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Class ACT

How the Australian Capital Territory became a global energy leader

The ACT will soon become the first Australian jurisdiction to achieve a transition from a fossil fuel-based supply to 100% renewable electricity. Just seven other jurisdictions have achieved this, in Germany, Austria and Spain.

Discussion paper

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The cover image was taken by David Clarke (www.ramblingsdc.net) and is used with appreciation. Hornsdale Wind Farm Stage 3, at 109 MW, is the largest project funded through the ACT's reverse auctions. It is located in South Australia.

Summary

In 2016, the Australian Capital Territory (ACT) upgraded its target to 100% renewable electricity by 2020. The agreement with the final renewable generator necessary to meet 100% will come into force in October 2019, ensuring the target is met on time by 1 January 2020.

The ACT will be the first state or territory in Australia to achieve a transition from a fossil fuel-based electricity supply to 100% renewable electricity. Internationally, only seven jurisdictions with populations over 100,000 have made similar transitions:

Table 1: Jurisdictions transitioned to 100% renewable electricity

Jurisdiction	Year	Pop. (mill)
1. Rhein-Hunsrück, Germany	2012	0.1
2. Mecklenburg-Vorpommern, Germany	2013	1.6
3. Extremadura, Spain	2013	1.1
4. Burgenland, Austria	2013	0.3
5. Carinthia, Austria	2013	0.6
6. Schleswig-Holstein, Germany	2015	2.9
7. Lower Austria, Austria	2015	1.6

Sources: CDP, Global Climate Action, Global Covenant of Mayors for Climate & Energy, REN21, 100-percent.org, Carbon Neutral Cities Alliance and others cited elsewhere in this report

Comparing transitions across sub-national jurisdictions is difficult. Data is limited and each faces its own unique circumstances. Key considerations in our analysis are:

- **100% net consumption:** Target applies to the net electricity consumed by the jurisdiction. The jurisdiction is not disqualified if the grid it is part of carries energy generated by fossil fuels, as long as the jurisdiction produces or commissions the production of more than its full annual consumption by renewable sources.
- **Transition from fossil fuels:** Jurisdictions with historic reliance on hydro and geothermal energy are omitted to concentrate on recent transition in response to climate challenges and renewable energy technology. Some hydro-heavy jurisdictions are included where they have also made significant transitions in non-electricity sectors.

Hot in pursuit of these leaders and the ACT are four additional significant jurisdictions expected to achieve the same transition in 2020. There are now over 107 countries, provinces and cities with 100% renewable electricity targets, with an average target year of 2033.

Introduction

While Australia's greenhouse emissions increase, its plans to double coal exports remain in place and the overall climate policy wars continue, the Australian Capital Territory (ACT) is about to achieve a remarkable feat. The ACT government has legislated a 100% target for the use of renewable electricity in the ACT on and from 1 January 2020. On 1 October 2019, the final purchase of renewable electricity generation, Stage 3 of the Hornsdale Wind Farm will come into force, ensuring the ACT will meet its 100% renewable electricity target ontime.¹

The ACT first formulated a Greenhouse Strategy in 1993 and its first 'action plan', *Weathering the Change*, was released in 2007.² In 2010 the ACT legislated to reduce its emissions by 40% from 1990 levels by 2020 and to net zero by 2060.

In 2012, the ACT reviewed and strengthened its climate strategy. The second action plan, AP2, was released in 2012.³ AP2 included a 90% renewable energy target:

The ACT Government will determine a new renewable electricity consumption target of 90% renewables by 2020 and in 2013 publish a methodology for accounting for renewable energy consumption and reporting against this target.⁴

In 2016, the ACT Government upped its target to 100%, having already contracted for 640 MW of renewable capacity.⁵ This capacity was secured by a 'reverse auction' where companies bid to provide the ACT with renewable energy at the lowest price. The ACT specifically contracted for new generation that otherwise wouldn't have been

¹ Mazengarb (2019) *ACT looks beyond 2020 renewables target, seals community solar off-take deal*, <https://reneweconomy.com.au/act-looks-beyond-2020-renewables-target-seals-community-solar-off-take-deal-32122/>

² ACT Government (2012) *AP2: A new climate change strategy and action plan for the Australian Capital Territory*, https://www.environment.act.gov.au/__data/assets/pdf_file/0006/581136/AP2_Sept12_PRINT_NO_CROPS_SML.pdf

³ Ibid, p. iii, viii

⁴ Ibid, p. XV

⁵ ACT Government (2016) *ACT to be powered by 100% renewable energy by 2020*, https://www.cmtedd.act.gov.au/open_government/inform/act_government_media_releases/corbell/2016/act-to-be-powered-by-100-renewable-energy-by-2020; ACT Government (2016) *Canberra 100% Renewable: Leading innovation with 100% renewable energy by 2020*, https://www.environment.act.gov.au/__data/assets/pdf_file/0007/987991/100-Renewal-Energy-Tri-fold-ACCESS.pdf

built. Bids were also evaluated on other criteria to ensure that quality proposals were chosen. (See appendix for a longer discussion of reverse auctions and ‘contracts for difference.’)

As a geographically small jurisdiction, it is understandable that the winners of the reverse auctions were largely outside of the ACT, in South Australia, Victoria and New South Wales (NSW). The energy generated is fed into the National Electricity Market (NEM) as a whole, and not sent specifically to the ACT. This necessitates that the ACT’s 100% target is a ‘net’ target.

The ACT procures renewable energy equivalent to consumption within the Territory from energy projects elsewhere in the NEM. There are times when the ACT is thus drawing energy from the NEM that has been by generated by non-renewable sources. However an analysis from November 2018 to July 2019 shows that over a 9 month period, 75% of the ACT's electricity could theoretically have been supplied directly from the wind and solar generation.⁶ Most European jurisdictions have an interconnected grid in a situation analogous to the ACT.

The ACT is certainly the first state or territory in Australia to achieve this milestone of transitioning from an electricity supply based largely on fossil fuels to procuring renewable generation equivalent to 100% of its consumption. This paper looks at what other international jurisdictions have had similar achievements.

While comparison is difficult, using our methodology the ACT is the eighth jurisdiction with population over 100,000 to achieve such a transition, and the first jurisdiction outside Europe to do so. Over 100 more jurisdictions have it as a policy goal.

⁶ Osmond (2019) *100% Renewable ACT* <https://sites.google.com/view/100-renewable-act/home>

Methodology

Comparing the policy achievements of different sub-national jurisdictions is difficult. There are no dedicated governmental agencies tracking sub-national energy or climate policy aims and achievement. Bodies such as the International Energy Agency and International Renewable Energy Agency focused on countries rather than smaller jurisdictions.

The international comparisons in this report are based on a database maintained by CDP, formerly the Carbon Disclosure Project. This is an international NGO based in the UK. CDP gathers mostly self-reported climate and other environmental performance information from companies and sub-national jurisdictions and provides analysis and data to investors, decision makers and the public.

The CDP's public database provides information on over 500 cities and over 100 provinces. This list was then checked against other sources, including:

- Carbon Neutral Cities Alliance⁷
- Non-State Actor Zone for Climate Action (NAZCA), also known as 'Global Climate Action',⁸ which is hosted by the UNFCCC
- The Global Covenant of Mayors for Climate & Energy⁹
- REN21, an international NGO based at United Nations Environment Programme¹⁰
- 100-percent.org¹¹
- General interest media and renewable energy media such as Australia's Renew Economy

Beyond sourcing data, comparing the policy achievements of different small jurisdictions is difficult as each has its own unique situation. Our approach towards comparing the ACT's achievement internationally is summarised in the table below.

⁷ Carbon Neutral Cities Alliance (n.d.) *Global cities cutting emissions by 80-100% by 2050 or sooner*, <https://carbonneutralcities.org>

⁸ UNFCCC (n.d.) *About NAZCA*, <http://climateaction.unfccc.int/views/about.html>

⁹ Global Covenant of Mayors for Climate & Energy (n.d.) *Who we are* <https://www.globalcovenantofmayors.org/about/>

¹⁰ REN21 (n.d.) *About us*, <http://www.ren21.net/about-ren21/about-us/>

¹¹ 100% Renewable Energy (n.d.) *100% Renewable Energy*, <https://www.100-percent.org/>

Table 2: Selection criteria

Selection criteria
1. 100% renewable electricity: The target must apply at least to all electricity consumed and may apply to other sectors such as transport or district heating.
2. 100% net consumption: 100% renewable electricity target applies to the net electricity consumed within the jurisdiction. The jurisdiction is not disqualified if the grid it is part of carries energy generated by fossil fuels, as long as the jurisdiction produces or commissions the production of more than its full annual consumption by renewable sources.
3. Transition from fossil fuels: Jurisdictions with historic reliance on hydroelectricity and geothermal energy are omitted to concentrate on recent transition in response to climate challenges and renewable energy technology change rather than natural/historic abundance of these types of energy.
4. Population: 100,000 minimum.
5. Contiguous territory: This excludes some jurisdictions, for example, island states that may have a number of islands that in total add up to 100,000 people, but use separate electricity systems.
6. Territory-wide not government only: Target must apply to the whole area within the jurisdiction, not just consumption of the jurisdiction's government itself

The table above describes our approach. Firstly, jurisdictions need to have a policy of achieving 100% renewable electricity and possibly decarbonisation of other sectors. Secondly, jurisdictions are included if they ensure the generation or procurement of renewable electricity equal to their electricity consumption. Like the ACT, many jurisdictions are part of a larger energy grid, meaning that not every electron consumed every day within their jurisdictions comes specifically from renewable generation. This is often the case in European sub-national jurisdictions. As long as the net contribution of the jurisdiction is at least 100% renewable electricity supply, they have been included.

Thirdly, we have focused on jurisdictions that have made a transition from fossil fuel-based supply to renewable energy. Some jurisdictions have been excluded that have traditionally relied on hydro and geothermal energy investments that predate climate challenges and recent renewable development. For example, Iceland has relied on geothermal and hydro power for decades, now with only 0.13% of its generation from fossil fuels (oil).¹² Likewise, Ethiopia has used hydroelectricity almost exclusively since

¹² International Energy Agency (2018) *Statistics data browser*, <https://www.iea.org/statistics/?country=ICELAND&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES> [selected for Electricity]

at least 1990.¹³ While there is much to be learned from these jurisdictions, their historic investments reflected their specific natural advantages rather than recent effort to transition to more sustainable systems. Some hydro-heavy jurisdictions have been included where they have made considerable efforts to transition non-electricity sectors such as heating and transport away from fossil fuels.

The fourth criterion is that only jurisdictions of 100,000 people or more are included. This excludes smaller towns that may be able to achieve such transitions relatively easily. Similarly, jurisdictions should be contiguous, rather than the sum of small islands.

The final criterion excludes jurisdictions that buy 100% renewable electricity only for specific purposes such as the local government's consumption. For example, some Australian local governments are known for using 100% renewable energy for the facilities owned by the local government. Melbourne was the first significant city to achieve this, in 2019,¹⁴ and Sydney will follow in 2020.¹⁵ Our selection criteria exclude these, as they are relatively easier to achieve and already common around the world.

¹³ International Energy Agency (2018) *Statistics data browser*,
<https://www.iea.org/statistics/?country=ETHIOPIA&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES> [selected for Electricity]

¹⁴ City of Melbourne (2019) *Council now powered by 100 per cent renewable energy*,
<https://www.melbourne.vic.gov.au/news-and-media/Pages/council-now-powered-by-100-per-cent-renewable-energy.aspx>

¹⁵ City of Sydney (2019) *Getting ready to go 100% renewable*,
<https://news.cityofsydney.nsw.gov.au/articles/getting-ready-to-go-100-renewable>

And the winners are...

Seven significant jurisdictions have achieved a transition from fossil fuel-dominated energy systems to 100% renewable energy consumption, as shown in Table 3 below:

Table 3: Significant jurisdictions to transition to 100% renewable energy

Rank	Jurisdiction	Year	Pop. (mill)	Notable features
1 st	Rhein-Hunsrück, Germany	2012	0.1	Broad public support, comprehensive energy policy across building, electricity, industry. Surplus electricity used in heat pumps, 'green' hydrogen and methane generated from excess solar and wind, EV charging and exports.
2 nd	Mecklenburg-Vorpommern, Germany	2013	1.6	Generation from wind, solar and biomass. Europe's 1 st utility-scale battery storage facility.
	Extremadura, Spain	2013	1.1	First achieved net 100% supply in 2010 when high rain contributed to increased hydro. Achieved 100% regularly from 2013 high solar PV, solar thermal and wind generation.
	Burgenland, Austria	2013	0.3	100% locally generated. 45% of Austria's wind energy. High biomass production. 2050 target set in 2009, achieved in 2013.
	Carinthia, Austria	2013	0.6	100% locally generated hydroelectricity plus ambitious progress towards 100% renewable heating and transport. Large biomass production, local renewables technology companies.
6 th	Schleswig-Holstein, Germany	2015	2.9	100% local, mostly wind power and also solar PV and biomass. Almost 16,000 people employed in local renewable energy.
	Lower Austria, Austria	2015	1.6	70% electricity generated by hydro from the Danube. Strong growth in wind and biomass for electricity. Broad strategy integrates energy efficiency including plan to retrofit 3% of buildings annually.
8 th	ACT, Australia	1 Jan 2020	0.4	Mostly generated outside the jurisdiction by wind farms facilitated by the ACT government. Most capacity procured through reverse auctions of utility-scale wind and solar.

Sources: CDP, Global Climate Action, Global Covenant of Mayors for Climate & Energy, REN21, 100-percent.org, Carbon Neutral Cities Alliance and others cited elsewhere in this report

Rhein-Hunsrück, Germany – 2012

Rhein-Hunsrück is a district located in south west Germany, west of Frankfurt. It has a population of just over 103,000. Its local clean energy production is concentrated in solar PV, wind and biomass. Rhein-Hunsrück began its transition to renewable energy in 1999. It now has a broad strategy across building efficiency, district heating, industry, transportation, electricity and public awareness. Community summits have been convened to develop its energy strategy, including professions such as architecture and sectors such as youth. Importantly, the driver for the strategy was energy independence, to progressively save on €290 million on imported energy and reinvest this in capacity, to become a clean energy exporter.¹⁶

Rhein-Hunsrück now has an overbuild of renewable energy. The surplus that is not needed to meet local electricity demand is converted and stored as ‘green’ methane, used in electric heat pumps and to charge EVs and exported out of the district.¹⁷ Generation from wind and solar varies with the natural variability of the energy and there are various approaches to capturing value and delivering dispatchability. An approach in Rhein-Hunsrück is to use excess solar electricity to produce hydrogen from water using electrolysis and then turn this into methane, binding carbon from carbon dioxide.

There are ambitious plans to increase clean energy exports from the district, with a generation target of 828% of demand, by 2050.¹⁸

Mecklenburg-Vorpommern, Germany – 2013

Mecklenburg-Vorpommern is a state on Germany’s northern coast, bordering Poland. Significantly, it has a population of 1.6 million, about 15 times as big as Rhein-Hunsrück’s. By 2012 it was generating around 90% of its consumption from local renewable energy and in 2013 it reached 120%. Wind (about 4,000 GWh in 2013), solar and biomass are the main sources of energy. The state is now a large exporter of clean electricity.¹⁹

¹⁶ Go 100% Renewable Energy (n.d.) *Rhein - Hunsrück - 100% Renewable Energy District*, http://www.go100percent.org/cms/index.php?id=78&tx_ttnews%5Btt_news%5D=258&cHash=81261a7fdf5436a56620c595d7f531c9

¹⁷ 100% Renewable Energy (2019) *Rhein – Hunsrück, Germany*, <https://www.100-percent.org/rhein-hunsruck-germany/>

¹⁸ Go 100% Renewable Energy (n.d.) *Rhein - Hunsrück - 100% Renewable Energy District*

¹⁹ 100% Renewable Energy (2019) *Mecklenburg-Vorpommern (State), Germany*, <https://www.100-percent.org/mecklenburg-vorpommern-germany/>

In 2014 Mecklenburg-Vorpommern installed the first large battery storage system in Europe, a 5 MW / 5 MWh lithium ion facility built by Younicos.²⁰

Extremadura, Spain – 2013

Extremadura is a region in southwest Spain, bordering Portugal, with a population of 1.1 million. It has long-established renewable energy capacity in the form of hydro and now leads the world in the development of solar thermal technology. The region first met over 100% of its demand from local renewables in 2010, thanks to high wind and rain in that year, and did so consistently from 2013.²¹

By the end of 2017, Extremadura had a renewable generation capacity of 3,727 MW, with an output of 4,768 GWh in 2017.²² This was provided by solar thermal with 2,056 GWh (39% of the Spanish total), hydro with 1,359 GWh and solar PV with 1,119 GWh.²³

Burgenland, Austria – 2013

Burgenland is located in the east of Austria along the border with Hungary, with a population of 294,000. In 1992 a local farmer wanted to install a wind turbine and this triggered a wave of interest in clean energy.²⁴ The state has long had a local strategy for clean energy industry development: workforce training, solar PV manufacturing, technological innovation, integration of agriculture and energy production.

The European Union has been closely involved with Burgenland's clean energy strategy and has provided funding through the European Regional Development Fund. Between 1995 and 2006, 253 renewable energy projects were built in Burgenland, at a cost of €180 million, with €28 million each from the national government and the EU.²⁵

In 1996 the European Centre for Renewable Energy was established in Güssing, Burgenland. The town has led the development of technologies and business models to generate electricity and heat from agricultural and timber production waste.²⁶

In 2009 Burgenland had 39% of Austria's wind farms, accounting for 45% of total national generation capacity, second to Lower Austria.²⁷ These are mostly located on

²⁰ Younicos (2017) *Schwerin Battery Park*, https://uberserver.de/younicos/wp-content/uploads/2016/07/Younicos_Reference_Project_Schwerin.pdf

²¹ 100% Renewable Energy (2019) *Extremadura, Spain*, <https://www.100-percent.org/extremadura-spain/>

²² Red Eléctrica (2018), *Renewable energy in the Spanish electricity system 2017*, p. 13-14

²³ *Ibid*, p. 21, 31, 43, 48

²⁴ 100% Renewable Energy (2019) *Burgenland, Austria*, <https://www.100-percent.org/burgenland-austria/>

²⁵ European Union (2009) *ERDF – promotion of renewable energy sources in Burgenland*, p. 6

²⁶ *Ibid*, p. 7

²⁷ *Ibid*, p. 5

the Parndorfer Platte, which has wind speeds averaging 9 m/s (at 100 metres), making it one of the windiest parts of Central Europe.²⁸

Carinthia, Austria – 2013

Carinthia is a region in southern Austria, sharing borders with Slovenia and Italy. It has a population of 550,000. It is a mountainous area with significant hydropower resources that provide 100% of its net demand. It is included here because of transitions in its heating and transport sectors – it already uses 70% renewable biomass for heating and aims to get to 100% by 2025. It aims to reach 100% renewable energy for transport by 2035.²⁹

Renewable energy is an important part of the local industry including a pumped storage, solar thermal and biomass energy companies.

Schleswig-Holstein, Germany – 2014

Schleswig-Holstein is the northernmost state in Germany, bordering Denmark. It has a population of 2.9 million, which makes it the largest jurisdiction to get to 100% by 2020. It saw rapid growth of renewables capacity, from around 30% in 2006, led mostly by onshore wind and also solar PV and biomass. The state has a target of 300% renewables by 2025 which includes 2.9 GW of solar PV and 2.6 GW of offshore wind.³⁰

Biomass is used mostly to help meet peak demand, managing the flexibility of wind and solar PV. The state also points to the economic benefits of the renewables transition, for example, by shielding it from the rise in heating oil prices. The next phase of its transition will see increased investment in energy efficiency, demand-side management, storage and power to heat technologies.³¹

Around 16,000 people work in renewable energy in Schleswig-Holstein.³²

Lower Austria, Austria – 2015

Lower Austria surrounds the national capital, Vienna, and has a population of 1.6 million. In 2011, it started to plan for deep emissions cuts, including a transition to 100% renewable electricity. Governor Erwin Proell, of the conservative OVP (Austrian

²⁸ Ibid, p.11

²⁹ 100% Renewable Energy (2019) *Carinthia, Austria*, <https://www.100-percent.org/carinthia-austria/> [accessed 4 June 2019].

³⁰ 100% Renewable Energy (2019) *Schleswig-Holstein (State), Germany*, <https://www.100-percent.org/schleswig-holstein-germany/>

³¹ Go 100% Renewable Energy (n.d.) *Schleswig-Holstein: 100+% Renewable Power*, http://www.go100percent.org/cms/index.php?id=77&tx_ttnews%5Btt_news%5D=353&cHash=1ab725b5563c94c775e2626a240c2576

³² EE.SH (n.d.) *Schleswig-Holsteins Erneuerbare Energieträger*, <https://ee-sh.de/en/erneuerbare-energien.php>

People's Party), published the *Lower Austria Energy Roadmap 2030* in 2013. It included a 2015 target for the province to generate more than 100% of its needs from locally sourced renewable energy.³³

Almost two thirds of the 2015 target was met by hydro (61%) and the remainder by wind (26%), biomass (9%) and solar PV (2%).³⁴

Australian Capital Territory, Australia – 1 January 2020

The Australian Capital Territory has a population of around 400,000. Around 75% of the 100% target is being met through new, large-scale renewable energy projects. About 25% of the target is being met through other measures including the national Renewable Energy Target, the ACT's legislated small and medium-scale Feed-in Tariff (FiT) schemes and solar support provided by retailers.³⁵

The 100% renewables target has directly led to significant investment around Australia, including around \$500 million in the ACT itself.³⁶ It has attracted start-ups and established companies to base their operations in Canberra. For example, Neoen, a multinational French renewable energy developer with a turnover of \$370 million (2018) has based its Asia-Pacific HQ in Canberra.³⁷ In 2017-18 there were 580 direct full-time equivalent jobs in renewable energy within the ACT.³⁸

³³ State Government of Lower Austria (2013) *Lower Austria Energy Roadmap 2030 Short Version*, p.7

³⁴ i2 Infrared (2016) *Exemplary electricity production in Austria*, <http://www.i2-infrarot.at/news-en/exemplary-electricity-production-in-austria/?lang=en>

³⁵ Buckman et al, p. 428.

³⁶ ACT Government (2017), *2016-17 Minister's Annual Report under the Climate Change and Greenhouse Gas Reduction Act 2010*, p. 19

³⁷ Neoen (n.d.) *About us*, <https://www.neoen.com/en/about-us-4-en>; ACT Government (2015) *Wind auction result delivers renewable energy and economic benefits to the ACT* https://www.cmtedd.act.gov.au/open_government/inform/act_government_media_releases/corbell/2015/wind-auction-result-delivers-renewable-energy-and-economic-benefits-to-the-act

³⁸ Australian Bureau of Statistics (2019) *4631.0 - Employment in Renewable Energy Activities, Australia, 2017-18*

In hot pursuit

The above jurisdictions are not alone. There are now at least 107 countries, provinces and cities with 100% renewable energy targets, which are set at an average year of 2033, 15 years later than the ACT's target year. The 55 sub-national jurisdictions have the most ambitious targets, with an average target year of 2028, 16 years earlier than the 52 countries with a 100% target.

Table 3: Jurisdictions with 100% renewable electricity transition targets

Level of jurisdiction	Number	Average Target Year
Nation	52	2045
Province	13	2027
City	42	2029
Total	107	2033



Source: The Australia Institute calculations from REN21, CDP Worldwide, The Climate Group / CDP Worldwide

The ACT will reach its 100% renewable target on 1 January 2020. Other significant jurisdictions expected to reach 100% renewable targets in the next year are listed below.

Flevoland, Netherlands - 2020

Flevoland is a province in the centre of the Netherlands, just east of Amsterdam. It has a population of 400,000. It was the last province to be reclaimed from the sea, in 1986. The province hosts 40% of the wind farms in the country, mostly owned by farmers.³⁹

Flevoland will reach 100% renewable energy, mostly or even wholly provided by wind, in 2020. There is little information about the province's energy transition available in English.

Skåne, Sweden – 2020

Region Skåne is the southernmost province in Sweden and includes Malmö. It has a population of about 1.3 million people. It has an ambitious target to be 100% 'fossil fuel free' for electricity, transport and heating (and cooling) of buildings, by 2020.⁴⁰

³⁹ Toke (2007) 'Supporting Renewables: Local Ownership, Wind Power and Sustainable Finance' in Elliott (ed) *Sustainable Energy*, p.168

⁴⁰ Region Skåne (2017) *Skåne – Fossil fuel-free by 2020*, <https://www.skane.se/en/politics-and-organisation/environment-and-nature/skane--fossil-fuel-free-by-2020/>

The region was 77% fossil free in 2015. It has significant bioenergy resources and the provincial government owns six wind farms, which generate about 40% of the local electricity demand. The government will use several other policies to meet the 100% target:

- Procurement of hydrogen gas vehicles
- A biogas industry plan
- Climate Interaction Skåne, a program encouraging councils, businesses and NGOs to reduce fossil fuel use
- Support for research

Kasese, Uganda – 2020

Kasese district in Uganda has been pursuing a plan for 100% renewable energy by 2020.⁴¹ Kasese is home to over half a million people and is located on Lake George, in western Uganda, near the equator. It set its goal in 2012, although it is not clear how much progress has been made.⁴² Key goals are to find renewable replacements for dangerous paraffin lamps and unsustainable use of firewood. Less than one in ten households have grid electricity and so the strategy is relying on distributed solar and battery systems.⁴³

Oslo, Norway – 2020

Oslo is the capital of Norway and has a population of 600,000. It has had climate policies in place since 1982. It has a target of 100% renewable electricity by 2020 and a 100% clean energy target for public transport. It will be carbon neutral in 2050. It has partnered with its regional government of Akershus to implement a Regional Hydrogen Strategy to help decarbonise transport. Since 2014 it has required all buildings built by local government to comply with a very high energy conservation standard called Passive House.⁴⁴

⁴¹ Kime (2015) 'Ugandan mayor: My district will be 100% renewable by 2020', The Guardian, <https://www.theguardian.com/global-development-professionals-network/2015/oct/20/ugandan-mayor-my-district-will-be-100-renewable-by-2020>

⁴² WWF (n.d.) *Selecting the clean energy champion district – Uganda*, <http://kasese.go.ug/wp-content/downloads/SELECTING%20THE%20CLEAN%20ENERGY%20CHAMPION%20DISTRICT-Final.pdf>

⁴³ Anon (2019), 'Uganda: Solar energy lights up Kasese', *Deutsche Welle*, <https://www.dw.com/en/uganda-solar-energy-lights-up-kasese/av-48769352>

⁴⁴ 100% Renewable Energy (2019) *Oslo, Norway*, <https://www.100-percent.org/oslo-norway/>

Conclusion

Over the past decade, sub-national jurisdictions have become important climate leaders. The lack of sufficient progress during United Nations climate negotiations in Copenhagen in 2009 led to a renewed focus on the role of cities, provinces and private corporations in setting ambitious climate targets.

The Australia Institute's recent Climate of Nation Report surveyed 1,960 Australians and found over two thirds (69%) agree that State and Territory Governments should be putting in place incentives for more renewable energy.⁴⁵ The ACT shows how substantial progress can be made when a government is willing to exercise leadership, formulate smart policy and communicate it effectively to its constituents.

The ACT is now holding a further reverse auction to 'future-proof' the 100% target to ensure the growing jurisdiction continues to be powered by renewables. The ACT is also turning its attention to reducing emissions in other sectors of the economy that are traditionally harder to address, such as transport.

Within a broader global movement, sub-national jurisdictions are making contributions in groups such as the Powering Past Coal Alliance. Established by the Canadian and the UK governments in 2017, the Alliance is made up of countries, sub-national jurisdictions and companies or organisations. The ACT was the first Australian jurisdiction to join the Alliance, in 2018.⁴⁶

The global Climate Action Summit is around the corner on 23 September 2019 and the UN Secretary General has asked all entities to ramp up climate action to meet the Paris Agreement goals. The ACT is a great local example of how a sub-national jurisdiction can offer, and deliver, credible climate leadership.

⁴⁵ The Australia Institute (2019) *Climate of the Nation Report 2019*

<https://www.tai.org.au/content/climate-nation-climate-change-concern-hits-81>

⁴⁶ Powering Past Coal Alliance (2018) *Members*,

https://poweringpastcoal.org/about/Powering_Past_Coal_Alliance_Members

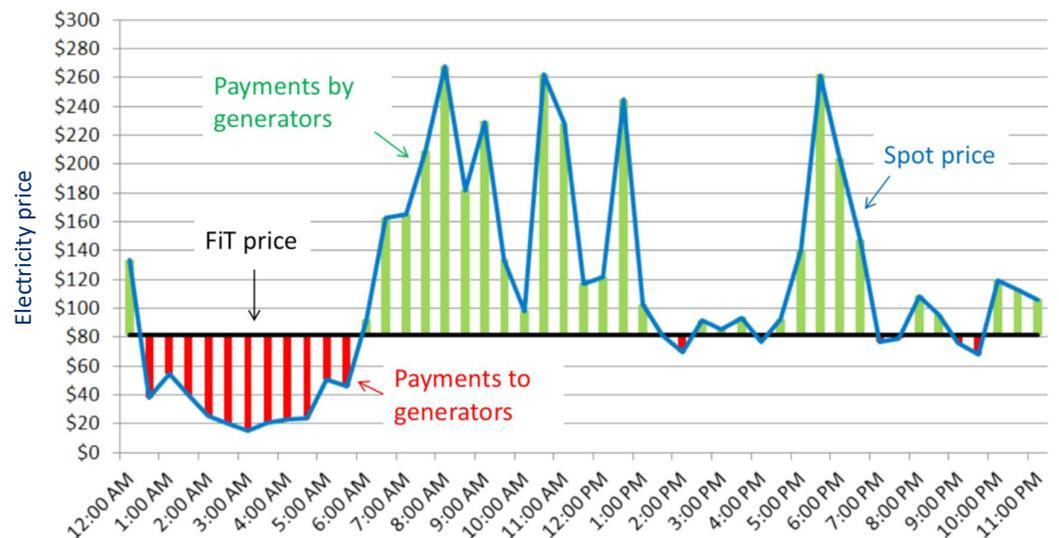
Appendix - ACT contracts for difference

The financial instrument behind the ACT's renewable reverse auctions is called a 'contract for difference'. These were originally used by financial traders, to hedge against volatility. The concept is that the ACT and the developer agree to a 'strike' or feed-in tariff price. This sets a regular expected source of income that allows the developer to finance the project.

The wholesale spot price for electricity in Australia can vary considerably, from minus \$1,000 / MWh up to \$14,500 / MWh. The strike price is a ceiling or maximum cost to be borne by the ACT.

Figure 4 gives a hypothetical example of how financial payments would work, over the course of a day. The horizontal axis shows a 24 hour period. The vertical axis is the price of electricity. The blue line is the actual wholesale spot price, in the National Electricity Market. The heavy black horizontal line shows a contract for difference set at \$80 / MWh.

Figure 4: Contracts for difference



Source: Buckman (2018), *The Australian Capital Territory's reverse auctions and its 100%-by-2020 renewable electricity target*, Clean Energy Solutions Centre webinar, p. 15

When the wholesale spot price goes above the FiT price shown by the heavy black line, the generator makes what is essentially a refund to the ACT. The volume of these

payments is shown by the green shaded areas. These 'difference payments' mean that the ACT never has to pay more than the FIT price it has agreed to.

The corollary of this arrangement is that it also provides a minimum income for the developer. If the wholesale spot price goes below the agreed FIT price, then the ACT pays a top-up to the generator – shown by the red shaded areas.