

Australia's clean energy jobs boom

A stocktake

September 2020



**AUSTRALIAN
CONSERVATION
FOUNDATION**

Key **findings**

Australia's renewable energy transition is well underway, with clean energy projects already generating zero-emissions electricity and driving a boom in employment across the country.

This report is a snapshot of the jobs created by Australia's clean energy transition. It shows the installation and ongoing operation of renewable energy and energy efficiency projects employed more than 85,000 Australians in the last 12 months.

The boom in renewable energy jobs is significant, especially in this time of high unemployment. In 2019, there were more than 27,000 full-time jobs in the construction and operation of large- and small-scale renewable energy projects. This is despite only 21% of Australia's electricity being generated from renewable energy. Moreover, these jobs have been created in the face of enormous and ongoing policy uncertainty, particularly at the federal level.

There are 58,000 jobs in energy efficiency. These energy efficiency jobs span occupations such as insulation installers, electricians, mechanics, and architects. These workers are delivering tangible benefits to Australians through more comfortable homes and offices, lower energy bills and reduced emissions. Energy efficiency plays a key role in the transformation of Australia's electricity system to zero-emissions.

The transformation of Australia's electricity system to one powered by renewable energy and storage and improving energy efficiency provides Australia with an opportunity to reduce emissions while growing jobs and the economy.

However, 2020 sees a fork in the road for clean energy jobs. Investment in clean energy fell to its lowest levels since 2017 due to grid infrastructure delays and federal policy uncertainty. If federal and state governments fail to soon set new policies to drive continued investment in renewable energy and energy efficiency, Australia's clean energy jobs boom could be headed for a bust. On the other hand, if governments support this transition, they can unlock tens of thousands of new jobs across Australia, while creating a zero-carbon, affordable energy system.

There are 58,000 jobs
in energy efficiency 

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**Green Energy
Markets**

This report was produced with the analytical assistance of Green Energy Markets and draws upon employment survey research prepared by the Institute for Sustainable Futures at the University of Technology Sydney.

Green Energy Markets specialise in economic analysis of renewable energy, energy efficiency and other carbon abatement solutions and associated markets.

Clean energy employment blooms, despite political uncertainty

In Australia, jobs in renewable energy have increased rapidly, due to a significant expansion in renewable energy projects over 2018 and 2019.

Australia is fortunate in that every state and territory has high quality renewable energy resources, with Australia's wind and solar resources considered some of the best in the world.

Figure 1 illustrates that the installation and ongoing operation of renewable projects employed over 27,000 Australians. Many of these jobs were related to Australia's world-leading rooftop solar installations. As of August 2020, more than 2.5 million rooftop solar systems had been installed across Australia.¹

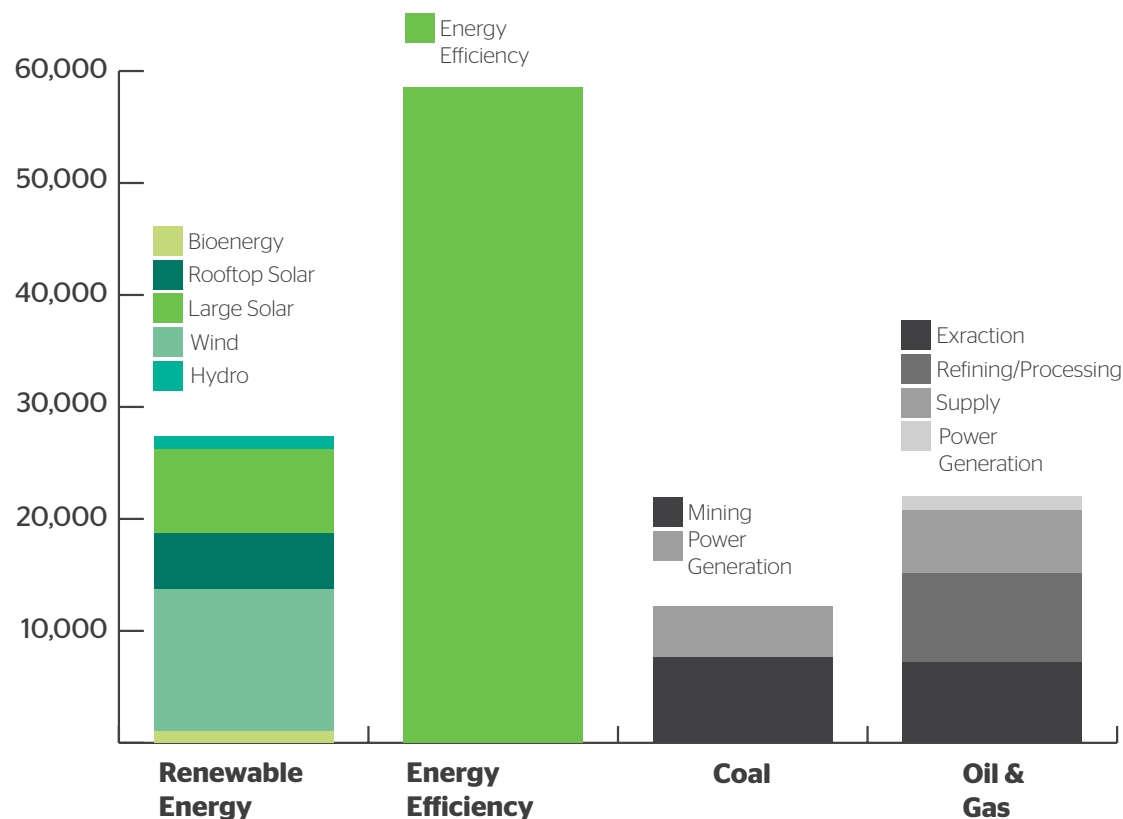
More than 85% of Australia's clean energy jobs were engaged in the construction of new projects. Renewable energy powered around 21% of Australia's electricity system in 2019,

demonstrating the substantial potential for tens of thousands more jobs to be created in the future. Replacing Australia's old, polluting energy infrastructure with clean energy is a very large task. This is likely to be a two-decade long construction program, supporting jobs in communities across Australia.

As Figure 1 shows, the generation of clean energy – despite representing only one-fifth of our electricity system – already creates more jobs than the generation of electricity by coal or gas does in Australia. (This is a like-for-like comparison between different sources of domestic electricity generation and therefore does not include jobs in coal and gas for export.)

There are even more jobs in energy efficiency. And they are good jobs. Architects, planners, insulation manufacturers and installers, refrigeration engineers and tradespeople are rethinking and retrofitting our houses and workplaces, so they use energy more efficiently.

Figure 1 Employment in Australia's domestic energy sectors²

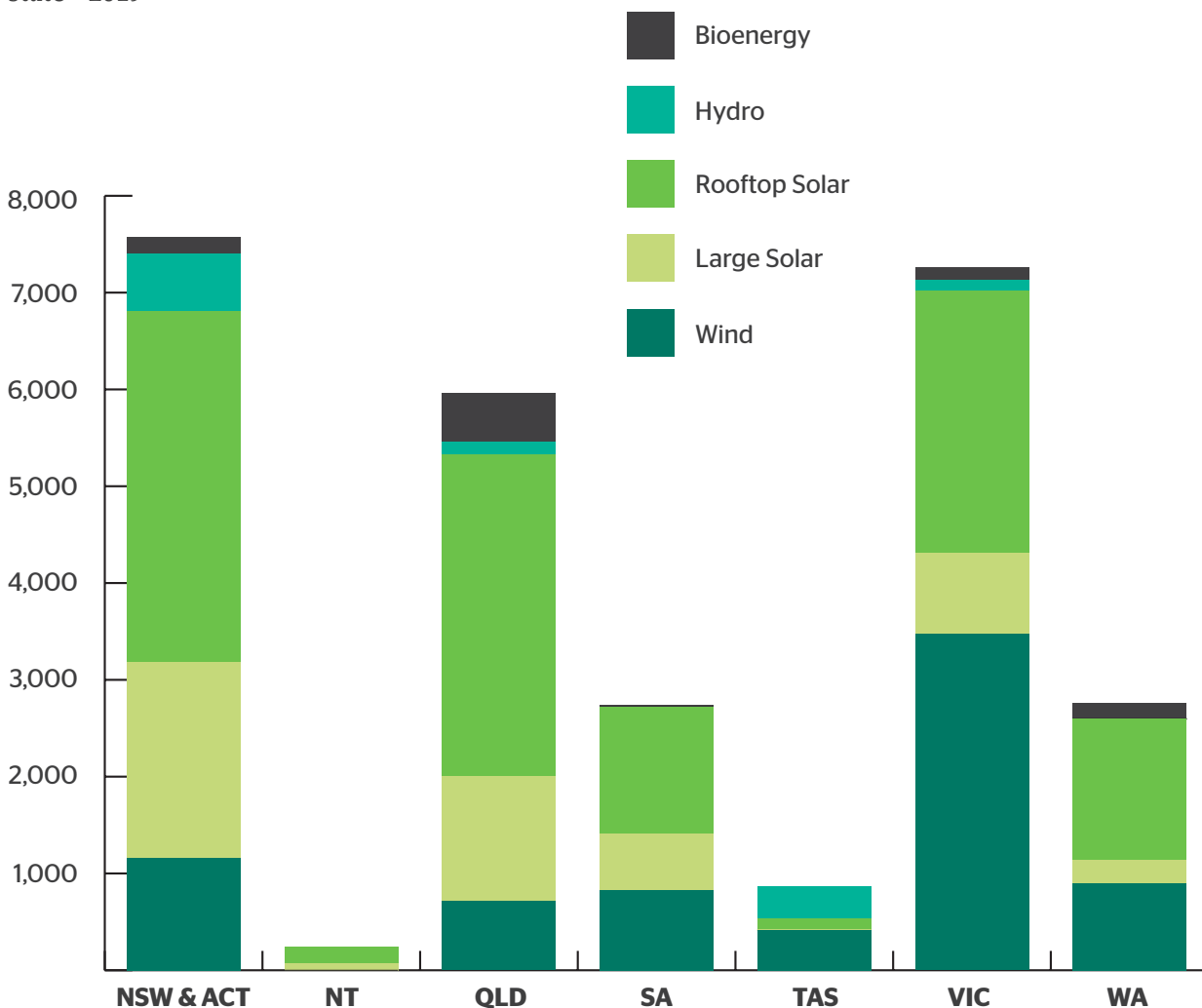


The construction of large-scale clean energy projects like wind and solar farms can provide significant local employment. These projects are also dispersed across regional Australia.

For example, last year large solar farms were under construction at Katherine in the Northern Territory, on the mid-west coast near Geraldton, in North Queensland near Townsville, at inland NSW at Balranald and down to the southern coastline near Geelong. Wind farms were being built in north Queensland at Hughenden, inland of Townsville, as far south as the rugged south west of Tasmania at Granville Harbour, all across western Victoria and in the west at Jurien Bay, halfway between Perth and Geraldton.

It is important to acknowledge that due to the lack of a long-term policy to modernise our energy system and reduce pollution, jobs are already being lost in the renewable energy sector relative to 2019 levels. Investment in new renewable energy projects has slowed considerably over the last 12 months, with a drop in investment of 40% between 2018 to 2019.⁴ If governments fail to set new policies soon, the renewable energy boom could be headed for a bust.

Figure 2 Employment in renewable energy by state - 2019³





If governments fail to set new policies soon, **the renewable energy boom could be headed for a bust** 🌱

Energy efficiency – the quiet achiever employing more than 58,000 workers

Australia's energy efficiency workers play an essential role in reducing emissions. There are more than 58,000 jobs created across Australia in energy efficiency projects.

We see and feel the benefits of this work in the comfort of our homes and offices. The fact these projects also save substantial amounts of energy – and therefore money – is often not apparent until the arrival of the next gas or electricity bill.

Energy efficiency changes can be subtle. Better oriented and specified windows; lights that look little different to those in place beforehand except that they provide better light using much less energy; better insulation surrounding a cool room; an adjustment to a fan, a seal applied to fix a leaking steam pipe; an extra electronic sensor here and there combined with new software to control a heating system.

Workers that deliver improvements in heating, lighting, ventilation, refrigeration and the movement and the processing of goods will rarely carry the label 'energy efficiency worker'. Instead they are usually known by titles such as engineer, mechanic, builder, architect and electrician. Unlike the products of workers that construct and install such things as wind farms or solar systems, energy efficiency is not a stand-alone object, but the invisible outcome of good design, maintenance and the retrofitting and ongoing operation of buildings and equipment.

In 2015, the US Government's Department of Energy commissioned detailed research that involved identifying 382,500 establishments with energy-related employment and a further detailed survey of 30,000 of these businesses to assess the proportion of staff engaged in energy-related activities including energy efficiency. This study discovered that energy efficiency employed more than two million people in the US. This was more people than were employed in the mining and extraction of coal, oil and gas, more than were employed in power generation across all fuel types, and more than were employed in the power, oil and gas transmission and distribution sector.

If Australia had a similar proportion of workers as the US engaged in energy efficiency across **construction, manufacturing, wholesale trade and professional services** then it would equate to jobs for **236,000 people**.

Equivalent research has not been undertaken in Australia. This report estimates energy efficiency jobs by identifying professions and industry sub-sectors where energy efficiency is likely to be a key priority. We then assessed how much time they were likely to allocate to enhancing energy efficiency. This more finely grained approach can help provide a lower bound, conservative estimate of Australian employment in energy efficiency.

Table 1. breaks down the various professions engaged in enhancing energy efficiency.

Table 1. Number of Australian energy efficiency workers based on professional categorisation.

Profession	Worker time allocation to energy efficiency
Architects and town planners	4,583
Construction managers & building technicians	19,469
Mechanical engineers & technicians	5,896
Engineers – electronics, chemical, general and managers	3,746
Engineering technicians & tradespeople	1,341
Air conditioning & refrigeration mechanics	4,687
Electronics trades workers	1,296
Electricians	6,830
Building facility managers	6,720
Insulation manufacture, distribution and install	4,000
TOTAL	58,569

Source: Green Energy Markets (2019) Energy efficiency employment in Australia – an analysis of the current and potential jobs created by saving energy in Australia.



Australia's energy efficiency workers play an essential role in reducing emissions.

There are more than 58,000 jobs created across Australia in energy efficiency project 🌱

References

¹Australian Government, Department of Industry, Science, Energy and Resources, 'Solar PV and batteries' (2020) <https://www.energy.gov.au/households/solar-pv-and-batteries>

²Sources: Employment in coal mining and the oil & gas industry is based on the Australian Bureau of Statistics Labour Market Survey March 2020. Employment in coal power generation and uranium mining based on Green Energy Markets research of employment by each power plant and uranium mine with adjustment for production of non-uranium products in the case of Olympic Dam. Renewable energy employment is derived from Green Energy Markets Database of Renewable Energy projects in construction and operation in conjunction with employment factors per megawatt taken from University of Technology Sydney Institute for Sustainable Futures (2020) Renewable Energy Employment in Australia: Methodology – June 2020. Energy Efficiency Employment is taken from Green Energy Markets (2019) Energy Efficiency Employment in Australia.

³Sources: Job numbers were derived from renewable energy capacity installation data derived from Green Energy Market's Power Project Database and Clean Energy Regulator data for rooftop solar. These were then multiplied by the amount of labour typically required to install this capacity as estimated with the following publication: University of Technology Sydney Institute for Sustainable Futures (2020) Renewable Energy Employment in Australia: Methodology – June 2020

⁴Peter Hannam, 'Spending on large-scale renewable energy in Australia plunges', The Sydney Morning Herald (16 January 2020) <https://www.smh.com.au/business/markets/spending-on-large-scale-renewable-energy-in-australia-plunges-20200116-p53s4g.html>.



Construction of large-scale clean energy projects like wind and solar farms **can provide significant local employment** 🌱

If governments support this transition to renewable energy, **they can unlock tens of thousands of new jobs across Australia**, while creating a zero-carbon, affordable energy system.

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