

30/09/2019

Dr Kerry Schott AO  
Chair  
Energy Security Board

Submitted by email to: [info@esb.org.au](mailto:info@esb.org.au)

Dear Dr Schott

## LYON GROUP RESPONSE TO POST 2025 MARKET DESIGN ISSUES PAPER

Lyon provides the following to the Energy Security Board (ESB) in response to its request for submissions in relation to the Post 2025 Market Design for the Australian National Electricity Market (NEM).

In providing its comments, Lyon is able to draw on the wide and deep experience of its team in the energy and infrastructure sectors, microeconomic and electricity sector reform, finance, and as project developers and principal investors (see **Attachment A**).

Lyon also draws on its long-standing and close relationships/alliances with a number of the leading global energy utilities, equipment manufacturers and capital providers (debt and equity).

### General Comments

#### **The original NEM drivers and objectives remain relevant**

Lyon considers that in refreshing the NEM design it is important to return to and remain consistent with the original NEM objectives.

Over the past 20 years, the lack of coordination between energy, environmental and industry policy has led to a deviation from these objectives. This has undermined the economic efficiency of the NEM and, as a result, undermined the Australia economy and its international competitiveness.

First and foremost, the NEM was established as an economic reform to achieve greater utilisation of invested capital in the sector, allocate future investment to where it was most needed, and to ensure that electricity was cost efficient as an input cost to consumers (industry and residential) in support of a competitive domestic economy and export industries.

Over time, alignment with the original objectives has been eroded and environmental policy has driven sector outcomes. As a result, Australia currently has an electricity sector beset with poor and conflicting policy that is not managing the transition to a renewable sector effectively, industry regulation that is lagging well behind technological change, and customers paying a high and unnecessary price for both.

Lyon supports, and will be able to deliver greatest long-term value to consumers in, a NEM designed on the basis that competitive markets, with limited barriers to entry, are implemented wherever possible and regulatory arrangements are applied only where competitive markets can't be economically efficient.

Lyon does not support:

- Government intervention in the NEM unless it is to remove barriers to entry and increase the efficiency of the markets;
- Continued Government ownership of electricity sectors assets where Government uses this ownership as a means of policy implementation; and
- A market design that provides for cross subsidies between sectors.

Traditional standalone solar and wind generation in the current market may deliver very low \$/MWh energy but this is a result of costs and risks of that generation being passed to other parts of the value chain less appropriate to deal with them. In other words, traditional wind and solar are being cross subsidised by the network sector and customers. It is delivered energy costs that are relevant.

### **The essential proposition of the Post 2025 Market Design Issues Paper**

Lyon agrees with the essential proposition of the Post 2025 Market Design Issues Paper (Issues Paper):

*The pace of change is not expected to slow down and the need to consider whether the overall market and regulatory design is fit for the future must be evaluated.*

By starting with identification of the full range of services required to deliver a secure, reliable and lower emissions electricity system at least-cost to customers, the Review has adopted an appropriate frame.

### **A False Paradigm**

Lyon takes issue with the very first sentence of the Issues Paper:

*The COAG Energy Council requested the Energy Security Board to advise on a long-term, fit-for-purpose market framework to support reliability, modifying the National Electricity Market as necessary to meet the needs of future diverse sources of non-dispatchable generation and flexible resources including demand side response, storage and distributed energy resource participation*

This statement frames the challenge of responding to the opportunities and risks of “future diverse [supply and demand side] sources” as changing the market framework to the meet the needs of those sources, rather than changing the market framework to ensure that the evolution of those sources meets the needs of consumers, at least cost.

As such, the framing in the Issues Paper reflects a false paradigm. This false paradigm is that solar and wind generation:

- are necessarily unstable and non-firm,
- can only be intermittent or weather-driven; and
- necessarily require massive co-investment in network stabilisation, transmission augmentation and “firming” of that unstable energy.

Lyon does not accept that the paradigm as presented above is correct and is disturbed that a market would be designed based on this.

It is accepted that to be connected to the NEM a solar or wind project needs an inverter that meets the requirements of connection. The cost of the inverter is accepted as part of the total capital cost of the project.

Yet there appears to be an acceptance that there should be little meaningful obligation on solar or wind projects to manage the effects of their destabilising power on the network despite the technology being available to do so.

This false paradigm serves a number of interests including:

- developers of simple and inflexible standalone solar and wind projects seeking to keep their costs down via passing the cost of the unstable power and its risk to other segments of the sector;
- network companies interested in growing their regulated asset base by accepting the solution to the issue is to undertake investment in their network rather than having the generation/transmission investment co-optimised;

- policy makers who confuse lower renewable wholesale electricity costs with the cost of delivered electricity, particularly where these lower wholesale cost are achieved by cross subsidising the wholesale price by transferring risk and cost to the networks who in turn have them factored into their regulated revenues and passed them on to consumers; and
- incumbent asset owners seeking to maintain the value of their existing assets.

But this false paradigm does not serve the interests of electricity consumers or economic efficiency.

Lyon is baffled by the endurance of this false paradigm.

The Review's journey toward proposing a pair of alternative market designs for the provision of the full range of services required to deliver a secure, reliable and lower emissions electricity system at least-cost to customers must avoid travelling via this false paradigm.

The ESB has the opportunity to change this by ensuring the market design recognises and values the AEMO's Power System Requirements.<sup>1</sup>

The majority of new generation in the last decade – utility and distributed solar and wind – has been developed and operates on a standalone basis, meaning that it is intermittent or driven by the weather, not by the needs of the system or electricity consumers. Standalone solar and wind is less flexible than the generation it has supplanted.

It should not continue because this inflexible new generation does not deliver most of the services required to deliver a secure and reliable electricity system. And, at the same time, it drives greater demand for such services because it delivers unstable energy that undermines system voltage and frequency. That new generation is clean is necessary but not sufficient.

A scenarios approach could, if appropriately applied, be very instructive. The Review will no doubt consider many scenarios. At this point in the process, Lyon would like to posit two high level scenarios.

In the first scenario, the MW capacity of clean energy that has entered the market in the last 10 years since the expanded RET legislation is repeated in the coming 10 years in terms of volume of new capacity, simpleness/inflexibility of approach and volume of supplanted thermal capacity. In this scenario, the supply of vital system stability services declines with thermal closures/mothballing, and demand for those services increases with the higher penetration of intermittent, weather-driven generation. Maintenance of system stability in this scenario, if possible at all, will require very large investment in network stabilisation, transmission augmentation and "firming".

In the second, alternative, scenario, an equal volume of new clean capacity comes into the market in the next 10 years but 100 per cent of that new clean generation is truly integrated with BESS, creating flexible power stations that meet power system requirements and deliver a smooth flow of energy more aligned with consumer needs.

Lyon is not suggesting that 100 per cent of future utility solar and wind will or should be fully integrated with BESS in the same way as Lyon's projects are. But a scenario exercise of the kind we have set out above would identify the additional network stabilisation, transmission augmentation and "firming" costs that would land heavily on consumers' bills in the first scenario compared to the second.

A large proportion of the difference would be explained by the fact that the cost of keeping the NEM secure and reliable in a, say, 50 per cent renewable generation scenario will be substantially higher if solar and wind developers continue to be allowed to push those costs onto the regulated network part of the value chain. The additional cost would grow exponentially as renewable penetration increased beyond 50 per cent.

Clearly, the market framework will change in response to the new characteristics of a supply chain with a fundamentally new and complex composition, just as those new characteristics will drive an amount of grid stabilisation and augmentation, and of "firming". However, the extent to which the market framework changes to accommodate the new generation (as opposed to the extent to which the new generation changes to deliver power system requirements and operate flexibly) must be what is economically efficient.

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<sup>1</sup> AEMO, Power System Requirements, March 2018, Reference Paper

Achievement of least cost outcomes will only be possible if we require/incentivise new clean generation to be delivered in ways that don't pass risks and costs that should be borne by developers of the new generation onto other parts of the value chain that are less well positioned to address them.

### **Investment in the NEM**

Lyon welcomes the focus of the review process on the question of whether the market has an investment/investability problem.

It is important that consideration of this question is framed by a realistic appreciation of Australia's relationship with foreign capital. Australia has been a net importer of capital since Federation, the continuation of which depends on global capital taking the view that Australia will continue to provide an investment environment that meets its risk and return requirements. Energy supply is a capital-hungry global industry. Global capital with a mandate to invest in energy supply can choose from a large number of opportunities, particularly given the need for all nations to transition to renewables.

There is growing investor realisation that the risks associated with investing in intermittent solar and wind continue to grow and that the countries best able to manage this process will provide greater investment certainty.

Lyon is increasingly seeing international capital withdrawing from Australia and being redirected to other markets. Lyon's involvement with its Japanese and Chinese partners provide a clear indication of this. While they have an interest in investing in Australia for various reasons, the demand for their capital in their home countries and internationally is providing greater incentive not to invest in the Australian electricity sector.

Clearly, there is a NEM investability problem and it is increasing.

### **Review Timelines**

While Lyon considers the ESB's review of the NEM's design to be a positive step, the review and implementation process outlined is far too long and the proposed implementation date too far in the future. Lyon notes that the factors compelling substantial and rapid change in the NEM, and the opportunities and challenges those changes create for market participants and policy makers/market bodies, are not unique to Australia.

If outcomes from the Review are too slow relative to the rate of technological development and innovation now impacting on the sector, positive innovation will be stymied or even permanently locked out, or in some instances new technology will become embedded in ways that are not economically efficient. For example, when the current NEM was first designed, technology such as advanced battery storage was not envisaged, and the market is struggling to properly accommodate this technology and innovation will accelerate from here.

In this regard, it may well be the case that if the ESB continues on its proposed timeline its work will be most usefully focused on:

- removing barriers to entry to allow the markets to operate efficiently and effectively;
- creating a market design that encourages innovation and limits barriers to innovation;
- allocating risks in the sector to those most able to manage them; and
- providing for economically efficient application and allocation of capital to the sector.

Further delays in addressing the required change will only exacerbate the current market instability and deteriorating investment climate, meaning higher than necessary prices to customers and reduction in Australia's international competitiveness.

## Specific Comments

### 1. What scenarios and shocks should be used?

Our work with leading global utilities and equipment manufacturers indicates that the rate of sector change is faster than predicted by independent advisers. For the purposes of the ESB's consideration of scenarios, Lyon suggests that the AEMO ISP Fast Change and Step Change scenarios are the most appropriate.

Lyon is keen for the ESB to assess the following in its consideration of future market design:

- The design implications for the allocation/misallocation of capital within the NEM;
- The design implications for withdrawal of capital from the NEM;
- The extent to which the market design will remove barriers to take full advantage of technological change and will encourage innovation;
- A range of Government interventions which will distort markets from their most efficient outcomes;
- The changes in capital movements likely to be caused by changed risk profiles in the industry combined with existing project financing arrangements (experience shows that real and conveniently asserted changes will be used to delay change – this was a case in the UK water sector).
- The introduction of a cost of carbon; and
- Any disparity between countries on the treatment of carbon costs causing changes to capital flows.

Lyon consider these scenarios are fundamental as the NEM must compete for capital with other sectors in the Australian economy, and the Australia economy is a net importer of capital. Understanding impacts on global capital movements is critical to determining market design.

### 2. How can market and economic modelling best be used to evaluate individual components of market design or the end-to-end market design?

Lyon concurs with the propose economic and financial tools ESB is proposing to use as part of its review.

However, we would note that while it is important to evaluate individual components of market design to understand how that individual component may operate under particular assumptions, the sector is highly integrated with complex interactions and transitions that take place along the supply/value chain. This requires that a whole of sector evaluation be used to assess the operation of the individual markets within the sector.

### 3. Is the assessment framework appropriate to evaluate the effectiveness of future market designs? What else should be considered for inclusion in the assessment framework?

Lyon considers the assessment framework to be appropriate. However, as noted above, we have concerns about the starting premise on which the assessment will be undertaken and therefore the conclusions reached.

### 4. Have we identified all of the potential challenges and risks to the current market? If not, what would you add?

Lyon would note from its experience that the following should form part of or be a significant focus of the assessment:

- Institutional resistance to change and identification of mechanisms to deal with this;
- The current governance of the sector and its lack of responsiveness to change;
- The incumbents' market power and their incentives to delay changes to the market design; and
- The consequence of major capital flows leaving the Australia electricity sector as global utilities look to take advantage of the multitude of other opportunities in less risky and complex energy markets and other sectors outside Australia.

**5. Which of these challenges and risks will be most material when considering future market designs and why?**

- ***Government interference and uncoordinated policy***
- ***Institutional resistance***
- ***Rules and regulation keeping pace with technological change***

Lyon considers that dots points 2 and 3 are the most significant. The pace of change is so fast and at a global scale that the actions and inactions of Governments are increasingly marginal in their implications for the sector.

**6. Which (if any) overseas electricity markets offer useful examples of how to, or how not to, respond to the challenges outlined in this paper?**

Lyon's considers that Australia lost it mantle as one of the global leaders in electricity reform some time ago. Many other markets are less entrenched, and less hamstrung by confused and poor policy, incumbent market power and loss of direction. These other markets seem better able to consider the opportunities and risks created by substantial and rapid change on their merits. Lyon would suggest four jurisdictions that, while not immediately obvious for their speed of electricity reform, have implemented current and recent reforms from which Australia could learn valuable lessons:

- Mexico;
- Germany;
- China;
- Japan

## **Conclusion**

As an Australian company developing utility scale integrated battery storage and renewable energy projects with global partners in a number of countries, Lyon is able to see firsthand how the opportunities and risks that this review is intended to tackle are being addressed in other countries.

In responding to the Issues Paper, Lyon has provided a brief and limited identification of some of the issues that are affecting the NEM currently and those that will influence market design going forward. We have also highlighted insights from our offshore activities.

We welcome the opportunity to be activity involved through the ESB's process. Questions regarding this submission should be directed to Luke Brown, General Manager Commercial via [lbrown@lyonasia.com.au](mailto:lbrown@lyonasia.com.au) or +61 (0) 403 805 310.

Yours sincerely,

**David Green**  
Chairman

## ATTACHMENT A: ABOUT LYON

The Lyon Group is an independently owned group of companies founded in 2003 which focuses on solar battery power station development, ownership and operation.

Lyon's founders have arranged debt and equity financing for more than \$10 billion worth of energy and infrastructure projects. They each have more than 20 years of renewables and energy market experience spanning Japan, other parts of Asia, Australia and Europe.

Lyon is recognised as one of the world's leading independent developer of integrated renewable generation and utility-scale battery storage (BESS).

Lyon developed the world's first grid connected integrated large-scale solar PV and BESS project, Lakeland Solar and Storage Project, in Queensland. We are now leading the roll-out of the region's largest pipeline of utility-scale integrated solar battery power stations.

Lyon's energy development companies pursue a project design philosophy based on the premise that all new electricity generation must meet power system requirements of a modern and stable electricity grid and be capable of providing commercial returns to investors.

Partners with whom we have ongoing joint development agreements include JERA, the operator of a power generation fleet in Japan and offshore totalling more than one and half times the capacity of the National Electricity Market (NEM). JERA is also the world's largest buyer of gas.

International utilities have chosen to work with and invest alongside Lyon because our design philosophy leads to flexible, dispatchable renewable power stations. Our projects deliver dispatchable clean power and valuable grid services, which contrasts with traditional standalone renewable projects.

With full integration of solar PV with four hour duration battery storage, Lyon is at the global forefront of moving renewable energy projects from their current state (i.e. dispatching unpredictable and unstable energy to the grid) to an advanced and usable form of energy that provides predictable, dispatchable, firm and on-call energy.

Lyon's developments are the only fully integrated grid connected solar battery power station developments currently available and are an important step forward for the industry. Among other things, Lyon's developments allow for the replacement of gas peakers with solar peakers, providing grid stabilisation and customer pricing benefits.

The nature of Lyon's projects addresses many of the key opportunities and challenges that substantial and rapid change are creating for market participants and policy makers/market bodies. For example:

- Low and even negative pricing during peak solar and wind production (in markets without competition, this translates as a pattern of new supply variously exceeding and falling short of demand);
- Greater demand for ancillary services at the same time as lower supply of them, reflecting the nature of predominant generation substitution;
- Growing curtailment of new generation, due to factors including but not limited to thermal constraints and local voltage and frequency destabilisation, driven by construction of clusters of solar and wind in zones remote from matching grid capacity or load;
- Adverse loss factor changes, reflecting the same factors as growing curtailment; and
- The perversity of replacing old generation that has a level of flexibility well short of future system and investor requirements with new generators that are even less flexible.

<https://www.lyonasia.com.au/about/>