AUSTRALIAN ENERGY COUNCIL

SOLAR REPORT

QUARTER 2, 2020

Australian Energy Council

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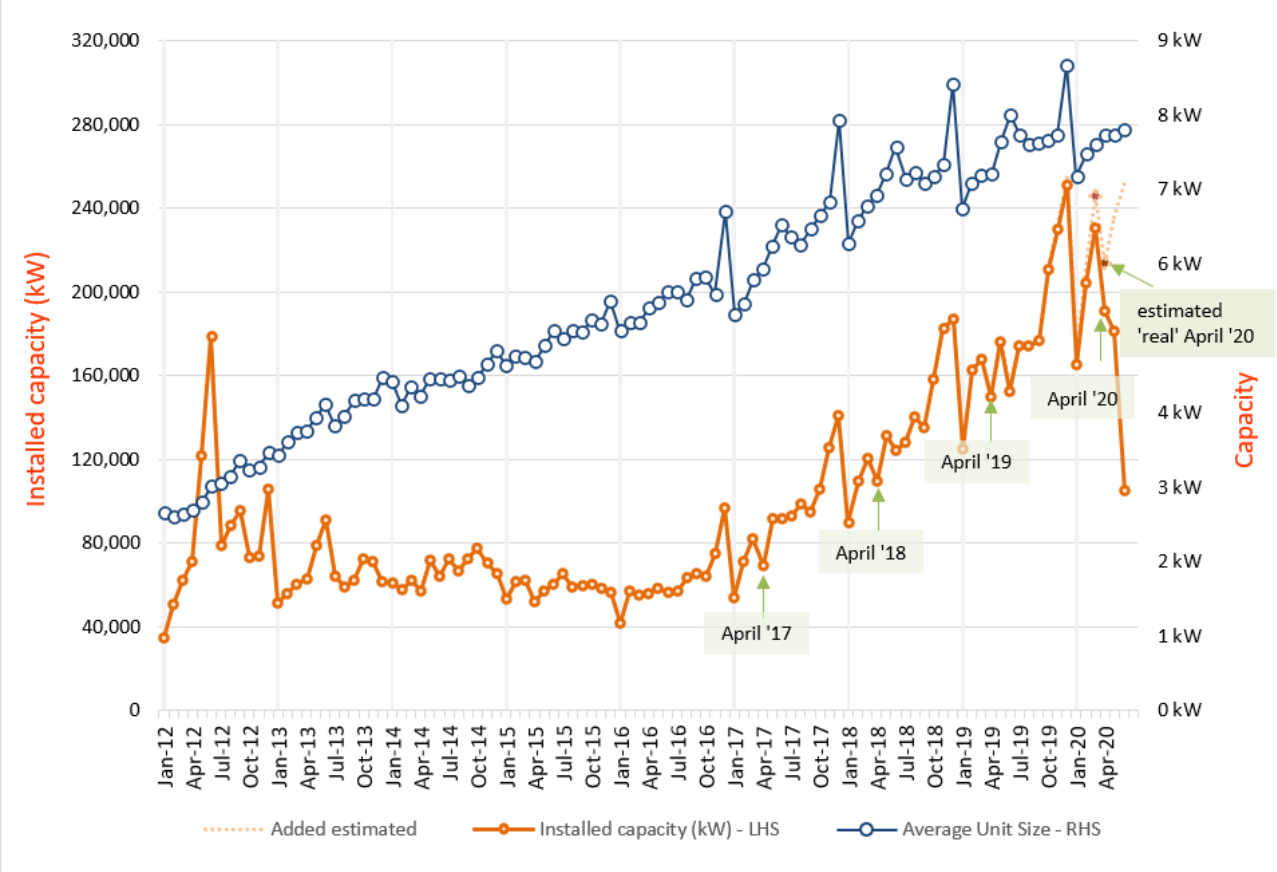
SECTION I: STATE OF SOLAR PV IN AUSTRALIA

The second quarter of 2020 shows that Australia's rooftop solar PV industry is maintaining healthy growth, as the nation progresses in flattening the curve of COVID-19 cases along with an easing of restrictions across different states.

According to the Clean Energy Regulator's (CER) latest Small-Scale Renewable Energy Scheme data, more than 2.46 million solar PV systems have been installed on households, community centres, schools and small businesses. This has resulted in more than 86,000 new installations compared to the first quarter of 2020 (56,000 installations) to reach a cumulative installed capacity of 11.4 gigawatts (GW).

Figure 1 below shows the historical trends in monthly installed capacity and installations of rooftop PV since 2012. This year has had a strong start with an upsurge in new rooftop installations; March almost reached December 2019's record (the highest recorded monthly installations and installed capacity to date).

Figure 1: Monthly installed solar PV capacity and average system size January 2012 – June 2020



Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 30 June 2020

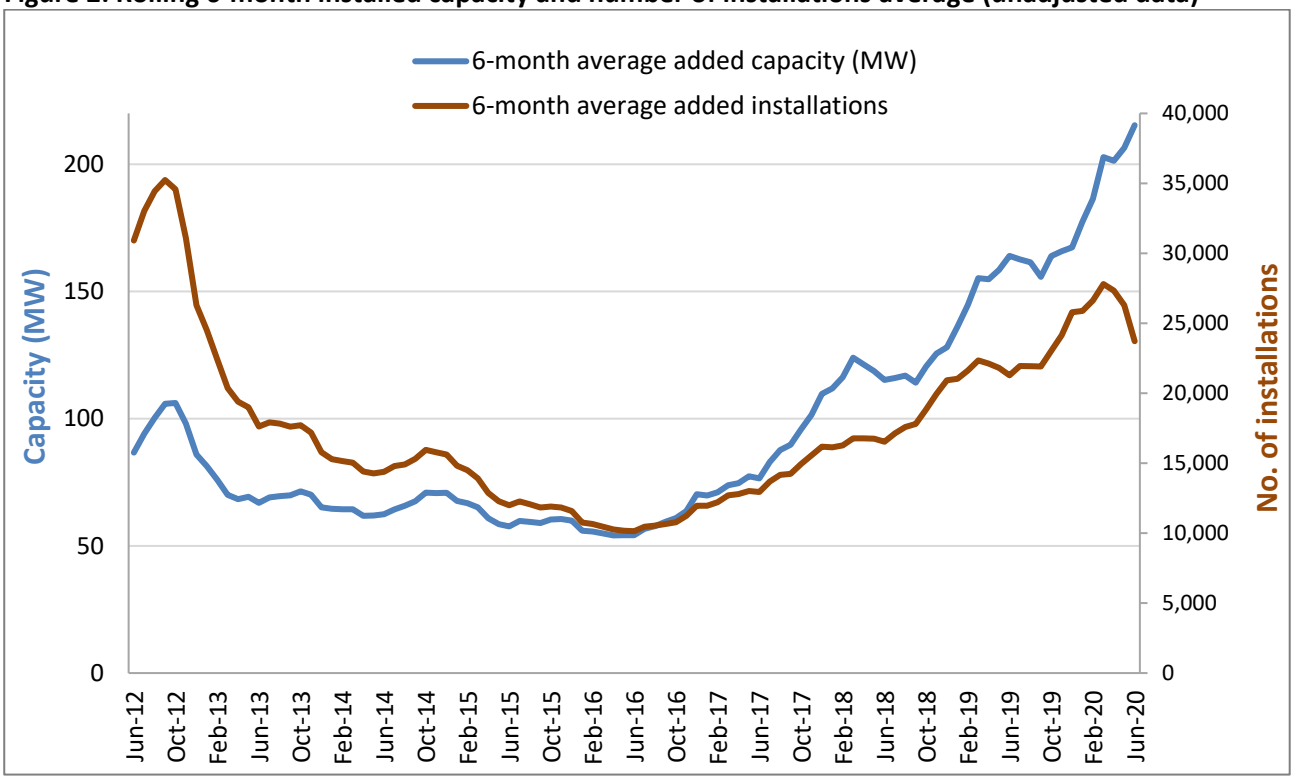
April 2020 has an estimated decrease in the number of new installations and installed capacity (14 per cent and 12.8 per cent, respectively) compared to March 2020, but this dip follows a historical trend for the month of April.

Australia's COVID-19 lockdown, which came into effect around the end of March 2020, would assume a slow-down in new installations, yet Figure 1 does not show any clear evidence of the impact of COVID-19 on solar

PV uptake. However the impacts of the virus on the rooftop PV industry will remain an ongoing point of interest as a second wave of COVID-19 and further lockdowns continue in Victoria.

Figure 2 below, again highlights the continued strong growth in Australian rooftop solar installations. The rolling average for installed capacity (blue line) continues to move upward with an average rate of 221 MW as of June 2020.

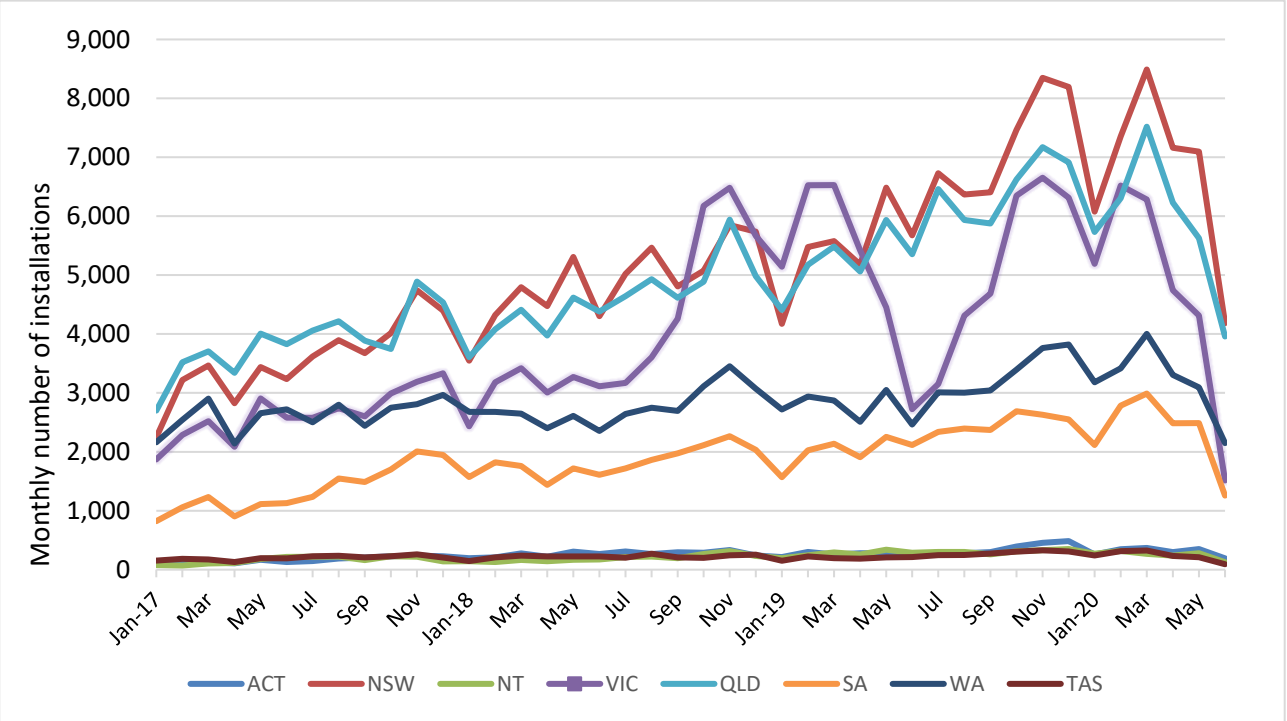
Figure 2: Rolling 6-month installed capacity and number of installations average (unadjusted data)



Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 30 June 2020

March 2020 recorded the highest uptake of new rooftop PV installations across all states, except for Victoria. Figure 3 shows that New South Wales (red line) recorded a new peak with more than 8,500 of new installations, followed by Queensland with more than 7,500 installations. In the first six months of 2020, the National Electricity Market (NEM) states accounted for 86 per cent of total monthly rooftop installations in Australia.

Figure 3: Monthly rooftop PV installations by states (unadjusted data)



Note: The most recent three months in figure 3 underestimates the data because of a time lag in collation of the data.[1] Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 30 June 2020

On 27 July 2020, the Victorian Government announced an expansion to the state's Solar Homes Program to renters and landlords. Landlords can now apply for an interest-free loan on top of the existing rebate of up to $1,850, it's estimated that rooftop solar PV will enable a saving of more than $120 every two months[i]. This announcement is expected to encourage more solar installations for Victorian renters, not just homeowners, especially as more consumers shift their energy use to during the day due to working and studying from home.

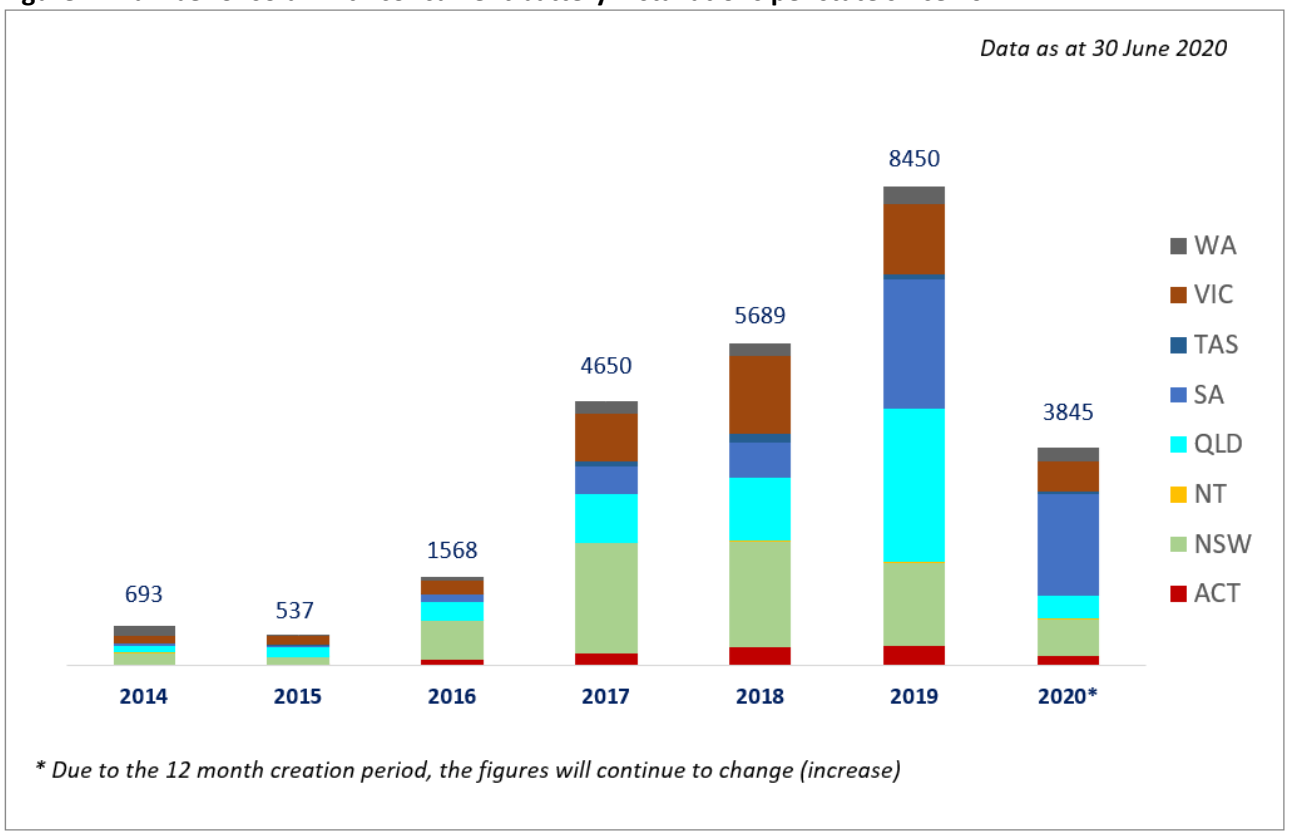
Battery installations with rooftop solar

When comparing the uptake of battery installations with rooftop solar by state (Figure 4), South Australia overtook Queensland to rank highest in the first half of 2020.

South Australia accounts for 46.6 per cent of total installations, with Adelaide's total battery installations with rooftop solar roughly equivalent to the total of installations across four states – New South Wales (16.8 per cent), Victoria (13.8 per cent), Queensland (10.5 per cent) and Western Australia (6.6 per cent).

[1] Solar PV system owners have up to 12 months to report their data to the Clean Energy Regulator, so the reported data

Figure 4: Number of solar with concurrent battery installations per state since 2014



Source: Clean Energy Regulator data, Australian Energy Council analysis, data as of 30 June 2020

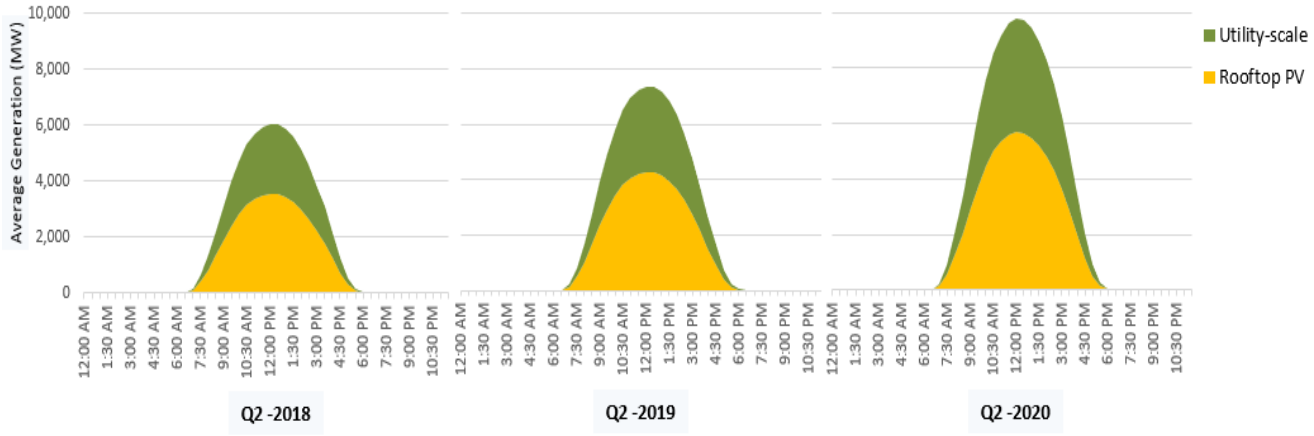
From the last Solar Report, there have been no updates on state government schemes or rebates on battery storage installation with solar systems. Schemes and rebates remain as:

- New South Wales: The Empowering Homes Program which will support installation for up to 300,000 households across the state with zero interest loans to purchase solar and battery systems[ii]. At the end of February 2020, this program was extended to allow residents in the Hunter region.
- Victoria: The Solar Homes Program has expanded to 250 postcodes (an addition of 143 postcodes) with offers up to 1000 rebates of up to $4,838 for a solar-battery system in 2019-20[iii]. The new postcodes now include regional Victoria.
- South Australia: The state's Home Battery Scheme has decreased its grant of up to $6,000 to $4,000 for a home solar battery, starting 15 April 2020 [iv]. This subsidy cap is expected to reduce over time due to increasing competition in the market along with the continued cost reductions of home battery systems.
- Queensland: The Queensland Government's scheme, introduced in November 2018, allows residents to apply for interest-free loans of up to $10,000 and grants of $3000 to purchase batteries or combined solar-battery systemsv. Approved applicants have six months to install an eligible system.

SECTION II: STATE OF UTILITY-SCALE SOLAR IN AUSTRALIA

In late July it was reported that Western Australia's largest solar plant, Merredin solar farm, started exporting generation to the grid[vi]. Over the previous three corresponding quarters, the NEM states saw a strong take up of PV energy resources (Figure 5). Q2-2020 saw a peak of near 10,000 MW of utility scale and rooftop generation during the 30-minute interval in the middle of the day; a profound acceleration in generation came from rooftop PV, accounting for 5,674 MW (58 per cent) of the total in Q2-2020, similar statistics to Q2-2019.

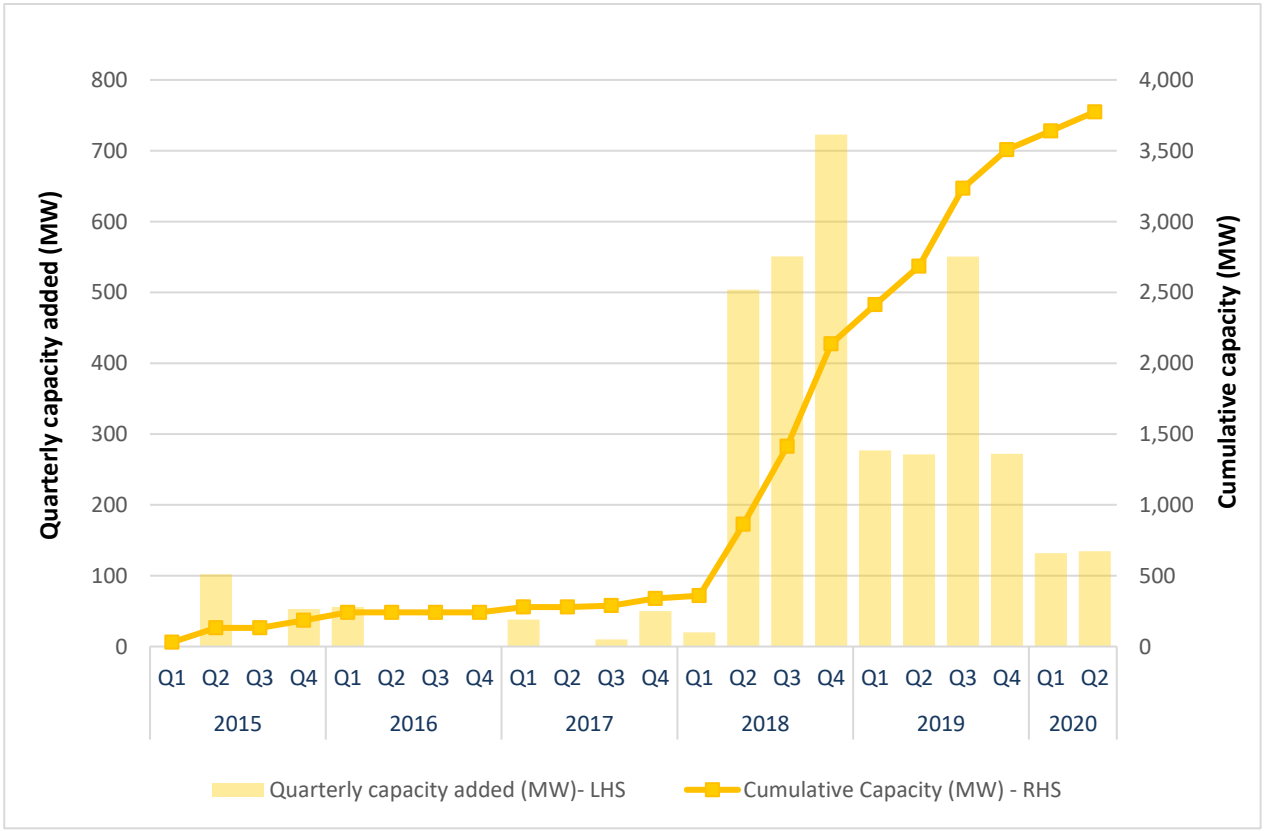
Figure 5: Average NEM half hourly large-scale solar and rooftop PV generation profile across Q2 2018, 2019, 2020



Source: Australian Energy Council Analysis

As of June 2020, Australia's large-scale solar energy capacity increased to a total of 3.8 GW across 54 projects. In the second quarter of 2020, an additional 134.5 MW of new utility-scale solar capacity started exporting to the grid from the Bomen Solar Farm (NSW, 100 MW) and Maryborough Solar Farm (QLD, 34.5 MW).

Figure 6: Australia utility-scale solar capacity commissioned by quarter

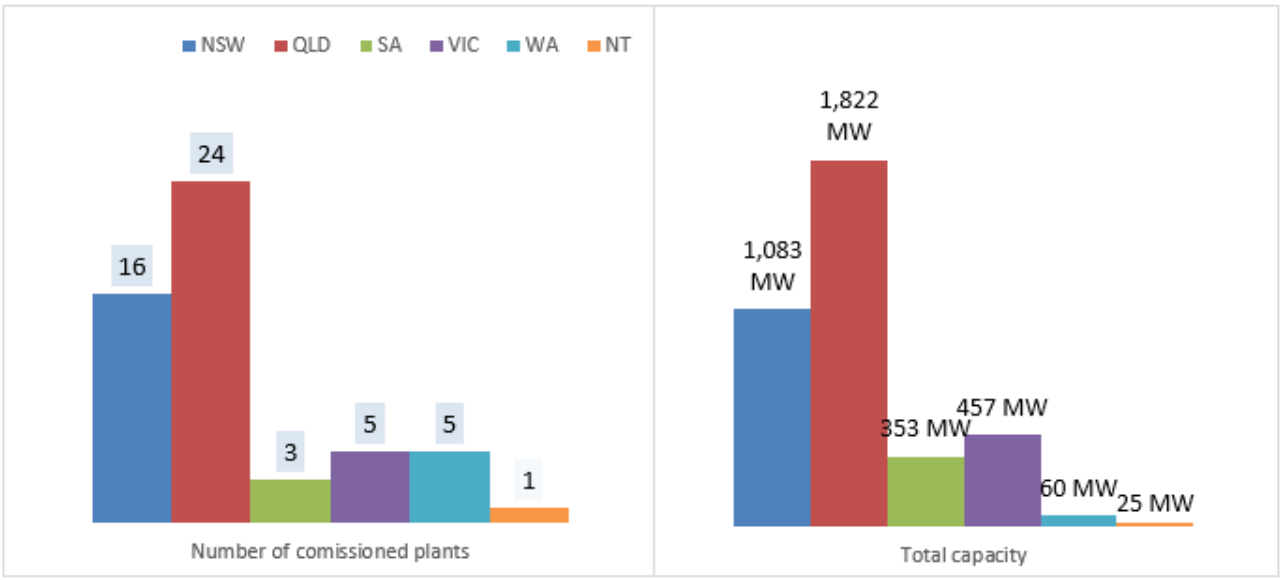


Source: Australian Energy Council's Analysis

Although Western Australia pioneered the installation of Australia's first solar plant (the 10MW Greenough River Solar Farm which is now upgrading to 40 MW), it is not surprising to see Queensland – a sunshine state - is leading with the highest number of committed large-scale solar plants with a total of 1,822 MW capacity added to the grid (Figure 7).

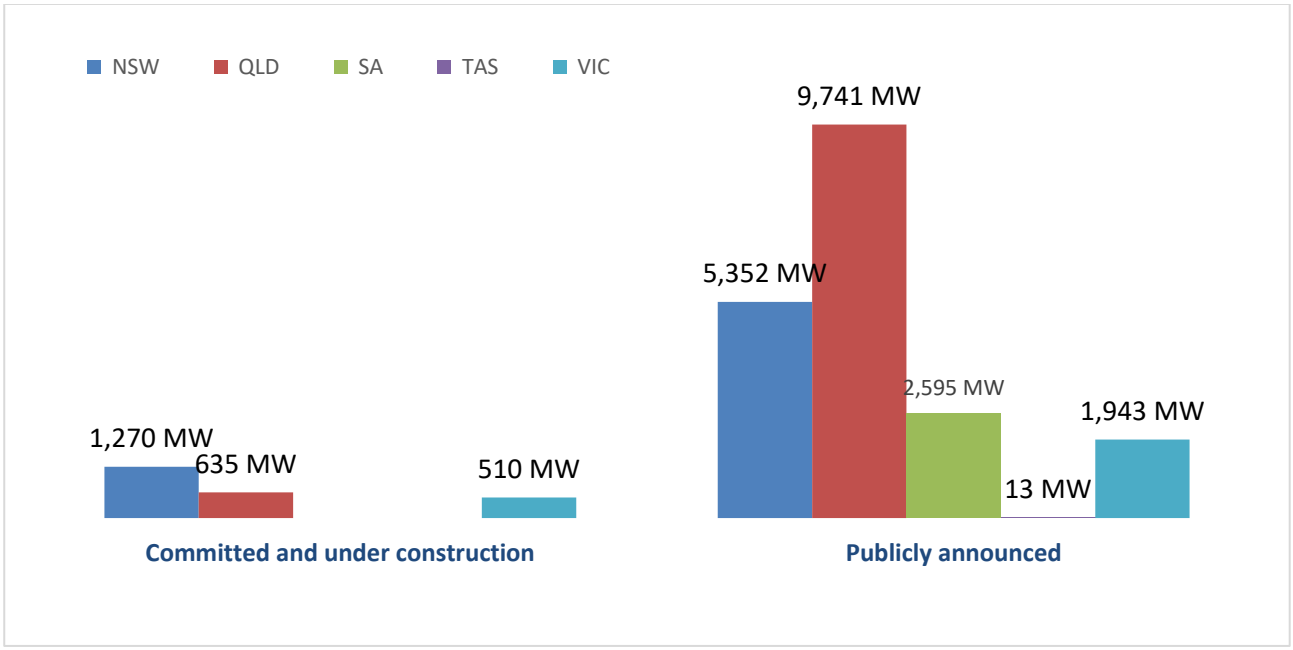
According to the Australian Energy Market Operator's (AEMO) July Generation Information data[vii], there are currently 95 proposed projects with 23 committed and under construction (Figure 8). With an ambitious planned pipeline and current installed capacity, looking further ahead to optimise operation and management of these assets is becoming increasingly important. A range of measures is being considered by the market operator and at times it has had to constrain the output of some projects to maintain system security[viii].

Figure 7: Number of commissioned plants and its total capacity as of June 2020 across the states in Australia



Source: Australian Energy Council's Analysis

Figure 8: Total semi-scheduled, committed & under construction and publicly announced solar projects in NEM states.



Source: Australian Energy Council's Analysis on AEMO's Generation Information data, July 2020.

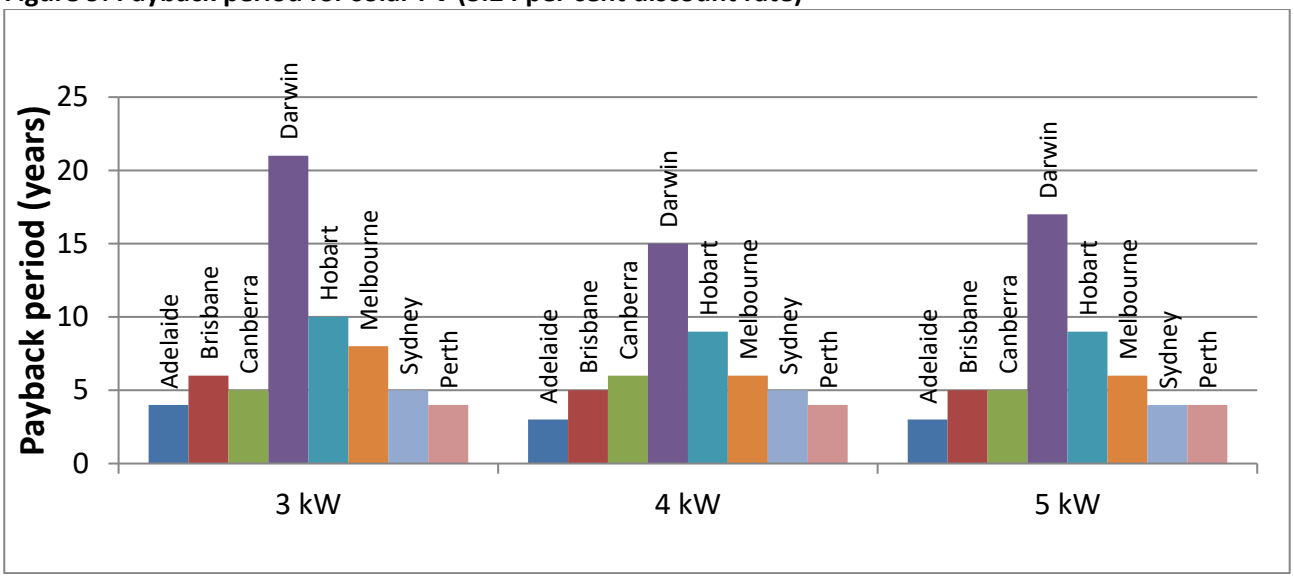
Given an expected solar boom, Australia remains an interesting country to watch on how it integrates more large-scale solar PV over the coming years. The increase of rooftop and utility solar, along with other renewable energy, has created a dramatic impact as some states within the NEM become net exporters of energy during the middle of the day. In contrast, Western Australia as an isolated grid so cannot export excess generation.

SECTION III: PAYBACK PERIOD, DETAILED MODEL

The payback period is defined as the year when the cumulative savings are greater than the cumulative costs of a solar PV system. Savings represent the avoided cost of consumption and any revenue received from Feed-in-Tariffs (FiTs). The cumulative cost incurred represents the initial investment and the time value of money. A detailed methodology is contained in Appendix 2.

Figure 9 highlights the payback period for different system sizes across Australia. Note that electricity prices are subject to change with consumer price index (CPI) levels and therefore will affect the payback period. Many retailers offer higher solar FiTs, which help to offset the impact of higher prices in some states and deliver savings to customers with solar panels. The low payback periods across many cities further highlights the greater encouragement for customers to install solar PV.

Figure 9: Payback period for solar PV (3.24 per cent discount rate)



Source: Australian Energy Council analysis, June 2020

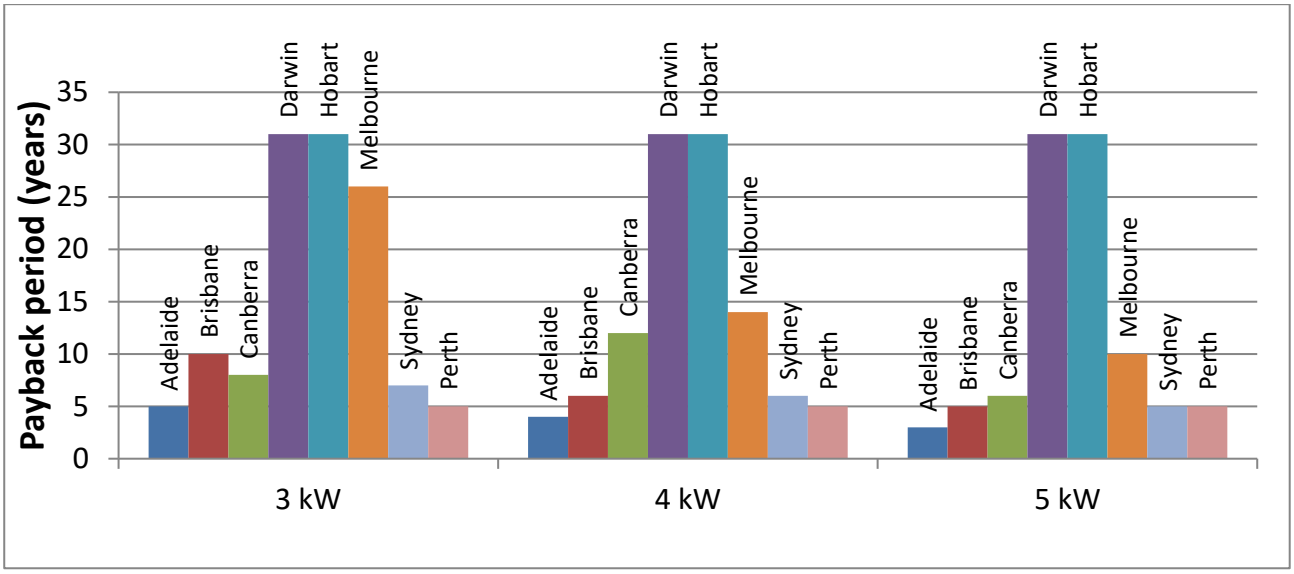
As of July 2020, while the interest rate is lower compared to the previous quarter, the negative CPI level of 0.3 per cent gives an increased real interest rate of 3.55 per cent (instead of 3.24 per cent).

The Northern Territory has the highest payback period of more than 15 years with a 3kW, 4kW and 5kW system. A reduction of its FiT from 23.6 c/kWh to 8.3 c/KWh contributes to a higher payback period.

Similarly, Figure 10 shows the expected payback period for systems with a 5.87 per cent discount rate (10-year average home loan rate) with a real rate of 6.19 per cent. Darwin and Hobart are highly sensitive to a higher interest rate due to the high cost of rooftop solar PV units. Both cities have a payback period of 31

years for a 3kW, 4kW and 5kW system. Other capitals see the payback period increased by only 1 or 2 years with a higher interest rate.

Figure 10: Payback period for solar PV (5.87 per cent discount rate)



Source: Australian Energy Council analysis, June 2020

SECTION IV: METHODOLOGY APPENDIX

1. Solar installations methodology

Analysis from the CER's monthly data allows us to estimate the amount of solar PV installed in Australia. Since November 2015, the CER has consistently released data dated as at the first of each month. The new consistent release date allows us to provide a more accurate estimate of the capacity of recent installations. Due to the lag in reporting of new installations, however, the CER data takes up to 12 months to be finalised.

2. Payback period methodology

This methodology outlines our approach in calculating the payback period for solar panels installed across capital cities in Australia. Our analysis includes the following:

- Initial investment
- Discount rate
- Efficiency
- System degradation rate
- Export rate
- Avoided usage cost
- FiT

Initial investment, discount rate, efficiency and system degradation rate are described in appendix 1. Key difference to LCOE calculation is the payback period assumes no annual maintenance cost.

Calculation

Payback period occurs when $\sum$ savings > $\sum$ cost

Where:

Savings = (usage cost x $(1+ CPI)^t$ x consumption / 100) + (Export x FiT)

Cost = investment x $(1 + \text{real discount rate})^t$

t = years

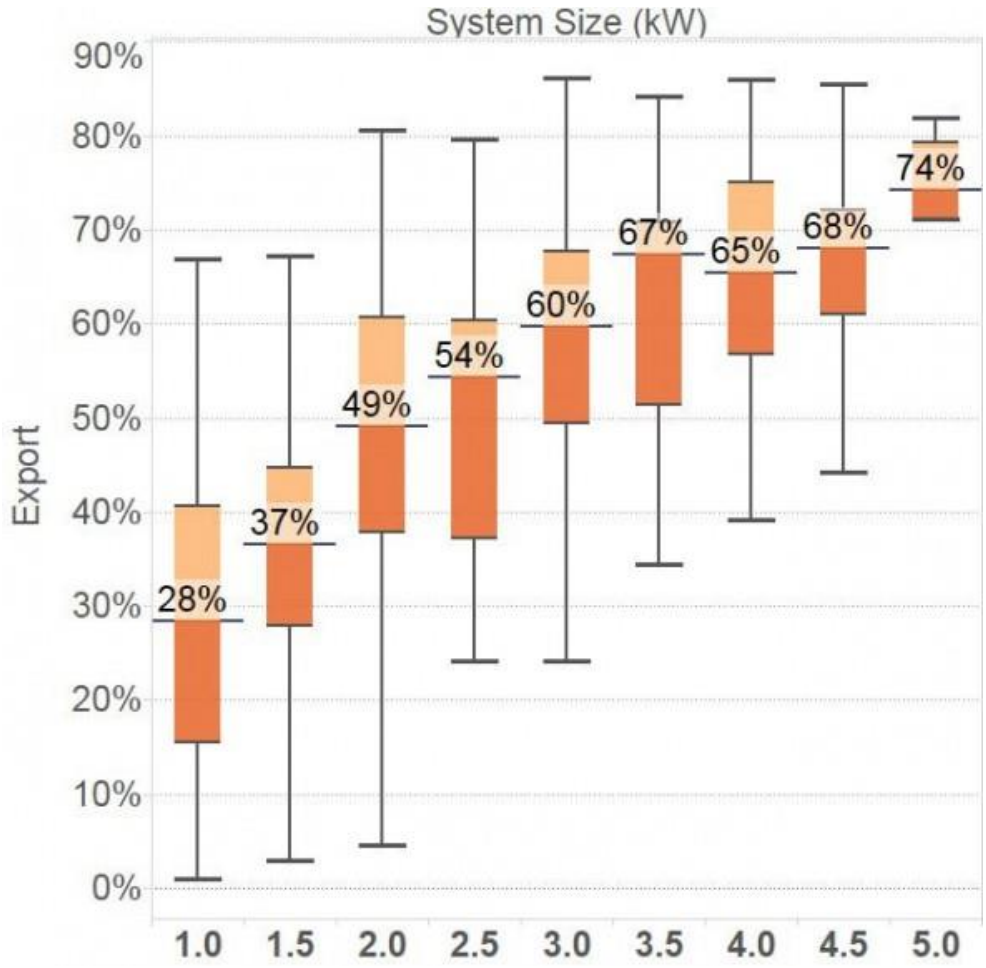
Avoided cost and FiT

The onsite consumption is multiplied by the retailer's usage charges. CPI has been applied to the usage charge to allow for growth in retail prices. The excess energy is exported to the grid and the customer is expected to receive the mandatory FiT or a realistic market offer where mandatory tariffs are not applicable.

Export rate

The percentage of onsite consumption and electricity which is exported to the grid is calculated using the median value from Sunwiz's analysis[ix]. See Figure 11 below.

Figure 11: Export rate of residential solar PV at different system sizes



Source: Sunwiz analysis, 2015

[i] https://www.premier.vic.gov.au/making-it-easier-for-renters-to-get-solar-panels/
[ii] https://energy.nsw.gov.au/renewables/clean-energy-initiatives/empowering-homes
[iii] https://www.solar.vic.gov.au/solar-battery-rebate
[iv] https://www.sa.gov.au/topics/energy-and-environment/energy-efficient-home-design/solar-photovoltaic-systems
[v] https://www.qld.gov.au/community/cost-of-living-support/concessions/energy-concessions/solar-battery-rebate/about-the-program
[vi] https://reneweconomy.com.au/west-australias-first-100mw-solar-farm-starts-sending-power-to-the-grid-30918/
[vii] https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information
[viii] https://www.aemo.com.au/-/media/files/major-publications/ris/2020/renewable-integration-study-stage-1.pdf
[ix] Sunwiz, Solar Pays Its Way on Networks. Last accessed 17 June 2015.