



Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

The Commission for Energy Regulation (CER) – Rate of Change of Frequency (RoCoF) project
Quarterly Report for Q2 2015

DOCUMENT TYPE:	Information Note
REFERENCE:	CER/15/204
DATE PUBLISHED:	20 th August 2015
QUERIES TO:	mvencius@cer.ie



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Abstract:

This report details progress with respect to the RoCoF project for Quarter 2 2015

Target Audience:

This paper is for the attention of members of the public, the energy industry, customers and all interested parties.

Related Documents:

CER 14/081¹: Rate of Change of Frequency (RoCoF) Modification to the Grid Code.

For further information on this Paper, please contact Mantas Vencius (mvencius@cer.ie) at the CER.

¹ [CER/14/081](#)

Table of Contents

1. Introduction.....	4
2. Background	4
2.1 Further Information	5
3. Final Approved Generator Categorisation List.....	6
4. Project Progress.....	8
4.1. Introduction.....	8
4.2. Progress	8
4.2.1 Project Status.....	9
5. Next Steps.....	12

1. Introduction

This report provides an update on the status of the RoCoF Generator Implementation Project in Ireland. The CER's Decision Paper, CER/14/081, requires that generators undertake technical studies to confirm their compliance with the new RoCoF standard. This new standard is required to facilitate the increased penetration of renewables, mainly wind, on the system and is a key part of the DS3 Programme.

This project formally commenced on 21st November 2014. Each unit on the system has been categorised as either high, medium, or low priority with a deadline to complete their studies by the end of May 2016, November 2016, or November 2017 respectively.

There are a number of projects being carried out in parallel to the RoCoF Generator Implementation Project in Ireland as part of the overall RoCoF Implementation Project. These include the Northern Ireland Generator Implementation Project, the TSO alternative/complementary solutions studies and the DSO implementation projects in Ireland and Northern Ireland. Progress on these projects is reported on with the overall DS3 Programme, available [here](#) on the EirGrid website.

2. Background

EirGrid and SONI have embarked upon a multi-year programme “Delivering a Secure, Sustainable Electricity System” (the DS3 programme), which is designed to ensure the power system can be operated with increasing amounts of variable non-synchronous renewable generation over the coming years. Together with the on-going work on infrastructure development (Grid25 and Network25) and the addition of renewable generation capacity, the DS3 programme is critical to meeting the renewable electricity targets by 2020. The DS3 programme includes enhancing generation portfolio performance, developing new operational policies and system tools to efficiently use the generation portfolio to the best of its capabilities, and regularly reviewing the needs of the system as the portfolio capability evolves.

Detailed technical studies undertaken by EirGrid have indicated that, during times of high wind generation following the loss of the single largest credible contingency, RoCoF values of greater than 0.5Hz/sec but no greater than 1.0Hz/s could be experienced on the island power system. The conventional generators have stated that they do not know what the impact of a 1Hz/s ROCOF event will be and must undertake extensive studies to assess the impact.

In its decision paper CER/14/081, CER approved, in principle, MPID 229, the proposed Grid Code change to increase the RoCoF withstand level from 0.5Hz/sec to 1.0Hz/s over a sliding window of 500ms. However, CER will not apply the new standard in the Grid Code until it has received confirmation from

EirGrid that a sufficient number of generators can comply with the standard to allow EirGrid to safely operate the system in a manner reliant on the new RoCoF standard.

2.1 Further Information

If you have any questions or queries concerning this information note, please contact Mantas Vencius (mvencius@cer.ie) at the CER.

3. Final Approved Generator Categorisation List

The CER “Rate of Change of Frequency (RoCoF) Modification to the Grid Code” Decision Paper (CER/14/081) published on 4th April 2014 directed EirGrid to categorise each generating unit according to the priority in which their declaration of compliance with the proposed new RoCoF standard should be made in a window from 18 months to 36 months.

EirGrid published a proposed categorisation list on 17th September 2014, which was based on EirGrid’s consideration of the following:

- Existing High Run-Hours / Constrained-On Units: Units that currently tend to have greater than average run hours during high wind scenarios as they are in merit, constrained on or have priority dispatch.
- Forecast High Run-Hours / Constrained-On Units: PLEXOS analysis of 2020 was used to forecast the run hours of generators during high wind scenarios.

In November 2014, EirGrid, CER and the Independent Consultant (TNEI) charged with co-ordinating the overall industry project met each generation company separately to discuss the scope of the generator studies and related matters. Following these meetings, EirGrid submitted its views to CER on the implications of approving generator requests for changes to EirGrid’s proposed RoCoF priority categorisation list.

Having reviewed EirGrid’s views on the generator requests, and based on the advice of its technical advisor, the CER requested EirGrid to revise the generator categorisation list and to circulate it to generators. The final CER-approved categorisation list for generating units in Ireland is shown in Figure 1.

Category	Ireland Units			
	Station	Unit ID	Capacity (MW)	Owner
1 - High Priority 18 mths	Turlough Hill	TH1	73	ESB
		TH2	73	ESB
		TH3	73	ESB
		TH4	73	ESB
	Moneypoint	MP1	285	ESB
		MP2	285	ESB
		MP3	285	ESB
	Sealrock	SK3	81	AAL
		SK4	81	AAL
	Dublin Bay	DB1	399	SynerGen
	Aghada CCGT	AD2	431	ESB
	Whitegate CCGT	WG1	444	Centrica
	Meath W2E	IW1	15	Indaver
2 - Mid Priority 24 mths	Huntstown	HNC	337	Viridian
		HN2	395	Viridian
	Poolbeg CCGT	PBC	463	ESB
	Tynagh	TYC	384	TPL
	Aghada	AD1	258	ESB
3 - Low Priority 36 mths	Edenderry OCGTs	ED3	58	EPL
		ED5	58	EPL
	Tawnaghmore	TP1	52	SSE
		TP3	52	SSE
	Rhode	RP1	52	SSE
		RP2	52	SSE
	Aghada OCGTs	AT1	90	ESB
		AT2	90	ESB
		AT4	90	ESB
	Tarbert	TB1	54	SSE
		TB2	54	SSE
		TB3	241	SSE
		TB4	243	SSE
	Lough Ree	LR4	91	ESB
	West Offaly	WO4	137	ESB
	Edenderry	ED1	118	EPL
	Ardnacrusha	AA1-4	86	ESB
	Erne	ER1-4	65	ESB
	Lee	LE1-3	27	ESB
	Liffey	LI1,2,4,5	38	ESB
	Marina	MRC	88	ESB
	North Wall	NW5	104	ESB
	4 - Exempted (Closing)	Great Island	GI1	54
GI2			49	SSE
GI3			109	SSE
5 - New (Currently undergoing compliance assessment)	Great Island CCGT	GI4	431	SSE

Figure 1 - Final CER-approved categorisation list

4. Project Progress

4.1 Introduction

Though one of the issues in raising the RoCoF level for the large conventional generators is the risk of losing synchronous stability during leading power factor operation, the conventional generators have stated that they do not know what the full impact of a 1Hz/s ROCOF event on their plant will be. Some conventional generators have cited safety concerns (e.g. catastrophic failure of a unit) as well as the potential adverse impacts of frequent high RoCoF events on the lifetime of the plant equipment. Therefore detailed technical studies have to be undertaken by the generators in order to determine compliance with the new RoCoF standard. Typically, plants will have to be adequately represented with its electro-mechanical limitations, such as flame stability and combustion controls, mechanical stress and transient torques on the turbine and rotor shaft, generator control and instrumentation equipment (e.g. excitation, PSS, protection), BoP auxiliary equipment.

While the exact nature and scope of the studies generators will have to undertake will vary, the scope of studies has been divided in to two broad sets of studies:

- Electrical dynamic simulations: The purpose of these studies is to assist EirGrid in assessing the impact on the transmission system of each generation unit's response to 1Hz/s over 500ms RoCoF values; and
- Mechanical/Plant integrity studies: This set of studies aims to examine whether the safety or plant integrity issues previously raised by some generators are material.

4.2 Progress

The RoCoF Implementation Project formally commenced on the 21st November 2014. Trilateral meetings were held between the generators/EirGrid and CER (and their representative TNEI) at the end of Q4 2014 to kick-off the process. Each generator was requested to provide a detailed project plan to which progress could be monitored and measured against.

This section contains the progress in Q2 2015, the second progress report, for the generation stations identified in the approved categorisation list.

Progress for each generator and the overall project status is assessed against the project programme using corresponding "traffic light" indicators.

-  - On schedule;
-  - Schedule is at risk;
-  - Delay to schedule.

4.2.1 Project Status

Overall Summary			
<p>All generators have kicked off the project, with high priority plants generally further advanced than low priority plants. Though no generators have raised any specific concerns with regards to achieving their deadlines, it has been highlighted that should the studies necessitate remedial action then there may be a risk to the schedule.</p> <p>GI4 has been confirmed as compliant with the new RoCoF standard.</p>			
Overall Status			
Station/Unit	Progress	Station/Unit	Progress
Sealrock SK3		Huntstown HN2	
Sealrock SK4		Tynagh TYC	
Whitegate WG1		Moneypoint 1	
Edenderry ED1		Moneypoint 2	
Edenderry ED3		Moneypoint 3	
Edenderry ED5		Turlough Hill 1	
Tawnaghmore TP1		Turlough Hill 2	
Tawnaghmore TP1		Turlough Hill 3	
Rhode RP1		Turlough Hill 4	
Rhode RP2		Dublin Bay Power	
Tarbert TB1		Aghada Unit 2	
Tarbert TB2		Coolkeeragh C30	
Tarbert TB3		Poolbeg CCGT	
Tarbert TB4		Aghada Unit 1	
Huntstown HNC		Meath W2E	

Generator	
ESB	
<p>ESB have the majority of generating units within the project, spread across all three stages (high, medium and low priority). The co-ordination of the project across the portfolio has resulted in a longer preliminary phase than for other generators. This phase has now and studies have commenced.</p>	

Generator	Progress
SSE	
<p>SSE prioritised completion of the new Great Island CCGT station. Their other units are low priority generating units and they have kicked off the RoCoF project internally, having commenced the development of the necessary technical specifications for each of their units. SSE is currently on schedule.</p>	

Generator	Progress
Bord Gáis Energy (BGE)	
<p>After an initial delay BGE have commenced and have committed to studying the capabilities of their plant in a timely manner. BGE are working to expedite the study and will estimate the study completion date once preliminary results come through in Q3 2015. They are expecting to have a phase 1 report in Q4 2015.</p>	

Generator	Progress
Bord Na Mona (BnM)	
<p>Due to OEM constraints studies have not commenced. However there is active engagement on-going. It is noted that as Edenderry is a low priority plant this gives BnM some room for manoeuvre and hence the relatively slow start raises no major concerns at this stage.</p>	

Generator	Progress
Tynagh Energy	
<p>Indications are that Tynagh Energy has made the good progress and phase 1 is essentially completed. The final Phase 1 report is expected early in Q3 2015.</p>	

Generator	Progress
Aughinish	
<p>Aughinish appear on programme to meet their deadline having taken several measures to de risk the project. The final Phase 1 report is targeted for completion early in Q3 2015.</p>	

Generator	Progress
Viridian	
<p>Viridian has made good progress with the mechanical and electrical studies on the project, and are on schedule.</p>	

Generator	Progress
Indaver	
<p>Indaver are making good progress. They have commenced their studies and the first results are expected in Q4 2015.</p>	

5. Next Steps

Reports shall be issues at the end of each quarter during the 36 month project period.

Report	Period
1	Quarter 1 2015
<u>2</u>	<u>Quarter 2 2015</u>
3	Quarter 3 2015
4	Quarter 4 2015
5	Quarter 1 2016
6	Quarter 2 2016
7	Quarter 3 2016
8	Quarter 4 2016
9	Quarter 1 2017
10	Quarter 2 2017
11	Quarter 3 2017
12	Quarter 4 2017