



ENERGY SECURITY BOARD

At a glance: Electricity market redesign advice publicly released (26 August 2021)

The Energy Security Board (ESB) welcomes today's release of its recommendations for the redesign of the national electricity market (NEM). These were submitted to energy ministers on the Energy National Cabinet Reform Committee (ENCRC) at the end of July.

ESB Independent Chair, Dr Kerry Schott AO, said the release of the detailed recommendations enables informed public debate about the package of interrelated reforms and will be of interest to industry and consumers and help inform future decisions by energy ministers and National Cabinet.

"The release of our complete advice should end the guesswork about certain aspects of the proposed reforms which has certainly not enabled an informed debate." Dr Schott said.

"This is not one big bang reform for the redesign of the electricity market. It is a set of interrelated measures to be implemented and considered over time. The reforms aim to deliver reliable, affordable, lower emissions electricity for consumers and to keep the lights on as the system decarbonises."

Making way for new large-scale generation

The ESB is recommending four key pathways for reform to manage both the orderly exit of old technologies (especially ageing coal fuelled generation) and pave the way for new technologies.

"The job is to get firm and flexible supply that is affordable." Dr Schott said.

"To achieve that we need improved information, harmonised jurisdictional schemes, orderly generator exit and timely entry of investment in new resources.

"We also need a capacity mechanism alongside the energy only market to bring forward the right mix of firm, flexible and variable resources when needed. That capacity might come from pumped hydro, batteries, wind, gas or coal, with those most able to be fast and flexible most likely to be relied upon and most likely to receive revenue.

"Participants need sufficient incentives and confidence to invest in new capacity. While that confidence is present for wind and solar generation, along with some battery storage, it is not evident for pumped hydro or gas peakers that can provide 'deep' storage on the probably few occasions when it is needed.

"Jurisdictions need assurance that participants will meet the power system's physical needs at all times and if that assurance is not there, governments will intervene (as they have done) to provide missing gas peakers and pumped hydro as thermal coal exits."

Recommendations include:

- Providing governments with tools to organise extra supply when they decide more 'insurance' is needed through a new opt-in strategic reserve or by triggering the current retailer reliability obligation (RRO), alongside principles to better align investment nationally.
- Incentivising the market to bring forward the right mix of firm, flexible and variable resources, including storage, through a new medium-term capacity mechanism.
- Increasing transparency to the market by requiring generators to provide more information about early exit and power supply status.
- Enhancing data capacity to enable tracking and forecasts of consumer choices, demand response, value of reliability, and better understanding of the wholesale market and changing contracting behaviours.



Connecting renewables to the grid

The ESB recommendations are also about getting new renewable generation to consumers.

“We need to build new transmission projects and we are already well progressed down this path through the actionable Integrated System Plan (ISP). New generation investment is 27% ahead of the ISP step-change scenario and the delivery of new transmission must meet the target dates” Dr Schott said.

“Nevertheless, even if it were physically possible to build enough transmission to connect all new generation projects located in increasingly remote locations, the costs to consumers would be unjustifiably high.

“A new efficient grid network will have some congestion. But the level of congestion needs to be managed. The benefits of new renewable generation diminish as the energy generated from new solar or wind farms either goes to waste or displaces existing renewable energy. These changes will help ensure that the generation that is being built can be operated successfully rather than building new projects that can’t connect to the grid and/or force those already there to be constrained. The reforms favour long-term operators over short-term speculators.”

The ESB recommendations complement planned transmission projects in AEMO’s ISP and the development of Renewable Energy Zones (REZs) with a congestion management mechanism to encourage more generation into renewable energy zones (and the limited other places) where transmission costs can be shared and firm access secured.

- Supporting the development of renewable energy zones through a consistent NEM-wide framework including principles to manage, planning, connections, access, funding, and economic regulation.
- Encouraging generators and others to locate in renewable energy zones (and the limited other ideal locations) via a dual mechanism of congestion charges and rebates.
- Identifying ways to maximise the timely and efficient delivery of major poles and wires (including ISP) projects.
- Enabling effective locational forecasting to help plan and prioritise transmission augmentation.

New modelling done for the ESB has been released recently to demonstrate the extent of future congestion challenges – link to separate FTI media release.

People’s generation – rooftop solar and other distributed energy resources

Properly harnessing latent demand side flexibility and solar PV will make the grid more productive, cutting both costs and emissions.

“The benefits of harnessing the power of rooftop solar, batteries and new technologies is clear,” Dr Schott said.

“These reforms will make it easier and more seamless for consumers to benefit more from these resources and manage their demand in return for financial rewards.”

- Resolving identified technical and market issues which slow down and make it harder for customers and the grid to get the full value of distributed energy resources. A detailed 3-year implementation plan has been mapped out with industry and consumers.
- Opening up new ways for customers with solar, batteries or smart appliances to be rewarded for responding to system needs, backed up by emergency tools to help keep the grid stable.
- Putting fit for purpose consumer protections in place that are based on a new risk assessment tool to assess potential harm to customers associated with new products and services.



Strengthening the power system

Lack of essential system services has cost consumers a lot of money in recent years as a result of expensive interventions that have had to be made by the operator to keep the system stable. New technical backups (frequency, inertia, system strength, operating reserves) are needed urgently with the increasing wind and solar (asynchronous) generation and falling levels of coal-fired (synchronous) generation.

Dr Schott said new technologies like large-scale batteries and flexible demand will help make the system stronger.

“We must restore confidence in the system, avoid high running costs for consumers, and value the capabilities of batteries and other innovations,” she said.

- Supporting availability and investment in the four essential system services - frequency, operating reserve, inertia, and system strength - through actions already underway.
- Providing new tools to help AEMO manage the complexity of scheduling these essential system services as the resource mix on the grid changes.
- Further monitoring of market conditions to identify the need for longer term reforms like the further bundling of system services and an integrated ahead market or development of an inertia spot market.
- Providing critical data for monitoring and forecasting of required services weather-driven generation and demand.

The ESB will continue to work with the Australian Energy Market Commission (AEMC), Australian Energy Market Operator (AEMO) and the Australian Energy Regulator (AER) to progress reforms to the National Electricity Rules while the broader advice is considered by governments.

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

Ends

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 2 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 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.

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