



# **RENEW AUSTRALIA 2030**

**Powering Past Coal to  
a Clean Future for All of Us**

**THE  
GREENS**

**“AS A SPECIES, WE ARE  
EXPERT PROBLEM SOLVERS,  
BUT WE HAVEN’T YET  
APPLIED OURSELVES TO  
THIS PROBLEM WITH THE  
FOCUS IT REQUIRES.**

**WE CAN CREATE A WORLD  
WITH CLEAN AIR, WATER  
AND UNLIMITED ENERGY  
AND FISH STOCKS THAT  
WILL BE SUSTAINED WELL  
INTO THE FUTURE.**

**BUT TO DO THAT, WE NEED  
A PLAN”**

**– DAVID ATTENBOROUGH**



# **RENEW AUSTRALIA 2030**

**Powering Past Coal to a  
Clean Future for All of Us**

**“I WANT YOU TO ACT  
AS YOU WOULD IN A  
CRISIS. I WANT YOU  
TO ACT AS IF OUR  
HOUSE IS ON FIRE.  
BECAUSE IT IS.”**

**– GRETA THUNBERG**

Swedish school student who sparked a global wave  
of student climate strikes

# CONTENTS

<b>1. A PLAN FOR PROGRESS</b>	<b>8</b>
<b>2. A PLAN FOR OUR REGIONS AND CITIES</b>	<b>10</b>
<b>3. WITHOUT A PLAN, THE DISRUPTION WILL CREATE CHAOS</b>	<b>11</b>
<b>4. AUSTRALIA'S CLIMATE TARGETS</b>	<b>11</b>
<b>5. THE PATHWAY BEYOND COAL</b>	<b>12</b>
<b>6. WHAT WE NEED TO DO TO GET THERE</b>	<b>14</b>
<b>A. ENDING COAL</b>	<b>15</b>
Phasing out Coal Exports by 2030, Building a Clean Energy Export Industry, Timeline for Coal Closure, Cleaning up After Coal, No New Coal, Oil and Gas	
<b>B. BECOMING A RENEWABLE ENERGY SUPERPOWER</b>	<b>18</b>
Developing Renewable Energy Zones, Restoring a Price on Carbon, Renewable Energy and Storage Targets, Investing in Clean Energy	
<b>C. LOWERING BILLS FOR HOMES AND SMALL BUSINESSES</b>	<b>20</b>
Lowering Energy Bills with Solar, Lowering Energy Bills with Storage, Boosting Energy Efficiency and Fuel Switching Away from Gas	
<b>D. AGRICULTURE AND LAND MANAGEMENT</b>	<b>24</b>
Supporting Farmers to Store Carbon, An Independent National Environment Protection Agency and Greenhouse Trigger	
<b>E. TRANSPORT</b>	<b>25</b>
Driving the Electric Vehicle Revolution	
<b>F. TRANSITIONING HEAVY INDUSTRY</b>	<b>26</b>
Clean Technology Investment Program and R&D for Industrial Substitution	
<b>G. A JUST TRANSITION FOR WORKERS</b>	<b>27</b>
<b>7. THE JOBS THAT WILL BE CREATED</b>	<b>28</b>
<b>8. HOW WE WILL PAY FOR THIS PLAN</b>	<b>29</b>
<b>APPENDIX A: The Detailed Pathway</b>	<b>30</b>
Detailed Pathway: State by State Breakdown of Fossil Fuel Phase Out, New Renewable/Storage Build, Mine Rehabilitation Schedule and Clean Energy Export Facilities	
<b>APPENDIX B: Jobs Figures Methodology</b>	<b>44</b>



# RENEWING AUSTRALIA: AN EXECUTIVE SUMMARY

- The Greens have a detailed plan to rapidly transform Australia's energy system from one of the oldest and dirtiest in the world, to one of the cleanest and smartest.
- UN scientists have told us we have less than 11 years to get global pollution under control or our planetary system is likely tip over into a climate breakdown.
- 80 per cent of the coal Australia digs up is exported and burned overseas. We are the world's biggest exporter of coal and this is our country's biggest contribution to global warming. The Greens are the only party to have a plan to phase out coal and build a clean energy export industry to replace it.
- Renewables are already driving down power prices. Australia is at the forefront of technological innovation and we have everything we need to turn this mess around. All we need is a clear plan and political leadership.
- The Greens plan to **Renew Australia** provides this leadership, setting our country up with a clear and achievable plan to encourage billions of investment and create tens of thousands of jobs, to spur technological progress and create a pollution-free future.

**“THE GREENS’ PLAN  
FOR RENEWABLES BY  
2030 SOUNDS HARD,  
BUT IT STACKS UP”**

**– PROFESSOR ANDREW BLAKERS**

Director of the Centre for Sustainable Energy  
Systems (CSES), Australian National University

# A PLAN FOR PROGRESS

Australia is the sunniest continent on earth with amazing wind resources. With smart and innovative minds, Australia can rapidly transition to a clean economy powered by renewable energy and exporting it to the world.

With the right plan in place, Australian homes and businesses can be generating their own clean energy, storing it for later, sharing it with neighbours and charging their cars so their travel is free.

Our energy bills will be lower, we will wrest back control from greedy power companies and we can choose to sign up with a government-owned not-for-profit energy provider.

That is worlds away from where we are now. Burning coal is the world's biggest cause of climate change and Australia is the world's biggest exporter of coal. Just 20 per cent of our thermal coal is burned locally while 80 per cent is burned overseas – all of it damages our climate and threatens our future.

Labor and the Liberals policies don't deal with the 80 per cent. The mining, burning and exporting of Australian coal around the world is our responsibility. The Greens plan will phase out coal, build a clean energy export industry and set an ambitious 100 per cent renewable energy target by 2030.

Instead of giant, multinational coal and gas companies extracting our resources for free, polluting local environments and paying no tax, they will be replaced with the clean energy exports of the future: renewable energy, transformed into hydrogen or ammonia or exported to Asia through underwater cables.

These groundbreaking projects have already commenced, but we need a plan to build them to scale where they will replace the dangerous products we are exporting today.

Instead of embracing the sunrise industries of clean, renewable technologies, the Liberal and Labor governments are protecting the polluting coal and gas industry in its sunset years, selling the rest of us out in return for the \$8.2 million in political donations that they've received from coal and gas since 2012.<sup>1</sup> They joined together to slash half a billion dollars

---

<sup>1</sup> Democracy for Sale reports that the Liberals received \$4.7m from coal and gas companies from 2012 to 2018, and that Labor has received \$3.5m [democracyforsale.net](https://democracyforsale.net)

out of the Australian Renewable Energy Agency (ARENA) undermining Australia's renewable energy industry and they stand united in keeping Australia as the world's number one coal and gas exporter.

The Liberals plan will see pollution continue to rise while Labor's 50 per cent renewables goal by 2030 would see our current renewables industry contract significantly, with 18,100 people employed today at risk of losing their jobs.<sup>2</sup> If the current rate of construction continues, we will reach 78 per cent renewables by 2030.

The Greens want to amplify this momentum to create this 100 per cent renewables, jobs-rich transition to a pollution-free future for the whole community, not for political donors or big business mates who want profits now at any cost. It's time to make cutting pollution an objective of our National Electricity Market as it leads the transition to a clean energy future.<sup>3</sup>

Stopping the damage from climate change means embracing progress and technological solutions. Those who refuse to put in place this rapid plan for a smooth transition are simply standing in the way of progress.

---

<sup>2</sup> [greenmarkets.com.au/images/uploads/Resources/RE\\_Index/Renewable\\_Energy\\_Index\\_-\\_Oct\\_2018.pdf](https://greenmarkets.com.au/images/uploads/Resources/RE_Index/Renewable_Energy_Index_-_Oct_2018.pdf)

<sup>3</sup> The current National Electricity Objective does not include pollution reduction as one of the

## WE HAVE NO TIME TO WASTE

As the UN's Intergovernmental Panel on Climate Change has told the world:

Every **ACTION** matters  
Every **BIT OF WARMING** matters  
Every **YEAR** matters  
Every **CHOICE** matters

# A PLAN FOR OUR REGIONS AND CITIES

Damage from climate change is affecting our farmers through drought, drying up our rivers and leaving croplands bare. It's already affecting our regions through more intense bushfires and prolonged heat-waves.

It's affecting our cities through flooding and infrastructure failures from trains to powerlines. It's putting more pressure on our emergency services from fire authorities to ambulance and hospital services.

While the world's temperatures have already increased by one degree, the Bureau of Meteorology has told us that 'Australia is already on average 8 degrees Celsius hotter than the average global land temperature, so further warming means our heat risk is far greater than for other industrialised countries.'<sup>4</sup>

To look after people and protect our environment, the Greens have laid down a detailed plan to rapidly clean up our economy and shield future generations from a breakdown of our climate system.

Not only will this plan protect our regions from the impacts of climate damage, but it will create jobs and investment as we deploy cutting edge technologies right across the country, with the bulk of new clean energy jobs occurring in regional areas and farmers given incentives to store carbon in the land.<sup>5</sup>

The Greens plan builds a detailed map of how we can do this as we rapidly modernise our electricity system, push power prices down, create jobs and attract the clean industries of Australia's future.

This plan shows that by 2030 we will have renewed our economy, harnessed our ingenuity to create pollution-free cities and water-smart and water-secure regional economies.

We will have created tens of thousands of new jobs and made the most of our natural advantages to be world leaders in renewable energy research and project development for both domestic and export markets.

---

<sup>4</sup> [mobile.abc.net.au/news/2017-01-19/2016-hottest-year-on-record-australia-needs-to-get-heat-smart/8194182](http://mobile.abc.net.au/news/2017-01-19/2016-hottest-year-on-record-australia-needs-to-get-heat-smart/8194182)

<sup>5</sup> "Will-O-the-ISP: Estimating renewable energy employment under the Integrated System Plan." November 2018.

# WITHOUT A PLAN, THE DISRUPTION WILL CREATE CHAOS

The world is changing fast. Massive structural shifts are occurring in global energy, food and transport markets as the world moves away from outdated, polluting practices and adopts rapidly evolving clean technologies.

## **We have a choice:**

- We can create those groundbreaking clean technologies at home and sell them to the world or we can prop up the polluting exports of the past and wait until they are replaced by someone else.
- We can plan for this inevitable transition and to support coal workers and their communities or we can leave it up to the boardrooms of multinational energy companies to decide when those workers will lose their jobs and when their communities are forced to transition.

The Greens believe the government has the important responsibility to manage these transitions, to protect workers and our environment while also sending a clear signal to innovators and investors that we need their help to get it done. Not only does this transition have to be rapid, but it has to be fair.

Previous governments have failed to protect workers and communities affected when industries like car manufacturing or textiles have gone through transitions and closures. Too often, workers have struggled to find new, reliable, well paying work and whole local economies have suffered. We are determined to learn from the past and create a genuinely just transition to a renewable future.

## AUSTRALIA'S CLIMATE TARGETS

Australia is a party to the Paris Agreement which obligates signatories to keep global warming to 1.5 degrees. So far the government's national determined contribution to that task is a commitment made by Tony Abbott to only reduce Australia's emissions by 26 per cent by 2030 from 2005 levels. Despite this pollution continues to rise.

Labor has made a promise of raising the target to 45 per cent. Both targets fall woefully short of what Australia needs to do to fulfil its Paris obligations. Instead the Australian Greens would set Australia's emissions target at 63-82 per cent by 2030 on a trajectory to get emissions to net zero by 2040.

Unlike the old parties, the Greens will not use the 'accounting trick' of rolling over Kyoto Credits to fulfil this obligation, which will cut Liberal and Labor targets by up to 50 per cent offsets. Many countries including the UK and NZ have cancelled these credits which the government wants to use to effectively halve its remaining abatement task.

# RENEW AUSTRALIA 2030: THE PATHWAY BEYOND COAL

At the centre of our plan is **Renew Australia**, a public authority that will lead the transition. It will be charged to work with communities, energy companies and the government to transition our domestic and export energy systems, map new transition lines to open up new Renewable Energy Zones and ensure that coal-dependent communities can continue to prosper.

Not only will this clear plan attract new industries, create new jobs and electrify our transport system with renewable energy, but this plan will minimise the ongoing **health impacts** of mining and burning coal which creates microparticles that enter the lungs and bloodstream, affecting communities both nearby and also carried by wind to major population areas.

NSW residents from the Hunter Valley down to Western Sydney are already facing 279 premature deaths a year from local coal stations and face another 3429 premature deaths if five coal stations are allowed to continue operating until the end of their commercial life.<sup>6</sup>

Managing the closure of coal stations will be guided by health impacts on communities, the age and efficiency of plants and the need to ensure a reliable transition with more renewables and storage technologies filling the gap.

The plan to Renew Australia is also centered around supporting lower-income households and guaranteeing that prices are pushed down and giant energy companies can no longer scoop up super profits.

**Privatisation** of essential energy production has been a disaster. Energy retailers have done nothing to improve the quality of our lives by spending our money mercilessly advertising back to us. Instead of giving us the simple, affordable energy we need, they have jacked up their prices, using their super profits to line their own pockets and buy influence with the Liberal and Labor parties. It's time to end this failed experiment.

The Greens plan re-establishes a government-owned public retailer with a mandate to work in the public interest to deliver low cost energy and drive competition, rather than being just another market player scooping up super-profits.

**Power Australia**, would be directly owned by the Australian Government and would act in the public interest, not in its own commercial self-interest. By removing the need for profit and excessive advertising, an average family would save around two hundred dollars a year.<sup>7</sup>

---

<sup>6</sup> [www.smh.com.au/environment/sustainability/scandal-nsw-coal-power-plants-will-kill-thousands-before-they-close-20181120-p50h66.html](http://www.smh.com.au/environment/sustainability/scandal-nsw-coal-power-plants-will-kill-thousands-before-they-close-20181120-p50h66.html)

<sup>7</sup> ACCC, *Retail Electricity Price Inquiry – Final Report*, June 2018, p 5 – the average residential customer pays around \$273 in retail costs and profits a year.

A public retailer, along with community owned players, would provide the competition with other retailers needed to end price gouging and super profits, while pushing down prices. It would also contract the next wave of renewable energy projects that the public so desperately wants to see built. It would ensure a positive alignment between our climate and energy policy by providing a guaranteed buyer for clean energy.

The Greens will also re-regulate power prices to ensure that price gouging of the energy retailers is brought under control.

Renewables are the cheapest form of new power and are fast becoming cost competitive with existing fossil fuel generation, which is why our plan will end the oligopoly of the big three energy companies, increase competition and **drive down power prices**.

Under our plan, the most expensive part of electricity – the poles and wires – will be renewed from an old, centralised system to a smart, shared and affordable one, with the government reclaiming its core role in essential services by purchasing key interconnectors and opening up new Renewable Energy Zones. And because **Renew Australia** will simply seek to recoup its costs, not try to make a profit from them it will help reduce power prices.

Having established both the Clean Energy Finance Corporation (the CEFC) and the ARENA, the Greens have a track record of building the institutions needed to transition to the new economy.

# WHAT WE NEED TO DO TO GET THERE

**Renew Australia** will be responsible for managing the massive transition as we power past coal by planning and delivering a multi-year pipeline of clean energy projects and managing the orderly and predictable closure of coal power plants.

This transition involves a range of cooperative policy mechanisms working together to drive down costs and create a highly-skilled, clean energy workforce through a staged pipeline of construction projects.

# ENDING COAL

## PHASING OUT COAL EXPORTS BY 2030

Australia's biggest contribution to the climate breakdown is coal exports. We are the world's biggest exporter of coal.<sup>8</sup> Approximately 80 per cent of the coal we dig up is exported. All our coal damages our climate – no matter where it is burned. The policies of the Labor and Liberal parties don't deal with the climate disaster we are facing because they won't touch the mining and exporting of coal.

The Greens plan will phase out thermal coal by setting a yearly limit on coal exports from 2020 reducing each year until a full-phase out in 2030. Each tonne of coal will require a permit to be secured by auction for the right to export coal according to the below schedule.

<b>Thermal coal exportation limits</b>		
<b>Item</b>	<b>Column 1 Calendar year</b>	<b>Column 2 Thermal coal exportation limit Quantity of thermal coal in kilotonnes per year</b>
1	2019	185,500
2	2020	170,000
3	2021	153,500
4	2022	137,000
5	2023	120,500
6	2024	104,000
7	2025	87,500
8	2026	71,000
9	2027	54,500
10	2028	38,000
11	2029	21,500

With a floor price of \$1 per tonne, this would raise at least \$268 million in its first five years<sup>9</sup> to help the economy smoothly transition into new sources of export revenue.<sup>10</sup>

We once used asbestos in our buildings because we thought it was safe. But we now know better, so we have banned it. Now it is coal's turn.

<sup>8</sup> [www.weforum.org/agenda/2018/01/these-are-the-worlds-biggest-coal-producers](http://www.weforum.org/agenda/2018/01/these-are-the-worlds-biggest-coal-producers)

<sup>9</sup> Note the measure is a net expense to the budget over the full medium term of \$652 million.

<sup>10</sup> The Parliamentary Budget Office costed a floor price in the alternative of auctionable permits, which were unquantifiable by the PBO, due to the difficulties of determining the price of tradable permits.

## BUILDING A CLEAN ENERGY EXPORTS INDUSTRY

Japan and South Korea are two of our biggest energy importers<sup>11</sup> and they have told the world that they want to end coal imports and substitute it with hydrogen.<sup>12</sup>The hydrogen economy is ours to make. It requires developing a hydrogen export infrastructure. Wind and solar can be turned into emissions-free hydrogen through electrolysis and exported overseas as ‘bottled wind and sunlight’. Our biggest customer of coal, Japan has made clear they want imported hydrogen to be at the heart of their new economy.

This is an incredible opportunity for Australia, which already has commenced a project in the Pilbara to export clean energy into Asia.<sup>13</sup> To turn this opportunity into a reality, we have to invest in bringing down production and logistics costs and put market infrastructure in place in order to prove our supply chain will be the smartest and most efficient in the world.

This is a role perfectly suited to the ARENA, working in partnership across government and industry. At the beginning of this current Parliament, the Liberal and Labor parties teamed up to strip half a billion dollars from ARENA’s budget.

The Greens will reinstate ARENA funding, investing \$500 million from July 2019, with a rolling \$300 million annual budget and allocate an additional \$10 billion in funding to Clean Energy Finance Corporation.

A new \$1.7 billion Clean Energy Export Development Fund will also be created and managed by ARENA to specifically build Australia’s renewable export industry up to scale and create ‘solar fuels’ export hubs in strategic locations around Australia.

The Greens will also revise the mandate of the Export Finance and Insurance Corporation to facilitate support for the development of High Voltage DC transmission cables and hydrogen fuel exports into Asia.

## THE ORDERLY RETIREMENT OF COAL-FIRED POWER STATIONS

Planning a clear timeline of when a coal power station must close provides a clear signal to the market years out of what new supply needs to be built – where and by when. It also gives coal communities certainty of when the transition will commence and complete.

The precise timeline will be developed by **Renew Australia** in consultation with communities and industry, but a proposed schedule is provided in Appendix A.

---

11 [www.australianmining.com.au/features/where-does-australias-coal-go-infographic](http://www.australianmining.com.au/features/where-does-australias-coal-go-infographic)

12 [www.chiefscientist.gov.au/wp-content/uploads/HydrogenCOAGWhitePaper\\_WEB.pdf](http://www.chiefscientist.gov.au/wp-content/uploads/HydrogenCOAGWhitePaper_WEB.pdf)

13 [asianrehub.com](http://asianrehub.com)

## CLEANING UP AFTER COAL

Greens will make sure that when existing mines shut down, companies will pay their fair share for the true cost of rehabilitation for the clean up, returning land to a usable state – for housing, agriculture or parkland.

Done right, mine rehabilitation can create thousands of sustainable jobs which will last long after mines close. It can also create safe and usable new spaces and boost economic growth in communities which would otherwise be negatively affected by mine and power plant closures.

Mining companies are required to pay bonds to states to cover the costs of rehabilitation. However, most bonds don't cover the true costs. In Victoria, the State Government required bonds from coal mining companies for just \$15 million each, despite rehabilitation costs now stretching to as much as \$200 million per mine.<sup>14</sup> Audits in Queensland have also revealed that in some cases, bonds cover just 1.5 per cent of the actual costs of rehabilitation.<sup>15</sup>

Jobs involved in mining rehabilitation include: environmental and technical managers, heavy equipment operators, general labourers, engineers, geologists, biologists, technicians and surveyors. Recruitment will prioritise workers from within the region affected by mine closure.

## NO NEW COAL, OIL AND GAS

An immediate ban on new coal mines, fracking and conventional onshore and offshore gas and oil fields, such as Adani's proposed Carmichael mine in the Galilee Basin, is needed to keep our resources in the ground and stop millions of tonnes of pollution being locked in for decades to come.

This nation-wide ban will protect our our prime agricultural farmland, secure those pristine natural places and save those sanctuaries in our oceans from destructive mining and drilling, like what energy multinationals have planned in the Great Australian Bight.<sup>16</sup>

---

<sup>14</sup> [environmentvictoria.org.au/2014/11/03/preventing-preventable](http://environmentvictoria.org.au/2014/11/03/preventing-preventable)

<sup>15</sup> Queensland Audit Office Environmental Regulation of the resources and waste industries April 2014 page 48.

<sup>16</sup> [www.fightforthebight.org.au](http://www.fightforthebight.org.au)

# BECOMING A RENEWABLE ENERGY SUPERPOWER

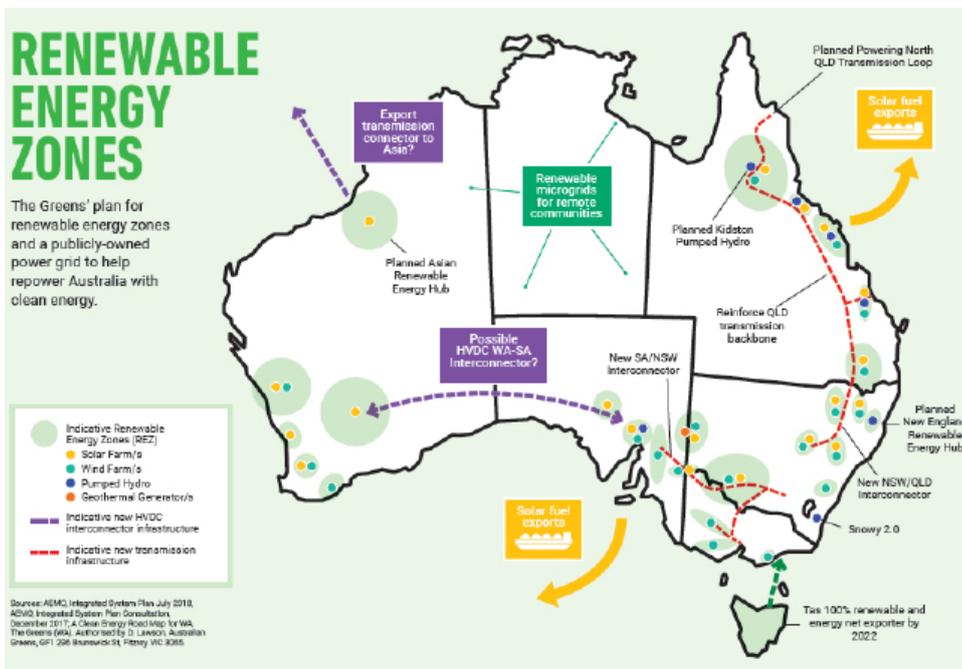
## DEVELOPING RENEWABLE ENERGY ZONES

The most critical, but under-discussed policy measure to rapidly deploy the next generation of energy generation is the urgent need to build transmission networks so that we can open up our most renewable rich areas for new jobs and investment.<sup>17</sup> Without building these Renewable Energy Zones, clean energy projects are heading for a bottleneck, with tens of thousands of jobs at risk.

A publicly-owned build of transmission lines will keep power prices down, by only seeking to recoup costs, rather than seek profits from households for decades, like our current privatised model allows.

**Renew Australia** will turn Australian Energy Market Operator's (AEMO) Integrated System Plan into reality, by opening up renewable energy zones right around the country, backed by a \$6 billion **Grid Transformation Fund**. The current 'applicant-driven' process has failed to deliver a low-cost grid that encourages massive construction levels in those 'hot-spot' zones of high solar, wind or storage potential.

These Renewable Energy Zones will unlock new construction and jobs right around the country with a guaranteed connection to the best renewable resources in the country.



<sup>17</sup> [www.theguardian.com/australia-news/2019/feb/19/renewables-urgent-investment-australia-transmission-bottlenecks](http://www.theguardian.com/australia-news/2019/feb/19/renewables-urgent-investment-australia-transmission-bottlenecks)

## RESTORING A PRICE ON CARBON

The carbon pricing mechanism that operated from 2012 to 2014 saw the greatest reduction in emissions ever recorded in Australia. Pollution has been continually rising since it was repealed. Not only does a carbon price change the investment decisions of heavy industry and energy companies, but it creates a new revenue source for farmers who can sell abatement on their land.

Crucially, it is the only method available to force gas companies and coal mines to pay for the fugitive emissions that leak into the atmosphere – it is Australia’s fastest growing source of emissions and neither the Labor or Liberal parties have a plan to contain it.

The Greens want the carbon price to pick up where it was trashed by Tony Abbott, mirroring the European price and driving innovation, clean investment and emissions reductions right across the entire economy.

## RENEWABLE ENERGY AND STORAGE TARGETS

The Renewable Energy Target (RET) helped to lower costs and develop an Australian renewables industry. The Greens will restore and extend the RET cut by Labor and Liberal. It is time to repeat its success with storage technologies to not only ensure reliability of dispatchable power across the country, but also to assist people to take back control from big energy companies to create, trade and share power directly.

To meet our future needs, we need to boost our ability to store clean energy by 26.65 Gigawatts (GW), growing to 30 GW in 2040. An Energy Storage Target would be set to help meet the total 419 GWh of dispatchable power required by 2030.<sup>18</sup> This would be further enhanced by a \$2.2 billion in construction funding managed by AEMO and the Clean Energy Regulator over five years to contract and build energy storage at grid level.

## INVESTING IN CLEAN ENERGY

The **Renew Australia** 2030 plan will attract energy intensive, 21st century industries to Australia like data centres, battery gigafactories, carbon fibre construction and advanced manufacturers by helping them negotiate clean power supply deals.

Alongside direct investment in publicly owned grid and storage infrastructure, **Renew Australia** will also be responsible for contracting clean energy projects where risk is needed to be eliminated through collar contracts, contracts for difference and floor price contracts where appropriate and oversee any Commonwealth direct investment in generation. This will encourage dispatchable renewables in areas where the market would not build, but where the public interest requires it.

<sup>18</sup> re100.eng.anu.edu.au/resources/assets/1708BlakersREAust.pdf

# LOWERING BILLS FOR HOMES AND SMALL BUSINESSES

## LOWERING ENERGY BILLS WITH SOLAR

We want to hand power back to energy users. Consumers of energy are already becoming their own creators of energy. While Australia leads the world in rooftop solar, not everyone has the ability or incentive to invest in solar panels. Renters, people living in apartments and small business tenants all face barriers to getting clean energy.

The \$1.2 billion **Solar for All program** will support landlords and apartment dwellers to install rooftop solar on their property or participate in local solar gardens. This will be a win-win for renters and landlords. People on low incomes and renters will benefit from lower power prices, including from the return on selling excess solar power to the grid.

Landlords will be able to access grants to support the upfront costs of installing a solar panel system on their property. The \$1.2 billion **Solar for All program** will save the typical landlord up to \$4,450 for installation of an average 4kW solar system and could help renters save as much as \$890 a year on their electricity bills.

**Power Australia** will offer people the opportunity to buy into Solar Gardens, installed on a supermarket or community building, and get to retain ownership of their solar panel when they move. Renters and apartment dwellers who invest will get an ongoing discount on their energy bill. The Greens will invest \$100 million over 4 years to establish the scheme and ensure the Commonwealth works with State and Territory governments to remove barriers placed by energy companies that are preventing body corporates and owners' corporations from installing solar.

### **The Greens will also invest:**

- \$100 million in an Indigenous and remote communities power fund, administered by ARENA, to support the shift to renewable energy, storage and the creation of microgrids in remote indigenous communities will be established.
- \$25 million in a community renewables program to support regional and community renewable hubs across the country.

## LOWERING ENERGY BILLS WITH STORAGE

A \$2.2 billion **Household Solar Storage Scheme** providing household battery storage incentives of up to \$7000 per battery (tapering down annually to July 1, 2023). Each quarter, \$137.5 million will be made available for use from the fund.

10 per cent of the funding cap each quarter will be set aside for low income households, who will be eligible to receive double the allocated rebate in that year.

The scheme will work in harmony with state-based schemes by ‘topping up’ state based rebates. For example, if a household receives the Victorian government subsidy of \$4838 in 2019, they will still be eligible to receive up to \$2162 from the Federal Government rebate.

Under the Greens’ scheme, small businesses will also have access to up to \$15,000 (tapering down to \$9300 in 2023-2024) to assist with the installation of battery storage. These loans will be repayable over a 10 year period supported by the CEFC.

## LEADING THE WAY ON ENERGY EFFICIENCY

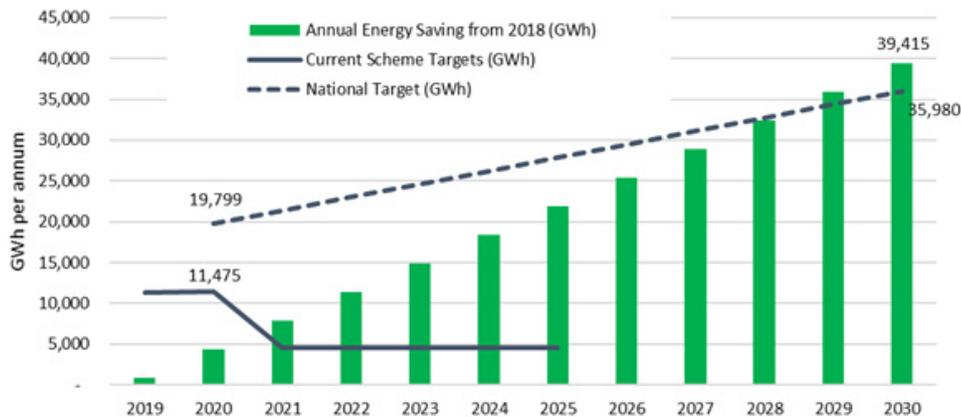
Cleaning up our energy system means we need to use energy smarter. Our goal is to double energy productivity by 2030 – this means significantly reducing the electricity and gas we currently use to achieve the same results.

As part of a plan to reach this goal the Greens will establish a **National Energy Efficiency Target** which will place an obligation on energy retailers to drive energy efficiency improvements across household and business. Our **National Energy Efficiency Target** will set a target of 10 per cent for energy efficiency Australia-wide and does not include any other gains that will be achieved through other federal incentives. The scope of the policy will drive energy efficiency improvements across energy use and will reduce the gas use of the residential and commercial sectors of the economy.

The scheme will work in tandem with existing state-based schemes which will eventually be ‘absorbed’ into the national scheme upon their expiration. The target will be set using forecasting from the AEMO to establish a trajectory for the energy efficiency target.<sup>19</sup>

<sup>19</sup> Developed in consultation with *Green Energy Markets* and the *Energy Savings Industry Association*

## Proposed NEET target and annual energy savings 2019-2030



To stimulate innovation and investment in the building industry to deliver higher energy performance in buildings at lower cost, the Greens will also mandate strong energy efficiency targets for new buildings in the National Construction Code of 22-60 per cent by 2030.<sup>20</sup> Setting effective energy efficiency standards could also reduce energy bills by up to \$27 billion, cut energy network costs by up to \$7 billion and deliver at least 78 million tonnes of emissions savings by 2050.<sup>21</sup>

### In addition the Greens will:

- Establish Clean Energy Solution Centres to support business to implement audits and develop energy efficiency plans;
- Establish a 'Clean Energy Small Business Fund' with an initial funding injection of \$200 million over the next 4 years. SMEs will be eligible to apply for up to \$10,000 to cover the cost of investment in assets or capital works that will reduce fossil fuel use, improve energy efficiency or switch from gas to clean energy.

<sup>20</sup> This target is in line with recommendations in the *Built to Perform* report [www.asbec.asn.au/research-items/built-to-perform](http://www.asbec.asn.au/research-items/built-to-perform)

<sup>21</sup> Australian Sustainable Built Environment Council (ASBEC) and ClimateWorks Australia, *Built to Perform: An Industry Led Pathway to a Zero Carbon Ready Building Code*. July 2018

## STEPPING OFF THE GAS

Gas has been touted as an essential part of the energy mix moving forward,<sup>22</sup> but gas is not a transition fuel, it's a fossil fuel. With cheap, clean electricity there's no need for households and most businesses to use gas for cooking or heating.

Australia's households are responsible for roughly 12 per cent of carbon pollution through burning gas and, indirectly, by consuming electricity.<sup>23</sup> This is driving up household costs and driving up pollution. By transitioning our homes and businesses off fossil fuels and improving energy efficiency, we can cut pollution and save money at the same time.

Payback periods can be as low as 3 to 4 years for investment in more efficient heating and hot water systems.<sup>24</sup> The transition away from fossil fuels should not be left solely up to consumers; government should provide powerful incentives to help households and businesses embrace this transition.

In addition to the \$200 million **Clean Technology Program**, the Greens will get Australia off gas by:

- Funding a \$50 million community education campaign targeted at households, encouraging them to use reverse cycle air conditioners as heaters instead of their gas heaters, which would cut pollution and save consumers up to thousands of dollars a year;
- Changing the Building Code of Australia requirements to prohibit the installation of gas in new developments;

---

<sup>22</sup> Chief Scientist, Independent Review into the Future Security of the National Electricity Market – Blueprint for the Future, June 2017, p. 6

<sup>23</sup> Department of Environment and Energy, Individuals and households, 2018, [www.environment.gov.au/climate-change/individuals-and-households](http://www.environment.gov.au/climate-change/individuals-and-households)

<sup>24</sup> Ginninderry, *Householder Attitudes to Residential Renewable Energy Futures*, February 2017

# AGRICULTURE AND LAND MANAGEMENT

## SUPPORTING FARMERS TO STORE CARBON

By abolishing the Emissions Reduction Fund (ERF recently rebadged as the Climate Solutions Fund) and re-establishing the Carbon Farming Initiative farmers and land managers will be supported to protect and grow the capacity of their land to drawdown carbon.

Agriculture is responsible for 13 per cent of Australia's emissions.<sup>25</sup> There are huge opportunities for Australian farmers and land managers to change their practices, regenerate their land and create new revenue streams by selling this abatement to the carbon market; just like they did before the carbon price was abolished.

## AN INDEPENDENT ENVIRONMENT PROTECTION AGENCY AND GREENHOUSE TRIGGER

To ensure economy-wide development is occurring consistent with the preservation of our natural environment and biodiversity, the Greens plan will introduce a new generation of environmental laws overseen by an independent regulatory body with real power to enforce environmental laws.

A national **Environmental Protection Agency** will have real powers to enforce the law and provide independent expert advice, at arm's length from the influence of politicians and the big business lobby.

The Environmental Protection Agency will oversee the next generation of environmental laws that will extend to:

- Greenhouse gas emissions and air pollution;
- Impacts from land clearing;
- National parks and reserves, including critical habitats, climate refugees and national biodiversity hotspots;
- Vulnerable ecological communities; and
- Water resources (including rivers, wetlands and aquifers)

---

<sup>25</sup> Quarterly Update of Australia's National Greenhouse Gas Inventory: September 2018 page 7.

# TRANSPORT

## DRIVING THE ELECTRIC VEHICLE REVOLUTION

Australia's very high transport emissions, at 19 per cent of our total pollution,<sup>26</sup> means we need to use our clean energy to power an electric vehicle revolution. A 17 per cent tax on luxury fossil fuel cars would help cover most costs for scrapping registration fees, import tariffs, GST and stamp duty on electric vehicles, reducing the cost of electric vehicles by around 20 per cent.

Combined with emissions standards for vehicles that lead up to a complete ban on new internal combustion vehicles by 2030,<sup>27</sup> air-quality will be improved and households can reduce their cost-of-living at the petrol bowser. We can encourage a homegrown electric vehicle and battery charging industry at the same time.

---

<sup>26</sup> Quarterly Update of Australia's National Greenhouse Gas Inventory: September 2018 page 7.

<sup>27</sup> Note, the PBO has not costed the interactions between emissions standards for internal combustion engines and the uptake of electric vehicles with reduced costs.

# TRANSITIONING HEAVY INDUSTRY

## CLEAN TECHNOLOGY INVESTMENT AND RESEARCH AND DEVELOPMENT FOR INDUSTRIAL SUBSTITUTION

Our plan for 100% renewable energy will be key to enabling industry to drive down pollution in the manufacturing, mining and other sectors as they electrify processes and substitute clean energy for fossil fuels.

The restoration of an economy wide carbon price will incentivise heavy industries to reduce pollution and will be complemented by a suite of targeted, specific policies, outlined below, that will support heavy industry to make the shift. Research and development, led by the government, into technologies that will enable industrial substitution will be critical to ensure we are able to reach net zero emissions no later than 2040.

The Greens goal of increasing Australia's public and private investment in research and development to 4 per cent by 2030 will also help drive the transition.

- Re-establish the Clean Technology Program, scrapped by Tony Abbott,<sup>28</sup> with a \$200 million investment supporting innovation of products, processes and services by business and industry;
- The Greens will also support investment in further research, development and commercialisation of low emissions steel through the establishment of a \$250 million **Green Steel Innovation Fund** within ARENA's boosted budget to drive down demand for metallurgical coal.
- Investing \$100 million in ARENA to support specific research, development and commercialisation into industrial substitution and electrification programs in the chemical, cement and other manufacturing and fabrication industries;

---

<sup>28</sup> Australian Government *Budget Paper No. 2 2014-15*, 2014

# A JUST TRANSITION FOR WORKERS

## CREATING AND TRANSITIONING JOBS

The Greens believe it is the government's responsibility to ensure these workers are looked after so that no coal power worker has to suffer the anxiety and financial insecurity that comes from losing their job. With a planned transition, workers can be looked after and not simply be subject to the whims of the global market for thermal coal.

With a \$1 billion **Clean Energy Transition Fund, Renew Australia** will be tasked with supporting workers to reskill, relocate or transition to retirement, depending on what the personal circumstances require. We will work with industry to seek to ensure that no coal worker is left behind. The fund will also target support at the local communities affected by the transition, prioritising infrastructure investment in those areas and offering economic incentives for investment throughout the local economy.

# THE JOBS THAT WILL BE CREATED

Employment modelling released by the Australia Institute estimates that a shift to just 53% renewables would create up to 70,000 installation, construction and operation jobs. Using the same analysis, the RenewAustralia 2030 plan for 100% renewables and a renewables export industry would create construction, engineering and installation jobs well beyond 130,000.<sup>29</sup>

But this plan is more than just renewables, it will drive a transition right across the economy, creating new industries, jobs and supply chains. From energy efficiency improvements in homes and businesses, research, agriculture, land-restoration, retailing and the rehabilitation of old mining sites, this plan will create over 179,780 full-time jobs a year in total – over 100,000 people more higher than people currently employed in coal, oil and gas mining combined.

## Average Annual Full-Time Equivalent Direct Jobs Created, by State and Territory<sup>30</sup>

Policy	NSW	VIC	QLD	WA	SA	TAS	NT	ACT	TOTAL
Establish Renew Australia	55	50	50	50	50	0	0	70	320
ARENA-managed initiatives	3,820	1,315	6,435	5,485	1,235	120	5	305	18,720
100% Renewables by 2030	45,910	39,030	36,710	18,090	4,640	1,870	890	0	147,120
Establish retailer Power Australia	70	300	30	0	10	0	0	0	410
Cleaning up coal mines	4,070	340	3,520	110	0	0	0	0	8,040
Household solar storage scheme	490	340	190	230	400	10	5	20	1,680
Household education campaign	30	25	20	10	5	0	0	20	110
Energy efficiency measures	40	90	10	20	10	5	0	30	205
Energy efficiency – market-based schemes	325	495	225	105	80	30	5	30	1,295
Clean Energy Transition Fund	140	0	175	5	0	0	0	80	400
Environment Protection Agency	50	30	25	15	10	110	85	485	810
Solar Fuel Export Hubs	30	20	180	45	140	40	30	175	660
<b>TOTAL</b>	<b>55,030</b>	<b>42,035</b>	<b>47,570</b>	<b>24,165</b>	<b>6,580</b>	<b>2,185</b>	<b>1,020</b>	<b>1,215</b>	<b>179,770</b>

*These calculations, while based on information provided by the Parliamentary Budget Office, have not been prepared by them.*

<sup>29</sup> Will-o'-the-ISP Estimating renewable energy employment under the Integrated System Plan, Australia Institute, November 2018.

<sup>30</sup> Figures may not sum to total due to rounding.

# HOW WE WILL PAY FOR THIS PLAN

– Financial implications prepared by the independent Parliamentary Budget Office are costed and current as at 2018-19 Mid-Year Economic Forecast and Outlook

<b>Budget reductions on an underlying cash balance basis</b>	<b>Cost over Decade (\$m) 2018-19 to 2028-19</b>
Establish and run the Renew Australia	\$1,009*
Planned Transition out of coal exports	\$652
Coal communities Clean Energy Transition fund	\$1000*
Restore ARENA's funding and develop hydrogen export industry	\$5,245
Grid Transformation Fund** and funding for AEMO	\$40
Grid-Scale Storage Fund	\$2,203
Solar for All, Solar Gardens and Community Renewables program	\$1,325*
Establish Power Australia – publicly owned energy retailer	\$85
Establish a National Energy Efficiency Scheme and Clean Energy Solution Centres for Small Business	\$285*
Switching off gas campaign and re-establish Clean Technology Innovation Program	\$227*
Household Solar Storage Scheme	\$2,217
Small Business Clean Energy Fund	\$184*
Remove taxes and registration fees for electric vehicles by increasing the luxury car tax on internal combustion vehicles	\$800
Invest in public fast-charging infrastructure	\$151
Establish and Operate the Environment Protection Agency	\$1,201
Public Debt Interest Impacts	\$1,772
<b>Total Expenses (including public debt interest impacts)</b>	<b>\$18,396</b>
<b>Budget improvements on an underlying cash balance basis</b>	<b>Savings over Decade (\$m) 2018-19 to 2028-19</b>
End the Liberal Government's "Emissions Reduction Fund"	\$148
Expand the investments of the Clean Energy Finance Corporation	\$1,629***
Reintroduce Carbon Price and boost household compensation	\$65,896
<b>Public Debt Interest Impacts</b>	<b>-\$861</b>
<b>Total Revenue</b>	<b>\$66,812</b>
Net improvement to the budget from the Renew Australia Package to be invested in other public infrastructure and quality public services	\$48,417

\* The public debt interest impact of this policy is included within the public debt impact line item of this table

\*\* The headline cash balance impact of an equity injection for publicly owned grid infrastructure to open up Renewable Energy Zones is \$6,000 million over the decade.

\*\*\* The public debt impact of this policy is included within the public debt impact line item of this table

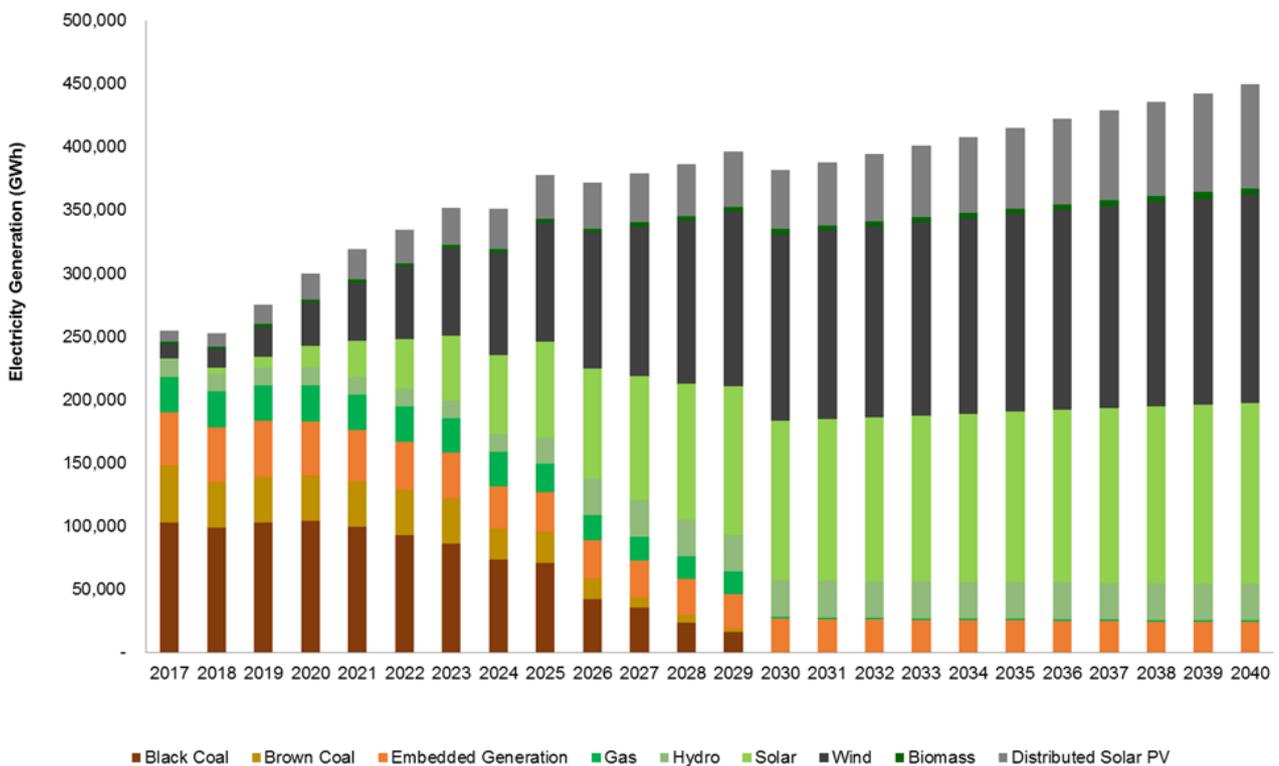
# APPENDIX A: THE DETAILED PATHWAY

State by State Breakdown of fossil fuel phase out, new renewable/storage build, mine rehabilitation schedule and clean energy export facilities

While the specific transition plan would ultimately be for **Renew Australia** to develop in consultation with communities, energy companies and government, the following shows a detailed scenario of how a clean energy transition can be implemented:

## PROJECTED FUEL SUPPLY

National electricity supply by source - RenewAustralia



## ASSUMPTIONS

The **Renew Australia** plan delivers on a target for 100 per cent renewable electricity by 2030, with a proactive transition away from coal fired generation.

The gradual, but ambitious, phase-out of fossil fuel generation is replaced through major investments in new lowest cost renewable energy capacity.

The reliability and security of supply is maintained through investment in new storage capacity (projections included below).

Total Australia wide electricity generation reaches 388 TWh, with 310 TWh being delivered in the NEM States by 2030.

New renewable build begins five years before the scheduled shutdown of a power station, allowing a “spike” of new renewable generation capacity to be built in response to a major shutdown.

All power stations decommissioned no later than reaching an operational life of 50 years.

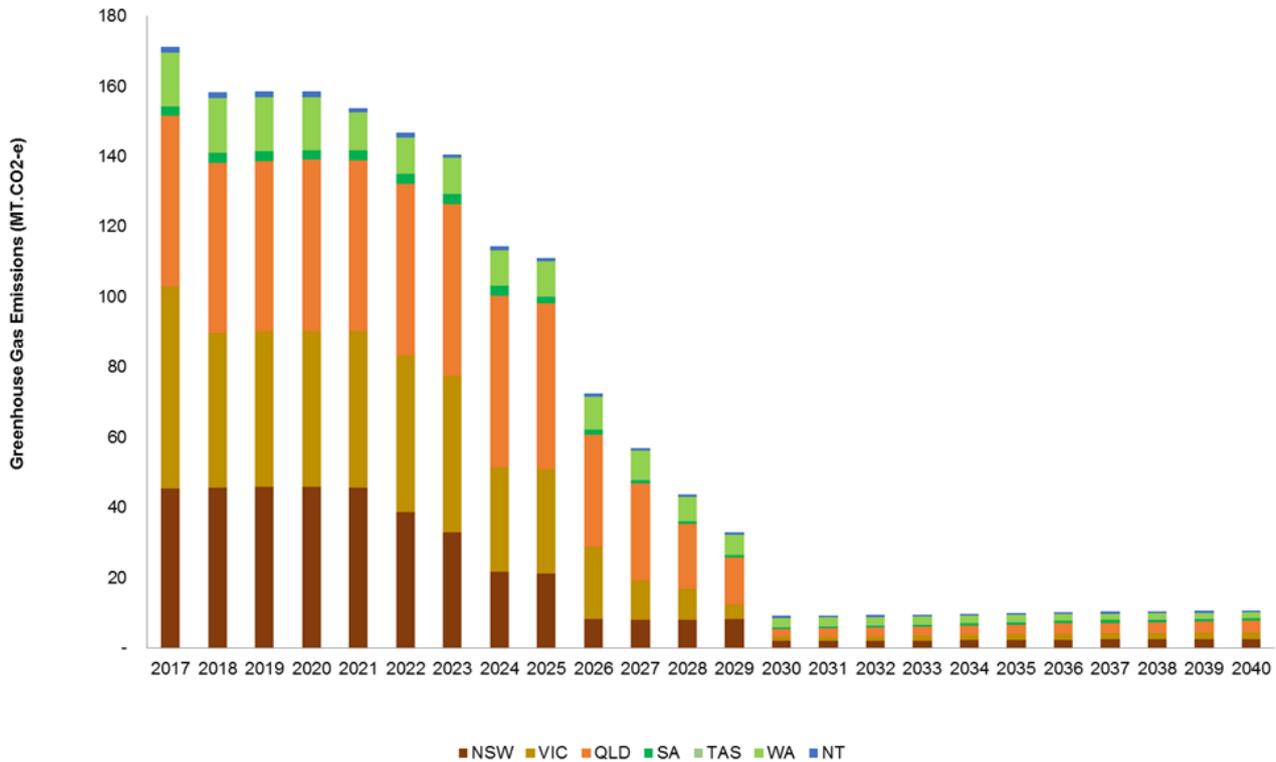
Phase out of all gas generation by 2030.

## OUTCOMES:

	2020		2030		2040	
	Demand (TWh)	Renewables (%)	Demand (TWh)	Renewables (%)	Demand (TWh)	Renewables (%)
NSW	86.0	26%	111.8	100%	134.6	100%
VIC	62.5	34%	86.5	100%	107.6	100%
QLD	78.6	18%	93.2	100%	102.2	100%
SA	15.1	67%	20.0	100%	22.7	100%
TAS	13.5	89%	16.2	100%	18.3	100%
Total NEM	<b>238.5</b>	<b>33.7%</b>	<b>327.7</b>	<b>100%</b>	<b>363.9</b>	<b>100%</b>
WA	41.2	19%	51.1	100%	60.7	100%
NT	2.6	17%	3.0	100%	3.2	100%
Australia	<b>299.6</b>	<b>31%</b>	<b>381.8</b>	<b>100%</b>	<b>449.6</b>	<b>100%</b>

# EMISSIONS PROFILE

Electricity emissions by state - RenewAustralia



The Renew Australia plan would achieve a transition to an electricity supply consisting of 100 per cent renewable energy sources.

Under the Renew Australia scenario, emissions in the electricity sector would be reduced by 95 per cent by 2030 (from 2017 levels).

Combined with growth in electricity demand, through the transition of other sectors of the economy towards electrification, the overall economy wide reduction in emissions would be significant. These additional reductions would be driven by fuel switching in the transport sector, through the increased adoption of electric vehicles, and the electrification of some industrial processes.

The economy wide emissions reductions under the Renew Australia plan would be approximately 234 million tonnes annually by 2030, representing a reduction of 41 per cent below the Australian Government’s estimate of ‘business-as-usual’ emissions.<sup>31</sup>

31 [www.environment.gov.au/climate-change/publications/emissions-projections-2018](http://www.environment.gov.au/climate-change/publications/emissions-projections-2018)

## EMISSIONS INTENSITY

The 'emissions intensity of electricity' refers to the amount of carbon dioxide emitted per unit of electricity generated. Australia's electricity emissions intensity is relatively high compared to other nations because of the reliance of the electricity system on coal and gas.

The table below shows the anticipated effects of the Greens plan for energy on Australia's emissions intensity over time.<sup>32</sup>

Year	Total Demand (TWh)	Total Electricity Emissions	National Emissions Intensity
2019	275.1	174.2	0.633
2020	299.6	173.7	0.58
2021	319	168	0.527
2022	334.7	159.7	0.477
2023	351.5	152.6	0.434
2024	351.1	125.5	0.357
2025	377.6	121.4	0.321
2026	371.6	82.2	0.221
2027	378.8	66.3	0.175
2028	386.3	52.7	0.136
2029	396.5	41.4	0.104
2030	381.8	17.3	0.045
2031	387.9	16.9	0.044
2032	394.3	16.6	0.042
2033	400.7	16.3	0.041
2034	407.6	16.1	0.039
2035	415.2	15.9	0.038
2036	422.4	15.7	0.037
2037	428.8	15.3	0.036
2038	435.5	14.9	0.034

<sup>32</sup> The emissions intensity of Australia's energy network described in the table differs from the emissions intensity trajectory modelled by the Parliamentary Budget Office for the preparation of the carbon price costings.

A final emissions intensity of around 0.03 TCO<sub>2</sub>/MWh is in line with the 2014 IPCC residual lifecycle emissions intensity figures from all energy sources.

# ESTIMATED STORAGE REQUIREMENTS

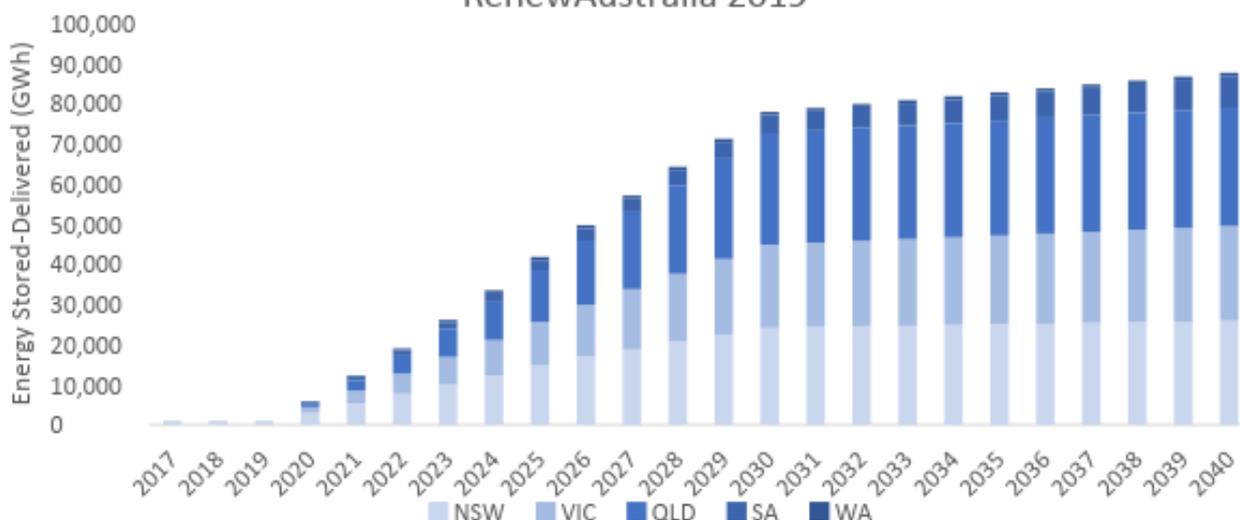
To support the transition to an electricity system with a significant percentage of supply being delivered by renewable energy sources, the amount of energy storage within the system will also need to scale up over time.

Previous studies into Australia’s storage requirements in a transition to clean sources of energy, have estimated that approximately one-third of our future energy usage would be stored and delivered by energy storage technologies.

This storage will be delivered using a diversity of technologies built at a variety of scales, including small- and large-scale battery storage and pumped hydro energy storage systems.

While supporting high penetrations of renewable energy generation capacity, energy storage systems will also provide crucial system support functions, ensuring that the energy system remains reliable and secure during a transition away from fossil fuels.

Energy Served by Energy Storage Technologies By State - RenewAustralia 2019



It has been estimated that by 2030, the amount of capacity required to be delivered by storage systems would be approximately 26.65 GW, growing to 30.0 GW in 2040. This growth is in response to both increases in the proportion of electricity delivered by renewable energy sources and increases in demand for electricity supplies.

Coal Mine Rehabilitation JIt has been estimated that by 2030, the amount of capacity required to be delivered by storage systems would be approximately 26.65 GW, growing to 30.0 GW in 2040. This growth is in response to both increases in the proportion of electricity delivered by renewable energy sources and increases in demand for electricity supplies.

## COAL MINE REHABILITATION JOBS FIGURES

As coal is phased out and coal mines close, jobs will be created in the rehabilitation of mine sites. In addition to the jobs created in renewable energy, mine rehabilitation will create an average of 8074 new full time equivalent jobs each year between 2020 and 2030.

Mining activity is concentrated in New South Wales and Queensland, with smaller numbers of mines operating in Victoria and Western Australia, meaning that jobs in mine rehabilitation will be concentrated in these areas. As more mines close, more long term jobs will be created, rising to 14,352 jobs created in 2031.

<b>Jurisdiction</b>	<b>Avg. jobs created each year 2020-2030</b>	<b>Jobs created in 2031</b>
<b>NSW</b>	4065	7280
<b>VIC</b>	340	624
<b>QLD</b>	3517	6240
<b>WA</b>	113	208

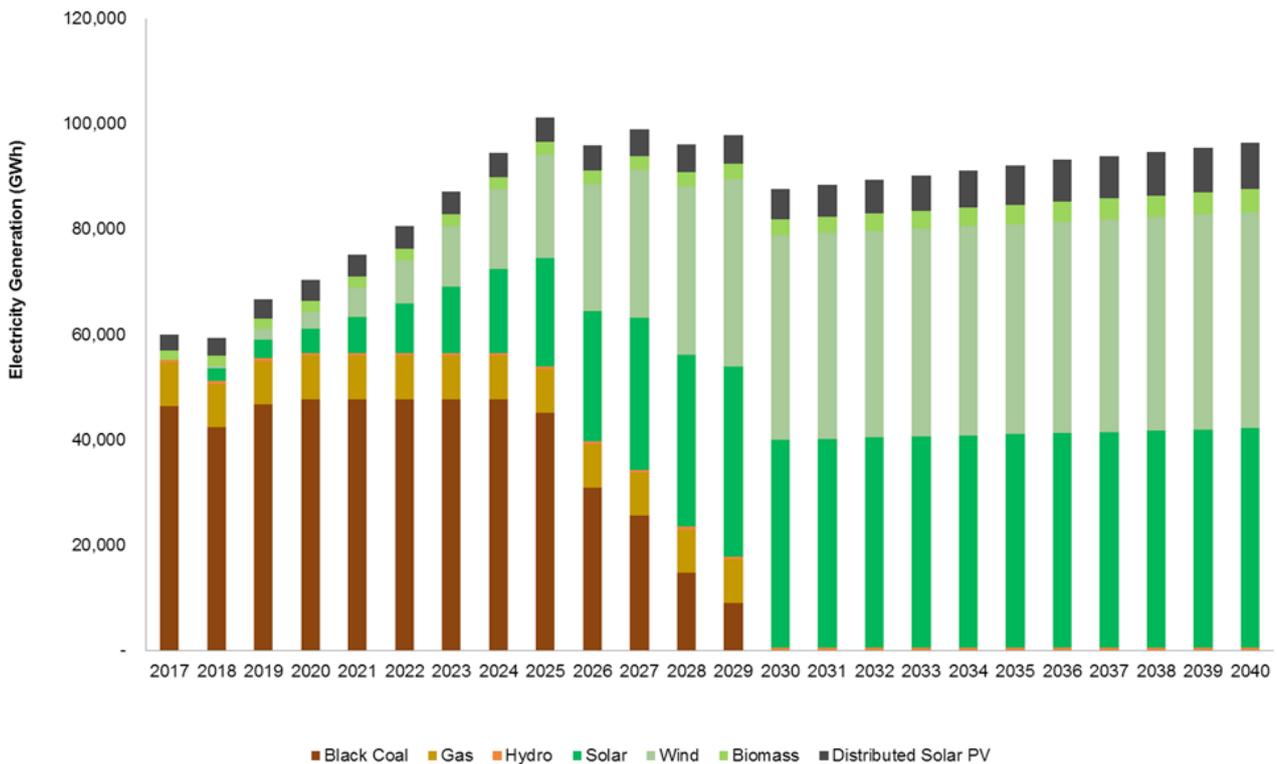
# STATE BY STATE

## NEW SOUTH WALES

### Decommissioning timeline

- Decommissioning of Bayswater Power Station brought forward by eight years to 2024 at the age of 42.
- Decommissioning of Eraring Power Station brought forward by eight years to 2023 at the age of 42.
- Decommissioning of Vales Point Power Station brought forward by five years to 2026 at the age of 45.
- Decommissioning of Mt Piper Power Station brought forward by ten years to 2030 at the age of 37.
- Shutdown of two small waste coal mine gas power stations in 2025.

Electricity generation by source - RenewAustralia - Queensland

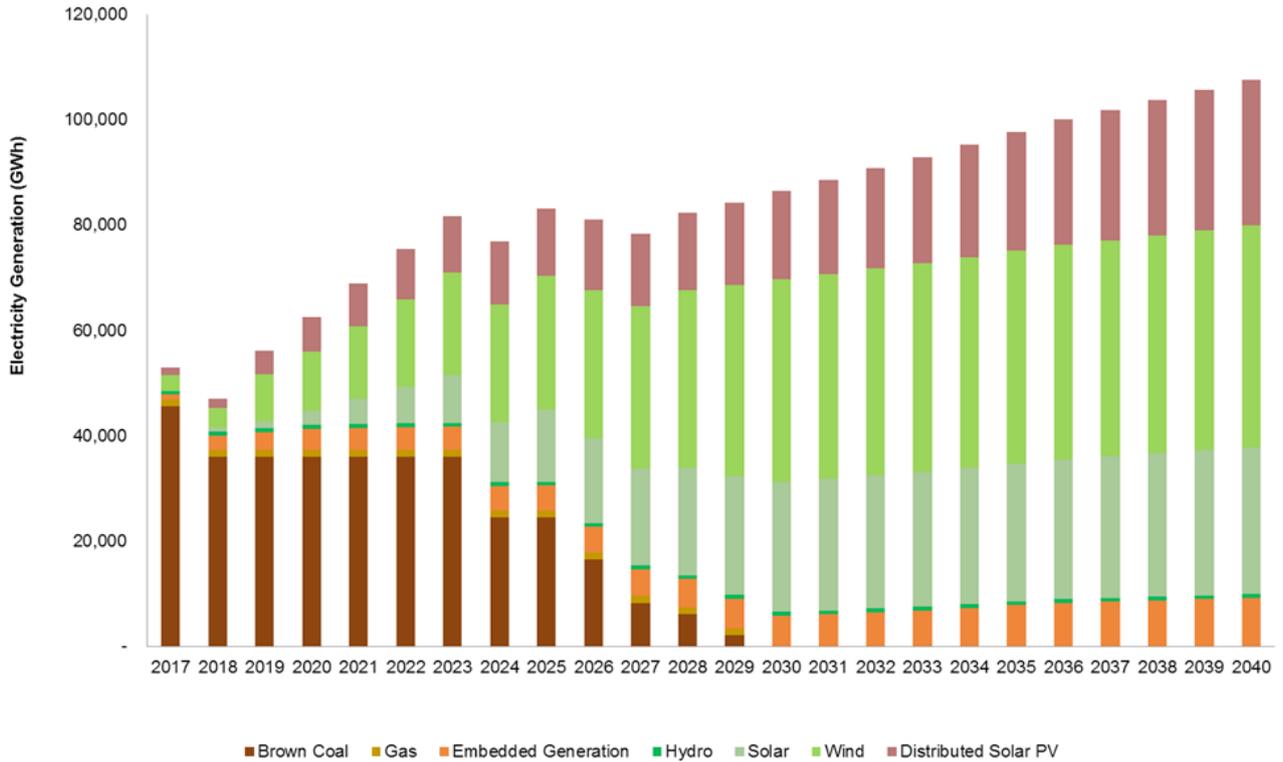


# VICTORIA

## Decommissioning timeline

- Decommissioning of Loy Yang A Power Station brought forward by five years to 2024 at the age of 40.
- Decommissioning of Loy Yang B brought forward by 13 years to 2030 at the age of 37.

Electricity generation by source - RenewAustralia - Victoria

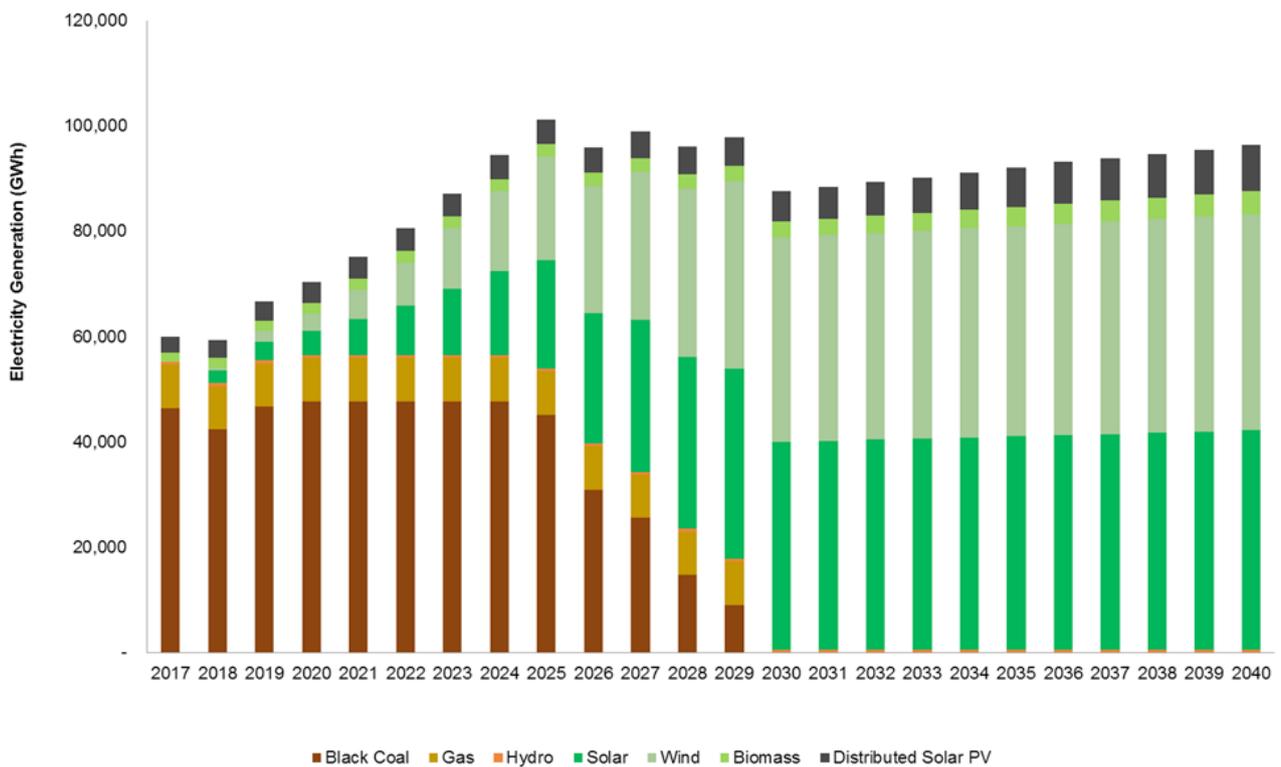


# QUEENSLAND

## Decommissioning timeline

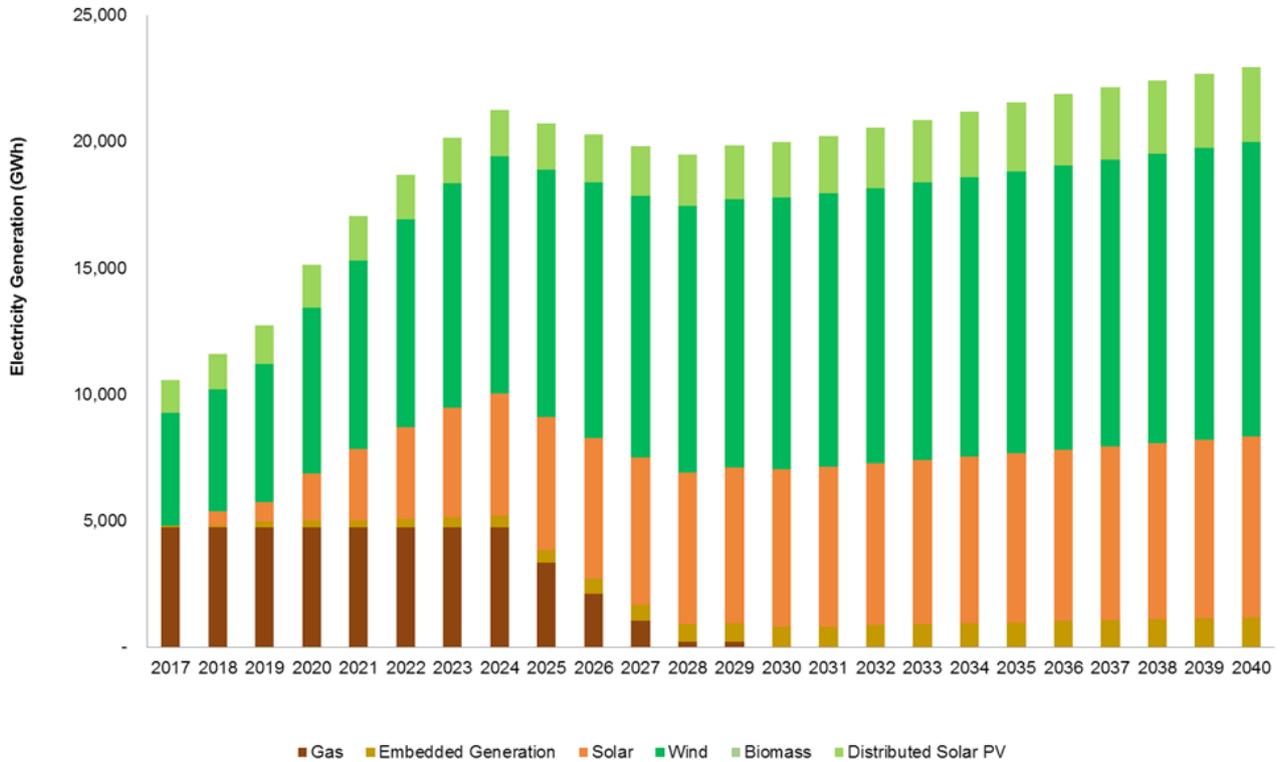
- Decommissioning of Tarong Power Station brought forward by eight years to 2026 at the age of 42
- Decommissioning of Stanwell Power Station brought forward by ten years to 2030 at the age of 37
- Decommissioning of Callide B Power Station brought forward by 15 years to 2028 at the age of 35
- Decommissioning of Kogan Creek Power Station in 2027
- Decommissioning of Callide C Power Station in 2028
- Decommissioning of Millmerran Power Station in 2029
- Closure of the Braemar I and II and Moranbah coal mine gas power stations in 2025.

**Electricity generation by source - RenewAustralia - Queensland**



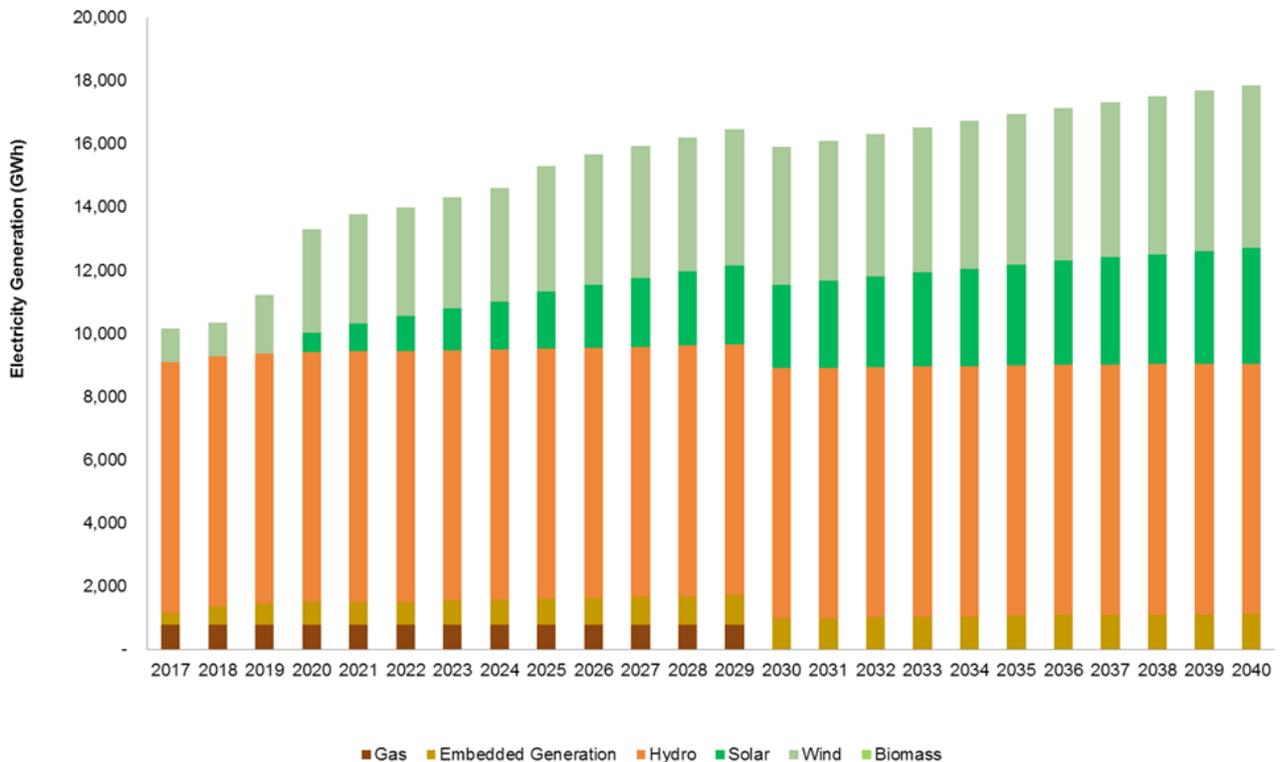
# SOUTH AUSTRALIA

Electricity generation by source - RenewAustralia - South Australia



# TASMANIA

Electricity generation by source - RenewAustralia - Tasmania

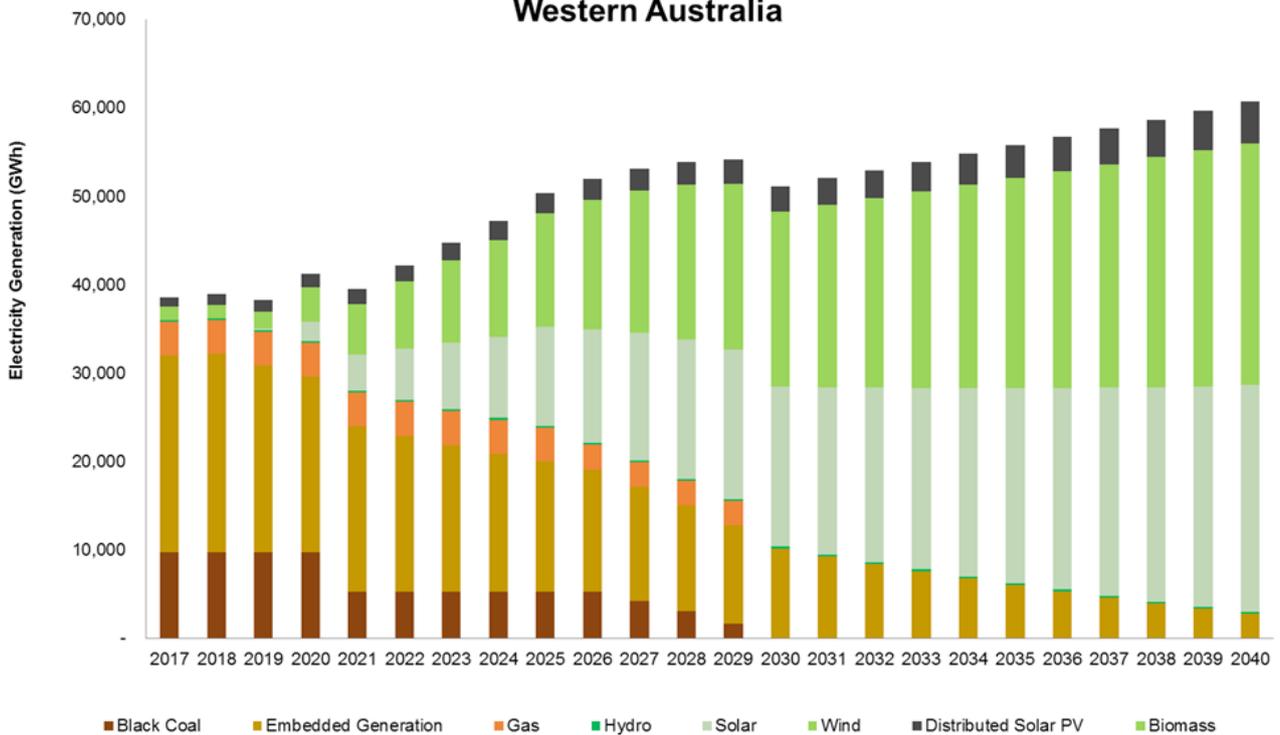


# WESTERN AUSTRALIA

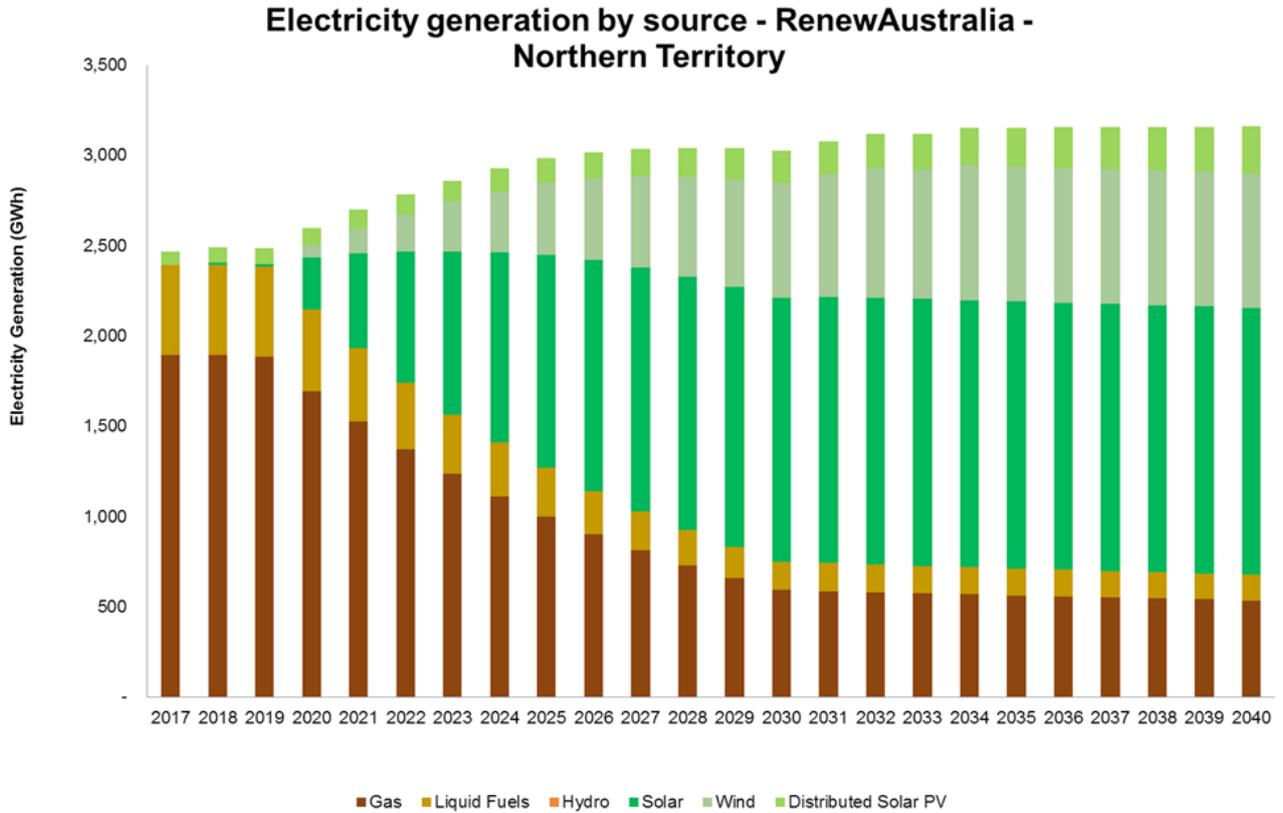
## Decommissioning timeline

- Immediate decommissioning of the Muja Power Station, foregoing plans to refurbish the power station (currently aged 52).
- Decommissioning of Collie Power Station brought forward by ten years to 2030 (earlier than currently proposed decommissioning date) at the age of 31.
- Closure of Bluewaters I and II in 2035.

**Electricity generation by source - RenewAustralia - Western Australia**



# NORTHERN TERRITORY



## SOLAR EXPORTS

Australia has an abundance of renewable energy resources, with some of the world's best areas for solar and wind generation. This provides Australia with a natural competitive advantage when it comes to the production of cheap and plentiful renewable energy that can be leveraged as an opportunity to increase Australia's energy exports.

## RENEWABLE ENERGY FOR EXPORT

The proposed **Australian Renewable Energy Hub** (AREH) provides an example of the type of development that could link Australia with regional neighbours to provide renewable electricity exports.

Northern parts of Western Australia have some of the world's best solar and wind energy resources that are also co-located closely with growing economies in our Asian region neighbours.

The AREH has proposed to build up to 11,000 MW of new solar and wind generation capacity, combined with two undersea cables linking Australia to Indonesia and Singapore. Renewable energy generation from the AREH would be used to replace fossil fuel electricity supplies in the Pilbara region, along with providing up to 20,000 GWh of clean electricity for export.

A proposed undersea electricity connection between Western Australia and the ASEAN Power Grid would allow for zero emission electricity from Australia to be exported to regional neighbours including Indonesia, Singapore, Malaysia and Vietnam. This would open the Australian energy market to serving a thriving ASEAN economic network, with growing energy needs.

## LIQUID FUELS

The AREH provides an opportunity for Australia to directly export renewable electricity generation to regional neighbours, however due to Australia's distance from other regional countries, the volume of electricity that can be exported is limited to serving our closest neighbours.

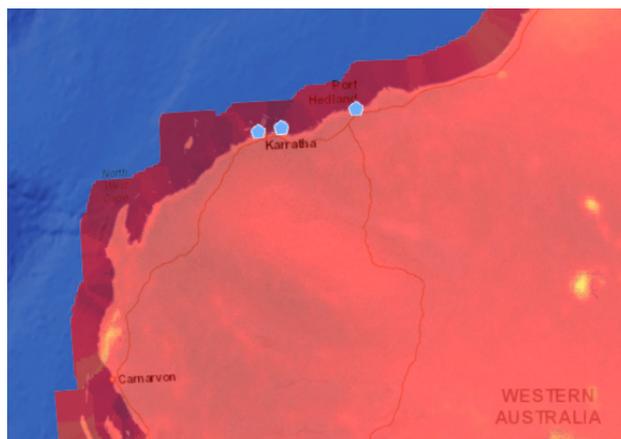
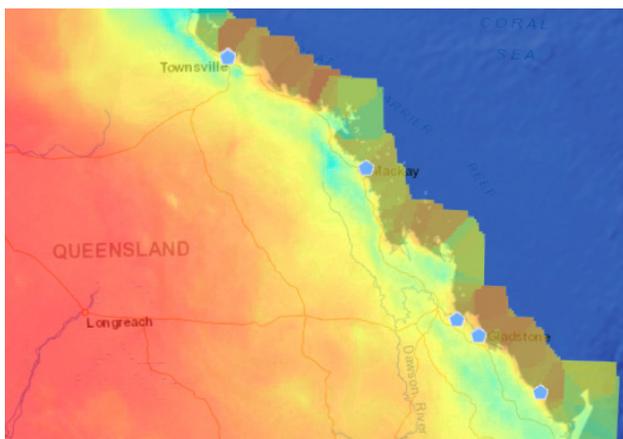
The production of renewable fuels, such as renewable hydrogen fuels, provide additional opportunities to leverage Australia's abundant clean energy resources.

As a fuel, liquid hydrogen offers has two key roles in supporting the energy system; as a means for energy storage, and as a replacement fuel for the transport sector.

The Hydrogen Council, a global collective of large energy producers and vehicle manufactures, predicts that by 2050, the market for hydrogen fuels could grow to become a \$2.5 trillion market, delivering almost one-fifth of the world's energy supply and supporting the creation of six million jobs worldwide.<sup>33</sup>

---

<sup>33</sup> Hydrogen scaling up: A sustainable pathway for the global energy transition, Hydrogen Council November 2017



Northern Queensland and Western Australia's Pilbara region have high potential to become Australia's premier locations for hydrogen fuel production and export

This is an opportunity for Australia, as access to abundant clean energy resources provides Australia significant potential to supply the world with zero emission hydrogen fuel. Hydrogen would allow Australia to maintain its position as a world leading energy exporter, but rather than leading the world in exporting coal and gas, renewable hydrogen fuels provide a way for Australia to do this while helping the world to lower greenhouse gas emissions.

Regional Western Australia and Queensland both have high potential to be host to hydrogen fuel production facilities, linked with existing infrastructure currently used for the export of liquified natural gas. The Pilbara region in Western Australia and Gladstone in Queensland, are well positioned to produce hydrogen fuels through abundant renewable energy resources in those regions, while deploying existing fuel export facilities.

Australia can leverage the existing connections to the global energy market, particularly to Asian customers for natural gas in the transition to clean, renewable fuels.

# JOBS FIGURES METHODOLOGY

Job figures have been produced using a range of sources, a selection of which is briefly outlined below:

1. ARENA-managed initiatives have been produced by projecting ARENA investments based on its historical geographic distribution of investments and ratio of investment to total project value leveraged, weighted for project type and initiative-specific directives. Resulting total finance achieved is assessed using the economic impact analysis methodology designed by the Australian Urban Research and Infrastructure Network, modified to update for 2016 census data and ANZSIC industry subdivisions.
2. 100% renewables by 2030 utilises a linear function of employment per gigawatt of installed capacity, disaggregated to construction and operation, by technology type produced by The Australia Institute in November 2018. This follows the methodology adopted by Labor's claim of supporting up 71,000 jobs through its renewable energy target policy.
3. Mine rehabilitation figures are a product of the distribution of thermal export coal mines in Australia, using the average cost structure of an export coal mine and the interaction with the export levy and cap schedule, which is then multiplied by the average employment requirements of mine rehabilitation over the average time to rehabilitate a mine.

Energy efficiency market-based scheme figures are based on job-year estimates produced by Green Energy Markets for the Energy Efficiency Council, with state-based distributions estimated using data from the Energy Consult 2015 Residential Energy Baseline Study: Australia, prepared for the Department of Industry and Science on behalf of the trans-Tasman Equipment Energy Efficiency Program and data from the Australian Bureau of Statistics.

---

#### Quote Sources.

Page 2: David Attenborough, [www.theguardian.com/business/blog/live/2019/jan/21/chinese-growth-lowest-in-28-years-as-davos-gets-under-way-business-live](http://www.theguardian.com/business/blog/live/2019/jan/21/chinese-growth-lowest-in-28-years-as-davos-gets-under-way-business-live)

Page 4: Greta Thunberg, [womenintheworld.com/2019/01/29/i-want-you-to-panic-climate-activist-greta-thunberg-16-lays-it-on-the-line-for-world-leaders](http://womenintheworld.com/2019/01/29/i-want-you-to-panic-climate-activist-greta-thunberg-16-lays-it-on-the-line-for-world-leaders)

Page 7: Professor Andrew Blakers, [theconversation.com/the-greens-plan-for-90-renewables-by-2030-sounds-hard-but-it-stacks-up-51115](http://theconversation.com/the-greens-plan-for-90-renewables-by-2030-sounds-hard-but-it-stacks-up-51115)

Page 45: Tristan Edis, [www.theguardian.com/business/blog/live/2019/jan/21/chinese-growth-lowest-in-28-years-as-davos-gets-under-way-business-live](http://www.theguardian.com/business/blog/live/2019/jan/21/chinese-growth-lowest-in-28-years-as-davos-gets-under-way-business-live)

**“WHILE A NUMBER OF INTEREST GROUPS HAVE CRITICISED THE 50% BY 2030 RENEWABLE ENERGY TARGETS OF THE FEDERAL LABOR PARTY AS TOO AMBITIOUS, THEY IN FACT WOULD INVOLVE A MAJOR CONTRACTION IN CONSTRUCTION ACTIVITY AND EMPLOYMENT IN THE RENEWABLE ENERGY INDUSTRY.”**

**– TRISTAN EDIS**

Green Energy Markets Renewable Energy Index: October 2018



# RENEW AUSTRALIA 2030

Authorised by Senator Richard Di Natale, Parliament House Canberra ACT 2600.