

Single Electricity Market Committee

Application of the Regulator's Decision on the Dual Rated Generator Units' Criteria

Information Note

SEM-10-078

19th November 2010

1. Background

A SEM Committee decision was published on the criteria to apply for what is a Dual Rated Unit (SEM-10-074)¹ following a consultation on the issue (“Criteria for any Regulatory Decision on Dual Rated Generator Units” SEM-08-160). This paper should be read alongside both of those papers.

This SEM Committee decision followed a Modification Proposal², raised by SEMO, which sought to introduce a new generator type, a Dual Rated Generator Unit, under the Code. This Modification Proposal, Mod_34_08, was recommended for approval by the Modifications Committee on 2nd November 2009 and subsequently approved by the SEM Committee at its meeting on 26th January 2010. The Central Market Systems and the associated Code changes which implement this Modification are expected to go-live this evening (the evening of 19th November 2010).

As part of the legal drafting which implements the Modification, paragraph 2.34A states that consent is required from the Regulatory Authorities for the registration of any generator as a Dual Rated Generator Unit. This report provides written consent for SEMO to register the relevant Generator Units as Dual Rated Generator Units. As referred to in the recent SEM Committee decision paper, this short report details any units considered to be a Dual Rated Generator Unit, in line with the criteria published in the decision paper.

2. Decision on the Criteria to Apply on what is a Dual Rated Unit

The original Modification Proposal referred specifically to the Kilroot Generator Units, however this problem is not necessarily confined to such units. The essential underlying problem 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). In particular, the behaviour of the MSP Software when dealing with the data submitted in respect of Kilroot³ is that, not only is the software (and the Code rules that it implements) unable to represent the Generator Units’ detailed technical characteristics, but that the effect of this limitation is (on occasion) to produce market schedules that are infeasible (in reality) and Shadow Prices that do not represent market conditions.

While strictly speaking this can be said of all Generator Units to a certain extent, it is particularly evident in the case of Kilroot due to the fact that 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 199MW (sent

¹ Published on the www.AllIslandProject.org website on 9th November 2010
http://www.allislandproject.org/en/TS_Decision_Documents.aspx?article=966dc2f5-6514-4423-8b41-79b9dac04397

² The background to the Modification Proposal (Mod_34_08) as well as the Final Recommendation Report are available on SEMO’s website
www.sem-o.com/MarketDevelopment/Modifications/Pages/Modifications.aspx?Stage=Active .

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

out) on coal to 238MW (sent out) 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.⁴

This suggested that the key criteria as to whether a unit is a Dual Rated Generator Unit should relate to a combination of 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 the effect on the Market Schedule and SMP of that modelling inaccuracy.

Further, given that the solution being brought about by the implementation of this 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 at present (for example by registering it as two separate Generator Units or by having Dual Fuel bidding in the SEM), which would be equally if not more effective in avoiding the errors.

Bearing in mind the above, the SEM Committee decided that it would adopt the following criteria in the consideration of whether a generator should be registered as a Dual Rated Generator Unit and that these Decision Criteria may be reviewed from time-to-time to ensure it is fit for purpose:

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 issue (and on advice from the Market Operator, as necessary), the SEM Committee must be satisfied:
 - 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. where 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 (which are not Dual Rated Generator Units); and,

⁴ 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.

- 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.

3. Generator Units that fulfil this Criteria

The RAs have now considered how these criteria apply to all generator units currently operating in the market. Following this review, in relation to the Kilroot units GU_500822 and GU_500823, the RAs have established that they meet the criteria above, including all parts of criteria 3. In this regard, our assessment is detailed below:

Criterion 1: These Kilroot units can use two fuels in normal operation – oil and coal.

Criterion 2: The maximum generation on each fuel is markedly different – it is 199MW on coal, which increases to 238MW on oil. The minimum generation on each fuel is also materially different.

Criterion 3:

- (a) For these units to change from coal to oil a 6 hour change over time is required. When changing from oil to coal a 3 hour change overtime is required, and in addition the output of the units must be ramped back to 131MW before the changeover can occur. Because of this the MSP Software is likely to determine infeasible Market Schedules for these units should they be required to change between coal and oil firing.
- (b) Due to the fact that the MSP Software does not take into account these changeover times and restrictions, the resulting SMPs will also not be reflective of reality if these units are scheduled to change between their coal and oil firing ranges.
- (c) These generator units are distinct from other generators in the market as their maximum capacity and other technical characteristics are materially different for operation on different fuels.
- (d) Due to the limitations of the MSP software and the fact that there is no dual fuel bidding and no way for the units to be registered as separate Generator Units on each fuel, the market as it stands cannot take into account the particular case of these Kilroot units and registering them as Dual Rated Generator Units is seen as a positive step in terms of reflecting them more accurately.

4. Next Steps

In relation to this work, the next steps are expected to be as follows:

1. The changes associated with Mod_34_08 go-live on the evening of 19th November 2010;
2. Following the system changes going live and in response to this report, the Participant in question is required to register the particular units as Dual Rated Generator Units.

Note that for generator units not currently operating in the market, at the stage where the generators begin discussions with the RAs and SEMO for registering the unit, consideration could be given to whether it is appropriate for that unit to apply for registration as a Dual Rated Generator Unit.