



DS3: RoCoF Workstream Plan 2015

CONTEXT

The “Facilitation of Renewables” report published in 2010 indicated that one of the key limitations to increasing the real time penetration of renewable generation on the all-island system is the Rate of Change of Frequency (RoCoF). In recognition of this, the Ireland and Northern Ireland Grid Codes are being changed to a 1 Hz/s calculated over 500 ms RoCoF standard.

Without this revised RoCoF standard, the curtailment of wind will be higher and the overall 40% renewable energy target may not be achieved by 2020. Therefore the realisation of the objectives of DS3, of which RoCoF is an integral work stream, is important in terms of meeting the obligations under Directive 2009/28/EC to take appropriate measures to minimise curtailment.

WORK COMPLETED:

EirGrid and SONI have been engaged in discussions with the Distribution System Operators (DSOs), Conventional Generators and Wind farm Generators in both Ireland and Northern Ireland on the subject of RoCoF on the island. A proposed grid code modification on RoCoF settings in both Grid Codes was brought forward to both Grid Code review panels. The modification was recommended by the “Ireland Panel” by a majority vote on 4th December 2012. In Northern Ireland, a corresponding public consultation was undertaken.

In February 2013, DNV KEMA presented on the findings of their Independent report on RoCoF at the Joint Grid Code Working Group meeting. This analysis looked at the ability of generators to ride through high RoCoF events. This document can be found [here](#).

In June 2013, the CER published its proposed decision; to go to consultation in relation to EirGrid's recommendation to modify the RoCoF standard in the Ireland Grid Code. UREGNI published its proposed decision on the Northern Ireland Grid Code modification for RoCoF in August 2013. The decision broadly aligned with the decision of the CER. Additionally, following feedback from Industry, the TSOs published a Frequency Transient Analysis document in September 2013 which included traces for all major frequency transients seen on the system from October 2010 to June 2013. This document can be found [here](#).

In April/May 2014, CER and UREGNI published their respective RoCoF decisions which, while approving the TSOs’ proposed modification in principle, set out requirements for establishment of an industry implementation project that is anticipated will run until the end of 2017.

FOCUS AREAS 2015 – 2018:

While both Regulatory Authority decisions approved the TSOs' proposed RoCoF Grid Code modification in principle, application of the new standard in the Grid Codes will only come into effect following confirmation from the TSOs that, from a system security perspective, it can be implemented. To determine this, an industry implementation project with three strands is being undertaken: TSO-DSO Implementation, Generator Implementation, and Alternative/Complementary Solutions.

The TSO-DSO Implementation project will oversee the DSOs' implementation of the new RoCoF standard on distribution Loss of Mains protection and application of the new RoCoF standard to distribution connected generation.

The Generator Implementation project will require generators to conduct studies to determine their capability to comply with the new standard. These studies will be phased over a period of 18 to 36 months, with higher priority units being required to complete their studies first. Generators shall be required to make a declaration to the TSOs regarding their level of compliance within 18 to 36 months and will be assisted in doing so through a structured generator study programme overseen by SONI in Northern Ireland and a CER-appointed "Independent Expert" in Ireland. The start date of the 18-36 month generator study period was 21st November 2014.

The Alternative/Complementary Solutions project is a TSO-led body of work to consider and develop complementary/alternative solutions to managing the RoCoF issue given the risk that implementation of the new RoCoF standard could take longer than the 18-36 month deadline set out in the Regulatory Authorities' decision papers. The Alternative Solutions project will be staged over two phases.

- **Phase 1:** The initial phase of the project involves a review of potential alternatives to changing the RoCoF standard from 0.5 Hz/s to 1 Hz/s. A range of options will be qualitatively assessed at a high level via a weighted scoring matrix approach. Based on this high level review of options and the need to identify deliverable solutions within a relatively short timeframe, a subset of viable options will be brought forward to Phase 2 for more detailed analysis.
- **Phase 2:** A more detailed review of the viable options identified during Phase 1 will be carried out. The focus of this analysis will be on the technical and economic aspects of each solution. The following studies/analysis of shortlisted options is likely to be undertaken:
 - Dynamic simulations
 - Plexos studies to assess economic benefit

In addition to the three main strands of the implementation project there is also a requirement to develop appropriate financial incentive mechanisms to expedite the adoption of the new 1 Hz/s standard by generators.

HIGH-LEVEL PLAN

TASK NO.	TASK	RESPONSIBLE	ORIGINAL DUE DATE	DUE DATE
Project Overview				
RCF 1.01	RA (Ireland) decision on RoCoF	CER	Q2 2014	Complete
RCF 1.02	RA (Northern Ireland) decision on RoCoF	UR	Q2 2014	Complete
RCF 1.03	Commencement of the RoCoF Implementation Project in Ireland	CER	New Task	Complete
RCF 1.04	Commencement of the RoCoF Implementation Project in Northern Ireland	UR	New Task	Complete
RCF 1.05	TSOs' recommendation to RAs on implementation of new standard (18mths+3mths)	TSOs	Q1 2016	Q3 2016
RCF 1.06	TSOs' recommendation to RAs on operation with new standard (18mths+3mths)	TSOs	New Task	Q3 2016
RCF 1.07	TSOs' recommendation to RAs on operation with new standard (24mths+3mths)	TSOs	New Task	Q1 2017
RCF 1.08	TSOs' recommendation to RAs on operation with new standard (36mths+3mths)	TSOs	New Task	Q4 2017
RCF 1.09	RA (Ireland) decision on RoCoF implementation	CER	Q4 2017	Q4 2017
RCF 1.10	RA (Northern Ireland) decision on RoCoF implementation	UR	Q4 2017	Q4 2017
RCF 1.11	RoCoF moves to 1Hz/s operational standard	TSOs	Q2 2014	Q4 2017
Incentive Mechanisms				
RCF 2.01	SEM Committee direction on incentive mechanisms	CER/UR	Q3 2014	Complete
RCF 2.02	Design of new RoCoF incentive mechanisms	TSOs	Q4 2014	Q2 2015
RCF 2.03	Completion of consultation on new RoCoF incentive mechanisms	TSOs	Q2 2015	Q4 2015
RCF 2.04	Decision from RAs on new RoCoF incentive mechanisms	CER/UR	Q3 2015	Q1 2016
RCF 2.05	Implementation of new RoCoF incentive mechanisms	TSOs	Q3 2015	Q2 2016
Generator Implementation Project				
RCF 3.01	Categorise each generation unit into different priority classification, engage with industry and submit to RAs for approval	TSOs	Q3 2014	Complete
RCF 3.02	Appointment of independent expert	CER	Q3 2014	Complete
RCF 3.03	Confirmation of ROCOF frequency traces to be used in analysis	TSOs	Q3 2014	Complete
RCF 3.04	Initial meeting between TSOs, generators and appointed 3 rd parties on ROCOF analysis	TSOs / Generators / Independent Expert	Q3 2013	Complete
RCF 3.05	RA approval of generator unit priority classification	CER and UR	Q3 2014	Complete
RCF 3.06	Interim milestone meeting with TSOs and generators on the progress of ROCOF analysis	TSOs / Generators	Q2 2015	Q3 2015
RCF 3.07	Generator testing of RoCoF standard (18 months)	TSOs / Generators	Q3 2015	Q2 2016
RCF 3.08	Final meeting at the end of every generator study (18 months)	TSOs / Generators / Independent Expert	Q4 2015	Q2 2016
RCF 3.09	Generator testing of RoCoF standard (24 months)	TSOs / Generators	Q1 2016	Q4 2016
RCF 3.10	Final meeting at the end of every generator study (24 months)	TSOs / Generators / Independent Expert	Q1 2016	Q4 2016
RCF 3.11	Generator testing of RoCoF standard (36 months)	TSOs / Generators	Q1 2017	Q4 2017

RCF 3.12	Final meeting at the end of every generator study (36 months)	TSOs / Generators / Independent Expert	Q2 2017	Q4 2017
ESBN and NIE Implementation Project				
Development of Standards				
TDL1.1	Development and submission Distribution Code RoCoF modification	NIE	New Task	Complete
TDL1.2	Development and submission of Distribution Code RoCoF modification	ESBN	New Task	Complete
TDL1.3	Regulatory decision on Distribution Code RoCoF modification	UR	Q2 2014	Q1 2015
TDL1.4	Regulatory decision on Distribution Code RoCoF modification	CER	New Task	Complete
TDL1.5	Development and submission of a further Distribution Code RoCoF modification to cover embedded generation	NIE	New Task	Q3 2015
TDL1.6	Development and submission of a further Distribution Code RoCoF modification to cover embedded generation	ESBN	New Task	Q3 2015
Data Gathering and Application of New Standards				
TDL2.1	Survey, compile database of existing RoCoF and frequency settings	NIE	Q2 2014	Q2 2015
TDL2.2	Compile database of existing RoCoF and frequency settings	ESBN	Q3 2014	Q2 2015
TDL2.3	Compile list of sites at which new standards would not apply	NIE	New Task	Complete
TDL2.4	Compile list of sites at which new standards would not apply	ESBN	Q3 2014	Q4 2015
TDL2.5	Determine implications / approach to dealing with sites at which new RoCoF settings would not apply.	NIE / TSO	Q4 2014	Q4 2016
TDL2.6	Determine implications / approach to dealing with sites at which new RoCoF settings would not apply.	ESBN / TSO	Q4 2014	Q4 2015
TDL2.7	Provide agreed RoCoF sample frequency events for testing/modelling purposes.	TSOs	New Task	Complete
TDL2.8	Procure representative sample of existing G10 relays and perform injection tests	ESBN	Q3 2014	Q1 2015
TDL2.9	Complete implementation of new RoCoF settings at sites where new settings can be applied	NIE	Q2 2015	Q3 2017
TDL2.10	Complete implementation of new RoCoF settings at sites where new settings cannot be applied	ESBN	Q2 2015	Q4 2015
TDL2.11	Complete implementation of alternative LoM solutions at sites where new settings cannot be applied (dependent on URegNI)	NIE	Q2 2015	Q3 2017
TDL2.12	Complete implementation of alternative LoM solutions at sites where new settings cannot be applied (dependent on CER)	ESBN	Q2 2015	Q4 2016
Enduring Arrangements				
TDL3.1	Agree enduring process for administration and sharing of Loss of Mains settings	NIE / TSO	Q4 2014	Q4 2016
TDL3.2	Agree enduring process for administration and sharing of Loss of Mains settings	ESBN / TSO	Q4 2014	Q2 2015
Demand Monitoring				
TDL 4.1	Study on the impact of the new RoCoF standard on demand customers and the quality of supply	TSOs	New Task	Q2 2016
TDL 4.2	TSOs to send RAs report on the impact of the new RoCoF standard on demand customers and the quality of supply	TSO	New Task	Q2 2016
TDL 4.3	DSO and TSO to monitor the impact of the new RoCoF standard on demand customers and the quality of supply as part of the TSO-DSO Implementation Project	ESBN	New Task	Q2 2018
TDL 4.4	DSO and TSO to monitor the impact of the new RoCoF standard on demand customers and the quality of supply as part of the TSO-DSO Implementation Project	NIE	New Task	Q2 2018
TSO Complimentary / Alternative Solutions Project				
Phase 1				
RCF 4.01	Develop scope for Alternative Solutions Project	TSOs	Q3 2014	Complete

RCF 4.02	Industry workshop on Alternative Solutions project and opportunity for industry to submit information	TSOs / Industry	New Task	Complete
RCF 4.03	High-level assessment of alternative solutions	TSOs	New Task	Q2 2015
RCF 4.04	Publish Interim Phase 1 Report	TSOs	New Task	Q2 2015
RCF 4.05	Publish draft Phase 1 assessment results	TSOs	New Task	Q2 2015
RCF 4.06	Submission of industry comments on draft Phase 1 assessment results	TSOs / Industry	New Task	Q2 2015
RCF 4.07	Publish final Phase 1 assessment results and provide to RAs	TSOs	New Task	Q2 2015
Phase 2				
RCF 4.08	Publish Phase 2 plan	TSOs	New Task	Q2 2015
RCF 4.09	Conduct studies on shortlisted options from Phase 1	TSOs	New Task	Q4 2015
RCF 4.10	Review status of Phase 1 technologies and other emerging technologies	TSOs	New Task	Q4 2015
RCF 4.11	Publish draft Phase 2 Report	TSOs	New Task	Q4 2015
RCF 4.12	Submission of industry comments on draft Phase 2 Report	TSOs / Industry	New Task	Q1 2016
RCF 4.13	Publish final report on alternative solutions and provide to RAs	TSOs	New Task	Q1 2016