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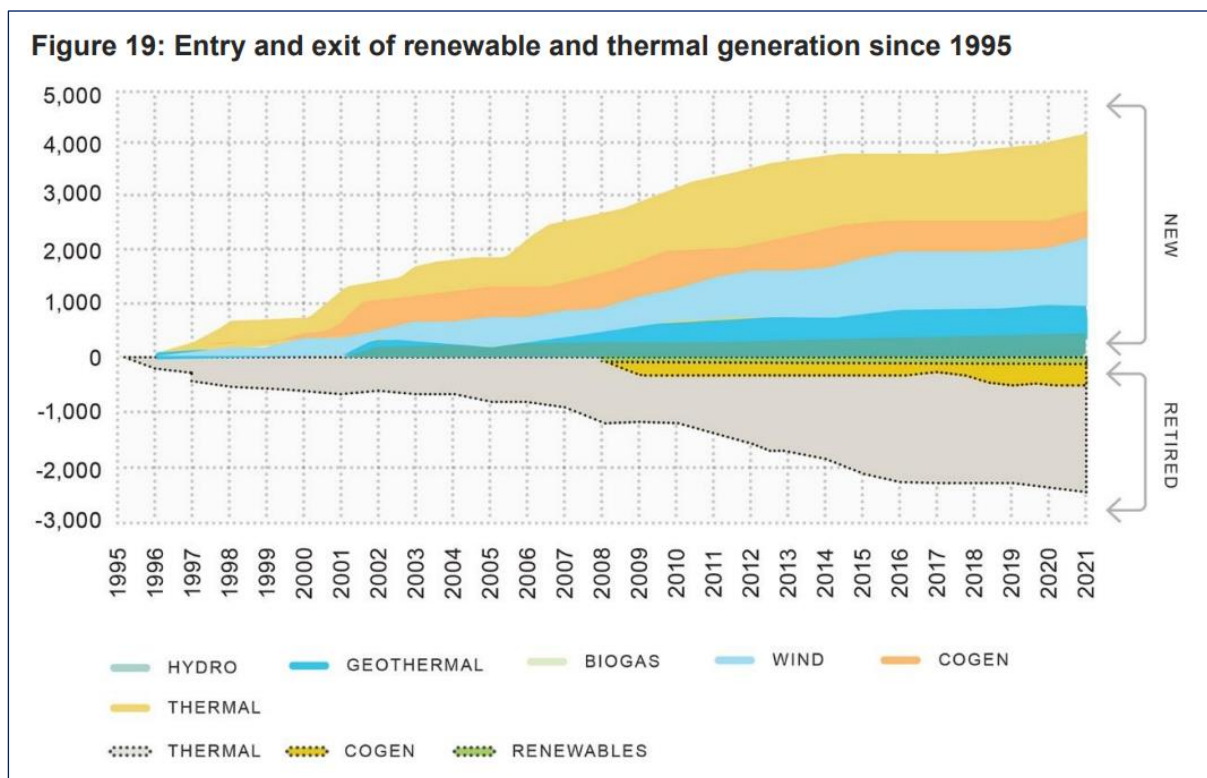
Submission on the MDAG Options Paper – Price Discovery in a Renewables-Based Electricity System

Introduction

1. This is Vector Limited's (Vector) submission on the Market Development Advisory Group's (MDAG) Options Paper, *Price discovery in a renewables-based electricity system* (the Options Paper), published on 6 December 2022.
2. Given the importance of an affordable, reliable, low-carbon electricity system to New Zealand's future, we are highly supportive of MDAG and the Electricity Authority (Authority) examining how best to incentivise investment in and operation of new renewable generation and demand-side flexibility, for the long-term benefit of New Zealanders.
3. Vector's key points of submission to MDAG on its Options Paper are as follows:
 - a. Sufficient levels of competition are critical to realising the theoretical benefits of the intended market design. A theoretically perfect market design can be undone by a market structure that is too concentrated. Without a level playing field between large and small participants – for generators, retailers and consumers alike – intended benefits will not be realised.
 - b. There is an increasing need for more active and sophisticated market monitoring to build confidence that the market is delivering positive outcomes for consumers. This will require the Authority to significantly increase its capability and capacity, especially through the use of new technology and data analytics.
 - c. Flexible demand and increased demand-side participation can drive competition and efficiency going forward. There are some key operational considerations required to enable market participation by distributed energy resources (DER) to happen safely and securely.
 - d. Overall, MDAG's work is of extremely high quality, deeply considered, and shows the benefit of engagement with the sector and overseas experts. MDAG's final set of recommendations is highly likely to be a coherent and cohesive package of reforms. We urge the Authority to adopt these recommendations in their entirety as the Authority's wholesale market work programme for the next five years. The Authority should also look to build on MDAG's success in this project (and their earlier success with trading conduct reform) and continue to engage them in the implementation of the more complex recommendations.
4. Each of the above points is expanded upon in the comments that follow. Our responses to a selection of the questions posed by MDAG are appended to this letter. Given competing priorities over the period of this consultation, our responses are necessarily brief; we would welcome the opportunity to discuss MDAG's proposals more fully.

Advanced market design can be undone by insufficient levels of competition

5. New Zealand's spot market is often celebrated internationally for its longevity and complexity. As well as remaining steadfastly energy-only, it is one of the few markets in the world to have full locational marginal pricing (LMP) – in place since the market started in 1996. This has meant New Zealand has avoided many of the issues experienced overseas that have resulted from inferior designs, especially relating to congestion and inadequate coordination of transmission and generation development.
6. However, as MDAG recognises, the best design in the world can still fail to deliver benefits to consumers if the forces of competition it relies upon are not present, or weak. Despite its longevity, and its success in stimulating new generation investment and retiring old thermal plant (as illustrated in Figure 19 in the Options Paper, reproduced below), the performance of New Zealand's market has perennially been called into question. Market concentration in generation is not materially different to how it was one or even two decades ago.
7. Concerns around a lack of competition are often conflated with issues of market design. Having an appropriate problem definition is therefore critical.



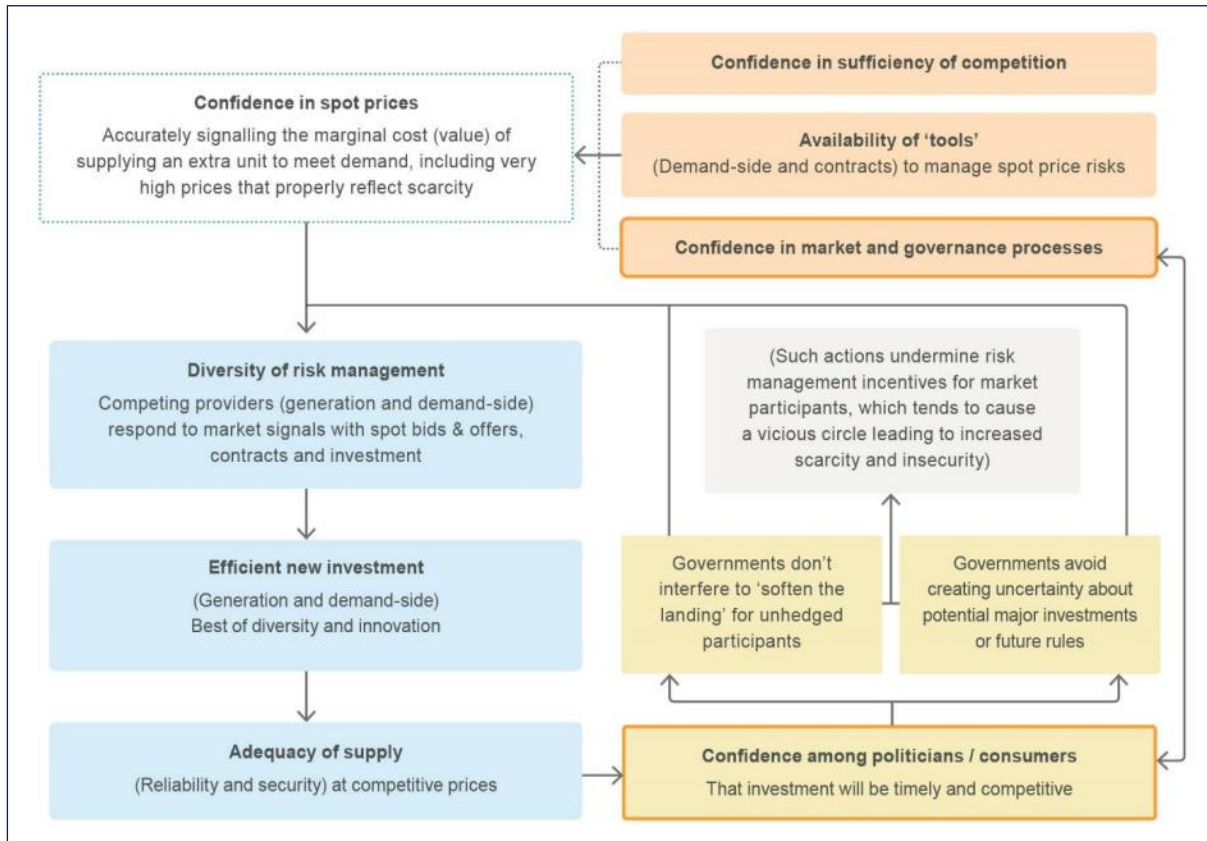
8. New Zealand's wholesale market is dominated by a small number of large participants, and has been ever since 1996. While overall, very gradual decline in market concentration is likely to accelerate (as a wider range of entities invests in renewable generation – especially solar PV), MDAG is right to highlight that there are certain sub-components of market supply in which concentration is likely to increase.
9. For consumer benefits to be maximised, there must be a level playing-field between different sizes of market participants – whether they be generators, retailers, consumers or any other competing entity. While not all barriers to entry and scaling are inefficient, the Authority must continue to prioritise ensuring conditions for competition are optimal.

10. In this vein, we are strongly supportive of the Authority's wholesale market review (WMR), and its recent proposals to address potentially inefficient price discrimination in relation to very large electricity contracts. This is an example of ensuring that competition between consumers for supply takes place on a relatively even playing field.
11. However, as we noted in our submission on large electricity contracts¹, the level of competition on the *supply* side should never have enabled such a deal to be struck in the first place. It is not unreasonable to hypothesise that if New Zealand has had ten or more medium-sized generators in the market (accompanied by a competitive fringe), as opposed to just four large ones, market outcomes might be quite different to what we observe. This is not an issue of *design*, but rather a concern around *market structure*. As noted above, it is particularly important in problem definition to distinguish issues of design from issues of competition.
12. We are therefore very supportive of MDAG's recommended actions in categories B ("**ensure effective risk management and efficient investment**") and D ("**strengthen competition**"), including the **development of a flexibility access code** (D3) and **extending the trading conduct rules to the hedge market** (D4). Clearly, current hedge prices are significantly out-of-step with new generation costs. While this is not indicative of a problem in and of itself, increased scrutiny of hedge market activity would provide more confidence that these prices are efficient.
13. We also believe consideration of **virtual disaggregation** (D7) should be in MDAG's recommended set of options for immediate further investigation, rather than being partially supported. We agree with MDAG that "*reallocating rights to that longer term storage is likely to more effectively target the issue while avoiding the complexities of asset transfers*". Intervention of this nature is not unusual in competitive markets overseas (e.g. electricity, telco), and could go some way to ensuring there is a level playing field between the parties who own flexible generation and those who do not.
14. As noted above, the benefits of a superior market design can only be realised if the competitive forces it relies on are present. The best market design in the world will count for nothing if consumers and stakeholders do not have confidence that the outcomes produced are competitive.

Market monitoring must become more active and sophisticated

15. Given the comments above, we clearly agree with MDAG that public confidence in the market is critical to its ability to deliver the desired outcomes. We therefore strongly support all of the options in category E ("**increase public confidence**").
16. MDAG's flow chart (reproduced below) is a useful way to think about the importance of confidence in driving long-term benefits to consumers.

¹ Available online at <https://blob-static.vector.co.nz/blob/vector/media/vector-2022/vector-submission-inefficient-price-discrimination-in-very-large-electricity-contracts.pdf>



17. In particular, we strongly support option E4, “**enhance monitoring with more autonomy**”. The electricity sector is becoming increasingly digitised, democratised, and sophisticated. More parties will be participating, leveraging more different types of technology. The use of learning algorithms and artificial intelligence will become much more prevalent in helping parties optimise the operation of their assets in the wholesale market, driving behaviour and outcomes not observed to date.
18. In order to keep ahead of this behaviour, the Authority will need to invest heavily in the same kinds of technology. Monitoring and exception reporting will have to become completely automated, able to handle the vast amounts of information generated. In the same way that multiple participants in the market will adopt the same technology from the same vendors, international regulators will also have to collaborate and share development costs.
19. As indicated in our submission on the Authority’s FY2024 levy-funded appropriations:²

The transition to new technologies is not costless, but efficiencies and greater market monitoring sophistication – enabled by digitalisation and new technology – will cut costs and increase transparency. For example, the application of analytics, machine learning, and artificial intelligence to the increasing volumes of data being collected by regulators would make detection of existing and potential harm to consumers, systemic risks, emergencies, and non-compliance timelier and more accurate, i.e. oversight and auditing shifts to being ongoing, in near real-time.

² Available online at <https://blob-static.vector.co.nz/blob/vector/media/vector-2022/vector-submission-ea-2023-24-levy-funded-appropriations.pdf>, page 3

The use of advanced analytics can provide real-time insights into market movements. This enables regulators to identify emerging trends that could benefit consumers or respond in a timely manner where there is harm or potential harm to market participants or consumers.

Increasing digitalisation could transform not only the regulatory infrastructure but also the boundaries between sectors which are already becoming less defined or blurred. For example, EVs – which are, first and foremost, a means of transport – can also become distributed generators that can store and inject power back to the grid when and where there is value for EV owners in doing so.

Digitally transformed regulators can rethink their approach to the creation and enforcement of regulatory frameworks nimbly, where necessary or warranted. Technology could simplify regulatory processes, capture feedback more quickly, and help ensure that the appropriate privacy and security settings are in place to protect consumers and uphold market integrity.

20. Indeed, the recent increase in publication of monitoring reports and insights is already a step in the right direction. We suspect that, if the Authority were to seek an increased appropriation to increase its investment in monitoring resource and capability, this would be well supported by stakeholders.

Increased participation by distributed flexibility resources will bring significant benefits, but implementation requires care

21. Vector's Symphony strategy is predicated on the widespread use of distributed flexibility minimising the amount of traditional network investment required, thereby increasing affordability for consumers. The Boston Consulting Group (BCG) recently quantified billions of dollars of benefits of a 'smart system', accruing across networks – transmission and generation.
22. We agree with MDAG that increased use of demand flexibility in the wholesale market will boost competitive pressure, enabling efficient balancing of non-dispatchable renewables, and increasing overall efficiency of the system. We are therefore strongly supportive of the recommendations in category E, "**Lift participation of demand-side flexibility**".
23. We also agree with MDAG's view³ that digitisation will be the number one enabler of mass participation in wholesale and other markets. In future, we will not be relying on individual consumers to be responding manually to price signals; instead the key to widespread demand-side participation is automation (our emphasis added):

...today's landscape for demand-side response [*i.e. flexibility*] is changing markedly. New technology means that consumers who receive a dynamic price signal should no longer have to dynamically (and often manually) determine their response. The recent evolution of sensors, automation, algorithms and smart devices has **dramatically reduced this need for consumer engagement**. Advanced communications are enabling an increasing range of consumption devices to be controlled remotely. ...

³ Options Paper, paragraphs 5.38 - 5.39

This lays the platform for a **range of commercial arrangements and tariffs** through which market participants can procure and reward demand-side flexibility (DSF) from resource owners (customers)…”

24. In relation to this, the FlexForum’s Flexibility Plan 1.0⁴ usefully distinguished between the two types of flexibility consumers can provide:

Consumers can provide flexibility in two ways:

- *price-based flexibility* is provided indirectly by the consumer via their response to price signals created by the structure and level of network charges or the retail and spot prices.
- *contracted flexibility* is provided directly via contract with the consumer. This could be a contract for delivering a flexibility response as part of specific connection terms between the customer and the distributor.

25. In future, the response of either type of flexibility will likely be automated – again, with little active participation required by consumers themselves, once their preferences and needs have been established. Managed services, such as managed EV charging or managed hot-water heating, are likely to be widespread, with sophisticated parties managing consumers’ DER and monetising their flexibility – through both price-based and contracted flexibility.

26. However, a number of important considerations are required to enable distributed flexibility to participate in the market, and provide both price-based and contracted flexibility, in a safe and secure way.

27. In a future where millions of devices connected to distribution networks are being used every hour of every day to provide services to multiple parts of the electricity value chain, the role of the distributor will need to have evolved significantly. Core tasks will remain, but new capabilities in advanced distribution system operation (DSO) will be required. The evolving interrelationships between the growing penetration of DER on our network, the operators (managers) of that DER, and the distributor, are therefore of critical interest to us.

28. The FlexForum’s recent Insights paper⁵ describes the evolution required to unlock system-wide benefits to DER owners and consumers more generally:

Diversity of demand, and predictable one-way flow patterns on networks, have meant it has not been necessary to monitor or manage capacity for consumption or generation on a connection-by-connection basis. Maintaining power supply and quality has been straightforward for distributors to achieve under a ‘set and forget’ basis due to stability and predictability in network use patterns and flows on their networks over time. ...

Continuing to use a conservative static, set-and-forget approach to allocating network capacity will likely lead to restrictions on connection of DER (eg, electric vehicle (EV) chargers and solar systems), and/or reductions in opportunities to maximise the value of flexible DER, and could drive the need to invest in a larger network, sooner. Capacity restraints could also inhibit the conversion of non-electric processes to electricity...

⁴ Available online at <https://www.araake.co.nz/assets/Uploads/FlexForum-Flexibility-Plan-1.0-31-August-2022.pdf>, page 22

⁵ Available online at <https://www.araake.co.nz/assets/Uploads/FF-insights-making-better-use-of-available-distribution-network-capacity-31-January-2023.pdf>, pages 7 and 8

Flexible DER can, with the explicit consent of consumers, be used to support the operation of the network by providing extra ability to defer or avoid the provision of upgrades to network capacity. Equally, use of flexible DER on local networks can mean that fewer transmission lines or power stations need to be built and operated across Aotearoa New Zealand.

29. The FlexForum's Insights paper further discusses how the role of the network operator will need to become much more sophisticated and dynamic, as behaviour on the network becomes driven by factors much less predictable than demand on its own:⁶

More routine use of flexible DER, especially as part of the national system, will change the patterns of network use, including potentially creating real or perceived localised network congestion and performance challenges. (Perceived congestion is a result of adopting conservative set-and-forget design parameters without having visibility of actual network capacity and loading in real time.) The capability to make better use of available network capacity will support using flexibility for network, system, and market purposes.

...

The demand for network capacity on the transmission network, and on local distribution networks, changes every hour of every day due to the combination of what households and businesses are doing and whether the sun is shining or wind blowing, how cold or hot the temperature is, and what planned or unplanned outages of network capacity have occurred.

30. Before beginning to propose potential new tools in the distributor's toolkit for managing this future world, FlexForum continues with a clear, succinct problem definition that aligns with our own concerns (our emphasis added):⁷

Flexible DER will have a growing impact on network operation as it increasingly participates in national markets for energy and ancillary services and is dispatched by Transpower, the System Operator (especially after the introduction of Dispatch Notification product in April 2023).

Distributors can manage sudden falls in load. **Restoring load (including after a period of load control) requires more careful management.** A fall in wholesale prices, due to increases in wind or solar generation across a part of Aotearoa New Zealand, could see many distributed batteries, EV chargers and smart hot-water cylinders being dispatched on by the System Operator. Similarly, large numbers of DER, such as household batteries, are already being armed to respond at short notice to a fall in system frequency on the grid.

About every five minutes of every day, the System Operator uses security-constrained economic dispatch, via the SPD tool, to work out which power stations to run, which flexible load to dispatch on or off, and which response resources to arm for reserves. However, by design, **this tool can only see as far as the grid exit point (the boundary between the transmission network and distribution network) and has no visibility of the security and power-quality constraints on the distribution networks.** As with the transmission grid, **the capacity available on distribution networks can change materially at short notice** – for example due to storms, car versus pole outages, every-day network switching and planned outages.

⁶ Available online at <https://www.araake.co.nz/assets/Uploads/FF-insights-making-better-use-of-available-distribution-network-capacity-31-January-2023.pdf>, pages 8 and 9

⁷ *Ibid.*, page 11

To enable flexible DER to provide services to national markets in a way that keeps distribution networks safe and stable, and maintain power quality to consumers within legislated limits, **distributors will need to provide operators of flexible DER with network access that represents not just maximum physical operating limits, but possibly also physical limits on the rate-of-increase of demand or output that the network can handle to avoid creating unmanageable surges** (which could happen if the wholesale price, or the system frequency, suddenly drops or increases).

With more DER operating, distribution networks will increasingly need to be operated similarly to the transmission network.

31. The FlexForum's Insights paper highlights just how important it is becoming for distributors to actively oversee the operation of flexible DER on their networks. This would ensure that the DER only operates within the physical and power-quality limits of the network.
32. We were encouraged that MDAG recognised this in their options library⁸, noting:

We note though that other jurisdictions are developing “dynamic operating envelopes” (DOEs) as a solution to ensuring wholesale DSF (and more generally DER) is consistent with a dynamic assessment of distribution network capacity. ...

The development of DOEs appears to be focused on a dynamic representation of network constraints, rather than the production of dynamic locational marginal prices to guide investment. However, as the penetration of DER increases in the network, a distribution system operator (invariably via an algorithm) will need to determine how to allocate scarce capacity amongst competing DER within each envelope. If this algorithm is seeking least cost dispatch, it will have to ration based on some indication of relative “cost” of the devices (and their relative impact on the “envelope”).

33. While discussions in New Zealand on the use of dynamic operating envelopes are still relatively nascent, compared with Australia, we note that there are some early examples of their application emerging – for example at Auckland Transport's new e-bus charging depot in Panmure. There are multiple innovative trials underway in Australia.
34. We are becoming increasingly certain of the view that, just as all real-time constraints on the transmission network need to be modelled in SPD (Scheduling, Pricing, Dispatch), taking the wholesale market beyond the grid exit point (GXP) will require all the constraints on the *distribution* network to be accounted for too. As the FlexForum Insights paper noted, available capacity on the distribution network changes every hour of every day, and not all possible actions from DER will be able to be accommodated by the distribution network. The only party with the knowledge of what actions are safe is the distribution network operator. This is a concerning gap in the market design.
35. We recently commissioned NERA Economic Consulting to develop a suite of options and potential pathway for the development and safe operation of market participation by DER. NERA's advice, which we also submitted as part of our response to the Authority's December 2022 Issues Paper, *Updating the regulatory settings for distribution networks*, is appended to this submission. We consider aspects of it to be worthy of MDAG's consideration.

⁸ Available online at <https://www.ea.govt.nz/assets/dms-assets/31/MDAG-Library-of-options-FINAL-1.pdf>, pages 59 and 60

36. NERA discusses the efficiency and competitive benefits of flexible, “smart” charging of electric vehicles to the wholesale market, but, like FlexForum above, notes the importance of this flexibility being exercised within the limits of the distribution network (our emphasis added):⁹

In the short run, EV owners will tend to arbitrage peak and off-peak wholesale energy prices, reducing price volatility and reducing prices at the system peak.

In the long run, a less volatile and more flexible total consumption profile means that capacity requirements can be better met through efficient baseload capacity and cheap renewable energy resources.

EV owners and flexibility traders will bring **more competitive discipline** to the wholesale market. Further, competitive forces will push energy retailers to procure the cheapest energy they can and pass those savings on to consumers.

At all times, however, the actions taken by those managing EV charging and other DER to reduce wholesale costs must remain within the physical and power quality limits of the network.

37. NERA highlights the ability for orchestrated smart charging to deliver benefits across the “stack” of value streams in the system, but notes the importance of certainty for distributors wanting to defer network asset upgrades long-term, especially in situations where the pool of potential “market” participants being served by that asset is limited. NERA notes that:¹⁰

If possible, the ideal end state would allow for the dynamic value provided by a market-based solution, while also providing enough certainty to limit unnecessary peak investment in distribution grids. Given this is not yet possible, a framework for smart, managed load in the meantime is necessary.

38. Like the FlexForum, NERA highlights the use of DOEs in Australia and more simple mechanisms like default off-peak charging in the UK. As we note above, a lack of cognisance that distribution-level constraints on DER actions could even exist, and the need for them to be managed efficiently in future, appear to have resulted in a concerning gap in the existing market design.
39. Therefore, we strongly recommend that MDAG adds to its list of recommended options in both categories A (“**Ensuring reliable and efficient operational coordination**”) and E (“**Lift participation of demand-side flexibility**”), a new option – **incorporate dynamic distribution-level constraints in wholesale market clearance**. Given the impending introduction of Dispatch Notification, and the increased use of distributed resources in ancillary services, this option is becoming urgent.
40. In the absence of this, distributors will be faced with two alternatives, both of which will be suboptimal for consumers – either imposing relatively conservative, static constraints on the operation of DER, or over-building the network to inefficiently build out constraints and enable permanently broader operating envelopes. Much of this over-build could become stranded as technology and coordination improve.
41. Even so, neither of those alternatives will be able to account for the fact that *unplanned* outages will often restrict the operation of DER beyond even conservative static operating

⁹ See Appendix B, NERA: *Promoting Efficient and Affordable Infrastructure to enable electrified transport*, Prepared for Vector, 28 February 2023, page 8

¹⁰ *Ibid.*, page 18

envelopes. A car-versus-pole outage, or a severe storm (as was experienced recently post Cyclone Gabrielle) can either take parts of the network offline completely, and/or require temporary reconfigurations which significantly restrict the ability of DER to provide services to wholesale markets. As noted above, SPD is blind to these constraints, as are the participants who will be managing these resources. As the distributor's role becomes increasingly similar to the system operator's, emergency management powers will be a necessary part of the distributor's toolkit.

The Authority should base its work programme on MDAG's recommendations

42. We appreciate the high quality and depth of MDAG's problem definition, analysis and recommendations. MDAG's work is deeply considered and shows the benefit of engagement with the sector and overseas experts. It is clear that a significant amount of thought has gone into developing the proposed package of recommendations, and the sequencing of their development and implementation.
43. We have no doubt that MDAG's final set of recommendations will be equally coherent and cohesive as a package of reforms. We therefore urge the Authority to adopt these recommendations in their entirety as their wholesale market work programme for the next five years. The actions for other parts of the Authority (namely those in category E) should also be prioritised for implementation.
44. We were pleased that the Authority signalled in its recent consultation on its appropriations¹¹ an increased level of resource required to address the Government's upcoming *Energy Strategy* and the transition to 100% renewables. This should allow the Authority to afford MDAG's recommendations the same degree of focus it gave to the recommendations in the Electricity Price Review over 2019-21.
45. The juxtaposition of MDAG's paper with the Authority's proposal to refine the operation of advisory groups and significantly reduce their role in providing quality thought leadership on significant sector issues – like trading conduct and 100% renewables – is interesting. The evidence of a successful working group process is clear in both these workstreams.
46. Rather than limit its scope of operation, the Authority should therefore look to build on MDAG's success in this project (and their earlier success with trading conduct reform) and continue to engage MDAG in the implementation of specific recommendations over the coming years – especially the most complex. Their expertise and experience in the design of the recommendations to date will be particularly useful as the finer points of implementation are discussed and debated.
47. We are happy to discuss any aspects of our submission with the Authority. Please contact me at james.tipping@vector.co.nz.

Yours sincerely














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¹¹ Available online at https://www.ea.govt.nz/assets/dms-assets/30/Final-2022_23-and-2023_24-levy-funded-appropriations-consultation-document1375503.1.pdf, page 5


Appendix A – Responses to MDAG’s consultation questions

A: Strengthen operational coordination

| | OPTION NAME | RATIONALE | STATUS | START | IN PLACE BY | |
|---|-------------|---|---|---------------|-------------|----------|
|  | A1 | Improve short-term forecasts of wind, solar, and demand | Provides better information for decision-makers leading into real-time | Preferred | 2023 | 2024 |
|  | A2 | Strengthen governance for next phase of FSR Project | Better ensures future design of system will be consumer centric | Preferred | 2023 | Mid 2023 |
|  | A3 | Update shortage price values | Ensures price signals are better aligned to consumers' interests | Preferred | 2023 | 2025 |
|  | A4 | New reserve product to cover sudden reduction from intermittent sources | Ensures ancillary services reflect changing needs of system | Preferred | 2023 | Mid 2024 |
|  | A5 | Offer price reductions after gate closure | Unlocks some flexibility that is otherwise held back | Preferred | Mid 2024 | Mid 2025 |
|  | A6 | Investigate + develop ahead market | Clearer price signals in lead-up to real-time should help parties to coordinate their plans | Preferred | 2025 | Mid 2027 |
|  | A7 | Remove UTS over-ride of trading conduct provisions | Reduces likelihood of confusing price signals from overlapping code provisions | Preferred | Mid 2025 | 2027 |
|  | A8 | Negative offers/prices | Complex to implement and appears unlikely to be needed for next 10-15 years | Not preferred | NA | |
|  | A9 | Centralised commitment based on complex offers | Complex and could hinder competition | Not preferred | NA | |
|  | A10 | Warming contracts | Likely to raise costs for consumers relative to other options | Not preferred | NA | |

 SUPPORTS OPTION

 DOES NOT SUPPORT OPTION

 PARTIALLY SUPPORTS OPTION

Q1. Do you agree that, weighing costs and benefits, our preferred options in Table 7 above are likely to best address the operational coordination issues described in that chapter? If not, why not?

Q2. What is your view of the proposed sequencing and timing of measures to strengthen operational coordination?

Q3. What, if any, other options should be considered to strengthen operational coordination?

1. We agree with MDAG’s preferred options. However, as noted in our cover letter, MDAG should also include a new option, **incorporate dynamic distribution-level constraints in wholesale market clearance**, to be in place by the end of 2024 at the latest.

B: Improve risk management and investment

| | OPTION NAME | RATIONALE | STATUS | START | IN PLACE BY |
|-----|--|--|--|----------|-------------|
| B1 | Greater transparency of hedge info (esp non-base load) covering offers, bids + agreed prices | Make it easier for participants to compare prices, especially for non baseload contracts. Also get better info for regulator | Preferred | 2023 | Mid 2024 |
| B2 | Market-making for longer dated futures (for price discovery) | Improve forward price discovery and supports OTC longer term contracting | Preferred | 2024 | Mid 2025 |
| B3 | Publish aggregated information on pipeline of new developments, energy and capacity adequacy | Provide more information to help participants with contracting and investment decisions | Preferred | 2023 | 2024 |
| B4 | Enhance stress testing regime | Help ensure that participants are actively considering and managing their exposure to spot price risk | Preferred | 2023 | 2024 |
| B5 | Develop standardised 'shape' product(s) | Develop some standardised non-baseload products | Preferred | 2024 | 2025 |
| B6 | Develop flexibility access code (non-price elements) | Promote reasonable access to 'flexibility contracts' | Preferred | 2025 | Mid 2026 |
| B7 | Extend trading conduct rules to hedge market | Deters participants from exercise of significant market power | Preferred | 2025 | 2026 |
| B8 | Market making in caps or other shaped products | Strengthen forward discovery and liquidity for a shaped contract | Potential augmentation for B1, B5, B6-B7 | Mid 2025 | 2028 |
| B9 | Capacity mechanisms | Significant implementation issues and likely to raise costs for consumers | Not preferred | NA | |
| B10 | Strategic reserve | Likely to raise costs and unlikely to improve security | Not preferred | NA | |

● SUPPORTS OPTION
 ● DOES NOT SUPPORT OPTION
 ● PARTIALLY SUPPORTS OPTION

Q4. Do you agree that, weighing costs and benefits, our preferred options in Table 10 above are likely to best address the risk management and investment issues described in that chapter? If not, why not?

Q5. What is your view of the proposed sequencing and timing of measures to improve risk management and investment?

Q6. What, if any, other options should be considered to improve risk management and investment?

2. No comment.

C: Demand-side flexibility

| 1 | | OPTIONS TO ADDRESS STRATEGIC ISSUE 1 | | | | Tariffs mute a signal for flexibility: Yet to see widespread emergence of DSF-rewarding tariffs that enable DSF owners to make risk-value and engagement trade-offs | | | |
|-----|--|---|---------------------------------------|----------|-------------|---|--|--|--|
| | Option name | Rationale | Status | Start | in place by | | | | |
| C1 | Monitor provision + uptake of DSF-rewarding tariffs | Provide reliable quantitative and time-series basis on which to assess retail market development and uptake of DSF tariffs | Preferred | 2023 | 2024 | | | | |
| C2 | Sunset profiling if smart meters in place | Continued use of profiles is impeding retailers' development of DSF tariffs | Preferred | 2024 | 2025 | | | | |
| C3 | Require retailers to offer DSF tariffs | Retailers are potentially slow to develop DSF-rewarding tariffs | Backstop if C1 evidence shows need | Mid 2024 | 2026 | | | | |
| C4 | Develop standardised shape-related hedge products to reward DSF | Enable large consumers to smooth volatile revenues from DSF | Preferred | 2024 | Mid 2025 | | | | |
| C5 | Provide significant funding for pilots/trials to kick-start dynamic tariff use | Help cut through complexities and risks in enabling use of DSF tariffs | Preferred | 2024 | Mid 2026 | | | | |
| C6 | Use Customer Compensation Scheme to reward DSF | | Not preferred | NA | | | | | |
| C7 | Negawatt scheme for wholesale market | | Not preferred | NA | | | | | |
| 2 | | OPTIONS TO ADDRESS STRATEGIC ISSUE 2 | | | | Market is not able to achieve the highest aggregate value for DSF, therefore compromising benefits | | | |
| | Option name | Rationale | Status | Start | in place by | | | | |
| C8 | FSR - improve DSF visibility and remove Code barriers | Covered in FSR project | Preferred | 2023 | 2025 | | | | |
| C9 | FSR - accelerate new ancillary services for DSF uptake | | Not preferred | NA | | | | | |
| C10 | Procurement process for high-scarcity DSF (RERT) | "Last resort" DSF should be formally contracted and paid for. | Backup if little increase in bid DSF | 2025 | 2027 | | | | |
| C11 | Ensure distribution pricing reflects network needs | Improve coordination and optimising the use of DSF across both network and wholesale market | Preferred | 2023 | 2025 | | | | |
| C12 | Investigate extending LMP into distribution networks | Static cost reflective tariffs may not provide the most efficient signal of dynamic network needs for flexibility, undervaluing the role that DSF can provide | Backup if C11 doesn't provide signals | Mid 2026 | Mid 2029 | | | | |
| 3 | | OPTIONS TO ADDRESS STRATEGIC ISSUE 3 | | | | Consumers and intermediaries have low awareness of current or future DSF value | | | |
| | Option name | Rationale | Status | Start | in place by | | | | |
| C13 | Provide info to help large users with upcoming DSF investment decisions | Help large consumers to better quantify the value of DSF in electrification investment decisions - see examples in accompanying 'DSF Case Studies' | Preferred | 2023 | 2024 | | | | |
| C14 | Provide info to help domestic customers with DSF decisions | Help smaller consumers to better understand benefits of DSF tariffs | Preferred | Mid 2024 | 2026 | | | | |

● SUPPORTS OPTION
 ● DOES NOT SUPPORT OPTION
 ● PARTIALLY SUPPORTS OPTION

- Q7. Do you agree that, weighing costs and benefits, our preferred options in Table 13 above are likely to best address the demand side flexibility issues described in that chapter? If not, why not?**
- Q8. What is your view of the proposed sequencing and timing of measures to improve demand side flexibility?**
- Q9. What, if any, other options should be considered to improve demand side flexibility?**

3. As noted in our cover letter and our response, MDAG should also include a new option in this category, **incorporate dynamic distribution-level constraints in wholesale market clearance**, to be in place by the end of 2024 at the latest. We would be happy to help MDAG frame this option up in more detail.

D: Competition

| | OPTION NAME | RATIONALE | STATUS | START | IN PLACE BY |
|--|--|--|--|---------------------|-------------|
| ● D1 | Develop dashboard of competition indicators for flexibility segment of wholesale market | Better assess how competition for flexibility products is changing | Preferred | 2023 | 2024 |
| ● D2 | (=B1) - Greater transparency of hedge info (esp non-base load) covering offers, bids + agreed prices | Make it easier for participants to compare prices, especially for non baseload contracts. Also get better info for regulator | Preferred | 2023 | 2024 |
| ● D3 | (=B6) - Develop flexibility access code (non-price elements) | Promotes reasonable access to 'flexibility contracts' | Preferred | 2025 | Mid 2026 |
| ● D4 | (=B7) - Extend trading conduct rules to hedge market | Deters participants from exercise of significant market power | Preferred | 2025 | 2026 |
| ● D5 | (=B8) - Market-making for shaped contract products | Creates better forward price discovery and market liquidity for a shaped contract | Potential augmentation for D1-D4 | Mid 2025 | 2028 |
| ● D6 | Physical disaggregation of flexible generation base | NA | Not preferred | NA | |
| ● D7 | Virtual disaggregation of flexible generation base | Addresses market power at source via structural change | Back-up if conduct measures not sufficient | 2027 ¹³⁴ | 2029 |
| ● D8 | Price caps applied in the electricity spot market | NA | Not preferred | NA | |

● SUPPORTS OPTION
 ● DOES NOT SUPPORT OPTION
 ● PARTIALLY SUPPORTS OPTION

- Q10. Do you agree that, weighing costs and benefits, our preferred options in Table 14 above are likely to best address the competition issues described in that chapter? If not, why not?**
- Q11. What is your view of the proposed sequencing and timing of measures to strengthen competition?**
- Q12. What, if any, other options should be considered to strengthen competition?**

4. As noted in our cover letter, we support MDAG's preferred options, but recommend that MDAG express its full support for exploration of **virtual disaggregation of the flexible generation base** (option D7 above).

E: Public confidence

| | OPTION NAME | RATIONALE | STATUS | START | IN PLACE BY |
|----|--|---|-----------|----------|-------------|
| E1 | Structured information programme for wider stakeholders | Explaining how security of supply is managed, both physically and via contracting, should promote better informed discussion of system performance | Preferred | 2023 | 2024 |
| E2 | Regular briefings for Ministers and officials on current and expected conditions | Regular updates should reduce scope for surprises and foster awareness that weather-induced spot price volatility is expected and should not be artificially suppressed | Preferred | 2023 | 2024 |
| E3 | Increase inter-change with international experts | Helps New Zealand to benefit from insights and experience from other jurisdictions | Preferred | 2024 | Mid 2024 |
| E4 | Enhance monitoring with more autonomy | Closer and more independent scrutiny of market performance should identify help to identify and remedy problems - and foster confidence in regulatory system | Preferred | Mid 2024 | 2026 |
| E5 | Periodic warrant of fitness review for independent regulatory agencies | Periodic independent reviews external should ensure any weaknesses are identified and contribute to confidence in regulatory system | Preferred | 2027 | 2028 |

● SUPPORTS OPTION
 ● DOES NOT SUPPORT OPTION
 ● PARTIALLY SUPPORTS OPTION

- Q13. Do you agree that, weighing costs and benefits, our preferred options in Table 16 above are likely to best address the public confidence issues described in that chapter? If not, why not?**
- Q14. What is your view of the proposed sequencing and timing of measures to increase public confidence?**
- Q15. What, if any, other options should be considered to increase public confidence?**

5. As noted in our cover letter, these options should all be progressed with urgency. In parallel, the Authority should invest heavily in increasing its market monitoring capability and capacity, to ensure it is on at least a level playing field for technology with the market participants.

F. Orderly transition

Table 18: Proposed measures to facilitate orderly transition

| | OPTION NAME | WHY IT FACILITATES ORDERLY TRANSITION | START | IN PLACE BY |
|----|--|--|-------|-------------|
| A1 | Improve short-term forecasts of wind, solar, and demand | Better information will assist operational coordination (unit commitment) decisions | 2023 | 2024 |
| A3 | Update shortage price values | Ensuring accurate price signals will assist operational coordination (unit commitment) decisions | 2023 | 2025 |
| A4 | New reserve product to cover sudden reduction from intermittent sources | New ancillary service should reduce exposure to sudden large fluctuations in wind/solar output | 2023 | Mid 2024 |
| B1 | Greater transparency of hedge info (esp non-base load) covering offers, bids + agreed prices | Improves investment signals | 2023 | Mid 2024 |
| B2 | Market-making for longer dated futures (for price discovery) | Improves investment signals | 2024 | Mid 2025 |
| B3 | Publish aggregated information on pipeline of new developments, energy and capacity adequacy | Improves information for contracting and investment decisions | 2023 | 2024 |
| B4 | Enhance stress testing regime | Encourages appropriate forward contracting | 2023 | 2024 |

Q16. Do you agree the measures in Table 18 should be prioritised to help ensure a smooth transition to a renewables-based system? If not, why not?

Q17. What, if any, other measures should be considered to facilitate a smooth transition to a renewables-based system?

6. No comment.

G. Implementation

Q18. Do you agree with the proposed categorisation of how measures should be progressed between Code processes, market facilitation and hybrid approaches in Table 20? If not, why not?

7. No comment.

Appendix B – NERA: Promoting Efficient and Affordable Infrastructure to enable electrified transport