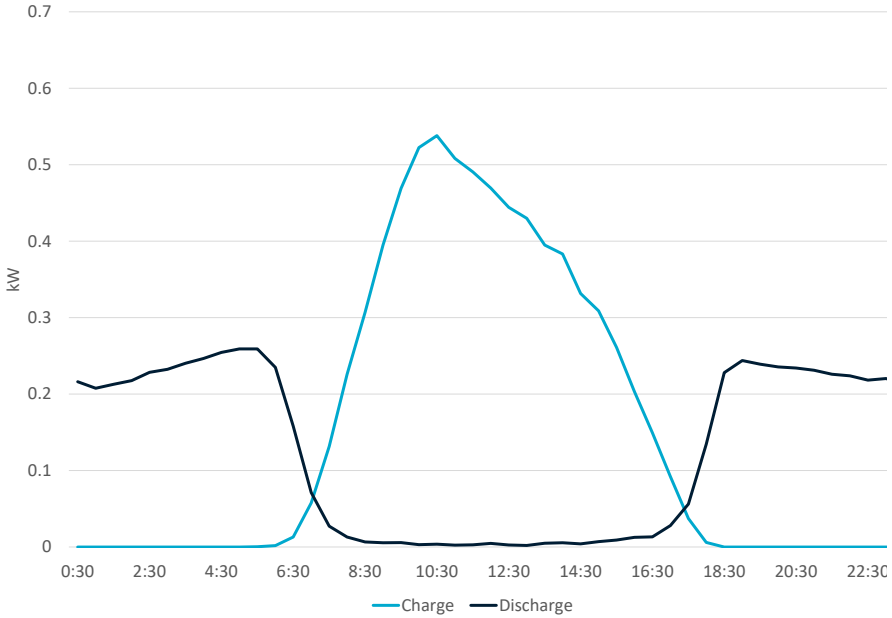


SWIS

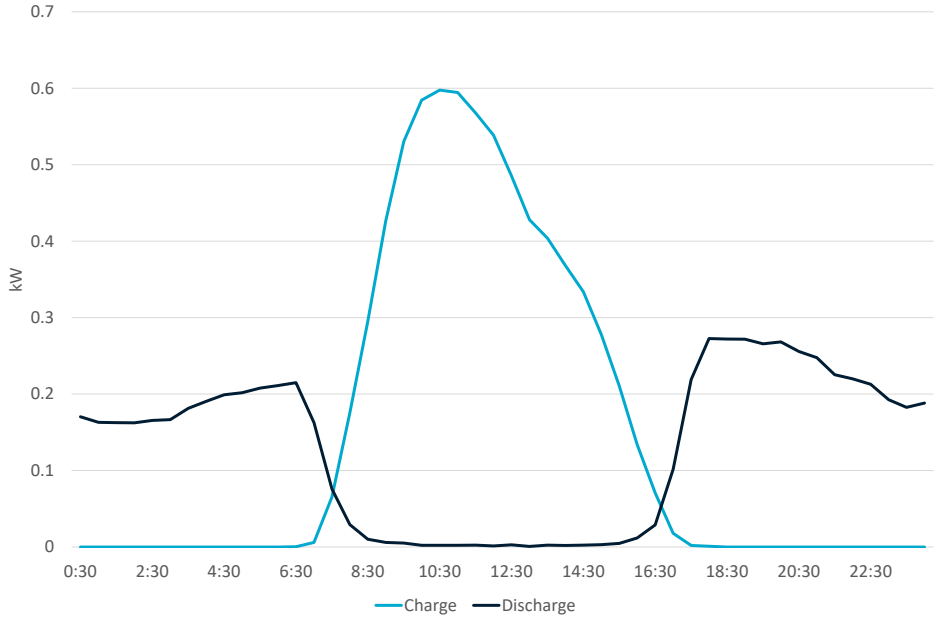


Residential shift solar profile

Summer average

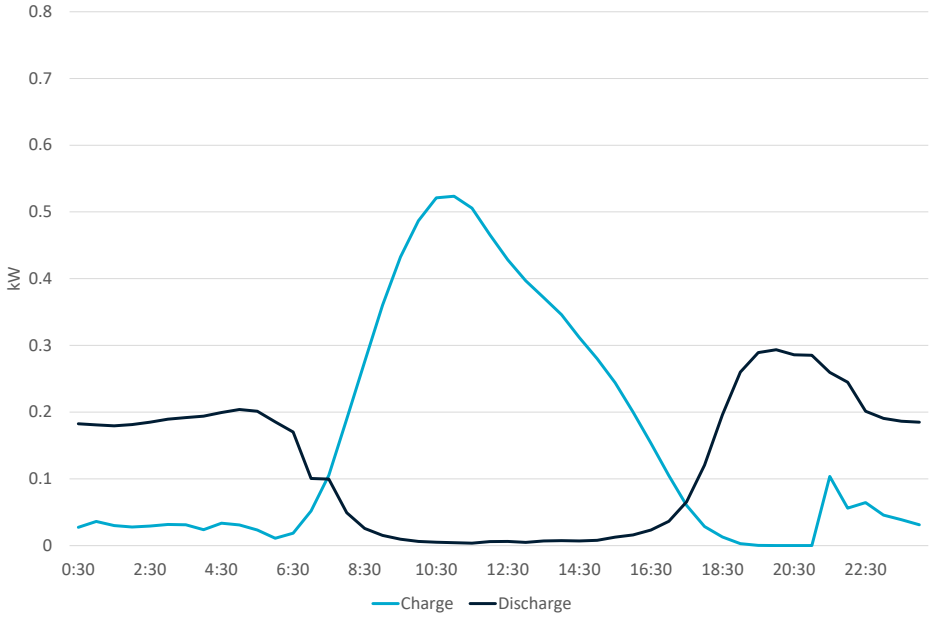


Winter average

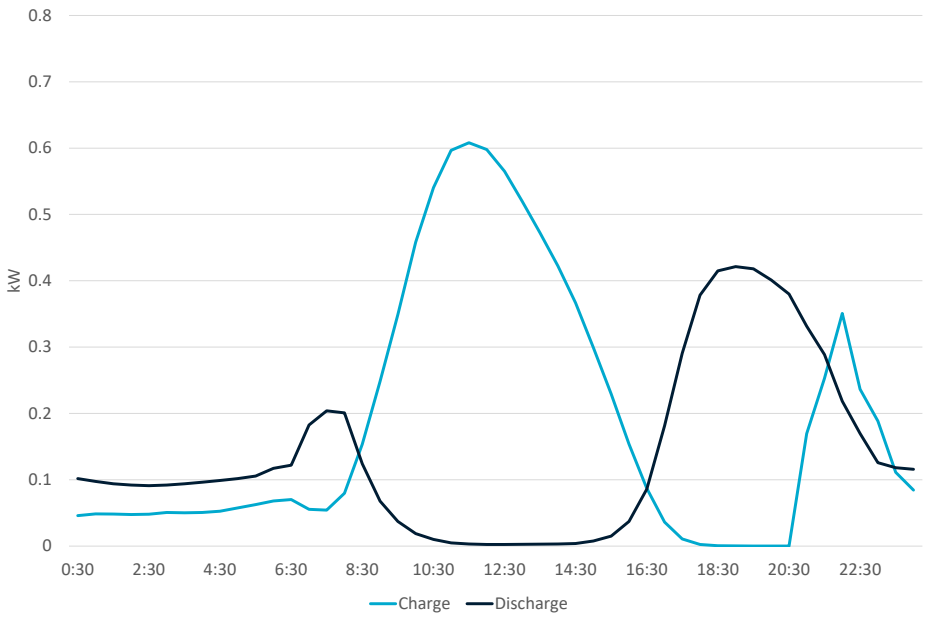


Residential TOU profile

Summer average



Winter average



Thank you

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