

TERRITORY TRAILBLAZER: HOW THE ACT BECAME THE RENEWABLE CAPITAL OF AUSTRALIA



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The authors contain sole responsibility for the contents of this report.

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Image credit: "John Kaye visit to Royalla Solar Farm 8 August 2015" by the late Dr John Kaye, former Greens NSW MLC and energy spokesperson.

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Key Findings

1

The Australian Capital Territory (ACT) is on track to acquire enough large-scale renewable energy to meet its 100% renewable electricity target by 2020.

- › The ACT is the first place in Australia where both major political parties have provided bipartisan support to a state or territory based target.
- › The ACT will reduce emissions by 3 million tonnes in 2020 by sourcing renewable instead of fossil fuelled electricity to meet the Territory's needs.

2

Households in the ACT currently pay the lowest electricity prices in Australia.

- › The ACT's "reverse auction" process has delivered record low wind and solar electricity prices, and in doing so has provided transparency around the cost of renewable electricity in Australia.
- › The prices for successful wind projects under the ACT's process are equal to or lower than prices for electricity from new coal and gas plants in Australia.
- › The additional cost to households and small to medium enterprises peaks in 2020 at around \$5.50 a week, with the ACT's electricity prices remaining among the lowest in Australia.
- › To complement the renewable energy target, the ACT has introduced the Energy Efficiency Improvement Scheme expected to save \$3.20 per household per week in 2020. Energy efficiency can offset the small price increases from investing in renewable energy sources.

3

The ACT's support for the renewable energy sector during extended federal uncertainty proved critical for Australia's renewable sector.

- › To date the ACT has supported the development of 640MW of large scale solar and wind capacity over four years.
- › At the end of 2015, the only wind projects under construction in Australia were those supported by the ACT's policy.
- › While more than 5,000 jobs in renewable energy were lost nationally between 2012-2015, the ACT's policy will create more than 1,000 jobs in construction across the ACT, Victoria, South Australia and New South Wales.

4

The ACT is also breaking new ground in public support for battery technology.

- › The ACT is leading the country in battery storage by supporting the installation of 36MW of energy storage across more than 5,000 households and businesses by 2020 - the largest battery storage rollout in Australia.

5

Other Australian states and cities can learn from the ACT's example.

- › Within five years, the ACT has shown that setting a seriously ambitious renewable energy target, is not only affordable but is also achievable, and creates jobs and investment for the Territory.
- › While recognising the ACT's advantages - being small in size and population and having no major industries or fossil fuelled generation - other states and cities can learn from its approach to sourcing large amounts of renewable electricity in a short period of time, while delivering a range of economic and community benefits.
- › Other states such as Victoria, New South Wales and Queensland are already following the ACT's lead using reverse auctions to meet renewable energy commitments.

Introduction

At 393,000 people and a little over 2,300 square kilometres, the Australian Capital Territory (ACT) might be one of the smallest of Australia's states and territories, but when it comes to renewable energy the ACT punches well above its weight (ABS 2016a; Figure 1).

The Climate Council's 2016 states and territories scorecard, "Game on: The Australian Renewable Energy Race Heats Up" found the ACT and South Australia are leading the other states and territories on renewable energy policy and performance, while others lag behind (Climate Council 2016).

Figure 1: Canberra, ACT.



In this report we profile the ACT's leadership on renewable energy illustrating the positive impact that one small territory can have in a few short years with political will and smart policy design. The ACT has successfully set an ambitious renewable energy target, and achieved it within a relatively short time frame, while maintaining low electricity

costs and maximising local economic development and community outcomes. Other Australian cities, states and territories will be able to learn from elements of this success story.

The ACT shows what can be achieved in renewable energy in a few years.

1. The Importance of State and Territory Action

Around the world, “subnational” governments - those at state, regional and local levels - are playing an increasingly crucial role in the transition from fossil fuelled energy to renewable power.

Ultimately, it is within the states and territories that jobs are created or lost so it is in their interests to encourage local investment.

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. States and territory governments have the advantage of being able to tailor policies according to their specific opportunities and circumstances and are often able to move faster, and adapt and learn from each other's experiences. Ultimately, it is within the states and territories that jobs are created or lost. It is therefore in their interest to encourage investment within their jurisdiction.

In the United States (US), state governments played the leading role in the country achieving second place globally for installed renewable energy capacity in 2015 (IRENA 2015). 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 and renewable energy auctions (IRENA 2015).

The US is 2nd in the world for renewable energy capacity due to state government action.

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 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).

Four Australian states and territories - ACT, South Australia, Queensland and Victoria - have higher renewable electricity targets than the federal government (Climate Council 2016; Table 1; Figure 2).

Table 1: Australian state and national targets.

Jurisdiction	Renewable electricity target
Australia	At least 20% by 2020
ACT	100% by 2020
South Australia	50% by 2025
Queensland	50% by 2030
Victoria	25% by 2020 40% by 2025

Notes:

1. While Tasmania does not have a set target, at 99.9% renewable electricity, they have the greatest share of renewable electricity out of Australia's states and territories (Clean Energy Council 2016).
2. The newly elected Northern Territory Government plans to adopt a target of 50% renewable electricity by 2030 (Territory Labor 2016).

Sources: ACT Government 2016a; Clean Energy Regulator 2016; Government of South Australia 2015; Queensland Government 2016; Victoria State Government 2016.

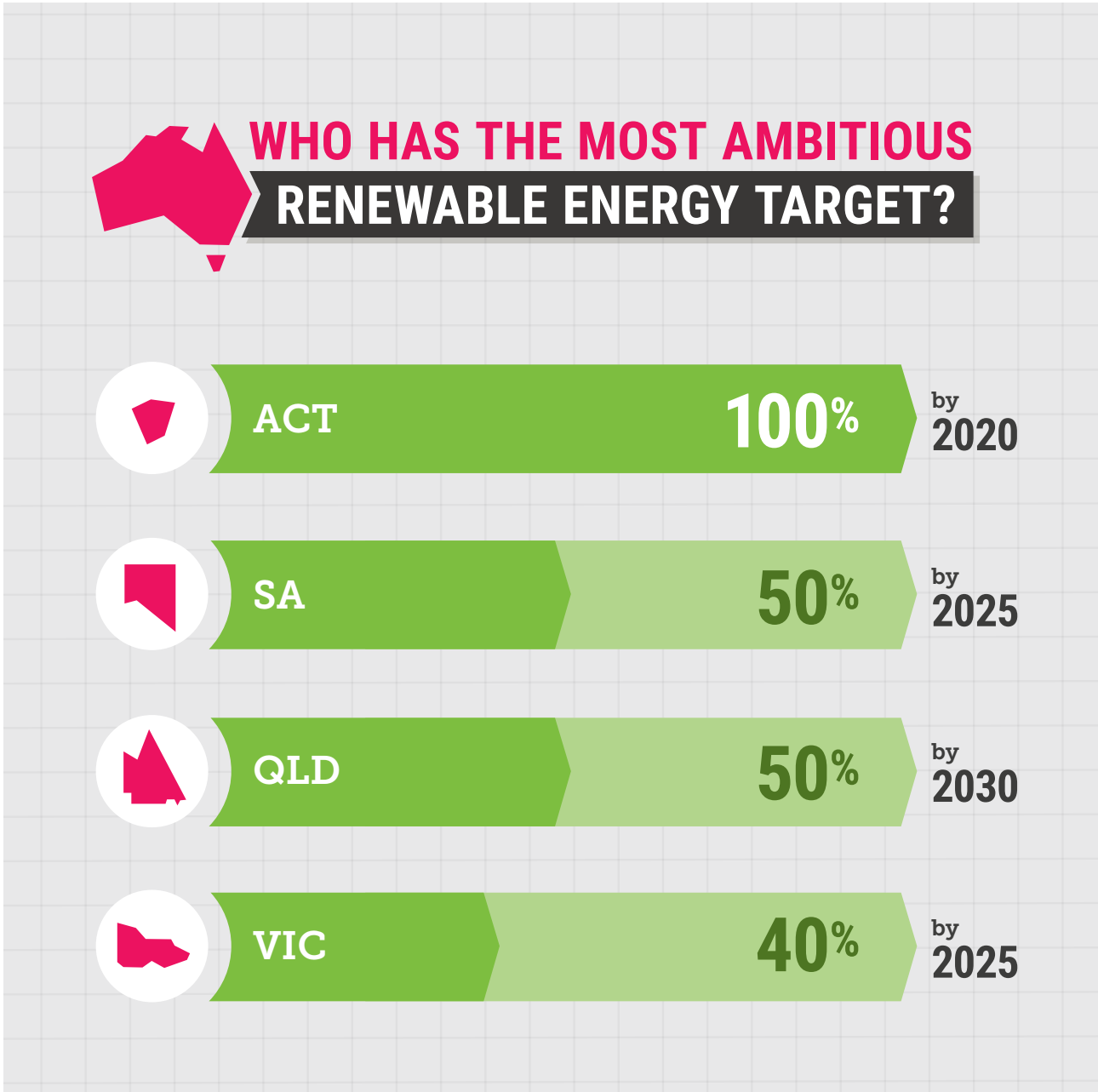


Figure 2: State and territory renewable energy targets.

Globally, sub-national governments are also 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 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). For example, the Paris City Hall Declaration which included a commitment to rapidly transition to 100% renewable energy was signed by over 1,000 mayors and governors from 150 countries, including the ACT Government (Melbourne Sustainable Society Institute 2015).



Figure 3: Hornsdale wind farm under construction.

1,000 mayors and governors have committed to 100% renewable energy.

The Compact of States and Regions brings together 44 sub-national governments around the world (including the governments of South Australia and the ACT) to report on, analyse and showcase state and regional level progress on greenhouse gas reductions and renewable energy. The ACT currently has one of the highest targets for renewable electricity generation out of the participating state and regional governments (Compact of States and Regions 2015).

In Australia, both national and state level policies are driving renewable energy growth. In 2001, the Federal Government's mandatory national renewable energy target of 2% by 2010 prompted early investment in wind and solar power in Australia. Early achievement of this target was followed by a period of inertia, which led to the South Australian and Victorian governments setting their own (higher) independent state-based renewable energy targets. The success of these state targets influenced the expansion of the Renewable Energy Target in 2009 to at least 20% of projected demand by 2020 (Parliament of Australia 2014).

Since 2014, policy uncertainty at the national level (due to a drawn out review and eventual reduction in the Renewable Energy Target and a senate inquiry into wind energy)

resulted in plummeting investment in large-scale wind and solar plants and falling employment in the renewable energy sector (ABC 2015; EY 2015; SMH 2015; EY 2016).

During this time, policy support from state and territory governments, such as the ACT, has been critical to shoring up investment and jobs in the renewable energy sector in Australia throughout this period of federal uncertainty.

The ACT almost single-handedly bolstered the wind energy sector in 2015, as investment in large-scale wind energy in Australia fell to extremely low levels (almost zero) in 2014 and remain below half of 2013 levels of investment (RenewEconomy 2016a; SMH 2016a). The only three wind energy projects under construction at the end of 2015 - Coonoer Bridge and Ararat in Victoria and Hornsdale Stage 1 in South Australia - were all supported by the ACT's "reverse auction" process (Clean Energy Council 2016; RenewEconomy 2016b; Figure 3). However, there were five other wind farms commissioned in Australia during 2015 which were not supported by the ACT (Clean Energy Council 2016). A reverse auction is a process where the best value, lowest priced renewable energy bids are successful.

2. The ACT's 100% Renewable Energy Target

When the ACT first introduced a renewable energy target in 2011, the Territory Government set an initial goal of sourcing 25% of its electricity from renewable energy by 2025. The ACT has progressively increased this target to its current level of 100% renewable electricity by 2020 - the highest incremental renewable energy target in Australia (ACT Government 2012; ACT Government 2016a).

The ACT is the first place in Australia where both major political parties have provided bipartisan support to a state or territory based target (Canberra Liberals 2016).

In the context of national policy uncertainty, the ACT was able to capitalise on its "first mover advantage" and a buyer's market, by attracting some of the best renewable energy projects at low prices. As the Territory Government demonstrated its ability to meet each of its set targets with limited costs through its reverse auction process, the ACT could then confidently increase its targets and bring them forward in time (SMH 2016b).

The ACT's 100% renewable energy target is the highest in Australia, and the first state or territory target to achieve bipartisan support.

3. How Will the ACT Meet its 2020 Target?

The ACT's 100% renewable energy target will be met by:

- › Rooftop solar and GreenPower purchases for Canberra homes, businesses and communities
- › ACT's share of the national renewable energy target scheme
- › Reverse auctions for large-scale renewable energy projects (ACT Government 2016a; Figure 4).

Reverse auctions for large-scale wind and solar projects are the Territory Government's main policy tool for reaching its 100% renewable energy target.

Given the Territory's small land size there are limited opportunities to generate power within the ACT apart from solar photovoltaic power and landfill gas. Physically, the ACT derives most of its power from the national electricity market (the electricity grid connecting Australia's southern and eastern states). This led to an auction scheme design allowing wind farms to be sited in other states.

In order to meet its renewable electricity target, the ACT effectively pays a premium for renewable electricity generated both within and outside of the ACT to produce enough power to meet the ACT's electricity demand. The renewable energy generated by successful projects under the ACT's reverse auction scheme is not counted towards the national Renewable Energy Target, but is additional renewable electricity.

The reverse auctions will enable the ACT to reach three quarters of its 100% renewable energy target (Figure 4). The large-scale renewable energy projects together with the ACT's share of the national renewable energy target, GreenPower purchases (by ACT households and businesses) and rooftop solar will make up the full 100% by 2020 (Figure 4).

Five reverse auctions for wind and solar will ensure the ACT reaches its 100% target.

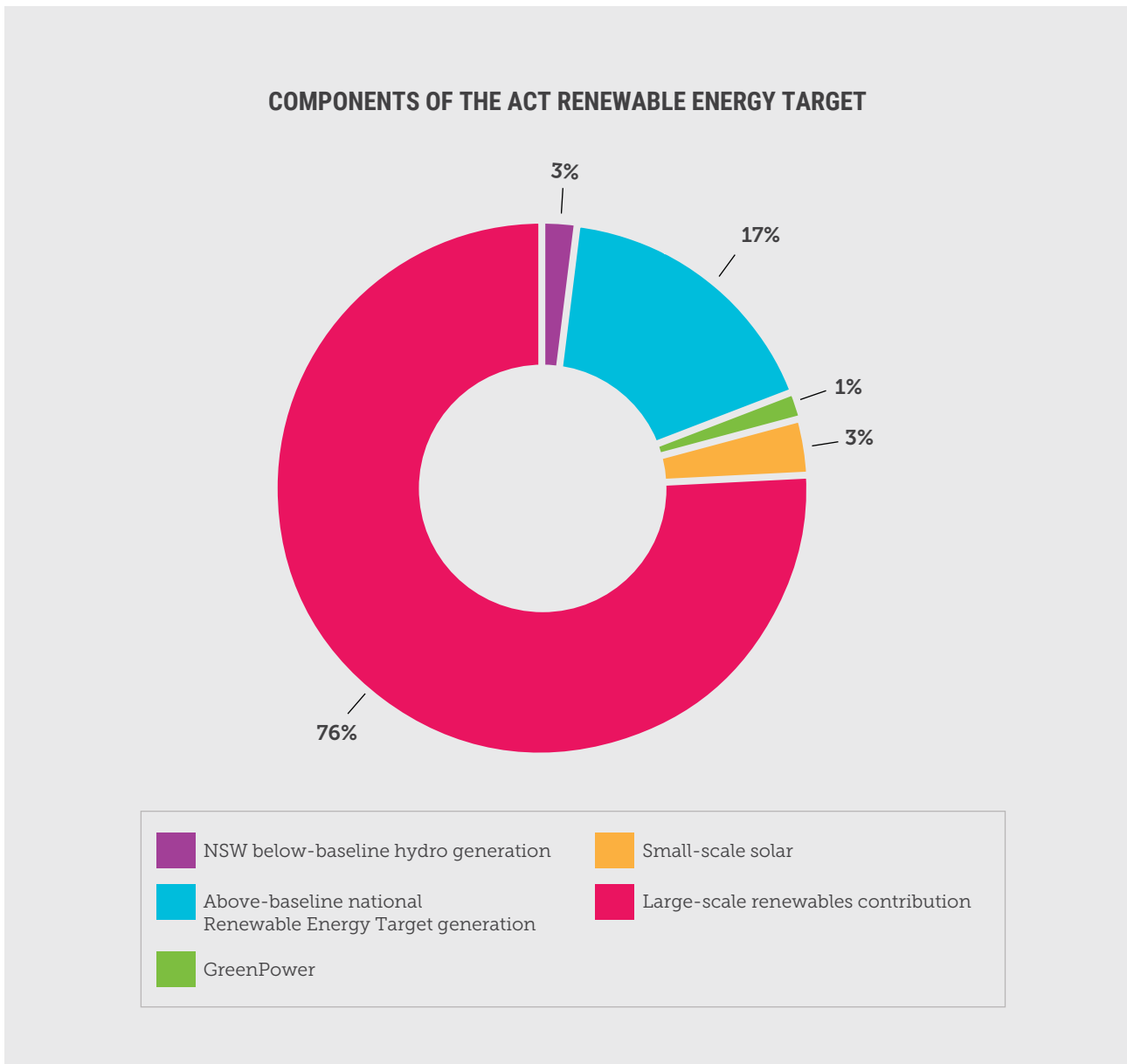


Figure 4: How the ACT will achieve 100% renewable energy by 2020. Source: Figure provided by the ACT Government.

4. About the ACT's Reverse Auction Process

The ACT was the first place in Australia to use a reverse auction process to promote large-scale renewable energy. In 2014, the ACT Government was awarded a Gold Banksia award for setting a new standard for affordable renewable energy through the reverse auction process (Banksia Foundation 2014).

Reverse auctions involve renewable energy companies bidding to supply electricity at a given price (measured in dollars per megawatt-hour, or \$/MWh) over time. Reverse auctions ensure that the renewable energy projects offering the best electricity prices (while also meeting other criteria set by the government) are the ones awarded contracts subject to developer competency and performance against non-price assessment criteria (CEM and IRENA 2015).

The ACT government has established clear objectives (in the ACT's *Electricity Feed-in (Large Scale Renewable Energy Generation) Act 2011*) for its reverse auction process.

These are to:

- › promote large-scale renewable electricity in the ACT
- › develop the ACT's renewable energy industry
- › reduce the ACT's greenhouse gas emissions
- › reduce the ACT's reliance on fossil fuelled power while also minimising cost to electricity consumers.

To date the ACT government has held five reverse auctions for large-scale renewable energy totaling 640MW of capacity: two 20MW solar auctions in 2012 and 2013; two 200MW wind auctions in 2014 and 2015; and a 200MW "next generation" auction (including energy storage) open to solar and wind in 2016 (Table 2).

The ACT pioneered the use of renewable energy reverse auctions in Australia.

Table 2: Successful projects under the ACT's reverse auction process.

Project name	Size (MW)	Location	Current status
20MW Solar Auction 2012			
Royalla Solar Farm (Figure 5)	20	South of Canberra, ACT	Completed 2014
20MW Solar Auction 2013			
Mugga Lane Solar Farm	13	Tuggeranong, ACT	Under construction, to be completed 2016
Capital Solar Farm	7	Williamsdal, ACT	Under construction, to be completed 2016
200MW Wind Auction 2014			
Coonooer Bridge Wind Farm	19.4	Northwest of Bendigo, VIC	Completed early 2016
Hornsedale Wind Farm (Stage 1)	100	North of Jamestown, SA	Under construction, to be completed 2017
Ararat Wind Farm	80.5	Northwest of Ballarat, VIC	Under construction, to be completed 2018
200MW Wind Auction 2015			
Hornsedale Wind Farm (Stage 2)	100	North of Jamestown, SA	Under construction, to be completed 2018
Sapphire Wind Farm	100	Near Glen Innes, NSW	Construction to start late 2016, to be completed 2018
Next generation solar and wind (plus storage) 2016			
Hornsedale Wind Farm (Stage 3)	109	Southeast of Port Augusta, SA	Construction to start late 2017, to be completed 2019
Crookwell 2 Wind Farm	91	Northwest of Goulburn, NSW	Construction to start late 2017, to be completed 2019
Total	640		

Sources: SKM 2013; Jacobs 2015; ACT Government 2016b; Clean Energy Council 2016; NSW Government 2016a; RenewEconomy 2016c.

The ACT's process requires that projects bidding in their reverse auctions meet set eligibility conditions for companies, and project requirements such as renewable energy type, size, location, grid connection and development approval. The ACT criteria also require projects to offer exceptional economic benefits to the ACT and to minimise costs to electricity consumers (Jacobs 2015).

The ACT's legislation for the reverse auction process requires each reverse auction to be independently reviewed within six months, against five criteria:

1. Appropriateness (whether the process met the stated objectives)
2. Value-for-money (timely project completion, best practice community engagement, economic development benefits for the ACT, low reliance on treasury guarantees)
3. Efficiency (administration, governance and management practices to deliver certainty, transparency and accountability)
4. Effectiveness (level of competition, quality of proposals)
5. Risks to project delivery and cost (Jacobs 2015).

Findings from each review process have ensured that the ACT's reverse auction process can be tweaked and improved over time.

Figure 5: Royalla Solar Farm.



5. Reverse Auction Process Delivering Low Cost Power

While the ACT was the first government to use reverse auctions in Australia, reverse auctions are becoming increasingly popular around the world as a way to ensure low renewable energy prices as well as certainty for both the government and developer, and transparency (CEM and IRENA 2015).

The ACT's reverse auction process has delivered some of Australia's cheapest prices for wind and solar power.

Successful solar and wind projects under the ACT's reverse auction process have delivered some of Australia's cheapest prices for renewable energy. The prices for successful wind energy projects (ranging from \$73 - \$92/MWh) under the ACT's process are equal to or lower than prices for electricity from new coal and gas plants (ranging from \$78 - \$91/MWh) (McConnell 2015; Table 3).

The ACT's 2012 and 2013 solar auctions produced some of the lowest prices for large-scale solar at the time, with all projects priced similar to or lower than the Australian industry benchmark of \$180/MWh (SKM 2013). Since that time, prices for large-scale solar (including bids in the ACT's 2016 wind and solar auction) have come down substantially (RenewEconomy 2016c).

In 2015, Coonooer Bridge set a record for the lowest (known) price for wind energy in Australia - \$81.5/MWh. This price was subsequently beaten in 2015 by the Hornsdale Wind Farm (Stage 2) - \$77/MWh (RenewEconomy 2015). Stage 3 of the Hornsdale Wind Farm, was successful under the 2016 reverse auction with the record price of \$73/MWh (RenewEconomy 2016c).

Price transparency under the ACT scheme has provided real data to refute inaccurately high renewable energy price claims in the media and in other publications (McConnell 2015).

Table 3: ACT reverse auctions and successful projects.

Project name	Size (MW)	Fixed feed-in tariff price for renewable electricity over 20 years
Solar		
Royalla Solar Farm	20	\$186/MWh
Mugga Lane Solar Farm	13	\$178/MWh
Capital Solar Farm	7	\$186/MWh
Wind		
Coonooer Bridge Wind Farm	19.8	\$81.5/MWh
Hornsedale Wind Farm (Stage 1)	105.6	\$92/MWh
Ararat Wind Farm	80.5	\$87/MWh
Hornsedale Wind Farm (Stage 2)	100	\$77/MWh
Sapphire Wind Farm	100	\$89.10/MWh
Hornsedale Wind Farm (Stage 3)	109	\$73/MWh
Crookwell 2 Wind Farm	91	\$86.60/MWh

Sources: RenewEconomy 2013; Jacobs 2015; ACT Government 2016b.

Note: These prices are fixed over 20 years, and do not increase for inflation.

6. What are the Cost Implications for Households and Small Businesses?

Households in the ACT currently pay the lowest electricity prices in Australia (on average), and ACT electricity prices are projected to remain among the lowest in the country in coming years despite incorporating the costs of the ACT's renewable energy policies (AEMC 2015).

The prime reason for the ACT's lower electricity prices are significantly lower retail charges (due to regulation of the ACT's retail electricity market) and lower network prices compared to the other states (ABC 2016b; CME 2016). Costs associated with the ACT's environmental policies per unit of energy (driving renewables) are comparable to other southeastern mainland states (ABC 2016b).

Costs passed onto households to achieve the 100% renewable electricity target are expected to peak at around \$5.50 per household per week in 2020 and then decline (ABC 2016a).

Household electricity prices are projected to remain among the lowest in the country when the ACT reaches 100% renewable electricity.

A standard electricity bill is made up of fixed supply charge and a consumption charge based on the amount of energy used (Australian Government 2016). In order to offset price increases by reducing the total energy consumed in households (particularly those with pension cards) and small to medium organisations, the ACT introduced an energy efficiency scheme in 2013. The Energy Efficiency Improvement Scheme introduced in conjunction with the renewable energy target is expected to save on average \$3.20 per household per week in 2020 (ACT Government 2016c).

The resultant net cost increase (once energy efficiency savings are factored in) for an average household is around \$2.30 per household per week.

7. Reverse Auction Process Delivering Economic, Innovation and Education Benefits

In addition to ensuring it meets its renewable electricity targets, the ACT has designed its large-scale reverse auctions (criteria and selection) process to deliver on a range of additional economic, innovation and social benefits for the Territory.

The reverse auction process, has delivered more than \$400 million in economic benefits to the ACT including developing world-class renewable energy research and development based in Canberra, renewable energy education, and a growing hub for renewable energy businesses basing their operation in the ACT (Jacobs 2015; ACT Government 2016b; RenewEconomy 2016c).

Economic benefits from the first wind auction included:

- › \$18m in research and development to the ACT
- › \$240m broader economic benefits
- › \$250,000 industry attraction (renewable energy showcase)
- › \$250,000 investment in renewable energy education
- › 10 undergraduate scholarships in the ACT (Jacobs 2015).

Economic benefits from the second wind auction included:

- › A \$10.8 million Renewable Energy Innovation Fund over 5 years to develop high-profile, world-class applied research capability in the ACT focussed on distributed energy storage and control systems, to support the development and implementation of the Canberra Energy Innovation Precinct and to design and implement market relevant renewable energy and energy storage trades-training programs
- › \$34 million for the development of an ACT-based renewable energy asset and operations management centre
- › \$33 million to support the development of world-leading carbon neutral microgrid initiatives with the Canberra Institute of Technology including an integrated microgrid test lab for research and education purposes
- › \$35 million to develop a hybrid generation Asia-Pacific Export Hub in the ACT
- › \$5 million invested in partnerships with local businesses and trades training (ACT Government 2016b).

Economic benefits from the 2016 Next Generation Renewables auction include:

- › \$25m in Energy Storage Contributions to fund the rollout of 5,000 small-scale battery storage systems across the ACT
- › \$125m in renewable-energy-to-gas research and development including the establishment of pilot testing plant in the ACT that will produce hydrogen from water.
- › The establishment of a wind company's Asia-Pacific Renewable Energy Centre in the ACT responsible for wind farm maintenance and project development
- › \$55m investment in hydrogen cars in the ACT including a local refuelling station and service and technical support.

A number of renewable energy companies, start-ups and consultancies have established their headquarters or based their operations in Canberra, such as WindLab, Reposit Power, Beast Solutions and Ecospectral.

JOB

Over 1,000 direct construction jobs and more than 30 ongoing construction jobs are being created in the solar plants and wind farms awarded contracts under the ACT's reverse auction process (Table 4).

These renewable energy jobs have been created at a time where employment in the sector has been severely impacted by policy uncertainty. More than 5,000 jobs in renewable energy (one in four) have been lost nationally between 2012 and 2015 (ABS 2016b).

Table 4: Direct jobs associated with ACT's large-scale solar and wind projects.

Solar and Wind Auctions to Date	State	Construction and Operations Jobs
Royalla Solar Farm	ACT	100 construction jobs
Mugga Lane Solar Farm	ACT	40 construction jobs 3 ongoing jobs
Capital Solar Farm	ACT	Up to 80 construction jobs
Coonooer Bridge Wind Farm	VIC	70 construction jobs
Ararat Wind Farm VIC	VIC	150-180 construction jobs 15 ongoing jobs
Hornsedale Wind Farm (Stage 1, 2 and 3)	SA	250 construction 6-10 ongoing jobs
Sapphire Wind Farm	NSW	250 construction jobs
Crookwell 2 Wind Farm	NSW	160 construction jobs At least 6 ongoing jobs
Total		About 1,100 construction jobs More than 30 ongoing jobs

Note: based on publicly available information.

Sources: ABC 2014; ACCIONA 2016; ACT Government 2016e; Canberra Times 2016; Coonooer Bridge Wind Farm 2016; Hornsdale Wind Farm 2016; mlsp 2016; NSW Government 2016b; OneSun Capital 2016; RenewEconomy 2016d; The Advertiser 2016.

The reverse auction process has also rewarded projects demonstrating leading approaches to community engagement. For example, the Coonooer Bridge Wind Farm was the first large-scale renewable energy project in Australia to provide neighbouring landowners (not just those with turbines on their properties) with a stake in owning the project (Coonooer Bridge Wind Farm 2016). This shared-ownership approach has since been adopted by other projects around Australia, including another of the ACT's successful reverse auction bidders, the Sapphire Wind Farm (NSW Government 2016b).

The ACT Government has also run a 1MW reverse auction specifically targeted to community-owned solar projects. The community solar scheme is currently being progressed.

CANBERRA LEADING THE COUNTRY IN ROLLING OUT BATTERY STORAGE

Storing energy for use later using batteries and other technologies allows renewable energy sources such as solar and wind to provide increasing amounts of electricity to the Australian grid.

Battery storage enables households to manage their electricity use to access the cheapest available power: households with solar panels can maximise their use of self-generated power minimising their reliance on electricity from the grid; households without solar can store electricity from the grid at times when it is cheaper for use later during more expensive peak periods (Climate Council 2015).

In 2016, the ACT Government provided initial grant funding to support 200 Canberra homes to install battery storage. Following the initial battery storage pilot, the ACT Government expanded its battery storage goal to supporting the installation of 36MW of energy storage across more than 5,000 households and businesses by 2020 - the largest battery storage rollout in Australia.

The 2016 "next generation renewables" reverse auction for 200MW required successful renewable energy companies to contribute funding towards this large-scale rollout of battery storage across the ACT (Canberra Times 2015; ACT Government 2016d).

8. Supporting Small and Medium Scale Solar Installations

While the ACT's support for renewable energy has focused heavily on large-scale wind and solar farms, the government has also provided incentives for small and medium-scale solar (medium scale projects are those between 30kW and 200kW in size) (ACT Government 2016a).

Between 2009 and 2011, the ACT Government provided a premium feed-in tariff scheme for rooftop solar providing an additional payment for solar electricity above the standard retail electricity price.

Figure 6: Canberra rural property with solar.



The ACT's feed-in tariff successfully drove a rapid increase in the number of households and organisations taking up solar power - from 400 (in 2008-09) to around 17,000 (in 2016) (ACT Government 2016a; Figure 6).

Like many states, the ACT's premium feed-in tariff was phased out as prices for solar panels dropped worldwide and solar reached "grid-parity" across Australia (meaning the cost of solar energy is at or below the cost of electricity from the grid).

Solar installations in the ACT have continued to grow following the closure of the feed-in tariff scheme, even though ACT power prices are the lowest in Australia (low retail

electricity prices reduce the potential cost savings from solar). In June 2016, there were over 17,000 solar systems in the ACT totaling 53.4MW capacity (data for systems under 100kW) (APVI 2016). 13.4% of ACT households now have solar panels on their rooftops (APVI 2016).

Monash (25%) and Belconnen (18%) are the ACT suburbs where the greatest proportion of households have installed solar (data from June 2015) (ACT Government 2015). However, these will soon be surpassed by new developments such as Denman Prospect where solar systems will be mandated on all houses with a minimum size of 3kW (ActewAGL 2015).

9. ACT Renewable Energy Projects Reducing Greenhouse Gas Emissions

The ACT's renewable energy target is closely linked to its target to reduce greenhouse gas emissions by 40% below 1990 levels by 2020. Electricity consumed in the ACT is responsible for around 56% of the Territory's greenhouse gas emissions (Pitt&Sherry 2015).

By sourcing renewable instead of fossil fuelled electricity to meet the ACT's needs, the combined effect of the solar feed-in tariff and the large-scale renewable energy auctions held to date is a reduction of 3 million tonnes of carbon dioxide emissions (Mt CO₂e) (Table 5).

Table 5: ACT reverse auctions and renewable energy projects.

Reverse auction or Program	Total emissions reduced (tCO ₂ e)
Solar	68,500
Wind 1	1,057,000
Wind 2	880,000
Next Generation	851,900
Small-scale feed-in tariff	85,600
Total	2,943,000

Source: SKM 2013; ACT Government 2015; Jacobs 2015; ACT Government 2016a.

10. What Can the Rest of Australia Learn from the ACT

The ACT provides a practical example to other Australian states, territory, and cities that renewable energy targets can be both ambitious and achievable.

Certainly, the ACT's circumstances are substantially different to the other mainland states. Being small in size and population, having low electricity prices, and no major industries or fossil fuelled generation located within the Territory enabled the ACT's Government to set and achieve a high renewable electricity goal in less than a decade. Australian states, particularly those relying heavily on local coal fired power generation will face a more challenging transition.

THE AUSTRALIAN CAPITAL TERRITORY IS RISING UP ON RENEWABLES

100% RENEWABLE
ENERGY BY 2020

640MW OF LARGE-SCALE
WIND AND SOLAR

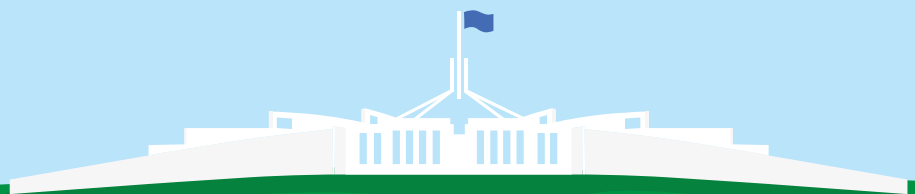
17,000 SMALL-SCALE SOLAR
INSTALLATIONS

\$400+ MILLION IN ECONOMIC
BENEFITS TO THE ACT

5,000 BATTERY STORAGE
SYSTEMS BY 2020

\$73/MWh RECORD LOW PRICES
FOR WIND POWER

1,000+
CONSTRUCTION JOBS



The ACT's approach to sourcing large amounts of renewable electricity in a short period of time, while also delivering a range of economic and community outcomes provides a useful case study for other Australian states, the Northern Territory and cities to learn from.

Other governments are already following the ACT's lead, particularly the reverse auction process which states are adopting to deliver renewable energy commitments at the least cost. These governments will benefit from the ACT's experience and the low price benchmarks for wind and solar already set by the ACT. For example:

- › Victoria will use reverse auctions for large-scale renewable energy to meet its targets of 25% renewable electricity by 2020 and 40% by 2025 (Victoria State Government 2016).
- › Queensland is supporting 120MW of large-scale solar projects in the state through a reverse auction process (Queensland Government 2016; RenewEconomy 2016e).
- › New South Wales tendered for 40-60MW of renewable energy to power its Sydney Metro Northwest rail project (RenewEconomy 2016f).

However it remains to be seen whether these governments will use these tender processes to maximise community and economic benefits as was done in the ACT.

Beyond the reverse auction process, the ACT also provides real-life case studies in other areas - such as large-scale rollout of battery storage, community power reverse auctions and suburbs with mandatory solar on every house.

In a few short years the ACT has shown that the transition to renewable energy is not only desirable but that it is achievable, affordable, and already underway.

Conclusion

The ACT provides an outstanding example of what can be achieved through renewable energy target setting combined with innovative, well-designed policies.

Not only is the ACT on track to achieve its renewable energy target, but it has also demonstrated how policy growth in one area - renewable energy - can also be capitalised on driving record low costs for wind and solar in Australia, supporting employment both locally in the ACT and other states, and facilitating positive economic, education and community outcomes.

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