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Submissions
Electricity Authority

By email: taskforce@ea.govt.nz

Rewarding Industrial Demand Flexibility

Meridian appreciates the opportunity to provide feedback on the Authority's issues and options paper on rewarding industrial demand flexibility.

Meridian agrees that demand response will play a critical role in the power system of the future. However, we are concerned that the consultation paper is overly focused on promoting one specific type of demand response – intra-day industrial demand response that could provide emergency reserves in extremely rare circumstances. At worst, we query whether this approach could amount to an inefficient subsidy for emergency demand response from a specific technology type that crowds out other investments in response to peak price signals.

In Meridian's opinion:

- There is limited evidence offered by the Authority that intra-day industrial demand response is "under-utilised". The currently level of utilisation may be efficient if it reflects the cost of delivering that flexibility relative to the cost of other options.
- Meridian has strong incentives to invest in intra-day flexibility and has made significant investments in response to market price signals.
- The consultation paper is unnecessarily critical of seasonal demand response, which from Meridian's perspective delivers efficient market outcomes and has a place alongside shorter duration demand response.

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- An Emergency Reserve Scheme may promote competition, reliability and efficiency if it delivers on several design parameters, namely:
    - Any Emergency Reserve Scheme should be designed to address an identified system need; it should not be implemented simply to promote one technology type.
    - The volume of Emergency Reserve procured should be the volume that will address the identified system need.
    - Procurement methods and pricing should be based on a market mechanism, for example a tender to select the least cost providers of the service.
    - The design should be technology agnostic and seek to procure new resources that can provide Emergency Reserves at least cost – that may be industrial demand response, or it may be other technology types. There is no evidence that industrial demand response is the most efficient technology to provide this service now, let alone to justify locking in that technology type as the only provider of Emergency Reserves for the future duration of any scheme.
    - The design should ensure the additionality of resources procured to avoid cannibalising existing resources that are already offered to market, for example as interruptible load. Ideally this would be done by co-optimising the Emergency Reserve Scheme with existing energy and reserve markets.
    - The design of any scheme should consider the impact it will have on existing incentives for investment in last resort generation, batteries, and demand response. The impact of any scheme would likely be to soften wholesale spot prices at times of scarcity. This has the potential to create a missing money problem that reduces investment such that there may not be any net benefits. Consideration could be given to designs that preserve scarcity price signals when Emergency Reserves are activated to preserve incentives for investment in last-resort resources.
- By comparison, industry co-design of a standardised demand flexibility hedging contract is relatively low risk. However, Meridian queries the extent of benefits that might result from development of a standardised product.

These points are addressed further below.

Meridian's views on the supposed barriers to industrial demand response

The consultation paper lists six potential barriers to the uptake of industrial demand response. Meridian's views on each are briefly noted below.

1. *Weak price signals and insufficient incentives*

   The consultation paper suggests that hedging of spot price volatility mutes incentives to respond to spot prices. In Meridian's opinion this is not a problem and simply reflects the strategy choices faced by any business. Businesses are free to stabilise their energy costs via a fixed price offering from a retailer or via hedging, just as they are free to take on spot exposure and investigate more active ways to manage the associated risks.

   Hedging is also not necessarily a disincentive to the provision of demand response. That would be the case if avoidance of high spot prices was the only incentive for the provision of demand response. However, that is not the reality. Demand response has value to retailers, aggregators, networks, and the system operator (as interruptible load) regardless of the hedge position of the consumer in question. Therefore, consumers that are willing to flex can work with potential counterparties to identify whether arrangements can be put in place that are mutually beneficial to both parties. Ultimately this will be a question of whether the physical demand response capability of a consumer helps to manage a risk faced by the counterparty and whether the price necessary to incentivise the demand response is efficient relative to alternatives.

2. *High upfront and operational costs*

   We agree that upfront and operational costs will be material for any business (although highly variable depending on the nature of each business). These costs are not necessarily a barrier but will be a key input in determining the price point at which industrial demand response becomes commercially viable. That price point would then need to be compared with alternatives to determine whether it is the most economically efficient option.

Meridian sees no evidence that industrial demand flexibility is underutilised. The currently level of utilisation may be efficient if it reflects the cost of delivering that flexibility relative to the cost of other options.

3. *Limited buyer incentives*

The consultation paper suggests that generator-retailers may have limited incentives to contract industrial demand response. That is not Meridian's experience. Further information about Meridian's incentives to invest in intra-day flexibility is set out in the next section of this submission. We would expect other generator-retailers to similarly have incentives to invest in intra-day flexibility but they will be better placed to comment.

Non-integrated retailers should also in theory have strong incentives to contract intra-day demand response from their customers as an alternative to, or addition to, super peak hedges or cap derivative products to manage their spot price exposure.

Meridian agrees that networks could do more to consider non-network solutions to manage congestion, avoid investment in peak network capacity, or provide other network services. This could help to build the potential revenue stack for consumers that are willing to flex their electricity demand.

4. *Market structure and platform gaps*

Industrial demand response is inherently bespoke to the technical capabilities and economics of each business. Competition in the market will deliver a range of solutions to meet industrial consumer needs and incentivise efficient levels of demand response in different ways reflecting the varying capabilities and economics of each situation. In that environment it is entirely expected that bilateral contracts will be the primary means of transacting. A centralised platform would only facilitate trading to the extent that arrangements were to some extent standardised; that is not the case with industrial demand response, nor should it be forced.

The consultation paper notes a lack of visibility of demand response arrangements. To the extent that demand response is material to wholesale prices then participants involved will have wholesale market information disclosure obligations with which they must comply. If the Authority wants to centralise information about demand

response arrangements (rather than rely on participant disclosures) then it has the power to require information provision under clause 2.16 of the Code. This does not seem like a barrier to individual demand response agreements. Rather it reflects a desire of the Authority to better understand the evolving demand response market.

5. *Complexity and transaction costs*

In Meridian's opinion, complexity and transaction costs are inherent and to some extent unavoidable in demand response arrangements. This reflects the inherently bespoke nature of each business' technical demand response capabilities and the economics of that demand response for that business. There is a role for counterparties to bilateral demand response agreements to assist consumers to understand the electricity market and help them derive maximum value from their flexibility.

6. *Cultural and organisational barriers*

With the median electricity cost for firms only 1.3% of total input costs, and only 11% of firms having a dedicated budget for energy management, it is apparent that there are organisational and cultural challenges to overcome in order to stimulate industrial demand response.

These challenges are significant but are not necessarily a problem – they reflect the choice of firms to focus on their core business rather than be distracted by complex energy transactions and requirements that may not be worth their time and resources. In Meridian's opinion, the Authroity's proposals are not likely to overcome these challenges. In our experience the best way to address these challenges is for a bilateral partner (like a retailer) to work closely with the consumer and assist them in realising any untapped value.

Meridian has strong incentives to invest in intra-day flexibility

In addition to the NZAS demand response agreements noted in the consultation paper, Meridian has demand response agreements in place with a dairy processor (27MW), a grower (1MW), a health provider (3MW), and a brewery (3MW), with several other demand response agreements under negotiation totalling a further 28.8MW. Each agreement has

different notice periods and durations but could be broadly categorised as options to conserve energy stored in hydro reservoirs by reducing Meridian's contract position.

Meridian is also interested in intra-day flexibility. There is a system need for such resources and wholesale prices efficiently signal that there is value on offer. Meridian is investing to realise that value as evidenced by our 100MW battery investment at Ruakākā in Northland. In addition, Meridian has further battery investments in its development pipeline. Meridian has also been investing in improvements to the peak capacity availability of its hydro generation assets. In addition to the direct wholesale market investment signals at peak times, Meridian is incentivised to procure intra-day flexibility if it means we can firm more intermittent generation in future and increase our retail contract book of firmed sales. Retail growth in the commercial and industrial segment also depends on Meridian taking opportunities to deliver additional value for customers. Realising the potential of demand response to reduce total electricity costs is one such opportunity. Facilitating flexibility for the financial benefit of customers is a key aspect of Meridian's retail strategy.

In short, Meridian's experience suggests that generator-retailers do have incentives to invest in intra-day flexibility based on existing market price signals. A range of technologies can provide intra-day flexibility, and the market should deliver investment efficiently into the least cost options. That may not always be industrial demand response. This is not a problem to be solved by the Authority. It is an efficient market outcome.

Bilateral seasonal demand response arrangements are efficient

Meridian agrees that longer-term demand response arrangements should continue to be managed under bilateral arrangements determined on commercial terms between the parties. However, we query whether the characterisation of longer-term demand response in the consultation paper is reasonable.

The consultation paper suggests that prolonged demand response can have a substantial impact on the New Zealand economy and goes on to mention the demand response agreement between Meridian and NZAS that was granted clearance by the Authority on 8 June 2023. It is undeniable that aluminium production at NZAS was reduced in 2024 by the exercise of Meridian's option to call on demand response under its contract with NZAS. However, that was an efficient market outcome negotiated by two willing parties. NZAS was rewarded under the contract for lost production while it enabled Meridian to conserve hydro

storage by reducing its contract exposure. For Meridian this is an economic and effective dry year risk management tool.

The agreement was a key enabler of secure electricity supply through 2024 in the face of significant gas shortages and historically low inflows. In the absence of the agreement, the security of supply implications could have had far greater implications for the New Zealand economy.

It is also inaccurate for the Authority to suggest that the counterfactual to the demand response agreement is simply more aluminium production and exports. Demand response arrangements were agreed as an integral part of the overall electricity hedge arrangements between Meridian and NZAS and in Meridian's opinion help to lower the total cost of electricity for the smelter and maintain its viability. It may be that the counterfactual to the demand response agreement would be Rio Tinto deciding to cease New Zealand operations entirely.

As noted in the preceding section of this submission, Meridian has agreed industrial demand response with several other parties and is in negotiations with several more. We note that in respect of these arrangements there is also not necessarily a loss of production or impacts to the New Zealand economy as the industry can switch from electricity to an alternative fuel source (for example a legacy boiler maintained as a backup to run on gas, coal, or biofuels).

Views on the proposed Emergency Reserve Scheme

Any Emergency Reserve Scheme should be designed to address an identified system need; it should not be implemented simply to promote one technology type

The Authority appears to be proposing an Emergency Reserve Scheme to incentivise industrial demand response rather than to respond to an identified electricity system need. It is not clear to Meridian what system need the Authority is now hoping to address or how the volume of Emergency Reserves required would be identified. Previous consultation and decision papers have started from a discussion of peak coordination issues and identified a potential need for standby reserves, defined as "flexible resource held in reserve, available to respond to unexpectedly large variations in net demand (demand minus intermittent generation such as wind or solar generation)."[1] The Authority identified that this may

[1] Driving-efficient-solutions-to-promote-consumer-interests-through-winter-2023-_D28umrs.pdf

become increasingly relevant as the penetration of intermittent generation increases. The consultation paper on potential solutions for peak capacity issues similarly considered the need to procure standby reserves as an additional ancillary service to support system security management, defining standby reserve as the capability to respond to large, unexpected changes in energy requirements.[2]

As noted in the paper by Robinson Bowmaker Paul:[3] "Successful programmes have **clear goals that relate to power system or market requirements**. Programmes which allow DR to provide a standard service in competition with or alongside generation succeed by delivering to the system need. In these cases, DR participation alongside generation increases the pool of potential providers, lowering overall costs. **Programmes with a general goal to increase DR participation have been less successful**."

The design of any Emergency Reserve Scheme should be technology agnostic and seek to procure new resources at least cost

It is not clear what has changed since the Authority previously consulted on the very similar concept of a standby reserve ancillary service. At that time the Authority emphasised that this new ancillary service for standby reserve should be technology agnostic and neutral between demand and supply flexibility to favour market competition.

The Authority is now proposing to promote one technology type above others, and it is not clear what has precipitated such a change of heart. Picking winners in the form of industrial demand response will not likely lead to efficient outcomes for consumers in the long term. As an example of competing technologies, Meridian now has 16,500 customers with hot water cylinders under active management. Aggregation of such resources may be able to more efficiently provide Emergency Reserves if the technology types that can provide any such service is less prescribed. In the absence of competition amongst resources to provide the service (i.e. via open tender), the Authority will not be able to determine that industrial demand response is an efficient option relative to investment in alternative like enhanced hydro capacity, battery storage, or last resort generation. It is unlikely that industrial demand response is cheaper than all alternatives now and will remain cheaper into the future for as long as the emergency reserve scheme remains in force.

[2] https://www.ea.govt.nz/documents/4385/Consultation_paper_-_potential_solutions_for_peak_electricity_capacity_issues.pdf

[3] https://www.ea.govt.nz/documents/7267/Demand_response_programmes_-_International_scan_-_Robinson_Bowmaker_Paul.pdf (emphasis added)

Competition amongst technology types could still encourage participation of demand side resources in the wholesale market by providing an additional revenue stream for the demand side (similar to the mechanism for interruptible load availability payments). However, it should only do so where a demand response option is more efficient than alternatives.

The design of any Emergency Reserve Scheme should ensure the additionality of resources

Similar to the above, in previous consultations the Authority has emphasised that any new ancillary service for standby reserve should be fully integrated into the spot market (like other ancillary services, such as frequency keeping and instantaneous reserves) to ensure additionality. In Meridian's opinion this is still critical to avoid cannibalising existing resources that are already offered to the market. Ideally this would be done by co-optimising any Emergency Reserve Scheme with existing energy and reserve markets. Full integration would allow for efficient, least-cost allocation of resources as well as the provision of efficient price signals.

The design of any scheme should consider the impact it will have on existing market incentives for investment in last resort generation, batteries, and demand response

The impact of any Emergency Reserve Scheme could be to soften wholesale spot prices at times of scarcity. This has the potential to create a missing money problem that reduces investment in last resort generation, batteries, and demand response such that there may not be any net benefits to procuring the Emergency Reserves. The Emergency Reserve Scheme could have a waterbed effect, displacing investment that might otherwise have occurred in response to market price signals.

As the Authority previously noted:

> "A standby reserve market is not primarily designed as a tool to provide long-term investment signals. Hence, there is a risk that such a market may dilute investment signals generally, particularly for fast-start plant. Furthermore, even signalling a long-term solution for an integrated standby ancillary service could discourage demand-response innovation in the near-term.
>
> Overall, a new scheme may not offer any security improvements relative to current arrangements. Standby reserve would primarily come from flexible sources that are already being offered to the market under the current regulatory regime. This would introduce additional costs for consumers while resulting in no net-gain in system security.

> This outcome is supported by the experiences in both the Texas market and the NEM, as described in section 8 and Appendix B."[4]

If the Authority proceeds with this proposal, any scheme would have to be carefully designed to try to mitigate these potential unintended consequences.

Consideration may also need to be given to designs that preserve scarcity price signals when Emergency Reserves are activated to maintain incentives for investment in last-resort resources, promote additionality, and avoid distorting existing price signals.

It was because of these potential unintended consequences that the CEO forum recommended a similar ancillary service only be trialled for one winter only under an urgent Code change.[5] Meridian will closely scrutinise the design of any scheme should the Authority proceed with this proposal. We would also strongly encourage the Authority to consider whether an initial trial period would be sensible with resourcing set aside for monitoring and post-implementation review (Action 10 in the consultation paper).

Views on the proposal to develop a standardised demand flexibility hedging product

By comparison, industry co-design of a voluntary standardised demand flexibility hedging contract is relatively low risk. However, Meridian queries the extent of benefits that might result from development of a standardised product.

Standardisation may offer a starting point for negotiating parties upon which to develop any necessary bespoke elements. Some standard terms could have value, but key terms will likely be inherently bespoke due to the variable technical capability of each business to respond, the variable risks that counterparties may be trying to mitigate via demand response, and the variable economics associated, for example:

- notice period
- duration and frequency of call availability
- return times
- stand down periods
- price structures (availability premium / call strike price / response payments); and
- volumes.

[4] https://www.ea.govt.nz/documents/4385/Consultation_paper_-potential_solutions_for_peak_electricity_capacity_issues.pdf
[5] https://www.ea.govt.nz/documents/1655/CEO-Forum-Submission-161222-1383294.pdf

If the proposal proceeds, Meridian supports the Authority's intent to explore this idea through an industry-led co-design process.

Next steps

Meridian will engage in detail with any further consultation on the Authroity's proposed near-term actions.

Please contact me if you have any queries regarding this submission.

Nāku noa, nā

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