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Energy Security Board Post 2025 Market Design

IEEFA's Response to Consultation Paper

Introduction

As a public interest thinktank, the Institute for Energy Economics and Financial Analysis (IEEFA) examines energy markets, trends, and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.

IEEFA is grateful for the opportunity to respond to the Energy Security Board's consultation paper, Post 2025 Market Design**,** released in September 2020.

Rapid ongoing technological change is creating a serious impediment to the efficient functioning of the National Electricity Market (NEM). IEEFA agrees with the ESB's assessment of the inadequacy of the existing NEM design to meet the requirements of consumers and market participants, both now and into the future. From the perspective of a market observer, IEEFA is pleased to offer high-level responses to selected questions in the consultation paper.

Referring to the *Summary of Questions for stakeholders* included as an Appendix in the Consultation Paper, our selected responses are as follows.

Section 1	**Consultation and Submissions**
1	The potential solutions and how well the characteristics of these solutions address the challenges identified with the current market design. Where alternative solutions can be identified for discussion, these would also be welcome.

We note the increasingly difficult task AEMO has in operating the NEM, and the imperative for change. Perhaps the most significant challenge is the need to maintain downward pressure on consumer prices, while also creating long-term wholesale price signals that will drive investment that avoids stranded asset risks associated with climate change. It is a simple fact that the energy transition, as it will occur in the NEM, will come at a substantial cost. But it is inevitable. As is the need for decarbonisation, even absent any Federal Government priority on this critical national imperative.

Consumers will pay for the transition, so all of the complex measures proposed for consideration in the paper that address these price challenges are important.

Similarly, a high degree of reliability is now expected. There is a very low tolerance for power outages. However, the government's prioritisation of even higher standards being expected of the NEM appear to be placing excessive pressure on the range and cost to consumers of solutions. The entire NEM has to go through a complete system-level change, and no one expects it to be cheap or easy. There should be some level of acceptance that there may be impacts on price and reliability along the way, and that individual consumers (particularly in the Commercial and Industrial sectors) may decide to provide their own backstops where reliability is critical.

Finally, at a very high level, the Post 2025 Market Design is adding or changing markets and mechanisms in order to accommodate the inevitable physical and digital changes in the system, driven by consumers and the shift to low cost but intermittent renewable energy. The potential solutions, and the characteristics of these solutions, appear to address the challenges with the current market design very well. It is well-recognised that the entire system must be overhauled, bit-by-bit, while it continues to operate reliably at an affordable cost. Some of the proposed solutions are derived from experience in overseas markets, and others are original and may be trialled for the first time in Australia, particularly given the world-leading nature of our rooftop solar penetration. Due to the above-mentioned price and reliability pressures, the solutions naturally follow the lowest risk path. Stepping back and thinking about what will be needed in the coming decades could perhaps spark some bold innovative thinking. Rather than bolt-on low-risk solutions, is there a grand scheme that is radically different from the existing NEM that allows a modernisation of the rules to solve a majority of the issues? Perhaps not, but it is worth seriously thinking about.

2 The proposed timing of the implementation of the changes to the market design and reasons for any alternative timing you may wish to propose.

Our separate analyses all point to a terminal decline in the economic viability of the now technologically obsolete concept of 'baseload' thermal coal and fossil gas generation in the coming decade. It is very possible that plant exits will occur earlier than forecast in the ISP, with planned investment in major maintenance no longer commercially viable. It is also likely that plant owners will not honour any advance notice directives, and would challenge any penalties, if their plants become terminally uneconomical and / or suffer an unexpected, catastrophic failure. Therefore, building out replacement capacity ahead of time is urgent.

DER, and the related technologies, are commercially viable tools that should be incentivised to play an increasingly important role. Market

price signals that incentivise DER, and therefore contribute to grid stability and lower prices, should be introduced without delay.

IEEFA appreciates the scale and complexity of the task, but there are increasingly material risks associated with not changing quickly. The NEM could be faced with early plant closures and inadequate capacity, and DER participants could falter and lose opportunities, or move overseas, because local markets are not available to match their business models, losing critical demand capacity and undermining Australia's national security as core manufacturing industries like steel and aluminium continue to be undermined by a lack of a long term energy and climate policy clarity here. Rio Tinto's July 2020 announced closure of the Tiwai Point aluminium refinery in NZ in 2021 is a clear warning for us.

Behind all of the challenges facing the NEM is the national imperative of shifting to a low cost, renewables-based net zero emissions economy. Even bigger challenges will emerge if we delay. Putting aside, for the moment, the Technology Roadmap recently issued by the Federal Minister for Energy and Lowering Emissions, the key to decarbonising the economy is electrification. The NEM will become ever more important in the process as heavy industry shifts from gas to electric. Despite the current emphasis on a fossil gas-lead recovery, our suggestion would be for the ESB to continue to focus on the Post 2025 market as underpinning a zero emissions electricity-lead recovery.

If the resources could be made available, our preference would be to see the Phased Market Development (Figure 1 in the Consultation Paper) compressed slightly, to help alleviate above-mentioned risks.

3 Our proposed approach to classifying the broad range of consumer needs, and what may be alternative or complementary incentives or regulatory measures (including consumer protections) to consider in support of these needs.

The approach is inclusive and thorough. Necessary stakeholder consultation is ongoing. It is not clear if any extensive consideration has been given to actual consumer sentiments and needs, with respect to the future market and related technologies. Many consumers are now familiar with rooftop solar, but it is not apparent if consumers know about DER, residential battery storage, the value of ancillary services markets and two-way markets. Referring to Section 2.1 of the consultation paper, the Energy Consumer Sentiment Survey perhaps reflects a level of dissatisfaction with price and (probably to a lesser extent) reliability, but we surmise that most consumers are simply not fully aware of the pending revolution in the energy sector, and the opportunities this brings. Education and outreach, combined with consultation, will be necessary. As we have mentioned, consumers may not get the full benefit of cheaper electricity near term, but they could be empowered to play a role in the system, even those who live in rented accommodation and apartments.

4 The proposed approach and criteria to evaluate the range of potential solutions identified within each workstream, as well as for assessing market design option(s) to be developed later this year.

It is early in the process, and we expect that more detailed evaluation and decision-making processes will be employed as solutions are developed further. At this stage the approach appears suitable.

IEEFA is fully supportive of the roadmap provided by AEMO's ISP and would encourage the ongoing review and updating of this plan in the meantime. The renewable energy zone and interstate grid connectivity initiatives are key pre-requisites to accelerated investment in lower cost, decarbonised electricity over the long term, so these need to be run in parallel to the Post 2025 Market Design review.

Section 4 Resource Adequacy Mechanisms – Market Design Initiative A

1 Do you have views on whether the current resource adequacy mechanisms within the NEM are sufficient to drive investment in the quantity and mix of resources required through the transition?

The important unpriced externality that is not highlighted in the Consultation Paper is carbon emissions, and other pollution from coal and gas combustion. So long as some market participants are permitted to freely pollute, there remains a certain lack of incentive to rapidly displace thermal generation with renewables. In the absence of a price on carbon, it is fortuitous that firmed renewable energy is the cheapest source of new capacity, but not pricing externalities such as carbon and pollution promotes rent seeking by thermal generators. The failure of the Federal government to introduce stable energy+climate policy, and interventions that promote further fossil fuel use in the energy sector (including enablers such as CCS and blue hydrogen, as well as ongoing subsidies like the diesel fuel rebate for coal mining) will slow the transition and ultimately increase costs.

The Resource Adequacy Mechanisms (RAMS), as introduced in the paper, are potentially useful drivers for ensuring adequate supply and reliability, but they should not in any way benefit what many consider baseload and/or synchronous generation from fossil fuels. Further to our comments above, IEEFA agrees with the need for an orderly, planned transition, but the era of stable synchronous baseload generation is over and (in our view) the ambition should be to move rapidly to a flexible largely asynchronous system, that values DER and demand response, and is highly digitalised. RAMS that support this are encouraged.

2 Do you have views on whether the short-term signals provided by an operating reserve mechanism or market would provide adequate incentives to deliver the amount and type of investment needed for a Post-2025 NEM in a timely manner? What impact could an operating reserve have on financial markets? What are the benefits of this approach? What are the costs and risks?

We have not analysed the operating reserve mechanism in detail. To the extent that a co-optimised market for operating reserves helps to sharpen the price signal and can incentivise investment, it is supported.

3 Do you have views on whether the signals provided by an expanded RRO based on financial contracts or a decentralised capacity market would provide the type of incentives participants need to deliver the amount and type of investment needed for a post-2025 NEM in a timely manner. What are the benefits of this approach? What are the costs and risks?

The enhanced focus on reliability and capacity procurement of the Retailer Reliability Obligation and decentralised capacity markets look overly complicated and ineffective, and are likely to distract from the larger picture and lead to unnecessary network 'gold plating' and/or excess capacity. Although we have not analysed these options in detail, they would seem less efficient than an operating reserve market and clear market price signals.

4 Do you have views on how an operating reserve mechanism and/or expanded RRO would impact the need for and use of RERT and the interim reliability reserve if they were introduced into the NEM? What adjustments to the RERT and/or interim reliability reserve may need to be made so that they are complementary and not contradictory or duplicative?

A well-designed and operating reserve market should reduce or eliminate the need for the RERT. Like the energy market, price caps can be set to limit consumer and retailer exposure. A competitive operating reserves market should produce better economic outcomes than the RERT. Perhaps a backstop RERT mechanism can be retained based on AEMO taking an option to purchase capacity in the event that the market falls short during a period of scarcity.

5 Do you have views on how RAMs (current or future) can better be integrated into broader jurisdictional policy priorities and programs? Should jurisdictions reflect broader policy priorities through the nature of obligations placed on retailers in an enhanced RRO or decentralised capacity market, or through the qualifying requirements for participation in an operating reserve?

It would be most efficient for jurisdictions to reflect broader policy priorities, but we have not considered the matter in detail.

Section 5 Ageing Thermal Generation Strategy – Market Design Initiative B

1 Have we correctly identified the cost, reliability and security risks to consumers from the transition away from thermal generation?

The ESB paper identifies the key risks associated with ageing thermal generators, although some risks may become acute more rapidly and

have a more severe consequence than others, particularly the increased probability of unexpected catastrophic failure, as evidenced in Muja AB in West Australia in 2017, at severe cost to consumers. Failure to acknowledge coal power plants were designed to operate for 40 years, not in excess of 50 years, is a failure of planning. It is recommended that the ESB complete a full risk impact assessment to determine the impact of each of the residual risks identified.

Closures of coal plants may arrive faster than forecast in expected closure years (shown in Figure 11 in ESB post 2025 market consultation report). There is potential for coal plants to close early due to erosion of profitability. This may occur in the short to medium term as the NEM sees reducing wholesale electricity prices as large volumes of renewable energy capacity are added to the grid at low marginal cost.

Coal plants may also not adhere to advance notice rules, potentially due to plant failures or profitability eroding to a point that operators and owners are under financial pressure to halt operation.

Investment signals in replacement capacity and transmission must be enhanced to ensure capacity is built and operational before closures. Investment signals encouraging capacity build may lead to initial temporary overbuild, reducing spot market prices until closures catch up. This risk will need to be managed.

Closures of coal plants will likely lead to windfalls for the remaining open coal plants in the absence of investment in replacement capacity ahead of time. Regional closures may drive large changes in supply across NEM jurisdictions (for example, QLD exporting to NSW), leading to large price differences. This risk must also be managed.

2 Are these risks likely to be material, particularly those relating to consumer costs?

The residual risks highlighted by ESB are likely to be material. As mentioned by the ESB, there is potential for sharp increases in wholesale prices following coal plant exits, with the historical example being Hazelwood. In order to reduce the impact of this risk and other risks associated with coal plant exits, the market design initiatives, including resource adequacy mechanisms, essential system services, and two-sided markets, will need to be developed, with the goal of protecting consumers against risk of price increases and ensuring acceptable levels of reliability.

3 Are there additional or alternate market design approaches that will ensure the transition away from thermal generation is least cost to consumers?

Past events, in particular the Hazelwood example, suggest that owners of thermal assets may not behave as the market and/or governments prefer, particularly for foreign domiciled private firms. Substantial risks

can be mitigated by a planned reduction in dependence on aging, high carbon emissions intensive thermal generation as quickly as possible. It would be prudent to look at contingencies in the event of rapid thermal plant exits, given the speed of international market developments in this area. Global financial markets are rapidly pricing in stranded asset risks and BlackRock's warning of AGL to accelerate its decarbonisation planning in October 2020[1] is a clear sign that Australia operates in a global financial market where investors, insurers and lenders are increasingly aligning with the Paris Agreement.

Contingent scenario planning, whereby jurisdictions undertake some planning for unexpected events, is recommended to ensure jurisdictions are prepared for future occurrences. This option should be developed further.

Major transformation of national infrastructure will have a substantial cost, and consumers will ultimately bear that cost. To maximum extent, the existing transmission, distribution, and generation assets should be re-used. To do this, the ESB can develop regulatory arrangements supporting the development of REZs, the retrofit of generators to run in SynCon mode and other arrangements to support efficient use of existing infrastructure.

Renewable generators, demand response and storage technologies are more modular and have shorter lead times than coal-fired and gas-powered generation. These technologies can be implemented at scale to smooth the impact of exiting coal plant generators, leading to less "chunky" step changes in available generation capacity. Market design approaches should ensure efficient investment in these technologies and any other technologies which can also deliver similar benefits to the grid and consumers.

The impact of hydrogen-based technologies and EVs on the energy market should also be considered. Regulatory arrangements to manage these growing technologies in the NEM may be explored to ensure efficient outcomes and maximise the investment, employment and export opportunities this could unlock for Australia.

4 Should the ESB consider and develop any of the options outlined in this section further?

Capacity market mechanisms have potential to deliver inefficient outcomes. As seen in the Western Australia capacity market example, in 2012 it was estimated that customers were paying $200 million a year in payments for capacity that was not needed. [2] The risk of large unnecessary expense to consumers will need to be prevented or mitigated while looking to the Western Australia example to understand the risks and potential unintended consequences. The risk

[1] Financial Times, BlackRock calls on AGL to hasten closure of coal-fired plants, 7 October 2020

[2] Renew Economy 7 Nov 2012 https://reneweconomy.com.au/dumb-and-dumber-energy-choices-in-the-wild-west-64327/

of inefficiency, arising from prolonging the life of a financially un-viable coal-fired or gas-powered generation facility, should be prevented.

Section 6 Essential System Services – Market Design Initiative C

1 What feedback do you have on the proposed provision of an operating reserve through spot market provision? How could this interact with operating reserve procurement for resource adequacy? Will such a mechanism assist manage greater system uncertainty more efficiently than current arrangements? What additional mechanisms might be needed to foster investment needed for a Post-2025 NEM? What are the benefits of this approach? What are the costs and risks?

We agree with the ESB that provision of operating reserves through a spot market is an efficient solution and could be co-optimised with other essential system services. The real-time market has a different purpose in the NEM that the Resource Adequacy Mechanism. There could be ways for market participants to contract such that services can be provided in both, from the same resource, with prioritisation for RAMS when the needs arise. IEEFA is unable to comment on the relative benefits and costs/risks of this approach.

2 What are your views about developing Fast Frequency Response with FCAS and developing a demand curve for Frequency Response? Will such a mechanism assist manage greater system uncertainty more efficiently than current arrangements. What additional mechanisms might be needed to foster investment for a Post-2025 NEM. What are the benefits of this approach? What are the costs and risks?

Our comments on this are similar to those for the above question.

3 What are your views on the proposed structured procurement for inertia and system strength by way of NSP provision, bilateral contracts and generator access standards, or through a PSSAS mechanism? Which approach is preferable, what are the relative benefits, risks and costs? Should the ESB instead prioritise the development of spot market for or structured procurement of inertia? What are the relative benefits, risks and costs of such an approach?

In the short to medium term, the proposed methods for procuring inertia and system strength may be plausible. IEEFA has not analysed the relative merits of each. Beyond this, in the 2025 timeframe, we suggest that inertia and system strength should be sourced through a spot market as suggested, at the same time as examining how and why the NEM remains locked into a stringent synchronous operational framework.

It is well known that reduced inertia is not fundamentally an issue and should not be viewed as an inhibitor of increased VRE. The adherence to strong frequency control and synchronous operation, and our reliance on inertia, are due to the current dominance of synchronous generators in the NEM. However, this view is changing as VRE and DER

increase worldwide, and new technologies demonstrate that inverter-based resources can provide system services and inertia[3]. DC interlinks and advanced controls can also support control of system strength. The ESB would be very aware of these developments, so our comment here is only intended to encourage progressive thinking and acceptance of some risk.

It is hard to imagine how the NEM will transition to the Post 2025 operation without some level of uncertainty and risk, with associated acceptable faults. Residential consumers may not be overly concerned with a slightly lower level of reliability, and C+I consumers (such as food industry, hospitals, police, telcos) where continuous supply is critical, should consider managing risk by ensuring they have adequate local backup supply. A technology disruption of this magnitude will entail transition risks and learning by doing, and everyone should be aware of the potential disruptions during the journey.

4 Given future uncertainties and the potential pace of change, what level of regulatory flexibility should AEMO and TNSPs operate under? What are the benefits, risks, and costs of providing greater flexibility? What level of oversight is necessary for relevant spending? Are there specific areas where more flexibility should be provided or specific pre-agreed triggers?

The referenced FTI report and the commentary on pages 72-73 of the Consultation Paper suggest a logical approach to regulatory flexibility. As we have mentioned above, the complexity and scale of the transition should not be underestimated, and to over-prescribe the solutions based on existing knowledge would be (in our view) a mistake, leading to undue costs and risks. Australia is at the forefront, and we should be bold in our ambition to transform the NEM, but this will require a lot of experiment, testing, trialling, and with that comes some degree of risk and associated impacts on reliability. Ultimately, the best Post 2025 Market will emerge after we find out what works and what does not.

Section 7 Scheduling and Ahead Mechanisms – Market Design Initiative D

1 The ESB is interested in stakeholder feedback on the options for the ahead mechanisms we have outlined. Are there additional options? Are the options for a UCS and UCS + ahead markets fit for purpose?

The UCS would seem to be essential, and we suggest it should be developed. Beyond this, we do not offer specific comments on this item.

2 The ESB proposes to develop the UCS tool for implementation. Do you support the UCS concept? What factors and design features should be considered for detailed development?

We support the UCS concept. We have not considered design features.

[3] NREL/TP-6A20-73856, May 2020

3 The difference between actual and forecast residual demand leading up to real time dispatch has been far more stable in the last decade than the difference between actual and forecast prices ($MWh) leading up to real time dispatch. What do you consider the drivers of this may be?

IEEFA has not analysed this feature but we suspect the influx of utility-scale VRE and evolving bidding strategies may contribute.

Section 8 Two-Sided Markets – Market Design Initiative E

1 What do you consider are the risks and opportunities of moving to a market with a significantly more active demand side over time? How can these risks be best managed?

It is expected that the market will involve significant demand side activity in the future.

The main risks are well known and have been identified in the consultation paper.

In the case of large energy users, such as aluminium smelters, demand load can be modulated to provide substantial DR. This could be either small amounts regularly and on short notice or large amounts. Such modulation requires technology investment. If the demand response pricing is sufficient, this investment will make financial sense for smelter operators and can be managed in such a way that enhances their overall business performance.

The grid stability that large scale DR can provide is immensely valuable to the NEM and far cheaper to implement than other forms of large scale grid stabilisation – such as pumped hydro storage. Accordingly, the pricing for this service must be set with that benefit in mind. This will create an attractive revenue stream and a strong financial incentive for large energy users to both invest in technology and make their operations more flexible.

It is important to avoid disadvantaging certain consumers, based on their ability or willingness to participate in the market. Nevertheless, those who choose to engage should be able to derive value from their participation. Risks that arise from communications, cyber security, and technology can be mitigated through establishing of standards and protocols. Opening up the demand side will contribute to grid stability, resource adequacy, and avoidance of over-building transmission and generation.

2 What are the barriers preventing more active demand response and participation in a two-sided market? What are the barriers to participating in the wholesale central dispatch processes?

Active participation will require large energy users to invest in technology to manage DR, to cost and finance may be barriers to entry. A key requirement for investment is sufficient certainty that pricing

will be available that generates a reasonable return on capital invested. Large energy users typically do not run operations in a way that allows them to flex electricity demand. This will need to change and will require both financial incentive and a new, more flexible mindset from industry.

We are not aware of any further fundamental barriers. If and when the market and participants (eg. Retailers, NSPs) are ready to accommodate participation, we expect that consumers and third parties, such as aggregators, will take advantage of any opportunities.

3 Do you think any other near-term arrangements or changes to the market design can be explored in this workstream?

Moving to 5-minute settlement, the DER register, and opening the wholesale demand response market are all concrete steps. IEEFA has already reported on how aluminium smelters operating as demand side participants can function as grid-scale batteries, potentially providing grid-wide benefits[4]. Pricing signals, and availability of financial instruments to hedge risk, will be important to drive investment.

Opening up co-optimised markets for DR and essential services (beyond FCAS) will allow consumers to participate. This should be explored in the near term.

4 What measures should be deployed to drive consumer participation and engagement in two-sided market offerings, and what consumer protection frameworks should complement the design?

This is a topic deserving of extensive investigation. We suggest that efforts are made in educating and outreach so that over time consumers, very broadly, gain an understanding and acceptance of DER and two-way market design, so that can consider how to participate. Like all major technology developments (eg. Internet, NBN, mobile phones, EVs, rooftop solar) consumers will make choices in their best interests when they are well-informed.

5 What might principles or assessment criteria contain to help assess whether it is timely and appropriate to progress through to more sophisticated levels of the arrangements?

There could be a benefit to starting with large energy users that have predictable demand loads. The DR capacity will be significant, and the arrangements can be tailored for each industry and thus designed to be effective for both sides of the market. Once that is trialled, aggregation of smaller energy user DR capacity could be added to the market. A key principle should be that the arrangements contribute to grid stability and offer a fair return for all participants.

[4] IEEFA, An Aluminium-Led Energy & Industry Renewal for Central Queensland, September 2020.

6 The ESB is considering combining the DER integration (below) and two-sided markets workstreams, or elements thereof, do stakeholders have suggestions on how this should be done?

No comment at this time.

Section 9 Valuing Demand flexibility and Integrating DER – Market Design Initiative F

1 Are there any key considerations for the incorporation of DER into the market design that have not been covered here? For DER to participate in markets, it needs to be responsive. How should the Post-2025 project be thinking about enabling responsive DER?

The most important factor involves data and connectedness. The recent ESB Consultation Paper on establishing standards for DER considered the need for the industry to adopt common platforms and technology standards to allow for seamless integration across from the consumer level, to retailer, DNSP, and AEMO. The digital systems required to manage this framework efficiently do not have to be overly complex, but will need to be capable of handling large data transfer rates and powerful cloud-based computing. It may be a challenge to bring all stakeholders together and settle on a unified approach, but it needs to be done. Again, there is the problem of who pays for it. It is important to work through the issues now, perhaps by expanding the Distributed Energy Integration Program (DEIP) to move from trials towards full implementation in the market.

2 In the next phase of the project the ESB proposes to focus on development of a detailed DER market integration proposal. What are the most important priorities for DER market integration? The ESB is considering combining the DER integration and two-sided markets workstreams, or elements thereof, do stakeholders have suggestions on how this should be done?

The DEIP should provide insights for this. IEEFA has no suggestions to offer in addition to those that may be derived from the DEIP reports.

3 How can we ensure that owners of DER can optimise the benefits of their DER assets over time as technology and markets evolve? How do we time reforms to manage the costs and benefits for DER owners?

The ESB, or AEMO with support from the other agencies, could launch a campaign to educate and inform the general public. Retailers and third-party participants, who offer services to consumers, will need to be regulated to some extent. The market for products will likely adapt to the changing reforms, just as vehicles adapted to changing fuel standards and mobile phones adapted to changing broadband standards. Consumers will adapt in turn and will choose themselves when to upgrade and when to persist with existing technology. The DER market just needs to be transparent, simple and clear.

About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.
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