

This is a summary of the submission I put in to the NEG, the National Energy Guarantee, now in limbo.

It contained a vision for the future as you can read below, with a New meaning for NEG.

I hope everybody can see that there is a war of words on this subject, unfortunately some of the words come from previous conflicts, for example the word Intermittent, being used as a substitute for the word Renewable, comes from the Nuclear Industry, that has competed for decades with the Renewable industry because they felt they had the only required answer, therefore requiring all grants, Govt aid. etc.

Well, Nuclear has had problems, so no longer an option, but Renewable does not have to be Intermittent, The Collins dictionary says, :**Intermittent** definition:

Something that is **intermittent** happens occasionally rather than continuously, (but the sun shines every day, not occasionally, can you see the bias in word selection?) that is an argument focussing on just one Renewable source, - eg the Sun, in just one place, hence "what do you do when the sun is not shining"? - taken by itself, sounds pretty damning, but the question should be, "what do you do when there is no sun shining at any longitude, when there is no wind blowing in any location, and no tide flowing? - Australia is a big country, The sun hits Eastern Australia two hours before West Australia and stays there two hours extra, so a possible 16 hours of sunlight per day, and the northern rains are usually very different to the Southern rains. Wind like wise, there is wind 11 months of the year along the coast of the Northern Territory, (the famed "Trade Winds" then at a different time in Western Australia and then in the South, the "Roaring Forties" plus the normal on-shore off-shore winds all

around the coast, and the New Generation of bigger higher Wind turbines run longer and are more powerful, due to the greater height.

There are also huge tides along the North coast, and the tides run 16 to 20 hours per day, plus tide times vary considerably across Australia and predictable thousands of years ahead, Tidal generation potential is just hitting its stride. This combination will be almost full power 24/7.

Then there may still be occasionally a small gap, easily filled by the much cheaper Pumped Hydro systems and the growing ever cheaper Big Battery instant response. There is also my new idea to use the current Hydro system, :- "It is perfectly reasonable to think that a Hydro electricity plant can displace a Coal fired electricity plant but not normal to think that a hydro plant can, if used in conjunction with new Solar and Wind, displace several coal fired plants, (or replace them as they die).

This can be done by using the hydro to supply power when there is no wind, sun or tide, - as outlined in my summary, but with a twist. -:

So Australia gets say 5% of its energy from Hydro, - that is a total percentage, with Hydros usually running 24/7.

But if we turn off the Hydro, by stopping the input, (probably best to turn it off down at the gensets, so gradually, to remove sudden surges) that water will build up, so eg we turn off all hydro for one hour, then there is the "fuel" ie the water, to run it for the next hour at 10%.

By that reasoning, if one turns off the water flow for 10 hours, it can provide 50% of Australia's electrical energy for one hour, 100% if off for 20 hours.

Of course there would have to be installed extra generators and pipe work and probably electrical cable to take the higher load, but those costs would be far less than building

the whole structure in the first place, - a relatively minor expense, eg the electrical connection to the nearest Mains would already be there, - with all the right of ways, poles, etc, it would just need more and thicker cable, - or replacement with HVDC. the main thing, the dam itself, would require very little change.

Yes, not all dams may be suitable, and some situations would not have all year full flow, but lesser flow could at least keep the dam full, then extra be used for day to day, then there would always be a full dam to step in when required, and over time, a pumped hydro component could be introduced.

The thing is, a very lower cost enormous 'battery' could be effectuated quite swiftly (with problem solving attitudes), using already existing extensive infrastructure."

To join all these disparate sources, there needs to be a ring of High Voltage DC lines (HVDC) right around Australia, linking all the capital cities and the areas between, this technology is already well developed. This then becomes a vision for the future energy of Australia, the **National Energy Grid**.

And Australia needs cheap Renewable Energy, lots of it as rain reduces, huge desalination plants to keep our crops growing, etc, major pumping systems to distribute it, electric vehicles needing charging, electricity to make steel, aluminum, etc, Air conditioning to survive the excessive heat, - in the list of essential cheap energy requirements, particularly inland, - there temperatures are already occasionally getting up to the point that the Human body can not survive, so Air Conditioning becomes life or death, Australia should decide for life for our farmers and miners and all who live in the hottest places, which will Alarmingly increase as time goes on.

- coal fired power will be much too expensive.

Only connected renewables will allow Australia to survive. Connected renewables are not 'Intermittent', and are fully Dispatchable - the word dispatchable being another loaded word, - it means available 24/7 and is used by the Govt to mean Coal fired Power stations, and so another word worthy, (imho) of closer Analysis. is this word Dispatchable, what really qualifies as Dispatchable? - You have it, it can go..

Hmm, a battery bank/controller can dispatch power in a microsecond, probably before the operators at the power plant where the failure occurs even know there is a problem, definitely qualifies.

Wind turbine blades slowing down by strengthening Generator fields, as already successfully used in South Australia, if supplied by thousands of huge wind turbines all over Australia, each turbine becoming a giant flywheel, - potentially huge, again in microseconds to dispatch, duration dependent on load and units and rotation speed at that time, but definitely dispatchable.!

Hydro, Inc pumped hydro. - 2.5 to 5.5 minutes, from various sources, doesn't qualify as immediately dispatchable, but would be fine if a shortfall in supply was looming, or configured to come on to bolster the battery/ wind turbine blade slowing, response, presuming the battery etc. big enough to maintain supply long enough to start the Hydro,

Gas Turbines, currently a darling because quite sizable units are installed widely, - take a bit longer than Hydro, but by the same criteria as Hydro would be classified as dispatchable, but because the price of Gas is so high, and other problems, there is reluctance to use them.

Solar, with modern Radar weather systems, a clouded over Solar array could potentially, particularly if it had a 'sky camera', claim dispatchability in 15 minutes, or more if the cloud break was further away, - definitely not dispatchable as we have talked so far, but potentially plannable in if you had the Virtual Power Station concept up and running, as we should, and could, with the HVDC ring.

Then Tidal, - when the tide is running, yes dispatchable, as already at full output, but not dispatchable during the lull between incoming and outgoing tides, or vice versa, each taking approx 2 hours, so twice a day that 2 hour delay, - definitely plannable but not dispatchable during that period, although possible considering the time difference across Australia.

Then finally Coal fired generators, approx 25 gigawatts in Oz,

At the moment, we have 23 units, 3 of them big old brown coal units, probably needing careful analysis as to how functional they are, how overdue their last service etc, what they can actually produce regularly.

Whatever, that is another question we are now talking on DISPATCHABLE, so, I was told many years ago that a coal fired power station requires a day and a half to get to full from off, the 16 power stations over 30 years old would fall into that classification and another 3 over 20 years old would also fit because I recall the publicity about powdered coal starting about 20 years ago and those would have already been planned.

To conclude, 16, or perhaps 19, of the 23, can not if switched off, claim to be dispatchable, that would be an utter nonsense, might as well claim tomorrow's Solar is

dispatchable today, but we just have to wait a day.. sort of like selling dehydrated water, 'just add water'.

Then is the stuff about 5 hours, - I have been told that modern or 20% capacity fired up Coal fired generators can deliver full power in 5 hours, and the AEMO has been pressing them to be at full speed for the evening peak, - That is not dispatchable either, unless they all run at peak, - currently not affordable, like Gas, most of Gas being pre-sold overseas..

Therefore, the Word, Dispatchable, as used by current Oz Pollies, unbeknownst to them, only applies to Nuclear power, which is so expensive that it has to run at full power 24/7, with enforced Purchase.

So, the Vision is not ancient dying coal fired power stations, that is very dubious, if not irresponsible, as a base for Australia's Energy Future, although fine to keep running as the renewable system is built, - the real answer is Connected Renewables, The Govt has only to build the HVDC ring connection, - Private industry, competing as they do, will build all the Renewable plants all around OZ, - win win.

Here is a link to the AEMO plan, it supports my coal critique, but not the HVDC ring, the ring is the vision.

<https://reneweconomy.com.au/csiro-aemo-study-says-wind-solar-and-storage...>