Snowy Hydro 2.0

Introduction

The Snowy Hydro 2.0 (SH2) project presents a number of challenges that may be grouped under three headings:

- Environmental damage
- Government intervention in a rapidly changing wholesale electricity market
- A lack of credible competitive evaluation

This submission draws attention to the considerable risk that SH2 will: detract from private investment in superior alternatives; incur large, unjustified costs to the taxpayer; and inflict irreparable damage to a sensitive alpine ecosystem.

The author has worked for 25 years in energy markets, and founded an ASX-listed energy market intermediary with over 3000 business energy customers.

Arguments for

Storage is a positive addition to Australia's large and growing renewable energy sector. Its benefits include:

- Allows much greater renewable feed into grid supply
- Reduces coal-fired generator emissions
- Promotes grid stability
- Reduces the incidence of demand-supply imbalance and outages

SH2, in particular, is large-scale but centralised, meaning that costs will be incurred in distributing stored energy to those who might benefit.

Arguments against

There are many ways of providing storage or its equivalent in terms of demand-supply balance, ranging from household batteries, utility-scale batteries, demand side management (including use of electric vehicles as storage), pumped hydro, geographical distribution of generation, and innovative but commercially immature methods such as compressed air, hydrogen, ammonia, and flywheels.

Batteries are gaining use in Australia, and their cost per kWh has declined and will continue to do so. Their ease of distribution across the National Electricity Market (NEM) reduces network costs and promotes grid stability. Their frequency stabilisation response (provided under the NEM term "ancillary services") is much more rapid than hydro, as has already been demonstrated in South Australia (SA)[1]. High peak pricing, and low (even negative) feed-in tariffs act as a strong financial

[1] As reported by the ABC here, quoting AEMO's Damien Sandford

incentive for households and businesses to install batteries. Solid state lithium batteries with twice the energy density of current technology will become available within three years[2].

Some of the negatives of SH2 are:

- Is rather inefficient owing to long pumping distance – perhaps only about 60% for the complete cycle[3].
- Systems storage capacity is nothing like as large as claimed – probably less than half the claimed capacity[4].
- Potential (certain?) conflict with irrigators. One summer of suspended SH2 operations owing to the demands of irrigators would in all likelihood destroy the business case presented.
- Requires major investment in grid enhancement before export to areas of need eg SA. It is not correct, as SH2 proponents claim, that the cost of grid enhancement should not be included in the capital cost, as the project is minimally useful without it. If it is to be regarded as a separate cost, then it must be compared with other storage projects with very much smaller transmission costs.
- Has not been judged competitively against multiple small-scale pumped hydro (see ANU study[5]). The Marsden Jacob Associates (MJA) report[6] referenced on the SH2 website makes no comparisons with the small-scale pumped hydro costs proposed in the ANU report. This latter report projects PV and wind plus 50% pumped hydro costs in the range $80-100 /MWh, while the MJA report uses battery costs 68% higher than current commercial offers in order to bolster its case.
- Hydro Tasmania has identified 14 pumped hydro sites[7] with superior cost profiles to SH2. Coupled to a new Bass Strait interconnector, these options provide more reliable energy sources with no potential for conflict with irrigators.
- Amounts to a massive government intervention in what is supposed to be a private sector energy market, with unpredictable effects on private investment. Energy technology is changing very rapidly (eg. solar PV, wind and battery cost reductions). It would be only a high-risk-seeking private investor that would invest in SH2 given this dynamism. Why should the taxpayer take the risk? Of course, any taxpayer funded project can provide a return on investment if it has near-monopoly pricing powers in the NSW market.
- Transmission losses will be large compared to local small-scale projects (which are also less likely to conflict with irrigators). This will add to costs (eg. in SA) because of the long transmission distance.
- Potentially very damaging in a sensitive and rare alpine environment. Disposal of spoil seems to be an unsolved problem. The vast quantities of surplus spoil are proposed to be dumped into existing reservoirs, which reduces system capacity, or to be used to "create new recreational landforms" which seems to be doublespeak for just leaving it somewhere and then claiming this as a virtue.

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[2] Quoting Toyota's Executive Vice President Shigeki Terashi here

[3] See Australia Financial Review, Jan 24, 2018: "In other words, Snowy 2.0 will use about 1.8 kilowatt hours for each kilowatt hour that it actually delivers to consumers."

[4] Associate Professor Bruce Mountain, Victoria University, quoted here

[5] http://re100.eng.anu.edu.au/

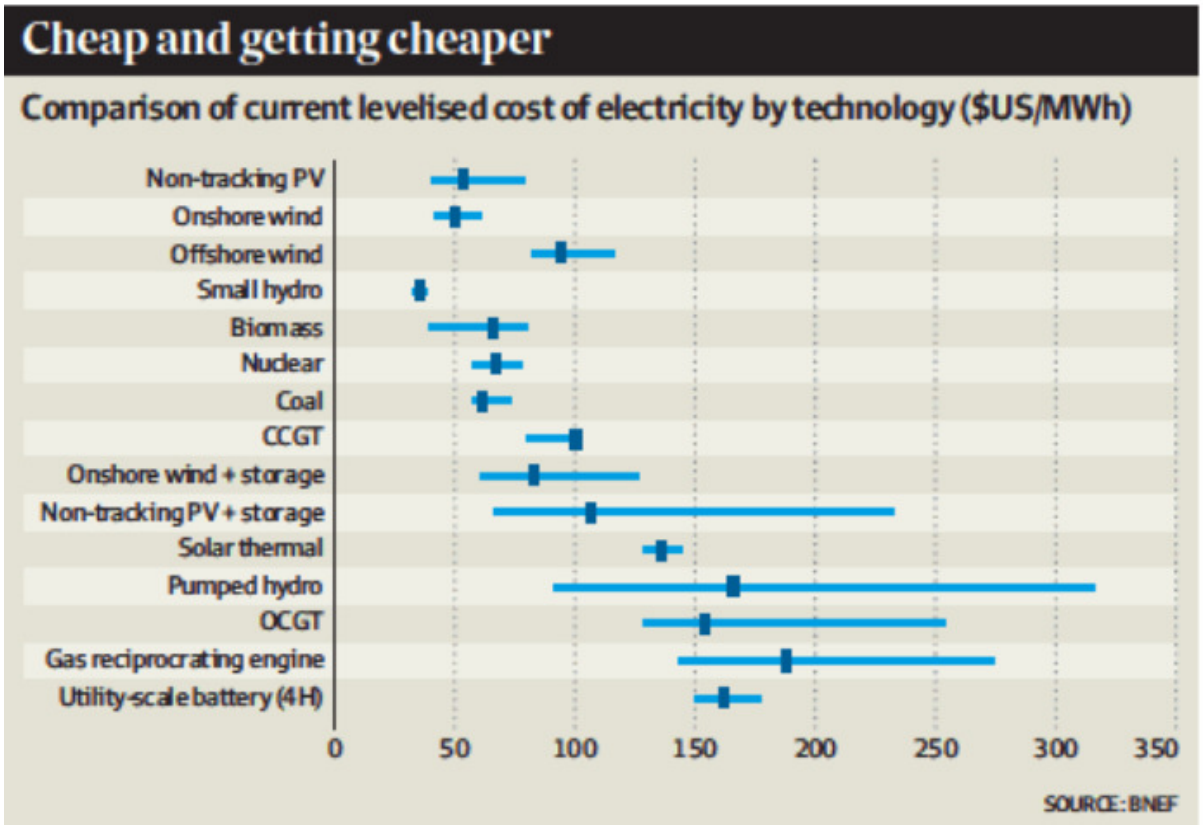
[6] https://www.snowyhydro.com.au/our-scheme/snowy20/

[7] https://www.hydro.com.au/clean-energy/battery-of-the-nation/pumped-hydro

- Is unlikely to be finished until 2027, by which time other storage options will have dramatically better cost/benefit indices.

The cost relativities of pumped hydro are, in any case, poor

The cost of new energy technology is reducing rapidly. The following table from Bloomberg New Energy Finance illustrates this trend:



Pumped hydro is amongst the most expensive technologies listed here, while wind and solar PV with storage are both substantially cheaper (median comparison). Hydro and transmission will not reduce in cost. Wind, solar, and battery storage will reduce.

Summary

SH2 is high-risk, uses taxpayer dollars to disrupt private investment, will inflict substantial ecosystem damage in a unique and sensitive environment, and is likely to add to future energy costs.

At the very least, its business case should be compared with the many existing alternatives, and with small-scale pumped hydro. The latter can be implemented in stages with evaluation before proceeding to the capacity of SH2. It can probably be financed entirely through private funding.

The business case must include all ancillary and related infrastructure costs, such as transmission interconnections, because it makes no sense to consider anything other than the whole-of-system costs, no matter who bears them. Otherwise the SH2 “business case” is really only a subsidy-shifting proposal.

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