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nova energy

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Submissions

By email: fsr@ea.govt.nz

Re: Future Security and Resilience - Review of common quality requirements in Part 8 of the Code

Nova Energy (Nova) supports the FSR programme of works summarised via the FSR roadmap. Nova is directly interested in the rules impacting the uptake of inverter-based variable and intermittent resources, and in how the Code is intended to enable different technologies.

Nova agrees that the identified underlying issues could become problematic for common quality outcomes if not timely addressed through key stakeholder industry collaboration. However, some of the Authority's problem definitions may be prematurely subjective, given related indicators proposed under the FSR roadmap have only recently been published[1]. That said, Nova supports the prioritised development of solution options in keeping with the FSR roadmap.

Responses to the Authority's detailed questions are appended to this letter.

Nova considers that given the extent of the unknown underlying issues across the transmission and distribution networks, the highest priority should be to assess and resolve the harmonics issue and associated ambiguities.

Yours sincerely

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[1] https://www.ea.govt.nz/news/general-news/future-security-and-resilience-indicators-published/

Nova submission: Review of the consultation and feedback processes

Q No.	Question	Response
Q1	Do you agree with the description of the first common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.	***1st common quality issue**: Inverter-based resources cause more frequency fluctuations.* <u>Response</u> Nova is in general agreement with the statement that "inverter-based resources cause more frequency fluctuations" and that emergent implications need to be proactively managed. However the following points are noted regarding the assumptions made and the bearing that these have on the stated priority for addressing the problem. • Nova agrees with the issues outlined in paragraphs 3.23 to 3.27 with respect to governor dead-bands and associated free-rider concerns. Though as an owner of thermal plant, Nova supports the reasonable application of governor dead-bands to help mitigate higher operations and maintenance costs and potential reliability implications from accelerated wear and tear in running without a (or minimal) governor dead-band. Generators in the FK ancillary services market are compensated to make such trade-offs for participation, though thermal plants have historically been uncompetitive in this segment. • The assumptions made regarding the change to the status quo, particularly point 3.30, suggesting that one third of all generation will be inverter-based variable and intermittent resources within five years, is likely to be overstated, as the basis of information (connection requests) may not reflect the actual considerable time required to consent, finance, procure, construct and connect this generation. Accordingly, the 'number of connection requests' is not a robust stand-alone 'FSR indicator' metric, without also monitoring the relative number and timing of eventual connections. • Nova does not agree with the statement in paragraph 3.50 that regulatory intervention is the only means by which the issue can be addressed. The fact that existing mechanisms outlined in paragraphs 3.44 (EA mandate) and 3.45 (SO conditional dispensation) have not been used to date, does not mean they couldn't be collaboratively and progressively utilised by the EA and SO in the near-term, and at a consolidated level, if required to help

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		quell an increasing number of frequency fluctuations caused by connected generators of less than 30 MW capacity. Given the risk of unintended consequences or sub-optimum outcomes from potentially rushed Code changes, Nova does not feel that this issue necessitates a high priority. The System Operator and Electricity Authority have time to further test their growth rate assumptions and monitor the actual grid frequency operational performance effects of increasing inverter-based generation connections, against the current Code requirements (perhaps with the development of supporting cohesive guidelines to help clarify and inform), to refine the problem statement and develop appropriate controls.
Q2	Do you agree with the description of the second common quality issue (ie, first voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.	***2nd common quality issue****: Inverter-based resources cause greater voltage deviations.* <u>Response</u> Nova agrees with the statement that "inverter-based resources cause greater voltage deviations" and that mitigating the potential for adverse impacts of inverter-based resources on system strength should be given a high priority. Though any regulatory changes need to recognise that this is generally a locational issue, which can change over time, and that a 'one rule for all' approach would likely lead to sub-optimal and inefficient outcomes. Nova notes that in the transmission context, the current dispensation process accessible for non-compliant generators provides a reasonable (and visible) balance between the trade-offs for initial full cost of compliance vs. future cost and risk of carrying a (conditional) dispensation, if granted, for the conditional non-compliance. As an aside, at the transmission level, monitoring of key summary dispensation metrics would likely provide a beneficial FSR Indicator.
Q3	Do you agree with the description of the third common quality issue (ie, second voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.	***3rd common quality issue****: Inverter-based resources can cause network performance issues.* <u>Response</u>

Q No.	Question	Response
		Nova agrees that "inverter-based resources can cause network performance issues" through sympathetic tripping, however the following points are noted regarding the priority of the issue. • This issue is considered a high priority for consideration by the SO and the Authority to determine potential control system functionality to optimise generation output, balanced with network stability, during the initial stages of inverter-based generation growth; and • By treating this as a high priority, the System Operator and the Electricity Authority may be able to test various assumptions and control configurations, in consultation with developers to better understand the future Code requirements under generation growth scenarios.
Q4	Do you agree with the description of the fourth common quality issue (ie, third voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.	***4th common quality issue****: Increasingly less generation subject to fault ride through obligations.* <u>Response</u> Nova agrees that "increasingly less generation [will be] subject to fault ride through obligations" as the relative proportion of inverter-based resources increases. If unaddressed, it has the potential for grid connected generators > 30 MW to face increasing free-rider costs through more onerous fault ride-through requirements that may be placed on them. Though as outlined in its response to Q1 (refer third bullet), Nova doesn't necessarily agree with the EA's view that this is an issue that can only be addressed via regulatory intervention, due to the potential risk of unintended outcomes. Nova supports the high priority placed on identifying options to help address this issue. Further noting the following points to clarify the issue and priority: • The issues paper identifies potential causes and options that the System Operator and Electricity Authority could readily monitor via an appropriate set of FSR indicators and associated mitigation guidelines; and • With respect to point 4.46 outlining the overseas experience of systemic issues with inverter-based resources disconnecting from the network during power system faults, and the issue proving difficult to address due to inverter protection mechanisms having hard-coded trips within the inverter, suggests

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		equipment specification guidelines to accompany grid / network connection and operation standards would be a beneficial low-cost interim measure, in lieu of hard regulatory intervention at this early stage.
Q5	Do you agree with the description of the fifth common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.	***5th common quality issue**: Some ambiguity around harmonics standards.* Response Nova agrees that there is "some ambiguity around the harmonics standards". Nova also agrees that the ambiguous standards may be inconsistently applied across generation (and load) connections on both the transmission and distribution networks. Nova's observations support the statement in paragraph 5.22 that currently there seems to be insufficient information to assess the extent of harmonics present at GXPs, or downstream of that. Nova also notes that the potential for significant harmonics to emanate from the demand side (given the increasing proliferation of smaller-scale non-linear electronic devices that distort the sinusoidal waveform, such as energy efficient LED lighting, variable speed motor drives, etc), with the risk that a historically unmonitored and unmitigated excessive base-line harmonic content could impose overly restrictive requirements on connecting generators / DER, as an easier path for network owners than resolving the root cause at source and presenting a barrier to entry. Nova considers the highest priority should be to assess and resolve the harmonics issue and associated ambiguities, given the extent of the unknown underlying issues across the transmission and distribution networks.
Q6	If you are a distributor, what is your experience of asset owners sharing information with you for network operation purposes?	Response
Q7	Do you agree with the description of the sixth common quality issue and that addressing it should be a high	***6th common quality issue**: Insufficient information on assets wanting to connect, or which are connected, to the power system.* Response

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	priority? If you disagree, please provide your reasons.	Nova works closely with network operators during the design, construction, commissioning and operational phases of its generation development projects, to ensure the appropriate information is provided. As such, Nova is unable to comment on the sufficiency of information provided to network operators by other developers. Nova notes that the current regulations appear to provide adequate mechanisms for Transpower and Distributors to resolve this issue.
Q8	Do you agree with the description of the seventh common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.	***7th common quality issue****: Some Code terms missing or not fit for purpose.* <u>Response</u> Nova agrees there are "Some Code terms missing or not fit for purpose". Code terms and definitions are fundamental, therefore a high priority should be given to reviewing the Code to identify and implement required updates and additions, to ensure the common quality Code terms are fit for purpose.
Q9	Do you consider there to be other high priority common quality issues not identified in this paper that are occurring or that you expect to occur because of: a. the uptake of inverter-based resources, and/or b. how the Code enables different technologies?	<u>Response</u> Nova does not have any additional common quality issues to raise.