# Environment Victoria Response to Capacity Mechanism Project High-level Design Paper

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Energy Security Board
By email only: info@esb.org.au

**Environment Victoria** is pleased to submit to the Energy Security Board (ESB) the following comments on its Capacity Mechanism High-Level Design Paper. We thank the ESB for the opportunity to make this contribution.

Environment Victoria (EV), formerly known as the Conservation Council of Victoria, is an independent charity that has campaigned on environment issues in Victoria for more than 50 years. Established in 1969 as a peak body for more than 70 environment groups, EV now has more than 200,000 individual supporters. Our work focuses on campaigning to solve the climate crisis and build a thriving, sustainable society that protects and values nature.

## SUMMARY STANCE

**Having investigated the impact of capacity mechanisms in other jurisdictions it is Environment Victoria's view is that the ESB and energy ministers should abandon planning for a capacity mechanism. There are more efficient, cheaper, and less complicated ways to modernise the NEM, so it addresses the challenges of orderly elimination of pollution from power generation, system reliability, and cost efficiency.**

**It is our view that the ESB and energy ministers should re-engage with policies that set clear timelines for orderly coal-fired power station closures. Policies such as those proposed by Professor Frank Jotzo and Salim Mazouz,[1] the Blueprint Institute,[2] and Energy Innovation: Policy and Technology group,[3] are models that provide informative starting points.**

**Analysis of capacity mechanisms around the world has shown that, despite years of re-design of their implementations, they consistently lead to an increase of polluting fossil fuel generation and excess capacity beyond reliability requirements that ultimately lead to higher costs, which are passed on to consumers. Introducing a capacity mechanism into the NEM would almost certainly instigate the same problem, meaning that NEM customers would be required simultaneously to pay for a shift toward a net-zero grid and pay for retaining polluting generation capacity.**

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[1] See: https://ccep.crawford.anu.edu.au/publication/ccep-working-paper/6775/brown-coal-exit-market-mechanism-regulated-closure-highly.
[2] See: https://blueprintinstitute.s3-ap-southeast-2.amazonaws.com/PhasingDownGracefully_FINAL.pdf.
[3] Sonia Aggarwal, Steven Corneli, Eric Gimon, Rob Gramlich, Mike Hogan, Robbie Orvis, and Brendan Pierpont. "Wholesale electricity market design for rapid decarbonization." June 2019. Available at: https://energyinnovation.org/wp-content/uploads/2019/07/Wholesale-Electricity-Market-Design-For-Rapid-Decarbonization.pdf.

**Other options for firming renewable generating capacity can deliver the needed emissions reductions and system reliability more cost effectively and efficiently, notably a renewable energy storage target.**

MORE DETAILED FEEDBACK

Environment Victoria strongly urges the ESB and energy ministers to pursue other options to support a rapid transition to a net-zero NEM.

Other policies can decarbonise the NEM more quickly while ensuring system reliability without the chronic over procurement of excessively expensive capacity that capacity mechanisms are known to cause. An example includes a dedicated energy storage target designed to provide mechanism signals and certainty to attract investment in storage capacity to firm increasing percentages of renewables capacity across the NEM. Moreover, comprehensive and systematic analyses of capacity mechanisms around the world have shown to slow decarbonisation, not necessarily improve reliability, and cost more than other options. An April 2022 study provides a survey of the relevant research and succinctly explains why capacity mechanisms consistently lead to the opposite of the stated, desired outcomes:

- slower decarbonisation because aging thermal plants retire later and new thermal plants enter the market that otherwise would not have;
- procurement of far more electricity capacity than what is needed to meet reliability objectives; and,
- paying excessive prices for that capacity with the result that consumers waste billions of dollars paying for overpriced, unnecessary capacity.[4]

The underlying reasons are quite straightforward. As the study's authors point out, capacity mechanisms are an attempt to use a combination of regulatory mandates and mechanism forces to make power producers procure a higher amount of capacity than they would absent the mandate and at prices lower than they would absent mechanism forces.[5] Since such mechanisms do not naturally arise through agreements among power producers and other system participants, most of its salient features such as prices and the shape and position of demand curve must be constructed from estimates. Those estimates, though, always deviate from the true number and, thus far, always by a large amount that leads to significant environmental and consumer harm.

Put differently, capacity mechanisms function as an incentive for system operators, such as the Australian Energy Market Operator (AEMO), to over procure capacity because they face reputational risk of reliability failures yet do not bear the costs of over procurement.[6]

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[4] Todd Aagaard and Andrew Kleit 'Why capacity mechanism prices are too high' (2022) 75 *Utilities Policy* 101, 335 (**Aagaard and Kleit**).
[5] Aagaard and Kleit.
[6] Aagaard and Kleit, citing: Regulatory Assistance Project (2018), 'Capacity mechanism review: Response to the call for evidence by the Regulatory Assistance Project,' a technical submission to the UK's Ofgem in response to input on proposed capacity mechanism reforms (**RAP 2018**); and, James F. Wilson, (2020) *Over-Procurement of Generating Capacity in PJM: Causes and Consequences* Prepared by Wilson Energy Economics for Sierra Club and Natural Resources Defense Council

Consequently, the artificially constructed demand curves end up far from the point where forecast capacity equals the level of required investment and have a wide range of shapes.[7] Additionally, even in a large mechanism such as PJM, with 65 million customers, participants still can obtain and wield mechanism power resulting in inflated mechanism prices.[8] Regardless of the shape (or, presumably, the slope), capacity mechanisms around the world thus exhibit the same characteristic: systematic procurement of excess capacity at significant cost to consumers.[9]

Empirical analyses of actual peak demand compared to forecast peak demand and weather-normalised peak demand bear this out. While all forecasts will be inaccurate compared to eventual reality, a good forecast would be unbiased – just as likely to under forecast as to over forecast – capacity mechanisms. Reviews of outcomes show, however, that capacity mechanism forecasts systematically *overestimate* by unnecessarily large amounts.

Consider PJM, for example. Since its inception in 2005, PJM's capacity mechanism has overestimated capacity needs every year. Instead of estimates hovering around the reliability reserve target of about 15%, forecasts show an 'average percentage absolute error and average percentage bias are 9 percent against actual demand and 7.5 percent against weather-normalized demand.'[10] Instead of forecasting a seemingly-high 15% margin, PJM has consistently forecast 22%-30% margins.[11] Adding to this, its 'actual reserve margins and excess capacity are even larger, because the actual, weather-normalized peak loads are generally even lower than the final forecast for each delivery year, and in addition, thousands of megawatts of additional resources that fail to clear in each RPM auction nevertheless continue to operate as "energy-only" resources on the PJM system.'[12] Other capacity mechanisms such as the Western Australian, NYISO, and the UK capacity mechanisms have been similarly found to over procure, though thankfully for their customers, by smaller amounts.[13] Nonetheless, if the domestic Australian example from

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(**Wilson 2020**) Available at: https://wilsonenec.com/dev/wp-content/uploads/2021/10/Wilson-Overprocurement-of-Capacity-in-PJM.pdf.

7 Jennifer Chen (2018) 'PJM Auction Illustrates Importance of Demand Curve Fix. Natural Resource Defense Council' Expert Blog (June 14) <https://www.nrdc.org/experts/jennifer-chen/pjm-auction-illustrates-importance-demand-curve-fix>.

8 McCullough, R., Weisdorf, M., Ende, J.C., Absar, A., 'Exactly how inefficient is the PJM capacity Mechanism?' (2020) 33 *Electr. J.* 106, 819.

9 Gramlich, R., Goggin, M.. 'Too Much of a Wrong Thing: the Need for Capacity Mechanism Replacement or Reform.' (2019) Prepared by Grid Strategies LLC for Sustainable FERC Project (November); James F. Wilson, 'Forward capacity mechanism CONEfusion.' (2010) 23 *Electr.* 25–40. Available at: https://wilsonenec.com/dev/wp-content/uploads/2021/10/Capacity-Mechanism-CONEFusion-Elec-Journal.pdf>; and Wilson 2020.

10 Aagaard and Kleit.

11 Wilson 2020.

12 Aagaard and Kleit.

13 See AEMC data for Western Australia's Reserve Capacity Mechanism, analysed by Carol Tran at the Australian Energy Council Available at: https://www.energycouncil.com.au/analysis/western-australia-s-dramatically-changing-electricity-consumption/; Aagaard and Kleit for findings on the NYISO; and RAP, *inter alia*, for details on outcomes of the UK's 1-year and 4-year ahead capacity auctions.

WA's capacity market is an example for the NEM, the burden of a capacity market could run into the billions of dollars per year.[14]

Analysis has also shown how payments tend to go to incumbent thermal operators, and often to existing capacity that was not at threat of withdrawal. Poland's capacity mechanism auctions have awarded payments to incumbent plants nearly 90% of the time, mostly coal-fired ones, and does not create sufficient incentives to attract investment in new power generation units.[15] The UK's shows a similar bias toward incumbent fossil capacity.[16]

Some impact of this should be immediately obvious: additional emissions with no increased reliability at a significant price for customers above what they needed to pay for reliability that become, effectively, windfalls for the winners of capacity auctions. Others require more careful observation and analysis. For instance, by stifling scarcity pricing, capacity mechanisms can exacerbate the very problem they are purported to solve: incentivising procurement of sufficient firm capacity to ensure system reliability. Combined with the increased capacity requirement the capacity mechanism creates, the system creates something of a positive feedback loop that reinforces the push for additional capacity support.[17] Moreover, suppressing prices and price signals is especially problematic right now.

OPTIONS

The NEM resource mix remains in rapid transition toward net zero. Mineral energy resources such as coal and gas are overwhelmingly exported leaving domestic use highly at risk to global price shocks and geopolitical events such as Russia's invasion of Ukraine even as the NEM's thermal fleet exhibits less and less reliability. The human impacts and monetary costs of a changing climate continually increase in Australia and around the world.

Under such conditions of uncertainty and risk, flexible attributes will become increasingly essential and valuable. To support and speed the transition to a reliable net-zero NEM, forward-looking design to encourage rapid uptake of flexible assets – not merely capacity – and ones that do not generate emissions with power while still firming capacity.[18] Not recognising the value of flexibility would create a systemic bias that favours inflexible and polluting capacity and run counter to the stated policies of achieving a net-zero NEM.

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[14] Johanna Bowyer and Tristan Edis. "Energy Security Board's Capacity Payment: Burden on Households Capacity Payment Primarily to Fossil Fuel Generators Could Be More Than Double the Cost of the Carbon Price." August 2021. Available at https://ieefa.org/wp-content/uploads/2021/08/ESB-Proposal-to-Require-Consumers-to-Pay-Generators-a-Capacity-Payment_August-2021.pdf.

[15] Przemysław Kaszyński, Aleksandra Komorowska, Krzysztof Zamasz, Grzegorz Kinelski, and Jacek Kamiński. 'Capacity Mechanism and (the Lack of) New Investments: Evidence from Poland.' (2021) 14 *Energies* 78, 43 (available at: https://doi.org/10.3390/en14237843).

[16] See Matthew Lockwood, Catherine Mitchell, and Richard Hoggett. "Incumbent lobbying as a barrier to forward-looking regulation: The case of demand-side response in the GB capacity mechanism for electricity." (2020) 140 *Energy Policy* 111426. Available at: https://doi.org/10.1016/j.enpol.2020.111426; and RAP 2018.

[17] RAP 2018.

[18] RAP 2018.

Such assets are already available. As the past decade of rapid expansion of wind and solar – notably distributed solar – generating capacity has shown, the right policies can support rapid decreases in capital costs and high percentage integration into the power grid. As AEMO's 2022 Integrated System Plan and the ESB's Capacity Mechanism Project High-Level Design Paper recognise, this will rely on a whole-of-system upgrade including transmission and distribution assets.

Several suggestions such as a renewable energy and storage target have been proposed. A renewables energy storage target, such as that proposed by the Victorian Energy Policy Centre (**REST**),[19] is preferable to a capacity mechanism. A REST will incentivise both large and small scale electricity generation that will assist delivery of community benefits of the type available under the Renewable Energy Target small-scale scheme.

Given the ongoing and visibly evident problems that capacity mechanisms have presented in Western Australia and around the world, instead of committing to a capacity mechanism *a priori*, the ESB and energy ministers should explore all policy options to achieve a net-zero NEM as soon as practicable, at least at a pace of as close as possible to 100% renewable generation by 2030.[20] As noted above, these policy options should be informed by Professor Frank Jotzo and Salim Mazouz, and the Blueprint Institute.

Several principles put forth by the Energy Innovation: Policy and Technology group can help support exploration of policy to achieve net-zero NEM in which Australia achieves net-zero energy grid by 2030. Specifically, wholesale electricity mechanisms should:

- Accommodate rapid decarbonization, including eliminating barriers to participation of zero carbon resources.
- Support grid reliability, **so the incremental costs of reliability do not exceed the amount customers would knowingly be willing to pay for, or do not exceed incremental benefits.**
- Promote short-run efficiency through optimized dispatch of the lowest-cost resource mix, and using existing and emerging technologies to manage reliability and congestion.
- Facilitate demand-side participation and grid flexibility.
- Promote long-run efficiency – including efficient, competitive entry to and exit from the mechanism – under conditions of significant uncertainty.
- Minimise the exercise of mechanism power and manipulation.
- Minimise the potential for distortions and interventions that would prevent or limit mechanisms' ability to achieve efficient outcomes, consistent with the public interest (including the overarching public interest in reaching net-zero in a time frame aligned with Paris Agreement commitments).
- Support adequate financing of resources needed to deliver cost-effective reliability, based on an efficient allocation of risk (i.e. those that can best mitigate risk should bear it) that prevents customers from bearing the cost of poor investment decisions made by private investors.

[19] See: https://www.vepc.org.au/_files/ugd/92a2aa_3abddb7f37994760b86e0c921a692b5b.pdf.
[20] Such as that envisaged by AEMO's Hydrogen Superpower scenario in its Draft ISP.

- Be capable of integrating new technology as NEM needs evolve and adapting as technology changes.
- Have designs that are readily and realistically implementable.[21]

Thank you for the opportunity to give feedback on the guidelines. If of interest, we are more than happy to share in more detail our joint experiences engaging with community and industry about the transition to renewable energy in Victoria.

**Paul Beaton**
Senior Policy Analyst
Environment Victoria
p.beaton@environmentvictoria.org.au

**Bronya Lipski**
Policy and Advocacy Manager
Environment Victoria
b.lipski@environmentvictoria.org.au

[21] Sonia Aggarwal, Steven Corneli, Eric Gimon, Rob Gramlich, Mike Hogan, Robbie Orvis, and Brendan Pierpont. "Wholesale electricity market design for rapid decarbonization." June 2019. Available at: https://energyinnovation.org/wp-content/uploads/2019/07/Wholesale-Electricity-Market-Design-For-Rapid-Decarbonization.pdf.