Mobilise Australia

RENEWABLE ENERGY

Table of Contents

RENEWABLE ENERGY

The renewable energy mantra is that energy from the sun and wind is not only ***"free"*** but also ***"emissions-free".*** Together, this makes a compelling case for renewable energy. In contrast, fossil fuels are portrayed as both expensive and destroying the planet.

One of the fundamental building blocks of any economy is the supply of affordable and reliable energy and power. Central to this discussion, therefore, is an appreciation of what Energy and Power actually are – two words that inconveniently connect ideology with real-world economic consequences.

Energy is defined as the capacity to do work.

- **Wind** is kinetic energy in the form of the motion of air, which you can feel when the wind blows – and it is free!
- **Solar radiation** is electromagnetic energy emitted by the Sun that you feel as warmth - and it is free!
- Relevant to fuel reserves, storage capacity, annual consumption, long-duration resilience.

Power is the rate at which work is done or energy transferred over time.

- Power is energy delivered in a form that has a practical application.
- **Wind energy** driving turbines that generate electricity – that is then transmitted over power lines to commercial and industrial users.
- **Solar energy** that is converted by solar panels into electricity – and then transmitted over power lines to commercial and industrial users.
- Relevant to generation capacity, grid adequacy, peak demand, and mobilisation speed.

Power is not free, however, as it has a dollar cost in terms of the resources (materials, manpower, land, capital) required to convert energy into power and deliver it to users.

This difference between ***FREE*** energy from the wind and sun and the ***EXPENSIVE*** conversion of that energy into a useful product for consumers in the form of electricity or heat is the new reality that now confronts all Australians. The mantra of free energy is now inflicting serious economic harm on all Australians through their electricity and gas bills, the cost of living and deindustrialisation.

The renewable energy question is now central to Australia's economic and strategic future.

THE PURPOSE OF A POWER SYSTEM

The climate change hypothesis has been the catalyst for the shift away from fossil fuels and towards renewable energy, which derives from natural sources such as sunlight, wind, water, biomass, and geothermal heat. These forms of energy are continuously replenished and produce far lower CO2 emissions than fossil fuels, such as oil, gas, and coal. Consequently, emissions reduction, particularly from coal-fired power stations, became the major focus of global action, driven by the UN and the IPCC.

Through its international agreements, Australia committed to climate action and emissions reductions. This commitment has relentlessly driven the phasing out of coal and gas power stations and their replacement with renewable sources, mainly wind and solar. This process is now well advanced.

At this point, we must address a fundamental question. What is the purpose of an electricity system? There are essentially two answers.

1. ***To minimise CO2 emissions so that a predicted global catastrophe can be averted.*** This is the official Australian government policy. In this case, the experience has been higher electricity prices and reduced reliability and security.

2. ***To provide the nation with the cheapest possible electricity to achieve economic targets***. In this case, experience shows that we must revert to fossil fuels for base load power.

Emissions reduction is the main objective of the Australian electricity system - not the cheapest form of power.

Emissions Reductions

If both the global and Australian aims for electricity systems are emissions reductions, then the questions must be asked:

1. How successful has this been?
2. As there are no free lunches - what has been the cost?

Global Emissions

Since 1990, global emissions have risen by 35-40%, reaching record levels in 2023-24 (Global Carbon Project, 2024).

- No sustained global decline has occurred at any point in the past 34 years.
- Short-term dips caused by economic shocks (1992 recession, 2009 financial crisis, 2020 COVID-19) have occurred, but not structural decarbonisation. After each dip, emissions rebounded to new highs.

- Fossil fuels remain the dominant driver, accounting for approximately 75% of global GHGs. Its continued growth is the primary reason total emissions keep rising.
- The world is not on track for any pathway consistent with the aim of 1.5°C or 2°C temperature reductions by 2100.
- Climate policy has slowed the rate of growth but has not produced global reductions.
- All major authoritative datasets (Rhodium Group, EDGAR, Statista, NOAA) show the same structural trend.
- NOAA's Annual Greenhouse Gas Index shows the warming influence from human-emitted GHGs was **51% higher in 2023 than in 1990**. This reflects the cumulative effect of rising emissions.
- Economic growth in China, India, Southeast Asia, and the Middle East has expanded energy use faster than efficiency gains or renewable energy could offset.
- Coal, oil, and gas remain the backbone of global energy supply. Coal still accounts for about 35% of global electricity. Oil is dominant in transport, and gas is used for heating. and industry.
- The major emitters (2024) are listed below. Combined, the share of the top three is about **55%.**
  - China: ~35%
  - US: ~12%
  - India: ~8%
  - EU-27: ~6%
  - Russia: ~5%
  - Brazil, Japan**:** 2–4% each
  - Australia: ~1%

Since 1990, despite significant efforts by many nations, global emissions continue to rise, and current national commitments are insufficient to reverse the trend. In 2026, the major emitters - China, the US, and India – have now effectively rejected reductions because of the dampening effect on their economies.

There is no prospect of the necessary steps to achieve structural decarbonisation being implemented. Fossil fuels are not being phased out; renewable energy has proven too expensive; large-scale deployment of renewables and storage has plateaued; and pro-climate-change policy measures are now seen as counterproductive to national economies.

The world is walking away from emissions reductions, and this trend will also drive the Australian response.

Australian Emissions

The Australian decision to pursue emissions reductions has had profound and unintended consequences, with the net effect that Australia has moved from having some of the cheapest electricity in the world to some of the most expensive.

Since 1990, Australia's net greenhouse gas emissions (all gases, expressed as CO_2-e) have fallen by roughly **25–30%**. Most of that reduction is attributable to climate-related policies, especially in land use/land clearing, as well as in electricity. In round numbers, net emissions have been cut by about **30%** since 1990.

Using official National Greenhouse Gas Inventory (NGGI) data (DCCEEW/ABS)

Year (NGGI)	***Net emissions (Mt CO_2-e)***	***Change vs 1990***	**Change vs 2005 *Paris baseline***
1990	*~610–620 (approx.)*	–	–
2005	*631.1*	*Slightly above 1990*	*Baseline for 2030 target*
2024	*446.4*	*≈ 28–30% below 1990.*	*27% below 2005*

How much of that is due to climate policies?

Policy Domain	**Key Instruments**	**Estimated Contribution to Reductions**
Land Use Land Clearing	QLD Vegetation Management Acts; VIC native forest rules; national LULUCF accounting	~50–60% of total reduction since 1990
Electricity Sector	RET (2001); state renewable targets; rooftop solar incentives; coal retirements	~20–30%
Waste	Methane capture at landfills	~5%
Industry & Transport	Safeguard Mechanism: fuel standards	Minimal to date

Land Use, Land-Use-Change and Forestry (LULUCF)

- Biggest single driver of reductions since 1990.
- Cuts in broad-scale land clearing and incentives for reforestation/vegetation management (state land-clearing controls, carbon farming frameworks, etc.) have turned LULUCF from a large source into a much smaller source or net sink.
- Sharp declines in the 2000s–2010s coincide with land-clearing restrictions.

Electricity and energy

- Since the mid-2000s, emissions from electricity have fallen as wind and solar displace coal, driven by the RET, state-based schemes and, more recently, federal policies under the Net Zero Plan and sector plans.
- NGGI data shows that most non-land-sector emissions (energy, industry, transport, etc.) are still close to 2005 levels, meaning the structural decarbonisation of the fossil system has been modest so far.
- Electricity-sector climate policies have delivered meaningful but still limited reductions relative to 1990; they are now becoming more important as land-sector gains plateau.
- Electricity emissions fell steeply after 2016 due to coal closures and rooftop solar uptake.
- Industry and transport: emissions are broadly similar to 2005, with only modest policy-driven reductions so far (safeguard mechanism reforms, EV policies, fuel standards are only now tightening).
- Agriculture and waste: some efficiency and methane-reduction measures, but these are small relative to land use and electricity.
- Without land-clearing controls and renewable-energy policies, Australia's emissions trajectory would have remained close to **1990 levels or higher**.

Zero Emissions Targets

In September 2025, the Australian government further pledged to reduce emissions levels. The targets, compared to 2005 levels, now include:

- 43% reduction by 2030 – legislated.
- 62-70% reduction by 2035 – announced.
- Net Zero emissions by 2050 – legislated.

To meet these targets, the government's ***Net Zero Plan*** focuses on the following strategy.

- **Clean electricity**: Scaling up renewables, transmission, and storage.
- **Electrification and efficiency**: Vehicle standards, home batteries, and energy upgrades.
- **Clean fuels**: Supporting green hydrogen and low-carbon liquid fuels.
- **New technologies**: Investment through ARENA and Future Made in Australia.
- **Carbon removals:** Land-based sequestration and robust carbon credit systems.
- **Transport:** Electrify light vehicles, expand EV charging, and develop clean fuels for freight.
- **Industry:** Decarbonise heavy emitters via the Safeguard Mechanism and a new $5 billion Net Zero Fund.
- **Households:** Support rooftop solar, batteries, and energy-efficient upgrades.

With China, India, Russia and now the US walking away from emissions targets, Australia's efforts to meet them are insignificant and unmeasurable. These measures are, in effect, a self-inflicted wound from which we may not recover.

Australian Primary Energy Mix

It is important to understand where renewable energy, particularly wind and solar, fits into the spectrum of Australian energy. The Australian Energy Statistics (AES, 2026) is the most authoritative source of data on primary energy (transport fuels, industrial heat, electricity, etc.). The latest dataset is 2023–24.

Energy Source	% of Total Energy	Notes
Oil	**41%**	Largest single energy source; dominated by transport fuels. Almost all imported; core vulnerability.
Coal	**25%**	Includes black coal and brown coal used for electricity and industry. Domestic: declining in power but still key for exports/industry.
Gas	**25%**	Used for electricity, industry, and residential heating. Domestic + LNG export industry; role in firming and industry.
Renewables (all forms)	**≈9%**	Includes mainly solar, wind, hydro, bioenergy.

(Table 1). Australian Energy Mix

Composition of the 9% Renewable Slice

Renewable	% of 9% Renewables	% of Primary Energy
Solar (PV + hot water):	36%	**3.2 %**
Wind	20%	**1.8%**
Hydro	10%	**0.9%**
Biomass & bioenergy	34%	**3.1%**

(Table 2). Composition of renewables.

Energy Composition of Electricity Sector

Electricity Sector (100%)	% of Electricity Sector (ES)
Fossil Fuels ~64%	
Renewables ~36%	
	Solar ~17% (of ES)
	Wind ~13% (of ES)
	Hydro ~6% (of ES)

(Table 3). Electricity Sector

Wind and solar make up only about 5 per cent of Australia's total energy mix. But they make up about 30% of Australia's electricity sector.

Why Renewables

Although electricity generation accounts for only a small share of the total primary energy mix, it accounts for the largest share of CO2 emissions by sector (Table 4). This is the basis for Australian federal and state government policy decisions to focus on emissions reduction in the electricity sector, to be achieved by phasing out coal and gas power stations and replacing them with renewable sources, mainly wind and solar.

Australian CO2-Equivalent Emissions by Sector

National Greenhouse Gas Inventory (NGGI) dataset Dec 25. (DCCEEW, 2025)

Sector (NGGI)	**Description**	**Emissions (Mt CO_2-e)**	**Share of Total**
Electricity generation	Coal & gas power stations	~145 Mt	~31%
Stationary energy (excl. electricity)	Fuel use in industry, mining, manufacturing, and buildings	~97 Mt	~22%
Transport	Road, aviation, rail, shipping	~101 Mt	~20%
Fugitive emissions	Coal mining, methane, oil & gas extraction, LNG	~46 Mt	~10%
Industrial processes & product use (IPPU)	Cement, steel, aluminium, chemicals, refrigerants	~32 Mt	~8%
Agriculture	Livestock methane, soils, manure	~76 Mt	~15%
Waste	Landfill methane, wastewater	~13 Mt	~3%
LULUCF	Land clearing, regrowth, and forestry	**~(-52 Mt) Net sink**	—
National total:		**~459 Mt**	

(Table 4). Emissions by Sector

Data

- **Energy** (Joules) = **Power** (Watts) x **time** (hours)
- For **electricity**, energy is measured in kilowatt-hours (kWh).
- Other scaled-up measurements are **(MWh)**, **(GWh), (TWh).**
- **Households:**
  - Your electricity bill is measured in **kWh.**
  - Most households pay between **24-46 cents/kWh** around Australia.
  - A kettle uses about **0.1 kWh** to boil 1 litre of water.
  - Most Australian homes: **13-19 kWh/day.**
  - Australian average household: **13.6 kWh/day.**
- **Melbourne**
  - **Effective** daily electricity use**:** 120-140 GWh/day.
  - **Average** continuous load: 5–6 GW.
  - **Peak load:** 7+ GW in extreme weather.
- **Victoria**
  - Annual requirement: 45 - 50 TWh.
  - Operational demand: 5 - 9 GW. (normal daily to summer peak).
- **Australia**
  - Annual requirement: 200–210 TWh.

WIND POWER

Photo: Pexels:

Many years ago, when coal was king and before renewable energy assumed the mantle, I travelled through Victoria's Latrobe Valley to see the Yallourn, Loy Yang and Hazelwood power stations and their open-cut brown coal mines.

The scale was impressive, as they collectively covered about 50 square kilometres of countryside. The view wasn't attractive, and I wondered about the long-term environmental impact. I was also aware that they provided Victoria with the cheapest electricity in Australia, and that Yallourn, the first to be commissioned, had been built in the 1920s by one of the state's engineering visionaries, Sir John Monash. At the time, it had been a major engineering achievement for Victoria.

There has been criticism of the environmental impact. Their saving grace was that they occupied a relatively small area, were remote from Melbourne, and used plentiful local resources to provide secure, reliable, sustainable, and cheap base-load power for Victoria.

By the 2000s, coal had lost favour to renewable energy. Wind and solar power were now the fashionable emissions-free base-load alternatives, and wind and solar farms were built.

I began to notice wind turbines on the skyline. In 2000, they were a source of curiosity because of their size, prominence and promise of cheap energy. By 2026, however, they now dominate the landscape, just a short distance from Australian cities.

I now realise that the environmental impact of the open-cut mines in the Latrobe Valley was minuscule compared with the widespread despoilation of rural landscapes, visual pollution, and the geographic footprint of ubiquitous wind farms. In addition to the wind farms themselves, new transmission lines are required to carry power from them to urban or industrial areas, further compounding the damage to rural areas, including state and national parks. This was the beginning of a realisation that there was another, more sinister side to the energy nirvana promised by wind and solar power.

Victoria is rapidly expanding its wind energy to meet its legislated climate and renewable energy targets. Wind power is already the state's largest source of renewable electricity, with more projects planned through to 2035. It supplies roughly one-third of the annual generation.

Wind turbines:

- Onshore: Hub height approx. 1**00 m.** Rotor diameter approx**. 130m.**
- Offshore: Hub height approx. **150M.** Rotor diameter approx. **150M**.
- Tip Height: 140-170M (approximately 550ft)
- Nameplate Capacity: Onshore. Up to 6 MW. Offshore. Up to 18MW.
- Turbines continue to grow in both hub height and rotor diameter to capture higher-altitude, steadier winds.

Victoria's legislated 2035 emissions-reduction and renewable-energy targets are:

- 65% emissions reduction by 2030
- 95% emissions reduction by 2035
- 95% renewable electricity by 2035
- Net zero by 2045

Number of Victorian Wind turbines

Currently, Victoria has the largest number of wind farms (both operating and under construction) with a generation capacity exceeding 1 MW.

- 45 operating or under-construction wind farms
- *2,000–2,200 operational wind turbines* in 2026.

To meet its legislated requirements, Victoria would need the equivalent of about:

- 900 new onshore turbines (10 to 15 large wind farms).
- 222 new offshore turbines (2 to 3 large offshore wind zones).

Turbines & - Capacity	**2026 Est**	**2035 Target**	**Requires**
Onshore turbines	2,000-2200	3000 - 3200	900 additional onshore turbines by 2035 (Vic modelling)
Onshore capacity	4.3 GW	9.7GW	9.7 GW onshore wind in Vic 2035 renewable plan
Offshore turbines	0 GW	220–230	Based on 4 GW offshore by 2035, 18 MW-class turbines
Offshore capacity	0 GW	4 GW	Matches Vic offshore wind targets for mid-2030s
Total wind capacity	4.3 GW	13.7 GW	Supports 95% renewable electricity by 2035 (with solar, hydro, storage)

SOLAR POWER

Photo: Pexels

In 2025, solar power generated 9% of global electricity and over 1% of primary energy. Solar power is now the largest single source of renewable electricity in Australia, ahead of wind and hydro, driven overwhelmingly by rooftop photovoltaics (PV), which supplied about 13% of national electricity generation in 2024. There are now more than 4 million rooftop systems, record annual installations, and rapidly growing system sizes.

Solar power is the conversion of sunlight into electricity and uses one of two technologies:

- Photovoltaic (PV) systems use solar panels, either on rooftops or in ground-mounted solar farms, converting sunlight directly into electric power.
- Concentrated solar power systems use mirrors or lenses to concentrate sunlight to extremely high temperatures, producing steam that drives a turbine to generate electricity.

PV was initially used solely as a source of electricity for small and medium-sized applications, from a calculator powered by a single solar cell to remote homes powered by an off-grid rooftop PV system. Commercial concentrated solar power plants were first developed in the 1980s. Since then, as the cost of solar panels has fallen, the capacity and output of grid-connected solar PV systems have doubled about every three years. Three-quarters of new generation capacity is solar, with both millions of rooftop installations and gigawatt-scale photovoltaic power stations continuing to be built.

China has about half of the world's solar power capacity, and over 40% of global polysilicon manufacturing capacity is in China.

Geography affects solar energy potential because some places receive more sunlight than others. Areas that are closer to the equator will generally receive more sunshine. However, solar panels that can track the Sun's position can significantly increase solar energy potential in areas farther from the equator. Daytime cloud cover can reduce the light available for solar cells. Land availability also significantly affects the amount of solar energy available.

Data

Households

- About 4.1 million rooftop systems installed nationally.
- 44% of free-standing homes now have rooftop solar.
- 74,582 home batteries installed in 2024.
- Battery uptake is rising but still low. Only 4.5% of solar homes have a battery.
- About 26 GW rooftop PV capacity by end-2025.
- Average new system size: ~9.8 kW.

National

- Solar supplied about 13% of all national electricity generation in 2024.
- **42 GW** total installed PV capacity (rooftop + utility-scale) in 2025.
- Annual installations reached **5.3 GW**, a new national record.
- Rooftop solar share of national electricity generation (2024**)** about **30,500 GWh**.
- **13.4 GW** of centralised (utility-scale) solar capacity by end-2024.
- Growth is still strong but slowing slightly in annual rooftop installation numbers.
- System sizes are increasing, reflecting electrification (EVs, heat pumps) and tariff incentives.
- Behind-the-meter batteries are accelerating but remain cost-constrained.

Solar power is economically viable as a low-cost generator, but not as a reliable, dispatchable power source without substantial system-level support. Its economic viability depends on:

- Subsidies and mandates.
- Regulated cost-recovery.
- Socialised transmission investment
- Public underwriting of firming capacity

Without this level of support, large-scale deployment would stall because investors cannot recover the full cost of intermittency, storage, and grid integration. It is also now apparent that the full cost of solar and wind subsidies cannot be passed on to consumers, as electricity would become unaffordable. The cost is now simply being added to the national debt.

HYDRO POWER

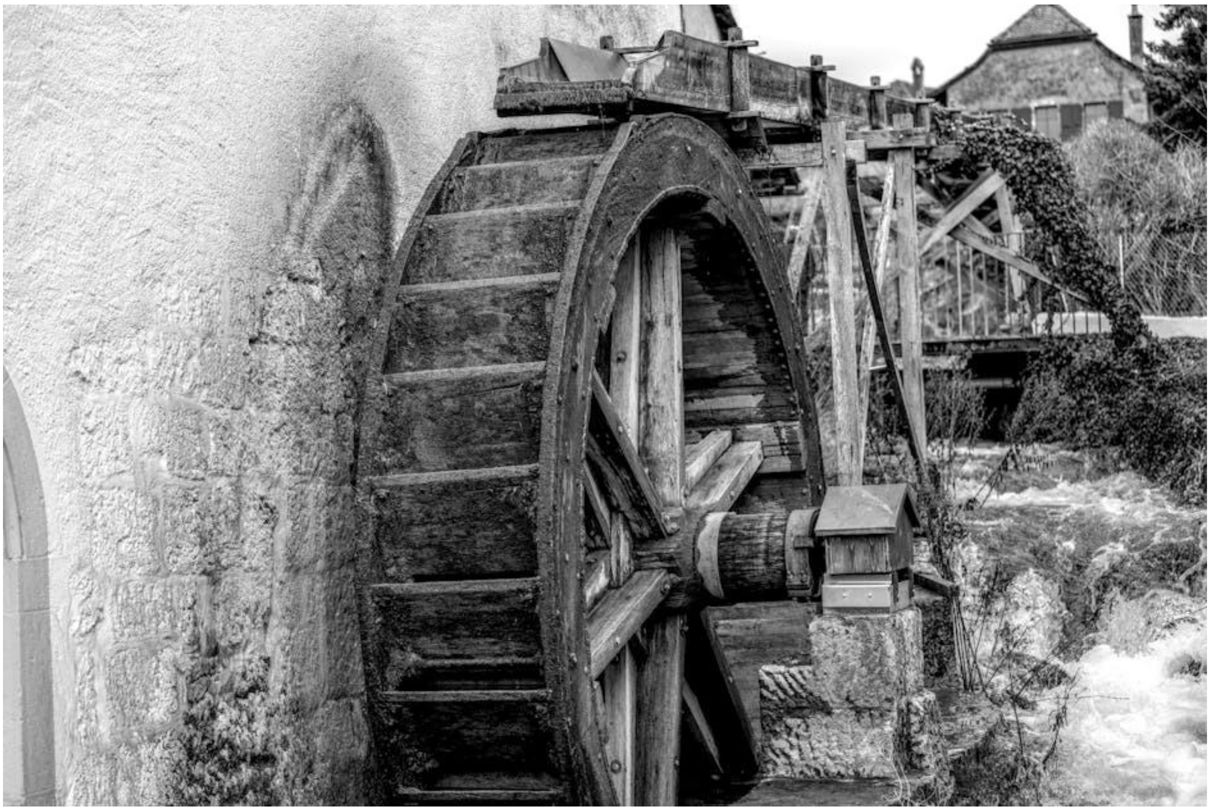


Photo: Pexels

Hydropower (hydro) is one of the oldest forms of renewable energy generation. For thousands of years, water has powered mills to grind flour, crush ore, and make paper. Today, hydro is an important renewable energy source.

Hydropower is the power derived from the energy of falling or fast-moving water, such as watermills, but today the most common use of hydropower is hydroelectric generation. By using dams and reservoirs in conjunction with turbines and generators, electricity can be generated and stored for public use. As of 2025, over 60% of all global renewable energy is generated through hydropower.

There are four ways to generate electricity from hydro, depending on the body of water from which the energy is being generated.

- **Run-of-river hydropower.** This utilises the movement of water to generate electricity. Due to the nature of rivers, this hydropower method often lacks storage capacity and instead generates electricity continuously.

- **Storage hydropower.** This uses dams to store water in reservoirs, generating electricity by releasing the water through a turbine to drive the generators. Storage hydropower can meet electricity grid demands by turning on and off as needed and, thanks to its storage capacity, can operate for months without additional water.

- **Pumped-storage hydropower.** This is similar to storage hydropower, but it requires an upper and a lower reservoir. When demand on the grid is high, water is released from the upper reservoir through turbines to the lower reservoir. When demand is low, water is pumped back into the upper reservoir using surplus energy.

- **Offshore hydropower.** This is a newer method of hydroelectric generation that utilises tidal waves and tidal lagoons to generate electricity, similar to hydroelectric dams**.**

Hydropower was once the largest source of renewable energy in Australia and, nearly a decade ago, accounted for over 55% of the country's renewable energy generation. In 2026, there are more than 100 hydro stations in Australia, with additional projects underway. This includes Snowy Hydro, which accounts for approximately half of the country's hydroelectricity generation, and its latest project, Snowy 2.0, which is under construction and will add 2,000MW. Outside of Snowy Hydro, the network of hydroelectric generators in Tasmania holds the largest concentration of hydropower.

Interest in hydropower has declined over the past 50 years, as damming rivers has become unfashionable and solar and wind power have emerged. The last major hydropower dam built in Australia was the Gordon Dam in southwest Tasmania, completed in 1974.
The hydro industry received a significant financial boost in 2023 when it was included in the federal government's ***Technology Investment Roadmap*** as one of five priority low-emissions technologies to help reach Australia's renewable energy target.

Advantages of hydroelectricity

- Renewable resource.
- Able to meet peak electricity demands.
- Provide essential back-up power.
- Able to provide secondary benefits to the surrounding area.
- Reservoirs can offer recreational opportunities.

Disadvantages of hydroelectricity

- Environmental impact due to the construction of dams.
- Expensive start-up costs.
- Dependent on rainfall and can be adversely affected by droughts.
- Not very scalable for residential use.

Data

National

- **Installed hydro capacity:** about **8 GW** across 108–120 operating stations (variation reflects classification of micro-hydro).
- **Share of electricity supply:** **5–7%** (stable for decades).
- **Share of total primary energy:** about **0.8%**, reflecting Australia's fossil-heavy transport and industrial heat sectors.
- **Geographic concentration:** South-eastern Australia (NSW, VIC, TAS) dominates due to alpine hydrology.

Snowy Mountains Hydro-Electric Scheme

- **16 power stations**: **4,100 MW** existing fast-start capacity.
- One-third of renewable energy in the NEM.
- **National significance:** peak-load support, water diversion to Murray–Murrumbidgee, and grid stability.

Tasmania's Hydro System

- 30 operating stations: about **2.3 GW**.
- Backbone of the "Battery of the Nation" strategy, enabling mainland firming via Marinus Link (under development).

Pumped Hydro Energy Storage (PHES)

PHES is now the **critical growth area** for hydro in Australia.

Snowy 2.0

- 2,200 MW new generation; 350,000 MWh storage.
- Expands Snowy's total dispatchable capacity to 6,300 MW.
- Full commercial operation targeted for Dec 2028.

Kidston (QLD)

- First new PHES in 37 years; repurposed gold mine.
- Integrates with solar and wind.

Constraints on Expansion

Australia's hydro potential is structurally limited by hydrology:

- **Driest inhabited continent**; >80% of land receives <600 mm rainfall.
- High rainfall variability → **volatile inflows** and limited new dam opportunities.
- Technically feasible potential **~60 TWh/year**, but most viable sites are already developed.
- Future growth will come from refurbishment of existing stations, Small-scale hydro (run-of-river, irrigation drops) and pumped hydro as long-duration storage for a high-renewables grid.

Snowy 2.0

Snowy 2.0 was conceived during the Turnbull government to provide a meaningful counter to the Labor/Green renewable energy agenda. Its original cost estimate was deliberately under-scoped to ensure the numbers were politically acceptable, and it has now evolved into what is probably the most spectacular renewable energy disaster from a strong field of contenders. Snowy 2.0 has shifted from a strategic storage asset to a high-risk megaproject with escalating fiscal, schedule, workforce, and system integration risks. Its delays and cost blowouts now have implications for national energy security and grid reliability.

- **Cost escalation:** $2 billion (2017) - $12 billion (2023 reset) - **$20 billion likely**, with independent estimates up to **$42 billion** including transmission and financing.
- **Schedule blowout:** Original completion 2021 - revised 2026 - now **2028–29** for commissioning. The project may not deliver full operational value in the early 2030s.
- **Financing exposure:** Each year of delay adds about **$1 billion** in interest, increasing Commonwealth contingent liabilities.
- **Transmission dependency:** HumeLink, VNI West, Western Renewables Link and Sydney Ring South add about **$12 billion** in system-level costs and are themselves delayed.

Frequency Stabilisation

Coal and gas turbines spin at a constant rate and provide frequency stability under normal operating conditions. With the removal of coal and gas, alternative means of frequency stability must be developed. Battery backup is often proposed; however, battery capacity is limited and extremely expensive, which increases overall cost.

TRANSMISSION LINES

Electricity must be transferred from where it is generated to where it is consumed. Extensive transmission lines for the coal-powered electricity industry have always been a major component of electricity costs. For the coal-fired system, however, these lines have been in place for many years.

Renewable energy, particularly wind turbines, must be located at sites most exposed to wind. These are invariably different from traditional coal power sites.

Connecting dispersed renewable power sites now requires massive new investment in transmission lines, with the cost passed on to consumers, either directly or indirectly. Estimates of the additional transmission lines required range from 10,000 to 28,000 kilometres by 2050.

The new transmission lines are proving horrendously expensive and divisive. Costs change regularly, but they are always moving upwards, so the following figures are indicative only.

In Australia, the main transmission projects being built or upgraded to connect renewable energy (wind, solar, and storage) to the grid are often referred to as **Renewable Energy Zone (REZ) transmission lines** and **interconnectors**.

Some of the most important are:

New South Wales

- **EnergyConnect**
    - Connects western NSW and South Australia.
    - Enables large solar and wind projects to export power across states.
    -
- **Central-West Orana REZ**

    - New transmission network linking major solar, wind, and battery projects to the grid.

Victoria

- **VNI West:** Proposed 500kV link between Victoria and NSW, intended to move renewable energy between states and improve reliability.
    - The 2023 cost estimate: $ 1.8 billion - now possibly up to 11.4 billion.
    - Delivery dates have been delayed by 2 years.
    - The Victorian government has rammed through legislation that will fine landowners up to $12,000 for denying access to their property for the construction of the line.
    - These costs could increase consumer prices by 50% and industry prices by 350%.

- **Western Renewables Link.** Connects renewable projects in western Victoria to Melbourne and the broader grid.

Queensland

- **CopperString 2032**
    - Extends the grid into northwest Queensland.
    - Allows renewable and mining-region generation to connect. [RG1]

Tasmania and Mainland Australia

- **Marinus Link**
    - Planned undersea high-voltage DC cable.
    - Would allow Tasmania's hydro and future wind resources to support the mainland.

South Australia

- **Project EnergyConnect**
    - One of Australia's largest transmission investments.
    - Helps South Australia export wind and solar generation.

National Backbone

Australia's main interconnected grid is the National Electricity Market (NEM), which spans the eastern states and Tasmania.

Most renewable energy projects connect to the NEM through **330 kV, 500 kV, or high-voltage DC (HVDC)** transmission lines.

The biggest challenge for Australia's renewable transition is no longer generating renewable electricity. It is building enough transmission capacity to move power from windy and sunny regions to major population centres such as Melbourne, Sydney, and Brisbane.

RENEWABLE ENERGY FOOTPRINT

Photo: Pexels

Genuine environmentalists would be horrified by the destruction of the Australian wilderness, fertile agricultural land, and national parks, as well as the visual pollution of the countryside that is the trademark of renewable energy. However, what was once a Cause Célèbre has now been sacrificed in the name of the greater moral cause of saving the planet from CO2 emissions.

Such inconvenient consequences are now belatedly penetrating the national consciousness as 36 years of renewable energy ideology come home to roost. One of these is the recognition that the footprint of renewable energy, both now and in the future, is far greater than previously recognised.

Coal. The baseline for the renewable energy footprint must be the mines and infrastructure associated with existing coal-powered electricity generation. A current estimate of the footprint of all coal mines in Australia is about **1,700 km².** As about 60–70% of Australia’s coal production is exported, it is reasonable to assume the remainder is dedicated to electricity power stations. Using a 40% local power figure, a footprint of about **680 km²** is the coal power baseline for comparison purposes.

Wind. Australia does not publish a national total for wind-farm project area or physical footprint, but the best available national dataset - the Australian Renewable Energy Map - provides authoritative figures from which estimates may be made.

Existing wind farms 2026:

- Wind turbines: **4,669**
- Existing footprint (land actually disturbed): **50 km²**
- Project area (the total area of land required): **2,000 - 30,000 km²**

Proposed wind farms by 2050:

- Wind turbines: **about 8,000**
- Total length of proposed new haulage roads: **46,167 km**
- Proposed footprint: **about 100 km²**
- Project Area **6,000–120,000 km²**

Wind turbines physically occupy very little land, consisting of the foundation and access tracks. The typical disturbance per turbine is about 1 ha (0.01 km²), including roads.

No national dataset publishes the project boundary area for wind farms. The Australian Renewable Energy Map does not provide the area of each wind-farm lease. However, wind-farm project areas typically range from 20–300 km² each (based on spacing requirements). Almost all of this land remains active farmland (grazing/cropping). Only **1–3%** of the project area is physically disturbed.

Because of the significant areas of land covered by wind farms and the dispersed nature of turbines across the countryside, the visual impact is enormous and intrusive. Wind turbines dominate the landscape within visual distances.

Wind Footprint (Victoria)

The 2025 Victorian Transmission Plan (VicGrid) provides the clearest land-use quantification:

Direct footprint (turbine pads, tracks, substations). This is the ***net*** footprint - the land actually removed from other uses.

- Renewable Energy Zones (REZs) together cover **7.9%** of Victoria's land area.
- Only **11%** of REZ land is expected to host actual wind/solar projects.
- Only **0.06%** of Victoria's total land area will be physically occupied by infrastructure (turbine foundations, solar panels, access tracks). This is approximately **136 km²** of Victoria.

Project area (gross area). The land ***within*** a wind or solar farm boundary.

- For wind farms, this can be tens to hundreds of square kilometres, but 98–99% remains usable farmland (grazing, cropping).
- Physical infrastructure footprint (net area).
- Turbine foundations (300–600 m² each).
- Access roads.
- Substations.
- Solar panel arrays (which have a larger footprint than wind).
- VicGrid modelling shows this footprint is 0.06% of the state.

- ANU's national analysis finds that all wind and solar needed to fully decarbonise Australia would require **1,200 km²**

What This Means for Victoria

- Wind energy will continue to grow as a major part of Victoria's electricity system.
- The number of turbines and land use will roughly double by 2035.
- Most new turbines will be larger and more efficient, meaning fewer turbines are needed per unit of energy.
- Land impacts are significant; however, farming can continue across almost all wind-farm areas.
- Offshore wind has the potential to become a major new industry for the state, especially in Gippsland. Project approvals have not yet been granted and may not occur as opposition increases. This will mean that Victoria cannot achieve its 2035 wind turbine target.

Solar.

The Australian Renewable Energy Map shows that the total physical footprint of all existing solar farms in Australia is approximately **297 km².** The footprint of proposed solar farms is a further **4,471 km².** This reflects the scale of the planned rollout of renewables. Not all proposed projects will be built; historically, only 30–50% of proposals reach construction. Solar farms use land more intensively than wind farms. Solar farms occupy nearly 100% of their landscape area because panels cover the ground.

Transmission lines.

Electricity needs to be transferred from the point of generation to the point of consumption. Extensive transmission lines for the coal-powered electricity industry have always been a significant part of electricity costs. However, for the coal-fired system, these lines have been in place for many years.

Renewable energy, especially wind turbines, must be sited in locations most exposed to wind. These sites are usually different from traditional coal power locations. Connecting dispersed renewable power sites now requires substantial new investment in transmission lines, with costs passed on to consumers either directly or indirectly.

- Australia's current high-voltage transmission network (NEM) is **~40,000 km**.
- Australia plans **~10,000 km of new lines** to connect REZs and renewable generation.
- AEMO's ISP includes 10,000–12,000 km of new transmission by 2050 and 25–35 new REZ terminals.
- Infrastructure Australia confirms **~6,000 km of new transmission** needed by 2050 in the NEM.
- **10,000 km** of new transmission line, the total land area affected is **415-850 km²**

Transmission systems include towers, substations, and right-of-way easements. These corridors can be up to 80m wide for a 500 kV line and are required to control vegetation, provide safety margins, access, and statutory clearances.

Summary of Renewable Energy footprint

Summarising these footprints gives a sense of the scale of the renewable energy transition's impact on the Australian environment. Because there has been a deliberate strategy of obfuscation in disclosing the real cost and footprint of renewable energy, these figures are estimates based on publicly available data.

- **Coal footprint:** **680 km²** (existing and proposed).
- **Renewable energy footprint:**
    - **Existing 2026:**
        - Solar: **297 km²**
        - Wind: **50 km²** (disturbed area)
          (2,000–30,000) km² (project area - use **15,000**).
        - Transmission: **0** (Base line)
        - **Total:** **347 – 15,297 km²** (2026 min – max range).
    - **Proposed by 2050:**
        - Solar: **4,471 km²**
        - Wind: **100 km²** (disturbed area)
          (6,000–120,000) km² (project area – use **50,000**).
        - Transmission: **415–850 km²** (use 600)
        - **Total:** **5,171 – 54,571 km²** (2050 min - max range).

The available figures must be interpreted to estimate the footprint area for renewable energy. However, in summary, it is apparent that:

- **In 2026:**
    - If only the disturbed land area is considered, the existing coal footprint is **about half** that of the existing renewable energy footprint.
    - If project areas are considered, however, the renewable energy footprint is already **22 times larger** than that of coal.
- **By 2050,** if the current proposed scale of renewable energy were implemented:
    - Only considering the disturbed land area, the renewable energy footprint would be at least **7 times larger** than that of coal.
    - If considering both the disturbed and project areas, then the renewable energy footprint would be at least **80 times larger** than that of coal.
- Whatever the extent of renewable energy implementation, the existing coal footprint, in place for many years, would still need to be retained to provide baseload backup power for a renewable system. The renewable footprint ***is in addition*** to that of the existing coal footprint.

Conventional coal-fired power stations, ugly as they are, are typically located in rural areas close to coal sources. By their nature, these power stations are reasonably compact. Opencut coal mining is intrusive and an unavoidable problem with coal. However, it can be mitigated by the eventual restoration of the site when the resource is exhausted. Underground coal mining, by definition, has a very small land-area footprint.

The footprint of renewable energy, particularly wind and solar farms, is becoming increasingly obvious as they expand towards Net Zero. This is now being recognised, and opposition to the visual pollution of wind and solar farms and transmission lines, and to the associated environmental degradation, loss of farmland, and decimation of bird life, is growing.

The future renewable energy footprint will massively exceed the existing coal footprint. Where are the environmentalists?

Renewable Energy Costs

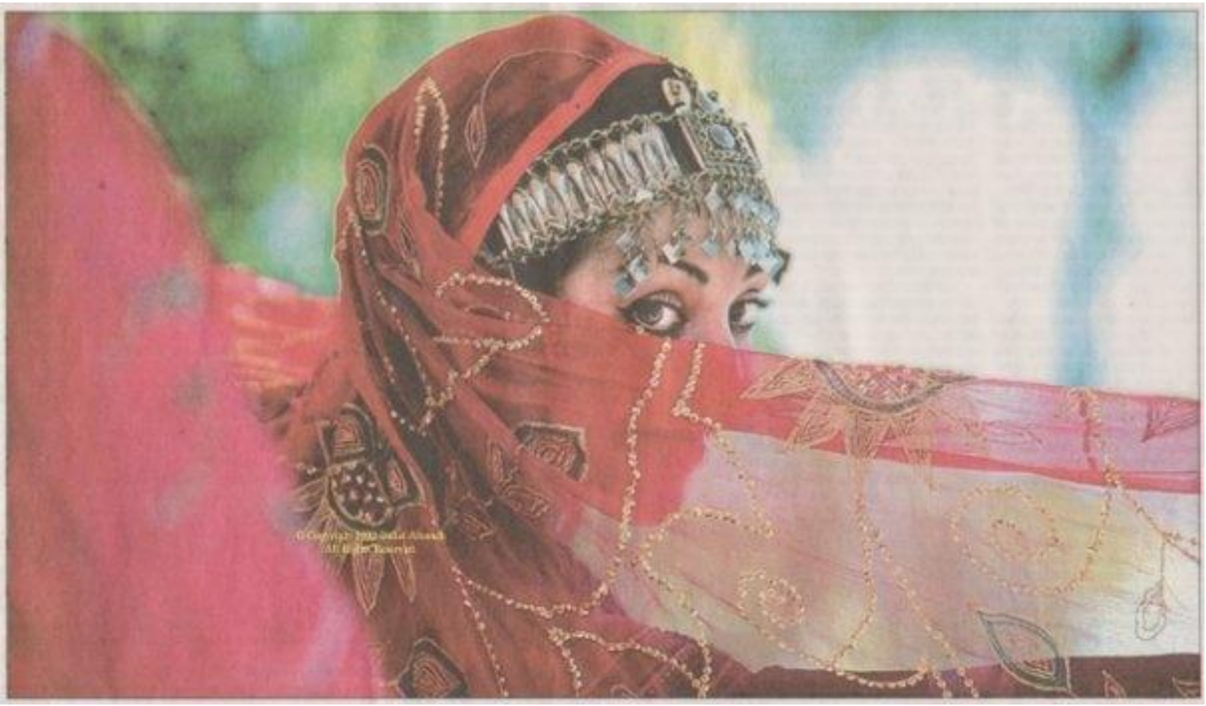


Photo: Source Unknown.

Winston Churchill famously described the Soviet Union as "a riddle wrapped in a mystery inside an enigma," highlighting its opaque and unpredictable nature. This description could equally apply to the discussion of the total costs of renewable energy in Australia today.

Australian federal and state governments no longer consolidate climate change "costs" into a single line item in their respective budgets, and accurate figures for the costs of climate change and renewable power are hard to find and substantiate. Australian governments have deliberately obfuscated the true costs and subsidies because these costs are passed on to consumers, are politically sensitive, ideologically confronting, and threaten those who make a living from the climate change gravy train.

True costs are now artfully concealed within a labyrinth of schemes, misleading and deceptive titles and terminology, and layers of bureaucracy.

Avoiding discussion of total system costs, however, is not only willfully deceptive but also counter-productive for the nation's economic future and the well-being of all Australians.

Exposing the true costs of renewable energy is akin to a forensic investigation - a modern-day dance of a thousand veils.

Subsidies

Subsidies in various forms are an essential feature of renewable energy. It is an inconvenient truth that wind and solar power cannot compete economically with fossil fuels. They have proven prohibitively expensive and must be heavily subsidised with taxpayer funds to be “commercially” viable.

There is now a vicious circle of subsidies that underpin “free” renewable power.

- Wind and solar farms are subsidised at the generation level via the ***Renewable Energy Target***.
- This, in turn, makes coal-fired power more expensive, so ***coal power is then subsidised*** to ensure the plants remain operating to provide essential base load power.
- As prices are forced up, ***consumers are then subsidised*** so that power bills are affordable and to avoid the political pain.
- In 2024, the IPA estimated that Australian consumers paid $660 million in subsidies to the 50 largest solar generation companies.
- 72% of these 50 companies are fully or partly foreign-owned, and just 28% are Australian-owned.
- In 2024, $1.7 billion was paid by consumers to wind and solar operators. Of this, $1.2bn was paid to foreign companies.
- ABS data reveals that without taxpayer subsidies, power bills would be 66% higher.
- Chinese, Spanish, and French wind farm operators earn up to $200 million per year in subsidies in Victoria. About $620 million in Large Scale Generation Certificates is paid by local electricity retailers to wind farm power generation companies to subsidise their businesses.
- Electricity costs are now a major driver of the rising cost of living in Australia. Subsidies are, in effect, a tariff on the Australian economy. The subsidies inevitably make fossil fuels more expensive, which in turn drives up electricity prices, reduces economic output, undermines productivity, increases living costs and reduces our standard of living.

- The IPA (IPA, 2025) findings in their research paper on "Net Zero" costs were that federal spending commitments to 'climate change' and 'net zero' programs, as defined in government budgets, have increased 15-fold over the last decade, to over **$9 billion per year.**
- If such spending were consolidated into a single program, it would be among the 20 most expensive federal government programs.
- Since the election of the Albanese government in 2022, financial support for "Net Zero" has dramatically increased from about $2 billion per year to the current $9 billion per year.

Between 2006 and 2024, total Australian subsidies for "free energy" from renewable power came to about $132 billion. Government direct subsidies for free renewables are at least $9bn per year. You couldn't make this up!

Federal Subsidies

Australia subsidises solar power primarily through certificate-based market schemes rather than direct budget outlays. The three approaches are:

- ***Small-scale Renewable Energy Scheme (SRES)*** for households and small businesses. This is a household subsidy that reduces the upfront cost of rooftop solar by issuing ***Small-scale Technology Certificates (STCs)*** for eligible systems. Households provide STCs to installers in exchange for a discount on the system price. It applies to systems up to 100 kW.
- ***Large-scale Renewable Energy Target (LRET)*** for utility-scale solar. States also add rebates, loans and feed-in tariffs. This is a utility-scale solar subsidy that supports solar farms by issuing ***Large-scale Generation Certificates (LGCs)*** for each MWh generated. Electricity retailers must buy and surrender LGCs annually, creating a market-driven revenue stream for solar farms. The target is 33,000 GWh of additional renewable generation per year (2020–2030).
- **Cheaper Home Batteries Program.** This is a battery subsidy that, from 1 July 2025, the Commonwealth will provide a discount of about 30% on eligible home batteries, delivered through the SRES framework. The Clean Energy Council is calling for a national battery rebate of up to $6,500 to accelerate adoption.

State & Territory Subsidies

Rebates and Loans. States and councils offer additional incentives such as:

- Upfront rebates for solar PV
- Zero-interest loans
- Battery rebates
- Community solar programs

Feed-in Tariffs (FiT)

- Retailers pay households for solar energy exported to the grid.

- Rates vary widely by state and retailer (e.g.***, 1–25 c/kWh*** in 2026).
- Self-consumption is typically far more valuable than exports to the grid.

Typical Costs (Melbourne)

Real-world economics is catching up. Significant and increasing federal and state subsidies over the past 20 years have made home solar installations so attractive that the grid is now saturated with household exports during peak solar periods. As a result, the value of solar exports to the grid may no longer be meaningful, and self-consumption becomes the dominant driver of value. This trend will only accelerate if current subsidy levels continue. Because of financial pressures, federal and state governments are now beginning to ratchet back subsidies and FiTs. This will, in turn, create enormous public pushback and political consequences.

A closer look at typical costs for a 10 kV home solar system, in Melbourne, without a battery, is revealing:

- Outlay is $9,000–$12,000 with subsidies, and $13,000–$17,000 without subsidies. Payback period for installation costs is 6–9 years.
- Battery prices are $8,000–$13,000, and payback periods are 10-16 years after all subsidies are applied.
- Subsidies in the form of STCs account for about **30%** of the installation cost.
- The value of the imported equipment, mainly from China, Vietnam and Austria, is about **50%.**

Home solar isn't cheap upfront, but after the initial outlay, electricity bills are significantly reduced. The unknowns at this stage are the future of FiTs, maintenance costs, long-term reliability, and the true payback period.

Subsiding Foreigners

The biggest winner from the pursuit of free energy from the sun and wind is China. China manufactures 80-85% of the world's solar PV modules and about 60% of global wind turbine components. Most of the massive Australian subsidies for solar and wind systems flow directly to China.

Most rooftop solar, wind and solar farms, and transmission lines are installed by Australian labour, which is a boon for the economy. However, about 70% of the large companies installing wind and solar farms and transmission lines are owned by foreigners, often Chinese.

If the Australian government insisted that wind and solar components were manufactured in Australia, it would be a massive boost to the economy. The cost would increase, but the money would stay in Australia rather than be exported. The massive subsidies would not be invested in the manufacturing bases of foreign

Not only has renewable energy driven up electricity prices, but it has also been a massive subsidy for foreign suppliers and is a missed opportunity to develop the Australian industrial base.

countries as they are now. The erosion of the Australian manufacturing base is the hidden cost of renewable energy. You could not make this up!

Transmission costs.

Electricity needs to be transferred from the point of generation to the point of consumption. Extensive transmission lines for the coal-powered electricity industry have always been a significant part of electricity costs. However, for the coal-fired system, these lines have been in place for many years.

Renewable energy, especially wind turbines, must be sited in locations most exposed to wind. These sites are usually different from traditional coal power locations.

Connecting dispersed renewable power sites now requires substantial new investment in transmission lines, with costs passed on to consumers either directly or indirectly. Estimates of the additional transmission required range from 10,000 to 28,000 kilometres by 2050.

The new transmission lines are proving horrendously expensive and divisive.

- **VNI-West (Vic - NSW):** 500kV line connecting Victoria's west to the NSW Riverina.
    - The 2023 cost estimate: $1.8 billion
    - May 2025 estimate: $3.6 billion
    - Aug 2025 report estimate: $7.6 billion and possibly up to $11.4 billion.
    - Delivery dates have been delayed by 2 years.
    - The Victorian government has rammed through legislation that will fine landowners up to $12,000 for denying access to their property for the construction of the line.
    - These costs could increase consumer prices by 50% and industry prices by 350%.

- **AEMO estimates:**
    - Original AEMO estimates for most of the transmission lines: 2020 $8.5 billion, 2026 $120-$200 billion.
    - Central West Orana REZ: 2021 $650, 2025 $5.5 billion.
    - New England Renewable Power Zone Transmission lines: 2020 $1.5 billion 2024 $3.7 billion
    - Queensland Super Grid: 2020 $500m, 2024 $3.3 billion
    - Hume Link (NSW - Vic): 2020 $2.4 billion, 2024 $4.9 billion
    - Marinus link (Tas - Vic): 2025 $4 billion

Total System Costs

Total system costs must include the base-load asset, such as a coal power plant, transmission costs from the power plant to the consumer's vicinity, and final distribution costs to the point of consumption.

Existing coal and gas assets are already in place, so only maintenance and replacement costs need to be considered. Nuclear power would mainly utilise existing transmission and distribution infrastructure, but nuclear plant construction costs are high.

For renewable assets, the costs of wind or solar generator construction, transmission, distribution, batteries or other storage, and hydro must be included. This will significantly increase the overall cost of the wind or solar asset.

The following costs are intended to provide some perspective on the scale of different components of the electricity system. Existing systems, such as coal and gas, are based on real-world data and are reasonably accurate; for much of the renewable power sector, they are closer to estimates.

- Australian existing coal base load: $50 MWh
- International cost for new coal-fired power: $50 - $70 MWh
- Australian existing gas base load: $100 MWh
- New coal or nuclear power estimate: $100 MWh
- 2024 wholesale electricity price in the NEM: $120 MWh.
- Offshore wind farms estimate: $135 - $175 MWh
- Mainly (>80%) renewable base load: $200 MWh
- Snowy Hydro 2 estimate: $217 - $303 MWh

The lowest-cost electricity system is the one we have, and the next-lowest-cost system is one built on new baseload plants, whether coal or nuclear.

As economic reality bites, previous global commitments to renewable power have plateaued and, in many countries, are now in decline. Australia will eventually follow suit when cost-of-living pressures force a critical reappraisal of renewable power. The Labor Government refuses to disclose the full costs of the renewable energy rollout; however, some sources estimate that costs to date are around $150 billion and that costs by 2050 will be between $600 billion and $1 trillion.

It is an inconvenient fact that “free power” from wind and solar is prohibitively expensive. The irrefutable evidence for this assertion is your electricity and gas bills.

The true costs of renewable energy cannot be passed on to consumers, as doing so would simply make electricity unaffordable. Costs are now simply added to the national debt to be paid for by our children and grandchildren.

Effect on Industry

Rising power costs are having a dramatic effect on major Australian industries, and many can now only continue because of substantial subsidies. The manufacturing sector’s share of Australia’s GDP fell to a record low of 5% in the June quarter of 2025, largely due to energy cost pressures.

Some of those who struggle and require high levels of subsidy to continue are:

- Tomago aluminium smelter in Newcastle.
- Copper smelting in Mt Isa.

- Steel works at Whyalla.
- Ampol and Viva Energy petroleum refineries.
  ASIC data shows that over 1,400 manufacturers have collapsed or relocated overseas since 2022–23, with energy costs cited as a major factor.

Some of the high-profile closures linked to high electricity and gas costs are:

- **Kwinana smelter.**
- **Incitec Pivot.** One of Australia's largest fertiliser producers closed its domestic manufacturing facilities, citing unsustainable energy expenses.
- **Qenos.** Australia's last major plastics producer shut down in 2024, citing excessive energy costs. Australia is now totally reliant on imported polymers, mainly from China.
- **Oceania Glass.** A significant player in the glass manufacturing sector ceased operations amid rising energy prices.

Case Study: The German Renewables Experiment

In 1992, the economies of the US and the EU were roughly comparable (Statistics 2025). In 2025, the EU economy is only about 75% of the US economy. What happened? Since 1990, the EU has indulged in green dreams, socialist governments, and a stampede away from fossil fuels towards renewable power. It has also introduced the Euro, the common currency, and added extra layers of bureaucracy, both of which have stifled the economy.

In 2025, the median disposable income in the US is 25% higher than in Germany and 60% higher than in Italy. Germany is now in recession.

In 2000, Germany initiated ***Energiewende*** (power turnaround), its strategy to decarbonise the economy by moving away from coal, gas and nuclear towards renewables. Germany is estimated to have spent at least $1.5 trillion on this crusade. The hyperbole was that Germany would become Europe's first green, solar-powered superpower!

In the real world of 2025, Germany has deindustrialised and depowered, and it enjoys the highest power costs in Europe, twice those of the US and nuclear-powered France, and three times those of China. Despite all of this, 78% of Germany's power still comes from fossil fuels.

After the Russian invasion of Ukraine, gas supplies from Russia collapsed, and Germany frantically began reopening coal mines, importing oil, and setting up LNG facilities to import natural gas. When the sun doesn't shine and the wind doesn't blow, Germany suffers from ***Dunkelflaute*** **(**dark doldrums).

Luckily for Germany, it can import power from neighbouring countries, particularly France, which has 70% of its power from nuclear sources, and Sweden and Norway, which rely heavily on hydro. This has upset the neighbours, as the enormous drain on their power systems is driving up their domestic prices and inflation.

Since 2021, Germany's industrial output has fallen by at least 10%, and many manufacturing companies are struggling to remain viable, with even Volkswagen threatening to close domestic plants.

Despite all of this, Australian politicians and bureaucrats are still quoting Germany as an example for Australia to follow.

Germany's green power experiment has proven to be a spectacular failure. They are now in a recession, for which renewable power has been a major factor. They now have the highest electricity costs in Europe, resulting in massive job losses and de-industrialisation.

The German renewables experiment has been an unmitigated disaster. Germany is the classic example that if you get the energy policy wrong, the economy will soon follow. Germany has pushed the panic button to reverse the economic decline by reinvesting in coal, gas, and nuclear energy.

Summary

With the release of the IPCC FAR in 1990, Australia discovered free energy from the wind and sun, embarked on a crusade against fossil fuels, and committed to renewable energy. Where is the nation 36 years later? The results are clear.

- Renewable energy has not resulted in cheaper energy as promised; rather, electricity and gas are significantly more expensive.
- Without massive subsidies, electricity and gas would be unaffordable for both households and industry.
- Australian emissions are negligible on a global scale, and any mitigation measures will have a “Net Zero” effect on reducing global emissions.
- Australia is guilty of breathtaking hypocrisy. Whilst posturing on the World stage against fossil fuels, it remains one of the world’s largest exporters of coal, gas, and uranium ore.
- Increasing electricity and gas prices have been a significant factor in the deindustrialisation of the Australian economy.
- The renewable energy crusade can rightfully be condemned as the greatest misallocation of resources in Australian history.
- Most wind and solar systems are imported from China. If they were manufactured in Australia, there would be a stronger economic case for supporting the renewable industry, but that is not the case.
- To meet the Labor government’s 82% renewables power target by 2030, it will require about 22,000 solar panels to be installed every day, 40 wind turbines every month, and at least 10,000 km of transmission lines to be built. This is utterly impossible within the time frames and prohibitively expensive.
- You could cover the Australian continent with wind and solar farms, and you would still need coal and gas for base-load power.
- In 2025, about 70% of wind farms are owned by foreign entities.
- The need for backup base-load power from coal or gas is an absolute necessity.
- All renewable power plants need to be replaced after about 15 years, whereas coal and gas plants have a much longer lifespan.
- ***Renewable power is not economically viable without substantial public subsidies.***

Emissions

Global action - to reduce carbon emissions and slow climate change, shows that there has been much rhetoric and posturing, but no progress in cutting emissions. Global emissions continue to rise each year, except during the COVID-19 pandemic.

The major emitters, namely China, the US, India, and Russia, which together contribute 59% of global emissions, have walked away from efforts to reduce emissions. It can be concluded that the major emitters have no intention of reducing their reliance on fossil fuels, as these fuels are fundamental to their economic and strategic strength.

Australia - has embraced climate change ideology with an evangelical fervour reminiscent of a religious cult. A virtuous circle of bureaucracy, lavish public funding and subsidies, complicit academia, and opportunistic industry has created a climate change industry that has now developed its own momentum.

- Since 1990, there has been about a 30% reduction in net emissions in Australia, driven by government policy. The biggest single driver of reductions has been changes in broad-scale land clearing and incentives for reforestation/vegetation management. The current trajectory is consistent with a gradual decline but is insufficient to meet net-zero aspirations without acceleration.
- As a direct consequence of climate change policies, electricity and gas prices have risen significantly. This has seriously affected the competitiveness of Australian industry. Heavy industries, such as steel and aluminium smelters, must now rely on public subsidies to survive.

The question must then be asked. If the major emitters have not willingly opted to reduce emissions primarily for economic reasons, why should Australia, almost alone in the world, willingly move away from fossil fuels and, by doing so, condemn the nation to deindustrialisation, economic decline, and strategic vulnerability?

The world's largest emitters have rejected climate change and moved away from renewable energy. Australia must do the same.

Costs

Probably the greatest tragedy in the misguided pursuit of renewable energy is the monumental waste of public funds and resources poured into sustaining the renewables gravy train.

It is estimated that about $100 billion has been spent from 1990 to 2025 to fund research, subsidise construction, and protect consumers from the cripplingly high electricity and gas prices. Some estimates put the cost of achieving net zero by 2050 at about $1 trillion, a truly astronomical amount.

The IPA (IPA, 2025-3) estimates that Federal spending commitment to 'climate change' and 'net zero' programs, as defined in government budgets, has increased 15-fold over the last decade, to over $9 billion per year.

Labor governments have refused to disclose the true cost of achieving Net Zero, knowing it would provoke a severe backlash from the Australian public.

A serious question must now be asked. Is the outrageous expense of pursuing renewables justified when the rewards are trivial, the commitment is out of step with the rest of the developed world, the major emitters have walked away, the scientific justification has been discredited, and the nation has been deindustrialised? The logical answer is NO.

Australia now faces the stark realisation that the pursuit of renewables has been the greatest misallocation of resources in the nation's history. Not only has Australia destroyed an economically sound power industry and effectively deindustrialised, but it has also seriously hobbled future economic growth.

The renewable energy crusade can rightfully be condemned as the greatest misallocation of resources in Australian history.

Conclusion

The purpose of the power industry is to provide the nation with a reliable, affordable, and sustainable energy supply while supporting economic growth, environmental goals, and national security.

Labor governments have made emissions reductions the priority, not affordable and reliable electricity and gas. Experience now clearly shows that this policy has dramatically increased electricity costs.

In 1990, only some 36 years ago, Australia enjoyed some of the cheapest electricity and gas in the world, thanks to our abundant natural resources, which gave industry a competitive advantage over foreign competitors.

Today, as a result of forsaking fossil fuels in favour of renewable energy, the situation is reversed. In retrospect, it can be safely said that the more renewables, the higher the electricity price and the lower the reliability. This scenario is unlikely to change in the near future.

The renewable energy experiment has failed. The "science" has been exaggerated; the rest of the world has effectively walked away from the hypothesis of cataclysmic man-made climate change and the associated emissions reductions; and the Australian experience has resulted in expensive and unreliable electricity and gas.

The quest for free energy has not only been misguided but also the greatest misallocation of money and resources in Australian history. Another unfortunate consequence has been the deindustrialisation of the nation.

Electricity is a fundamental input for industry, and coal baseload power, backed by gas and hydro if available, is without doubt the cheapest option for Australia. The more coal-fired power stations are used, the lower the price and the higher the reliability.

Australia is at a historic juncture for its sovereign power industry. We are confronted with the stark and unequivocal fact that we are on a trajectory rejected by all the major emitters and to which most other countries now only pay lip service. If not corrected quickly, we are well on the way to Paul Keating's Banana Republic.

The time has come for Australia to walk away from renewable energy, revert to fossil fuel, and plan a transition to nuclear power. Affordable, reliable, and sustainable electricity and gas are essential to reviving the Australian industrial base, raising economic complexity, and securing the nation's economic future.

The Australian renewable energy experiment has successfully transitioned the nation from low-cost fossil-fuel power - to high-cost renewable power. Few countries have done it better!

MOBILISING THE POWER INDUSTRY

Power Economic Hub

The true value of the power industry lies in the broader economic hub it fosters, comprising a multitude of associated businesses and a workforce that grows around the industry over time. This aspect is often overlooked by those who argue against coal, gas, and nuclear power.

Cheap coal and gas could be catalysts that give Australian industry a competitive advantage over foreign competitors. At present, we cannot compete on the basis of cheap labour. However, our vast mineral reserves, if combined with cheap power, could be the basis for value addition across a multitude of industries, particularly the mining industry on a broad scale.

The current geopolitical outlook, particularly regarding China, has heightened interest in strategic minerals. This includes overtures from the US to enrich uranium ore and other strategic rare earth minerals, such as lithium, cobalt, and platinum. Cheap electricity and gas are fundamental inputs for value-added mineral processing across the board.

Industrial hubs and strategic industries are key drivers of diversified, resilient, and complex industrial bases across all major developed nations. Australia must move in this direction as well. There must be an industrial vision for the next 20 years, in which Australia maximises opportunities based on our vast natural resources, coupled with cheap power and gas.

Cost Estimate

The intent of this section is not to provide definitive costings, but rather to provide ballpark figures and an appreciation of the scale of the financial commitments that owners, operators, strategic partners, and the Government must make.

The costs to date for renewable energy have been described as the greatest misallocation of national resources in the nation’s history – and this is probably an understatement. Future costs will also be significant.

However, it can be safely said that reverting to the cheapest forms of power, coal and gas, cannot be more expensive than the failed renewables experiment and will gradually result in cheaper electricity and gas for all.

Savings will be achieved through the following measures.

Removal of all subsidies.

The scope of public subsidies for the so-called "free energy" from the sun and wind has been obscene, as outlined in the previous section on costs. This is conservatively estimated at about $9 billion per year.

Future subsidies can be removed immediately; however, existing subsidies can only be removed over time as contractual arrangements expire.

Subsidies for renewable energy have not only been detrimental to the nation but have also had the unintended effect of "subsidising" China's industrial base, as most wind and solar equipment is manufactured in China.

Dismantling the Renewables Bureaucracy.

Successive governments have created an almost impenetrable miasma of climate change agencies and legislation, the intent of which has been to support climate change momentum, obfuscate the facts, and conceal the true costs.

This, in turn, supported a climate change industry that benefited from the gravy train of public funding for the cause. All of this must be dismantled over time.

Streamlining Project Bureaucracy.

Bureaucracy is now a sea anchor on economic progress and must be minimised. In Australia today, national, state, and local legislative requirements demand that all new projects meet stringent air, water and environmental standards, comply with numerous building and labour requirements, and accommodate Indigenous activism and union demands. Many of these requirements are reasonable; however, many are excessive, contradictory, and redundant.

In addition, red, green, and black tape lawfare has often been used to stop or delay new projects, to the nation's economic detriment. The irony is that most activists rely on public money to fund their agendas – a classic case of biting the hand that feeds you.

This Australian penchant for national self-harm is a major barrier to future development and must be reversed if meaningful progress is to be made in resuscitating the power industry, particularly in introducing nuclear power to the mix.

New-generation coal stations.

The remaining coal-fired power stations are ageing and need to be replaced with new technology, namely high-efficiency, low-emission generators. As Labor governments have reluctantly conceded, the remaining power stations must be retained to provide viable base-load power when the wind doesn't blow and the sun doesn't shine!

Nuclear power.

As the rest of the world has discovered, nuclear power is an efficient, low-emission, low-footprint technology and the way ahead for Australia. Why shouldn't Australia benefit from its own uranium ore, as many other nations have? In addition, Australia requires a domestic nuclear industry to support the future nuclear submarines to be acquired under AUKUS.

The introduction of nuclear power is not cheap. However, the technology offers a fantastic opportunity for Australia to diversify the economy through uranium enrichment, nuclear waste treatment and storage in remote locations, technology training, and job opportunities.

Removal of existing wind and solar farms.

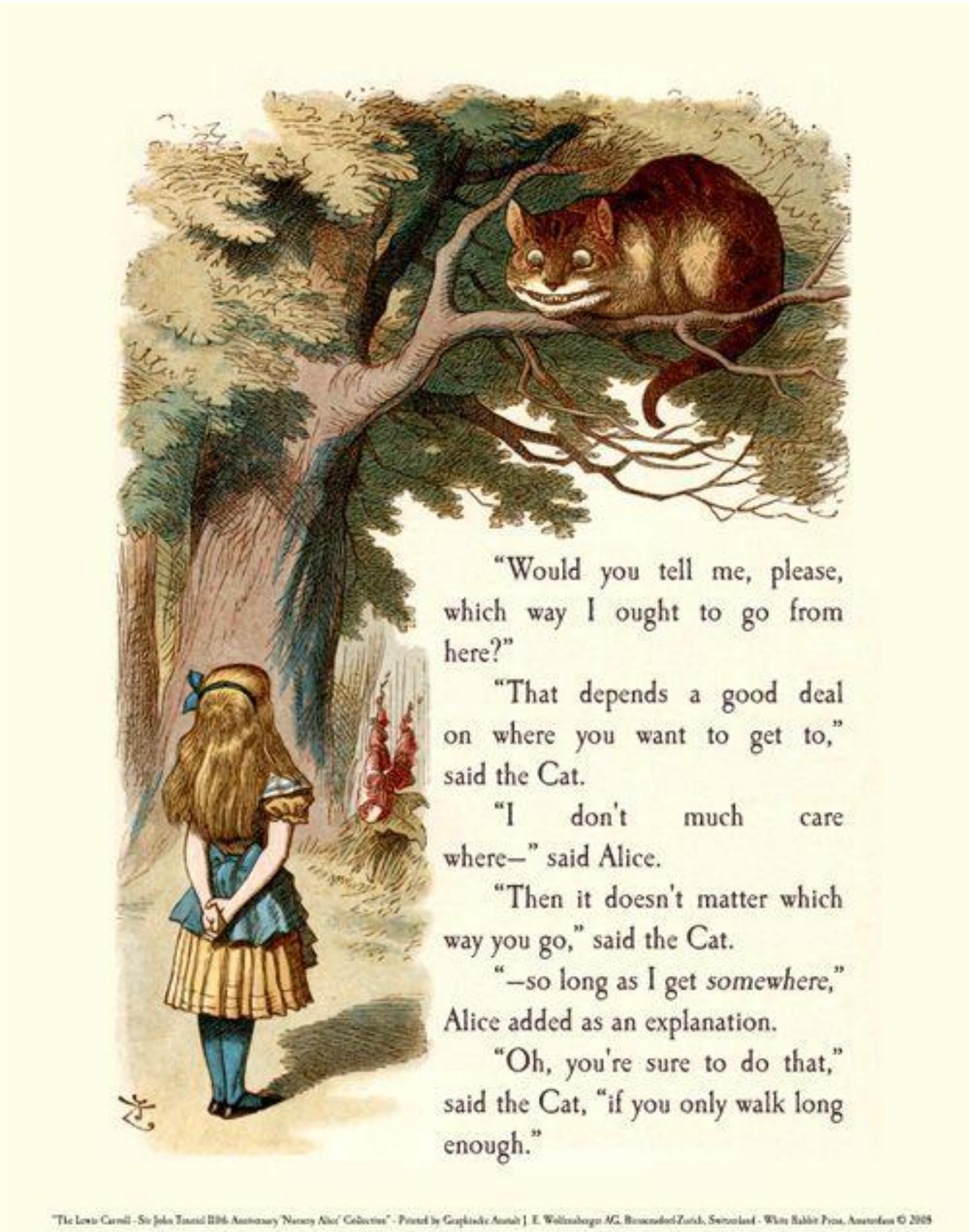
As wind turbines, solar panels and batteries reach the end of their life, they must be recycled, which is almost impossible, or safely disposed of. Because they contain exotic and toxic materials, the process is expensive and difficult, and burial is probably the most convenient option. Most of this disposal will have to be done at public expense, and the cost will be considerable.

PROPOSALS.

1.	***Electricity***: • Declare the electricity industry to be a Strategic Industry. • Prioritise an affordable and reliable electricity system over emissions reductions. • Aim for the cheapest electricity in the world for consumers and industry. • Reject climate change ideology, the Paris Agreement, renewable energy and Net Zero. • Remove all forms of subsidy for renewable energy. • Develop a ten-year plan to dismantle the renewable energy industry and restore energy security. • Revert to coal, supported by gas and hydro where available, for base load electricity generation.
2.	**Nuclear Energy.** Commit to nuclear energy as the next-generation power source.
3.	**Bureaucracy.** Dismantle the climate-change and renewable-energy bureaucracy by defunding it.
4	**Strategic Partnerships.** Seek collaborative arrangements potentially under the AUKUS or QUAD umbrellas.
5.	**Politics.** A bipartisan political approach to the way ahead for the power industry needs to be agreed upon.
6.	**Ownership**. • The power system is to be mainly owned and managed by private industry. • Some form of Government ownership in the power industry is to be implemented to ensure that core power system infrastructure cannot be simply sold off.
7.	**Government.** • Declare the power industry to be a Strategic Industry. • Incentivise investment in the power industry through tax reform and other financial measures.

THE LAST WORD

The last word belongs to Lewis Carroll and his "Alice in Wonderland" - Alice is lost in the forest, meets the Cheshire Cat and asks for directions. It is a perfect analogy for Australia's present lack of a coherent national vision for the power industry.



The only difference between where we are today and what could have been – or what is possible in the future – is a question of national will.

Photo Credits

Front Cover: Pexels.
Wind power: Pexels
Solar Power: Pexels
Hydro Power: Pexels.
Transmission Lines: Pexels.
Footprint: Pexels
Costs: Source unknown.
The Final Word, Lewis Carroll, Alice in Wonderland.

References

AES (2026). www.energy.gov.au/energy-data/australian-energy-statistics

DCCEEW (2025). DCCEEW, *https://www.dcceew.gov.au › climate-change publications › national.* National Greenhouse Gas Inventory: Quarterly updates, Dec 2025

Global Carbon Project. (2024). *Global Carbon Budget 2024*. Carbon Brief. https://www.carbonbrief.org/

IPA (2025). IPA-Resesarch-Note-May-2025-Government-net-zero-budget-blowout.pdf

IPA (2025-1) IPA-Research-Note-May-2025-Solar-farm-subsidies-FINAL.pdf

IPA (2025-2) IPA-Research-The-Five-Pillars-of-net-zero-FINAL (2).pdf

Copyright