

My name is Fraser Maywood, chair at Sustainable Energy Now (SEN) for the past 3 years.

SEN is a WA member based, independent clean energy advocate formed in 2006 and run by volunteers. We have a growing membership of over 100, over 2,000 followers on LinkedIn and email subscribers.

From a practical systems engineering approach we don't support nuclear power in Australia

A rational and transparent process prioritises options with the lowest economic, environmental, technological and safety risks given the applicable geo-political and technical context. Higher-risk options, like new nuclear, should only be considered where it can be clearly demonstrated that the lower-risk options have been fully optimized and developed in the planning process.

Our approach is only if nuclear power makes engineering and economic sense specifically in the WA SWIS context, would it be worth addressing the other hurdles listed in our written submission.

Our independent modelling aligns with Energy Policy WA and AEMO on the technology pathways for the SWIS:

1. Renewables (wind and solar), firmed by batteries and with gas generation acting as back-up as the least cost and least risk pathway;
2. Renewables contribution on an annualised energy basis ranges across the modelled scenarios with an end state vision being 80-90% renewables with fossil gas and / or liquid fuels providing the balance.

We recognise getting to net zero with a fossil fuel option in our model poses a challenge. There are a wide range of potential alternative technological solutions available - we asked ourselves could nuclear power be one of those potential solutions for the remaining 10-20% of the energy mix, in whole or in part? Could nuclear be the missing piece in the energy jigsaw.

Our SWIS energy model was used the problem definition framework for a possible nuclear power solution. We looked at current and planned assets and the general trends on the SWIS and identified the required solution attributes from a technical and economic perspective. We then looked at how nuclear power engaged with those requirements:

1. **Domestic rooftop solar is the defining feature of the diurnal energy mix** and continues to grow and now dominates the energy mix from a design perspective to the extent that any complementary power generation source needs to be technically and commercially flexible to ramp-down when solar output is high during the day and ramp-up in the evening and night time when solar output is zero. **Nuclear power** plants need to operate at high-capacity factors to optimise their levelised cost of energy and for investors to recover their investment. Nuclear power does not meet the technical and commercial flexibility requirements to firm a renewables dominated grid.
2. **Large scale renewables require large scale back-up** for prolonged wind droughts and / or low solar output. Without access to large scale pumped hydro in WA, our model and that of EPWA and AEMO, uses fossil gas as long duration storage in the form of chemical energy. Our modelling indicates around 6GW of capacity is required, operating at a low capacity factor. **Nuclear power** is not cost effective when operated in this back-up role and it would be prohibitively expensive for nuclear power to provide the required back-up generation capacity.

3. **Rising demand** –There is not a scenario where electricity demand increases to the extent that requires the use of nuclear power in that least cost pathway. It is also worth noting that the new generation needs to be deployed quickly to meet the forecast demand growth. ***Nuclear Power is not required to meet rising electricity demand*** this demand can be met in a timely manner by firmed renewables, subject to timely State Government investment in state owned common user infrastructure.
4. Western Australia’s Wholesale Energy Market operates on the SWIS with energy and auxiliary services traded in markets governed by a regulatory framework. Households, private companies and Government Trading Entities have all made capital investments based on these rules. In the event a government owned nuclear power plant was introduced to the SWIS as a baseload generator it would require both extensive changes to that regulatory framework and require other generators on the SWIS (including rooftop solar) to be ramped down or curtailed to accommodate nuclear power. This would significantly devalue that prior investment, create significant investor uncertainty for future investment and erode trust in Government and institutions at a time when trust needs to be bolstered.
5. **Energy Prices** – with a baseload nuclear power plant in the mix and using CSIRO’s levelised cost of energy for nuclear and the current WEM settlement rules, wholesale energy prices would rise. This is because more expensive nuclear power facilities operating in 24/7 baseload mode would increase prices in all the WEM energy market settlement periods. ***Nuclear power would therefore increase wholesale energy prices and / or require additional taxpayer subsidies to keep energy prices stable.***
6. **Emissions Reduction** – for nuclear to displace fossil gas or distillate fuels in the energy mix to reduce emissions, a large quantity of nuclear energy capacity (circa 6GW) would be required which would be prohibitively expensive as previously noted. SWIS power generation related emissions represent only around 10% of the State’s overall emissions. Therefore, there are many other more cost-effective means of reducing WA’s rising emissions other than using nuclear power to displace gas power generation and hence reduce emissions.
7. **Energy security** – could nuclear power increase energy security? The proposed small modular nuclear reactor of around 500MW for WA at Collie is less than 10% of the 5,859MW of registered generation capacity on the SWIS (as of November 2024) and so would have minimal impact on energy security.
8. **Timely solution** –The LNP proposal of building seven nuclear plants, presumably sequentially to capture the NOAK (nth of a kind) learnings and manage supply chain, would take years to plan, build and commission by which time other more cost effective and readily deployable technology will have well and truly solved the SWIS problem.

So overall, whilst considering just the limited selection of technical and economic criteria ***clearly demonstrates that nuclear power on the SWIS*** (and probably on the NEM for similar reasoning) ***is currently not an attractive option.***

END