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It's revolution baby!

So what do we do about it?



- Unplanned market-led transformation has resulted in chaotic, inefficient change, legacy network constraints, uncertainty, profiteering and lost fortunes.
- The good news is that there are solutions but, in the roughly paraphrased words of someone much smarter and more famous than me, *the same thinking that got you into a problem is unlikely to get you out of it!*
- This paper talks to the role of, and opportunity for, Local Governments and/or regional communities to step in at a scale that is meaningful and with a model that delivers dividends locally.

According to many sources, the electricity grid will be 50% renewable by 2025

- <http://theconversation.com/at-its-current-rate-australia-is-on-track-for-50-renewable-electricity-in-2025-102903>

- Market situation – 14:1 projects ratio

<https://energy.nsw.gov.au/renewables/clean-energy-initiatives>



- “New dispatchable, emerging energy resources will be needed in the system over the next two decades to support the NSW energy system transition. The scale of the investment challenge is illustrated in Figure 1 below”
 - NSW Gov. Also Finkle report.

Australian Energy Market Operator projections (Integrated Systems Plan)

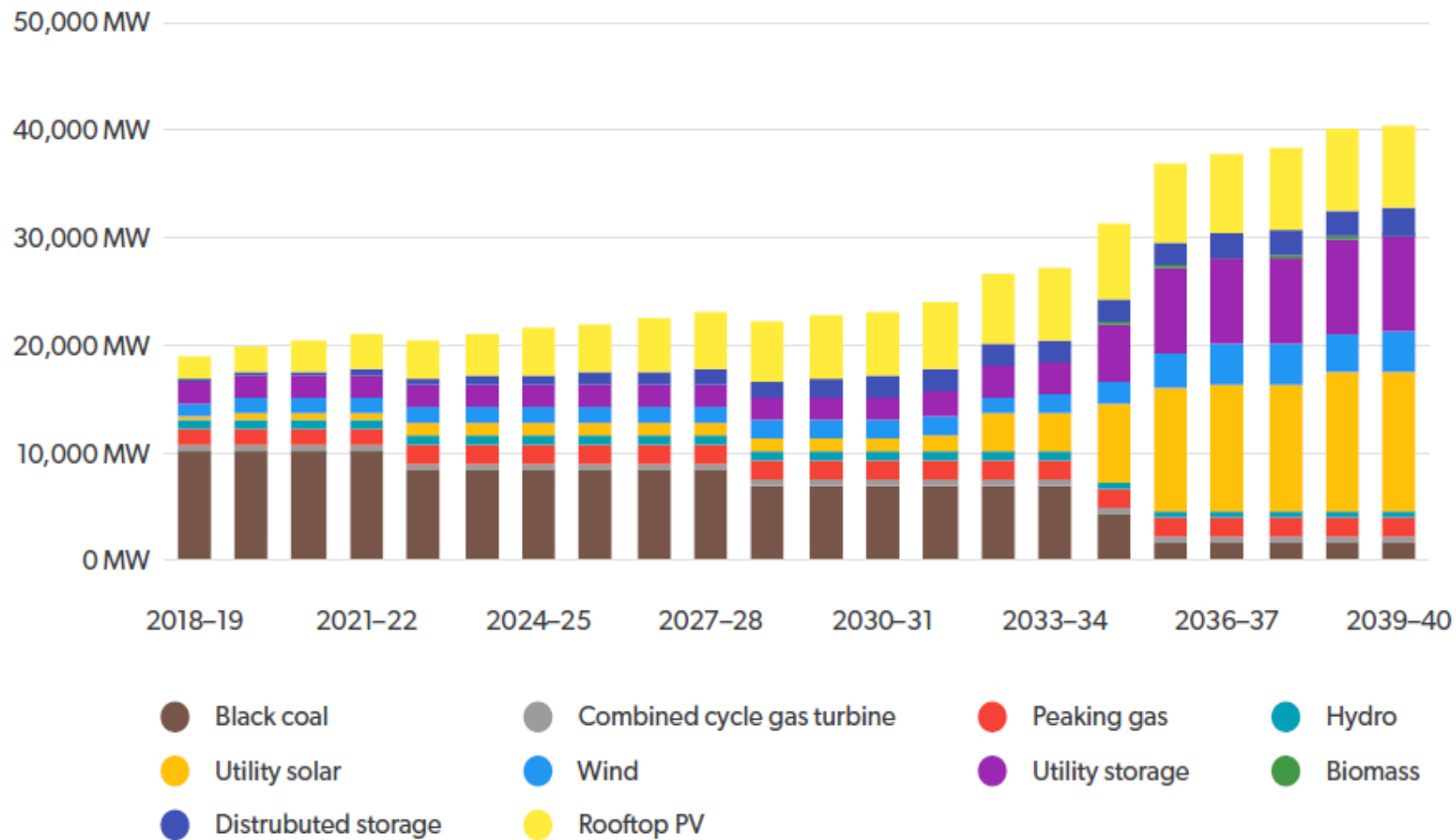
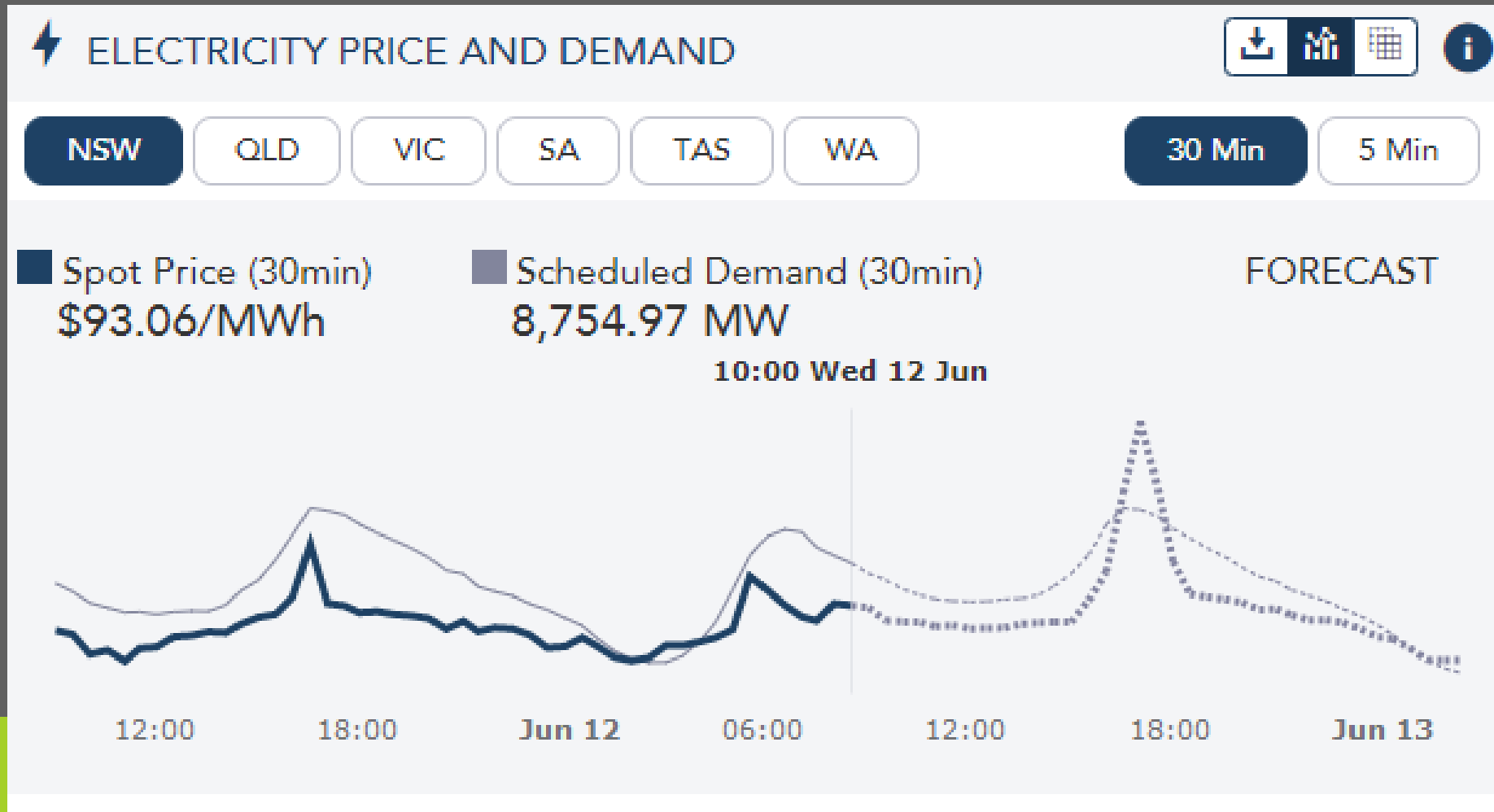


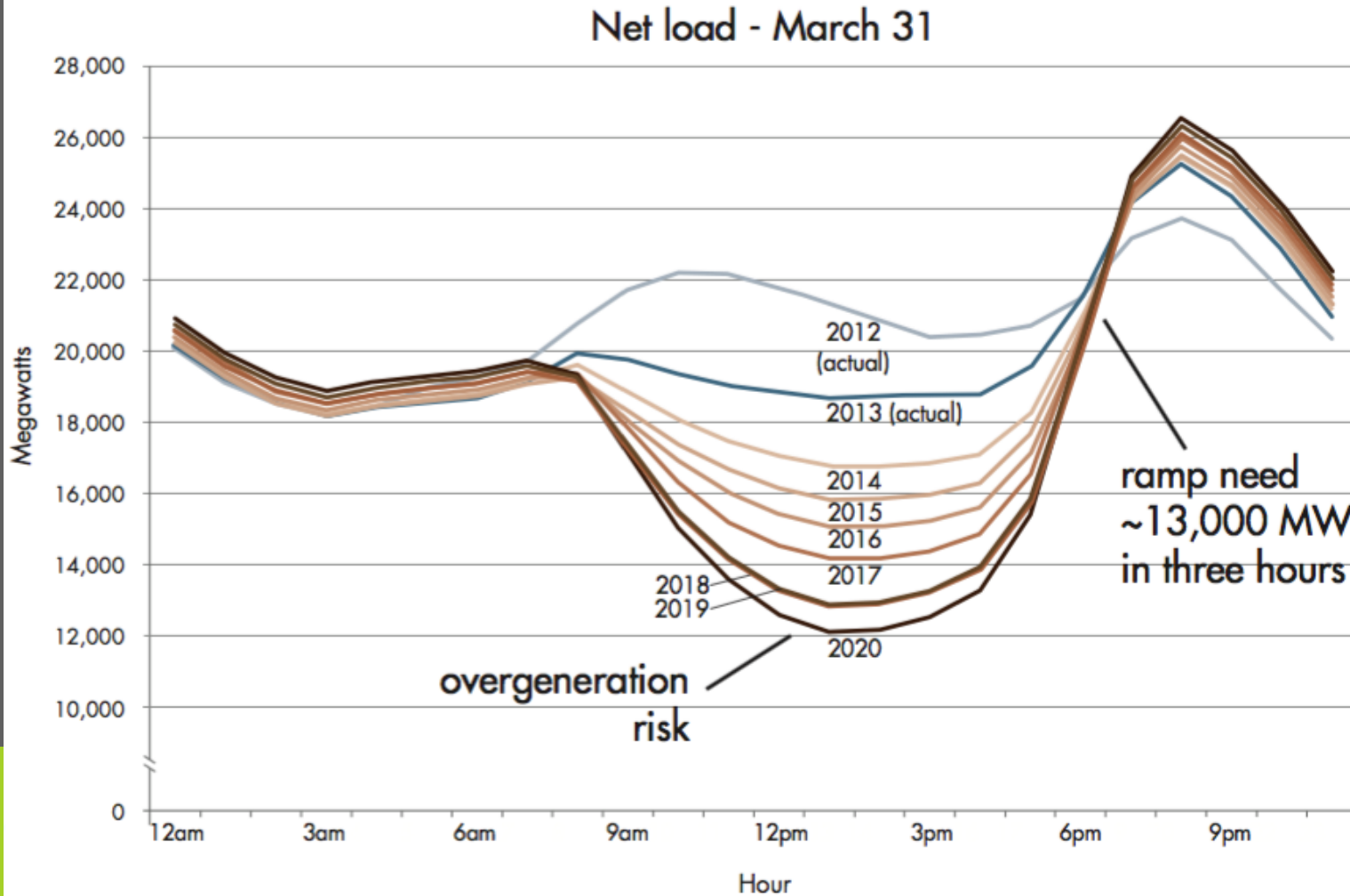
Figure 1: Projection for NSW electricity capacity under the Australian Energy Market Operator 2018 Integrated System Plan neutral economic scenario with storage initiatives

- The National Energy Market <https://www.aemo.com.au/>



Market impact - projections

Figure 2: The duck curve shows steep ramping needs and overgeneration risk



NB. Despite this, NEM price is expected to keep trending upwards overall.

Implications for RE generally

- Post boom 'buyer beware' - new RE projects need to be smart and/or have purchasers locked in. Opportunity still exists within distribution networks.
- Case for new thermal coal power plants in Australia is poor. Lengthy approval timeframes, market uncertainty, inflexibility of supply and on-going operating costs have reduced the appetite for finance in all but the least developed communities.
- Case for Batteries keeps getting stronger – as the economic tool to shift and save or earn, trading on market fluctuations. Large-scale solar without storage is less likely to be viable.

Battery case study

- Tesla Powerpack – 400 kWh (100kwp for 4 hrs) = \$250,000. Ie \$625/MW
- S Korean battery – 500 kWh = \$100,000 or about \$125/MW

Eg for 500kWh battery.

\$100,000	CAPEX		
500	kWh		
		Per day	Per year
input	\$ 0.05	\$ 25.00	\$ 9,125
sell	\$ 0.08	\$ 40.00	\$ 14,600
sell	\$ 0.10	\$ 50.00	\$ 18,250
sell	\$ 0.15	\$ 75.00	\$ 27,375



Where to now?

- Energy Efficiency – very often the best thing you can do is use less
- Back-of-meter – still viable, increasingly so with storage, because the strongest economic case relates to not buying energy.
- Innovative business models – eg Council as energy provider
- Energy use outside of grid export – eg Evs, heat and hydrogen



Longer term

- Micro-grids and embedded networks.
Possible regionally owned and operated networks... again.
- Distributed 'smaller' systems acting as Virtual Power Plant.
- Healthy application of RE to non-grid energy such as transport and process heat.



Discussion – questions.

Threats to and opportunities for the regions?

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