Ramping Margin Requirements in Scheduling

22 September 2021

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1   INTRODUCTION

OVERVIEW

The scheduling process is heavily dependent on accurate forecasting of renewable (wind and solar) generation levels. However, as the level of renewable generation increases, so too will the magnitude of the renewable forecast error. To ensure that we can maintain a safe, secure and reliable all-island power system, the DS3 programme identified a requirement for ramping margin to manage this error. Ramping margin will allow us to maintain a level of dispatchable generation and demand that can ramp to replace renewable generation in the event that it is below forecast.

We are now[1] accounting for ramping margin in our scheduling process in order to identify periods where the uncertainty in the renewable forecast might pose a risk to the secure and reliable operation of the power system. This will provide us with a look ahead ramping capability available to the power system in 1, 3 and 8 hours' time.

RAMPING MARGIN DEFINITIONS

Classification	Category	Delivered within	Maintained for
Ramping Margin	Ramping Margin 1 (RM1)	1 Hours	2 Hours
	Ramping Margin 3 (RM3)	3 Hours	5 Hours
	Ramping Margin 8 (RM8)	8 Hours	8 Hours

Ramping Margin 1 is the increased MW output or reduction in demand, a unit can provide, within one hour of receiving a dispatch instruction and maintaining that MW output for a further two hours after the one hour period has elapsed.

Ramping Margin 3 is the increased MW output or reduction in demand, a unit can provide, within three hours of receiving a dispatch instruction and maintaining that MW output for a further five hours after the three hour period has elapsed.

Ramping Margin 8 is the increased MW output or reduction in demand, a unit can provide, within eight hours of receiving a dispatch instruction and maintaining that MW output for a further eight hours after the eight hour period has elapsed.

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[1] From the first day ahead schedule on 8 September 2020.

RAMPING MARGIN REQUIREMENTS

Ramping margin is a minimum level of ramping capability available from online or offline generation and demand units. Ramping margin is essential to manage the power system with increasing variability and uncertainty associated with increasing amounts of variable generation.

The ramping margin requirement is calculated on an on-going basis as follows:

$$RMR_{t(R)} = LSI_{(t+R)} + LFE_{(t+R)} + \max\left(RR_{(t+R)}, Uncert_{t(R)}\right) + Tie_{uncert} - IC\_Cap_{(t+R)}$$

Where

- *t is the scheduling interval*
- *R is the ramping margin category interval, (RM1 (t+1), RM3 (t+3), RM8 (t+8))*
- *$RMR_{t(R)}$ is the Ramping Margin Requirement for interval "t" for ramping margin category interval "R"*
- *$LSI_{(t+R)}$ is the Largest Single Infeed in scheduling interval "t+R"*
- *$LFE_{(t+R)}$ is the Load Forecast Error in scheduling interval "t+R"*
- *$RR_{(t+R)}$ is the Replacement Reserve in scheduling interval "t+R"*
- *Uncert is the variable generation uncertainty forecasted for each reserve category "R" in scheduling interval "t"*
- *Tie_uncert - Tie Line uncertainty flow, default value for each reserve category "R"*
- *$IC\_Cap_{(t+R)}$ is the interconnector capability in scheduling interval "t+R"*

SCHEDULING

The ramping margin requirements (which are being calculated on an on-going basis) will feed in to the Long Term Schedule (LTS) in order to ensure that we schedule sufficient ramping margin to meet the varying requirements.

INTERCONNECTOR UNCERTAINTY

The Ramping Margin Tool (RMT) ramping requirement calculation will factor in an interconnector uncertainty figure to take account of the uncertainty in the interconnector schedule.

Please see the table below outlining the different interconnector gate closers, RMT is designed to calculate an interconnector uncertainty based on the non-firm period. The interconnector uncertainty is added to the ramping requirement, if the interconnector schedule is firm, zero uncertainty is added to the ramping requirement, if the interconnector schedule is non-firm, a pre-determined static uncertainty is added to the ramping requirement.

	Receive Time	Firm Period	Non Firm Period
Day Ahead	12:00 D-1	N/A	23:00 D to 23:00 D
IDA1	18:00 D-1	23:00 D to 10:59 D	11:00 D to 23:00 D
IDA2	08:00 D	11:00 D to 23:00 D	N/A

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