



12 April 2022

Electricity Authority  
Level 7, Harbour City Tower  
2 Hunter Street  
Wellington 6011

Submission by email: [fsr@ea.govt.nz](mailto:fsr@ea.govt.nz)

Dear Electricity Authority,

### **Re: Roadmap to achieve future security and resilience of the New Zealand power system**

Thank you for the opportunity to participate in the Electricity Authority's consultation on the phase 2 draft roadmap which has been developed as part of the future security and resilience workstream.

Simply Energy (Simply) is supportive of the Electricity Authority and Transpower's work in this area, and acknowledges the importance to electricity consumers of ensuring a secure and reliable electricity supply throughout the transition towards a lower emissions economy.

Simply's Demand Flex program pays businesses to switch off selected electrical equipment on-demand to support the electricity grid. Customers at over 50 predominantly industrial sites, across a range of sectors, are participating in the program. Sites provide a combination of Fast Instantaneous Reserves (FIR) and Sustained Instantaneous Reserves (SIR). As the electricity grid transitions towards a future with less reliance on coal and gas power, and less system inertia, load providing FIR and SIR will play an increasingly important role in maintaining system frequency.

This submission is focused on roadmap activity 5, "Managing reducing system inertia". The roadmap activity covers the development of new reserve products, which are envisaged to be required as less system inertia results in the current FIR and SIR products being ineffective in managing the fast rate of change frequency events. Individual action items include:

- FSR 5.1 – a study on what new fast/slow reserve types are needed for low inertia system (2029)
- FSR 5.2 – ensuring market system and tools can manage the new reserve types (2030)
- FSR 5.3 – update procurement plan and testing methodologies for new reserve types (2030)
- FSR 5.4 – update operational procedures and RMT for new reserve types (2030)

Whilst we agree with the action items identified, we believe:

1. There needs to be flexibility to bring forward the timing of a broader review ahead of 2029/30
2. There are short term measures which can increase market efficiency and security prior to a more comprehensive review

These two items are discussed further below.

#### **Timing of a broader frequency management strategy review**

Experience in other jurisdictions such as Australia and the UK over the past 3-5 years has shown that a drive towards decarbonisation and deployment of new technologies has resulted in very rapid changes in electricity markets. Regulations in these jurisdictions are also evolving very quickly, including updates to frequency management frameworks and products/tools, to ensure continued reliable power system operations. Whilst New Zealand has not experienced the same pace of change

at this stage, there is a growing focus on decarbonisation from business and individual consumers alike, which is resulting in a growth in electricity load from, for example, electric vehicles and electrified process heat. This is occurring at the same time a drive towards a 100% renewable power system, which will inevitably result in less system inertia. With the potential for these drivers to accelerate, 2029/30 appears a long way into the future to be evaluating whether the current FIR and SIR products (which were designed many years ago) will continue to be fit for purpose in an evolving power system.

In our view, either the timing of a broader frequency management strategy review should be brought forward, or there should be flexibility on the timing and if certain market conditions are triggered, the review should be accelerated. The market conditions to accelerate the review could include, for example, the potential retirement of synchronous generation becoming more likely, or the observed rate of change of frequency during a contingency event reaching a defined threshold. We note that in Table 2 of the roadmap document a threshold has been included for monitoring and prioritising the “Managing reduced system strength” roadmap activity.

### **Short term frequency management measures to improve market efficiency and security**

#### 1. FIR response time for Interruptible Load (IL) vs generation reserve

For FIR participation, IL is measured as the reduction in load at 1 second post the triggering of an under-frequency event, whereas generation-based FIR is measured as the increase in generation output at 6 seconds post the triggering of an underfrequency event. Both IL and generation-based reserve provide a proportional response between the triggering of the event and respective 1s and 6s cutoff time for participation; Simply’s portfolio response to the March 2022 UFE highlighted that the majority of the load reduction occurred over the first 100-200ms, with declining additional load dropping each 100ms out to 1s (data has been provided to Transpower). However, despite IL having a much faster response than generation-based reserve, and therefore being more valuable to the system, both load and generation are paid the same rate for participating in the FIR market.

Other frequency markets do not differentiate between the value of a MW of load reduction and the value of a MW of additional generation output. For example, in the Australian Frequency Control Ancillary Services (FCAS) markets, contingency FCAS for the 6s raise product is measured as the increase in generation amount, or the decrease in load amount averaged over the time period between the contingency event time and 6s post the event.

In our view updating New Zealand’s FIR market settings to pay based on actual response time would be a more efficient approach, provide a fair incentive for the continued development of fast acting IL, and would lead to greater competition in the reserves market by enabling IL providers and technologies which cannot meet the 1s requirement to participate and compete with generation-based FIR in a 6s market.

One potential method for dealing with this legacy framework would be to split the current FIR market into two separate markets, for example, the introduction of a new very fast 1s market, and the continuation of the existing fast 6s market. We note in 2021 the Australian Energy Market Commission (AEMC) approved the introduction of a new Fast Frequency Response (FFR) product, which requires a 2s response from both load and generation. The new FFR product will operate alongside the existing 6s product, as well as slower contingency FCAS products. The excerpts below from the final rule change report highlight some of the advantages of the FFR product.

*The introduction of FFR services, which operate over much shorter time frames, will provide an alternative source of frequency control thereby reducing the overall costs of managing the frequency of the power system relative to the status quo or other alternative arrangements. These markets will*

*also incentivise technology development and innovation, given that the types of resources that are most likely to provide such services are those inverter-based technologies, such as wind, solar PV, batteries and demand-side resources. The introduction of these new markets will further encourage entry of these types of resources into the market, and so the proposed change will also have flow on effects to reliability and security, beyond that associated with management of frequency control.<sup>1</sup>*

*At lower operating levels of inertia, increased volumes of fast acting frequency control services are required to arrest and stabilise the system frequency within the existing power system operating standards. Under the current market arrangements, AEMO expects that increased quantities of the current fastest service, which operates over a time frame of six seconds, will be required to arrest sudden changes in power system frequency following contingency events under low inertia operating conditions. This could lead to a significant increase in the costs for fast (6 second) FCAS, which could be partially mitigated by the procurement of faster responding services, such as FFR.<sup>1</sup>*

We believe the introduction of a 1s very fast FIR market has the potential to reduce the overall quantity of FIR and SIR procured and reduce costs and increase power system security and resilience for consumers. Updating the legacy load 1s / generation 6s framework for FIR should be evaluated by the System Operator as a near-term priority.

## 2. IL metering point for flexibility traders vs distributors

Flexibility traders such as Simply are required to measure the participating IL at each individual ICP / point of connection. This requirement includes 100ms high speed power metering for both FIR, and under the latest recently approved Procurement Plan, for SIR as well. However, distributors are only required to have one high speed power meter per grid exit point, which can be used to verify the response of multiple aggregated participating IL sites downstream of the GXP meter. This enables distributors to offer, for example, multiple residential and SME hot water sites (and potentially in time battery, EV, heat pump and other technologies) into the reserve market at very low cost.

These legacy distributor arrangements distort the FIR and SIR markets. The SIR price is being suppressed by low-cost distributor IL (enabled by the metering requirements above), which does not have the same commercial incentives as competing flexibility trader IL, due to the distributor use of regulated monopoly infrastructure to enable participation, and non-regulated IL income flowing through to the distributor. Distributor IL participation is disincentivising the maintenance of existing reserve, and the development of new competing forms of reserve.

An ongoing privileged position for distributors in the FIR and SIR markets appears difficult to justify, and approaches which level the playing field with non-distributors should be evaluated by the System Operator as a near-term priority.

## **Summary**

Consistent rules for all participants in the FIR and SIR markets will promote competition and the ongoing maintenance and development of load-based reserve, which as discussed in the sections above will become more important over time as system inertia reduces and load and new forms of reserve play an increasingly important role managing system frequency.

Updating legacy market settings to provide a fair incentive for fast 1s acting reserve will not only support system frequency management, but also support the development of additional reserve which can enable greater use of existing risk-setting assets like the HVDC. This will improve the overall

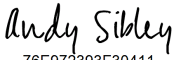
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<sup>1</sup> AEMC, Final Report, NATIONAL ELECTRICITY AMENDMENT (FAST FREQUENCY RESPONSE MARKET ANCILLARY SERVICE) RULE 2021, July 2021

efficiency of the market, supporting the integration of more intermittent renewables, and support wholesale energy costs for consumers.

We would be happy to discuss our submission. Please contact [rob.prest@simplyenergy.co.nz](mailto:rob.prest@simplyenergy.co.nz).

Yours sincerely,

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