



## EAI Response to UR Consultation

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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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## Executive Summary

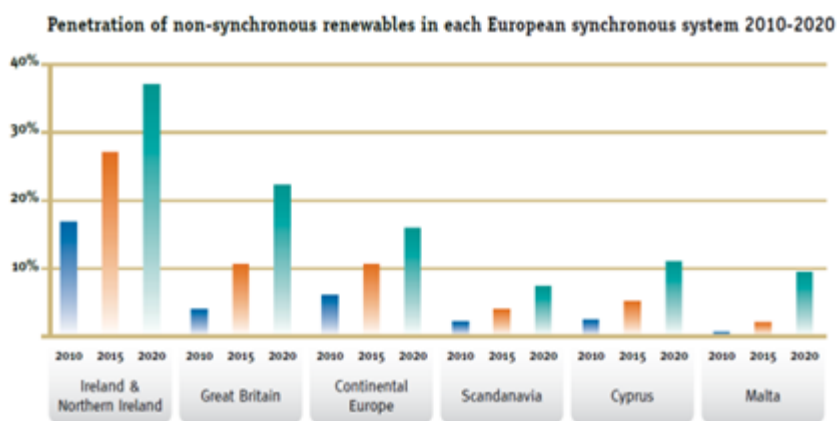
- EAI fully supports delivery of the two governments' ambitious renewables targets and is committed to full engagement in the DS3 process.
- A reasoned justification of the rejection of the PPA recommendations is required.
- A UR decision on cost recovery of mandatory studies under this retrospective proposal is required.
- The proposed timeline is unrealistic.
- The process for modification of the two codes on the island should be aligned and a common ROCOF standard applied on a consistent basis in both jurisdictions into the future.
- In line with this above, EAI contends that the Code Modification cannot be approved or rejected at this time.
- 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.

## 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 Northern Ireland (NI), under the Strategic Energy Framework 2010, and the Republic of Ireland (Ireland).

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 simultaneous 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.



Data collated from information submitted to the National Renewable Energy Action Plan by EU Member States to the EU Commission in June 2010.

## The ROCOF Issue

EAI notes that there is no ROCOF requirement applicable to all generators presently in NI. 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. SONI, in parallel with Eirgrid, has proposed a modification to the Northern Ireland Grid Code to impose a ROCOF capability for plant on the system of 1.0 Hz/s, which is the subject of the current UR consultation. Evaluation of plant capability to respond to a ROCOF of 2Hz/s is also requested. Notwithstanding the nature of the final outcome, EAI would express a very strong preference that both RA

<sup>1</sup> The TSOs have not specified the critical mass threshold whilst the Proposed Decision will require compliance by all.

decisions be consistent now and into the future. Specifically, a single ROCOF value should apply across both jurisdictions.

The Proposed Decision requires the TSO to ensure compliance with the revised Code. However, there is no test that TSO can apply reliably to check compliance by a generation unit. As acknowledged, technical desktop studies by original equipment manufacturers (OEMs) will be 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 of this modification 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. 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 technical parameters of the proposed modification. A retrospective modification of this type and a requirement to carry out studies to establish capability as proposed (a 500ms period rather than a more standard 100ms period) is unprecedented. The cost of the studies is significant, at an estimated £17 million 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 UR decision. The TSOs' 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, on which the Proposed Decision is silent, it could well be uneconomic for some plant to proceed. Ultimately there is no guarantee that the outcome of the studies by OEMs will be conclusive in relation to the proposed new ROCOF standard.

In this regard also EAI considers it unreasonable to penalise generators, as indicated in the Proposed Decision, through a Generator Performance Incentive (GPI) for failing to "demonstrate" compliance within the 18 month timescale given the clear observation of the Consultant.

Reference is made in the documentation to the positive vote at the Joint Grid Code Review Panel notwithstanding its rejection by all conventional generator representatives. The contested modification and the majority vote in its favour at the Panel meeting should not be misconstrued. 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.

## General Comments on the UR Consultation

**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 the TSOs shall ensure that compliance with the ROFOC standard is achieved by **all generators** and that this should apply within 18 months of the final UR decision. Non-compliance would result in non-commitment during high wind events and, possibly, the application of a punitive Generator Performance Incentive (GPI). The onus is on individual conventional generators to demonstrate compliance to the satisfaction of SONI based on robust studies.

Imposing the costs of such studies on conventional generators would be an 'inequitable situation' when the commercial benefits of the modification will accrue to wind farms<sup>3</sup> and interconnectors (to the detriment of thermal generators through reduced utilisation). The UR has not indicated a mechanism by which the costs of these studies for retrospective application of a standard are to be recovered in its Proposed Decision. EAI considers that all costs of investigations by generators related to this retrospective imposition should be fully recoverable. Clarity in this respect is essential.

## 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 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.
- EAI also concurs with SONI that all relevant analysis should be completed before full implementation of the proposed change.
- 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.

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<sup>3</sup> To the extent that it supports government policy on renewable targets society at large will also benefit.

## Fundamental Concerns

- The UR has examined the report prepared by independent consultants PPA Energy and TNEI (PPA), appointed by CER to consider the proposed modification and advise accordingly. The Consultants **“recommend that CER does not approve MPID 229”** (the proposed change to ROCOF) pending the outcome of a number of further processes, considerations, and investigations germane to the proposed modification. The Proposed Decision 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 could be applied. Instead the UR proposes to require all generators to comply with the new requirement or de-commit plant during high wind events and impose a GPI;
  - That the TSOs prepare a report exploring the level of ROCOF that arises over the more generally accepted 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>4</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>5</sup>.
- 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 tenet 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>6</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

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<sup>4</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>5</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.

<sup>6</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.



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.

- Limited 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 proposed new standard of ROCOF and a future potential 2Hz/s standard) and attain the new standard within an 18 month period needs to be explained give this period represents the time projected by the Consultants to determine ROCOF compliance for a single plant and who also indicated a period of 8 – 10 years for completion of all plant studies.
- 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 TSO be satisfied a plant can support the revised standard but so too must the operator. A question arises as to what would happen if the TSO considers a plant to be compliant and the operator does not, or indeed vice versa? The proposal that SONI will decide if a plant meets the ROCOF standard or not is too arbitrary. EAI is strongly of the view that 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. SONI is within its 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 SONI 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.
- The absence of a proposal for cost recovery in the Proposed Decision is a major cause for concern.
- 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 the UR is minded to propose 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. 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.**
- The UR Proposed Decision does not address the manner in which the considerable analysis workload involved in determining plant capability should be coordinated, including with the similar studies that will be progressing in RoI. An appropriate governance structure for implementing this work programme should be defined. 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 the RAs 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 the Proposed Decision 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 proposed 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, the Proposed Decision is silent on this issue notwithstanding their relevance to the ROCOF proposal.

## Test Regime

- In order to progress the Proposed Decision and enable OEMs to undertake studies that are both consistent and sufficiently comprehensive, the TSOs must first make available a rate of change of frequency that plant can expect to realistically have to withstand over the period 0 – 500ms and in particular over the period 0 – 100ms. 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 the current generalised standard.

## Costs

- Notwithstanding EAI's full 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 £250 million value to customers of the DS3 system services review. Both the TSOs 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 considers that the cost incurred in simply determining whether the ROCOF standard could be modified constitutes an additional cost. The UR should indicate how this is to be recovered which could take into account the fact that, since significant (relative) savings for customers may arise, then it is entirely reasonable that customers contribute towards the cost of delivering this saving.
- **In summary, EAI supports full cost recovery and urges the UR to adopt this approach when making a Decision.**



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