

At a glance: FTI Consulting final report on forecast congestion in the national electricity market (5 August 2021)

New modelling shows severe network congestion by 2030

The Energy Security Board (ESB) has released modelling that shows severe network congestion even with expanded construction on the grid. New large scale renewable generation must have a way of managing its congestion risk or face being constrained and unable to dispatch.

The modelling, by FTI Consulting also identifies increased wholesale prices driven by the dispatch of higher cost generation when lower cost renewables are constrained from the grid.

These higher wholesale costs would be on top of higher network costs associated with additional transmission network investment to accommodate new renewable generation, including an estimated 200% increase in wind and solar by 2030 and a total fleet of large scale generation and storage of over 72,000 MW.

The power system balances supply and demand continuously – starting with the cheapest generation first and moving up the dispatch order until consumers have the level of power they need. Congestion arises when network limitations constrain the flow of electricity from places where lowest cost generators are located to where electricity is demanded (generators are then constrained off to protect the technical stability of the grid). If cheaper generation has to be constrained off – then more expensive options need to be dispatched.

ESB Independent Chair, Dr Kerry Schott AO, said this modelling has been an important input in the development of a congestion management mechanism for further consideration by energy ministers in the months ahead.

A public forum will be held on 9 September to have FTI present their work and to discuss the modelling and outcomes.

“The FTI modelling shows just how serious the impact of congestion will be within the next 10 years,” Dr Schott said.

“The cost implications for consumers of both higher wholesale prices and higher network costs are clear, along with the chilling effect congestion risks will have on renewables investment.

“In the immediate term congestion can be largely managed through state-led renewable energy zones (REZs), but reforms are needed to realise the promise that energy intensive industries can get a wholesale market cost advantage from locating near plentiful supply, as well as to address congestion across the NEM as a whole.”

FTI forecast wind and solar capacity across the national electricity market (NEM) to increase by at least 200% to 31GW by 2030, consistent with AEMO’s ISP Step Change forecast.

Using the assumptions from AEMO’s 2020 ISP and network limits from AEMO’s Electricity Statement of Opportunities (ESOO), FTI predicts that with both the generation and transmission connected as planned in the national electricity market, around 2.5 TWh of solar and 1 TWh of hydro generation would be constrained off the grid in 2030, with additional thermal generation dispatched in its place. This represents around half of the current grid-scale solar in the market – or 20% of the potential increase - being constrained within 10 years.

Dr Schott said the actual situation could be much worse with the current level of new generation investment already running 27% ahead of the ISP step-change scenario.



“That extra generation doesn’t have the transmission to go with it, so it will be wasted with nowhere for it to go. We need to reform the way generators access the grid before this get worse,” she said.

“More renewable generation can’t help lower emissions if it is constraining off another solar farm down the road. All it does is make the clean energy transition more expensive than it needs to be.”

FTI found that constraints generally lead to higher prices in each state across the year. The average increase in price is \$5/MWh, ranging from \$3/MWh in November to \$9/MWh in January. They estimate that the higher prices, along with spikes during periods of system stress, which are worsened by constraints, result in consumers paying at least an additional \$1.05 billion over the year.

Additionally, investors of generation located behind frequently-constrained transmission lines could, because of curtailment, be prevented from earning a significant proportion of revenues.

The biggest impact is likely to be on solar generators, with over 20% of the potential increase in solar generation curtailed when constraints are introduced. Constraints on generation from additional wind capacity is typically less correlated with significant constraint periods, and while batteries can help the system during periods of high demand and prices, they are less beneficial to the system during periods of high renewable generation.

The modelling has been released ahead of the public forum to facilitate detailed examination of the findings as part of the ESB’s preparation of a rule change for submission to the AEMC to progress the congestion management model, subject to ENCRC deliberations.

About the Energy Security Board

The Energy Security Board reports to the Energy National Cabinet Reform Committee (ENCRC). The ENCRC and the energy ministers’ meeting are ministerial forums for the Commonwealth, States and Territories to work together in pursuit of national energy reforms. The ENCRC and energy ministers’ meeting were established following cessation of the Council of Australian Governments (COAG) in May 2020.

The Energy Security Board has five members:

Dr Kerry Schott AO	Independent Chair
David Swift	Independent Deputy Chair
Clare Savage	Chair of the Australian Energy Regulator
Anna Collyer	Chair of the Australian Energy Market Commission
Daniel Westerman	CEO and Managing Director of the Australian Energy Market Operator

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