

Submission from
The National Committee members of the Ingenieurs Australia Society Inc
to
The AEMO Draft 2024 Integrated System Plan For the National Electricity Market
- A roadmap for the energy transition.

Contribution from Ing. Kelvin Lillingstone-Hall, Telecommunications Professional Engineer. Profile on LinkedIn.

After reading the comprehensive AEMO Draft 2024 Plan, I would like AEMO to investigate the following four point scenario for the Australian Electricity Network for possible adoption going forward from now. The objective of this scenario is to decarbonize the electricity network well, minimize overall network costs plus have a stable, well performing network to cater fully for Australia's residential and business needs now and going well into the future up to and well passed 2050 without undue blackouts. This scenario aims to adjust the emphasis of the current approach and minimize the multiple risks spelt out in the AEMO Plan.

1. Replace all existing coal fired power stations with gas fired power stations (as clean as possible) starting from now so that the aging coal fired power stations will be replaced in good time by the new gas ones. This will provide some ongoing baseload power, renewables firming, renewables peaking, network stability, network reliability and good capacity for the overall network to meet all residential and business demands for electricity throughout Australia on an ongoing basis. Also, some old coal fired power stations could be replaced with gas fired power stations where advantageous to do so. This approach utilizes most of the power generation assets at the current coal fired power station sites as well as their existing transmission lines and rights of way to feed all the cities and towns throughout Australia.
2. Grow solar power generation on roofs and buildings throughout Australia, with battery back-up (in the buildings and/or in the local communities) in a major way so that this becomes the major form of renewables power generation in Australia. Solar power on roof tops and buildings has zero transmission line costs and negligible hassles plus the building owners each have the power to meet all of their own building's electricity needs if they need to. This approach leaves the way open to utilize electricity network back-up from the batteries in the buildings and from electric cars as needed.
3. Round out all the current solar farm, wind farm, associated transmission line and associated storage back-up projects and basically have none of these new renewable type projects being progressed from now onwards.
4. The gas fired power generators should preferably be hybrid plants so that they can be upgraded in stages as appropriate for hydrogen operation. No carbon capture and storage to be contemplated for these gas/hydrogen power generators. From about 2050, some of these gas/hydrogen powered generators could possibly be augmented or replaced with safe nuclear power generators with negligible nuclear waste as and where appropriate. For example, the uranium/thorium Molten Salt Reactor nuclear power generators could be used for the electricity network and for providing industrial heat for the production of things such as hydrogen. This type of nuclear generator is passively fail safe and doesn't use water cooling with the associated high pressure as part of their process. They keep on processing their molten salt nuclear fuel so very little is left for storage as waste and they are also factory built to contain their construction costs well. They are currently now starting to come online in a few countries overseas. Nuclear power generator plants emit negligible carbon dioxide and methane over their lifetimes.

Kelvin Lillingstone-Hall

Ing. Kelvin Lillingstone-Hall, FIEAust, FIngAust, CPEng
President,

Ingenieurs Australia Society Inc

Mobile: 0418 304 103

ingaustsociety@bigpond.com

www.ingaust.org.au



Professional Engineers

Addendum.

This is another IngAust National Committee member contribution which looks at the broader picture:

Contribution from Ing. Chris Stoltz AM FIE(Aust) FAICD FAIM, Civil Professional Engineer. Profile on LinkedIn at <https://www.linkedin.com/in/christopherstoltz/?originalSubdomain=au> and google “Chris Stoltz Engineer”.

At a higher level, we need a transition plan that is built upon science/physics and engineering ... not politics or ideology. And we need to have some KPIs that AEMO and the government are prepared to be held to.

My question is this: Is the goal of all this to transition to renewable energy because ...

- We'll eventually run out of oil, gas and coal natural resources; or
- We want to create jobs; or
- We want to be the world leader in something; or
- We want to reduce carbon emissions; or
- We want to stop climate change; or
- We want to reduce the number of heat waves, storms, cyclones, floods, bushfires, earthquakes, volcano eruptions, new mines, etc.

Depending on what the answer is, we can apply good science and good engineering to get the outcome ... and we can do a performance and cost/benefit analysis to see if it's worth it.

Currently we've seen nothing but rising energy costs and declining reliability. And the government's plan for zero emissions will not be achieved anyway (physically and politically impossible).

We need to contemplate nuclear in the energy mix.

Cheers, Chris.

Chris, My thoughts on your points to take a more fundamental approach to the electricity network situation going forward are:

1. We need to take into account the politics of the situation which takes in the overall directions the community wants to take. In this current situation this is to minimise the effects of Global Warming / Climate Change and have an electricity network which provides well for all residential and business needs and has minimum cost, plus an acceptable risk of problems associated with it. The community has been led by the Greens to accept their proposed way forward which provides renewables power

from free sunlight energy and free wind forces without looking at the total project lifetimes and their associated side effects. These side effects include having intermittent inputs to electricity generation which require very large, expensive back-up projects plus lots of new transmission lines with their high costs and associated hassles from the land owners involved and people generally who don't like to destroy large parts of nature's landscape and assets for mankind's enjoyable existence on mother earth. A growing section of the community is seeing the benefit of using dispatchable nuclear power generators based at existing coal fired power generator sites to minimise the effects of Global Warming / Climate Change provided the problems of community safety and construction costs are well contained.

Ing. Kelvin Lillingstone-Hall.

14 February 2024.