



**Proposed Values for Uninstructed Imbalances for the year
2009**

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TSC Obligations

Paragraph 4.142 of the Single Electricity Market (SEM) Trading and Settlement Code V4.3, requires the System Operators to make a report to the Regulatory Authorities at least 4 months before the start of the year proposing values for the five parameters outlined below used in the calculation of Uninstructed Imbalances for that year. This document is the System Operators' joint submission under Paragraph 4.142.

Proposed Uninstructed Imbalance Parameters

The System Operators propose the following values for the parameters used in the calculation of Uninstructed Imbalances:

Parameter		Proposed Value
1.	Engineering Tolerance ENG_{TOL} (where $0 \leq ENG_{TOL} \leq 1$);	0.01
2.	MW Tolerance MW_{TOLt} (where $0 \leq MW_{TOLt}$) for each Trading Day t ;	1
3.	System per Unit Regulation parameter (UREG);	0.04
4.	the Discount for Over Generation (DOG_{uh}) for each Generator Unit u in each Trading Period h , such that $0 \leq DOG_{uh} \leq 1$; and	0.20
5.	the Premium for Under Generation (PUG_{uh}) for each Generator Unit u in each Trading Period h , such that $0 \leq PUG_{uh} \leq 1$.	0.20

Background to Proposed Values and Parameters

Overview

To ensure the safe and secure operation of the power system, dispatchable generation is required to follow instructions from the control centre. Failure to do so could at best lead to increased constraint costs for the transmission system operator as it re-dispatches other generation at short notice to account for the mismatch in actual and instructed generation, or at worst lead to system blackout. Thus, dispatchable generation should receive economic signals to follow its instructions within acceptable practical limits. The uninstructed imbalance mechanism under the SEM Trading and Settlement code is such a signal.

It is essential that the uninstructed imbalance mechanism provide economic signals that:

- are sufficient to cause generators to follow dispatch instructions
- are cost related – where possible
- are not unreasonably punitive
- avoid perverse incentives

The System Operators are proposing continuing with the values used for the start of SEM trading (2007-2008) as they feel that these values adequately provide the above signals and have been previously reviewed and accepted by the Regulatory Authorities.

MW Tolerance (MWTOLt) and Engineering Tolerance (ENGTOL)

A MW Tolerance value of 1 MW was proposed by the System Operators for the period 2007-2008. This value was used for settlement of the electricity market in Ireland used by EirGrid prior to the start of the SEM. The value had been in place since 01-Jan-2000 and was accepted and understood by participants in Ireland.

The ENGTOL parameter and value of 1% was introduced to the imbalance calculation in the market in Ireland as part of Modification PM 153 approved and implemented in 2004. Before ENGTOL was added the previous MW tolerance

allowed for regulation based on the instructed quantity level of the machine, however the response of a unit is primarily affected by its governor droop and rated capacity. As a result, two units rated 1,000 MW and 200 MW that are instructed to 100 MW will respond differently to a given frequency event. This was not reflected in the uninstructed imbalance calculation and was added in 2004 to reflect engineering limitations. For the 2007 – 2008 calculations, EirGrid and SONI reviewed the values for MWTOL and ENGTOL and their application in Ireland and SONI agree that these values were appropriate for Northern Ireland participants in the SEM. The System Operators also took into account the possible need to have a MWTOL value that varies by Trading Day but at the time were unable to find a reason to vary the value. The System Operators proposed the 2007-2008 values for MWTOL of 1 MW and ENGTOL of 0.01. When taken together, these parameters ensure minimum tolerance bands of the greater of 1% of dispatch quantity and 1 MW.

System per Unit Regulation parameter (UREG)

The System Operators proposed that UREG be set at 0.04 based on an assumption that all generating units typically have a 4% speed droop. This 4% value is a technical characteristic of the generation units on the island of Ireland and hence it was a reasonable assumption to use it as the value for UREG.

Discount for Over Generation and Premium for Under Generation (DOGuh and PUGuh)

Over generation outside of tolerance by a market participant results in the need to instruct other market participants from their dispatched levels to lower levels in order to balance supply and demand. From a system security standpoint over generation is undesirable as it can result in ramping, and stopping units unnecessarily increasing the potential for possible unit trips and / or wear on units.

Under generation outside of tolerance by a market participant results in the need to instruct other market participants from their dispatched levels to higher levels or may even result in starting additional units in order to balance system resources.

Previously a study was carried out by the TSOs¹ to evaluate the costs incurred on the system by Uninstructed Imbalances. Generally, a market participant that over generates should only be entitled to the average costs of the resources dispatched down to displace the over generated volumes. For the purposes of the study carried out, the TSO's assumed that the participants dispatched downward would be at a generation cost that is lower than the SMP. Given the difficulty in predicting the behaviour of a generator that is not complying with dispatch instructions and the state of the system at the time of non compliance it is a reasonable assumption to make that the participants dispatched downwards would be at a cost lower than the SMP.

In contrast, a market participant that under generates should, generally speaking, pay back to the TSO the average costs of the resources dispatched up and on to replace the under generated volumes. Once more, the study carried out by the TSOs made the assumption that the participants dispatched upwards or on will be at a generation cost that is higher than the SMP. In the event of unexpected under-generation by a generator the TSO must act in a quick and decisive manner to restore appropriate system balance and reserve targets. To achieve this there is a high likelihood that it will be necessary to dispatch a plant that has quick response characteristics. Hence the generation cost necessary to compensate for the under-generation will most likely be at a cost in excess of the SMP.

The results of the study carried out by the TSO's into the costs involved in uninstructed imbalance suggested that a value of 0.2 for both DOG and PUG provided an appropriate signal to generators to comply with dispatch instructions.

Proposed Values of Uninstructed Imbalance Parameters for 2009

It is the TSOs' opinion that System Operational experience to date has indicated that the Uninstructed Imbalance parameters are providing adequate signals at present and that no change is currently warranted to these parameters. Hence the current values used for DOG, PUG, MWTol, ENGTol, UREG are proposed for 2009. These values are shown in the table below.

¹ Proposed values for Uninstructed Imbalances for the year 2007

Parameter		Proposed Value
1.	Engineering Tolerance ENGTOl (where $0 \leq \text{ENGTOl} \leq 1$)	0.01
2.	MW Tolerance MWTOLt (where $0 \leq \text{MWTOLt}$) for each Trading Day t	1
3.	System per Unit Regulation parameter (UREG)	0.04
4.	the Discount for Over Generation (DOGuh) for each Generator Unit u in each Trading Period h, such that $0 \leq \text{DOGuh} \leq 1$	0.20
5.	the Premium for Under Generation (PUGuh) for each Generator Unit u in each Trading Period h, such that $0 \leq \text{PUGuh} \leq 1$	0.20

The TSOs believe that to carry out any further analysis on the Uninstructed Imbalance parameters would require at the very least a full year's data. At the time of writing of this report have less than a full year's SEM data is available (8 months: November to July). As such, it would be difficult to base an accurate re-assessment of the parameters on an incomplete data set.

Once a full year's data is available, the TSOs believe that it would be timely for a comprehensive re-evaluation of the uninstructed imbalance mechanism to assess if it is producing outcomes that are consistent with market design. The outcome of this review may be proposed modifications to the Trading and Settlement Code and/or changes to the uninstructed imbalance parameters.