

Single Electricity Market Committee

Criteria for any Regulatory Decision on Dual Rated Generator Units

Consultation Paper

SEM-08-160

29 October 2008

Table of Contents

1. Introduction.....	3
2. Background.....	4
3. Dual Rated Generator Unit.....	5
4. Consideration of Decision Criteria.....	6

1. Introduction

The SEM Trading and Settlement Code (the Code) Modifications Committee are publishing a consultation on Modification Proposal Mod_34_08, “Dual Rated Generator Amendment” (“the Modification Proposal”). The Modification Proposal suggests the introduction of a new generator type; a Dual Rated Generator Unit, under the Code. It further suggests that the registration of a Dual Rated Generator Unit should be subject to prior approval by the Regulatory Authorities.

The Modifications Committee have yet to submit their final recommendation report to the Regulatory Authorities. That report and recommendation, once submitted by the Modifications Committee, will have to be considered by the SEM Committee.¹ The final decision regarding the Modification Proposal rests with the SEM Committee.

In advance of the matter going before the SEM Committee, and in consideration of the fact that the current Modification Proposal envisages that the Regulatory Authorities² will have an approval role in relation to the registration of a Dual Rated Generator, the SEM Committee is of the view that it is appropriate at this time to consult upon the criteria that would be used in relation to making any approval decision that may be required in the event that the Modification Proposal is approved by the SEM Committee. The consideration of those criteria is the subject of this consultation paper.

The SEM Committee welcomes the views of interested parties on these proposals. It is intended to publish all responses received. If any respondent wishes all or part of their submission to remain confidential, then this should be clearly stated in their response. Comments on this paper should be sent to Philip Newsome and Kevin O’Neill, preferably electronically, to arrive no later than noon on Wednesday, 26th November 2008.

Philip Newsome
Commission for Energy Regulation
The Exchange
Belgard Square North
Tallaght
Dublin 24

Kevin O’Neill
Northern Ireland Authority for Utility Regulation
Queens House
10-18 Queen Street
Belfast
BT1 6ED

pnewsome@cer.ie

kevin.oneill@niaur.gov.uk

¹ The SEM Committee is established in Ireland and Northern Ireland by virtue of section 8A of the Electricity Regulation Act 1999 as inserted by section 4 of the Electricity Regulation (Amendment) Act 2007, and Article 6 (1) of the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 respectively. The SEM Committee is a Committee of both CER and NIAUR (together the Regulatory Authorities) that, on behalf of the Regulatory Authorities, takes any decision as to the exercise of a relevant function of CER or NIAUR in relation to an SEM matter.

² Decisions ascribed to the Regulatory Authorities under the Code are taken by the SEM Committee.

2. Background

On 8th July 2008 the SEM Market Operator (SEMO) submitted the Modification Proposal to the Modifications Committee secretariat. The purpose of the Modification Proposal is to introduce a new type of Generator Unit under the Code; a Dual Rated Generator Unit. The Modification Proposal has been discussed at the Modification Committee meetings on 28th July and 30th September 2008 and, following consideration by a working group of the Modifications Committee, it is expected that a consultation on the Modification Proposal will be published shortly by the Modifications Committee.³

Following the consultation on the Modification Proposal, the Modifications Committee will consider it further before preparing a Final Modification Recommendation Report for the Regulatory Authorities in accordance with paragraphs 2.213 to 2.215 of the Code. On receipt of such a report, the Regulatory Authorities will give it consideration before submitting the Modification Committee's Report to the SEM Committee for its decision. The SEM Committee will then make an appropriate direction in accordance with paragraph 2.218 of the Code.

The SEM Committee notes that the current drafting of the Modification Proposal provides that Regulatory Authority consent would be required for the registration of any generator as a Dual Rated Generator Unit. In advance of the final decision by the SEM Committee on this matter, and in order to avoid undue delay in the event that the Modification Proposal is approved, the SEM Committee is of the view that it is appropriate to consult at this stage on the question of the criteria for any decision by the Regulatory Authorities as to whether a Generator Unit should be registered as a Dual Rated Generator Unit.

For the avoidance of doubt, this consultation does not make any assumptions regarding the future decision to be made by the SEM Committee.

³ Please refer to the SEMO website: <http://www.sem-o.com/>

3. Dual Rated Generator Unit

The Modification Proposal states that the Code and the Market Scheduling and Pricing (MSP) Software model generators as having a single fuel type and do not take account of the special case where a generator may have more than one fuel type and a different rating corresponding to each fuel type. It adds, referring specifically to Kilroot that the Kilroot generator consists of two 300MW units which were originally commissioned to run on oil. The units were later converted to allow the burning of either oil or coal. However, when fired by coal, each unit can only run up to 220 MW and when fired on oil 260 MW. In normal operation the units are generally run on coal i.e. are available up to approximately 220 MW. In order for the units to generate up to 260MW, they must be switched to operate on oil. This changeover takes approximately 6 hours. During the change back from oil to coal firing operation it is understood that the units must drop their output to about 150 MW. This changeover typically takes less than one hour. This behaviour cannot be accurately modelled in the current MSP Software and is not set out in the existing rules under the Code.

The Modification Proposal further states that the Kilroot units currently submit price quantity pairs reflecting their short-run marginal costs for coal up to their penultimate price-offer pair. Thereafter their commercial offer data reflects the use of oil. The time that the units take to change over from coal to oil is reflected by a dwell time in their technical characteristics. The current handling of these units within the market has resulted in high price spikes, as the Kilroot units have become the marginal units which set the price on a number of days, on occasion for more than one Trading Period.

The proposal also makes the point that as a change to the Code and to the Central Systems to more accurately model the operation of the units i.e. a change to the market engine, would be very major, the Modification Proposal proposes to define a new type of generator unit, a "Dual Rated Generator Unit". A simplified solution to the issue is proposed, whereby the units' availability in the Energy market would be limited to the availability of the fuel which they are actually using. The units' availability in the Capacity market would remain equal to their maximum availability (i.e. maximum availability on oil, availability on coal).

The SEM Committee notes that, although the Modification Proposal refers specifically to the Kilroot Generator Units, this issue is not necessarily confined to such Units. The underlying issue is that the Code rules and the MSP Software are limited in the range of Unit configurations which can be effectively modelled in the process of determining the Market Schedule Quantities for each Generator Unit and the System Marginal Price (SMP).

A permanent, long term solution to this problem would be to implement changes to the Code and to the MSP Software to generalise the generator modelling approach so as to model effectively a wider range of generator types and configurations. However, such a change would require major changes to the software and to the legal framework and their justification would require a compelling case and careful consideration. It is understood that such a change would also most likely require a re-certification of the MSP Software and limit the choice of solver to Mixed Integer programming (MIP). In the meantime the Modification Proposal suggests a short/medium term solution for generators using dual fuels and which have a different rating for each fuel.

4. Consideration of Decision Criteria

The issue for consideration here is, were the Regulatory Authorities to be required under the Code to decide whether a particular generator should be registered as a Dual Rated Generator Unit, what criteria should be used to reach such a decision?

The essential issue that has been revealed by SEMO's analysis of the behaviour of the MSP Software when dealing with the data submitted in respect of Kilroot⁴ is that, not only does the software (and the Code rules that it implements) fail to model the Generator Units effectively, but that the effect of that failure is (on occasion) to produce market schedules which are infeasible (in reality) and Shadow Prices which do not represent market conditions. In the case of Kilroot this is because the MSP Software models the Generator Units as having a single ramp rate from Minimum Stable Generation to Maximum Generation and therefore assumes a high degree of flexibility in moving from 220MW on coal to 260MW on oil where such flexibility does not exist. If the dwell time between the two positions was modelled, the software would not schedule a Kilroot unit on oil in preference to lower priced plant which might have to be brought on.⁵

This suggests that the key decision criteria should relate both to the improper modelling, both represented by the rules within the Code and by the MSP Software which implements those rules, of the commercial and technical behaviour of the Generator Unit and to the effect on the Market Schedule and SMP of that modelling inaccuracy.

Further, given that the solution proposed in the Modification Proposal is in some ways a "sticking plaster" rather than a full permanent solution, one criterion should be that there is no alternative way of representing that Generator Unit in the SEM (for example by registering it as two separate Generator Units), which would be equally if not more effective in avoiding the errors.

The SEM Committee therefore proposes that the criteria that would need to be fulfilled by any Generator Unit that was to be registered as a Dual Rated Generator Unit (if such a Generator Unit were to exist under the Code) should be:

1. The generator design is such that it can use more than one fuel type in normal operation;
2. The effective rating (i.e. Maximum Generation) of the generator is different depending on which fuel it burns;
3. Having considered the advice of the Market Operator, submitted in the form of a report (that would be published), on the criteria below, that the SEM Committee is satisfied:

⁴ Please refer to the SEMO website: <http://www.sem-o.com/>

⁵ While the Single Ramp Rate used in the MSP does not model dwell times exactly, they are used in the calculation of the Ramp Up Time and Ramp Down Time where Single Ramp Up Rate = $(\text{Max(Availability)} - \text{Min(Minimum Stable Generation)})/\text{RampUpTime}$ and Single Ramp Down Rate = $(\text{Max(Availability)} - \text{Min(Minimum Stable Generation)})/\text{RampDownTime}$. Also the ramp rates are determined from Max Availability rather than Maximum Generation as per the equation above.

- a) that the process for transfer between fuels for the generator is such that the MSP software is likely to determine infeasible Market Schedules for that Generator Unit (i.e. were the schedule cannot be replicated in actual dispatch) unless it is registered as a Dual Rated Generator Unit;
- b) that the MSP Software is likely to determine an uneconomic SMP on occasions unless the Generator Unit is registered as a Dual Rated Generator Unit;
- c) that in relation to items a) and b) above, that the generator concerned is materially different from other Generator Units registered in the Pool (that are not Dual Rated Generator Units); and
- d) that there is no practical way (other than registration as a Dual Rated Generator Unit) that the generator could be represented in the market (e.g. as more than one Generator Unit) which would avoid the problems in a) and b) above

The SEM Committee would welcome any comments on these proposals.