Renewable Energy Index

September 2017

Green Energy Markets, October 2017

Key findings

Meeting our power needs while reducing pollution

- Wind and solar combined had their biggest ever month in September generating 2,363 GWh of electricity, exceeding the power produced by gas, and the previous monthly high of 2,257 GWh in October 2016.
- This is the fourth time since 2016 that monthly generation from solar and wind exceeded that from gas. Taking into account projects under construction, by 2019 wind and solar generation can be expected to exceed that from gas throughout the year.
- Once we also include the power produced by hydro and bioenergy, Australia produced an amount of renewable energy in September equal to the power consumption of 8.5 million homes.
- Renewables made up 21.9% of the electricity generated across the east and west coast main electricity grids. The amount of renewable energy used in September avoided an amount of carbon pollution equal to removing 9.3 million cars from the road.

Construction activity and job creation

- **78 large-scale renewable energy projects** were under construction at the end of September. This is up by 22 projects on last month due mainly to a surge of 14 smaller solar projects from one company in SA. Of these new construction projects, 3 accounted for 94% of the extra capacity - the Wemen and Bannerton Solar Farms in Victoria, and the Lilyvale Solar Farm in Queensland.
- These 78 projects are estimated to create **enough jobs to employ 12,702 people** full-time for a year ("job-years" of employment), up by 761 on last month;

Rooftop solar installation jobs and power production:

- **14,931 small-scale rooftop solar systems** were installed in September 2017;
- These systems will generate **power equal to the needs of 25,296 homes**;
- **The systems installed in September will deliver around $180 million in power bill savings over the next 10 years** for the households and businesses that installed them.
- Installing these solar systems supported **4,819 full-time jobs** (across installation, design and sales).

Contents

About this report

The Green Energy Markets' Renewable Energy Index tracks on a monthly basis the amount of renewable energy Australia relies on, the jobs it's creating, the power bill savings it is delivering for Australian households, and the environmental benefits of the rising use of clean power.

This edition covers the period of September 2017.

The Renewable Energy Index is funded by GetUp! to provide a reliable, up-to-date record on renewable energy's contribution to Australia.

Green Energy **Markets** Pty Ltd
ABN 92 127 062 864
2 Domville Avenue
Hawthorn VIC 3122 Australia
T +61 3 9805 0777
F +61 3 9815 1066
insight@greenmarkets.com.au
greenmarkets.com.au

Part of the Green Energy Group

What renewable energy is contributing to the grid

1. Wind and Solar had their best ever month, and generated more electricity than gas.

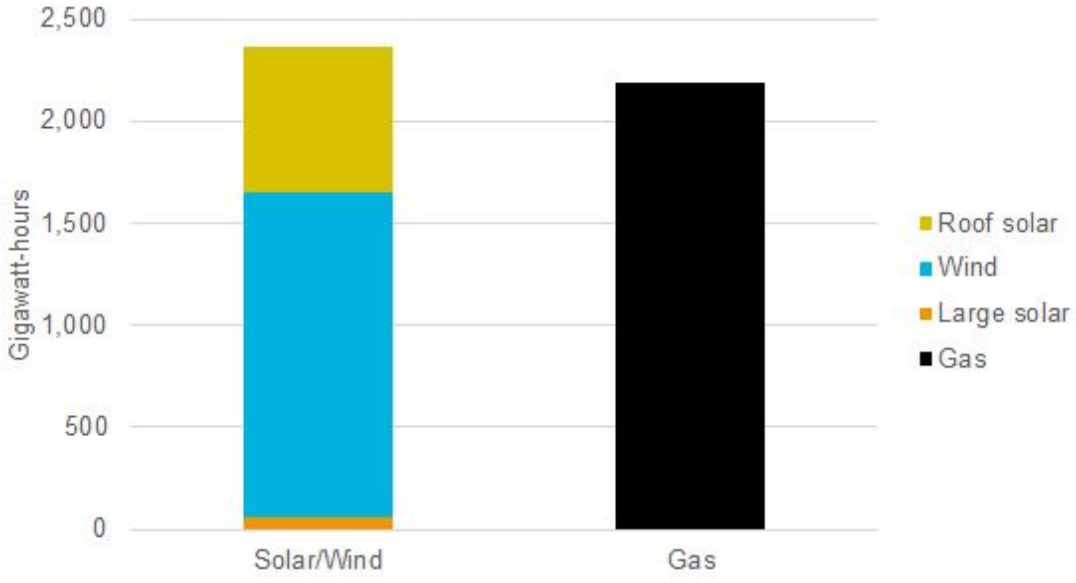

Figure 1: Solar and wind power generation vs gas power generation west & east coast power grids – September 2017

Green Energy Markets

2. Renewables made up 21.9% of the electricity generated in Australia's main grids

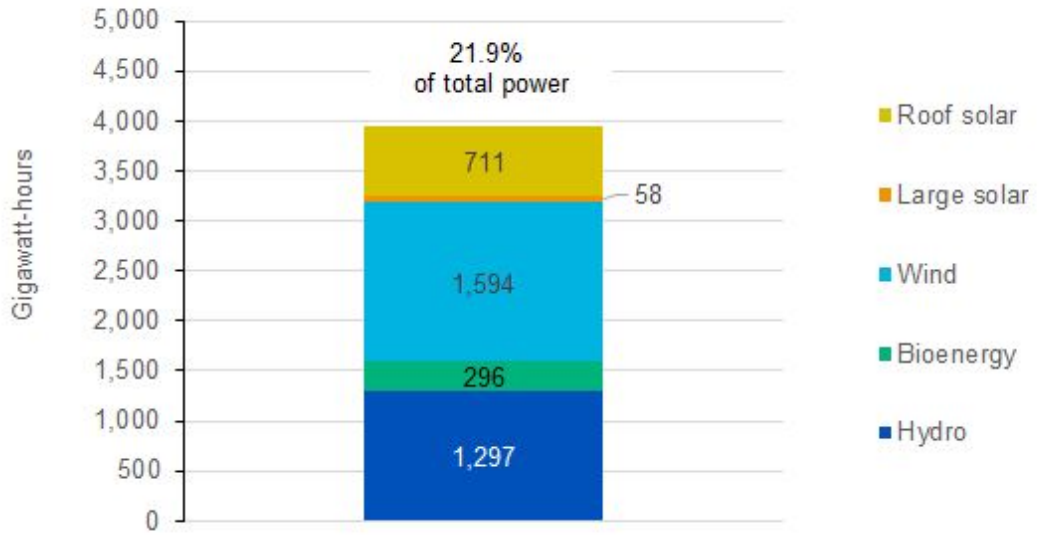

Figure 2: Renewable energy power generation by fuel & market share for west & east coast power grids – September 2017

3. Enough renewable energy to power 8.5 million homes

Figure 3: Renewable energy power generation September 2017 in terms of number of households' power consumption by state

Green Energy Markets

4. Renewable energy avoided 2.4 million tonnes of CO2 pollution

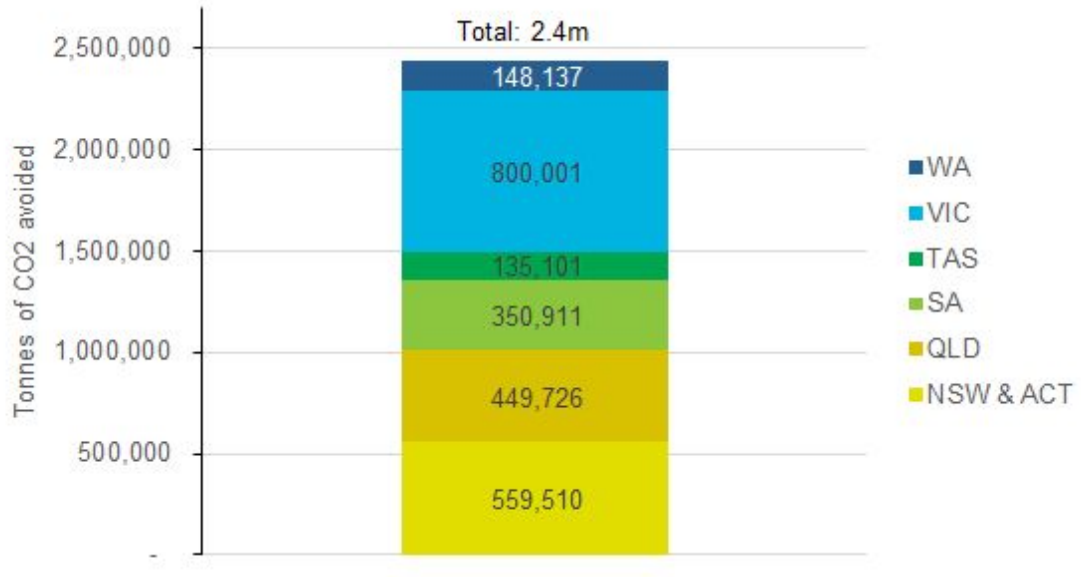

Figure 4. CO2 pollution avoided by renewable energy generation over September 2017

5. Renewable energy avoided 9.3 million cars' worth of CO2 pollution over September

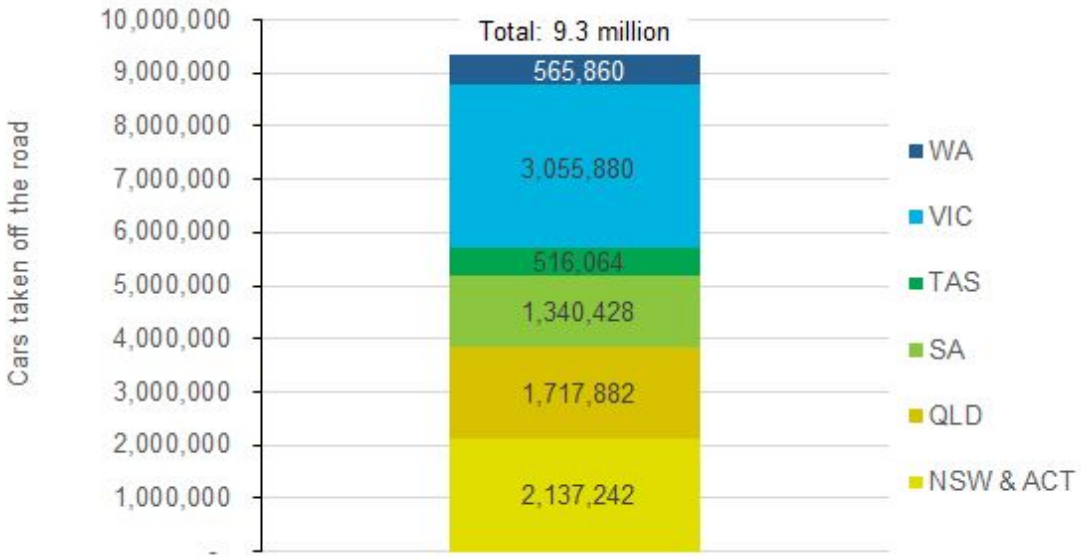

Figure 5. Number of cars' CO2 pollution avoided by renewable energy generation over September 2017

Large-scale renewables construction activity

6. 3,728 megawatts of large-scale renewables under construction

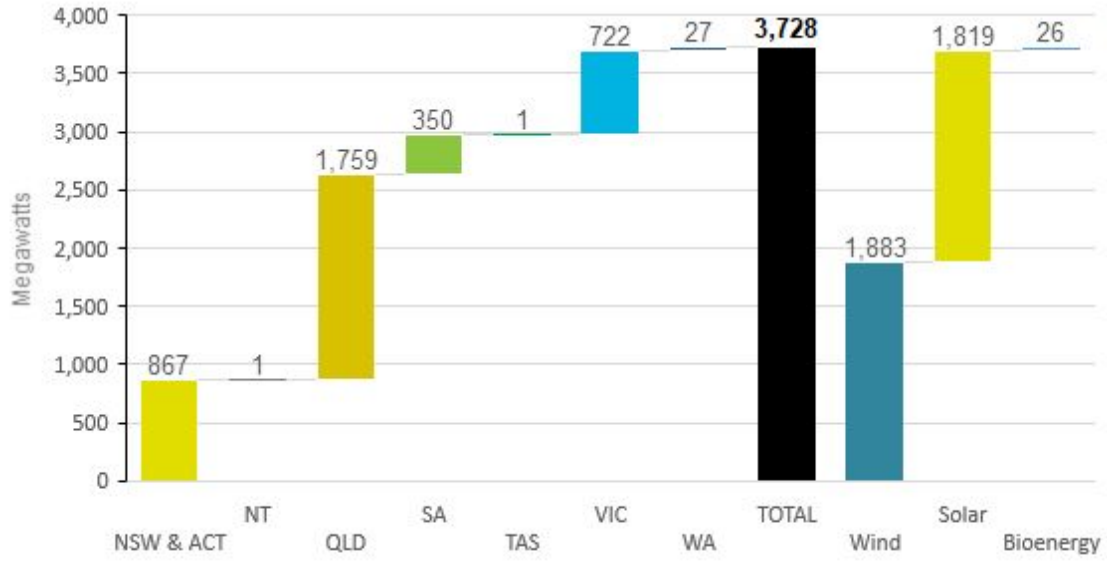

Figure 6: Megawatts of large-scale renewable energy projects under construction by state and fuel at end of September 2017

Green Energy Markets

7. Enough work to employ 12,702 people

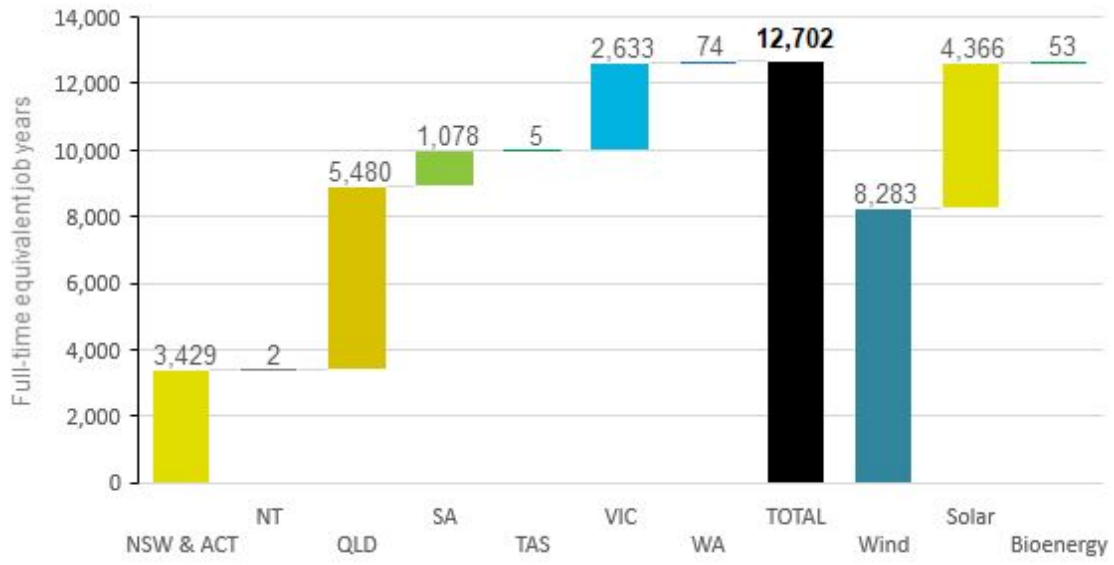

Figure 7: Job-years created by renewable energy projects currently under construction by state and fuel - as at end of September 2017

Green Energy Markets

Rooftop solar installation activity

8. 14,931 small-scale solar systems installed in September

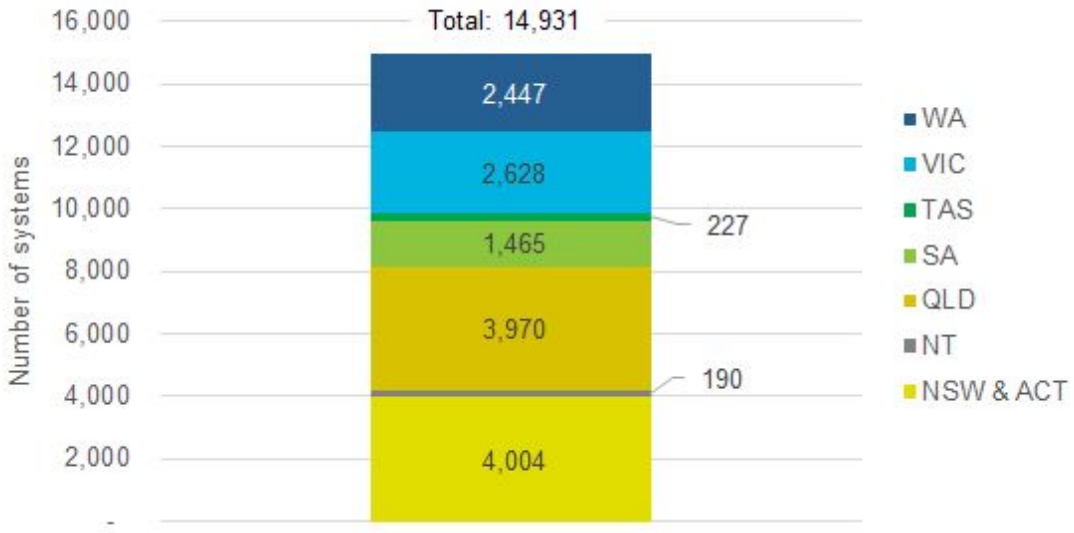

Figure 8: Small-scale solar PV systems installed by state - September 2017

Green Energy Markets

9. Rooftop solar employed 4,819 people in September

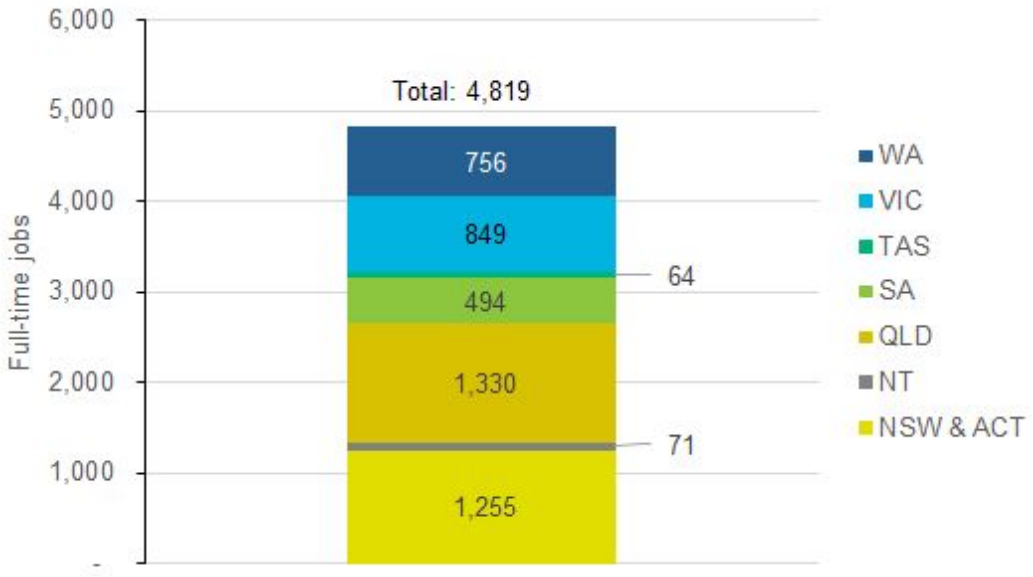

Figure 9. Number of full-time equivalent jobs by state in the installation and sale of rooftop solar PV systems installed over September 2017

10. Enough rooftop solar installed in September to power 25,296 homes

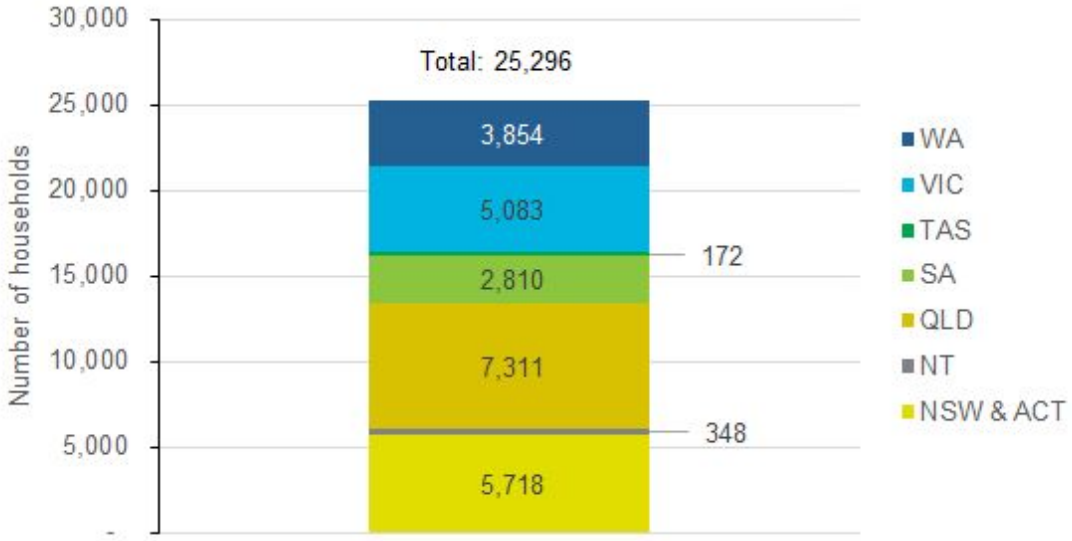

Figure 10: Expected generation from solar systems installed over September in terms of number of households' power consumption

Green Energy Markets

11. Rooftop solar installed in September will deliver $180 million in bill savings

Figure 11: Power bill savings (in $millions) over next ten years from rooftop solar systems installed in September 2017

Notes on sources and methodology

Figure 1 – Data sourced from the Australian Energy Market Operator (AEMO) and via NEM Review for all power except rooftop solar PV generation in the WEM. Rooftop solar PV generation in the WEM is derived from an estimate of the cumulative installed capacity in WA multiplied by a generic capacity factor for each month derived from AEMO's 2017 WA Electricity Statement of Opportunities with a discount to align it with Clean Energy Regulator estimates for solar PV annual average generation.

Figure 2 – Data sourced from the Australian Energy Market Operator (AEMO) and via NEM Review for all power except rooftop solar PV generation in the WEM. Rooftop solar PV generation in the WEM is derived from an estimate of the cumulative installed capacity in WA multiplied by a generic capacity factor for each month derived from AEMO's 2017 WA Electricity Statement of Opportunities with a discount to align it with Clean Energy Regulator estimates for solar PV annual average generation.

Figure 3 – This chart is calculated by dividing the amount of renewable energy produced in each state by the average annual electricity consumption of households in that state which are sourced from the Australian Energy Market Commission's 2016 Residential Electricity Price Trends publication.

Figure 4 – This chart is calculated by multiplying the amount of renewable energy produced in each state by the average emissions intensity of grid power in that state sourced from the Australian Government's National Greenhouse Accounts Factors – August 2016. Readers should note this is an approximate measure because estimating abatement precisely depends on a complex array of factors. The method employed in the Index is highly likely to underestimate abatement delivered by renewable energy in Tasmania and South Australia while potentially overestimating abatement in Victoria and to a lesser extent other states.

Figure 5 – This chart is calculated by dividing the estimated tonnes of CO2 avoided by renewable energy generation by the average emissions of an Australian passenger car. The average annual emissions of an Australian passenger car was derived by dividing the total CO2 emissions of Australia's passenger cars sourced from the Australian Government's 2016 Emissions Projections by the number of passenger vehicles in Australia as estimated in the Australian Bureau of Statistics' 2016 Motor Vehicle Census (31 Jan 2016).

Figure 6 – This data is sourced from Green Energy Markets' Power Plant Register which tracks information on every renewable energy project in the country that is currently registered or likely to register under the Large-Scale Renewable Energy Target.

Figure 7 – This chart is calculated by multiplying the number of megawatts under construction by an estimate of the job years (a person employed full-time for a year) involved in constructing renewable energy projects by fuel type sourced from ROAM Consulting report to the Clean Energy Council –RET Policy Analysis, dated 23 May 2014. Readers should note that job estimates provided by individual project proponents may not align due to inconsistent definitions of how to measure job creation that are not necessarily reported in job-years.

Figure 8 - Data sourced from Green Energy Markets' Solar Report produced using data extracted from the Clean Energy Regulator's register of Small Scale Technology Certificates.

Figure 9 – This chart is calculated by sorting solar PV systems into different kilowatt size categories using information sourced from the Green Energy Markets Solar Report using data extracted from the Clean Energy Regulator's register of Small Scale Technology Certificates. These are then multiplied by estimates of the average person-hours involved in selling, designing and installing such sized systems based on a Green Energy Markets' survey of solar PV industry participants which is then converted into full-time equivalents working a 37.5 hour work week.

Figure 10 - This chart is calculated by using data on the number of small-scale technology certificates within the Clean Energy Regulator's registry as a proxy for the expected average annual power generation from solar PV systems installed in each state. This is then divided by the average annual electricity consumption of households in that state which are sourced from the Australian Energy Market Commission's 2016 Residential Electricity Price Trends publication.

Figure 11 - This chart is calculated by using data on the number of small-scale technology certificates within the Clean Energy Regulator's registry as a proxy for the expected average annual power generation from solar PV systems installed in each state. To determine how much of this generation is displacing imported power from the grid at retail rates or exported to the grid where it receives a feed-in tariff tied to wholesale electricity prices, systems are sorted into different kilowatt size categories using information sourced from the Green Energy Markets Solar Report using data extracted from the Clean Energy Regulator's register of Small Scale Technology Certificates. The amount exported by solar power systems rises from 50% for 2 kilowatts systems up to 90% for 8-10kW systems based on advice received from the Alternative Technology Association. Systems larger than 15kW are assumed to only avoid or receive an electricity rate equal to the export feed-in tariff we estimate for residential customers in each state. The imported retail rate of electricity and the export feed-in rate is based on an average of the AGL, Origin and EnergyAustralia lowest post-discounted published offer for the capital cities in the states of QLD (Energex), NSW (Ausgrid), VIC (Citipower) and SA (SA Power Networks).

For Tasmania, WA, ACT and NT we use the regulated and standard feed-in tariff rates of the Government-owned retailer in each state.