



The nuclear option

I'll get back to market specifics next week, but this week I have focused on one of, if not the most important issue of our generation; security of a reliable energy supply, how it is produced, and the ramifications of those choices.

For those who haven't seen it, the AFR is running a series of articles on nuclear energy, with a clear focus on lifting the debate on whether we should use nuclear power in Australia.

<https://www.afr.com/topic/nuclear-energy-hun>



NUCLEAR OPTION

Part One | North America Nuclear energy

This green city is trying a mini nuclear reactor. Why isn't Australia?



In the first instalment of the Nuclear Option series, a small modular reactor in Canada's Ontario could power 1.2 million homes by the end of the decade. Now it's trying to convince Australians to try them too.

Part Two | Europe Nuclear energy

Britain fires starter's gun on race to nuclear

In the second instalment of the Nuclear Option series, Prime Minister Rishi Sunak's government is suddenly ready to shower billions of pounds on getting modular nuclear reactors up and running by the early 2030s.



Part Three | Asia Nuclear energy

This country knows the worst of nuclear, but it still wants it

In the third instalment of the Nuclear Option series, Japan is pushing ahead with plans to restore reactors as a major source of power despite the 2011 Fukushima meltdown.



Opinion The AFR View

If nuclear power stacks up overseas, why wouldn't it in Australia?

Canada, the US, UK and Japan are incorporating small modular reactors into net zero energy transitions, so that nuclear power can back up intermittent renewables.

Opinion Letters to the Editor

Ontario nuclear model may not suit Australia

Despite Ontario's energy minister's claim that nuclear is "reliable", it is not always so. Last year in France, 32 of 56 nuclear reactors were shut down due to maintenance or technical problems.

The key messages are:

- There is no viable pathway to global decarbonisation without nuclear energy – renewables alone will not get us there.
- The future is in small modular reactors (SMR) – these are cheaper and quicker to build. Have a look at what Canada, the UK and UAE are doing. UAE has gone from no nuclear energy to 25% dependent on nuclear in just over a decade.
- The UK is spending A\$38b on expanding its nuclear energy industry as it tries to decarbonise its economy – this would take nuclear from 15% to 25% of power demand by 2050.
- Even Japan, which suffered with the Fukushima accident, is turning back to nuclear.

Australia is very reliant on coal for our base load electricity generation. Unfortunately, the location of our coal-fired plants are not the ideal locations for wind and solar – so decades of investment in grid infrastructure needs to be upgraded to transmit solar and wind energy to our cities. If we want to close down coal-fired power stations, replacing them with SMRs makes sense.

Australia has decided to go down the nuclear path with the AUKUS submarine purchases. These are all powered by SMRs. If we're happy to have SMRs floating around our coastline, why not on land?

Even Bill Gates, via his company TerraPower is building a new SMR in Wyoming in the US.

<https://abcnews.go.com/Technology/bill-gates-future-nuclear-energy-ai/story?id=99160110>

Political tit for tat

Chris Bowen, the Australian Federal Minister for Climate Change and Energy, penned an opinion piece in the AFR dismissing nuclear as a viable energy source for Australia.

He has five reasons why nuclear is not for Australia:

1. It is too expensive.
2. SMR technology is unproven.
3. Nuclear is slow to build.
4. Nuclear is not a good source of peaking and firming capacity.
5. Nuclear waste.

Bowen has framed his argument as nuclear v's renewables - *"Imagine having abundant resources of the cheapest form of energy available and choosing, as a matter of policy, to deploy a source of energy much more expensive and slower to build instead?"*. However, this is a false argument. Advocates of nuclear are not saying its nuclear or renewables. There is the need for both if we want to decarbonise.

This was subsequently countered by Ted O'Brien, the Shadow Minister for Climate Change and Energy with his 10 reasons Bowen is wrong:

1. Cheaper prices: Data from the International Energy Agency and OECD shows that nuclear in an energy mix lowers power bills. Bowen criticises Ontario, Canada, but fails to acknowledge that with up to 60 per cent nuclear in its grid, its residents' power bills are half the price we pay in Australia.
2. Cleaner energy: Nuclear energy produces zero emissions.
3. More reliable supply: With a capacity factor over 90 per cent, nuclear can provide synchronous baseload supply 24/7, which is why it's a like-for-like replacement for retiring coal plants.
4. Better partners for renewables: Next-generation designs are inherently flexible, with an ability to ramp up and down, making them complementary companions for intermittent renewables.
5. Better for the environment: If the Liddell power plant were replaced by a nuclear plant with the same capacity, it could be comfortably located on the same 100ha site. By contrast, an equivalent renewables-only solution would need a solar farm spanning about 35,000 hectares, or a wind farm spread over 200,000 hectares, with a huge impact on the natural environment.
6. Better for energy security: Given you can store years of fuel for a nuclear plant on site, it's protected from external supply chain disruptions. Compare that to our reliance on China for Solar PVs.
7. Better for industry: Next-generation nuclear plants also provide heat, which is a game-changer for hard-to-abate industries. It explains why companies such as Dow Chemical in the United States are investing in SMRs, and BHP in Australia has also flagged interest.
8. Good for communities: People with "high energy IQ" in communities such as Wyoming in the United States, which is replacing retired coal plants with nuclear, welcome nuclear's economic and social value.
9. Complementary to AUKUS: In adopting nuclear submarines, Australia will be the seventh nation to possess nuclear submarines, but the only one lacking a civil nuclear industry – an unsustainable position if we're to build and maintain a qualified workforce.
10. Geo-strategically sensible: If SMRs and nuclear batteries take off like our closest allies expect, it won't be long until smaller developing nations explore these versatile plug-and-play options. Australia and its allies can't afford to vacate the field in this area of technology.

Sadly, as is the case across all of Western Society, these discussion points are boiled down to partisan views with little room for accepting new information and flexibility and common sense.

For mine, if it is about cost, let the market decide. Other countries have come to different conclusions.

1. SMR technology is not unproven – we’re actually buying a fleet of them in our AUKUS nuclear submarine deal.
2. Yes, it is slow (but so is building batteries and transmission for renewables). The UAE has shown what can be done with the right will and approach. They’ve gone from a standing start in 2008 to 25% of power from nuclear today.
3. Nuclear is not for firming and peaking – it is base load power.
4. Yes, waste is an issue; a big issue. It is a key drawback of nuclear and quite terrifying. However, it is not insurmountable and other countries deal with it. Wind and solar farms are not without their issues either. Many are polluting the landscape, as far as the eye can see, and the noise generated by the turbines is quite literally sending people mad in the farms near where they are located. We in the city are pretty comfortable to defend our rights with the Not In My Back Yard (NIMBY) mentality, what about the poor farmers who have to deal with these massive renewable farms and simply get no choice on the matter after living in these regions for generations?

Australia’s current Energy sources

When we look at Australian energy – the following charts show the source of Australian energy over the past 57 years, plus a projection of what might happen to 2030 assuming aggressive buildout of renewables to replace coal.

Some facts:

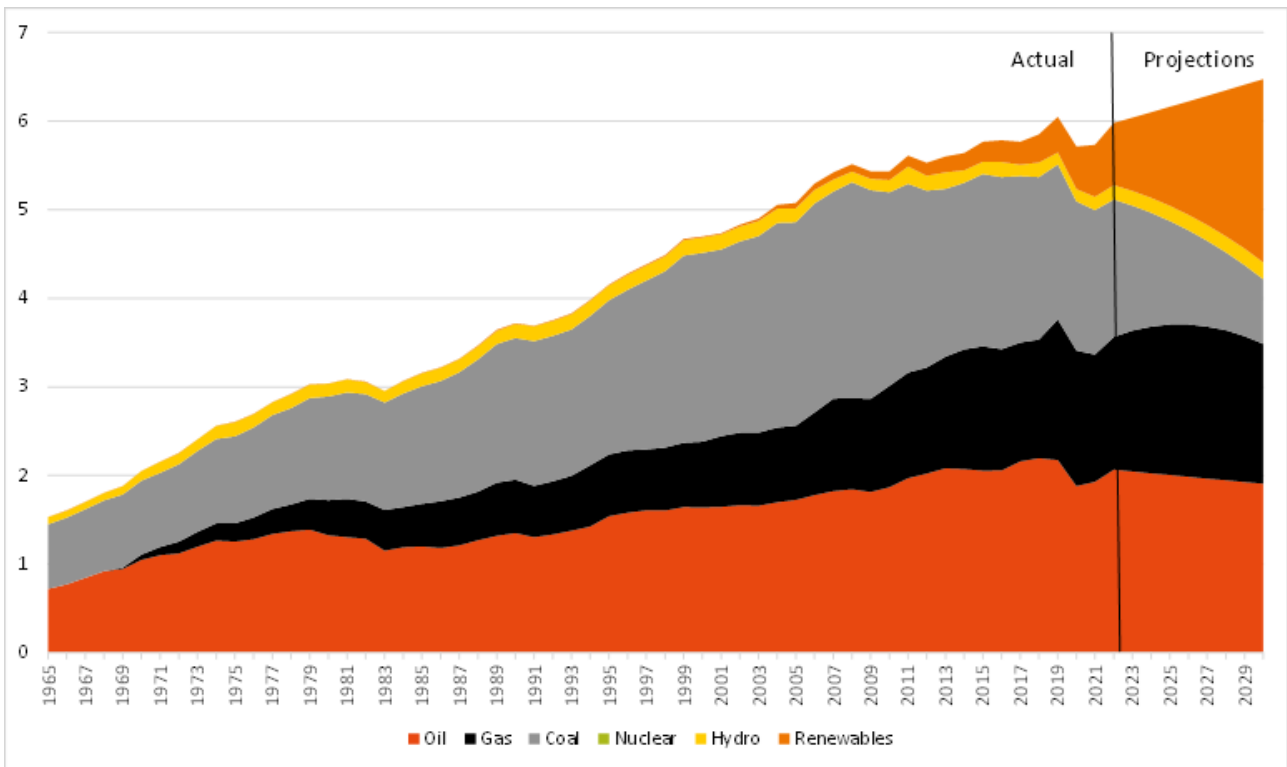
1. Fossil fuels currently represent 86% of Australia’s energy requirements – down from 96% in 2010.
2. Renewables currently represent 12% of Australia’s energy requirements – up from 2% in 2010.
3. Renewable penetration hit an inflexion point in 2017 – installed wind and solar capacity has increased 171% in the past six years. It grew 8% in 2022.

There could be a realistic pathway to renewables reaching 32% of our energy requirements by 2030 – but this will require an acceleration in our rate of renewable installation. Even if that was achieved, fossil fuel would still be 65% of our energy mix.

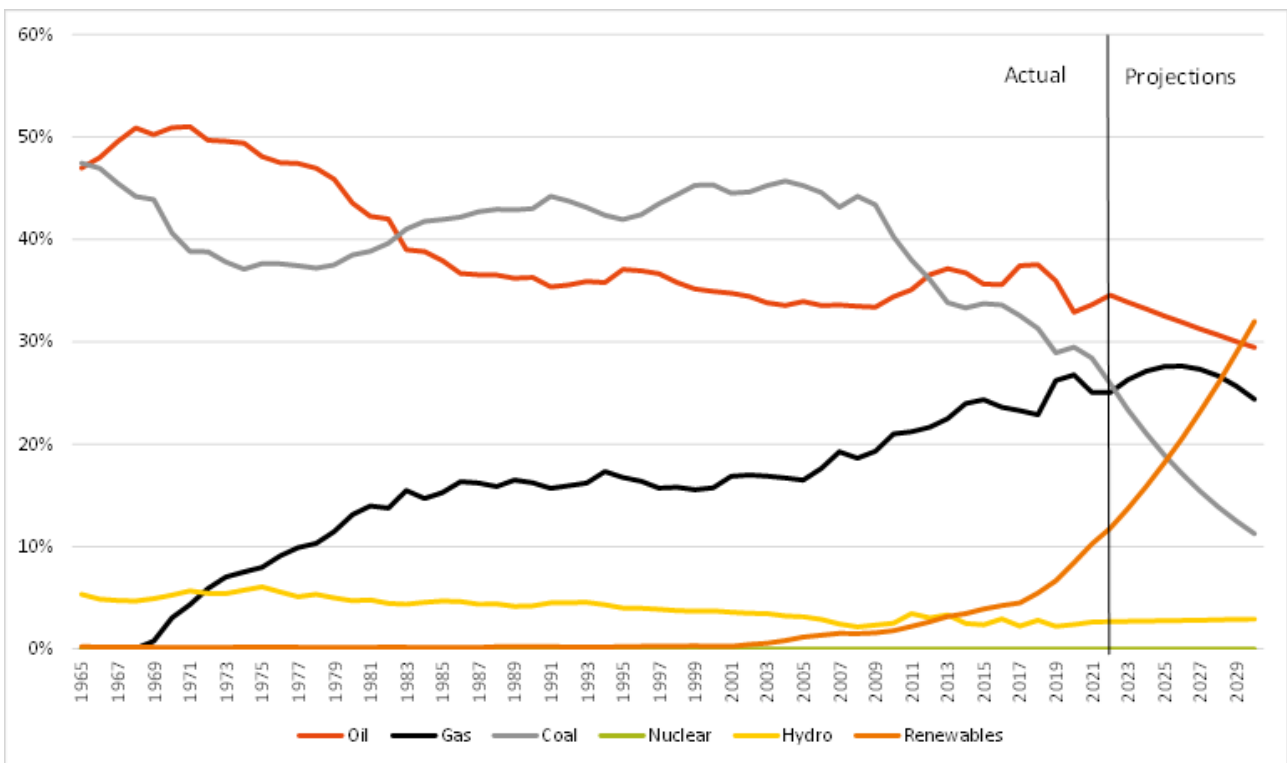
Nuclear will not solve the problem this decade, but our energy transition is going to take well more than a decade and nuclear could become baseload power replacing coal and gas by the mid-2030s if there was a will.

We need base load power. Renewables do not provide base load power.

Australian Energy Consumption by Energy Source (EJ)



Australian Energy Consumption by Energy Source (% of total)



Blackouts are coming

And then on Thursday this week, the Australian Energy Markets Operator (AEMO) stated that extending the life of Origin Energy’s 2800-megawatt Eraring coal-fired power station in NSW by two years would significantly ease pressure on the electricity grid, to help avoid potential blackouts. It has indicated that even as soon as this coming Summer, Victoria and South Australia could endure ‘reliability problems’ resulting in blackouts.

And then, after a crazy hot Northern Hemisphere Summer, Australia has just closed out one of the hottest Winter periods on record:

Winter 2023 breaks records

Hobart and Adelaide registered their warmest winter on record based off the mean temperature (average of all minimums and maximums) with data extending well back into the 1800s.

2023 Winter Temperature for Australia's Capitals

Mean = average of minimums & maximums

City	2023 Mean	Long-term Average	Record	2023 Rank	Site Opened
Adelaide	13.1C	11.86C	12.9C (2009)	1st	1887
Brisbane	17.6C	15.82C	17.7C (2019)	2nd	1887
Canberra	7.8C	6.5C	8.0C (2013)	2nd	1939
Hobart	10.6C	8.7C	10.1C (1988)	1st	1882
Melbourne	12.1C	10.4C	12.2C (2005/2013)	equal 3rd	1855
Perth	13.6C	13.7C	15.3C (1983)	67th	1897
Sydney	14.7C	13.0C	15.0C (2013)	2nd	1859
Darwin	26.7C	25.4C	26.9C (1998)	equal 3rd	1941

We are in a right pickle and the opportunity for us to pull together and find a unified solution is predictably and infuriatingly being drawn down political lines.

Are temperatures rising? Maybe.

Is it a result of human activity? Maybe. I don't know, and I'm certainly not going to insult your intelligence by claiming I truly understand what's going on. My two bob's worth is simply that the potential ramifications of being wrong and not acting are too great.

Hopefully sanity prevails and we start to unite on globally significant issues- just like we didn't with a Global pandemic-..., but with money, power and egos on the line, I'm not holding my breath.

Uranium price forecasts

- The uranium sector has entered the next phase of its recovery post Fukushima. Utilities are back buying uranium in large volumes in the term contract market with pricing continuing to ratchet up. We expect to see term contracts being signed above US\$60/lb in 2H23, approaching US\$70/lb in 2024 and over US\$80/lb in 2025.
- Demand for uranium is growing again – governments around the world have realised that decarbonisation requires a strong contribution from nuclear energy. Renewables will be limited by transmission, battery and firming capacity. New reactors are being built in multiple countries – led by China.
- The uranium market remains in a structurally large supply deficit (~40Mlbpa) and requires significant new investment in mine capacity. That investment won't happen without the right incentive price – which for large greenfield projects is likely to be above US\$80/lb.
- The spot uranium market is now dominated by financial buyers – very little uranium is bought/sold by utilities on the spot market. That means that although movements in the spot will continue to create volatility in uranium equities, the real action is in the term contract market.

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Financial Planning Weekly

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Intergenerational Report 2023

Click on the link below to read

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Have a good weekend,
Ben and the team.

This report has been prepared by Ben Morrissey

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