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16 March 2022

Market Development Advisory Group
Submissions
Electricity Authority
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By email: mdag@ea.govt.nz

Dear Tony and MDAG members,

Re: Price Discovery under 100% Renewable Electricity Supply – Issues Discussion Paper

The IEGA welcomes the opportunity to make this submission on MDAG’s comprehensive Issues Discussion Paper on Price Discovery under 100% Renewable Electricity Supply.¹

We appreciated the opportunity to talk to the group as you were developing your Issues paper. As well as providing context about the IEGA and its members, our discussion² with MDAG at that time highlighted two problems for smaller scale commercial distributed generation, namely:

1. Volatile spot prices results in volatile / unbankable generation revenue for funding existing capacity and, more importantly, new investment
2. Volatile spot prices impact affordability for consumers and the social license to operate for all electricity participants

We acknowledge MDAG’s analysis extends across our identified problems and provide further feedback below.

However, first, it is worth recapping the two roles of the System Operator that determine outcomes in the wholesale market:

- physical instantaneous matching of supply and demand for electricity - this role manages physical operation of grid connected generation plant, direct connected demand and load at the distributors’ connection with the transmission grid to ensure supply equals demand
- organising dispatch of generation plant according to a least cost model based on offer prices made by generators.

¹ The Committee has signed off this submission on behalf of members.

² Presentation available here: <https://www.ea.govt.nz/assets/dms-assets/29/IEGA-presentation.pdf>

In our view, it is important to distinguish between these two functions. We suggest the second function, of least cost dispatch, has the most influence on price outcomes in the wholesale market, that is, wholesale market design. In our view this is the “spot market”. The first function is more related to secure supply, scarcity and constraints with the outcome of 9 August 2021 proving that the arrangements (forecast prices) on the spot market may not achieve secure supply (being insufficient to incentivise generation to be available to meet demand resulting in regulated pricing). These functions are also focused on participants that are connected to the transmission grid.

Relevance of the spot market

This section of our submission is our answer to Question 4: *Do you agree that these are the key issues in relation to real-time coordination? If you disagree, what is your view and the reasoning for it?*

IEGA agrees paragraph 7.14 lists the key issues for real-time coordination with 100%RE. There appears to be an assumption in the MDAG Issues Paper that reliance on the wholesale spot market can increase over time to ensure physical secure supply. We do not necessarily agree with MDAG’s conclusion that ‘the spot market will be even more important as the primary real-time balancing mechanism’.

“In essence, the system is expected to move from being balanced in real time by relatively ‘few big’ resources to much more reliance on ‘many and small’ resources. As noted in the previous section, this change will make the spot market even more important as the primary real-time balancing mechanism.” (paragraph 7.10)

In our view the role of the spot market in ensuring secure supply needs further analysis and thinking with a blank sheet of paper as opposed to assuming the current arrangements can be progressed / improved.

The most important signal is the one required for new investments to maintain secure supply. As we see our economy more and more reliant on electricity supply the focus should be on actually lifting the level of supply security, rather than just trying to maintain what we have had which has been able to rely on multiple fuel options. Electricity is effectively replacing over time the IEA mandated requirement for fossil fuel storage reserves.³

The IEGA suggests a marginally priced spot market system will not support building in a security margin and additional resilience. Some other investment pricing instruments are going to be required to improve energy security. In our view, MDAG’s mandate extends to investigating and recommending additional pricing mechanisms to improve energy security.

We suggest the question should be asked of whether the two functions currently performed by the System Operator could be performed by different parties and whether ‘design’ is being considered strongly enough by MDAG for both of these functions.

³ In accordance with the Agreement on an International Energy Programme (I.E.P.), each IEA country has an obligation to hold oil stocks equivalent to at least 90 days of net oil imports and to be ready to collectively respond to severe supply disruptions affecting the global oil market. <https://www.iea.org/areas-of-work/ensuring-energy-security/oil-security> Another sector where reserves play a critical role in economic success is the finance sector and central banks commitments to international and foreign exchange reserves.

MDAG acknowledge *“the system (generation, batteries, and demand response) is expected to become more disaggregated, with ownership and control spread among a much wider range of parties such as households and businesses with solar panels and/or storage devices and/or electric vehicles”*⁴.

With this outlook for substantial growth in generation capacity connected to distribution networks and more active management of demand levels by consumers within the distribution network, matching demand and supply within distribution networks will become more important (to ensure the physical characteristics of the power system at the connection to the transmission grid are within the right limits (eg, voltage, frequency etc)).

We query if this change means an increasing role for distributors / a distribution system operator as a compliment to the System Operator’s management of the physical instantaneous matching of supply and demand aspect of the wholesale market.

And / or does the increasing level of demand and generation activity within distribution networks require a change to the design of the least cost dispatch aspect of the wholesale market. The Real-Time Pricing project⁵ anticipates consumers connected to distribution networks being more active in the wholesale market. MDAG’s modelling makes assumptions about the timing of the uptake of demand side activity in the spot market. However, if this doesn’t happen the ‘pricing signals’ delivered by spot prices will not influence a growing proportion of generation or demand (or may take longer than assumed) .⁶

A further question therefore is: will there be increasing reliance on distribution charges and the way they incentivise connected generation and load within a distribution network if these electricity consumers do not interact with the wholesale market.

In addition to an increasing proportion of generation being connected to the distribution networks (discussed above), MDAG highlight that *“a shrinking proportion of the total generation base will be easily and directly controlled via central dispatch”*. We suggest MDAG’s identified “key issues for real-time co-ordination”⁷ are based on the current paradigm. It is not clear that addressing any of these issues will solve for managing generation that is not controlled by central dispatch, or has a conclusion been made that this generation is irrelevant for operation of the wholesale market?

Further, participants are more frequently signing long term Power Purchase Agreements⁸ and MDAG have highlighted the importance of an effective hedge market under 100%RE. These are both

⁴ Paragraph 7.9 of Issues Paper

⁵ We understand the Real-Time Pricing project is designed to accommodate increasing participation in the wholesale market from the demand side (including distributed generation)

⁶ This is a different issue from that highlighted by MDAG in paragraph 7.7 about the higher proportion of generation that will not be dispatchable. Paragraph 7.7:

“Looking ahead, a growing proportion of grid-supplied power will come from intermittent sources such as solar and wind generation. In the reference case, these increase from 6% of supply in 2020 to 47% by 2050. While these resources may be dispatched downward (by spilling some energy) they will often not be dispatchable upwards. In addition, a rising number of customers are expected to install rooftop solar panels or other distributed generation, and this is unlikely to be dispatchable. Together, these two factors suggest a shrinking proportion of the total generation base will be easily and directly controlled via central dispatch.”

⁷ Paragraph 7.14

⁸ In its 1HFY22 result presentation Contact Energy Chief Executive talked about the importance of long term contracts and described the market as moving from a commodities market to more of a subscription market. (at ~2.10 minutes)

<https://youtu.be/5M1JU8-XbUw>

developments that the IEGA support. However, we query: is a generator's decisions about how much to generate increasingly going to be influenced by these long term financial commitments? Are offers in the dispatch stack reflective of least cost or the desire to generate to meet these contract commitments? How much volume is really being transacted on the 'spot market' and therefore how relevant is the 'spot market' to providing investment signals?⁹

The IEGA is concerned that the Electricity Authority (Authority) has put all its eggs in the 'spot price signal fixes all' basket. We suggest there needs to be a shift towards acknowledging that there are many moving parts to keeping the grid stable and it is not just about the supply of megawatts. MDAG should progress developing markets for products that are currently provided for free. In a volatile market, we suggest the more levers there are to pull the better.

The IEGA has submitted on numerous occasions that complexity (which drives costs) is already a major issue for small scale participants who attempt to interact with the wholesale market. We suggest MDAG should attempt to reduce or, at a minimum, not increase complexity in any redesign of the wholesale market.

Volatile spot prices and peak demand

MDAG highlight that the increasing proportion of intermittent generation capacity will increase volatility in spot prices. The analysis reveals that there is *"an expected shift in the main causes of spot price volatility, with demand peaks playing a lesser role and wind/solar intermittency playing a bigger role."*¹⁰

That is, high spot prices are less correlated with peak demand periods or peak demand does not necessarily equate to peak prices. This is a significant, but not unexpected, conclusion. These high spot prices could provide signals for investment in new generation capacity or investment in storage to fill the gaps in supply of intermittent fuel. However, these high prices are not related to any capacity constraints on the transmission (and distribution) infrastructure. This has consequences: under the proposed new TPM the Authority is relying on spot market prices to reveal the cost of using the transmission grid, signal congestion and achieve timely investment in new transmission grid capacity.

"Existing wholesale electricity market (nodal) prices would then work alongside the new [transmission] charges, providing a more accurate, responsive and targeted signal of the cost of using the grid ... Real-time pricing combined with emerging technologies and new business models (eg, flexibility trading) that can be very responsive to price signals are expected to make this an increasingly effective and efficient way to manage grid congestion." (pg ii – iii) [emphasis added]

"... that wholesale electricity market nodal pricing provides an efficient market-based signal of the cost of using the grid". (pg v)¹¹

⁹ We suggest there is a difference between the gross pool – necessary for reconciliation – and the volume of electricity that is actually traded between third parties on the spot market

¹⁰ Paragraph 7.55

¹¹ <https://www.ea.govt.nz/assets/dms-assets/29/Proposed-Transmission-Pricing-Methodology-Consultation-paper-v2.pdf>

We note that MDAG’s modelling reveals peak demand increases at a slower rate than overall demand growth¹². However, the activities that reduce peak demand may also be being called on to manage periods with low intermittent fuel. The IEGA queries whether participants can identify when, and need to react differently, when spot prices are high due to the lack of intermittent fuel or when prices are high due to a physical constraint on the transmission grid. It may be too difficult to plan to operate to help alleviate transmission capacity constraints if prices are unpredictable so generation output is flat to achieve average prices. And whether overall more volatile spot prices hide a developing transmission infrastructure constraint, delaying a decision to invest in new transmission capacity.

While this might be outside the scope of MDAG’s analysis, the success of the proposed new TPM in delivering timely generation and transmission investment is critical. If there is not timely investment in new capacity wholesale prices will go up across the board not just when there is low renewable fuel or high demand.

The IEGA suggests MDAG should take this into account in developing its options on what changes should be made to the wholesale electricity market assuming 100% renewable supply to ensure economically efficient price signals (from short to long term).

If there was a peak demand signal in transmission charges this would alleviate our concerns. We reiterate our submission to the Authority on the proposed new TPM that *“It would seem prudent given the uncertainty of demand growth for decarbonisation to have something already in the ‘toolkit’ to ensure reliable supply and avoid constraints”*.¹³

Will more volatile spot prices be manageable for everyone?

The IEGA acknowledges MDAG asked the question “Will greater price volatility create undue financial risk for investors or purchasers?”¹⁴

MDAG appears to conclude:

“Overall, the results suggest that increased volatility per se should not pose unmanageable risks for investors or purchasers provided they can enter into suitable forward contracts. This involves both access to the products themselves (volumes and types) and having confidence in the pricing of those contracts (an issue that is discussed further below).” (paragraph 7.56) [emphasis added]

MDAG also notes:

“(c) In absolute terms, volatility ratios for shorter duration periods tend to increase more than those for longer periods. For example, the volatility in weekly average prices almost doubles between 2020 and 2050, whereas the volatility in annual average prices increases by around 15% over the same period.” (paragraph 5.57)

The IEGA supports MDAG’s focus on the importance of improving the hedge market. However, if volatility is expected to be manageable then the arrangements must ensure that:

¹² Footnotes 61 and 78 including “As a point of comparison, in our reference case, peak demand is assumed to grow at 80% of the rate of energy demand by 2050”

¹³ <https://www.ea.govt.nz/assets/dms-assets/29/IEGA-TPM-Cross-submission-2021.pdf>

¹⁴ Paragraphs 7.45 – 7.58

- products are available that match the risk profile (eg to deal with weekly / daily price volatility)
- these risk products are accessible across the full range of size of market participants
- everyone has confidence in the pricing of these contracts¹⁵.

Bankability of new independent generation capacity investments is critical to ensuring competition in the decision making process (ie timing of new investments) as well as competition in the supply of electricity.

Ancillary services with 100%RE

The IEGA is following with interest the Future Security and Resilience project and its consideration of the role and type of ancillary services (and how those services are provided) as NZ transitions to a low-emissions future.

In answer to question 5, we fully support further analysis of the following question asked by MDAG as being a key issue:

(d) How can decentralised distributed resources and new technology be sourced and used to provide current and new ancillary services? (paragraph 7.37)

Work on this question should begin immediately. There is existing distributed generation plant that can be incentivised to provide ancillary services – price and contractual arrangements are the missing pieces. Again this comes back to distributed generation being connected to distribution networks, the role of distributors to manage power quality within their networks and at the connection with the transmission grid and the System Operator or the distributor procuring these services.

The IEGA agrees that ancillary services will become more important. Again, we are not convinced by placing faith (all the eggs) in the ‘spot price signal fixes all’ basket.

Given our discussion above about the relevance of the spot market we suggest MDAG should consider if co-optimisation of procurement of energy, frequency keeping and instantaneous reserves continues to be appropriate as intermittent fuel becomes more predominant in the energy system.

Social licence to operate

MDAG refer to the “Goldilocks” zone for electricity supply:

“Households and businesses must have access to reliable electricity at prices that are socially acceptable. To achieve this goal, it is vital that investments in new capacity are made at the right time, in the right quantities, in the right locations, using the right technology at the right cost – for the long-term benefit of consumers.”(page 11)

MDAG states competition will be vital:

“Competition will be vital to ensure a successful shift to 100%RE. Without effective competition, consumers and policy makers will not have confidence in electricity spot or contract prices. Without that confidence, investors are unlikely to commit the sums needed to underpin the shift to 100%RE.

¹⁵ MDAG could consider whether the stress test regime is sufficient to successfully address the confidence issue

Competition also has a critical role to play in spurring innovation and finding the best solutions to drive down costs over time.” (paragraph 3.54)

The IEGA suggests the objectives of any changes the wholesale market design must be to improve competition and progress as far as possible towards the Goldilocks zone. The social licence to operate and achieve approval for new generation projects for the entire industry depends on the performance of each participant and effective regulation.

In conclusion, the IEGA notes the transition to a higher proportion of renewable energy is already underway. MDAG has been asked to look at wholesale market design under 100% renewable electricity supply. Other analysis¹⁶ has revealed consumers face substantial costs from converting the last few percent of electricity generation to renewable fuel. Biofuels could be classified as renewable fuel – in which case the current fossil-fuelled thermal plant, and the properties these bring, may still be operating at 100%RE. The IEGA suggests MDAG consider design of the wholesale market at 95% renewable fuel and consult on the options to achieve a competitive wholesale market at the 95%RE level. There should be transparency about the costs and benefits of designing the wholesale market to operate with 100% renewable fuel.

We also note the 95%/100%RE is an end goal but the wholesale market has to continue to operate as a higher proportion of renewable electricity enters the system and we move towards the end goal. The IEGA suggests MDAG prioritise its analysis and options to identify no regrets changes as well as near term changes that can be trialed and modified as we progress to the end goal, bringing long-term benefits for consumers.

We would welcome the opportunity to discuss this submission with you.

Yours sincerely



Warren McNabb
Chair

¹⁶ Including from the Interim Climate Change Committee