

NUCLEAR POWER: TOO SLOW, TOO RISKY, TOO EXPENSIVE

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Introducing nuclear power to Australia would not help reduce greenhouse emissions. It would worsen the problem by diverting resources away from cheaper, faster, safer solutions: renewables coupled to energy efficiency and conservation programs.

Nuclear power is:

- **Too slow:** Nuclear power could only *begin* contributing to climate change abatement in Australia in the late 2050s
- **Too risky:** Nuclear power poses unique risks: the proliferation of weapons of mass destruction; trillion-dollar accidents resulting in thousands of deaths and the evacuation of hundreds of thousands of people; and the risk of catastrophic disasters resulting from military attacks on nuclear plants.
- **Too expensive:** Nuclear power is far more expensive than renewables plus integration costs (storage, transmission and synchronous condensers).

TOO SLOW

Nuclear power could only *begin* contributing to climate change abatement in the late 2050s:

- * 10 years to gain political support for nuclear power in Australia + repeal of legal bans (those bans were enacted under the Howard government and retained by the Abbott, Turnbull and Morrison Coalition governments)
- * 10 years for planning, site selection, licensing approvals
- * 10 years for reactor construction
- * 6.5 years to repay the energy/carbon debt from construction

So nuclear power could only *begin* contributing to climate change abatement in the late 2050s ... and only then if nuclear power displaces fossil fuels.

TOO RISKY #1: WEAPONS PROLIFERATION

After decades of deceit and denial, the nuclear power industry now openly acknowledges its contribution to weapons proliferation and its support for weapons programs. That support is being used to justify greater subsidies for troubled nuclear power industries in the UK, the US, France and elsewhere.

The use of civil nuclear facilities and materials for weapons research or weapons programs has occurred in over 20 countries. Five of the ten countries that

produced nuclear weapons did so under cover of a 'peaceful' nuclear program.

Nuclear warfare has the potential to cause catastrophic climate change (nuclear winter) by lifting vast amounts of aerosols, smoke, soot and dust into the atmosphere. Fossil fuel burning is the surest route to climate catastrophe; nuclear warfare is the fastest route.

TOO RISKY #2: ATTACKS ON NUCLEAR PLANTS

Nuclear facilities have been targeted by adversarial nation-states to prevent the use of those facilities in weapons programs. Examples include: 1981 – Israel destroyed a research reactor in Iraq; 1980-88 – Iran and Iraq targeted each other's nuclear sites; 1991 – US destroyed a research reactor in Iraq; 2007 - Israel attacked a research reactor in Syria.

Since Feb. 2022, Russia has attacked and seized nuclear power sites in Ukraine, and bombed other nuclear facilities. Disrupted electricity supply to the operating Zaporizhzhia nuclear power plant has been the biggest risk so far: off-site [power has been lost 6 times as of March 2023. A constant supply of power and cooling water is essential to prevent nuclear meltdowns.

In a worst-case scenario, war between two nuclear-powered nations could result in multiple Chernobyl or Fukushima-scale nuclear disasters on top of all the non-nuclear horrors of war.

TOO RISKY #3: TRILLION-DOLLAR ACCIDENTS

The economic costs of the Chernobyl and Fukushima disasters amounted to around A\$1 trillion each. In Australia, that equates to \$40,000 for every single citizen.

Over half a million people were evacuated after the Chernobyl (350,000) and Fukushima (160,000) disasters.

The lowest scientific estimate of the Chernobyl cancer death toll across Europe is the estimate of 16,000 deaths (*International Journal of Cancer*)

Radioactive fallout from Fukushima will cause around 5,000 fatal cancers, in addition to the indirect death toll of at least 2,000 people resulting from the botched evacuation and mistreatment of evacuees.

TOO EXPENSIVE

Wind and solar PV became cheaper than nuclear power a decade ago and the gap continues to widen. Nuclear power has been stagnant for the past 30 years. In percentage terms, nuclear has fallen from a peak of 17.5% of global electricity generation to 9.4% now. Renewables have grown to 29% and the International Energy Agency expects growth to 38% in 2027.

Research by the CSIRO and the Australian Energy Market Operator demonstrates that nuclear power is far more expensive than renewables plus integration costs (storage and transmission and synchronous condensers).

In its 2021 GenCost report, CSIRO provides these 2030 cost estimates:

- Nuclear (small modular reactors): A\$128–322 / MWh
- 90% wind and solar PV with integration costs: A\$55–80 / MWh

The South Australian Nuclear Fuel Cycle Royal Commission estimated a cost of A\$225 / MWh for power produced by small modular reactors (SMR). Yet the Minerals Council of Australia states that a cost of \$60–80 / MWh would need to be obtained for SMRs to be economically competitive.

Russia's SMR – one of only two in the entire world – produces power at a wildly uneconomic cost of A\$288 (US\$200) / MWh.

South Australia already averages 67% renewable electricity supply and is on track to meet its target of 100% net renewable electricity supply by 2030.

The federal Department of Industry, Science, Energy and Resources expects 69% renewable supply to the National Electricity Market by 2030.

The Climate Council of Australia – comprising Australia's leading climate scientists – noted in a 2019 briefing paper that nuclear power is "not appropriate for Australia – and probably never will be." The briefing paper states: "Nuclear power stations are highly controversial, can't be built under existing law in any Australian state or territory, are a more expensive source of power than renewable energy, and present significant challenges in terms of the storage and transport of nuclear waste, and use of water."

COULD 'ADVANCED' OR 'GENERATION IV' NUCLEAR POWER COME TO THE RESCUE?

In a word: NO!

Old, failed Generation I technology is being dressed up as 'advanced' or 'Generation IV' technology.

- Fusion ... decades away from being commercially viable – if ever.

- Thorium ... much the same as uranium ... still produces long-lived nuclear wastes, could have catastrophic meltdowns, produces uranium-233 which can be and has been used in nuclear weapons.
- Small Modular Reactors ... not new ... do not reduce safety or proliferation risks ... more expensive than large nuclear reactors per unit of energy produced and far more expensive than renewables ... used in some cases to power fossil fuel mining (e.g. Russia's floating plant in the Arctic).
- Fast Breeder Reactors ... not new ... in theory they could reduce weapons and waste risks but in reality they do the opposite ... only half a dozen trial reactors after 70 years of R&D ... expensive and accident-prone.

The poor track record of these (and other) nuclear power concepts explains the paucity of investment from both governments and industry.

NUCLEAR WASTE

Worldwide number of operating repositories (dumps) for high-level nuclear waste from nuclear power: zero. One underground dump for intermediate level waste in the US state of Georgia (called 'WIPP'): chemical explosion in 2014 due to staggering mismanagement, cost-cutting and lax regulatory oversight.

MORE INFORMATION

dont-nuke-the-climate.org.au (including useful 'myth busting' info)

facebook.com/dontnukeaus

twitter.com/dontnuke

dont-nuke-the-climate.org (international)

nuclear.foe.org.au/climate, /economics, /power, /fusion, /thorium, /smr (small modular reactors), /fast-breeder-reactors, /racism

Climate Council of Australia, 2019, 'Nuclear Power Stations are Not Appropriate for Australia – and Probably Never Will Be', climatecouncil.org.au

RenewEconomy, 23 Oct 2019, 'Why the nuclear lobby makes stuff up about the cost of wind and solar', reneweconomy.com.au

Detailed joint ENGO submission to 2023 Senate inquiry: <https://tinyurl.com/nukes-no-solution>