



RMIT
UNIVERSITY

Regenerative Future
Institute

Australia's Energy Future

Australia today depends heavily on a carbon-intensive energy system to supply its cities, homes, vehicles and manufacturing. Most of this energy comes from burning oil, gas and coal, which are the biggest contributors to global greenhouse gas emissions.

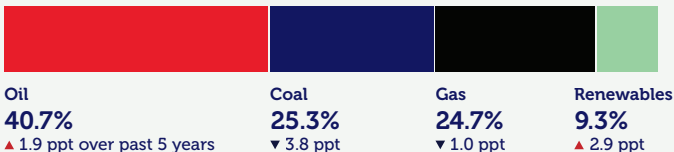
But while Australia likes to think of itself as a small part of the problem — accounting for 1 per cent of global emissions — it embodies an acute contradiction, pursuing an ambitious renewable transition while remaining one of the world's largest energy exporters.

With the climate crisis worsening, the future of energy isn't just a question of technology. It's a question of transformation. So, what needs to shift in our society, built environment and economy to move from extracting energy to regenerating it?

The story so far

Around 90 per cent of the energy we use comes from fossil fuels. At the last count, less than 10 per cent came from renewables. The picture may be simplified, but the story is clear: there's plenty of work to do.

Share of primary energy use in 2023-24



Latest data available at the time of publication (2023-24)

Source: Australian Energy Statistics ([2020](#), [2025](#))

Change has been gathering pace — and electricity, our highest emitting sector, is where the transformation is most visible.

The federal government aims to lift the share of electricity we generate from renewables to 82 per cent by 2030. By mid-2025, that share had climbed to nearly 40 per cent, and the figure for Australia's main grid is even higher.

Solar generation is surging, and battery sales with it. As households capitalise on falling costs and government subsidies, Australia has among the highest rates of installed solar globally.



Share of total electricity generation in 2024-25

Fossil fuels

60.5%

▼ 16.9 ppt over past 5 years



Renewables

39.5%

▲ 16.9 ppt



Coal 42.7% ▼ 12.2 ppt



Gas 16.2% ▼ 4.6 ppt



Oil 1.7% – 0.0 ppt



Solar 19.6% ▲ 11.7 ppt



Wind 14.0% ▲ 6.3 ppt



Hydro 4.7% ▼ 1.0 ppt



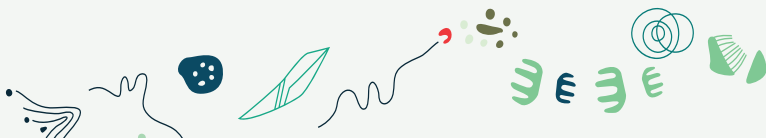
Renewables total includes bioenergy (<1.5%), not shown separately.

Source: Australian Energy Statistics ([2021](#), [2026](#))

But transport uses more of our energy (30 per cent) than even electricity (23 per cent), and more of it than ever. Despite fuel efficiency gains and the rapid uptake of EVs, Australia leads the world for diesel use per person, largely due to our reliance on freight delivery.

Most of the remaining energy we use powers manufacturing, mining, and the residential and commercial sectors. Households may be doing more with less energy, but industries have not significantly cut their energy use, and their shifts to electrification have been modest.

Australia has legislated a target of net zero greenhouse gas emissions by 2050. The Climate Change Authority has warned we will miss this — and our 2030 and 2035 targets — unless we go further, faster.



Rebuilding our energy systems

With 54 per cent of households still using mains gas, many could slash their energy costs by fully electrifying their homes and cars. Global events have also revealed how relying on refined fuels such as diesel and petrol — 80 per cent of which we import — exposes us to unexpected price shocks.

It all points to greater demand for electricity, forecast to double by 2050 with help from an anticipated seven-fold jump in data centre usage over the next decade.

As coal power exits the grid, meeting this demand requires a steady pipeline of renewables projects, and delays are likely to push up prices. In 2025, investment in new wind and solar projects fell to one of its lowest levels in a decade, and the electricity sector is already suffering a skills shortage for critical jobs.

The CSIRO has found that wind and solar are the cheapest forms of electricity — and the least-cost path to net zero when backed by transmission infrastructure, occasional gas, and storage such as batteries or pumped hydro. For Australia's eastern grid, all this could cost \$106 billion by 2050, the energy market operator says. Projects large and small are rolling out, with big batteries taking on more of the work as prices plunge.

Charging infrastructure is being established for EVs, which can travel more than 400 kilometres per charge and now outsell petrol cars. For road freight to make the switch, Australia will need to develop megawatt charging solutions to help trucks travel vast distances.



Building the solutions



Industries that can't easily electrify may need to find low-carbon fuel alternatives.

One prospective solution is “green” hydrogen, made from renewable electricity and water rather than natural gas. It has the potential to replace fossil fuels in the production of ammonia, alumina, iron and steel; however, splitting water takes huge amounts of power, which is one reason the industry is struggling to get off the ground.

Renewable fuels are being developed for air transport. Planes at Brisbane airport will soon be able to use fuel made partly from used cooking oil; in 2028–29, a commercial UK facility is expected to begin turning sewage into jet fuel.

Zooming out, urban planners are reconceptualising cities, aiming to reduce transport energy by placing everyday necessities only a short walk from home. Cities can also cut heating and cooling needs by adding shading to buildings and streets.

We may soon find vertical wind turbines generating power in our cities and towns, and Australia is leading efforts to develop new technologies that could eventually see us generating ever more localised energy — even with our clothes.

New research suggests solar cells’ ability to convert sunlight can be pushed to new heights, potentially also paving the way to longer-lasting panels. The CSIRO is developing technology to generate solar power at night, and a world-first quantum battery prototype, while tiny now, could one day enable super-fast EV charging.



Towards a circular economy

Energy transformation means using less to do more — starting with generation, where renewables waste less than fossil fuels. For homes, better insulation and other upgrades can cut the energy needed for heating and cooling. The CSIRO estimates 44 per cent of Australian houses score two stars or less (out of 10) for energy efficiency.

Cutting energy waste extends to the materials we use. Concrete, for example, is both highly energy intensive and, after water, the most commonly used material on Earth. Embodied energy is all the energy that has gone into the things we make, and we can avoid spending it twice by moving towards a circular economy.

Still, there are barriers. Wind turbines and solar panels are 85–95 per cent recoverable, but recycling solar panels costs roughly six times more than sending them to landfill.



Beyond extraction

Domestic energy use is only part of the story. Australia exports 80 per cent of the energy it produces, all of it fossil fuels burned overseas.

Renewables could enable new exports of energy or “green” metals, which Treasury modelling suggests could net Australia \$68 billion by 2050.

Resource extraction damages the environment and can devastate Aboriginal sacred sites. Renewables still rely on mining for critical minerals, albeit very little compared to coal; installing infrastructure can also mean land clearing or flooding (for hydropower). Ecological impacts will depend on each project’s design and management.

Indigenous practices predate the extractive, carbon-intensive energy systems that arrived with colonisation.

Aboriginal and Torres Strait Islander peoples have been sustainably managing water and land for tens of thousands of years, informed by a deep connection to Country.

Indigenous Knowledge centres the importance of regeneration, of place and local culture, and of our interconnectedness with each other and the natural environment.

Guided by values such as harmony, mutuality, reciprocity, restraint and respect, it offers an alternative approach to social and economic systems — one that prioritises cooperation over competition, and relationship over extraction.

This messaging circulates online and makes its way into media reporting — and surveys show many of us believe it.

68%

of Australians find it believable that more renewable energy will increase household energy prices

58%

find it believable that electric cars are as bad for the planet as petrol cars

51%

find it believable that wind farms take more energy to build than they provide over their lifetime

50%

find it believable that offshore wind farms cause harm to whales

Source: [Ipsos \(2024\)](#)



Bringing everyone along

Much of the transition's success depends on how fairly its opportunities and costs are shared.

Cutting fossil fuels entirely would put some 70,000 jobs at risk in mining and power generation. Renewables could add 40,000 jobs to today's clean energy workforce by 2030, the industry estimates, but not everyone will benefit. Some mining occupations have no clean energy equivalent. Renewable jobs will be spread widely, though often beyond coal regions.

Lower energy prices — while not the main driver of support for clean energy — remain a key concern for most people. Yet the clean energy solutions most likely to cut household costs are prohibitively expensive for many.

In 2025, a basic home energy upgrade cost upwards of \$13,000, and a new EV roughly twice that. The people most likely to miss out are those already lacking affordable, reliable energy, such as low-income households or First Nations people, along with renters whose landlords won't cover the up-front costs. Affordability and home ownership — falling for decades — are the primary determinants of solar and battery uptake. Strata laws and space constraints also lead to lower rates for apartments.





The RMIT Regenerative Futures Institute's inaugural events season is exploring the future of energy through a series of talks, workshops, screenings and hands-on experiences.

Season highlights	Date
The Truth Behind Australia's Energy Transition: An RFI Explainer	24 September
I Brought a Thing: Electricity	29 September
Reciprocity & Regeneration: Lessons from the Murnong at Shared Futures Festival	3 October
Healing Cultures: Designing Regenerative Systems at Burrinja Climate Change Biennale	10 October
Wild Hope: What if Hope Is Something We Grow, Together?	15 October
Everflow: Birrarung RiverFest Closing Event	18 October
RFI Community Forum	23 October

To find the full details — plus many more events visit :
rmit.edu.au/about/regenerative-futures/events

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