

DELIVERING ADEQUATE POWER SUPPLIES RIGHT NOW AND INTO THE FUTURE

Being prepared for old coal retirement:
resource adequacy mechanisms and ageing thermal retirement

FINAL REPORT JULY 2021



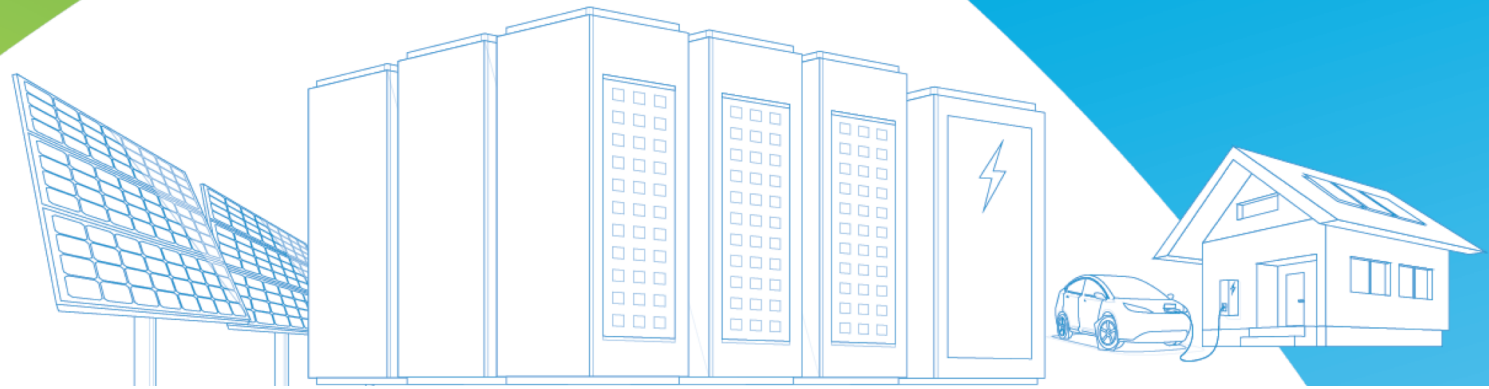
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Australia is turning over its generation fleet to higher levels of weather-driven power. Government emissions targets and environmental schemes have increased the level of renewables. Cheaper renewables have changed the financial prospects for ageing thermal generation which is leaving the system. The post 2025 electricity market redesign includes essential measures to provide confidence that power will be there for consumers when it's needed. They are the best way to reduce significant price or reliability shocks to consumers during the transition.



Delivering adequate power supplies

A profound change underway. The scale and speed of renewables penetration has already changed the energy economy and will continue to do so. Cheaper variable resources can provide many cost and environmental solutions. They also make for a necessary transition which needs careful coordination.

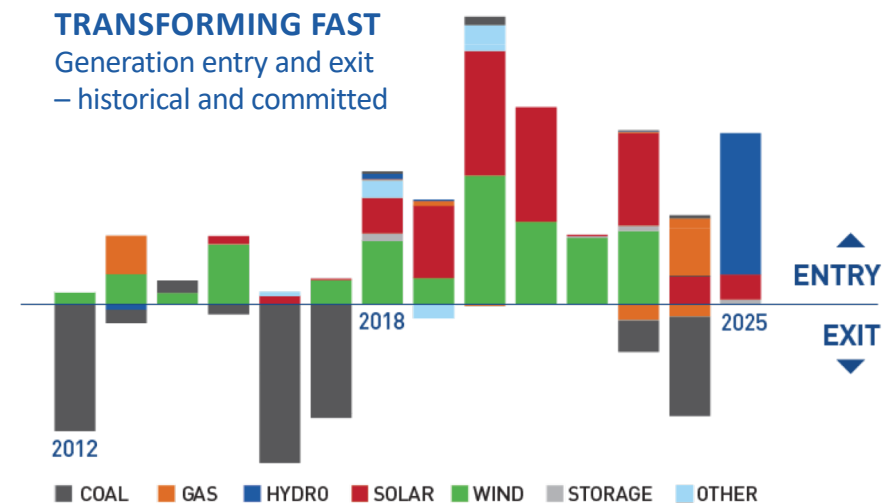
Investment to replace exiting ageing thermal generators will be significant.

Given the scale of transformation, governments need to know that supply is there to cover demand. We also need to prepare for a very different future power system powered by generation with low-to-no fuel costs.

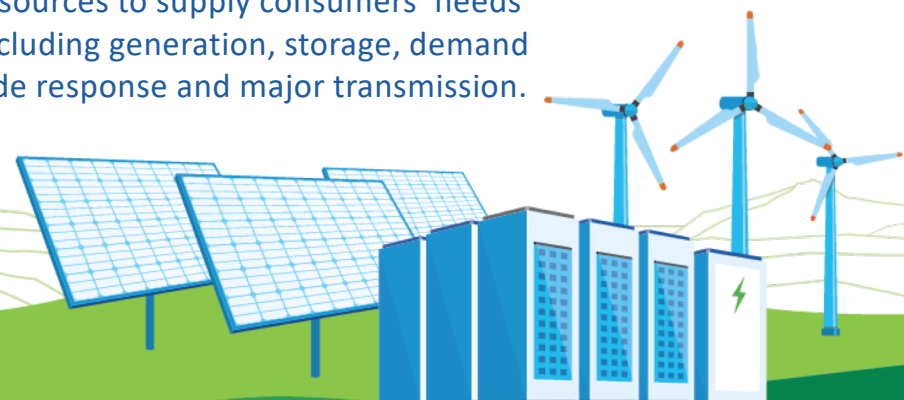
The adjustment will not happen overnight – new supply and demand patterns are being established and long-term, billion dollar investments in the right mix of resources are required. Governments are also likely to intervene to keep the lights on and prices affordable as the market adjusts to incoming wind and solar, the rise of batteries, and thermal exit.

A new market design will help align the risk appetite for reliability between investors and governments. Government willingness to accept gaps in reliability or the high pricing necessary for market investment seems to be significantly lower than that of the private sector, with governments investing sooner to manage risk on behalf of customers

TRANSFORMING FAST Generation entry and exit – historical and committed



Reliability = is having enough resources to supply consumers' needs including generation, storage, demand side response and major transmission.



Unlocking benefits of change for families and business

This is about managing reliability to keep investment going in a market now based on different economic behaviour we move to a high variable renewable energy system with low-to-no fuel costs.

We are looking ahead at what will be needed for a reliable electricity supply in the future. That requires improved information, a national approach, targeted investment signals, and being prepared for the exits of big generators.

Resource adequacy is a real and present danger. We have had a very mild summer, and everyone has got very complacent, but we only need one hot summer in three jurisdictions together or a major unexpected outage at a big coal plant and we've got a real resource adequacy issue right on top of us.

We want arrangements in place to manage emerging reliability needs and risks. The reforms we recommend will unleash strong competitive forces in the market, helping to achieve structural changes we need to improve innovation and productivity - not only in the energy sector but across the Australian economy more broadly.



Affordability – will be achieved by harnessing the power of commercial investment to deliver reliability and avoiding price shocks from early generator exits.



Emissions reduction – building a stronger market for firm and flexible energy that can be dispatched on demand sets up renewable generation to succeed because in our energy market the lowest cost electricity is dispatched first.



Keeping the lights on – in the new-look market depends on having the right mix of variable, firm and flexible power to respond to changing demand and supply conditions. Coal might be firm but it is not intrinsically flexible. It is more likely that when firm and flexible energy is needed it will come, to start with, from batteries, gas and pumped hydro generation. Wind and solar will increasingly 'firm up.'



Supporting jurisdictional reforms – coordination of government investment is needed during the complex industry restructuring that comes with the sector's transformation. This work provides a transition pathway from immediate actions of national principles and 'insurance' tools ahead of future market-based mechanisms to deliver resource adequacy.



A simpler energy market transition for users – will result from a nationally coordinated transition and improved confidence in the power system's ability to cope with massive change. Recommended MTPASA changes and better information sharing will also provide greater transparency to the market on changing operations of existing thermal fleet.



Powering up with a new capacity mechanism

We need to shift focus to the medium and long term; to the future market design; and to regulatory frameworks that will support new investment that maintains reliability and security of supply at lowest possible cost.

The ESB has developed a straw proposal for a new capacity mechanism, based on a physical retailer reliability obligation (RRO), that sits along side the market.

It can provide an ‘investable’ and enduring signal that directly targets what we need and help reduce the current and future investment uncertainty the transition brings.

A detailed design period of intensive stakeholder engagement on the capacity mechanism proposal is recommended. At the outset it’s important to clarify that this is not a mechanism which favours coal.

All resources, variable, firm and flexible, will be eligible for participation in the new capacity mechanism. They will be rewarded for being available during periods when reliability is ‘at risk.’

Resources that support the system during periods of low renewable energy output; or cover poor reliability from an ageing thermal fleet will be the major beneficiaries of a capacity mechanism. Coal may be firm, but it is not intrinsically flexible. When dispatchable energy is needed it is more likely going to come from gas, batteries and/or pumped hydro generation to start. The right capacity mechanism will also help variable renewable energy to ‘firm’ up with storage and in the long term can provide support for more capital intensive renewable generation.

We expect that a new capacity mechanism would over time increase penetration of wind and large-scale solar, encourage construction of batteries and pumped hydro, and see an orderly exit of coal;

Maintaining reliability, affordability and security during the energy sector’s transition is essential to build a strong foundation for the continuing decarbonisation of the sector. Other recommended mechanisms would provide jurisdictions with measures to address capacity concerns immediately, including a ministerial trigger for the existing RRO straight away and a new strategic reserve.

The national electricity market needs a new mechanism that can harness the power of commercial investment to meet capacity requirements. Debate to date has not sufficiently engaged with the scale of transformation ahead. A future high-variable renewable power system with low-to-no fuel costs diminishes the value for capacity implicit in spot and contract prices. More substantial change is now required.



Maintaining reliability while transitioning to the future power system

The ESB's resource adequacy reform includes measures to drive investment in generation, storage and demand side response. This all needs to happen in time to support an orderly transition as ageing plant retires so closures don't cause price or reliability shocks to consumers.

The immediate job is to firm up reliability before 2025. By then we expect a new capacity mechanism could be in place to secure the future. That new mechanism should drive innovation and activate the demand side to build the power system of the future.



Empowering current arrangements to optimise investment decisions.

- investment principles for jurisdictional schemes
- rule changes for operational information to help manage orderly exit of generators.



Insurance tools for governments to organise extra supply when they decide it's necessary.

- jurisdictional strategic reserve
- market-wide ministerial trigger to activate the retailer reliability obligation

Maintaining reliability while transitioning to the future power system (continued)

NOW

Investment principles for jurisdictional energy investments. These may be interim only as the capacity mechanism proposal includes possible common approach to coordinating jurisdictional investments:

- incentives for parties to contracts to base operational decisions on wholesale price signals (inclusive of ancillary services)
- incentives for investors to enter bilateral contracts with market participants rather than rely on underwriting contracts.
- principles for orderly exit management contracts to address key terms and conditions including: cost recovery should be funded by governments and include specified obligations.

Information gathering and provision:

providing governments with the more detailed information they need by leveraging reports eg ESOO and ISP by market bodies to help governments decision-making by providing whatever additional information jurisdictions may need.

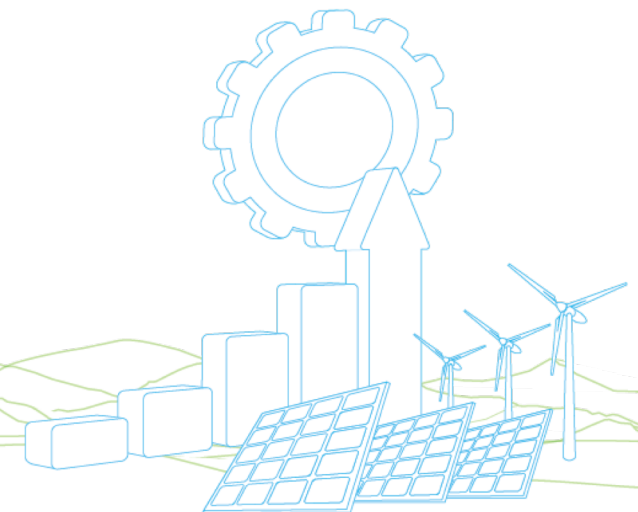
No recommendations were made in relation to these as existing information arrangements can be better leveraged

Rule changes to help manage orderly exit which improve information disclosures around mothballing and seasonal shutdowns via the MT PASA process.

New jurisdictional strategic reserve allowing jurisdictions to procure required reserves beyond the market reliability standard with the costs of establishing the reserve (fixed costs) borne by jurisdictions and operating costs recovered through RERT arrangements.

Market-wide trigger for all minister to activate the current retailer reliability obligation to fill supply gaps as required (currently only available to South Australian Minister).

Operating reserve mechanism is currently being considered as part of AEMC rule change projects with draft determination due December 2021.



Maintaining reliability while transitioning to the future power system (continued)

Building on current retailer reliability obligation with a new capacity mechanism

International electricity markets are facing similar issues as the world moves to lower energy sector emissions and focuses on decarbonised trade. Most international markets have some method of valuing electricity capacity directly – often working as an adjunct to other market reserves mechanisms.

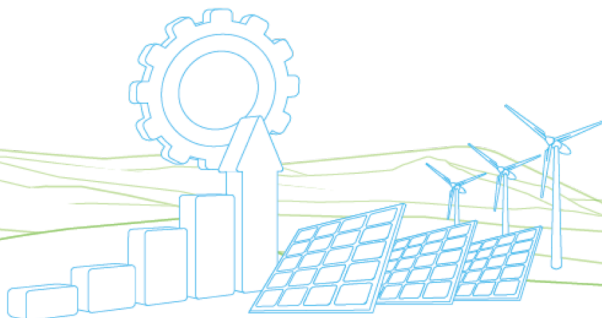
Any capacity mechanism needs to support investment signals in the mix of technologies and capacities that are needed to provide reliability, namely those that are flexible and responsive enough to support a generation fleet with very high penetrations of weather-driven power.

The ESB has developed a straw proposal for a new capacity mechanism called the physical retailer reliability obligation. Is intended to form the basis of stakeholder engagement on the final shape of the mechanism. It borrows features from other decentralised capacity markets such as the French capacity mechanism and applies them in the national electricity market context.

NEXT

Capacity mechanism detail to be developed over 12-18 month detailed design phase. A straw proposal for a physical retailer reliability obligation will be open for public discussion over this period. Its key design features are:

- change the nature of the current obligation so retailers and customers who opt in are required to hold sufficient qualifying capacity certificates (rather than financial contracts) to cover their share of meeting actual peak electricity demand.
- it would operate as an ongoing obligation.
- physical resources to support certificate would be assessed and certified in advance by AEMO.
- reporting on certificate positions would become an ex-post obligation.
- compliance assessment and enforcement would be dependent on a reliability shortfall, namely RERT activation or dispatch or unserved energy.
- volume of required capacity determined by liable entities who must cover their full demand load.
- certificates would have minimum value where energy market price settings are adequate to drive needed investment.



Maintaining reliability while transitioning to the future power system (continued)

Longer term reforms

Operating and regulating a power system with such a high proportion of variable, renewable, generation is a new experience globally. And Australia is at the forefront. This makes review and monitoring especially essential so we can adapt to changing experience and what we learn along the way.

A successful transition will see the right mix of resources incentivised to enter and exit the energy market consistent with reliability expectations and minimising cost. This would include low capacity factor assets that don't run except when needed during periods of low wind volumes, higher forced outage rates on ageing thermal units or hot and/or cold weather.

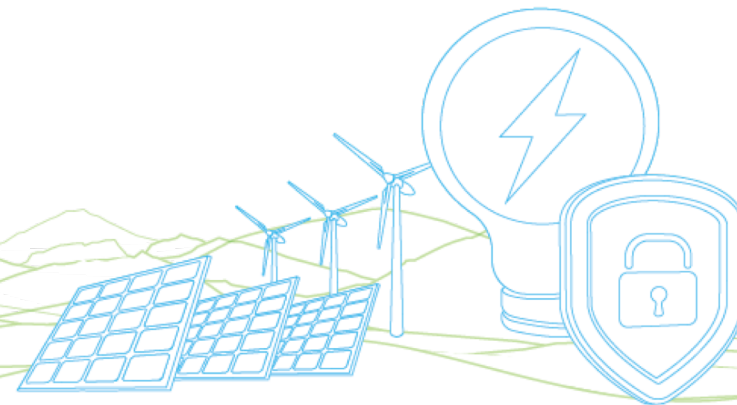
Monitoring of long-term storage like pumped hydro and new fuel types like hydrogen will be particularly important. Pumped hydro with its planning and infrastructure requirements, may require contracting arrangements that go well beyond a market's ability to efficiently deliver. A certificate scheme could be designed to lengthen the investment signal but its decentralised nature means it may be difficult to provide 10-15 year contracts outside of those underwritten by jurisdictions.

It is not part of this resource adequacy reform pathway to consider whether or not large scale storage can provide a broader range of capabilities than generation alone. Other capabilities might include alleviation of congestion or provision of essential system services. This may require further consideration after the impact of the ESB's post 2025 reforms are known.

The immediate criteria and settings for a certificate scheme will be determined in a detailed design phase following the post 2025 work, and may have to be revisited from time to time to ensure the new framework is driving good outcomes for consumers as we navigate the changes the transition brings.

FUTURE

Continued monitoring of reliability and overall costs to consumers will be necessary following implementation of the ESB's post 2025 reforms.



ESB recommendations to energy ministers

Supporting the immediate delivery of adequate power supplies while managing the timely entry of new generators and the orderly exit of old ones.

To support immediate resource adequacy in the national electricity market (NEM) the ESB recommends energy ministers:

- a) instruct the ESB to prepare rule changes for the AEMC to implement
 - I. a NEM-wide jurisdictional strategic reserve for the procurement of any required reserves that ministers consider necessary beyond the market reliability standard
 - II. enhancements to existing generator exit mechanisms for greater transparency of generator availability.
- b) adopt principles to guide development of any future jurisdictional energy schemes to ensure a common approach consistent with current market signals for investment. Jurisdictions are encouraged to use information on market needs and seek additional information from market bodies as necessary.
- c) adopt ministerial lever to trigger the current retailer reliability obligation as currently used by South Australia. This would give ministers the ability to strengthen the retailer reliability obligation while further detailed design work is done on a capacity mechanism.

To support timely entry and orderly exit of resources in the NEM for 2025 and beyond we recommend ministers:

- a) provide in-principle support for a capacity mechanism to ensure competitive provision of right generation mix as the market transitions towards net zero emissions.
- b) instruct ESB to engage with governments and stakeholders to develop detailed design of the capacity mechanism for ministerial agreement in mid-2023. Policy choices need to be made so the recommended design is effective and efficient.
- c) decentralised capacity mechanism should be the starting point for design work and consideration given to:
 - i. whether it's preferable to centrally determine required capacity
 - ii. whether existing contracts or new certificates should be the basis of the scheme
 - iii. how best to address impacts of the proposed capacity mechanism on retail competition (including small retailers), commercial and industrial customers, market power, transaction costs for participants and affordability
 - iv. integrating a NEM-wide common approach to jurisdiction investment schemes to work alongside the new capacity mechanism.



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