

GAME ON: THE AUSTRALIAN RENEWABLE ENERGY RACE HEATS UP



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Contents

Key Findings.....	ii
States and Territories Renewable Energy Score Card	1
Introduction	3
1. Australia’s Renewable Energy Potential	8
2. Economic Drivers for Renewable Energy	10
3. Renewable Energy Performance of the States and Territories.....	13
4. States and Territories’ Renewable Energy Targets and Policies.....	23
Conclusion	38
Appendix A - States Score Card Grade Methodology	40
Appendix B – Acronyms and Abbreviations	41
References	42
Image Credits	46

Key Findings

1 Australian states and territories are increasingly supporting renewable energy after two years of federal uncertainty.

- › Globally and in Australia, governments at state, regional and local levels are playing an important role in growing renewable power.
- › The number of states and territories with renewable energy targets has increased from two to four in the last year. The Australian Capital Territory (ACT) has the highest target (100% by 2020), followed by South Australia (50% by 2025), Queensland (50% by 2030 and one million solar rooftops) and Victoria (at least 20% by 2020). New South Wales, Western Australia, Tasmania and Northern Territory do not have renewable energy targets.
- › All states, except Victoria and New South Wales, have increased the proportion of renewable energy in their electricity supply in the last two years.
- › In the past eighteen months, some states and territories have stepped up their support for renewable energy to shore-up investment and jobs in the sector and to combat renewable energy policy uncertainty and a loss of investor confidence at the national level.
- › Renewable energy tenders from state and territory governments (such as the ACT's reverse auction process and Queensland's Ergon Energy tender for large-scale solar) have played a role in boosting Australia's appeal as a place to invest in renewable energy.

2 South Australia and the ACT are the best-performing state and territory on renewable energy.

- › ACT has a target of 100% renewable electricity by 2020, while South Australia has a target to achieve 50% renewable electricity by 2025 and has set a new target for zero net emissions by 2050.
- › South Australia has seen the greatest increase in its share of renewable energy of Australian states - going from 26% renewable electricity in 2013 to 40% in 2014.
- › ACT will meet its 100% target through large-scale solar and wind projects supported through its reverse auction process.

3 New South Wales is the worst performing state as it has the lowest (and falling) percentage of renewable electricity.

- › New South Wales received the worst renewable report grade due to the lowest (and falling) percentage of renewable electricity, low large-scale renewable capacity per person, no renewable energy target and low levels of rooftop solar.
- › In New South Wales, Queensland and Victoria, fossil fuels such as coal and gas still account for 90% or more of the power supply.
- › Victoria and Queensland are signalling intent to increase their share of renewable energy through targets and policy.

4 Queensland has overtaken South Australia to claim the top spot for percentage of solar households.

- › Both Queensland (29.6%) and South Australia (28.8%) are approaching almost a third of homes with solar and are far ahead of the other states. Western Australia is in third place on 22.5%.
- › There are now fourteen postcodes in Australia in which more than half of households have rooftop solar. Rooftop solar photovoltaic (PV) panels could soon become as common as home insulation.

States and Territories Renewable Energy Score Card

We have rated the states based on their performance (percentage renewable electricity, large-scale renewable capacity per person, proportion of solar households) and policy settings (targets, policies and program support). See Appendix A for the methodology.

South Australia clearly remains a leader among the states on renewable energy, both in terms of performance and policy. Tasmania, Queensland, Western Australia, and Victoria follow.

New South Wales received the lowest overall score due to the state's low proportion of renewable energy, low large-scale capacity per person, solar households and lack of renewable energy target.

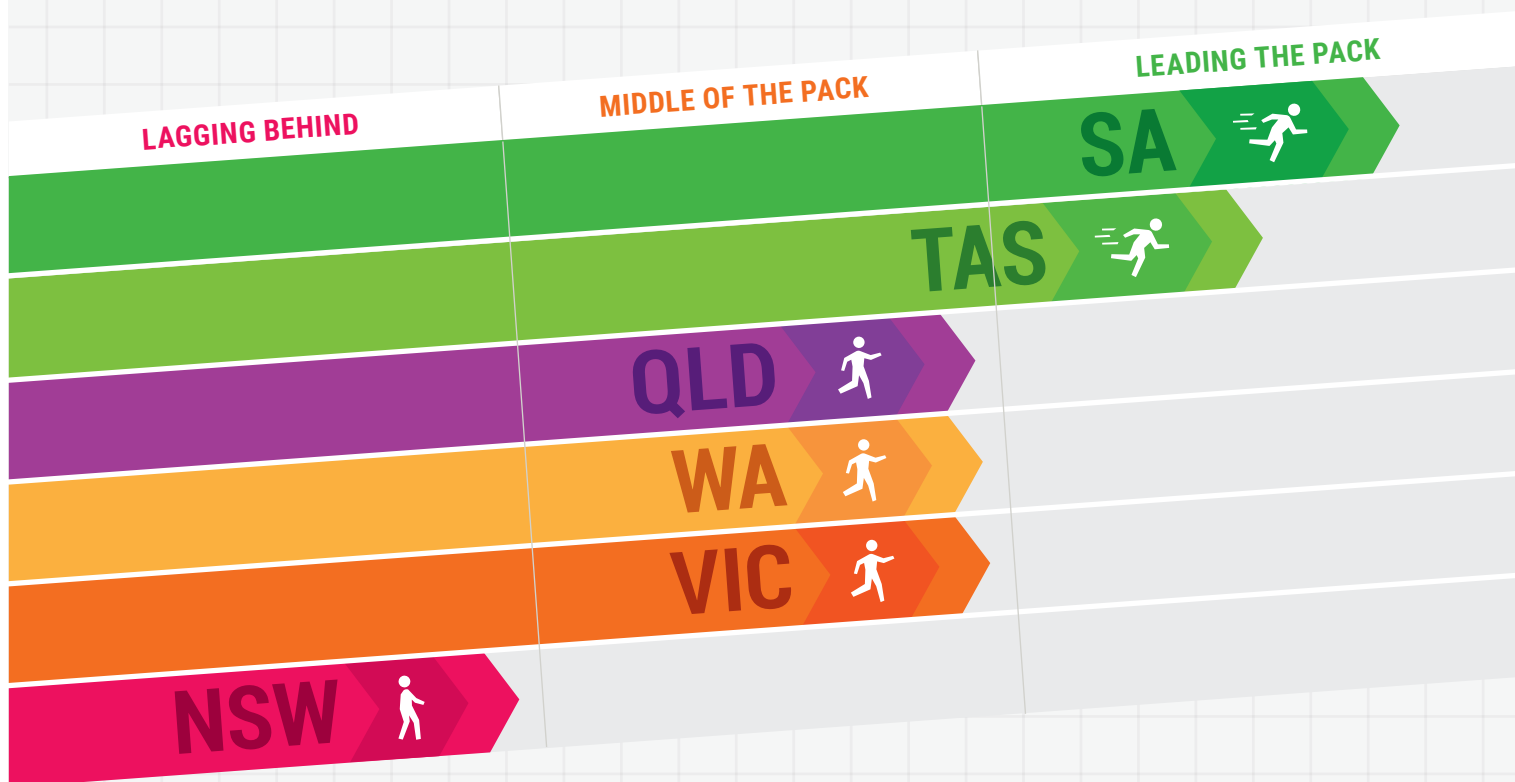
See the Conclusion and Appendix A for more details.

South Australia is the leader of the pack on renewable energy.

THE AUSTRALIAN

RENEWABLE ENERGY RACE:

2016 SCORE CARD



State	NSW	VIC	WA	QLD	TAS	SA
Overall Score	D	C	C	C	B	A
Renewable Electricity	6%	10%	13%	7%	95%	40%
Large-scale Renewables (excl hydro) Per Capita (kW/cap)	0.14	0.23	0.23	0.24	0.62	0.88
Households with Solar PV	14.1%	14.2%	22.5%	29.6%	12.1%	28.8%
Renewable Electricity Targets	-	At least 20% by 2020	-	50% by 2030	-	50% by 2025

Figure 1: The Australian Renewable Energy Race: 2016 Score Card. Sources: ABS 2015; Australian PV Institute 2016; Government of South Australia 2015a; Clean Energy Council 2015; Queensland Government 2015; Victorian Government 2015a; ACT Government 2016; Clean Energy Regulator 2016a.

Note: Due to the lack of comparable data on percentage of renewable energy in electricity supply for the territories, we have not given the territories a grade (refer to Appendix A for grading methodology).

Introduction

Around the world, governments at state, regional and local levels are playing an increasingly crucial role in the transition from fossil fueled energy to renewable power. In many cases, sub-national governments are adopting stronger renewable energy targets and policies than their national counterparts; are piloting new, creative approaches to boosting renewable energy; and are teaming up to expand their influence.

In the United States (US), state governments played a major role in the US achieving second place globally for installed renewable energy capacity in 2015 (IRENA 2015a). The majority of US states have had renewable energy portfolio standards or goals in place for over a decade in the absence of a national target (C2ES 2016). In 2015, as the US pledged to reach 20% non-hydro renewables nationally by 2030, many US states were already progressing towards much higher proportions of renewable energy (DSIRE 2015; The White House 2015). California for instance is on track to reach its target of 50% renewable electricity by 2030, having put in place a range of policies such as support for rooftop solar, renewable energy auctions and a cap-and-trade emissions reduction scheme (IRENA 2015a).

Governments at state, regional and local levels are playing an important role growing renewable power worldwide.



Figure 2: Wind turbines in Mecklenburg-Vorpommern, one of two German states that is already producing 100% renewables.

In Germany, which has a national target of 40-45% renewable electricity by 2025 (and had already reached 28% in 2014), two states - Mecklenburg-Vorpommern (Figure 1) and Schleswig-Holstein, with a combined population of over 4 million people - are already producing more than 100% renewable electricity (producing more power than consumed) (Clean Technica 2016).

Two German states are already producing 100% renewable energy.

State governments can pilot and test new approaches influencing the development of national policies. For example, China has piloted emissions trading schemes in two provinces and five cities, testing a range of approaches before moving to a national emissions trading scheme in 2017 (Matthews et al. 2015).

Sub-national governments around the world are banding together to extend their influence beyond state borders. In the lead up to and at the 2015 United Nations Climate Conference in Paris, cities, regions and states helped to generate momentum for a global climate agreement with commitments to accelerate the transition to a low carbon global economy (Melbourne Sustainable Society Institute 2015; Time 2015; UNFCCC 2015). The Paris City Hall Declaration signed by over 1,000 mayors and governors from 150 countries included a commitment to rapidly transition to 100% renewable energy (Melbourne Sustainable Society Institute 2015; Figure 3).



In the absence of a national US carbon price, nine US states – representing 13% of the US population – created a joint carbon pricing scheme in 2005 called the Regional Greenhouse Gas Initiative (IETA 2015). Similarly California, the world's 9th largest economy, now has a multi-sector cap-and-trade program designed to contribute to the state's economy-wide target for reducing emissions to 1990 levels by 2020. In January 2014, California officially linked its emissions trading scheme with Quebec, Canada (World Bank 2015).

In Australia, both national and state level policies are driving renewable energy growth. In 2000, a mandatory national renewable energy target of 2% by 2010 led to the South Australian and Victorian governments setting their own (higher) state-based renewable energy targets. The success of these state targets influenced the expansion of the Renewable Energy Target in 2009 to 20% of projected demand by 2020 (Parliament of Australia 2014).

Since 2014, there have been eighteen months of policy uncertainty at the national level – caused by reviewing the Renewable Energy Target and repealing the Carbon Pricing Mechanism – followed by a reduction in

the national Renewable Energy Target. In 2015, Australia became the first developed country in the world to reduce its national Renewable Energy Target - from 41,000 GWh of large-scale renewable energy to 33,000 GWh in 2020. Far less renewable energy will be delivered in Australia in the next decade and a half, resulting in nearly 100 million additional tonnes of greenhouse gases emitted nationally and AUD 5-6 billion in foregone investment in the years to 2020 (Sydney Morning Herald 2015a).

An Australian Government directive (which was later revoked) preventing the Clean Energy Finance Corporation from investing in wind and small-scale solar, a Senate Inquiry into wind energy, and the appointment of a Wind Farm Commissioner to investigate complaints further hampered confidence in Australia as a place to invest in renewable energy (EY 2015; Federal Register of Legislation 2015). As a result of these risk factors and an excess in power generating capacity, investment confidence in large-scale renewable energy in Australia continues to be adversely affected - with new investment in 2014 and 2015 remaining at levels well below half the annual investment in the sector between 2010 and 2013 (Sydney Morning Herald 2016).

Australia became the first developed country to reduce its national Renewable Energy Target.

In this national context, the past eighteen months has seen an upsurge in policy support for renewable energy by state and territory governments. The number of governments with renewable energy targets has increased from two to four, and those with targets in place back in 2014 – South Australia and the Australian Capital Territory (ACT) – have increased or extended them.

Facing the prospect of falling investment and jobs, a number of state governments have been taking both policy and practical action to shore-up the renewable energy industry in Australia (ABC 2015a). In particular the governments of ACT, Victoria, South Australia and Queensland have introduced a range of policy and program measures (reverse auctions, investment and government procurement processes) to provide funding and support for local renewable energy projects. Tenders for renewable energy from state and territory governments (such as the ACT's reverse auction process and Queensland's Ergon Energy tender for large-scale solar) have played a role in boosting Australia's appeal as a place to invest in renewable energy (EY 2016).

Although important given federal policy setbacks for renewables, state and territory governments have limited scope to directly drive large renewable capacity increases other than through direct procurement (for government electricity needs or through additional GreenPower purchases). The Renewable Energy Target is national legislation, and the eastern seaboard mainland states have privatised most of their energy retail businesses, which are the entities required to buy renewable energy certificates under the Renewable Energy Target.

In this report, we review state and territory "leaders" and "laggards" on renewable energy based on performance, policies and progress. Much has changed since the Climate Council's (2014) "The Australian Renewable Energy Race: Which States Are Winning or Losing?".

While South Australia and the ACT continue to lead on policy and targets, the majority of states are now implementing targets, policies or providing funding to support local investment in renewable energy and jobs.

Most states are now setting targets, implementing policies or providing financial support for local renewable energy.

1. Australia's Renewable Energy Potential

There have now been years of analysis on solutions to tackling climate change. Accelerating the transition away from fossil fuels, particularly converting power generation to renewable energy, is a proven technological solution with much lower costs than other alternatives like nuclear power and carbon capture and storage. If we are to have a reasonable chance of holding global temperature rise to less than two degrees Celsius above pre-industrial levels, it is critical to transfer our power generation systems to zero carbon renewables by 2050.

The International Renewable Energy Agency (IRENA) has modelled practical, cost-effective measures to double the global share of renewables by 2030, in line with countries' commitment to keeping global temperature rise below 2°C (IRENA 2016a). IRENA (2016a) indicates Australia could achieve well over 50% of its electricity generation from renewable energy by 2030.

ClimateWorks has also assessed what it will take for Australia to meet its share of the global commitment to keeping global temperature rise below 2°C. All scenarios demonstrated achieving at least 50% renewable electricity generation by 2030 is both critical, and achievable given that existing identified renewable energy projects (approved or in development) are equivalent to two-thirds of Australia's forecast demand in 2030 (ClimateWorks 2015).



Figure 4: Australia has the potential to generate more renewable energy, such as solar and wind.

Australia has the potential to generate a much higher proportion of our electricity from renewables. Our renewable energy resources are among the best in the world, potentially capable of providing 500 times the amount of electricity we currently use (Commonwealth of Australia 2014; AEMO 2013). However, compared to similar countries, Australia has one of the lowest levels of renewable electricity generation (ESAA 2015a).

Modelling has shown that it would be possible for Australia to generate all its electricity from renewable energy. Computer simulation modelling of the hourly operation of the National Electricity Market (NEM) by the University of New South Wales (UNSW) and independently by the Australian Energy Market Operator has shown that it would be technically and economically feasible to operate the electricity supply system reliably on 100% renewable energy technologies (Elliston et al. 2014; AEMO 2013).

Australia's renewable energy resources are among the best in the world.

2. Economic Drivers for Renewable Energy

In addition to tackling climate change through reduced emissions from electricity generation, renewable energy can provide economic benefits through investment opportunities and job creation (EY 2015).

Renewable energy can provide investment opportunities and employment.

Globally, 2015 was a record year for renewable energy in many respects. Investment in renewable energy (excluding large hydro) reached USD 286 billion in 2015, well above the previous investment record of USD 279 billion in 2011, and because of significant cost reductions in renewables in intervening years, far more capacity was added in 2015 than in 2011. Renewable energy investment was more than double the investment in new fossil fuel capacity. Global renewable energy capacity installations were also the highest ever, and, at 134GW made up 54% of all new capacity (62% with the addition of large hydro). 2015 also saw new record low prices for solar photovoltaic (PV) power, at USD58.50/MWh for a 200MW solar PV project in Dubai, United Arab Emirates (Frankfurt School-UNEP Centre/ BNEF 2016). Illustrating how quickly renewable costs are coming down, a recent renewable energy auction in Dubai has set a new, even lower cost record for large-scale solar PV at USD 30/MWh, almost halving the 2015 cost record (RenewEconomy 2016a).

Steep declines in the cost of renewable energy technologies have been a key factor driving this accelerated investment and rollout of renewable energy. In the past five years, global wind power costs fell 30% and solar PV prices fell 75% (IEA 2015a). Renewable power now competes directly with new fossil fuel capacity on price, providing low cost power without the need for government assistance in many markets (IEA 2015b; IRENA 2015b). Australia also has some of the most competitively priced rooftop solar PV in the world (IRENA 2015b).

Global investment in renewables reached record levels in 2015 at USD 286 billion.

Overseas it has been shown that sub-national governments can successfully attract investment in renewable energy through providing policy and program support for renewable energy. For example, in Canada where there is no national renewable energy target in place, Ontario and Quebec attracted USD 4.5 billion and USD 3.9 billion (respectively) in renewable energy investment last year through supportive provincial legislation, policies and programs (Clean Energy Canada 2015; REN21 2015).

Figure 5: Wind farm near Millicent, South Australia.



To date, AUD 6.6 billion has been invested in South Australia mainly in wind and solar generation, putting the state well over halfway to reaching its AUD 10 billion investment target from low carbon electricity generation by 2025 (Government of South Australia 2015a; Figure 5).

Renewable energy growth creates jobs both globally and in Australia. Renewable energy jobs continue to grow worldwide, with jobs increasing 18% in the past year to reach 7.7 million people employed in the sector globally (REN21 2015). In Australia, there are an estimated 12,900 people employed in the renewable energy sector (ABS 2016).

Accelerated renewable energy deployment creates new jobs across a broad range of activities including planning, construction, manufacturing, operations and maintenance. Renewable energy jobs are expected to continue to grow under a business as usual scenario, and doubling renewable energy correlates with even more jobs being created, even taking job losses in fossil fuels into account (IRENA 2016b).

Renewable energy is a job creator, providing various employment opportunities in planning, construction, manufacturing, and operations and maintenance.

3. Renewable Energy Performance of the States and Territories

To compare the performance of states and territories on renewable energy, we used the following measures:

1. Percentage of renewable energy in electricity supply.
2. Large-scale renewable energy capacity installed, and capacity per capita (excluding large-scale hydro).
3. Total number of solar PV installations and proportion of households with solar panels.

Percentage Renewable Electricity

Renewable energy provided 13.5% of Australia’s electricity in 2014 based on the most up-to-date data publicly available (Clean Energy Council 2015; Table 1; Figure 6).

At a state level, electricity generated in Tasmania and South Australia is made up of a much higher proportion of renewable energy than the national average, and compared with the other states. Comparable data is not available for the territories.

However, while Tasmania relies mainly on its historic development of hydro power with some wind, South Australia’s renewable electricity is made up almost entirely of wind and solar PV developed in the last 12 years.

Table 1: States proportion of renewable electricity supply.

State	2013	2014	Change
Tasmania*	93%	95%	▲
South Australia	26%	40%	▲
Western Australia	11%	13%	▲
Victoria	12%	10%	▼
Queensland	6%	7%	▲
New South Wales	7%	6%	▼

Sources: Clean Energy Council 2014; Clean Energy Council 2015.

* Tasmania’s renewable energy proportion may fall after low dam levels and low rainfall reduced hydro generation leading to brown coal power imports from Victoria, and the use of diesel generators to shore-up electricity supply after the Basslink interconnector (linking Tasmania to the mainland electricity network) failed in December 2015 (Energy Matters 2016a).

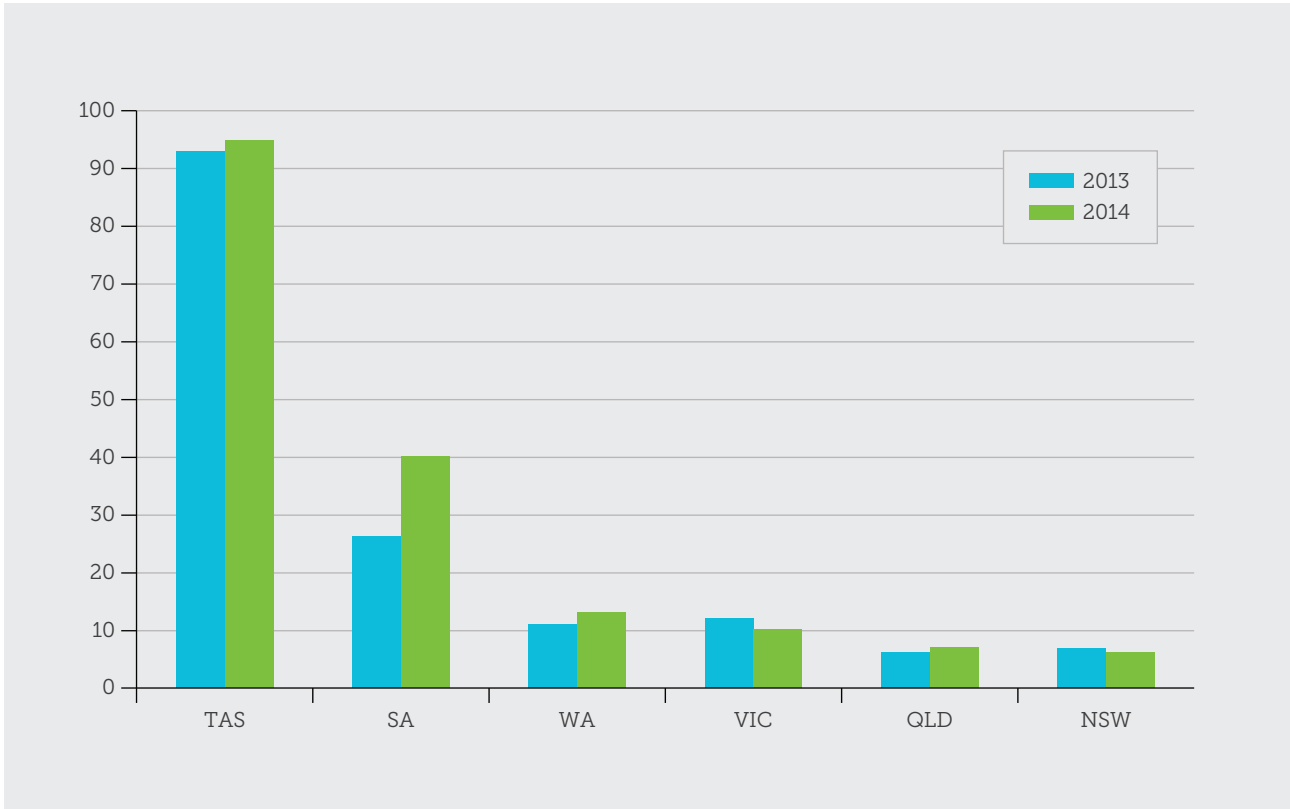


Figure 6: States proportion of renewable electricity. Source: Adapted from Clean Energy Council 2015.

While most states are increasing the proportion of renewable electricity, in Victoria and New South Wales, the proportion of renewables, already at low levels, fell further.

In New South Wales, Queensland and Victoria fossil fuels such as coal and gas account for 90% or more of the power supply (Clean Energy Council 2015).

Fossil fuels provide 90% or more of the power supply in New South Wales, Queensland and Victoria.

Large-Scale Renewable Energy

Australia has 482 large-scale renewable power stations with a total capacity of 13,656MW. Just over half of Australia's renewable energy capacity is large-scale hydro (Clean Energy Regulator 2016a) with the remainder comprising mainly wind, biomass, and solar (see, for example, Figure 7).

State and territory governments play a role in attracting or deterring large-scale renewable energy investment through their energy and planning policies. For example, wind farm planning restrictions in Victoria (in place between August 2011 and March 2015) are estimated to have cost the state AUD 4 billion in lost investment with only two small wind farms approved under the strict planning conditions (CESV 2013; Sydney Morning Herald 2013).

Among the states and territories, South Australia, Victoria and Queensland respectively have the highest large-scale renewable energy capacity (excluding large hydro). However, on a per capita basis, South Australia leads, followed by Tasmania (ABS 2015; Clean Energy Regulator 2016a; Table 2).

It should be noted, that while the ACT has a low share of large-scale renewable energy capacity within its borders, the ACT Government has supported 400MW of large-scale wind projects in South Australia, New South Wales and Victoria through its renewable energy reverse auctions (ACT Government 2015a). If these wind farm projects were included as part of the ACT's capacity, it would have the highest large-scale renewable energy capacity per person.

Figure 7: AGL's large-scale photovoltaic (PV) power plant in Nyngan, New South Wales.



Table 2: States and territories large-scale renewable energy capacity and capacity per capita (excluding large-scale hydro).

State / Territory	Population ('000)	Total large-scale renewable energy installed (MW)	Total large-scale renewable energy installed excluding hydro (MW)	Large-scale renewable energy excluding large hydro per capita (kW/cap) ¹
South Australia	1701	1508.4	1,505	0.88
Tasmania	517	2645.1	319.6	0.62
Queensland	4,793	1301.8	1,135.7 ²	0.24
Victoria	5,967	2117.4	1,377.8	0.23
Western Australia	2,598	631.6	599.5	0.23
New South Wales	7,644	5413.9	1,069.7	0.14
ACT	392	26.3	25.6	0.072
Northern Territory	245	11.6	11.5	0.05
Australia	23,857	13,656.1	6,044.4	

1. If large-scale projects supported by the ACT's renewable energy reverse auctions were included here, it would have the highest large-scale renewable energy capacity per person.
2. There appears to be a discrepancy between Queensland's biomass and landfill gas capacity figures from the Clean Energy Regulator (2016a) in the above table and the Australian Energy Market Operator's figures. The above table includes 509MW landfill gas capacity and 465MW of bagasse capacity - significantly more than the 350MW reported by AEMO (2015) and more than six times the biomass and landfill gas capacity in NSW, the next highest amount. Accredited landfill gas capacity in Queensland is higher than other states as the total capacity of fossil fuel power stations which co-fire landfill gas is included by the Clean Energy Regulator. However the historical record of Renewable Energy Certificates indicates the effective landfill gas capacity in Queensland is less than 20MW.

Sources: ABS 2015; Clean Energy Regulator 2016a.

Note: International organisations (such as REN21 and IRENA) focus on new renewable energy additions such as wind and solar separating out historical large-scale hydro developments.

Rooftop Solar

Australia is a world leader in household solar PV, with double the rate of take-up (15% of households on average) compared to the next country, Belgium where about 7.5% of households have solar (ESAA 2015a).

High retail electricity prices, competitively priced solar panels and government incentives (like the small-scale component

of the Renewable Energy Target and state-based feed-in tariffs) have led more than 1.5 million Australian households to install solar PV panels (by March 2016) (Australian Energy Council 2016; Clean Energy Regulator 2016b). These economic benefits are a key reason why solar panels are primarily taken up by lower and middle-income home-owners (Green Energy Trading 2014).

Australia leads the world in household solar PV uptake.

Figure 8: Worker installing household solar PV.



Historically, state and territory governments have driven the uptake of rooftop solar through premium feed-in tariffs, however most of these programs have been wound back as solar PV has become cost-competitive with retail electricity prices. State governments can also play a role

encouraging or discouraging solar PV through planning policies (for example heritage legislation can restrict solar PV in certain locations), regulations impacting on households' ability to feed solar PV into the grid and whether extra fees or charges are imposed by networks on solar households.

The sunshine state, Queensland, has the highest share of total solar PV systems installed in Australia.

Table 3: States and territories total solar PV installations and 2015 installations.

State / Territory	Population '000 (% of Australian population)	Solar PV systems installed in 2015	Total number of solar PV systems installed (by March 2016)	Share of total solar PV systems installed
Queensland	4,793 (20%)	38,839	470,953	31%
New South Wales	7,644 (32%)	32,522	331,378	22%
Victoria	5,967 (25%)	30,246	282,295	18%
Western Australia	2,598 (11%)	20,024	199,662	13%
South Australia	1,701 (7%)	11,764	194,927	13%
Tasmania	517 (2%)	1,944	26,660	2%
ACT	392 (2%)	989	16,655	1%
Northern Territory	245 (1%)	1,140	5,334	0%
Australia	23,857 (100%)	137,468	1,527,864	100%

Sources: ABS 2015; Clean Energy Regulator 2016a; Clean Energy Regulator 2016b.

At the state and territory level, South Australia, Queensland, and Western Australia all have a higher share of Australia's solar PV installations than their share of the population (Table 3).

In terms of the proportion of households with solar PV, South Australia and Queensland will soon be approaching nearly a third of households with solar PV. Western Australia, in third place is not far behind with solar PV panels on one in five households (Australian PV Institute 2016; ESAA 2015a; Figure 9).

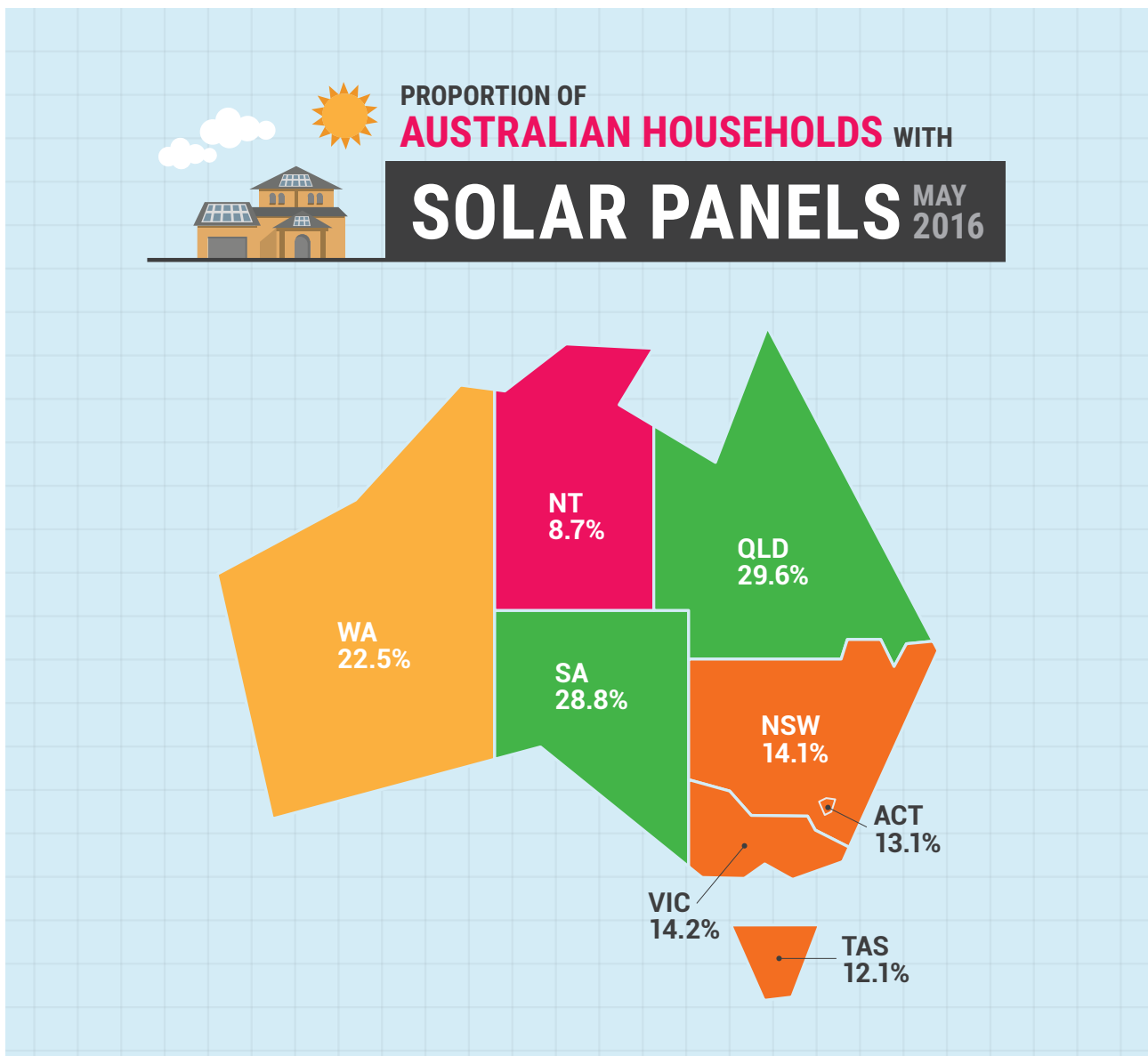


Figure 9: States and territories proportion of households with solar panels. Source: Data from Australian PV Institute 2016.

Most States have Phased Out Premium Feed-in Tariffs for Solar PV

Most states and territories, except for the Northern Territory, have now dramatically reduced regulated feed-in tariffs - the amount solar households receive for excess electricity fed into the electricity grid - for solar PV from premium levels (between 44 - 60 cents per kilowatt-hour offered in the ACT, New South Wales, Queensland, Victoria and South Australia) to rates of between five to eight cents per kilowatt-hour (Grattan Institute 2015; Energy Matters 2016a; Solar Choice 2015).

Solar households on feed-in tariffs of five to eight cents per kilowatt-hour are selling power to the grid at rates far below the retail price they pay for electricity from the grid (20 to 35 cents per kilowatt-hour). This is starting to change consumer behaviour, with solar households impacted by low feed in tariffs increasingly using the surplus solar power generated within the home (for example, in household appliances) rather than exporting the electricity back to the grid for minimal financial benefit. The disparity between feed-in tariff rates and retail electricity prices is a key driver for battery storage systems. Battery storage paired with solar panels enables households to maximise their use of self-generated solar PV power, and take advantage of the variable price of electricity at different times of the day (Grattan Institute 2015).



Figure 10: Solar rooftops in Melrose, South Australia.

Leading Solar Suburbs

In some suburbs solar PV penetration is much higher than the state or territory average. There are now fourteen postcodes in Australia where half or more of households have rooftop solar PV (Table 4). Angle Vale in South Australia and Leinster and Sir Samuel in Western Australia are leading the charge with 65% of households with solar PV (ESAA 2015b). In these suburbs, rooftop solar could soon be as common as home insulation (ABS 2010).

Suburbs with high levels of rooftop solar PV have generally low to medium income levels and tend to be located in the outer metropolitan “mortgage belt”, or in regional areas. Factors encouraging higher levels of solar uptake are likely to

include level of home ownership, building suitability, energy bills as a proportion of household income and renovation activity (Green Energy Trading 2014).

In addition, new suburbs are now being built with 100% solar. Denman Prospect in Canberra, will be the first suburb in Australia to require a minimum of 3kW of solar PV on every house (Canberra Times 2015). Breezes Muirhead in Darwin being developed by Defence Housing Australia plans to include a 4.5kW solar system and charging points for electric vehicles on each house - features anticipated to save residents over \$2,000 a year on their electricity bills (RenewEconomy 2015a).

Table 4: Top solar postcodes – with 50% penetration or more.

Postcode	Suburbs	State	Penetration Rate
5117	Angle Vale	SA	65%
6437	Leinster, Sir Samuel	WA	65%
2769	The Ponds	NSW	64%
4516	Elimbah	QLD	58%
6171	Baldivis	WA	57%
3978	Cardinia, Clyde, Clyde North	VIC	57%
5235	Cromer, Eden Valley, Flaxman Valley, Mount Pleasant, Springton, Taunton	SA	53%
5120	Buckland Park, Virginia	SA	53%
5480	Appila, Laura, Stone Hut	SA	52%
4511	Goodwin Beach, Ningi, Sandstone Point	QLD	51%
4155	Chandler	QLD	51%
4307	Coleyville, Harrisville, Mutdapilly, Radford, Silverdale, Warill View, Wilsons Plains	QLD	51%
4270	Tamborine	QLD	50%
4512	Bracalba, Bracalba, Wamuran, Wamuran Basin	QLD	50%

Source: ESAA 2015b.

4. States' and Territories' Renewable Energy Targets and Policies

To compare the renewable energy policies of states and territories we examined renewable energy targets and other policy and program support. States and territories were given a score for renewable energy targets, supporting programs and policies. Score card methodology is outlined in Appendix A.

The number of states and territories with renewable energy targets has increased from two to four in the past year:

- › Two new states - Victoria and Queensland - have announced new targets for renewable energy.
- › States with targets already in place - South Australia and the ACT - continued to expand their renewable energy ambitions, and plan further into the future.

Renewable energy targets are designed to increase renewable energy uptake, mainly in electricity generation. Targets can range from political announcements (without accompanying policies or action plans), through to targets which are supported by detailed roadmaps, clear policies and legislation. Renewable energy targets can serve a range of purposes, including to raise awareness and signal political commitment, establish accountability, to provide clear policy direction to communities and organisations and to set milestones and evaluate progress (IRENA 2015c).

The number of states and territories with renewable energy targets has doubled in the past year.

States and territories are at different stages in setting renewable energy targets and implementing actions to achieve them. For example, the ACT's renewable energy target in place since 2010 is underpinned by measurable policies and quantifiable actions designed to meet its target, such as the renewable energy reverse auction process. In South Australia consistent policy support, ratcheting up of renewable energy targets, and improving complementary planning legislation has established the state as an attractive location for wind and solar (IRENA 2015c). In contrast, Queensland and Victoria are at the early stages of renewable energy target setting – at the political announcement and vision setting stage.

Renewable energy targets should ideally:

- › Be legally binding and therefore less vulnerable to changes in political leadership.
- › Be backed by clear strategies and appropriate enforcement.
- › Set clear plans and responsibilities for implementation.
- › Be ambitious, but achievable (IRENA 2015c).

Each box below provides a summary of the state of play in each state and territory.

South Australia: Leading the Pack

South Australia has made a rapid shift to renewable energy, going from 99% fossil fuel electricity in 2003-04 to just over 40% wind and solar power in 2014-15 (Government of South Australia 2015a).

In 2013, South Australia introduced a new investment target of AUD 10 billion in low carbon generation by 2025. In 2014, South Australia increased its renewable energy target to 50% of electricity produced in the state to come from renewable sources by 2025 (Government of South Australia 2015a).

South Australia's plans include:

- › facilitating projects approvals and funding, such as for Sundrop Farms expansion (a solar thermal powered greenhouse and desalination plant in Port Augusta), Coober Pedy wind and solar hybrid project, and off-grid solar and battery storage for Marree.
- › funding for solar tracking station and electric vehicle charging network on Kangaroo Island (Government of South Australia 2015a).

South Australia is well on the way to achieving this target – already generating 40% of its power from wind and solar PV in 2014 (Clean Energy Council 2015). Recently, on 25 November 2015, South Australia announced further plans designed to transition the state more quickly to a greater reliance on renewable energy sources whilst ensuring competitive price, reliable and secure supplies of electricity, and setting in place a state target to achieve “zero net emissions” by 2050 (Government of South Australia 2015b).

With government electricity contracts soon due to expire, South Australia has taken advantage of the opportunity to shift its supply towards renewable energy. The State Government has called for expressions of interest from companies to supply up to 100% of the State Government's electricity use from “low-carbon” technologies. Companies are asked to provide up to 481 GWh of electricity from solar, wind, batteries or other low emitting technologies, equivalent to about 4% of South Australia's total electricity consumption (AEMO 2013; Government of South Australia 2015c; The Advertiser 2015).

BOX 1: SOUTH AUSTRALIA – RENEWABLE ENERGY FACTS AND STATS

South Australia has:

- › a target to reach **50%** renewable electricity by 2025 and “zero net emissions” by 2050
- › **40%** renewable electricity supply – second highest after Tasmania
- › **1,505MW** of large-scale renewable energy capacity installed (excluding hydro) – highest capacity and capacity per capita of all the states and territories
- › **194,927** solar PV systems installed
- › **28.8%** of households with solar PV – second highest proportion after Queensland.

Sources: ABS 2015; Australian PV Institute 2016; Government of South Australia 2015a; Clean Energy Council 2015; Clean Energy Regulator 2016a.



Figure 11: Adelaide Airport Solar PV panels.

The South Australian Government has also supported the rollout of battery storage, seeking tenders to provide battery storage to high profile buildings along North Terrace including the Museum, the State Library and the Art Gallery. The project complements the City of Adelaide's Sustainable City Incentives Scheme that provides rebates to households installing solar PV, battery storage systems and electric vehicle charging systems (City of Adelaide 2015).

South Australia has recently seen its remaining coal fired generator, the 500MW Northern Power Station, permanently closed, and AGL announce that the 480MW Torrens Island gas fired plant will be mothballed in 2017 (AEMO 2015a, AEMO 2015b). With almost 1000MW of overcapacity removed from the State's generation market bringing supply and demand into closer balance, it is no surprise that wholesale market contract prices have increased, as has price volatility. Queensland is seeing similar increases in price and volatility with the LNG expansion adding to the State's power demand

(Australian Energy Market Commission 2015). Inspection of historical power prices in all states would also show periods of higher prices and volatility have existed when supply-demand was in closer balance. It is just that the National Electricity Market has seen surplus capacity in recent years due to new plant builds (fossil fuel and renewable) and contracting demand. South Australia's ability to add more renewable capacity and export surplus clean power interstate, as well as import power from interstate when local renewable supplies are low, is being adversely impacted by the limited size of the existing interconnector with Victoria, even though that is being expanded. A second interconnector with NSW would increase competition in wholesale power markets in three states, improve supply security and reduce carbon intensity of supply in the NEM. As in the case of Tasmania (Prime Minister of Australia 2016), there are compelling reasons to urgently investigate a second interconnector between South Australia and NSW.

South Australia has a target of "zero net emissions" by 2050.

ACT: Leading

The ACT has had a 90% renewable energy target (for electricity consumed) in place since 2010. In the past year, the Territory Government has ratcheted up its target, initially to 100% renewable electricity by 2025, and then, in April 2016 brought forward the 100% target by five years to 2020 (ACT Government 2015b; ACT Government 2016; Canberra Times 2016).

The ACT Government has been progressively transitioning to renewable power sources since 2012, by holding three large-scale renewable energy reverse auctions aimed at purchasing renewable energy from wind and solar projects at the lowest price. To date the ACT's reverse auction process has supported 400MW of wind power and 40MW of large-scale solar, with the projects supporting jobs and providing training opportunities across Canberra, Victoria and South Australia (ACT Government 2015a). If these renewable energy projects were included as part of the ACT's capacity, it would have the highest large-scale renewable energy capacity per person out of all the states and territories.

In order to meet the 100% renewable electricity target by 2020, ACT has increased its latest renewable energy capacity release from 109MW to 200MW (Canberra Times 2016).

BOX 2: ACT – RENEWABLE ENERGY FACTS AND STATS

The ACT has:

- › a target to reach **100%** renewable electricity by 2020 – the highest of any state or territory
- › **25.6MW** of large-scale renewable energy capacity installed (excluding hydro) and has contributed to large-scale renewable energy in other states through its renewable energy reverse auctions
- › **16,655** solar PV systems installed
- › **13.1%** of households with solar PV.

Sources: ABS 2015; Australian PV Institute 2016; ACT Government 2016; Clean Energy Council 2015; Clean Energy Regulator 2016a.



Figure 12: Royalla Solar Farm, ACT one of the first projects to receive support from the ACT's renewable energy reverse auctions.

The ACT is on track towards 100% renewables by 2020.

The ACT has recently introduced a grant scheme to encourage businesses and homes in the Territory to take up battery storage, (ABC 2015b). The scheme aims to encourage the installation of up to 6,000 battery storage systems over the next four years.

Tasmania: Leading

Tasmania has long relied on renewable hydro-electric power to provide the majority of its power needs (AEMO 2015).

Tasmania's new energy strategy seeks to highlight and make the most of what the State terms its "renewable energy advantage" (Tasmanian Government 2015). The strategy aims to reduce energy costs while also positioning Tasmania for a lower emissions future and as an attractive location for businesses such as data centres, silicon smelters and food processing seeking to power their operations by renewable energy.

In the past year, Tasmania's ability to realise its renewable energy advantage has been at risk in the short term after running down its hydro dams towards the end of the Carbon Pricing Scheme followed by the Basslink interconnector (linking Tasmania to the mainland electricity network) failing in December 2015.

During the operation of the Federal Government's Carbon Pricing Mechanism, Hydro Tasmania ran its hydro power plants at full capacity to maximise financial benefit from the scheme. This meant that Tasmania exported as much excess hydro power to Victoria as possible over the Basslink Interconnector, drawing down hydro dams to below 30% capacity. The El Niño shift in weather followed soon after the Carbon Pricing Mechanism repeal, meaning a drier than usual spell for Tasmania, so hydro dams haven't refilled (Sandiford M 2015). As a result, Tasmania began importing Victorian brown coal to provide one third of the State's demand.

When the Basslink Interconnector failed in December 2015, the limited hydro power capacity, and inability to import electricity from Victoria has seen Tasmania resort to using diesel generators to supply the state's electricity needs (Energy Matters 2016b). However, Tasmania's hydro dams (Figure 13) are beginning to recover following sustained rainfall. In May, the State was able to switch off the emergency diesel generators (for the first time in 2016) and supply all its energy needs from hydro power and wind (ABC 2016).

BOX 3: TASMANIA – RENEWABLE ENERGY FACTS AND STATS

Tasmania has:

- › **95%** renewable electricity supply – the highest of any state
- › **319.6MW** of large-scale renewable energy capacity installed (excluding hydro) – second highest capacity per capita after South Australia
- › **26,660** solar PV systems installed
- › **12.1%** of households with solar PV.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Clean Energy Regulator 2016a.



Figure 13: Hydro dam providing renewable energy in Tasmania.

Hydro Tasmania and the Tasmanian Government are managing the Basslink failure by reducing energy demand and sourcing additional power needs from gas and diesel. Hydro Tasmania proposes to switch on over 300MW of gas capacity, make voluntary agreements with industries to reduce energy use and continue to rely on diesel generation (Hydro Tasmania 2016). A Federal-State study was recently initiated to investigate a second interconnector between Tasmania and the mainland to improve supply security and allow the state to economically increase its renewable energy and export more renewable power to the mainland states. Tasmania's major hydro

resources are ideally positioned to supply large-scale energy storage to the mainland grid as renewable supply increases and coal plants close in future.

As Australia faces up to delivering deep cuts to emissions from its electricity supply through greater uptake of zero emission renewables, it is no surprise that increased grid inter-connectivity and storage will be needed. In this respect, Australia is no different to other regions globally where the level of renewables has increased, with Tasmania and South Australia, with their high renewables penetration, being at the front line in Australia.

Queensland: Middle of the Pack

In January 2015, the then Australian Labor Party opposition took a policy of 50% renewable energy by 2030 and one million solar rooftops (or 3GW of solar PV capacity) by 2020 to the election. Since being elected, the Palaszczuk Government has reaffirmed its commitment to these targets, but is yet to implement further specific policy measures until an independent public inquiry has established the steps needed to reach the 50% goal (Queensland Government 2015; RenewEconomy 2015b). On 27 January 2016, an Expert Panel commenced the public inquiry into the 50% renewable energy target for Queensland.

The Queensland Government is partnering with the Australian Renewable Energy Agency to support the development of 60MW of large-scale solar energy in the state. The purpose of the funding is to encourage large-scale solar in Queensland, to demonstrate technical and economic feasibility and to facilitate future developments (Queensland Government 2015). Queensland Government owned Ergon Energy has also shortlisted seven renewable energy projects (four solar farms, two wind farms and a biomass plant) to provide 150MW of generating capacity. A decision on the successful project is expected in 2016 (Ergon Energy 2015; RenewEconomy 2016b).

The State Government also asked the Queensland Productivity Commission to conduct an inquiry into fair pricing for solar customers to specifically investigate the broader community benefits from households taking up solar electricity (Queensland Government 2015). The inquiry did not recommend an increase in feed-in tariffs (Australian Energy Council 2016).

BOX 4: QUEENSLAND – RENEWABLE ENERGY FACTS AND STATS

Queensland has:

- › a target to reach **50%** renewable electricity by 2030 and 1 million solar households by 2020
- › **7%** renewable electricity supply
- › **1,135.7MW** of large-scale renewable energy capacity installed (excluding hydro)
- › **470,953** solar PV systems installed – the highest of any state or territory
- › **29.6%** of households with solar PV – the highest proportion of any state or territory.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Queensland Government 2015; Clean Energy Regulator 2016a.



Figure 14: Rooftop solar panels in Beenleigh Queensland.

Queensland has a target to reach 50% renewable electricity by 2030 and 1 million solar households by 2020.

Victoria: Middle of the Pack

In 2014, Victoria was the Australian state with the most restrictive policy environment for renewable energy, largely due to planning policies actively discouraging the development of wind farms (Climate Council 2014). Landowners had an effective veto over wind energy developments located within two kilometres of a dwelling, and the State Government had prohibited wind farm development in extensive “no go” areas across the State.

Since coming to office in November 2014, the Andrews Government has sought to re-badge Victoria as a more attractive investment location for renewable energy. In March, the State Government eased the wind farm planning restrictions from two kilometres to one kilometre, but retained the “no go” areas (Victorian Government 2015a). Despite these changes, the remaining one kilometre veto and “no go” areas still mean it is easier to gain approval for a new coal mine than a wind farm in Victoria (Environment Defenders Office (Victoria) 2011). The Victorian Government is currently carrying out an independent review of coal programs, including a decision making framework for the approval of any new coal mines.

Victoria is consulting on a modest renewable energy target of “at least” 20% by 2020. The “at least” 20% renewable energy target is outlined in Victoria’s Renewable Energy Roadmap (with a final renewable energy target, to incorporate community and industry feedback yet to be announced) which also sets out other key priorities including tendering for renewable electricity to power government operations, supporting solar households, and establishing a \$20 million “New Energy Jobs Fund” (Victorian Government 2015a). The State Government is expected to release further details on its renewable energy plans, including any increases to the renewable energy target after setting aside \$12 million in the April 2016 budget for transitioning the State from brown coal to renewable energy (The Age 2016).

BOX 5: VICTORIA – RENEWABLE ENERGY FACTS AND STATS

Victoria has:

- › a target to reach “at least” **20%** renewable electricity by 2020
- › **10%** renewable electricity supply
- › **1377.8MW** of large-scale renewable energy capacity installed (excluding hydro) – second highest capacity after South Australia
- › **282,295** solar PV systems installed
- › **14.2%** of households with solar PV.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Victorian Government 2015a; Clean Energy Regulator 2016a.

It is easier to gain approval for a new coal mine than a wind farm in Victoria.

The Victorian Government has called for tenders to supply (expected to equate to 100MW) of renewable energy certificates over an initial period of five years and has provided grants to community led renewable energy projects in Newstead and Woodend (Victorian Government 2015a; Victorian Government 2015b; Victorian Government 2016).

The Victorian Government is also making changes to support solar households. The State has tightened rules for electricity retailers to ensure that households with solar (or other renewable energy generator) are not charged higher tariffs than other customers. The Victorian Energy Legislation Amendment (Consumer Protection) Bill 2015 was passed by the Victorian Parliament in October 2015 I (Victorian Government 2015c).

Victoria has also announced an inquiry into whether the environmental and social benefits of solar power are adequately reflected by feed-in tariffs (Victorian Government 2015d). The first report from the Essential Services Commission conducting the inquiry recommended feed-in tariffs reflect the benefit of reduced greenhouse gas emissions from solar PV (Essential Services Commission 2016).

In December, the Victorian Government announced its intention to make regulatory changes to enable solar leasing arrangements. Solar leasing is a business model which is popular in the US and the United Kingdom and involves an agreement between a household and solar company whereby the household pays less upfront to install a solar system, but then buys their electricity from the solar company for an agreed price over time, effectively paying off the solar system in installments (Victorian Government 2015e).

Western Australia: Middle of the Pack

Western Australia does not currently have renewable energy policy targets in place. However, the State Government is currently working on a state renewable energy policy expected to be released later in 2016.

Western Australia has taken a small step to support households with solar PV and battery storage. In November 2015, the Energy Minister, Mike Nahan announced a rule change allowing households with battery storage systems or electric vehicles to export excess electricity to the grid (Government of Western Australia 2015a).

The Western Australian State Government has contributed to a number of renewable energy and battery storage projects including:

- › Funding (in partnership with the Federal Government) for a 600kW solar farm on Rottnest Island to complement the existing wind farm and lift the island’s reliance on renewable energy from 30 to 45% (Government of Western Australia 2015b).
- › Trialling the cost-effectiveness of “off grid” power systems (solar PV together with battery storage and backup diesel) in rural locations compared with connecting to the grid via overhead power lines (Government of Western Australia 2015c).
- › Trialling large-scale battery storage replacing diesel reserve power in Carnavon (Government of Western Australia 2015d).
- › \$500,000 Funding for a power plant generating electricity from food and organic waste (Government of Western Australia 2015e).
- › Funding for solar and battery storage and energy efficiency measures for new housing developments – Alkimos Beach and the Gen Y Demonstration Housing Project (RenewEconomy 2015d).

BOX 6: WESTERN AUSTRALIA – RENEWABLE ENERGY FACTS AND STATS

Western Australia has:

- › **13%** renewable electricity supply
- › **599.5MW** of large-scale renewable energy capacity installed (excluding hydro)
- › **199,662** solar PV systems installed
- › **22.5%** of households with solar PV.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Clean Energy Regulator 2016a.

New South Wales: Lagging Behind

Despite the Baird Government promising to make NSW “Australia’s answer to California”, NSW has dropped to the lowest share of renewable energy among the states (Clean Energy Council 2015; Sydney Morning Herald 2015b).

When it comes to renewable energy, the state’s focus has been continued implementation of its 2013 Renewable Energy Action Plan (NSW Government 2013). This plan focuses on facilitating renewable energy developments across government and fostering innovation, for example through establishing a Renewable Energy Innovation and Knowledge Hub in Newcastle and creating a prize for renewable energy innovation.

Joining an emerging trend (in South Australia and Victoria) to use government procurement to increase renewable energy, the NSW Government has sought tenders to provide 137GWh of renewable energy (equivalent to 40-60MW of additional renewable generating capacity) to power the Sydney Metro Northwest Project (RenewEconomy 2016c).

However, draft NSW planning guidelines for wind farms released in 2011 are yet to be finalised five years later, holding up wind projects and creating uncertainty for wind energy developers (NSW Government 2011; Daily Examiner 2016).

The NSW Government also removed the specific position within the ministry responsible for promoting renewable energy following the 2015 election; namely the parliamentary secretary for renewable energy (RenewEconomy 2015e).

BOX 7: NEW SOUTH WALES – RENEWABLE ENERGY FACTS AND STATS

New South Wales has:

- › **6%** renewable electricity supply – the lowest of any state
- › **1,069.7MW** of large-scale renewable energy capacity installed (excluding hydro)
- › **331,378** solar PV systems installed – the second highest number after Queensland
- › **14.1%** of households with solar PV.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Clean Energy Regulator 2016a.

NSW has the lowest share of renewable energy.

Northern Territory: Lagging Behind

There has been little progress on renewable energy in the Northern Territory since the Climate Council's report in 2014 which found the Territory had no renewable energy target, and the lowest proportion of households with solar PV (despite high electricity costs, quality solar resource and the most generous feed-in tariff rates in Australia) (Climate Council 2014).

The Northern Territory retains the highest solar PV feed-in tariff rates in the country. Solar households in the Northern Territory receive the same rate for feeding solar electricity into the grid as the standard retail price for grid-based electricity (Energy Matters 2016a).

The Northern Territory has no specific targets or policies to encourage renewable energy.

BOX 8: NORTHERN TERRITORY – RENEWABLE ENERGY FACTS AND STATS

The Northern Territory has:

- › **11.5MW** of large-scale renewable energy capacity installed (excluding hydro)
- › **5,334** solar PV systems installed
- › **8.7%** of households with solar PV – the lowest level of any state or territory.

Sources: ABS 2015; Australian PV Institute 2016; Clean Energy Council 2015; Clean Energy Regulator 2016a.

Northern Territory is at the back of the pack in Australia's renewable energy race.



Figure 15: Solar panels on a hotel roof, Uluru, Northern Territory.

Conclusion

The Climate Council has rated the states' and territories' renewable energy performance and policy based on comparable measures: percentage renewable electricity, large-scale capacity per capita, proportion of solar households and the existence of targets, policies and program support. See Appendix A for methodology.

South Australia remains a leader among the states on renewable energy, both in terms of performance and policy. Tasmania, Queensland, Victoria and Western Australia follow.

New South Wales received the lowest grade, in large part due to their low percentage of renewable electricity uptake, low level of large-scale capacity per capita, and low percentage of households with solar (Table 5).

Table 5: 2016 States and territories renewable energy score card.

State / Territory	Grade	Comments
Leading the pack		
South Australia	A	<p>South Australia has:</p> <ul style="list-style-type: none"> > a target to reach 50% renewable electricity by 2025 and "zero net emissions" by 2050 > 40% renewable electricity supply – second highest after Tasmania > 1,505MW of large-scale renewable energy capacity installed (excluding hydro) – highest capacity and capacity per capita of all the states and territories > 194,927 solar PV systems installed > 28.8% of households with solar PV – second highest proportion after Queensland
ACT	*	<p>The ACT has:</p> <ul style="list-style-type: none"> > a target to reach 100% renewable electricity by 2020 – the highest of any state or territory > 25.6MW of large-scale renewable energy capacity installed (excluding hydro) and has contributed to 400MW large-scale wind farms in other states through its renewable energy reverse auctions. The ACT would have the highest large-scale renewable energy capacity per person if these projects were attributed to the ACT's total. > 16,655 solar PV systems installed > 13.1% of households with solar PV
Tasmania	B	<p>Tasmania has:</p> <ul style="list-style-type: none"> > 95% renewable electricity supply – the highest of any state > 319.6MW of large-scale renewable energy capacity installed (excluding hydro) – second highest capacity per capita after South Australia > 26,660 solar PV systems installed > 12.1% of households with solar PV > relied increasingly on fossil fuels in recent times (Victorian coal power, and diesel generators after the Basslink Interconnector failed) after running down hydro dam capacity ahead of the end of the Carbon Pricing Mechanism

State / Territory	Grade	Comments
Middle of the pack		
Queensland	C	<p>Queensland has:</p> <ul style="list-style-type: none"> > a target to reach 50% renewable electricity by 2030 and 1 million solar households by 2020 > 7% renewable electricity supply > 1,135.7MW of large-scale renewable energy capacity installed (excluding hydro),¹ > 470,953 solar PV systems installed – the highest of any state or territory > 29.6% of households with solar PV – the highest proportion of any state or territory > supported large-scale renewable energy projects and will conduct a public enquiry to determine the steps needed to reach its target
Western Australia	C	<p>Western Australia has:</p> <ul style="list-style-type: none"> > 13% renewable electricity supply > 599.5MW of large-scale renewable energy capacity installed (excluding hydro) > 199,662 solar PV systems installed > 22.5% of households with solar PV > trialled a range of “off-grid” solar and battery storage projects for towns and housing developments
Victoria	C	<p>Victoria has:</p> <ul style="list-style-type: none"> > a target to reach “at least” 20% renewable electricity by 2020 > 10% renewable electricity supply > 1377.8MW of large-scale renewable energy capacity installed (excluding hydro) – second highest capacity after South Australia > 282,295 solar PV systems installed > 14.2% of households with solar PV > outlined a range of renewable energy policies including a New Energy Jobs Fund, grants for community power and regulation changes to support solar households.
Lagging behind		
New South Wales	D	<p>New South Wales has:</p> <ul style="list-style-type: none"> > 6% renewable electricity supply – the lowest of any state > 1,069.7MW of large-scale renewable energy capacity installed (excluding hydro) > 331,378 solar PV systems installed – the second highest number after Queensland > 14.1% of households with solar PV – the lowest level of any state > sought tenders to provide renewable energy for the Sydney Metro Northwest project, and created uncertainty for wind farm developers due to lack of final planning guidelines
Northern Territory	*	<p>The Northern Territory has:</p> <ul style="list-style-type: none"> > no specific targets or policies to encourage renewable energy > 11.5MW of large-scale renewable energy capacity installed (excluding hydro) > 5,334 solar PV systems installed > 8.7% of households with solar PV – the lowest level of any state or territory

1. There appears to be a discrepancy between Queensland’s biomass capacity figures from the Clean Energy Regulator (2016a) and the Australian Energy Market Operator’s figures. The above table includes 509MW landfill gas capacity and 465MW of bagasse capacity - significantly more than the 350MW reported by AEMO (2015) and more than six times the biomass and landfill gas capacity in NSW, the next highest amount.

* Due to the lack of comparable data on percentage of renewable energy in electricity supply for the territories, we have not given the territories a specific grade (refer to Appendix A for grading methodology).

Sources: ABS 2015; Australian PV Institute 2016; Government of South Australia 2015a; Clean Energy Council 2015; Queensland Government 2015; Victorian Government 2015a; ACT Government 2016; Clean Energy Regulator 2016a

Appendix A - States Score Card Grade Methodology

This Appendix describes the methodology for rating the states based on their renewable energy performance and policies.

To apply a grade (A, B, C) to each of the states, we gave each state a score according to performance on percentage renewables and household solar and presence of a target and/or policy support (Table A).

Table A: Calculating state report card grade.

State	% renewable electricity	Large-scale capacity (excl hydro) per capita (kw/cap)	% solar households	Policy	Report grade
	***50%+ ** 20%+ *10%+	**0.6+ *0.2+	** 20%+ * 10%+	*** target and detailed plans ** target * policy / project support	A 8-9* B 6-7* C 4-5* D 2-3*
South Australia	**	**	**	***	A
Tasmania	***	**	*	*	B
Victoria	*	*	*	**	C
Queensland		*	**	**	C
Western Australia	*	*	**	*	C
New South Wales			*	*	D

Note: Due to the lack of comparable data on percentage of renewable energy in electricity supply for the territories, we have not given the territories a grade (refer to Appendix A for grading methodology).

Appendix B – Acronyms and Abbreviations

ACT	Australian Capital Territory
AUD	Australian dollars
GW	gigawatt (1,000,000,000 watts)
GWh	gigawatthours
kw	kilowatt (1,000 watts)
MW	megawatt (1,000,000 watts)
MWh	megawatthours
PV	Photovoltaic
US	United States of America
USD	United States dollars

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