Good morning,

Please find enclosed our submission to the above. This submission has also been discussed at the web site "Whirlpool" in the "Economics" and "Nuclear Energy" forum of green energy.

Nuclear And Variable Renewable Energy (VRE): Using Present Estimated Capital Costs And Based On AEMO ISP 2024:

Pumped Storage: Snowy Hydro 2.0 (SH2) at 2GW/350GWh, $12bn so far and rising,

LS Batteries: ISP 2024: 19GW. It has been estimated we need only 16GW/50GWh as we still have 10GW of coal by 2030 (ISP 2024, NEM), using the cost estimate of the Kwinana battery: 50GWh = 50,000MWh / 800MWh x $625m = $39bn, using ARENA figure of $0.64bn/GWh = $32bn,

New Grid: ISP 2024 and Minister Bowen mentioned 5,000km in the next decade and 10,000km by 2050. The Hume Link will be completed in Dec 2026 and that 500kV grid for 360km has an estimated cost so far @ $5bn or $13.8mio/km,

The completed 330kV part NSW-SA link at 206km cost $546mio (Electranet) or $2.65mio/km, total length is 900km,

QLD Super Grid South, 430km @ 500kV + 60km @ 275kV, completion September 2031, ISP estimate is $3.3bn for 490km plus/minus 50%! $6.7mio/km – used that figure for Bowen's 5000km in ten years, half to 2030 or 2,500km x $6.7mio/km = $17bn,

Both, CSIRO Gencost and AEMO ISP ignore the new grid as "sunk costs" and ISP simply makes the statement " … it will avoid $17 billion in additional costs to consumers if those projects were not delivered".

ISP On-shore Wind: 35GW @ $3.22bn Gencost figure = $113bn, ignoring offshore wind, not available by 2030,

ISP LS Solar/ARENA cost figure: 55GW @ $1.39bn/GW = $76bn, Gencost figure is $1.46bn/GW,

Gas Firming: 16GW needed by 2030 and 2050, using Kurri Kurri (Hunter Gas Project) which has now blown out to 660MW for $2bn = $48bn, Gencost estimated 660MW @ $900mio or $22bn,

Private solar capital costs: Four million roof-top PVs @ $3,000 min. = $12bn, mine cost $4,535,

The CSIRO Gencost report only works on the requirement of 65% VRE by 2030 and not 82% as it includes private PV, so we have done the lifting of the extra 17%!

Federal VRE subsidies via STCs: Four million private roof-top PVs @ $3,000 min. = $12bn, mine were 101 x $37/STC or $3,737,

Large-scale PV STCs: $17.1bn in federal subsidies for a total of 29.1bn, source: CIS,

Total per state VRE subsidies: Not known. Federal and state subsidies are not included in Gencost.

Compensations to landowners for the new grid (up to $100,000/km) and battery/PV/windmill fields – unknown billions. Gencost adds in ~$15/MWh, which is not transparent.

When a shortage of electricity is looming, the AEMO can force major electricity consumers, like aluminium smelters (Tomago) to curtail their operations and the gov. then compensates industry for it. Industry curtailments – unknown millions. Not included in Gencost.

On-going cost-of-living adjustments due to higher electricity costs – unknown millions. Not included in Gencost.

21GW of old coal cannot be replaced by 21GW of variable RE and dispatchable RE from batteries, hydro and SH2 pumped hydro. It requires an overbuild factor of four to five times as much of VRE/RE or a max. of 100GW by 2035 and that leads to time delays.

As it will take ten years until 2035 to get rid of 90% of coal, generators like Eraring and Bayswater receive federal/state funds to keep going a few more years. Eraring alone will receive $225mio/year for the next two years. Such a cost item should be included in the total cost of VRE as VRE cannot be built fast enough. Not included in Gencost.

Grants are made available for VRE by state organisations like the NSW Emerging Energy fund. The Hepburn wind farm received $2mio. for two turbines. Not included in Gencost.

Total cost of VRE is more than $346bn by 2030 and includes part gov. money and private funds. By 2035 another 10GW of coal has to be replaced by VRE costing another $300bn? Does not include $17bn for the new grid for the second half of 2,500km and assumes lower cost for PV and mills.

Calculation of the present cost of each VRE MWh by 2050 with assumptions

By 2030 we have spent >>$344bn on VRE/RE to get rid of 10GW of old coal. By 2035 another 10GW of coal must disappear. Assuming PV, mills and batteries will be cheaper, in the next five years less than an additional $344bn will need to be spent, let's say $660bn instead of $688bn by 2035 in total. This generosity also allows the cost of the new grid to be seen as a "sunk cost" as by 2035 our demand will have doubled to 40GW necessitating a stronger grid anyway.

By 2035 a VRE asset has been created, which will theoretically allow 20GW of former coal to "run cost free" ("no bill from sun or wind!") from 2035 to 2050 or another 15 years. This is assuming a life of 25 years for PV, mills and batteries from 2025 onwards to 2050, which coincidentally happens to be the Net Zero target.

End 2035: 10 years x 365days x 24 hrs x 20GW }

End 2050: 15 years x 365days x 24 hrs x 20GW } 25 years or 4,380,000GWh for $660bn or $151/MWh VRE/RE.

Nuclear Cost Calculations:

Four Korean APR-1400 reactors were installed at Barakah (UAE) for a total cost of $32bn. Each reactor produces 1,400MW or 1.4GW, so a total of 5.6GW of electricity's capital cost is $32bn or about $6bn/GW. Assuming higher labour costs and stricter regulations, a FOAK figure of $15bn/GW can be used?

At one stage we used 20GW of coal, so at a total cost of 20GW x $15bn/GW or $300bn our entire coal-produced energy could theoretically have been taken over by CO2-free nuclear energy without 16GW of "gas firming" and we would not have to wait until 2035 for 90% of coal to disappear entirely.

Regards

Dominic Wild

Bentley, WA