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Cross-submission on *Dispatch Notification Enhancement and Clarifications*

Introduction

1) This is Vector Limited's (Vector) cross-submission to the Electricity Authority (the Authority) on the submissions it received in response to its consultation paper titled *Dispatch Notification Enhancement and Clarifications*, published on 1 September 2023.

2) While we earlier elected not to provide our own submission to the consultation, we had provided input to, and supported, the submission lodged by Electricity Networks Aotearoa (ENA).

3) Even though only six parties submitted to the Authority, it was pleasing to see a range of perspectives provided – including that of distribution businesses (EDBs), who have not engaged heavily in the design of dispatch notification to date.

4) We noted the divergence in views and issues canvassed between the perspectives – and even between the three parties acting in 'aggregator' roles.

5) Several issues were raised that had not been expressly canvassed by the Authority in its consultation; we expect these to be explored more fully by the range of submitters during this cross-submission phase.

6) In summary, we think the consultation has usefully surfaced the underlying tension between the motivations of aggregators to deliver new services to their customers and monetise flexibility , and those of the system operators and host networks legally accountable for maintaining security of supply (for the benefit of all consumers they serve).

7) Both perspectives are important and are essential for a future disaggregated system that minimises whole-system costs to consumers. We think the issues and solutions raised are worthy of further discussion, in a forum facilitated by the Authority.

Compliance costs are a clear focus for aggregators

8) Both Enel X and Octopus Energy noted that the participation and compliance costs for dispatch notification were already high, and the alternative of responding more passively to real-time spot prices may be more economic for them. For example, Enel X noted:

> *"in Enel X's experience operating in many global markets, demand bidding mechanisms have failed to see any meaningful uptake. This is because the benefits rarely outweigh the costs, complexity and risks of participating."*

9) Octopus agreed:

> *"Instead of becoming a dispatched notified participant we could instead be responsive to the 5 minute live pricing which would be significantly easier but provide a similar reduction in spot market risk."*

10) One of the key questions raised by the Authority was whether distributed energy resources (DERs) should continue to be required to be offered at the relevant GXPs behind which they are embedded, or could be aggregated across multiple GXPs. The aggregators' views appeared to diverge on the capability required to offer resources to the market across multiple GXPs. While solarZero stated:

> *"It is impractical to offer the unaggregated set of resources at each GXP. … Bidding at each GXP when you are offering thousands of devices is potentially a major challenge and barrier to entry."*

11) Octopus Energy offered the contrasting view, that:

> *"with a modern technology platform, the requirement to offer and respond to dispatches at an individual GXP is not a significant barrier to joining the scheme."*

12) We would tend to agree with Octopus – modern DER management systems (DERMSs) certainly have, and are required to have, the capability to dispatch and coordinate millions of devices, and to aggregate them in any number of ways. As we highlight in the following section, location matters – it is critical that DER under aggregators' management is able to be dispatched on a granular locational basis.

13) Rather than any technical limitation on aggregation by GXP, Octopus noted instead that the 1 MW minimum threshold per GXP was the more relevant barrier to participation, as opposed to the requirement to offer at the relevant GXP. Aggregation across GXPs would help to overcome the 1 MW barrier, which in their view is more regulatory in nature than technical.

14) Transpower disagreed with the Authority's proposed means of addressing the barrier, noting instead that its preferred solution to the participation barrier would be for all parties to bid at the appropriate GXPs, irrespective of the total size of the aggregated fleet (we assume this would mean relaxing the 1 MW threshold). We interpret Octopus's submission as saying the same thing – the Authority should remove the 1 MW threshold, rather than remove the requirement to offer at the relevant GXP.

15) We would absolutely agree with Transpower's position, for the reasons discussed in the following section.

For network owners and system operators, location matters

16) Before discussing concerns with the design of dispatch notification it is worth reiterating that ENA and Northpower were unequivocal in their support of the increased participation in the wholesale market for small-scale generation, load and aggregators.

17) We fully agree with the sentiment expressed by ENA towards the philosophy behind dispatch notification:

> *"More widespread market participation of the resources embedded in our members' networks will further the overarching policy intent of minimising whole-of-system costs and improving system security, as New Zealand progresses towards a 100% renewable power system."*

18) Despite this support, the views of ENA, Northpower and Transpower were clear – for dispatch of DER, location really matters. We agree with ENA that an essential aspect of wider participation of DER in wholesale markets is to ensure:

> *"… the bids reflect actions* [by the DER] *that can be accommodated by the host networks that the resources are embedded in."*

19) There are currently no mechanisms in place to ensure that this is the case. This risks the occurrence of issues for network owners and operators, potentially putting security of supply, equipment, and/or consumer safety at risk.

20) Further, reliance by Transpower on operation of DER which is physically infeasible, due to constraints on the distribution network, could put *wider* system security at risk.

21) As Transpower noted, in relation to the Authority's proposal to relax locational precision:

> *"… we expect the scope for this type of implementation* [aggregation of offers across multiple GXPs] *would be limited before it begins to have negative impacts on our ability to manage system security risks (i.e. meeting our principal performance obligations), particularly around modelling transmission constraints.*

22) Transpower continued that failing to appropriately account for the physical characteristics of the network in market dispatch could lead to material issues:

> *"Because load aggregated to a nominal node is not necessarily representative of where that load is located physically, the SPD solution may calculate a reduction in load inefficiently which could lead to local or regional power system issues, depending on where constraints bind within the network."*

Complexity of local resource dispatch has been significantly underplayed

23) We would take the problem a step further – there are a whole range of dynamic constraints on *distribution* networks that SPD is completely blind to. As noted above, failure of DER and aggregators to adhere to these constraints – both power quality and thermal limits – risks a whole host of power system issues at a very local level. Failure to account for these constraints in market solution risks SPD producing dispatch profiles that are physically infeasible, and as a result, inaccurate, but will be relied on for system security.

24) ENA and Northpower noted that, at the heart of the problem for network operators is a lack of recognition of the complexity of operating a distribution network, especially in a world of myriad manageable devices operated by a large number of aggregators. ENA summarised this as follows (our emphasis added):

> *"Throughout the development of the dispatch notification process, there appears to have been an incorrect implicit assumption that the actions of aggregators will not impact EDBs' networks. This is not the case, especially at the low-voltage level; where* ***network headroom is dynamic and can quickly change*** *(e.g. due to car versus pole outages)."*

25) Just as Transpower implied that a resource connected to one GXP cannot necessarily perform a service for a different GXP (such as alleviating a transmission constraint), a resource connected

to one part of a distributor's network cannot automatically be considered to be fungible with a resource connected to another part – even if they are embedded behind the *same* GXP.

26) As indicated in ENA's comment above, network capacity and available headroom for DER changes in a dynamic, unpredictable way. DER operating on one part of a distribution network could be heavily constrained, temporarily, while on an adjacent part of the network the DER could operate more freely. As Northpower highlights, there are clear risks if aggregators operating DER are unaware of these constraints:

> *"where there is a fault or planned outage on the network, the capacity can be reduced and thus needs to be communicated, otherwise our network can potentially be overloaded creating hazards to network assets and customers"*

Increased communication and formal operating protocols will mitigate the risks

27) ENA and Northpower highlighted that, under the current regulatory framework, EDBs currently have no visibility of aggregator capacity and activity, due to the absence of communication between aggregators and their hosts.

28) However, there are readily available solutions to this challenge, which can enable safe and secure value-stacking and market participation by aggregators. ENA suggests:

> *"EDBs will need a way to communicate to aggregators which actions can safely be accommodated by the host network, at that location and point in time."*

29) Northpower agrees, recommending:

> *"establishing appropriate communications between aggregators and EDBs to ensure sufficient information is received by both parties in relation to where new sources are participating within the dispatch notification process, the location on our network (in relation to individual ICPs) and the aggregator that controls that resource. To achieve this, formal agreements should be entered into by both parties."*

30) We are fully supportive of this, and the actions proposed by ENA (our emphasis added):

> *"ENA recommends that dispatch notification process participants, and other aggregators, be* ***required to enter default distribution agreements*** *(DDAs, aka Use of System Agreements) or equivalent contracts with EDBs. This would ensure the rights and obligations of each party are documented, and* ***operating protocols are agreed*** *(as is the case for retailers currently, under cl 5.6)."*

31) Like ENA, we had expected that a DDA equivalent for aggregators would be addressed in the Authority's current consultation on the DDA, given the issues repeatedly highlighted to the Authority. We were very disappointed that this was not the case.

32) We also think ENA's suggestion of additional pre-requisites for approval for wholesale market participation has merit (our emphasis added):

> *"… ENA recommends the Authority also add, as a pre-requisite for approval as a dispatch-capable load station (DCLS), that* ***the applicant has entered into an operating protocol with its host EDB(s)****. This would be the equivalent of the 'asset owner performance obligations' on parties connecting to and operating on the transmission network, which supports the system operator complying with its principal performance obligations.* ***There is currently no equivalent to ensure that a DCLS assists (and does not hinder) its host EDB in meeting the EDB's obligations for reliability and quality of supply.****"*

33) This echoes a theme articulated earlier this year in an insights paper by the FlexForum[1], that over time the role of the distribution system operator will begin to more closely mimic that of the system operator (our emphasis added):

> *"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****."*

34) It is critical that equivalent settings to the transmission system are put in place to enable and support the safe market participation of distributed resources.

35) We made this observation, and proposed some solutions to the Authority, in our recent submission to the workstream updating the regulatory settings for distribution networks[2]. From our perspective, the key elements are to ensure:

a) The intended actions of a DER under the management of an aggregator – whether dispatched by the system operator or responding to price signals more passively – can safely be accommodated by the host network at that location, at that time, without risking violation of thermal or power quality limits and therefore risking the supply to other consumers in that location; and

b) The aggregator can and will use the DER to assist the host distributor in managing network emergency events, from national events to the very local, in a similar way to how industry participants already assist the system operator in managing grid emergencies. This is currently enabled under the DDA (albeit with insufficient clarity), but only for aggregators who are also retailers.

36) It is hard to imagine a situation in which a generator or large load would connect to Transpower's transmission network without letting Transpower know, or agreeing to follow at least these two recommendations. However, that is the situation we find ourselves in currently with manageable load and aggregators on distribution networks.

37) The settings we and ENA recommend are undoubtedly likely to increase the costs of participation for aggregators – which, as we noted at the top of this cross-submission, are a clear focus for them. However, such settings are critical for electricity security and reliability, as well as the success and durability of DER market participation and, more broadly, whole-of-system optimisation.

38) In one of the quotes above, ENA referred to the asset owner performance obligations (AOPOs) on grid-connected participants. Requirements for governor response by generators are a clear example. Adhering to these requirements certainly requires extra investment and increases compliance costs for those parties, but they are deemed critical to assisting the system operator in complying with its principal performance obligations (PPOs) and enabling the interconnected system to function in a way that benefits all participants, and all consumers.

39) As noted above, EDBs are supportive of the potential for DER to play a wide role in minimising whole-of-system costs for consumers, and increasing competitive pressure in the wholesale

[1] FlexForum insights paper: "*Making better use of available distribution network capacity will enable more affordable and reliable electrification*". Page 11.

[2] Vector submission: "*Updating the regulatory settings for distribution networks*". Page 48.

market. This just needs to happen safely and securely, without putting security of supply, or consumer safety, at risk.

40) As noted above, we think these issues and solutions are worthy of further discussion. We are happy to provide further information to support this cross-submission, or discuss any aspects of it with the Authority. Please contact me at james.tipping@vector.co.nz.

41) No part of this cross-submission is confidential, and we are happy for the Authority to publish it in its entirety.

Yours sincerely

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