Inquiry Name: Inquiry into Nuclear Prohibition

Mr Frank Simpson

SUBMISSION CONTENT:

--

Dear Committee Members,
I submit to the Committee, based upon the facts below together with the attachment that the Act should not be amended to permit exploration for or the mining of uranium and thorium (derived from monozite or thorianite). . Such activities need to be prohibited.

(1) The potential for Victoria to contribute to global low carbon dioxide energy production through enabling exploration and production of uranium and thorium.
Amendment of the Act to enable exploration and production of uranium and thorium will enable the establishment of nuclear power plants. Nuclear power plants have no place in Victoria or Globally because of
- Cost,https://www.bettermeetsreality.com/the-cost-of-renewable-energy-solar-wind-hydro-etc-vs-fossil-fuels-nuclear/
Capital Costs

Refer to this resource for a list of the different energy sources and their estimated capital costs (cost to construct) – https://en.wikipedia.org/wiki/Cost_of_electricity_by_source#Levelized_cost_of_electricity

From cheapest to most expensive:

gas/oil combined cycle power plant – $1000/kW
onshore wind – $1600/kW
solar PV (fixed) – $1060/kW (utility), $1800/kW
solar PV (tracking)- $1130/kW (utility) $2000/kW
battery storage – $2000/kW
conventional hydropower – $2680/kW
geothermal – $2800/kW
coal (with SO2 and NOx controls)- $3500-3800/kW
advanced nuclear – $6000/kW
offshore wind – $6500/kW
fuel cells – $7200/kW
Upfront costs of renewables can be expensive, but the lifetime costs drop renewable energy sources to the same

level of cheaper than fossil fuels
Read more at https://www.ucsusa.org/clean-energy/renewable-energy/barriers-to-renewable-energy#bf-toc-0
An estimate of the LCOE of different energy sources in the US in 2018 was:

Hydro – 39.1 (LCOE in $/MWh)
Solar PV – 45.7
On Shore Wind – 49.8
Gas Combined Cycle – 46.3-67.5
Nuclear – 77.5
Biomass – 92.2
Coal – 98.6-104.3

The full table and supporting information can be accessed at https://en.wikipedia.org/wiki/Electricity_pricing
Australia has the lowest cost for solar PV and Africa has the highest due to investment costs
South Australia, along with China has the lowest unsubsidised, levelised cost of energy (LCOE) for concentrating solar power.
Now, in Australia, coal fired power stations and gas turbines cost more to produce electricity compared to solar farms, when built from brand new]
[Capital investment costs for fossil fuel plants compared to 60 years ago are very different]

– abc.net.au

[in the future, a carbon price in Australia could put super critical and ultra critical coal plants up to a LCOE of around $100 per MWh $80 per MWh … and this is in comparison to a completely renewable electricity system at $75-80 per MWh]

– theconversation.com

- Water Usage & Fish Life Impacts in Mining to Nuclear Power Plant operation
https://www.ucsusa.org/resources/water-nuclear
The nuclear power cycle uses water in three major ways: extracting and processing uranium fuel, producing electricity, and controlling wastes and risks.
Processing uranium requires mining, milling, enrichment, and fuel fabrication, all of which use significant quantities of water.

Water-related risk management

The main difference between nuclear reactor types is that pressurized water reactors keep the boiler water separate from the reactor, which allows this water to be kept free of radioactivity.[12] Nuclear cooling systems are designed so that if pipes begin to leak, local water runs into the plant rather than radioactive water leaking out. Radioactively contaminated water can then be discharged to local water sources after treatment in “liquid radwaste systems” if radioactive discharges are below federal limits.

In the event of a serious accident, such as an overheated reactor, a nuclear power plant is required by federal regulation to have an emergency supply of water that can continue to cool the plant for at least 30 days. These water sources, called Ultimate Heat Sinks (UHS), are used to cool the reactor, which will continue to produce heat long after it is turned off. During an accident, a UHS may need to supply 10,000 to 30,000 gallons of water per minute for emergency cooling. A UHS can be the same water source used for power plant cooling (lake, river, or ocean) or it can be a separate, dedicated water supply.

When nuclear plants draw water from natural water sources, fish and other wildlife get caught in the cooling system water intake structures. While this is an issue for all power plants with water-cooled systems, a study completed in 2005 in Southern California indicates that the problem is more acute for nuclear facilities. The study investigated impacts from 11 coastal power plants and estimated that in 2003, a single nuclear plant killed close to 3.5 million fish--32 times more than the combined impact of all of the other plants in the study.
Waste storage

After being removed from the reactor, the nuclear fuel is still very hot and requires storage both to cool down and to control the risks of radiation poisoning. This stage can last as long as 15 years.[16] Water-based storage pools are a common way to cool spent uranium fuel bundles after they are used in nuclear reactors, though air-cooling can also be used. These systems consume limited amounts of water through evaporation.
Nuclear plants as a whole withdraw and consume more water per unit of electricity produced than coal plants using similar cooling technologies because nuclear plants operate at a lower temperature and lower turbine efficiency, and do not lose heat via smokestacks.Dry cooling is not currently used in nuclear power generation due to safety risks of using dry-cooled technology with nuclear reactors [4] and the high costs of operating large dry-cooling fans.
In addition to cooling the steam, nuclear power plants also use water in a way that no other plant does: to keep the reactor core and used fuel rods cool. To avoid potentially catastrophic failure, these systems need to be kept running at all times, even when the plant is closed for refueling.

(2) There are no Economic, environmental and social benefits for Victoria,in including those related to exploration and mining;of uranium & thorium because :
Risks In Mining Uranium http://large.stanford.edu/courses/2017/ph241/longstaff1/
Uranium mining facilities produce tailings that generally are disposed of in near surface impoundments close to the mine. These tailings pose serious environmental and health risks in the form of Randon emission, windblown dust dispersal and leaching of contaminants including heavy metals and arsenic into the water. [5] Historically in many countries around the world these risks have been politicized as they have disproportionately affected low income and minority populations. For example, from 1944-1986 the United States extracted 4 million tons of Uranium ore from and left 500 abandoned mines in native Navajo territories. In that time the rates of lung cancer and other diseases effecting Navajo living near the mine rose drastically. [5] While the Navajo eventually were able to ban mining on their land these problems still exist within other communities today and should not be overlooked in considering the future of Uranium mines.
Water Usage https://www.ucsusa.org/resources/water-nuclear
Mining – Uranium mining consumes one to six gallons of water per million Btus of thermal energy output, depending on the mining method.[6] Mining uranium also produces waste that can contaminate local water sources, and which can be especially dangerous given the radioactivity of some of the materials involved.
Processing – Uranium processing consumes seven to eight gallons of water for every million Btus of thermal output.[7],[8]
Milling – The milling process uses a mix of liquid chemicals to increase the fuel's uranium content ; milling leaves behind uranium-depleted ore that must be placed in settling ponds to evaporate the milling liquids.[9]
Enrichment – The next step, enriching the gaseous uranium to make it more effective as a fuel accounts for about half of the water consumed in uranium processing. The conventional enrichment method in the United States is gas diffusion, which uses significantly more water than the gas centrifuge approach popular in Europe[10],[11]
Fuel Fabrication – Fabrication involves bundling the enriched uranium into fuel rods in preparation for the nuclear reactor.
Risk in contaminating a prime green food producing region of Victoria.

(3) This implies all stages of the fuel cycle from exploration to waste repository storage. Victoria does not need o participate in the nuclear fuel cycle.for the reasons given in 1 & 2 above plus waste repository storage risks as per https://www.ucsusa.org/resources/nuclear-waste are:
Nuclear fuel remains dangerously radioactive for thousands of years after it is no longer useful in a commercial reactor. The resulting waste disposal problem has become a major challenge for policymakers as the search for a repository site has stalled, with no resolution likely in the near future.
The Union Of Concerned Scientists opposes reprocessing because it increases proliferation and terrorism risks while actually adding to the waste problem rather than reducing it.
https://greentumble.com/nuclear-waste-storage-and-disposal-problems/
in reality there is no such thing as a safe exposure to nuclear waste and the poisonous radiation it produces.
Because of its tremendous toxicity, which will make it lethal for tens of thousands of years or longer, high-level nuclear waste is not fit for conventional disposal. It must be stored in safe, secure locations, in durable containers that won't crack, leak, or be vulnerable to damage from bombs, earthquakes, or high-powered weapons used in military or terrorist attacks.
Conclusion
based upon the above facts The Act should not be amended to permit exploration for or the mining of uranium and thorium (derived from monozite or thorianite). . Such activities need to be prohibited.

--

File1: 5e3ec8f17c74a-Nuclear Vic.docx

File2:

File3:

Dear Committee Members,

I submit the following for your information & deliberation:

1. Waste management, transport and storage.
As [per https://evatt.org.au/papers/nuclear-power-public-health.html
The average nuclear power reactor produces 300 m3 of low and intermediate level waste and some 30 tonnes of high level solid packed waste per year.

It is a serious issue that has definitely not been solved as most radioactive material has a half life between 10,000 and 1,000,000 years. In other words, we not only have to ensure that these final resting places for such dangerous materials keep us and our children safe, but also thousands of generations down the line.
The risks in storing radioactive wastes or material areas per https://www.conserve-energy-future.com/dangers-and-effects-of-nuclear-waste-disposal.php
- Accidents due to incorrect disposal resulting in dispersal of radioactive material in dust to human & animal populated areas & surface & underground water contamination.
- Scavenging
- Transportation accidents & I add security issues during transportation
- Health effects to humans & wildlife due to especially, long term radiation exposure
- Accident clean up expense is very high
- Also I add siting a repository is complex, costly & at risk of some event like an earthquake or flooding etc. Due to the complexity of the problem and the long time periods considered, the ability of a repository to retain radioactivity has a significant degree of uncertainty. per https://evatt.org.au/papers/nuclear-power-public-health.html

2. Health and safety as per https://evatt.org.au/papers/nuclear-power-public-health.html
- Peter Karamoskos
... there is a linear dose-response relationship between exposure to ionizing radiation and the development of solid cancers in humans. It is unlikely that there is a threshold below which cancers are not induced.
- National Academy of Science, BEIR VII report, 2006.
We now have voluminous evidence of public health risks of low levels of ionising radiation, even within occupational regulatory limits. We also know that there is no 'safe' level of radiation exposure below which radiation does not lead to a risk of cancer - there is no safe threshold. Although the measured doses on surrounding populations from nuclear power plants are very low, we also have strong evidence of a link between increased rates of childhood leukaemia and proximity to nuclear plants. We acknowledge that nuclear power reactors operate within a nuclear fuel chain that commences with mining of uranium and ends with decommissioning of nuclear reactors, with occupational risks at every step. The long association with uranium mining and lung cancer is unequivocal, due to radon gas exposure. Recent evidence points to radon gas being twice as hazardous as first thought. There is also increasing evidence of an increased rate of solid cancers in nuclear industry workers throughout the nuclear fuel chain proportional to their radiation dose.
The likelihood of core melt and containment failure had been underestimated: the accidents in Chernobyl and Fukushima amount to catastrophic meltdown in four nuclear reactors over the past few decades, more than originally assumed. Furthermore, given that, in the history of nuclear energy, 582 reactors have operated for a total of 14,400 years (counting each year of operation by one reactor as a reactor-year), a core-damage accident has happened once every 1,309 years of operation with a total of 12 core melts. With 439 reactors now operating worldwide, the rate would yield a core melt an average of once every three calendar years, and a major accident with release of radioactivity once every 9 years per https://evatt.org.au/papers/fukushima-beyond.html

Per https://truthout.org/articles/nuclear-roulette-the-truth-about-the-most-dangerous-energy-source-on-earth/ Small modular reactor. These "mini-nukes" could be housed inside a two-car garage but would probably be placed underground. Dispersing these small reactors across the landscape would increase security risks, magnify supply-and-transportation hazards, and do nothing to reduce the danger of reactor accidents and routine releases of radioactivity. Let's be clear: nuclear plants don't generate electricity. They produce only three things: vast amounts of heat (which is used to spin the turbines that generate electricity), radioactive fallout (in the form of "permissible" leaks that have been linked to thyroid tumors and childhood leukemia) and tons of radioactive garbage.
Recently, nuclear power has been promoted as a clean alternative to fossil fuels, but even if atomic power were carbon-free (which it is not), relying on nuclear to eliminate even of the world's climate-warming CO_2 emissions would require building 32 new reactors a year. That's not gonna happen.
3. Environmental impacts – Refer to 1 & 2 above & I add the following the well known impacts of the Chernobyl & Fukushima where large land areas are unusable & uninhabited.

4. Energy affordability and reliability
As per https://www.energyandcapital.com/articles/why-investors-should-forget-about-nuclear-power/93263 ($ are in US$)
If you look at the levelized cost of nuclear power compared to other energy sources, it's incredibly high.
The minimum cost per megawatt-hour to build a new nuclear power plant is $112. For natural gas, it's about $40.
Throw renewable energy into the mix, and you get $46 for utility-scale solar and $30 for wind. Although even with the integration of cheaper battery storage and new energy intelligence technology, eventually solar and wind's intermittency issues will become irrelevant, thereby making continued investment in nuclear even harder to justify.
As per https://truthout.org/articles/nuclear-roulette-the-truth-about-the-most-dangerous-energy-source-on-earth/
Nuclear power is inherently unreliable because reactors must be regularly shut down to replace used fuel assemblies. Reactors also experience "unplanned shutdowns," which means they can be offline more than 10 percent of the time. Nuclear reactors are not energy efficient. They produce far more heat than they can possibly use. I also add nuclear reactors require water for cooling & recently one had to power down because the water was too warm. Also cost over runs & construction delays Re U.K Hinckley C. Also plant decommissioning is long & costly .
5. Economic feasibility See 4 above.
6. Workforce capability No or little workforce capability presently in all areas.
7. Security implications See 1 & 2 above.
Need constant security & properly trained security personnel. The U.K has a Nuclear Constabulary.
8. Other
Per https://truthout.org/articles/nuclear-roulette-the-truth-about-the-most-dangerous-energy-source-on-earth/

The world is not only running out of cheaply obtainable fossil fuels; we're also running out of high-grade uranium ore. Because all these mineral resources are finite, some kind of transition is inevitable. The only question is, how much damage will we inflict on human and planetary health in the meantime?
I add:
Government subsidies required to decrease & hide real costs.
Government & industry mis-information, lies, cover up & delayed information especially when an adverse event occurs.