Transmission expansion planning in the NEM: a profound failure and some suggestions

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Outline

- The economics of renewable electricity production and storage in the NEM
- Why does AEMO Integrated System Plan (ISP) claim that benefits exceed costs ?
- What might be done about it ?

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It costs much the same to produce electricity from renewable sources, and to store electricity, in neighbouring NEM regions

1. Solar irradiance in neighbouring NEM regions is comparable and solar PV is very cheap to build.
2. Wind resources in neighbouring NEM regions do not differ much. Although wind generation is relatively more expensive than solar, local factors are much more significant in deciding location.
3. Batteries costs much the same everywhere.
4. Pumped hydro is not competitive with batteries, anywhere in the NEM

- Conclusion: Interconnection can't be justified on the basis of production/storage cost differences.

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But what about diversity? Can (possible) diversity of wind resource justify interconnection?

Even if there may be some inter-regional diversity in wind resource (is there?) in markets producers respond to prices. We can see that has led to high inter-state correlation in wind generation

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Regional farmed solar diversity? Of course not – very high regional irradiance correlation

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Ditto rooftop solar

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So, why did ISP claim benefit of interconnection exceeds costs?

1. Biased and implausible counter-factuals (WRL, VNI-west, Marinus, Humelink).
2. Salami slices/Roman arches (WRL/VNI-west, Humelink/Sydney Ring South, Marinus/NW Transmission development).
3. Systematic deep under-costing in cost/benefit assessment (latest estimates typically 6X claims in initial actionable ISP analyses).
4. Local social and environmental costs ignored.
5. “Least cost” optimisation assumes the real world away (in markets, producers seek to maximise the difference between price and cost, not to minimize cost; and they don’t assume network congestion away).

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What to do about it?

1. Any body charged with developing a model and policy will have difficulty finding the best policy and if appropriate changing its mind. That problem is greater if that body has “national” responsibility. Smaller planning entities offer better ability to involve all interested parties and to work out a mutually acceptable way forward.

2. Allowing a variety of different planning entities to develop their own approaches increases the chances of finding the best approach, from which others can learn.

3. In general, seek arrangements that value gradualism, decentralisation, learning, negotiated settlement.

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Some specific suggestions

a) Relevant ministers order work suspension on Marinus, VNI-West, WRL, PEC and Humelink. CEFC hold capital allocations not yet made. Appoint independent commission to advise ministerial council on how to make the best of a bad lot.

b) Urgent rule change to take away all “actionable” rules for ISP.

c) Shrink AEMO back to power system operation only. Spin out market operation to a not-for-profit association accountable to market participants.

d) Transmission connection to be determined by state authorities.

e) Introduce network use of system charges so that all generators pay 50% of TNSP regulated revenues.

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