



ENERGY 2030

The Greens' vision for 100% renewable electricity by 2030

The world is rapidly embracing clean energy. An energy sector driven by renewable technologies and innovation is the path to new jobs and prosperity. We need leadership from our government to secure a fair transition for workers and communities, and to harness the jobs of the future.

Western Australia is blessed with some of the world's best renewable energy resources and available land on which to build the infrastructure, yet we have one of the lowest mixes of renewable energy in the developed world. Just 9% of WA's power comes from renewable sources,ⁱ much lower than the global average, which is now 19%.

Meanwhile, WA's total annual greenhouse gas emissions have *increased* by 8% since 2010 to 86 million tonnes of CO₂e per year. This includes includes 49.3 MtCO₂e from the stationary energy sector (up by 2% since 2010ⁱⁱ). The commencement of the Pluto and Gorgon LNG hubs add a further 10MtCO₂eⁱⁱⁱ. In contravention to the Paris Agreement which sets out a global action plan limit global warming to well below 2C, we are heading towards a climate catastrophe. Our planet is warming, sea levels are rising, and we are living through hotter summers, reduced rainfall in winter and spring and more extreme weather events. Not only does climate change have devastating impacts on the natural and built environments, but impacts our health and our economy.

There a moral imperative and it makes economic sense to act now. The coal industry is in structural decline and the world is shifting towards clean energy.

> ENERGY 2030

As one of the sunniest and windiest places in the world, WA can lead the transition to a clean energy powered future.

This is why the Greens are the only party providing a genuine solution by showing a credible pathway to 100% renewable power on the WA South West grid.

Energy 2030 builds on our previous *Energy 2029* reports as well as a number of credible studies that have shown 100% renewable energy is technically achievable, including one by the Australian Energy Market Operator (AEMO)^{iv}.

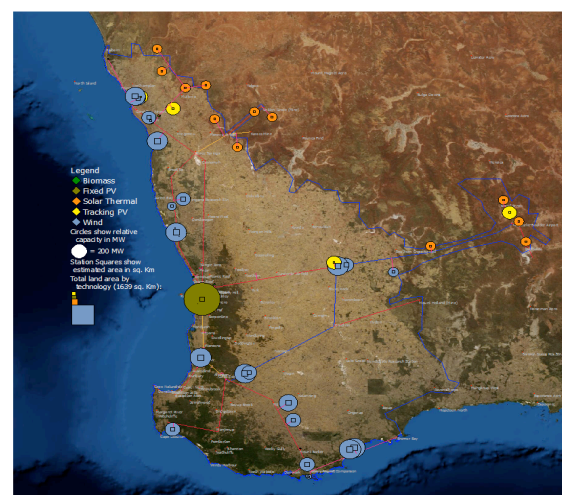
There are now many countries and cities with 100% renewable energy plans, as well as credible and costed roadmaps showing not only is it possible, but cheaper, safer, and will create more jobs than the fossil-dependent business as usual.

The Greens' *Energy 2030* Plan will:

1. **Introduce a target of 100% renewable energy by 2030** and increase our energy efficiency by at least one third;
2. **Establish a new government authority called *Renew Western Australia* to drive the transition**, responsible for planning and leveraging \$500 million of investment into construction of new energy generation over the next four years in WA;
3. **Support workers as we transition away from fossil fuels through a \$100m Clean Energy Transition Fund** to ensure coal workers and communities are not left behind, with \$6.6m each year for direct training and re-skilling programs and investment for new businesses;
4. **Introduce a staged Phase out Plan based on new emissions and pollution intensity standards**, to enable the orderly and stable closure of our dirtiest coal and gas-fired power stations, and a fair transition for all.

> CREDIBLE SCENARIOS

Energy 2030 modelled two different scenarios for the South West Interconnected System (SWIS) and showed it is not only technically possible to achieve a 100% renewably-powered grid but the overall cost would be cheaper than business as usual.



Scenario 1: Location and type of technology

Scenario 1: Emphasises large scale solar thermal

Found WA could achieve 100% renewably powered electricity from:

- 12 solar thermal (CST) stations
- 29 wind farms
- 4 existing Biomass plants
- 6 utility scale Solar PV farms
- Up to 700,000 households and businesses installing solar PV and battery storage

Scenario 2: Focused on lowest-cost technologies (Wind & PV):

Found WA could achieve 100% renewable electricity from:

- 27 wind farms
- 2 solar thermal (CST) stations
- 8 Solar PV farms and
- 4 existing biomass plants
- Up to 700,000 households and businesses installing solar PV and battery storage

The good news is that while both Scenarios will need 41-51 renewable power stations by 2030, 17 already exist. We're already well on our way.

> CLEAN ENERGY JOBS

Energy 2030 is a jobs rich plan.

The move to 100% renewable power **creates 151,000 – 156,000 jobs to 2030**, or about 12,000 new jobs each year.

This includes:

- **79,000-87,000** jobs in construction and installation;
- **6000-8000** jobs in operations and maintenance; and
- **49,000-55,000** jobs in manufacturing.

(*Calculations are in *job years* which means one year of one job)

This is higher than the number of people employed in WA's entire mining industry at the height of the mining boom.^v

Jobs figures for Scenario 1 by 2030					
	MW (Cap)	C&I Jobs	O & M Jobs	Manf. Jobs	Total
Rooftop PV	1,200	15,730	847	8,107	25,894
Solar thermal	1,200	1,560	720	1,116	4,596
Tracking PV	800	10,400	560	5,360	17,120
Wind	5,480	17,542	1,645	25,765	50,434
Biomass	3,000	42,182	4,520	8,738	58,452
Total jobs		87,414	8,291	49,086	156,497

Many of these jobs will be located in regional areas and would provide a massive boost to local economies, as well as new opportunities for training and trades.^{vi}

> CHEAPER THAN BUSINESS AS USUAL

Energy 2030 shows we could achieve 100% renewable energy for the same cost or less than business as usual.

Many studies have found 100% renewable energy would produce electricity prices at an amount similar to business as usual if there is at least some global action on climate change, including reports by the independent analysis from the Centre for Energy and Environmental Markets at the University of NSW^{vii} and the AEMO.^{viii}

Our study found it would in fact be **cheaper than business as usual**, when a carbon price of \$30/tCo2 was added and surplus generation is sold at \$30/MWh:

- Scenario 1 (CST focus) LCOE \$125.80/MWh
- Scenario 2 (Wind and PV focus) LCOE \$121.45/MWh
- Scenario 3 – Business as usual LCOE \$129/MWh

> NO CHANGE TO YOUR POWER BILLS

Our modelling of the cost of electricity for each Scenario by 2030 shows that going to 100% renewable electricity will have no impact on people's power bills at all, with all scenarios including business as usual costing us 27c/kWhr by 2030.

Over the longer term however the average household power bill would be significantly less given there will be no fuel costs. Recent studies have shown that billions could actually be *saved* from the transition to renewables over the long term.

One of the biggest myths is that renewable energy drives up prices for everyone else, when the opposite is true. Recent analysis of the Renewable Energy Target (RET) showed power prices will be cheaper with the RET, and in the long run it will save every Australian household up to \$140 on their electricity bill each year^{ix}.

A national study called the *Homegrown Power Plan* also found the cost of transitioning Australia's energy system to 100% renewables by 2050 would pay for itself in lower prices by 2025, and save \$90 billion by 2050, and fuel cost savings would cover 110% of the capital investment needed^{xxi}.

> PHASE OUT PLAN

Energy 2030 includes a timetable for a staged, stable closure of fossil-fueled power stations.

Approximately 500MW a year in new renewable capacity is added to the grid as we power down our most polluting and inefficient fossil power generators, based on new emissions intensity and air pollution standards the Greens will introduce.

By 2030 all coal generation has been phased out, and some gas-turbines have been retained and modified to run on bio-fuels during potential shortfall periods of low solar and wind supply.

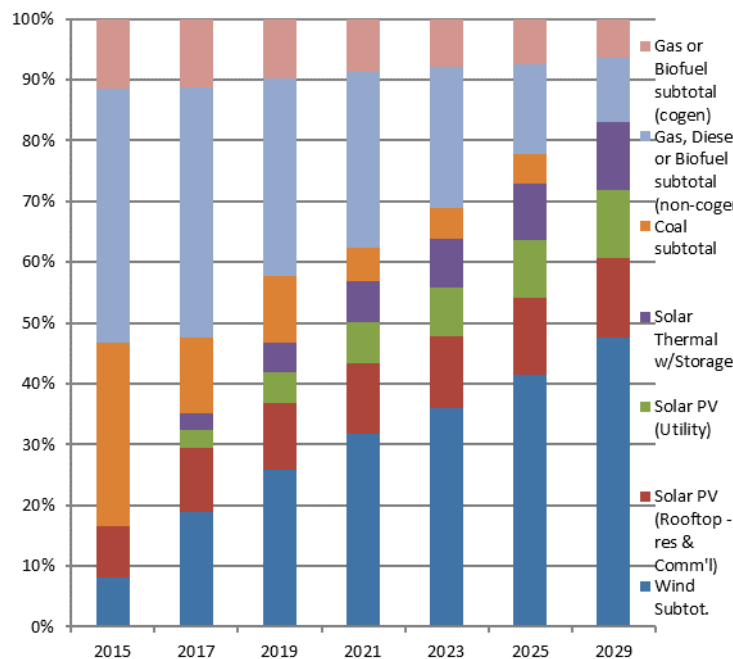


Figure 1: Energy 2030 Phase Out Plan

The transition from our existing primarily fossil-fuelled electricity generation system to 100% renewable sources will ensure a reliable and economically affordable supply as all the existing coal plants are retired and the gas plants are reduced and modified to run on biomass fuel supply. Our Plan includes a 20% oversupply of renewable power at any one time. The renewable mix will consist of wind, solar PV, solar thermal and biomass.

> SUPPORTING TRANSITION IN COLLIE

The global energy market is undergoing massive structural shifts, and fossil fuel industries face uncertainty as the inevitable shift to renewables gathers pace. Here in WA as the mining construction also phases down, thousands of workers face the prospect of unemployment with no transition plan in place.

We have a responsibility to ensure WA workers are looked after and this is why the Greens are strongly advocating for a just and stable transition. We are committed to ensuring no workers are left behind as we transition from fossil fuels, and that communities are supported during the inevitable closure of coal mines and power stations.

WA's two black coal mines are located in Collie, employing almost 900 people. In addition hundreds more are employed at Collie's Muja, Bluewaters, and Collie 1 power stations.

This is why we have proposed a \$100m Clean Energy Transition Fund to ensure coal workers and communities are not left behind, with \$7.5m each year for direct training and re-skilling

programs, investment for new businesses, and to assist new industries move to affected areas.

The Greens are also committed to working with the Collie community to help develop a transition plan, and build on our work and outreach in 2013 which identified Collie as a future renewable energy zone in WA.

Collie is an ideal future renewable hub because it has high quality renewable energy resources including solar, biomass and wind; it's ideally located to supply renewable energy to the South-West Interconnected System (SWIS), there are already billions of dollars invested in power generation and transmission infrastructure, and it has a local workforce skilled in electricity generation and maintenance, with transferable skills relevant to large scale / utility size renewable energy generation.

Dragging us backwards:

Barnett's total fail on climate and energy

- ✓ Completely overestimated WA's energy demand – costing us \$200 million a year in extra capacity
- ✓ Refurbished instead of retiring ageing coal-fired power station Muja AB, costing taxpayers \$330 million
- ✓ Caught totally off-guard by the massive demand for rooftop PV
- ✓ Paid outmoded power stations to stay on in case they're needed
- ✓ Forced households to sign contracts saying they wouldn't install battery storage systems or large rooftop solar pv in their own house Locked in WA's ongoing oversupply of dirty electricity for 20 or 30 years via secret contracts and the Collie Coal debacle
- ✓ Actively prevented entry into the market by clean energy companies or community-owned renewable organisations
- ✓ No emissions reduction target
- ✓ No Climate Change Unit – he abolished this in 2013
- ✓ No commitment to renewables beyond the existing federal target of 20% by 2020
- ✓ No feed-in tariff for renewable energy since 2011
- ✓ Hardly any funding or policies for stimulating the renewable energy industry, with groundbreaking pilot projects being funded mainly by ARENA, and recent cuts to the Low Emissions Energy Development Fund of \$3.5million
- ✓ A 20-year energy plan proposing both increases in energy demand *and* reliance on fossil fuels

> OUR COMPREHENSIVE PACKAGE FOR WA

During the 2016 federal election the Greens released a number of packages to support Australia's clean energy future. This included:

- **\$2.8 billion for Battery storage**, with \$280m for WA
- **\$201 million for Electric Vehicle** infrastructure and incentives, with x for WA
- **\$304 million for community-owned renewables**, with x for WA
- **\$197 million for homes, schools and businesses**, with x for WA
- **\$240 million for renewables in public and community housing**, with x for WA; and
- **\$474 million for renewables and retrofitting rental properties**, with x for WA

Our full *Energy 2030* Plan is available at <http://www.energy2030.org.au/>

ⁱ Western Australian Government Public Utilities Office. At <http://www.finance.wa.gov.au/cms/content.aspx?id=15108>

ⁱⁱ Question on Notice 11 October 2016 by Robin Chapple MLC, to the Minister for Energy, using Commonwealth Department of Environment 2016 State and Territory Greenhouse Gas Inventories 2014. Accessed 17 October 2016.

ⁱⁱⁱ With a further 3 projects, the Browse Basin, Prelude and Wheatstone projects due to come online this will add another 24mtpa

<http://www.robinchapple.com/wa-co2e-emissions-estimates-2012>

^{iv} <http://www.climatechange.gov.au/reducing-carbon/aemo-report-100-renewable-electricity-scenarios>

^v Including construction, extraction, exploration, operations, administration and maintenance) of 127,221 ABS Catalogue 8415.0 'Mining Operations' employment figures 2014-15 (Released May 2016) and ABS Mining construction sector employment (using 2011 Census figures).

^{vi} Clean Energy Council, '[Clean Energy Career Hub](#)', Clean Energy Council website, 2014, accessed 11 April 2016.

^{vii} Dr Jenny Riesz, Ben Elliston, Assoc. Prof Iain MacGill, Assoc. Prof Mark Diesendorf (2013). Submission on 100 per cent Renewables Study – Draft Modelling Outcomes Report. Centre for Energy and Environmental Markets University of NSW.

^{viii} <http://www.climatechange.gov.au/reducing-carbon/aemo-report-100-renewable-electricity-scenarios>

^{ix} Clean Energy Council (2014) RET Policy Analysis. At <file:///C:/Users/carusoc/Downloads/RET%20policy%20analysis%20-%20full%20report.pdf>

^x http://cdn.getup.org.au/1499-Homegrown_Power_Plan_-_Full_Report.pdf

^{xi} See also the Guardian's summary of report: <http://www.theguardian.com/environment/2016/apr/19/modelling-shows-move-to-100-renewable-energy-would-save-australia-money>