



100% CLEAN ENERGY ROADMAP

CONNECTING CLEAN ENERGY

Linking clean energy hotspots to our cities

Australia can harness our sun, wind and wave power to replace polluting coal and avoid dangerous global warming. We need a nation-building plan to connect our cities to clean energy hotspots like Port Augusta, where community support and world-beating solar resources meet.

We need a major rethink of how we plan our electricity grid. We need to know where our best clean energy resources are, involve local communities in planning their energy future, and help connect these hotspots to a genuinely national electricity grid.

> CLEAN ENERGY HOTSPOTS

Australia is rich in clean energy hotspots: regions where our solar, wind, geothermal, biomass and wave resources are among the best in the world. Communities like Port Augusta have already identified their clean energy potential and are mobilising to make it a reality.

We need to empower the regions where clean energy resources and community support meet, and if needed, help connect them to our cities to power Australia with 100% renewable energy. Our Connecting Clean Energy plan would do just that.

> OUR PLAN

We would allocate \$2 billion to a new Connecting Clean Energy Task Group in the Department of Energy.

The Connecting Clean Energy Task Group would:

- **map Australia's clean energy resources** with the latest information;
- **involve local communities in planning their energy future from the start**, with all levels of government, the Australian Energy Market Operator (AEMO) and clean energy developers;
- where our world-beating clean energy resources and genuine community support align, **set up Renewable Energy Development Zones** with quicker approval processes for clean energy projects;
- run a competitive tender to **link clean energy hotspots to the national energy grid** and contribute financial support where necessary.

> REGIONAL CLEAN ENERGY JOBS

The Greens' Connecting Clean Energy plan would offer many benefits to Australia, including more clean energy investment, cleaner air and cuts to the pollution that's driving global warming.

Because many of Australia's best clean energy resources are in rural and regional areas, our plan would bring investment and thousands of rewarding jobs to our regions, many of which are struggling with the decline in the number of people employed in agriculture.

> CONNECTING THE NATION

The Greens' Connecting Clean Energy plan would also create a genuinely national clean electricity grid, and end the current system dominated by state borders and fossil fuel generators.

We would make AEMO the national grid planner, to make it easier to get clean energy from distant wind farms in South Australia and Tasmania, or from massive solar or geothermal farms in New South Wales or Queensland, to the bigger population centres.

We would make pollution cuts part of the National Electricity Objective, to avoid repeating previous mistakes that are holding back clean energy development.

The Greens strongly support communities like Port Augusta that have identified their clean energy potential and are mobilising to make it a reality.



> THE PROBLEM

Australia can be a renewable energy powerhouse.

We can harness our tremendous resources of sun, wind and wave power to replace polluting coal with 100% renewable energy within the very short timeframe we have to avoid catastrophic global warming.

But we will need a nation-building exercise to make it happen, including detailed planning, community consultation and appropriate funding to connect our cities to our renewable energy hot spots.

That is how our existing energy grid was built. It was designed around coal-producing regions such as the Hunter and La Trobe Valleys and subsidised by the taxpayer. High voltage lines were built to carry power from coal regions to major centres.

With global warming already hurting and threatening far worse, we have to turn that around quickly, connecting our cities to the extraordinary renewable resources located in remote areas beyond the grid or where inadequate power lines need augmentation.

While coal companies still benefit from a grid that was built by governments, electricity market rules now require renewable energy developers to pay for network extensions. This can be prohibitively expensive for individual renewable energy projects, and there is no mechanism for sharing costs with other developers.

Consequently, renewable energy projects focus on areas near the grid rather than areas with the best resources. There is a “first-mover” disincentive as project developers wait for others to invest, and network extensions that do occur are often inefficiently under-sized.

This is affecting our ability to increase renewable energy production, and increasing the cost to consumers of grid management.

In addition, state and territory government approval for renewable electricity development is expensive, time consuming and a major barrier to investment.

Unlike several other countries, Australia does not proactively plan the utilisation of its renewable energy resources.

> THE SOLUTION

Australia needs a nation-building plan. We need to know where our best renewable energy resources are; we need streamlined consultation and approvals processes that bring communities together instead of dividing them; and we need jobs and infrastructure in the right place at the right time.

The Greens have announced very strong policies to support renewable energy, including:

- **increasing the Renewable Energy Target to 90% by 2030**
- **boosting the funding of the Clean Energy Finance Corporation to \$30 billion over ten years**
- creating an Energy Savings Agency which would, among other things, **ensure the owners of renewable energy generators (including the 1 million households with solar photovoltaic panels) receive fair payments for the electricity they produce.**

More detail about these policies is available on [our website](#).

The Connecting Clean Energy plan builds on these announcements by creating Renewable Energy Development Zones. The plan involves:

- allocating \$2 billion to a new Connecting Clean Energy Task Group within the Department of Energy to:
 - map the renewable energy resource areas of Australia and identify development priorities in collaboration with AEMO
 - manage a thorough consultation process involving local communities, all levels of government, the Australian Renewable Energy Agency, and renewable energy developers
 - create Renewable Energy Development Zones with streamlined development approval processes, based on mapped areas and community consultation
 - operate a competitive tender to extend high-voltage transmission to regional areas with high-quality renewable energy resources and, where required, contribute financial support, potentially in collaboration with the Clean Energy Finance Corporation
- inserting a greenhouse emissions reduction objective into the National Electricity Objective
- directing the Standing Council on Energy and Resources to establish AEMO as the national transmission planner for a high-voltage network that can maintain system security while moving high volumes of renewable energy between regions and states.



> KEY STEPS FOR THE TASK GROUP

1. Mapping the renewable energy resource areas of Australia.

There has already been significant effort put into mapping Australia's renewable energy resources, including by Geoscience Australia, the CSIRO and some state governments. The Task Group's first job will be to collate this knowledge and present it in a user-friendly way.

Australia's four best renewable electricity sources, all with significant untapped potential, are solar, wind, hot rock geothermal and biomass. Ocean energy also has great potential but is not yet ready for large-scale use. Large hydro has been fully exploited in Australia.

Existing renewable energy resource maps suggest:

- there is significant overlap of prime solar and wind areas in southern Western Australia, South Australia and throughout many parts of the Northern Territory and Queensland
- the best hot rock geothermal areas are mostly located in the north-east of South Australia, south-west of Queensland and the north of the Northern Territory.

Regions where prime solar, wind and geothermal resources overlap may have such great promise for large-scale renewable energy development that they would warrant significant public investment in grid infrastructure. Just as railways opened many parts of the world to agriculture in the 19th and 20th centuries, grid infrastructure will open many parts of Australia to electricity production.

Australia has a large number of potentially significant ocean energy sites around its coastline. These may coincide with coastal wind resources, but they need to be located in areas where siting and connection to coastal grids is cost-effective and supported by local communities.

Biomass energy has potential for growth and may provide a major financial boost to farming communities across the country. Biomass energy, however, must be generated from sustainable sources, and native forest sources must be excluded.

The mapping exercise should also include identifying existing and emerging electricity grid constraints. For example, the transmission interconnector between South Australia and Victoria frequently reaches its maximum capacity, limiting further renewable energy development in South Australia.

Once the resource mapping is complete, the Task Group should collaborate with AEMO in identifying development priorities. AEMO is well placed to assist because it recently completed a study into 100% renewable energy in Australia. This study will provide the Task Group with insight about the need to develop a range of complementary renewable energy technologies in a range of regions to maintain electricity supply security. The

Task Group's objective will be to prioritise development opportunities that exploit prime renewable energy resources and, where necessary, provide dispatchable electricity supply.

2. Bringing together all levels of government, local communities and renewable energy developers in consultation and streamlining of the approval process.

The second job for the Task Group will be to manage a thorough consultation process so as to enable streamlined planning permission for areas identified as prime renewable energy zones.

State and territory government approval for renewable electricity development is expensive, time consuming and a major barrier to renewable energy investment. Unlike several European countries, Australia does not proactively plan the utilisation of its renewable energy resources. This is despite the fact that, unlike Europe, Australia has enough renewable energy to be able to generate its current national electricity demand hundreds of times over.

The Task Group will facilitate communication and consultation links between all levels of government, local communities, experts such as the Australian Renewable Energy Agency, and renewable energy developers in order to establish the Renewable Energy Development Zones.

The Task Group must invite and respond to local views on proposed development in the renewable energy zones.

This type of planning approach is already used in Denmark and Germany, and is being increasingly adopted in other European countries. Grassroots consultation will be essential to ensuring a high level of community agreement.

3. Planning and funding of the connection of Renewable Energy Development Zones to the electricity grid.

The third major job of the Task Group is the planning and funding of the connection of zones to the electricity grid.

Australia's electricity transmission network is elongated and sparse – it is the least dense transmission network of any developed country, and it fails to reach into many areas with significant renewable energy generation potential. It also has weak links between most state grids, does not include the Northern Territory and Western Australia, and is owned and operated by monopoly public and private owners who will only extend the transmission grid if users pay for the extensions. The country's locally based distribution grids are also of varying quality.

All these factors create often insurmountable barriers for renewable electricity generation.



RENEWABLE ENERGY ZONES CAN BENEFIT REGIONAL AUSTRALIA

The number of farmers in Australia has been declining for many decades as small farmers sell up to large-scale farming operations, and fewer young people take over family farms. Over the 30 years to 2011 the number of farmers declined by an average of 294 farmers every month and there were 19,700 fewer farmers in Australia in 2011 than in 2006, a fall of 11% over five years.¹

Renewable energy is another crop in the rotation. It provides a new source of income for farmers struggling with low farm-gate prices, and the vagaries of the weather.

Many studies have shown that renewable energy technologies create more jobs per unit energy than coal and natural gas². As well, developing renewable energy zones in regional areas will ensure many jobs will be created where the need for secure employment is high.

A study published in 2009 by the Climate Institute which estimated how many jobs would be created in the renewable energy sector by carbon pricing, the 20% renewable energy target and other existing industry development measures, concluded that around 26,200 new jobs would be created.³ This included almost 2500 new permanent positions, over 15,000 construction jobs and more than 8600 indirect jobs in supporting sectors. The study also concluded that most of the permanent operation and maintenance jobs will be created in regional areas, with the bulk occurring in South Australia, New South Wales and Victoria.

Since then, support for renewable energy has been significantly boosted by the \$10 billion Clean Energy Finance Corporation. The Greens' policies of significantly increasing both the Renewable Energy Target and support for the Corporation would obviously boost regional job creation even further.

¹ Australian Bureau of Statistics 4102.0 - Australian Social Trends, Dec 2012.

² Wei, M., Patadia, S. & Kammen, D.M. "Putting Renewables and energy efficiency to work: How many jobs can the Clean Energy industry generate in the US?" Energy Policy 38 (2010): 919-931.

³ [Clean Energy Jobs and Investment in Regional Australia](#), The Climate Institute.

The new grid connection and planning function of the Task Group draws upon overseas examples. Jurisdictions in the UK, Denmark and Texas, facing the same issue, have implemented a coordinated response to facilitate investment in network extensions.

For example, the Public Utility Commission of Texas has designated regions with high-quality renewable energy resources as Competitive Renewable Energy Zones. These zones required transmission lines to be built with the cost shared across the community. Similarly, the Connecting Clean Energy Task Group will designate key transmission corridors needed to connect the renewable energy development zones to the grid and will expedite the planning and financing of the transmission extensions.

Based on the Texan approach, the Connecting Clean Energy Task Group, in partnership with AEMO and Australian Energy Regulator, would operate competitive tenders open to network and non-network bidders to build high-voltage transmission assets to regional areas with prime renewable energy resources. Where required, the Task Group, potentially in collaboration with the Clean Energy Finance Corporation, could enter into partnership agreements and contribute financial support.

The Task Group's funding of \$2 billion, assuming it leveraged private sector funding in a ratio of 1:2, would facilitate a \$6 billion investment in transmission infrastructure connecting the renewable energy zones – a significant portion of the total cost. AEMO's draft 100% renewable energy study projected costs of \$17–\$22 billion to achieve 100% renewable energy by 2030.

The Clean Energy Finance Corporation, a Greens initiative, can also provide concessional finance for grid augmentations, is in close contact with large-scale renewable energy developers and would be well placed to work in partnership with the Task Group. This could make a difference to individual projects. Public funding is also required to build the spine of a new transmission network to remote areas with renewable energy resources at a scale that will support future projects efficiently in the long-term interests of consumers.

4. Reforming the National Energy Market.

Too often, the current National Electricity Market rules create a barrier to sensible planning for renewable energy. A simple reform could turn that around.

The Ministerial Council on Energy recently directed the Australian Energy Market Commission to change a rule to enable appropriately sized transmission lines to be built in order to accommodate future clusters of renewable energy generators in remote areas. In an extraordinary breach of common sense, the AEMC refused to do so because it found it contradicted the National Electricity Objective.



Including an objective to reduce greenhouse emissions in the National Electricity Objective would make sure that did not happen again. It would allow the AEMO and Australian Energy Regulator to exercise regulatory oversight on publicly funded grid extensions to remote renewable energy zones.

In addition, the Greens would create a truly national electricity grid. Currently, the national market is, in practice a group of inter-linked state markets. As AEMO, the AEMC and the Productivity Commission have noted, this creates a potential bias against inter-connection between regions.

A national transmission system which can support high energy-flows between states will be crucial to maintaining a secure electricity supply; for example, to transfer surplus power from lower electricity demand states such as South Australia and Tasmania when the wind is blowing or south from solar power stations in Queensland and NSW on hot days.

The Standing Council on Energy and Resources should direct the AEMC to examine rule changes and other reforms required to establish AEMO as a single, independent planning agency to administer a national transmission planning and reliability framework.

> THE POSITION OF THE OTHER PARTIES

The ALP promised to implement a \$1 billion Connecting Renewable Energy program at the 2010 election but it appears not a dollar was spent by the time this funding was rolled into the newly established Australian Renewable Energy Agency in 2011.

The Coalition has no policy on expanding the electricity grid to facilitate renewable energy development.

Neither of the old parties wants to build the infrastructure to facilitate higher penetrations of renewable energy.

The Australian Greens are the only party you can trust to drive the rollout of 100% renewable energy in Australia – the only party with the political will to drive and develop the policy frameworks to make it happen.