The nuclear debate - again

Model of Hinckley Point Nuclear Power Station

The coalition's recent declaration of support for nuclear energy is strange given the long history of debate and false starts in Australia, neatly summarised by Crikey[1].

Way back in 1970 the Gorton government proposed a nuclear plant for Jervis Bay, which was dropped by his successor Billy McMahon. In the late 1970s WA premier Charles Court set the (then) State Electricity Commission off to find sites and even bought land near Cape Bouvard, south of Perth. Nothing came of it. A Liberal government in Victoria also dallied with the idea but then lost the 1982 election to Labor who legislated to ban nuclear energy in the state. The Howard government revisited the subject prior to the 2007 election and commissioned a study by Ziggy Switkowski (a nuclear physicist). Unfortunately for the nuclear supporters his report showed nuclear power would not be cost competitive, even with coal. The South Australia government set up a royal commission in 2015 that found "it would not be commercially viable to develop a nuclear power plant in South Australia beyond 2030 under current market rules".

Of course, it is not just the cost of nuclear energy that is relevant. The country with the longest history of nuclear energy is the UK[2]. The first plant was built at Calder Hall in 1956 by Taylor Woodrow (my first employer) and operated until 2003. According to the World Nuclear Association[3] there are 9 operable reactors in the UK (capacity 5,880 MWe), 2 reactors under construction (each 1,930 MWe) and 36 reactors have been shut down. The 2 new reactors at Hinckley Point in Somerset were licensed in 2012 and construction commenced in 2017 and the

[1] https://www.crikey.com.au/2024/03/22/peter-dutton-australia-nuclear-history/
[2] https://world-nuclear.org/information-library/appendices/nuclear-development-in-the-united-kingdom
[3] https://world-nuclear.org/information-library/country-profiles/countries-t-z/united-kingdom

latest[4] is that it will be completed sometime between 2029-2031, some 17-19 years after a licence was granted. Even if the pandemic added 2 years to the schedule that means around 15-17 years for the country with the longest history of nuclear energy. Final cost estimated at £46 billion (AUD 87 billion). The first nuclear related legislation was enacted in 1947, 9 years before Calder Hall, and there is now a plethora of regulatory agencies with jurisdiction over some aspect of nuclear energy and waste under the Nuclear Installations Act 1965, including for the licensing of nuclear installations (Health and Safety Executive (HSE), statutory safety requirements (the Nuclear Installations Inspectorate (NII), and various others. This regulatory structure would take years to establish in Australia even if we copied other countries. If we say five years from a Dutton government elected in 2025, we have the first reactor built by 2045-47, longer than the period quoted recently by CSIRO[5] for a smaller plant. If this was of the same scale as the Hinckley Point plant its capacity would be around 1.5% of the required capacity in the National Electricity Market by then (around 250,000 MW)[6]. These are massive, highly complex projects so the likelihood of having engineering capacity to build several at a time is negligible. There is simply no way nuclear could contribute to Australia's required trajectory to meet a Net Zero by 2050 timeline.

And then there is the question of nuclear waste. Australia has been trying to establish a low level radioactive waste repository for decades. In the latest effort some 40 sites across Australia were considered and in 2021 the government announced Kimba in South Australia as the proposed site for the facility. The traditional owners (the Barngarla Determination Aboriginal Corporation) challenged the declaration in Federal Court who set aside the declaration. In 2023 the government said it was no longer pursuing Kimba as a potential site, nor other shortlisted sites.

Storing low level radioactive waste is trivial in comparison to storing spent fuel rods from nuclear power stations. However, despite 70 years of nuclear energy generation globally there is at this moment no permanent repository for high level nuclear waste. That's right – not one. In fact Finland, Sweden and France are the only countries with sites selected. Finland is the only country with a project under construction which is due to open in the mid 2020s at Olkiluoto, an island off Finland's west coast[7]. Finland has only 2,300 tonnes of waste (2019 figure), while there is about 263,000 tonnes of spent fuel in interim storage facilities worldwide. The U.S. alone has around 85,000 tonnes of spent nuclear fuel from commercial nuclear power plants and 90 million gallons of radioactive waste from the nation's nuclear weapons program[8]. After years of planning and partial construction, the proposed permanent storage facility under Yucca Mountain in Nevada was abandoned by the Obama administration. It would likely take longer to build a permanent waste storage facility in Australia than a nuclear power station, even if a site acceptable to aboriginal people could be found.

There are more challenges to building a nuclear industry in Australia not covered above, including:

- the massive cost relative to all other options, including renewables;

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[4] https://en.wikipedia.org/wiki/Hinkley_Point_C_nuclear_power_station
[5] https://www.csiro.au/en/news/All/News/2024/May/CSIRO-releases-2023-24-GenCost-report
[6] https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf
[7] https://www.science.org/content/article/finland-built-tomb-store-nuclear-waste-can-it-survive-100000-years
[8] https://www.gao.gov/nuclear-waste-disposal

- finding a location for plants with permanent access to cooling water;
- the costly and time consuming process of decommissioning plants[9]; and
- convincing Australians that the safety risk associated with both plants (remember Fukushima) and nuclear waste is manageable.

The coalition might continue to run with the fantasy of nuclear without answering all these questions up to the next election but if they win that won't be sustainable.

[9] https://www.eia.gov/todayinenergy/detail.php?id=33792