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2022 Senate Inquiry into Nuclear Power

My first employment, after completing my PhD in surface physics from Southampton University, was to work as a research officer at Berkeley Nuclear Research Laboratories. These were located adjacent to the Berkeley Nuclear Power Station. This gave me a life-long interest in the industry and the controversies associated with it.

I find it hard to believe that the issue of Nuclear Power in Australia has come back to the Senate. From an energy point of view it is unbelievable that a country with such abundant sources of renewable energy should even contemplate using nuclear energy. Nuclear power is the most expensive, inflexible, complex and socially problematic source of energy. All that massive infrastructure with its associated safety and security measures built just to boil water.

Re-engineering a nuclear bomb to generate heat in a controlled and safe manner may have been an extraordinary feat of engineering and optimism in the 1950s, but technology has moved on. Nuclear Power is an inappropriate, unnecessary and potentially dangerous choice for Australia for the reasons outlined below.

1 Too slow and too expensive

Nuclear power has never been cheap despite the initial vision of nuclear energy as “too cheap to meter”. It has very large upfront costs, is plagued by delays and cost over-runs. While the costs of renewables are decreasing, the cost of nuclear is increasing.

The high profile and controversial nature of nuclear power would divert attention, funds and focus from renewables to nuclear. The world cannot afford any more delays in reducing carbon dioxide emissions.

2 Lessons from recent world-wide extreme weather events

The impacts of global warming can no longer be dismissed as a future problem. Records are now being broken on a regular basis. The last two years have been particularly brutal with extreme temperatures, intense wild fires, droughts and floods across the world. Using only historic data to predict future weather is no longer sufficient. This would have a very major impact on site selection, the safe operation and emergency planning for any nuclear power plant.

3 Unacknowledged social impacts

The presence of a nuclear power station in an area would alter the risk profile of the area for those in the vicinity and pose an additional psychological stress on residents. In addition to bush fire and flood preparedness plans, residents would need to have nuclear accident preparedness plans. These are not necessarily compatible. Local authorities would need response plans for minor and major nuclear accidents.

If the power plant site is in a country area, which is likely, then there is an additional problem. Country areas, in WA for example, rely on a large volunteer component in fire and ambulance services. Will volunteers wish to serve in an area which includes a Nuclear Power Station? How will they be protected? How will they be trained?

4a Adverse environmental impacts - normal operation

The environmental case for nuclear power appears to be based on its low carbon dioxide emissions while operating without incident, compared to the carbon dioxide emissions from a fossil fuel plant. This is correct but incomplete. It compares one yet-to-be-built working nuclear power plant with an operating fossil fuel power plant. But their life cycles are very different. The public relations material ignores some or all of the emissions from the following:

- Site preparation
- Construction
- Water supply
- Storage of spent fuel rods
- Decommissioning including the treatment of the highly radioactive pressure vessel and shielding (*while the reactor is operating, the fuel vessel and shielding are constantly under neutron bombardment from the core, hence becoming highly radioactive*).
- Long term storage and monitoring of radioactive waste.

4b Adverse environmental impacts - accidents

In the case of a major nuclear accidents (e.g. Chernobyl and Fukushima) all energy benefits while operating became insignificant compared to the energy used to deal with the aftermath of the accident. These include the energy costs of making the reactor safe and monitoring it for an innumerable years, site and area rehabilitation, relocating residents and broader health costs.

The probability of a weather related nuclear accident has been made greater by the changes in climate with extreme weather events more likely.

Accidents release radioactive isotopes into the environment. These can expose plants and animals to external radiation. If ingested, then they can be absorbed into body tissue and irradiate the body from inside.

Our environment is under enormous threat from human impact and climate change. It does not need another threat.

5 Security issues

The war in Ukraine has brought into sharp focus, the reality of having a nuclear power station in a country when under attack . It is not an asset that adds to a country's security, so why would we choose to have nuclear power stations that we do not need?

In addition, the presence of enriched uranium in the country broadens the range of possible terrorism threats. Extra security then becomes an added expense for the taxpayer.

6 Ethical issues - intergenerational equity and resource sharing

Should a nuclear power station be built and assuming the station is accident free, then the current population would get the advantage of the power generated. Future generations would be bequeathed the costs. They would inherit responsibility for

decommissioning (if not already done) looking after the waste, maintaining its security from terrorists and monitoring containment, all the while living with the impacts of climate change. This lacks intergenerational equity and is not acceptable.

Uranium is a finite resource. As world citizens with an abundant supply of renewables, we should not be using Uranium for our power. Uranium should be reserved for countries that have few or no alternatives.

If we with our enormous renewable resources choose to use nuclear, what message about renewables are we sending to our Pacific neighbours? What message does it send about our concern for their wellbeing if they could be down-wind from a possible nuclear accident?

7 Conclusion

Nuclear Power is an inappropriate and unnecessary choice for Australia. It fails on economic, social, and environmental grounds and is ethically indefensible. I call upon all politicians to reject nuclear power.