

Mr Ben Hiron  
FFR Rule Change Project Lead  
(AEMC Ref: ERC0296)  
Australian Energy Market Commission  
Submission lodged online via AEMC website

3 June 2021

**Re: Consultation on draft determination of the FFR market ancillary service rule change (ERC0296)**

Dear Mr Hiron,  
Thank you for the opportunity to respond to this important consultation.

By way of introduction, VIOTAS is a market-leading smart grid technology and demand side services company headquartered in Ireland and we have recently established a Melbourne office. We are passionate about enabling a low carbon future by leveraging smart grid technology to accelerate the use of renewable energy worldwide and have a dedicated in-house team developing the leading-edge technologies that underpin our services to meet the ever-changing needs of our customers and the power system.

See enclosed below detailed submissions from VIOTAS in respect of the issues considered in the draft determination and draft rule.

If you require any further information on this submission, please contact me by email on [william.salis@viotas.com](mailto:william.salis@viotas.com) or by telephone on 0403 613 243. VIOTAS is more than willing to have a follow up discussion with the AEMC on any of the topics contained within this response.

Yours sincerely,



**William Salis**  
Market Operations Manager  
VIOTAS Australia

## **1. Introduction:**

VIOTAS wholeheartedly supports the development of market ancillary service arrangements for faster frequency response as an immediate priority area for reform in the NEM. The proposed new arrangements for FFR will enable AEMO to manage system frequency following contingency events under low inertia conditions in a more economically efficient manner than solely with the currently available services.

VIOTAS already provides FFR in the Irish market with response times as quick as 150ms and is in the process of deploying its technology in the NEM. VIOTAS technology provides FFR response as standard to enable its customers to continue servicing the ever-changing needs of the power system.

Overall, VIOTAS believes the implementation of the proposed very fast raise / lower market ancillary services are a 'no regrets' strategy, and the AEMC should strongly consider accelerating the proposed roll out beyond the initial timelines set out in the draft determination, considering the rapid change.

## **2. Proposed implementation timelines:**

The draft rule change envisages AEMO will publish an updated MASS incorporating the two new services within 18 months from the rule change, and the new FFR market arrangements will commence within 3 years, by approximately mid-2024 assuming the rule change is published in July 2021.

While recognising the significant work involved to develop and implement the new arrangements, VIOTAS supports the AEMC's view that these proposed timelines should be an absolute deadline, and every effort should be made to bring these dates forward to implement the new arrangements as soon as practical, ensuring they are in place before the need for the new services becomes urgent. Recognising the time it will take participants to adapt their own systems once the service specifications are clear, the continuing pace of the power system transformation, and the AEMC's own analysis indicating that in the absence of the integration of FFR the projected decline in system inertia may lead to a doubling of the requirement for R6 services by 2025, the need to act immediately and quickly is clear.

VIOTAS agrees with other participants advocating for the AEMC to accelerate the roll out of FFR market arrangements as a no-regrets reform. Accordingly, VIOTAS recommends the AEMC challenges AEMO to confirm the fastest timeline possible to make the necessary changes. Having the new FFR arrangements in place and well proven prior to the expiry of the mandatory Primary Frequency Response arrangements (mid-2023) is a more reasonable deadline to build into the implementation timeline. This will provide more time for industry and AEMO to design, develop and deploy the systems required to

The AEMC's notes that the ISP step change scenario indicates that the potential benefit offered by FFR services will become increasingly material over the next 5 years, starting from the commencement of the constraints for dynamic FCAS requirements (inertia-dependent FCAS volumes) as flagged by AEMO for action in Q3/Q4 2021. VIOTAS believes this is an additional strong driver to implement the new FFR arrangements as soon as possible, not mention we recently heard AEMO suggest the NEM has already surpassed the ISP's step change scenario, which further highlights the rapid rate of change. Prior to the new FFR services being operational, AEMO is reliant on the procurement of greater volumes of fast contingency reserves which has already been identified as an inefficient tool to manage frequency during lower inertia operation, resulting in higher costs, and lower system reliability.

## **3. Transitional Arrangements:**

VIOTAS is cautiously supportive of the consideration of out of market arrangements for the procurement of FFR services as a transitional measure. However, these should not detract resources from or delay the full implementation of the enduring FFR market arrangements.

While FFR operational experience does not exist in the NEM, the AEMC and AEMO can draw on experience from other markets which have integrated similar services, such as Ireland (where VIOTAS operates a demand response portfolio of >160 MW) which procures FFR services with response times down to 150 ms. The availability of this experience to support the service specification and the management of system impacts associated with FFR services significantly reduces the system benefit of transitional arrangements.

Accelerating the development of the FFR service specification (which will in any case be required for transitional procurement arrangements) should remain the principal priority, and if the AEMC and AEMO are able to sufficiently accelerate the roll-out it may be preferable to focus on scope changes to get a basic FFR market up and running more quickly as opposed to developing transitional procurement arrangements.

#### **4. Response time:**

In its illustrative technical specification AEMO states the FFR service response time should be set with reference to the expected time to reach the frequency containment requirement under the expected system inertia and credible risk size. AEMO analysis has shown that nadir times of under 2 seconds could be expected under expected future system conditions, and that faster response times will therefore be required to enable lower RoCoF operation (AEMO assumes the FFR response time needs to be at least as fast as the minimum nadir time). While taking care to avoid unduly limiting the amount of FFR that can be delivered, VIOTAS agrees with AEMO's assessment that a response time equal to or approaching 1 second is likely to be suitable for an FFR specification for frequency management under system intact conditions in the mainland NEM.

VIOTAS looks forward to engaging further with AEMO during the development of the detailed service specification for FFR, including the optimal response time. In general, VIOTAS supports a relatively wide minimum requirement (e.g. 1-2 seconds) but with a strong incentive for providers to deliver faster response.

#### **5. Scaling factors / differential pricing:**

VIOTAS notes the AEMC's current view that the introduction of performance based differential pricing multipliers to reward faster frequency response in the NEM is not recommended at this time.

It is important to note the success which such performance based pricing has achieved in other markets, for example in Ireland where "scalars" are applied to DS3 ancillary services payments. The Irish market rewards FFR response provision within 150 ms threefold versus that within the 2 second minimum requirement.

With lower levels of inertia, the loss of the same size maximum infeed will result in faster system frequency nadirs. Response times fast enough to meet the minimum frequency nadir time allow safe operation across all inertia levels. Fast response contingency services act to address the frequency nadir quickly and also reduce the RoCoF experienced by other devices on the grid. Within the same service, not all response is equal and that which can respond faster provides greater benefit.

VIOTAS believes it is important for ancillary services minimum requirements to be as broad as possible (enabling the widest possible range of providers) but for these to be complemented by strong price signals to incentivise the characteristics of highest value to the system. One method to achieve this is scalars / differential pricing.

VIOTAS notes that a form of differential pricing already exists implicitly within the current FCAS market arrangements. Both the registration and testing processes quantify the amount of R6 a participant can provide based on 2x the power average response during the 0-6 second period and 6-60 second period following the frequency disturbance. This provides an inherent benefit for fast responding plant that can exceed the linear ramp to achieve full response within 6 seconds, however, this is currently compensated for by a deduction from the unit's R60 response if the unit is able to provide a sustained response, significantly reducing the benefit.

The existing arrangement – allowing the response speed to determine the volume of FFR that a provider can deliver – means the proportion of nameplate capacity that can be recognised as FFR will vary depending on the characteristics of different equipment. The incentivisation of fast response providers via volume multipliers at registration may be the best option to continue with for the new FFR arrangements; rewarding faster response providers, but without applying highly complex market price based scalars / performance multipliers.

VIOTAS recommends the AEMC continue to assess the significant merits of rewarding fast FFR response providers, even if this occurs during a second phase once the basic FFR market arrangements are operational, to reflect the significantly increased value that faster individual plant response profiles offer to the system.

## **6. FFR Market Arrangements:**

VIOTAS supports the integration of FFR services through an extension to the existing FCAS market ancillary services arrangements and in a similar manner to the existing fast raise / lower services. VIOTAS supports the procurement of all ancillary services via competitive market arrangements to maximise efficiency of dispatch and pricing of services. Transparent and predictable market arrangements for FFR will drive innovation in service provision from different technologies and enable market participants to make informed investment decisions to bring forward more capability in this regard.

Regarding the two options considered by the AEMC, VIOTAS supports the creation of two additional services for the integration of FFR (very fast raise / very fast lower) and does not believe the optimal solution is to do this by reconfiguring the existing market ancillary services (in particular by combining R6 and R60 into a single service). Maintaining a reasonable number of services allows differentiation between providers and technologies, and VIOTAS believes 4 contingency raise / lower services respectively is a sensible balance that will avoid potentially excluding assets which can't meet the technical requirements for services which are too broadly defined.

VIOTAS strongly supports the principle that the market arrangements for FFR are technology neutral and are therefore open to all providers, including generation and loads / demand response technologies. It is important that all aspects of the arrangements and the service specification (including performance parameters, registration requirements, etc.) ensure this technology neutrality.

VIOTAS supports the retention of as much as possible of the existing FCAS market arrangements (for registration, pricing, dispatch, settlement, cost allocation, etc.) for the procurement of FFR services to reduce complexity where possible.

## **7. Relationship between inertia and FFR:**

VIOTAS agrees that while they are different services and not directly interchangeable, there is a significant interaction between inertia and FFR. While FFR can help control system frequency during low inertia operation, a minimum quantity of synchronous inertia will continue to be required over the medium term.

The Irish Grid Code requires generators to remain synchronised for events with Rate of Change of Frequency (RoCoF) up to 1 Hz per second, measured over a rolling 500ms period. Accordingly, any FFR action taken within 500 ms of a frequency event can not only act to address frequency drop but also do so quickly enough to reduce the RoCoF measured by other devices on the grid. This illustrates the inertia-like benefit which FFR contingency response services can have and in Ireland the increased value for response in the sub-500ms region is reflected in the product scalar for FFR, incentivising response down to 150ms.

While FFR and inertia complement each other, they are fundamentally different and should not be combined into a single service. Some providers may be able to provide FFR but not inertia, and vice versa. VIOTAS supports the long term development of market arrangements to appropriately value and procure inertia but separately, as a distinct product. VIOTAS agrees with the AEMC that, while noting the interaction between the two and the long term requirement for co-optimisation, the development of the FFR market arrangements (which will be structured the same as the current FCAS arrangements) should continue without delay, while the valuation of inertia is more complex and is best done in parallel or sequentially and outside of contingency FCAS services. This will ensure the complexity of fully valuing inertia within the existing contingency FCAS frameworks does not cause knock on delays to the implementation of FFR market arrangements.

Contingency FCAS volumes are currently determined based on an assessment of the largest credible system event, without an explicit link between the required volumes of frequency responsive reserves and the amount of inertia on the system. VIOTAS agrees that the operational trade-off between inertia levels and the requirement for fast responding contingency services can be reflected later, with the primary target to deploy FFR as soon as possible alongside the existing contingency FCAS services.

## **8. Relationship between FFR and Primary Frequency Response (PFR) incentive arrangements:**

The implementation of the mandatory PFR requirements has resulted in a marked improvement in system frequency and VIOTAS believes it is important the new FFR arrangements are in place and well proven prior to the sunset on these requirements (June 2023), to ensure the system frequency remains tightly controlled.

The proper incentivisation of capable plants to continuously manage frequency in the normal operating range, automatically in response to small changes via PFR is critical to ensuring proper system frequency control during normal operation as recently demonstrated in the NEM – which is key to the power system operational security and reliability.

As the power system transforms and the governor-based technologies that have provided frequency control, inertia, etc. as a by-product face retirement, the range of system services procured and the technologies providing these must change significantly. It is important to recognise different technologies are suited to providing different services and the services must be defined separately to enable the best possible utilisation of all providers. Demand response, for example, is particularly suited to providing contingency raise services, including FFR, but typically not well suited to providing PFR, Regulation services, or inertia.

FFR and PFR are clearly separate services with different requirements, VIOTAS believes that complementary arrangements to incentivise and reward the provision of distinct services for PFR are important and should be progressed in parallel to the development of the new FFR market arrangements. VIOTAS looks forward to reviewing the AEMC draft determination on the PFR incentive arrangements rule change later this year.

## **9. Retention of value by large energy users:**

Concern has been raised that the introduction of new arrangements for FFR may lead to increased electricity prices. VIOTAS agrees with AEMC that the introduction of FFR will not increase overall costs – and will provide system security at lower cost for consumers. Also, the new service is well suited to demand response (as has been proven in other markets which have implemented FFR services), therefore some customers can provide the service, playing a more active role and reducing their overall electricity costs as a result. This is to be encouraged and is a key benefit and requirement of demand response participation in general, which will play an important role in a future two-sided market.

## **10. FFR Procurement Volumes:**

It is clear that in the long term, the need for FFR is dynamically related to inertia levels and will therefore vary over time. It's important to send participants a long term market signal on what volumes will be required so they can invest accordingly. Clear signal to stakeholders about both what services are required and what volumes of those services will promote innovation and investments in equipment that can provide these services.

VIOTAS recommends that a key element of the FFR market arrangements includes a strong signal as to how much FFR is expected to be procured, and under what conditions. This will provide clarity to participants on the likely volumes of FFR required based on AEMO's assessment of power system needs.

While moving to inertia dependent scheduling of required FFR volumes to be procured may have long term merit, VIOTAS agrees with AEMO that scheduling static FFR volumes is an appropriate interim measure for the initial procurement of FFR and the establishment of the associated market arrangements. All aspects of FFR co-optimisation with inertia, risk size, other FCAS services, etc. merit further investigation but are complex and are not a high priority component of FFR service development for go live. These should be subject to further detailed analysis to confirm whether the potential benefits outweigh the costs (e.g. system changes).

## **11. Frequency event “t=0” times:**

Following a frequency event the determination of “time zero” from which performance is measured is a critical parameter. Currently, the MASS defines this relative to the Contingency Event Time (time of the initial event that led to the frequency leaving the Normal Operating Frequency Band (NOFB), determined retrospectively by AEMO) and the Frequency Disturbance Time (time at which the local frequency falls outside the NOFB).

VIOTAS believes this is an area where the current MASS is deficient, at least when applied to response delivered by Switching Controllers. For Switching Controllers, VIOTAS believes all performance monitoring and assessment should be relative to the time at which the local frequency falls below a controller’s assigned frequency trigger.

Under the current arrangements, if the frequency was to fall slowly and linger in the period between departing the NOFB and crossing the Switching Controller’s assigned frequency setting, when assessed versus the Contingency Event Time or Frequency Disturbance Time, the provided response would fall short, despite the Switching Controller having behaved exactly as expected and as agreed with AEMO.

This situation will be exacerbated as we move to FFR and should therefore be resolved as part of the required changes to the MASS to incorporate the two new FFR services.

## **12. FFR Service Specification:**

While it’s clearly stated the very fast services will operate more quickly than the existing contingency services and will be focussed on the period within 2 seconds of a frequency disturbance, very limited technical details are yet available or defined. VIOTAS looks forward to contributing to future processes to support the development of the detailed service specification and performance parameters for the FFR services in the updated MASS.

VIOTAS understands that FFR providers will have to respond within 2 seconds and sustain their response until at least 6 seconds after the frequency disturbance, allowing the R6S contingency FCAS market to take over. VIOTAS has highlighted above (see section on Scaling factors / differential pricing) the significant value in providing response in under 2 seconds and reiterates the merit in further consideration of implementing an incentive for this within the design of the FFR market arrangements.

VIOTAS agrees with the AEMC the arrangements must recognise the technical and economic characteristics and capabilities of different types of market participants, and this should be a fundamental principle underpinning the development of the service specification – enabling the system to make the most efficient use of all technologies (conventional generation, demand response, batteries and renewables).

It is highly important the proposed detailed service specification for the two new FFR services builds upon best practices from other markets internationally, such as Ireland, which have already introduced such services.

## **13. FFR registration requirements**

AEMO notes that FFR service registration may include additional technical studies not necessarily required for current FCAS services. While this is intended to avoid integration issues, any limitations placed on FFR service providers must be as transparent as possible and made clear to affected participants as early as possible in the process, prior to projects being developed to an advanced stage.

VIOTAS shares concerns echoed by other market participants that AEMO’s initial proposals for FFR market registration (including the requirement for technical studies) seem to be designed around those typically suitable for conventional power generator sites. VIOTAS reiterates the need to design an FFR registration system that is equally suited to new FCAS service providers such as demand response and battery storage, and not only to conventional power generation participants. This is an important requirement to avoid introducing / consolidating biases against particular types of FFR providers.

Some of the lessons learnt from the Connections Reform Initiative by the Clean Energy Council and AEMO may be equally applicable to FFR registration if technical studies are determined to be required to avoid the pitfalls encountered by developers during the generator connection process over the past decade or more.

#### **14. Price responsive approach to FCAS procurement:**

VIOTAS agrees with the AEMC's decision to separate the potential development of price responsive demand curves for the procurement of ancillary services from the design of the FFR market and to separately review how demand curves could be simultaneously introduced across all ancillary services if it is assessed that the value in doing so outweighs the complexity and implementation costs.

#### **15. Technical requirements for switched FFR**

AEMO highlights the different properties of dynamic versus switched FCAS and states its desire to maintain that a minimum portion of fast response FCAS services should come from dynamic response providers. VIOTAS has significant experience providing fast response FFR in the Irish market using switching controllers, and accordingly looks forward to engaging further with AEMO on this topic during the detailed product specification development process.