

Nuclear Myths and How to Respond to Them

By
Ken Enderby

In this article, we look at eleven myths about nuclear energy in Australia, and how you can debunk them simply and effectively.

1. Myth: Nuclear energy is on the rise globally

Fact: Nuclear power has halved as a proportion of global electricity generation over the past three decades

While there has been an uptick in the construction of nuclear reactors in China in the last couple of years, the nuclear industry has been in decline for the last three decades.

There are currently 413 nuclear reactors operating in the world today, down from an all-time high of 442 in 1996. 57 are under construction. Five began operating in 2023, while five others closed permanently. (The global average is 6.1 opening each year over the past decade.) Total generating capacity fell by 1.7 gigawatts last year. Since 1996 nuclear's share of global electricity generation has fallen from 17.5 percent to 9.2 percent.¹

Nor is there any sign of a rise in construction rates. Work began on six reactors last year, all but one in China. The International Atomic Energy Agency (IAEA) estimates that ten will close each year over the next decade, meaning that the total number operating will continue to decline unless the start-up rate is almost doubled – and there is no sign of this happening.²

The US figures are dire. Of the 259 US reactors built since 1955, 94 are still in service; only 28 remain competitive and have not suffered at least one outage of up to a year. When all this is taken into account, it gives nuclear power an 11 percent success rate.³ If the same were true for renewables, they'd be labelled a disaster.

2. Myth: Isn't nuclear power cheaper than renewables?

Fact: Nuclear energy is more expensive than renewables.

As the CSIRO GenCost Report has shown, nuclear power is far more expensive than renewable energy, even when you take into account the need to build new transmission lines. The report found that a grid running on 90 per cent renewables, including transmission lines and battery storage or peaking gas, would cost between \$70 and \$100 a megawatt hour in 2030.⁴

Costs can only be kept down with nuclear power if it runs at near full capacity. But it can't do this if its role is to firm renewables. To do the latter, it would have to operate at 60 percent of capacity, which would push the cost beyond \$225/MWh.

¹ Jim Green, "The latest nuclear power 'renaissance' is going in reverse," *Pearls and Irritations: John Menadue's Public Policy Journal*, 27/1/24

² Jim Green, "Global status report highlights parlous state of nuclear power sector," *Renew Economy*, 20/9/29

³ Amory B. Lovins, "Australia can learn from the American experience with nuclear power," *Renew Economy*, 21/5/24

⁴ Angus Thompson, "Bowen costs Coalition's nuclear plan at \$387bn," *Sydney Morning Herald*, 18/9/23

As far as Small Modular Reactors (SMRs) are concerned, the GenCost Report estimates that power produced by these would cost between \$200 and \$350 a megawatt hour, assuming they ever become commercially available.

Nuclear would also lock us into a fixed energy price for 40 years. Pricing for renewables, by contrast, takes into account the need to replace solar panels every 20 years or so and wind turbines every 30. When this happens, cheaper panels and turbines can then be installed.

Finally, if nuclear power really were cost-effective in Australia, private companies would be lining up to invest in it. Instead, not one has expressed any interest, forcing Peter Dutton to use taxpayers dollars to pay for his seven proposed reactors.

3. Myth: What about the Frontier Economics report? Doesn't it show that nuclear is cheaper?

Fact: The Frontier Economics report is badly flawed and does not make a legitimate comparison of costs.

The Frontier Economics report was commissioned by the Coalition commissioned to give substance to its nuclear plan. The report estimates that the first nuclear reactor built in Australia will have a capital cost of \$10,000 per kilowatt of generating capacity. The CSIRO's GenCost report estimates the capital cost to be far higher – \$27,500 per kilowatt of capacity – based on overseas experience. In other words, nuclear will be far more expensive than renewables.

Another problem with Frontier's report is that it does not take into account the cost of decommissioning nuclear power plants when they reach their use-by date. By some estimates, decommissioning is just as expensive as construction, meaning Frontier's estimate needs to be doubled if it is to truly reflect the cost of nuclear.⁵ Of course, it will be future generations that will pay to dismantle Mr Dutton's nuclear reactors, so perhaps that is why the would be prime minister is not concerned about such costs.

Yet another problem is that initial cost estimates for nuclear reactors invariably blow out. The cost of Britain's Hinkley Point C project, for example, has blown out from £9 billion when announced in 2007 to £34 billion upon completion (which is expected to be in 2031).⁶ The company building the reactor, Électricité de France, had to be bailed out by the French government in 2023 then nationalised, it was losing so much money. Indeed, France's own reactor fleet is so old and unreliable that it has to be subsidised to the tune of US\$26 billion a year – all at the taxpayer's expense.

In the US, only two nuclear projects have been commenced this century, with both losing huge sums of money. The twin Vogtle reactors in Georgia saw their costs blow out from US\$2.8 billion to US\$17.5 billion by their completion date in 2024.⁷ The twin V.C. Summer reactors being built in South Carolina fared even worse. Their costs blew out by US\$13.5 billion over four years of construction, causing the entire project to be abandoned.

⁵ Mike Foley, "The \$80 billion question buried in Dutton's nuclear power plan," SMH, 3/1/25

⁶ Giles Parkinson, "Cost of UK's flagship nuclear project blows out to more than \$A92 billion," *Renew Economy*, 29/1/24

⁷ Amory B. Lovins, "Australia can learn from the American experience with nuclear power," *Renew Economy*, 21/5/24

As for SMRs, the American company NuScale Power decided to abandon its key SMR project in Idaho – this after receiving US\$4 billion in funding from the US government.⁸ SMRs are nowhere near operationally or commercially viable.

4. Myth: Won't nuclear save us from having to build new transmission lines?

Fact: Even with new transmission lines factored in, renewables are still significantly cheaper than nuclear.

Peter Dutton claims that we will need to build 28,000 kilometres of new transmission lines if we opt for a grid based around renewables. His own plan calls for far fewer new lines to be built, as his proposed nuclear reactors will be located where the coal-fired powers stations they will replace are based.⁹

The Australian Energy Market Operator (AEMO) disputes Peter Dutton's figures, stating that only 10,000 kilometres of new lines will be needed.¹⁰ One reason is that many renewable projects are already in the pipeline, and the transmission lines for them will have to be built no matter who wins the next election. Another reason is that much of the existing network is 50 years old and needs to be replaced within the next 10 years.

In addition, AEMO estimates that new transmission projects would pay for themselves and deliver an additional \$17 billion of net market benefits.¹¹

5. Myth: Nuclear reactors can be built in as few as 6 years

Fact: In western democracies, nuclear power plants take up to two decades to bring online, from the announcement to start-up.

A nuclear reactor can take up to 20 years to be built in a western industrialised nation. The Vogtle nuclear plant in Georgia – possibly the last commercial plant ever to be built in the United States – was first announced in 2008, and completed in 2024.¹² That's a construction time of 16 years. The Hinkley Point C power plant in the UK was first announced in 2007 and began construction in 2017. It is not expected to be completed until 2031! That is a construction time of 24 years. And both these nations have decades of experience building nuclear power plants.¹³ Australia has no such experience, and would have to develop it from scratch. Added to this would be the time needed to write the legislation and regulations that would cover construction and operation of nuclear reactors. This would have to happen before the first concrete could be poured.

⁸ Giles Parkinson, "Coalition nuclear plan flips back to SMRs after latest meeting with lobbyists," *Renew Economy*, 12/4/24

⁹ Dutton, Littleproud, O'Brien – Media Release – Australia's Energy Future, 19/6/24.

<https://www.peterdutton.com.au/dutton-littleproud-obrien-media-release-australias-energy-future/>

¹⁰ Giles Parkinson, "AEMO's jaw dropping prediction for coal power – all but gone from the grid in a decade," *Renew Economy*, 15/12/23

¹¹ Ibid.

¹² Jim Green, "Cold turkeys: The demise of nuclear power in Australia's AUKUS partner countries," *Renew Economy*, 12/3/24

¹³ Adam Morton, "The Coalition says the rest of the G20 is powering ahead with nuclear – it's just not true," *The Guardian*, 25/6/24

It is therefore not surprising that the CSIRO Gencost report suggests that it would take a minimum of 15 years to get a nuclear reactor up and running in Australia.¹⁴ Kane Thornton, CEO of the Clean Energy Council, puts the figure at closer to 20 years. This means the earliest we could expect to see one would be 2040, and more likely 2045, given the British and American experience. All our coal-fired power stations will be gone by then (see below).

6. Myth: There is no hurry to complete the transition to clean energy. We can wait until nuclear power plants are ready to come online.

Fact: We need to move quickly, as our coal-fired power stations are breaking down and need to be replaced.

Australia has 18 coal-fired power stations. Eight of them are 40 years or older, and are operating at just 60 percent capacity. Three are slated for closure by 2030, the rest by 2035. Another three will also close around that time, bringing the number that will be gone within a decade to 11. These represent 76 percent of the nation's electrical generating capacity. AEMO expects the other 7 power stations to be retired by 2037. That means all our coal-fired capacity will be gone within a dozen years!

Given the construction times involved with nuclear (see above), it can't possibly replace any of these power plants before they retire. In other words, by the time nuclear reaches the finish line, it will not be needed. The transformation of the grid will already have been completed.

7. Myth: Won't nuclear power get our emissions down?

Fact: It will get them down, but nowhere near as much as renewables will, and nowhere near fast enough. We would have to rely on coal for at least another decade.

Even if we managed to build seven nuclear reactors by 2041, they will not cut our carbon emissions by anything like as much as renewables would. The reason is that we will need a ten-fold increase in gas generation in order to replace our coal-fired power stations while we wait for the nuclear reactors to arrive. No company will invest in these gas plants if they are to be closed once nuclear power comes online, so we won't be able to build the requisite number of nuclear plants to cut our emissions to zero.

In addition, an extra 2.3 billion tonnes of CO₂ will be released while we wait for the reactors to be completed. This represents five times Australia's annual emissions.¹⁵

If we are serious about climate change, nuclear has no place in our energy mix.¹⁶ This may seem contradictory, as nuclear is every bit as clean as wind and solar (at least with regard to emissions). But it is not compatible with a clean energy transformation. If we truly wanted nuclear as part of the mix, we should have got going on it twenty years ago.

¹⁴ Amy Remeikis and Paul Karp, "Peter Dutton names seven potential nuclear power station sites but avoids questions on cost," *The Guardian*, 19/6/24

¹⁵ Simon Holmes à Court, "Peter Dutton's flimsy charade is first and foremost a gas plan not a nuclear power plan," *The Guardian*, 21/6/24. Mike Foley, "Libs nuclear plan would blow out climate pollution," *Sydney Morning Herald*, 9/6/24

¹⁶ Giles Parkinson, "Dutton's nuclear plan wouldn't even meet net zero by 2050 target, report finds," *Renew Economy*, 11/6/24

8. Myth: What about when the sun don't shine and the wind don't blow? How are we going to produce enough electricity if we don't have baseload power – i.e. nuclear?

Fact: We don't need nuclear power to keep the lights on. Renewables can do the job perfectly well, as long as they're backed up by battery and hydro storage.

Many people are still obsessed with the notion of 'baseload power' – the capacity to produce a minimum amount of electricity at any time of day. But this is a concept that is no longer relevant, given advances in energy management.¹⁷

Renewable energy is now perfectly capable of supplying our energy needs, as long as it is sufficiently firmed by hydro and battery storage, with peaking gas as a backup.¹⁸ The key is to have overcapacity, so that the grid can still generate electricity when weather conditions are poor, and enough storage to get through any shortfall.¹⁹ A key requirement is to have transmission lines that connect the various states, so that when there is a shortfall in one, it can be compensated by imports from another. Such connections have been lacking until recently, as each state's grid has largely operated autonomously.

The Clean Energy Finance Corporation estimates that \$120 billion will need to be invested to fully decarbonise the grid.²⁰ Much of this will have to be spent anyway, as all 18 of the nation's coal-fired power stations will be replaced by the end over the next 12 years. Households will also do some of the heavy lifting, by continuing to invest in rooftop solar. This already constitutes 11 percent of the nation's generating capacity – a world record.

And if any proof were needed that the national grid can be successfully decarbonised, one need look no further than South Australia. Its grid is already 75 percent renewable, and is on target to reach 100 percent by the end of 2027.²¹ If SA can do it, there is no reason why the rest of the nation can't do so as well. It's as simple as that.

9. Myth: Can't we have both renewables *and* nuclear?

Fact: Nuclear power is incompatible with renewables.

Even if we were able to build seven nuclear reactors in time to replace several of our coal-fired power stations, they would not be compatible with renewable energy, as their output could not be altered quickly to match changes in demand.²² The technologies that can do this are batteries and pumped hydro storage and peaking gas.²³ Adding nuclear to the

¹⁷ Sophie Vorrath, "Baseload coal and peaking gas paradigm 'no longer fit' for modern grid, says AEMO chief," *Renew Economy*, 21/10/24

¹⁸ David Osmond, "A near 100pct renewable grid for Australia is feasible and affordable, with just a few hours of storage," *Renew Economy*, 23/8/23. Giles Parkinson, "Australia could be at 99 pct renewables by 2032, if green exports take off as hoped," *Renew Economy*, 15/12/23.

¹⁹ Giles Parkinson, "AEMO says coal exits won't trigger shortfalls if big batteries built on time," *Renew Economy*, 1/9/23

²⁰ Sophie Vorrath, "Bigger and faster: CEFC says more than \$120 billion needed to decarbonise the grid," *Renew Economy*, 19/10/23

²¹ Sophie Vorrath, "South Australia joins Denmark in elite club of two, 'pushing the boundaries' of renewable energy integration," *Renew Economy*, 20/9/24. Christiaan Zuur, "The response to South Australia's blackout started with a tweet and became a revolution on the grid," *Renew Economy*, 27/9/24.

²² Karen Middleton, "Peter Dutton's nuclear proposal disrupts investment in cheaper renewables. Is that the point?," *The Guardian*, 20/6/24. Giles Parkinson, "Nuclear lobby concedes rooftop solar will have to make way for reactors," *Renew Economy*, 24/6/24

²³ Tim Buckley and Annemarie Jonson, "Coalition's taxpayer-funded nuclear con a road to ruin," *The Australian Financial Review*, 26/6/24

grid would require rooftop solar to be curtailed in times of excess power generation (the so-called 'solar duck'), which would be wasteful and extremely unpopular with those who had invested in such systems.²⁴ Already, 3.9 million Australian homes and businesses have rooftop solar. This number may well double over the next decade.²⁵

To avoid the need for such curtailment, the Coalition plans to cap renewables at 54 percent of the grid. But this is totally unrealistic, as they are already at 40 percent and will reach 50 percent by the end of this year, given projects that are already in the pipeline. What exactly does Peter Dutton plan to do to keep them from rising above 54 percent – tell people they can't install solar on their roofs? This would be completely ridiculous, as rooftop solar is the cheapest form of energy available.

10. Myth: Aren't nuclear reactors completely safe these days?

Fact: Nothing is completely safe – especially not a nuclear reactor

The latest nuclear reactors are said to be much safer than their earlier counterparts, but accidents still happen and can be catastrophic when they do.

When three of the six reactors at Fukushima melted down in 2011, disaster was only averted by the fact that the wind blew most of the radioactivity over the Pacific and not inland. Had it been blowing towards Tokyo, the result would have been very serious. Even so, 100,000 people had to be evacuated from the Fukushima region and the cost of the disaster has been estimated at over US\$500 billion.²⁶ The power station was insured for only US\$1.5 billion, meaning Japanese taxpayers have had to pick up most of the bill.

Following the Chernobyl disaster, the International Atomic Energy Agency estimated that up to 4,000 people would die from cancer. The International Agency for Research on Cancer puts the estimate much higher: 16,000 deaths by 2065.

Another issue relating to nuclear reactors is security. In the event of war, an enemy state would only have to target our nuclear reactors in order to completely devastate us. Given the pinpoint accuracy of modern missile systems, it's hard to imagine how a nuclear plant could be protected from attack. And if successfully hit, not only would radiation be spread far and wide, power would also be knocked out for large numbers of people for a very long period of time.²⁷

Renewable energy, by contrast, is decentralised and very difficult to destroy or even disrupt. It is also entirely safe.

Finally, there are political difficulties to overcome. Even though the latest generation of nuclear reactors are much safer than their first generation counterparts, the public was told the latter were also safe, and this turned out not to be true. As a result, people lost faith in nuclear power, and that sentiment hasn't changed much since. Nuclear power might be technically feasible, but it presents almost intractable political problems.

²⁴ Giles Parkinson, "Is David Littleproud prepared to switch off rooftop solar to jam nuclear into the grid?," *Renew Economy*, 18/6/24

²⁵ "Solar panel install statistics in Australia," *Solar Calculator*.
<https://solarcalculator.com.au/blog/solar-energy-facts-and-statistics/>

²⁶ Mark Diesendorf, "Too expensive, too slow: Even the baseload argument doesn't work for nuclear," *Renew Economy*, 29/10/21

²⁷ "Nuclear reactors could become targets of war, defence experts warn," *SBS News*, 28/2/25. Jim Green, "Is nuclear power in a global death spiral?," *Renew Economy*, 3/3/23.

People don't want to live near a nuclear reactor. Nor do they want nuclear waste transported through their neighbourhoods, for fear of an accident. This is why the waste generated by Australia's sole nuclear reactor is stored on site rather than somewhere much safer. Both these factors suggest that the pursuit of nuclear power in Australia is futile. Better to adopt forms of clean energy that do not carry the same stigma.

11. Myth: Hasn't the waste management problem been completely solved now?

Fact: Nuclear waste will always be a problem, whatever we do with it.

Supporters of nuclear power assert that there is very little radioactive waste from a nuclear reactor, and that storing it is therefore not a problem. Peter Dutton even went so far as to say, "If you look at a 450-megawatt reactor, it produces waste equivalent to the size of a can of Coke each year."²⁸

In fact, a reactor that size would produce 27,000 Coke cans' worth of nuclear waste per year, bringing the total to about six tonnes.²⁹ Little wonder Peter Dutton has stopped bandying around the Coca-Cola can claim!

Currently, high-level waste is stored in pools of water at nuclear power stations. But this is only a temporary measure. Any long-term solution must involve underground storage. Yet the world still does not have a single underground repository for such waste. The US spent US\$13.5 billion on an underground repository at Yucca Mountain, but was forced to abandon it as the site was found to be unsuitable. Finland has also started work on an underground repository. No other countries are doing so.³⁰

Low-level waste also presents a problem. Currently it is stored on site at nuclear reactors, but long-term solutions are needed. There are also considerable amounts of low-level waste at uranium mines.

In addition, parts of decommissioned nuclear reactors are highly radioactive, and present a major waste problem. The cost of dismantling these reactors is comparable with the cost of building them, and much of this falls on taxpayers rather than the nuclear industry.³¹

²⁸ Mike Foley and Bianca Hall, "Dutton's claim nuclear waste would be size of Coke can 'hard to swallow'," *SMH*, 23/6/25

²⁹ Mike Foley, "Dutton said a reactor's waste would fill a Coke can. Try 27,000 of them," *SMH*, 19/12/25

³⁰ Mark Diesendorf, "Too expensive, too slow: Even the baseload argument doesn't work for nuclear," *Renew Economy*, 29/10/21

³¹ Mike Foley, "The \$80 billion question buried in Dutton's nuclear power plan," *SMH*, 3/1/25