



# EAI Response to CER Consultation CER/13/143

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## Rate of Change of Frequency (ROCOF) Modification to the Grid Code

Electricity Association of Ireland

Markets Committee

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The Electricity Association of Ireland (EAI) is the trade association for the electricity industry on the island of Ireland, including generation, supply and distribution system operators. It is the local member of Eurelectric, the sector association representing the electricity industry at European level.

EAI aims to contribute to the development of a sustainable and competitive electricity market on the island of Ireland. We believe this will be achieved through cost-reflective pricing and a stable investment environment within a framework of best-practice regulatory governance.



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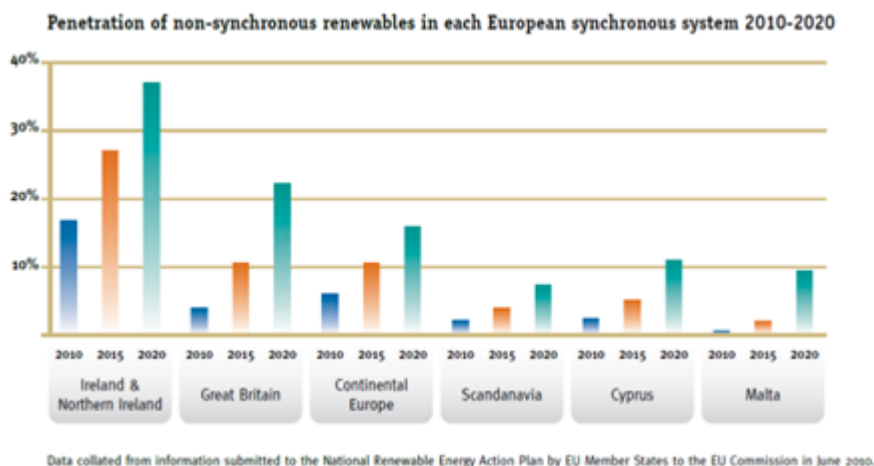
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## Introduction and Context:

The Electricity Association of Ireland (EAI) supports the achievement of the respective government targets of 40% electricity generation from renewable energy sources by 2020 in both the Republic of Ireland (Ireland) and Northern Ireland (NI).

The technical challenge underlying delivery of this target (mainly from non-synchronous wind which is projected to account for 38% of total generation) was established in Eirgrid’s all island grid study in 2009. The chart below illustrates the scale of this ambition relative to other European synchronous systems.

EAI acknowledges that in order to meet this target, it will be necessary to have a system that can sustain a system non-synchronous penetration (SNSP) rate of 75% on the island of Ireland. At the moment, a SNSP threshold of 50% applies in both jurisdictions to ensure security, resulting in Transmission System Operators (TSOs) effectively curtailing wind or countertrading against interconnector imports in order to keep the system stable. To increase the SNSP threshold and reduce the curtailment of wind, the TSOs will require a number of services from generators. The TSOs proposed harmonised approach to securing these services encompasses both ‘carrot’ (DS3 value-based incentive approach) and ‘stick’ (grid code retrospective modification and penalties in the case of the rate of change of frequency (ROCOF) standard). ROCOF is different to the other relevant services in that all (or almost all)<sup>1</sup> plant must provide this service for the benefit to be realised.



## The ROCOF Issue

With increased penetration of non-synchronous generation (wind and interconnector imports), the probability of an event resulting in a 1 Hz/s disturbance becomes greater. According to the TSOs, three such events have occurred to date on the system. Eirgrid has proposed a modification to the Irish Grid Code to increase the ROCOF capability of plant on the system from 0.5 Hz/s and this is the subject of the current CER

<sup>1</sup> The TSOs have not specified the critical mass threshold.

consultation (CER-13-143). SONI has proposed an analogous modification to the Northern Irish Grid Code and a separate consultation is expected from the Utility Regulator on this in the near future, though we note CER's stated preference for both RA decisions to be consistent.

Technical desktop studies by original equipment manufacturers (OEMs) are required to assess whether a specific plant is capable of attaining the new standard. The TSOs may have events-based evidence from the historical records suggesting that some plant have this capability but a form of 'certification' is required that all (or almost all<sup>2</sup>) plant on the island of Ireland will meet the requirement if the ROCOF change is to be considered feasible and thus if its key objective is to be delivered i.e. an overall increase in the SNSP limit from 50 to 60%.

The process for determining capability or not is challenging, costly and complicated by a distinct lack of clarity as to how precisely the standard is to be assessed and proven, as recognised in the consultation paper<sup>3</sup>. There will be difficulty for older plant in particular, in establishing precisely which are the relevant OEMs to carry out the studies. In addition, for both these and other plant, there are real and pronounced difficulties in persuading the OEMs to engage, despite the best and sustained efforts of the plant operators concerned. Lack of engagement from the OEMs can be attributable in no small way to the small size of the Irish market and the unique nature of the proposed modification. A retrospective modification of this type and a requirement to carry out studies to establish capability is unprecedented<sup>4</sup>. The cost of the studies is significant, at an estimated €20million in aggregate, with the potential for even greater cost depending on scope and initial findings. Further, it is completely unrealistic to expect and require these studies to be carried out as proposed within 18 months of a CER decision and to penalise generators onerously through a new Generator Performance Incentive (GPI) for not doing so within this timescale. CER's own consultants, PPA, have stated that these studies could take 8-10 years. Without OEM engagement the studies cannot even be initiated and without compensation to carry out the studies it could well be uneconomic for some plant to proceed. Ultimately there is no guarantee that the outcome of the studies or OEMs will be conclusive in relation to the proposed new ROCOF standard.

Eirgrid referred the modification to the CER after the modification was rejected by all conventional generator representatives at the RoI Grid Code Review Panel (the Panel). This was and is a highly contested modification and the majority vote in its favour at the Panel meeting should not be misconstrued. The supplier and demand side representatives abstained from voting because of uncertainty regarding its ramifications and feasibility, and supporters of the modification had an interest in its implementation and/or were unaffected negatively by it. The consultation paper should have made this clear to the wide audience it is targeting for feedback.

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<sup>2</sup> Ibid footnote 1.

<sup>3</sup> Page 7 of the consultation comments that 'Proving compliance with a higher ROCOF standard than that currently required in the Grid Code will be an issue for the TSO. There is no test that can reliably check that a generator will withstand a high ROCOF event. Therefore the TSO is entirely reliant on the generator's assessment and "certification" of the unit's capability'

<sup>4</sup> The consultation paper refers to a ROCOF standard of 2Hz/s in Spain and 2.5Hz/s in Denmark and suggests that manufacturers have already undertaken studies in the design of these units. There is no evidence presented in the consultation paper that manufacturers have carried out such studies, the ROCOF standard that exists in these countries is not the same as proposed by Eirgrid (1Hz/s measured over 500ms).

## Summary of CER Consultation (CER/13/143)

The consultation paper outlines the CER's view on the TSO proposal to change the ROCOF to 1Hz/s (MIPID229). The current ROCOF capability required of all units in Ireland is 0.5 Hz/s as set out in Grid Code clause CC7. 3.1.1 (d). In the event of a coincidence of high wind generation and the loss of the single largest credible contingency, ROCOF values of greater than 0.5Hz/s and no greater than 1Hz/s are possible. Values in excess of 2Hz/s are possible in NI in the event of system separation. The TSOs maintain that the ROCOF modification will allow for an SNSP of 60%. The TSOs estimate the benefits of increasing the SNSP to 75% to be approximately €300m per annum on an all island basis from 2020.

**The key issues of concern to thermal generators relate to the uncertain implications of the proposed ROCOF modification (including the possibility of catastrophic plant damage or the risk of desynchronising and reduced plant life); its retrospective application; the costs of compliance testing and possible GPI penalties; the difficulty in delivering OEM engagement and future certification.**

It is proposed in the consultation paper that generators will be required to declare compliance (or not) with the prevailing ROCOF standard<sup>5</sup> within 18 months of the final CER decision and that this must be supported (except where historical system records are deemed to provide adequate proof) by robust generator studies of sufficient quality to convince the TSOs it is safe to operate the system with a high SNSP when that unit is on the system. It is proposed that implementation of the modification would be "most efficiently completed through a coordinated and managed industry wide project" by Eirgrid under the oversight of the CER. It is suggested Eirgrid is best placed to determine system needs and compliance and, as an 'independent third party', generators will be more inclined to share appropriate commercially sensitive information with Eirgrid.

Notwithstanding acknowledgement that it could be considered an 'inequitable situation' to impose the cost of studies on conventional generators when the commercial benefits of the modification will accrue to wind farms<sup>6</sup> (to the actual detriment of thermal generators through reduced utilisation), CER is proposing that the cost of such studies will not be recoverable, socialised or postalised in some form. This is argued on the grounds that the proposed grid code modification is to support government policy on renewable targets, that grid code compliance is the responsibility of generators and that non-compliance is a clear exit signal in the context of said government policy. Furthermore, CER proposes that there will be a GPI implemented in respect of the ROCOF Grid Code Standard that will apply 18 months from the date of the CER's decision (which is somehow envisaged by CER to be when the generator studies will be completed).

## High Level Comments

- EAI supports the renewable energy targets set out by the NI and Irish Governments, the scale of which is very ambitious in the context of the island system and very limited availability of synchronous, predictable and non-intermittent renewable generation.
- In this regard, EAI has fully engaged with the TSOs' on-going review (under DS3) of the system services required for the secure and sustainable operation of the all-island power system with

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<sup>5</sup> The consultation paper suggests that studies will be required to not only prove compliance with the proposed new ROCOF standard but also with the existing standard.

<sup>6</sup> To the extent that it supports government policy on renewable targets society at large will also benefit. This is a point returned to later in this response.

increasing penetration of non-synchronous renewable generation to meet the respective 40% targets.

- EAI acknowledges that a SNSP limit of 50% will remain in the absence of additional flexible products and services being provided to the system, ideally both from synchronous and non-synchronous generators on the transmission and distribution system. With a 50% SNSP, curtailment will continue to increase.
- EAI concurs with the TSO assessment that with curtailment levels regularly above 5% there is a significant risk of projects not being progressed as wind projects would no longer be financeable.
- Resolution of the ROCOF issue can make a substantial contribution to progressing the DS3 programme. However, other measures to address the curtailment issue are also available, including innovative technologies under development.

## Fundamental Concerns

- The independent consultants PPA Energy and TNEI (PPA) specifically appointed by CER to consider the proposed modification and advise accordingly “**recommend that CER does not approve MPID 229**” pending the outcome of a number of further processes, considerations, and investigations germane to the proposed modification. The consultation paper provides no justification for rejecting this unequivocal recommendation. EAI is of the view that, should this position be maintained and given the materiality of the proposed decision, an acknowledgement and fully reasoned explanation as to why the recommendation is rejected must be provided.
- Of related concern is the absence of any reference to the following recommendations made by PPA:
  - That the TSOs explain the process by which derogations from the proposed new ROCOF standard would be applied;
  - That the TSOs prepare a report exploring the level of ROCOF that arises over a 100ms period in a range of scenarios that show an average ROCOF of 1.0Hz/s over 500ms. This is to enable further consideration of the impact of potentially higher rates of ROCOF over this shorter period by generator manufacturers<sup>7</sup>;
  - That the TSOs provide further information about the alternatives to changing the ROCOF standard that exist, describing the potential impact of these on system operation and the electricity market, and detail the likely limitations of any alternatives on the level of SNSP that can be achieved in 2020; and
  - That the TSOs give further consideration to the potential impact of higher ROCOF on system demand customers (at all connection voltages) and, along with the Distribution System Operators, consult with demand customer groups on this issue<sup>8</sup>. Whilst the consultation

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<sup>7</sup> The Consultants’ consider a ROCOF standard of 1Hz/s measured over 500ms as clearly more stringent than the more usual 100ms timeframe such as that which was being considered by the new European standard and that insufficient evidence has been presented to assess the ROCOF magnitude over 100ms that would occur. The Consultants’ report also states that the justification for the measurement being made of 500ms is less clear.

<sup>8</sup> It should be noted that the supplier and demand side representatives abstained from the Grid Code Review panel vote on the proposed ROCOF modification because they were unclear of its ramifications and implementation.



paper is open to all interested parties, including customers there is no further information on the impact of the higher ROCOF standard on them.

- Grid Code modification proposals, in particular ones which are highly contested, are not usually presented without robust technical analysis to support the modification. This should be a core tenant of the modification and approval process. For example the impact of local and inter-area interactions on generator rotor speeds has not been fully investigated and will only be fully appreciated after a series of real events<sup>9</sup>.
- The Grid Code should not be used to set out a roadmap of the TSOs preferred future operating parameters without the technical analysis to support operating the system and generating units in such a manner. The Grid Code should not become a document of future scenarios which may require a plethora of derogations if they are either theoretically or physically impossible to achieve. This would result in a Grid Code which is both difficult to operate and also, due to uncertainty in the Grid Code standard, increase the cost of new investments.
- No recognition appears to be given to the fact that the Grid Code provides for “testing” to prove compliance rather than detailed (and costly) technical studies.
- The proposed requirement for all plant on the system to complete studies (to assess compliance with the existing and proposed new standard of ROCOF) and attain a new standard outside the design specification of plant within an 18 month period, being the time projected by the Consultants to determine ROCOF compliance for a single plant, needs to be explained.
- Basing the proposed decision on an implicit and unsupported assumption that the studies, as yet not technically specified, will indicate an ability by almost all plant on the system to comply with the revised standard is without foundation. Not alone must the TSOs be satisfied a plant can support the revised standard but so too must the operator. A question arises as to what would happen if TSO considers a plant to be compliant and the operator does not, or indeed vice versa? The consultation paper appears to indicate that ultimately the TSO will decide if a plant meets the ROCOF standard or not. This is too arbitrary. Ultimately the operator should declare their plant compliant or not under the advice of their OEM and informed by an objective assessment of the study results. The TSOs are within their remit to accept or reject this assessment and operate the system accordingly but this should not form the basis for a particular plant being deemed compliant or not with the new ROCOF standard unless an objective test can be carried out by the TSO to prove this.
- A new and significant uncertainty for investors is created by the Regulatory (as opposed to Statutory) imposition of standards and associated technical studies applied retrospectively that have a material cost and impact, and that incorporate onerous non-compliance penalties.
- The conflation of policy obligations imposed on Government to meet a specific national target with compliance obligations on operators (which do not arise under the RES Directive or national policy) as justification for the proposed action in the absence of legislation is of concern.

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<sup>9</sup> Predicting future power system dynamics with material changes to system typology and types of generating units is extremely difficult and cannot be achieved solely by computer modelling. As an example, the system harmonic issues experienced as a result of commissioning the East-West interconnector is proof of how difficult it is to model power systems.

- The proposed refusal to provide for cost recovery of the studies required to test compliance is inequitable for the reasons provided in the consultation paper and in particular given that other options have not been examined. Such arbitrary behaviour undermines confidence in the regulatory process and jeopardises the future investment required to meet renewable energy and security of supply objectives.
- EAI rejects the contention that a conventional plant which is not capable of demonstrating a capacity to meet the revised standard because of the current technical limitation of variable generating plant, is given a clear exit signal - in particular given alternative potential solutions to this deficiency are being developed. Such generating plant provide potentially more inertia to the system than non-synchronous plant and interconnectors.
- One of the most material risks to system security, as identified in the TSO reports, is the mal-operation or fault on the East-West interconnector. The East-West interconnector has the capability of causing one of the largest ROCOF events on the system due a single point of failure. However, whilst CER is proposing a GPI for non-compliance with the proposed ROCOF standard it does not address in a similar manner one of the most likely causes of a major RoCoF event.
- **In summary, EAI contends that the Code Modification cannot be approved or rejected at this time.** Technical studies of this modification and of alternative solutions [with appropriate cost benefit analyses] need to be completed before it can be established if this is the most appropriate modification at this time. In order to progress, the review of system services must account for the system value of ROCOF and as a first step, **must compensate prospective providers for the costs incurred for investigations undertaken to establish feasibility.**

## Governance Structure

- Adherence to the principles of better regulation and Governance is crucial to an issue of this importance. We welcome the CER's first attempt to define an appropriate governance structure. However, further definition, most notably in relation to role of the TSO, is required before a final decision on Governance can be made.
- In principle EAI supports the proposal to establish an implementation project to co-ordinate the activities of generators and TSOs. However, our members would be most concerned if the TSO was authorised to project manage test activities in relation to their plant. The TSOs should have a role in the test programme but this should be managed by independent consultants subject to oversight by CER with close coordination with the TSOs and in consultation with industry. Members do not agree that the TSO can be considered an 'independent third party' in the process given its asset ownership interests and reputational considerations.
- For the proposed ROCOF modification to succeed, all generators also must be satisfied their respective plant can achieve the new standard. It is appropriate that generators manage the interface with their respective OEMs. It is counterproductive to this objective for the TSO to mandate which plant should be tested by what entity and when (given that part of that organisation is a participant in the market).

## Process/Timelines

- A key consideration for the PPA recommendation was the length of time required for completion of these studies given each study could take up to 18 months. The consultants note that OEMs report they would have little opportunity to run studies in parallel and consequently indicate a period of 8 – 10 years to complete the studies.
- EAI considers that, given the analysis by PPA and feedback from members, the 18 month timeline for implementation of MIPID 229 is both arbitrary and highly unrealistic, and has real potential to be inequitable. Plant operators are reliant on OEM willingness and availability to carry out studies and it has been established and accepted by PPA that studies for all plant cannot be completed in parallel.
- In this context, EAI is of the view that no plant should be subject to any GPI penalty on ROCOF until such time as it has completed and fully assessed any required studies.
- Notwithstanding the pressing need for these studies to commence as soon as possible, it is reasonable that alternative measures to addressing the ROCOF issue must be considered in parallel. However, there are no timelines proposed in the consultation paper for these to be progressed by the TSOs.

## MIPID 229 Test Regime

- In order to progress MIPID 229 and enable OEMs to undertake studies that are both consistent and sufficiently comprehensive, the TSO must first make available a rate of change of frequency that plant can expect to realistically have to withstand over the period 0 – 500 ms and in particular over the period 0 – 100 ms. Clarity as to the technical interpretation of the current standard is also required if it is to be tested.
- EAI proposes that a time-set of test points (worst-case frequency curve) would provide a more consistent and practical measurement basis on which the TSO and generators could assess the capability of plant to respond to events. Such a curve would provide a more meaningful basis for measuring ROCOF capability than a the current generalised standard.

## Costs

- Notwithstanding EAI's support for the delivery of the RES targets for electricity of the respective governments, the Association views the proposal as unduly discriminatory.
- Resolution of the ROCOF issue is a potentially significant component in realising the estimated €300 million value to customers of the DS3 system services review. Both the TSO and generators consider that a technical evaluation of the capability of plant to deliver a revised ROCOF standard is an essential part of realising this annual gain for customers.
- In this context EAI disagrees in the first instance with the CER's assertion that the cost incurred in simply determining whether the ROCOF standard could be modified constitutes a "compliance" cost. Secondly, given the significant (relative) savings for customers that arise if the technical standard can

be modified, then it is entirely reasonable that customers contribute towards the cost of delivering this saving.

- One might with equal validity argue that since this cost is a result of Government imposed policy then it is reasonable the cost of implementation should be supported by central Government funds or the generality of consumers. Since Government has determined that its renewables policy delivers a social benefit then it is justifiable and economically rational that the cost should be socialised. To unfairly impose the cost on a subset of generators is economically irrational and inefficient and sends a negative signal for future investment in generation that will be now exposed to future government policy as interpreted and implemented in regulatory decisions and applied retrospectively to investments. It should be stressed in this context that the broader DS3 programme (and delivery of current government policy) has a need for significant investment in flexible generation to support the 2020 renewable targets<sup>10</sup>. Thus if the ROCOF issue is not carefully managed from a regulatory perspective and generators appropriately compensated for studies required this could ironically undermine further investment required to facilitate government policy.
- Given the regulated regime under which generators operate in the SEM, there is no means to recover the costs of the studies other than from company resources. EAI has the strongest reservations in relation to the principle of arbitrarily and retrospectively imposing costs on operators without providing a mechanism to recover such costs as this in effect amounts to expropriation of large sunk irreversible investments in generation. To argue that these costs are being imposed to simply determine compliance with current standards is disingenuous when the system has been operated with this standard in place for years. If there are genuine concerns about the current standard are the TSOs suggesting that the SNSP limit of 50% is too high?
- **In summary, EAI continues to strongly oppose the ‘no cost recovery’ option proposed in the paper for reasons explained above.**

## Clarifications

EAI seeks clarification on the following aspects of the paper:

- *How will the critical mass threshold for compliance with the proposed new ROCOF standard be determined?*
- *How will the possible exemption of plant with lower running hours be treated?*
- *As discussed above, what are the merits of the Standard of Measurement used (500ms) versus the ENTSOE Standard (100ms)? The latter standard is possibly more relevant in terms of the actual plant impacts.*
- *CAN CER confirm that there is currently no protection for plant against a 1Hz/s event which is increasing in probability with increased RES penetration and imports on the interconnector?*
- *Please identify and explain the criteria against which derogation applications in respect of the proposed new ROCOF standard will be assessed and the process that will be applied*

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<sup>10</sup> It is proposed to incentivise this investment with relatively short term (5 year) system services contracts (with remuneration based on an estimated 10 year payback). This invariably exposes these investments to changes in government policy.

- *Can it be confirmed that plant will not receive a GPI after the stipulated testing and study period (currently proposed as 18 months after the CER decision) if delay to testing and studies is as a result of factors beyond the control of the plant operator (e.g. OEM unwillingness to engage or inability to deliver on the scheduled testing programme determined by the implementation project manager?)*

## Concluding Comments

To reiterate

- EAI supports delivery of the two governments' ambitious renewables targets and is committed to full engagement in the DS3 process.
- A reasoned justification of the rejection of the PPA recommendations is required.
- The proposed timeline is unrealistic.
- The process for modification of the two codes on the island should be aligned – the CER acknowledges that “it would be preferable for both Regulatory Authorities to make decisions which did not conflict with one another”. EAI would agree but two separate and unsynchronised consultations on the same issue by the respective regulatory authorities appear contrary to this objective.
- If a ROCOF GPI is adopted despite the concerns raised in this response, EAI calls on the respective regulatory authorities to bring this to the SEM Committee for careful consideration and a separate SEM Committee consultation in the context of the harmonised Other System Charges regime.

## Annex 1: EAI response to consultation questions

### **1. Do you agree with the CER's proposal to approve MPID 229 in principle?**

The Code Mod cannot be approved or rejected at this time. Technical studies of this modification and alternative solutions and cost benefit analysis appropriate to these need to be completed before it can be established if this is the most appropriate approach at this time.

### **2. Do you agree with the conditions for giving MPID effect in the Grid Code?**

No. We refer to the Consultant's unambiguous recommendation to the CER.

### **3. Do you agree with the proposal to establish an implementation project to co-ordinate the activities of generators and system operators?**

Yes, but we do not agree that the TSO should operate in a project manager role

### **4. Do you agree with the proposed high level governance structure?**

The proposed high level governance needs further definition most notably in relation to the role of Eirgrid before we could form an opinion.

### **5. Do consider that the costs for the technical studies should be recoverable?**

Yes, for reasons explained in the main body of this response.

### **6. Do you agree with the proposed introduction of a GPI for ROCOF**

No. It is unreasonable and disproportionate to impose an onerous ROCOF penalty when the timeline for completion of technical studies is unrealistic and when studies cannot be completed for reasons beyond the control of the plant operator (for example due to the unwillingness of the OEM to engage or because the OEM does not have the capability or resource to complete a study within stipulated timelines). It is also unclear what the grounds for derogation would be and how assessment criteria would be applied. These and other important issues need to be carefully considered in detail and we suggest it is inappropriate for this to be done in the context of the current consultation. GPIs should be considered and developed if appropriate on an all island basis by the SEM Committee<sup>11</sup>.

### **7. Do you agree with the proposal to require EirGrid to explore and implement alternative solutions?**

Yes, but specific timelines should be stipulated. Alternative solutions will help reduce the magnitude and frequency of ROCOF events. Also, if a large number of generators cannot meet the new ROCOF standard, alternative solutions may be the only way forward.

### **8. Are there any other issues you wish to raise?**

Yes, see the Concluding Comments section above.

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<sup>11</sup> The ancillary services and other system charges regimes are harmonised on the island of Ireland. The consideration and development of a ROCOF GPI in one jurisdiction would be a significant retrograde step in the all island market, especially when considered in the context of an 'exit signal' as mooted in the consultation paper.



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