From: ***[Redacted for privacy]***
Sent: Sunday, July 30, 2023 3:09 PM
To: Licence Query Info (ESC) <Licences@esc.vic.gov.au>
Subject: Marinus Link Licence

Dear Government regulator,

I attach my comments.

Regards,

[Redacted for privacy]

Dear Project Promoter and Government Regulator,

CLIMATE CHANGE AND ENERGY POLICY

Please provide a written response to the issues raised in this submission.

THE WEST VERSUS THE REST

The Paris Accord was signed by 196 countries in 2015 to aim for "net-zero" by 2050. However, only 11 have enacted legislation, and another 22 have pledges of varying robustness. Australia has the full suite all enshrined in law of a 43% reduction and 82% of renewable electricity by 2035, net zero by 2050, net-zero beyond 2050, and of all greenhouse gases. However, the reductions are non-binding on developing countries who currently produce 63% of carbon emissions.

THE WEST IS DELUDED

At the Shanghai Co-operation Organisation Summit in Samarkand, Sept 16, 17, 2022, with Xi Jinping, Narendra Modi, Vladimir Putin, Racep Erdogan, and a few others, they stated that in relation to energy "we will not be co-erced, . . .will delay renewables, and aggressively increase fossil fuels." [Reported by Vijay Jayaraj from Newsmax who was present.]

That is concise, clear, and unequivocal. China, India, Russia, Turkiye, spoken for.

IT IS EXPENSIVE AND FUTILE

Australia produces 1.2% of global carbon dioxide emissions which is a small part of the world emissions and is very expensive to reduce. The CEO of Australian Super, Paul Schroder, estimates the cost for Australia to achieve Net Zero at up to A$10Tn dollars. Australian annual GDP is currently a A$2.3Tn. McKinsey estimates it will cost the U.S. US$9.2Tn per annum.

And it is futile. Australia is planning to phase out its remaining 22 coal fired power stations whilst worldwide over 535 are proposed or commissioned; China is building 2 new coal fired power stations per week; and in China, India, Indonesia, Vietnam, and Turkey, etc. [Michael Shellenberger in about Sept 2022].

Willis Eschenbach, 2/6/23, with interactive map, plots the 1,008 coal fired power plants announced, in planning, permitted, or under contract.

THE EXPERIENCE OF EARLY ADOPTERS IS STARK

Guyana and Sri Lanka under World Bank influence tried to remove ammonium fertilisers, which produce great crops and also carbon dioxide, and almost ruined their economies. In June 2022 40,000 Dutch farmers drove their tractors onto expressways in protest at the proposed reduction in nitrogen and phosphate fertilizer and number of animals. The jurisdictions of South Australia, Victoria, Great Britain, California, Texas and Germany tried to replace coal fired power with renewables and were only saved by the supply of electricity from their neighbours. GB and Germany are reintroducing coal power and Germany is now building dozens of gas fired plants.

There is a great maxim that "you should not be first to adopt new technology, but not the last."

NET ZERO IS A SUICIDE PACT.(Dr Patrick Moore)

Fossil fuels provide 6,000 products, a lot of fertilizer and 97% of transport energy. Unless we are to return to an existence like the Shakers, net zero is unlikely to be achieved.

Electricity represents only 21% of world energy.

RENEWABLES ARE NEEDY AND HUNGRY

Renewables consume at least ten times the quantity of copper, lithium, cobalt, rare earths, concrete, steel and manpower than required for equivalent generation from coal. [Mark Mills]. The carbon dioxide emissions of solar panel production is so large that at the 35 degrees of latitude from the equator, the expended carbon dioxide exceeds the saving for the remainder of their life.[Pollock] This is at about Canberra, Swan Hill, Adelaide.

Renewable energy sources are low density and low EROEI, and low on all sustainability scores.

IF RENEWABLES ARE SO CHEAP, WHY IS MY ELECTRICITY BILL GOING UP?

The cost of wind and solar may be cheap in isolation when the wind blows or the sun shines. But in a grid, wind and solar produce a varying magnitude of DC power that needs firming from inverters, complex switching, or batteries. And being at the extremities of energy networks, they require vastly greater new transmission networks, which in the NEM the 10,000Kms which was to have cost $13BLN has now blown out by 40%. [On 13/5/23 Bowen mentioned $20BLN, being +55%].

WHAT IS THE REAL COST OF RENEWABLES

Wind and solar add another layer of generation to a grid. When there is no sun and no wind they need 100% back up power rapidly deployed. Initially in Australia this has been provided by existing coal fired power and the previous inbuilt 20% surplus capacity. As coal fired power stations are retired, proponents are promoting the idea of storage. The reality is that back up needs to be provided by fast response generators, which are traditionally gas. The Combined Cycle Gas Turbines, CCGT, generation is at least twice the cost of coal. Being new compared with retiring old equipment, also adds a layer of cost. Jeff Dimery, CEO of Alina

Energy estimates the capital cost to replace their existing $1BLN of coal power will require $8BLN with gas.

So, the all-inclusive cost of new renewable electricity and transmission to a grid is between 3 and 9 times the cost of coal.

In fact, it's already common in other parts of the world to see efficient combined-cycle gas turbines replaced by open-cycle ones because they can be throttled up and down more easily to back up the rapidly changing output of wind and solar farms. But open-cycle gas turbines burn about twice as much gas as combined cycle gas turbines. It is ironic to be switching to high-emissions machinery as part of an effort to reduce emissions. [Bryan Leyland]

ANOTHER DILEMMA FOR ENVIRONMENTALISTS

Green supporters had been very much against gas which at its best produces only half the emissions of coal. However, the grid instability has compelled the NEM to accept gas generators. Pumped hydro and batteries are expensive and provide very little to the grid. Maybel nuclear will be acceptable.

THE SAFEGUARD MECHANISM IN AUSTRALIA

The large emitters in Australia (in excess of 100,000 tons per annum of carbon dioxide) number some 215 organisations and businesses, accounting for about half of Australia's emissions. They are required to reduce emissions, or buy offsets, from 1 July 2023, at about 5% p.a. on a reducing balance to achieve a 30% reduction by 2030 and 100% by 2050. This will result in large cost increases, loss of international competitiveness and a massive transfer of production offshore.

THE IDEAL SOLUTION

If one really did believe that decarbonisation of an economy was necessary, (and I do not wish to concede that premise), you would install nuclear in the location where you phased out coal and use the available water and transmission.

AN IDEAL RENEWABLE GRID

In Australia, the production of electricity from solar farms averages 19% of their rated capacity, and wind 29%, which I call the Pollock limit. That will probably decline slightly as the best sites went first. Beyond that, overbuilding and spillage or curtailment of electricity occurs. [Pollock]. Yes, some overcapacity could be used for storage or maintaining the traditional 20% surplus for unexpected occurrences, but these are small amounts.

[You can skip the difficulty in this paragraph.] However, there is a complexity here, that about 11% of the 29% wind generation is synchronous with solar. As solar has a lower cost and is less energy dense and has a lower EROEI it will jeopardise or cannibalise the 11% of synchronous wind. So effectively generation into the grid is only 18% from wind and 19% from solar meaning the economic build of renewables is ONLY 37%.[Trembath and Jenkins.][ ]

Never mind the complexity; 37% is the optimum input of renewables into the Australian network NEM. [King]

THE EXISTING NEM CAPACITY

In the NEM, these ideal capacities for solar of 19% and wind 18% are far exceeded. The NEM is said to be a "22GW enterprise", with a minimum demand of 18GW and a maximum of 28GW. Solar has an existing and commissioned capacity of 12GW, 67% of the likely minimum demand, and a further 48GW proposed, being another 270%. Wind has an existing and commissioned 12GW, 43% of the likely maximum demand, and a further 19GW proposed, another 68%. Rooftop solar capacity at 20GW (Aust) is huge, the largest penetration in the world, and in the NEM could replace about 3GW. That 3GW will reduce demand and make the above percentages even higher.

HOW MANY RENEWABLES DO YOU NEED.

It is often naively stated that you just keep adding more renewables until the grid is fully supplied. There are several things wrong with this assumption.

Firstly, if the renewables were only producing a meagre 8.3%, say, of their nameplate capacity, then it is supposed you simply construct 12

times as many. But that is a massive amount of extra capital and a huge spillage of electricity at times when they produce more.

Secondly, the renewables produce in an environmental sawtooth fashion. Ponton analysed the UK over 2022 where wind supplied 25% of demand, (they have no effective solar). He then notionally kept doubling up possible wind turbines. At 4 times current quantity, you would naively expect to be supplying 100% of the grid. However, only 2.5% extra supply came from the fourth 25% (22.5% was curtailed), because wind blows at varying rates producing varying amounts of electricity, and the lows in the sawtooth do not get filled up. (A small 15% of demand had to be reserved for supply by idling standby gas generators). At 4 times capacity wind could only supply 52% of demand, and regardless of however many times you doubled up, the wind could only provide a maximum 60%. [Ponton]

Thirdly, there are renewable droughts, or dunkelflautes. At times there is no wind and no sun. Studies at various locations around the world show that in a full year the combined addition of all wind droughts and low sun will be equivalent to a full 30 days, (varying at location from 15 to 46 days).

For these periods you need backup. Fast response gas has been mentioned and hydro is able to provide about 6% of Australian electricity production. Otherwise you need storage. Battery storage is the main generation being considered and pumped hydro storage is useful provided the top dam is full.

SO, BRING IN STORAGE BY BATTERY

We need to differentiate three types of battery storage.

Firstly, traditional storage provides supply when there is no wind or sun. You often see wind turbines not turning. That is sometimes referred to as a "time shift of energy".

Secondly, and most importantly is firming. Batteries, or a combination with switchgear and inverters, controls the frequency, voltage, amperage, and ohms, and to get to the end of the 5 minute bid period. That is sometimes referred to as FCAS, Contingency Frequency Control Ancillary

Services. Batteries have become increasingly needed as the unreliability of renewables has become apparent.

Third is seasonal storage to provide the difference between winter and summer, which means the battery is inefficiently only used once. Luckily for Australia this is not as marked as in Europe or North America. Although Australian summer air conditioners and winter heaters do cause spikes.

There are a number of other uses, the most significant being 'arbitrage' to buy when cheap and sell when dear.
Unfortunately we did not heed the old maxim "don't jump off the boat until we have reached the shore". It was only after the variability of renewables became apparent that batteries became necessary. Renewables have been discussed since 1988, yet the IEA first analysed them in 2020 and the CSIRO in 2023.

Electricity storage is horrendously expensive. My domestic supply is provided at 40 cents, of which 12 cents is generation. The best current estimates of generation of electricity from storage are A$700 to A$1,000/Khr. The large Hornsdale battery in S.A. costs A$1,000 a kilowatt. Tesla's current price is US$600 /Kwhr, plus installation. Some limited pumped hydro may come in at A$700. And 30 days out of 365 days is to come from storage.

Batteries are almost unaffordable.

HENCE SNOWY 2.0

Malcolm Turnbull's pet project in 2017 was expected to cost A$2BLN and be complete by 2021, then pushed out to '24, '26, '27 and now Dec '29. The last A$6BLN estimate is to be updated again this July 2023. The transmission line still has not achieved a social licence for any route and the cost of A$3.6Bln by 2026 had blown out to at least $5Bln by 2028.

My guess is construction and transmission together will cost $20BLN. Minister Chris Bowen is urging their completion, although the Greens and others would like it scrapped.

Pumped hydro generation costs depend a lot on how much they are used, and how long it takes to refill the top reservoir. Early Snowy 2.0 estimated its cost at $450 KWhr, but with cost blowouts this may exceed $1,000 KWhr.
More realistically, Tasmanian Hydro may be used as a battery, to which GenCost puts an estimate of between $100 and $500 KWhr, which is still large compared to the 12 cents wholesale component in your own domestic electricity bill.

A standard figure from EIA for the cost of grid scale battery arrays is US$250 per Kwhr, which is quoted by Dr David Wojick in Jan 2022.

THE SOLUTION TO UNAFFORDABLE BATTERIES

One way to avoid such high storage and high battery costs logically leads to considering nuclear as the alternative as it does not produce carbon dioxide. But then if we have 100% nuclear backup for wind and solar, we would not need wind and solar at all. They become, in fact, completely pointless. [Bryan Leyland]. The cofounder of Greenpeace, Dr Patrick Moore, imagines we will be seeing solar, wind, and battery infrastructure rusting in paddocks.

OVERALL IMMENSE COST

Fossil fuels worldwide still provide 97% of transportation and 82% of worldwide energy consumption. This has fallen only 2% from 84% with the massive expenditure of US$6.5Tn (BloombergNEF 2004-22) worldwide on renewables. [Mark Mills] And the share of non hydro renewables was just 6.7% of total global primary energy consumption in 2021. Australia 7.0%.
After 30 years, (the first IPPC COP was in RIO in 1992), the 2022 Australian proportion of electricity produced from wind is 16% and grid solar 6%, totalling 22%. In the UK it is 25%, EU 22%, US 13%, and worldwide 10%.

THE IMPOSSIBILITY OF 100% RENEWABLES, EVEN 50%

Bowen is wanting 82% of Australian electricity to come from renewables by 2030, and 100% by 2050. As said in The Castle movie, "Tell him he's dreaming."

The only jurisdictions to exceed 50% penetration did so with emergency supply from neighbours. Ponton has already shown, even at enormous cost, the impossibility for wind in the UK to exceed 60%. At 50% of renewables, all sorts of instabilities become apparent.

The belief that the sun will be shining or the wind blowing somewhere else is a complete fallacy.

THE DIFFICULTY WITH INTERMITTENCY

Base load coal had the advantage of a harmonised grid to which a change in demand produced a change in voltage which produced a change in output which signalled a change in supply. Electrical Engineers in 2021 voted "The Grid" one of the marvels of the 21st century.
There is a vast difference between harmonising two dozen generators all cycling in unison at 50 hertz (US 60), and co-ordinating in Australia the existing 567 generators (as at 20/4/23, soon to be 1,500). The wind and solar farms and batteries all produce electricity of variable strengths, and the over 3 Million household rooftop solar systems are variable, and uncertain if or when they will be fed in.

A Chilean electrical engineer found widespread puzzlement that after a certain point – varying from species to species and grid to grid – adding more renewables either did not increase that species' share of total grid output or resulted in ever-growing capacity-constraint payments or do-not-generate orders even at times of high wind, strong sun or low demand. He discovered a counter-intuitive and unexpected fact that the greatest penetration achievable without great cost and waste is equal to the mean national capacity factor of that species. [pollock]. I call this the Pollock limit. Australian solar is 19% and non synchronous wind is 18%.

DOMESTIC ANTAGONISM AND LACK OF SOCIAL LICENCE

In the US, domestic push back to renewables has seen over 500 renewable projects rejected and 500,000 people signed a petition that offshore wind farms seem to cause whale destruction. [Robert Bryce]. Individuals in the US who believe climate change is anthropogenic has fallen to 49% and its need for remediation has fallen to 17th place of the nation's concerns. People's low willingness-to-pay to reduce emissions has

also long been evident from surveys. Everybody expects others to pay or make sacrifices. This is also true in Australia.

In Australia there is much rural discontent, as wind turbines cause noise and flicker disturbance, unsightly high-tension wires, and the disturbing use of prime flat farmland for solar farms, or batteries. Victoria in particular has seen several court cases, and these have not favoured the wind farms. And a number of petitions.

In contrast, Chinese photos show hillsides being used for solar and funny mosaics made from panel placement.

SUBSIDIES

Iconic billionaire investor Warren Buffet said –
" wind and solar make no sense without the tax breaks and subsidies,"

AUSTRALIAN SUBSIDIES

Australian direct subsidies come in so many ways that it is difficult to accurately calculate, but estimates are around A$15B annually. The May 2023 budget had A$25B expenditure toward energy and climate programs with forward estimates for those programs of A$82B.
Additionally and separately, there are mandates, prohibitions, inducements, penalties, gas volume reservations and gas price caps.

EXCESSIVE AUSTRALIAN SUBSIDIES

Due to the substantial Australian government subsidies, solar and wind projects have attracted many overseas investors. Australia currently has 79 connected wind farms and 89 solar farms and at least double that number under consideration.

Virtually none are listed on the stock exchange. My interpretation is that the government guaranteed returns are so good that investors have not sought risk sharing or diversification by listing. The few that were listed have been taken over. There are 2 integrated retailers AGL and Origin, and they have both received takeovers. There is one small listed generator, and two unlisted debt funds.

SQUADRON ENERGY PTY LTD - AN EXAMPLE OF EXCESSIVE SUBSIDIES

Andrew Forrest's private company Squadron, 7/12/22, bought the wind farm developer, CWP Renewables Pty Ltd for A$4.1BLN. There were two very close underbidders. The company owns 5 wind farms with 257 turbines, and a large portfolio of potential projects.

This is equivalent to paying $15M per turbine which recently cost A$6M each. The purchase price shows just how lucrative the government contracts have been.

So lucrative, that developers offer good money to landowners housing turbines, and to local communities.

"A project in Walcha comes with the promise of a $1m community development fund, with an additional $750,000 a year once the generators are turned on and a further projected amount, depending on output, that's up to $850,000 a year for this town that sorely needs investment."

Hornsdale, for a while the biggest battery in the world, cost $160M (stage 1 A$90M, stage 2 - 70M). It earned $150M in its first two years and is expected to earn at least $22M per annum for 20 years.

MANUFACTURING IS GOING OFFSHORE

Bowen states that the current production of solar panels by China that is now 84% worldwide, is soon to be 97%.
Regrettably these are manufactured using coal fired electricity, lax environmental laws and poor industrial relations.
So, mandated by the Australian Government, this enormous shift in energy production in Australia is providing enormous export orders for China, and a lessening of Australian manufacturing.

In Australia we manufacture 0.3% of the solar panels used, we assemble some turbines and manufacture some towers.

ELECTRIC VEHICLES AND THEIR BATTERIES

EV batteries require cobalt, whose source is questionable from slave and child labour, and require 3 times more energy to produce, and 3 times the carbon dioxide emissions than conventional batteries, which are 98% recycled.
The EV batteries may only last 10 years and Li-Ion are expensive and complex to recycle, 5% worldwide and 3% in Australia. Unprocessed batteries are reputed to leach toxic substrates into landfill and the water table.
Motor vehicle company Ford lost US$2.1BLN on its EVs in 2022, about $34K each. 2023 losses are running at $66K each.
Australia currently has only guidelines but not standards for recycling. (Parliament is due soon to consider solar panel recycling standards).

AUSTRALIA IS IMPOVERISHING OURSELVES

The year 2023 is the milestone when Australian electricity became the most expensive in the world. Less than 20 years ago we had the cheapest in the developed world. The fivefold increase in electricity prices is reducing any comparative advantage we had; manufacturing and industrialisation will shift to other countries.

But hey, maybe there is no climate problem, no emergency.
Wind and solar are low density, diffuse in energy, expensive, unreliable, and need 100% backup. They require ten times the concrete, steel, land, and 10 times the amount of high value materials. I predict they will eventually be white elephants, with the overseas owners disappearing to leave lessee farmers, or councils, to pay for their decommissioning and clean up including toxic components.

MAYBE CARBON DIOXIDE IS NOT A PROBLEM

Professor Ian Plimer states that there is no scientific evidence that carbon dioxide causes global warming or climate change. Warming being just natural.

Our achievement of net zero will have “virtually no effect” on the climate, as stated by our then Chief Scientist, Alan Finkle, in 2017.

‘The climate system is way more complex than something you can simply tune with a carbon-dioxide control knob'. [Judith Curry]

The human contribution to climate is minimal, if at all. Dr Patrick Moore 14/3/22

In fact, carbon dioxide is released from the warmer earth and oceans - not the other way around of CO2 causing warming.
And warming is beneficial for mankind as it has been for the last 150 years. The benefits of fossil fuels far outweigh the drawbacks.[Alex Epstein].

Even the IPCC says without any carbon dioxide reduction, warming is expected to be only a minor hinderance to world development and that severe climate impacts are unlikely. [Steve Koonin]

UNEXPLAINED WHICH CARBON DIOXIDE DOES WHAT

Fossil fuel burning only produces about 1% of worldwide emissions of carbon dioxide. There is another 2% of anthropogenic, and 97% of natural emissions. Plimer asks that someone needs to explain why only those 1% cause global warming. "That needs to be answered". [Plimer]

THE CORRELATION OF TEMPERATURE AND CARBON DIOXIDE

Bud Bromley on 6/2/22 displayed an analysis of the correlation of CO2 and temperature from 1750 where the time intervals had been chosen by A.I. He also compared these periods with the prior years from the start of agricultural production in 7500 BCE. 1750 was the start of the industrial revolution and 1850 was the start of modern record keeping.

CARBON DIOXIDE CORRELATION WITH TEMPERATURE

Period		Number Of years	Temperature change C	Carbon Dioxide Level		Correlation
7,500 to 4,800BCE		2,700	- 0.04	264 – 259	=	NOT
4,800BCE to 1,500CE		6,300	-0.70	259 – 282	+23	Negative
1,500	to 1750	250	=	282 – 276	=	NOT
1,750	to 1849	100	-0.63	+0.1 ppm pa		NOT
1850	to 1929	80	=	+0.2 ppm pa		NOT
1930	to 1944	15	+0.25	+0.4ppm pa		YES
1945	to 1980	36	=	+0.7 ppm pa		NOT
1981	to 2000	20	+ 0.33	+1.5 ppm pa		YES
2001	to 2012	12	=	+2.0 ppm pa		NOT
2013	to 2019	7	+0.23	+2.75ppm pa		YES
2020	to 2023	2.5	-0.2	+4.4 ppm pa		NOT

It is positively correlated in only 3 of 11 periods, which accounted for 42 years out of 273 years.

Since the start of the industrial revolution in 1750, carbon dioxide has risen continuously and at an increasing rate up to 4.4 ppm per annum more recently.

In a prior 6,300 year period there was a highly correlated <u>negative</u> trend between temperature and carbon dioxide. i.e. as CO2 rose temperature fell.

IPCC INFORMATION USES GROUP THINK

People behave differently in groups or individually.

Psychological studies of individuals compared with groups have shown how close the average of individual private estimates is to an actual measure. i.e. Over 850 fair goers estimated the dressed weight of a live bullock on average, to be 1198 pounds compared with an actual 1207. [Mackay "Memories of Extraordinary Delusions"]. Another study showed that individual silent estimates of beans in a jar averaged 1,771 compared with an actual 1,776, but after group discussion, the group average estimate was 850. [Greenblatt].

Nietzche says "Madness is rare in individuals - but with groups . . it is the rule."

The IPCC is based on 'group think'. It is not a democratic body, nor voted into existence. The process is severely flawed, evidence is untested, not subject to the rules of admissibility, not subject to the rigours of cross-examination, the conclusions are written first and supporting papers are altered to reflect the conclusion. Delegates are locked in a room until they reach a consensus with the process working on group dynamics.

IPCC GAME OF WHISPERS [once called "Chinese whispers"]

Koonin has conclusively shown how the Secretary General's comments do not reflect the IPCC Synthesis Report, which does not reflect the Summary for Policy Makers, which does not represent the Assessment Reports, which does not reflect the underlying scientific papers, which do not reflect all available studies.

WHAT IS TOLD TO US IN NEWS IS NOT CORRECT

According to Dr. Clauser, Nobel Prize winner in 2022 in Physics, “The popular narrative about climate change reflects a dangerous corruption of science . . ." .

SOME MAJOR CONCLUDING REMARKS

There is most probably no climate problem and no emergency. Wind and solar are low density energy, expensive, unreliable, and need 100% backup. They require ten times the materials and space, and have toxic components.
I predict they will eventually be white elephants, with the owners disappearing to leave lessee farmers, or councils, to pay for their expensive decommissioning.

The fivefold increase in electricity prices in Australia will reduce any comparative advantage we had; manufacturing, industrialisation and carbon producing activities will shift to other countries.

SOURCES AND AUTHORS

I regret that we have ideology and dogma rather than open constructive dialogue. Anyone wanting to explore the numerous groups and professionals portraying an optimistic viewpoint of climate and energy could start with the references in the website wattsupwiththat.

Three authors of recent books who accept the premise of carbon dioxide being anthropogenic, but believe we will be better adapting, are:
Steven Koonin, Unsettled, 2021
Michael Shellenberger, Apocalypse Never, 2020
Alex Epstein, Fossil Future, 2022
END OF MY SUBMISSION