Single Electricity Market

All-island harmonised transmission loss adjustment factors (TLAFs)

Terms of Reference for Impact Analysis on TLAF Splitting

Information Paper

14th February 2011

SEM-11-006

1. Introduction

The SEM Committee has been undertaking a review of locational signals (Generator TUoS and TLAFs) in the SEM since January 2009. On 24 September 2010, the SEM Committee published a decision paper on all island transmission loss adjustment factor (TLAFs) arrangements (SEM-10-066) for the tariff year 2010/2011. This paper also outlined the SEM Committee's intention to examine 'Splitting' as its preferred long-term solution for the treatment TLAFs in the SEM. The SEM Committee requested that the Regulatory Authorities (RAs), assisted by the Transmission System Operators (TSOs), would carry out an impact analysis into Splitting and would report back to the SEM Committee outlining the results of this analysis.

2. Purpose of this paper

Since then the RAs have been working to develop the terms of reference for the impact analysis into Splitting, as well as to put in place the appropriate modelling arrangements to carry out a robust impact analysis. The purpose of this information paper is to outline to the industry the terms of reference for the TLAF Splitting impact analysis.

- *Splitting*

The Splitting concept involves implementing different transmission loss signals in the SEM market schedule to those in the SEM physical dispatch schedule, i.e. separating the locational signal and cost recovery for transmission losses in the SEM market and their treatment in physical dispatch. The SEM Committee provided guidance to the Regulatory Authorities with regard to splitting by stating in SEM-10-066 that, *"the SEM Committee favours an efficient dispatch signal through TLAFs….., (and), in the market schedule, the SEMC favours and values stability (non-volatility).*

- *Splitting Impact Analysis*

The aim of the Splitting impact analysis is to assess if the potential benefits and advantages of implementing splitting, as the long term solution for the treatment of transmission losses in the SEM, outweigh any potential costs and disadvantages of this approach. In order to assess this, the RAs intend to carry out a modelling project in conjunction with the TSOs and assess the results of this modelling against a set of measurement criteria.

The remainder of this information paper outlines the measurement criteria which the SEM Committee has decided upon and provides an overview of the market schedule and dispatch schedule modelling which will be carried out.

3. Measurement Criteria

The SEM Committee has decided that the impact assessment for TLAF splitting will examine the case for splitting against the following four criteria:

1) Stability of the market schedule - how inframarginal rents (IMR) vary with loss factors

The SEM Committee has outlined its preference for stable loss factors in the market schedule to promote security of supply and efficient investment signals. This criterion will aim to assess stability through an analysis of the variation in inframarginal rents received by Generators, where this variation is driven by loss factors only. This means that the impact of all other variables which can drive changes in inframarginal rents, such as fuel costs will be removed.

Therefore, for the purposes of this impact assessment, the losses methodology to be implemented in the market schedule (as one side of Splitting) should result in a stable allocation of infra-marginal rents to Generators over the study period, with absolute levels being determined by individual plant costs and efficiency. Stability in the market schedule will be measured by the level of volatility as a result of different loss factors, in the allocation of inframarginal rents, *ceteris paribus*.

By measuring the change (increase or decrease) in infra-marginal rents (IMR) for a number of plants, in each year for each loss scenario combined with different dispatch scenarios, the RAs will be able to determine the impact of losses on inframarginal rents.

2) Efficiency of the dispatch schedule - how total production costs vary as loss factors move closer to real time

The SEM Committee has outlined its preference for loss factors to promote efficient dispatch, while considering the cost benefit analysis of any decision it makes. This means that the loss factor(s) for each Generator in the dispatch schedule should provide a dispatch signal to the TSO based on power flows across the network at any particular moment in time. To measure efficiency in dispatch, the SEM Committee has decided that it will examine the variation in total production costs resulting from the use of different loss factor values in the dispatch schedule.

The SEM Committee is in favour of moving towards real time loss factors (or as close to real time as possible) in dispatch. The SEM Committee is not asking the TSOs to actually develop the methodology for implementing real-time losses, but rather to calculate/model real-time losses based on the current methodology. This will allow the RAs, working with the TSOs, to determine whether this improves (i.e. reduces) production costs.

In advance of this, the TSOs have made a modelling proposal to the SEM Committee in order to assess the impact of increased loss granularity[1] on total production costs. The SEM Committee notes the requirement under licence for the TSOs to dispatch in a manner which reduces total production costs. This TSO proposal involves incrementally increasing the granularity of TLAFs closer to real time. The RAs will discuss this further with the TSOs in advance of carrying out modelling on the variation in total production costs arising from dispatching using different loss factor values.

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[1] Granularity can be defined as the extent to which a system is broken down into small parts with respect to time. In this case it reflects the movements of the current TLAF modules (e.g. day and night for each calendar month) into weekly TLAFs, daily TLAFs, 6 hourly TLAFs, 4 hourly TLAFs etc.

3) Impact on the all-island customer

The principal duty of the SEM Committee under SEM legislation in Ireland and Northern Ireland is *"to protect the interests of consumers of electricity in Northern Ireland and Ireland supplied by authorised persons".*

It is the SEM Committee's position that Splitting should either have a quantifiable benefit for end users, or at the very least should not place the all-island customer in a materially worse position than at present.

In order to measure this criterion, the SEM Committee will look at the impact of applying different loss factors in the market schedule on total suppliers' costs. Total suppliers' costs is the cost to all suppliers of purchasing electricity at the trading point, which is subsequently passed on customers in NI and ROI, i.e. it is the total energy cost (market schedule only) which will have to be paid for by end users. The RAs currently believe that a stable loss methodology adopted in the market schedule would ideally not materially increase total suppliers costs paid in the SEM.

4) Divergence between the market schedule and dispatch schedule - Dispatch Balancing Costs

The losses methodologies to be implemented in the market schedule and separately in the dispatch schedule should not result in a significant divergence between the market and dispatch schedule as measured by increased dispatch balancing costs (DBC).

Applying different loss factors in the market and dispatch schedules will result in divergence between the two schedules. The net effect of this divergence is seen in DBC, which are subsequently passed on to consumers. Appendix A of this paper defines what is meant as the divergence of the market schedule from that of the dispatch schedule. Conscious of the need to protect the interests of NI and ROI consumers and the work being undertaken in the 'Scheduling and Dispatch' workstream, the SEM Committee considers that any Splitting methodology adopted should not result in a material increase in this divergence, i.e. minimise the impact on Dispatch Balancing Costs and the cost to the final consumer.

In order to measure this criterion, the RAs will ask the TSOs to provide updated DBC estimates for a set of Splitting scenarios, following completion of the market schedule and dispatch schedule modelling.

4. Modelling to be carried out

The SEM Committee has decided that it is important that a wide range of different TLAF scenarios are looked at in both the market schedule and the dispatch schedule. This will provide for a comprehensive and robust analysis ensuring that the likely impact of Splitting is determined in advance of any decision to implement Splitting or not.
The following matrix (Table 1.0 below) shows the range of TLAF options under consideration by the RAs or currently available to be modeled.

Table 1.0 – Spectrum of TLAF Options

		Treatment in Dispatch Schedule			
		REAL TIME	**LOCATIONAL**	**COMPRESSED**	**UNIFORM**
Treatment in Market Schedule	**Real Time**	Real time in dispatch preferable but not in MS.	Real time in MS not considered feasible.	Real time in MS not considered feasible.	Real time in MS not considered feasible.
	Locational	Locational in dispatch preferable, but may promote volatility in MS.	Methodology up to 2010 – 2011 (locational in both DS and MS).	Solutions where dispatch is less locational than MS not desirable.	Solutions where dispatch is less locational than MS not desirable.
	Compressed	Real time in dispatch preferable. Compressed in MS may promote stability?	Locational in DS may promote efficiency, with compression in MS to promote stability?	2010 - 2011 interim solution. Provides a form of locational signal in DS and a form of stability in MS.	Solutions where dispatch is less locational than MS not desirable.
	Uniform	Real time in DS promotes efficiency. Uniform in MS promotes stability.	Locational in DS promotes efficiency. Uniform in MS promotes stability.	Compression in dispatch provides a weakened locational signal. Uniform in MS promotes stability.	Uniform in DS unlikely to promote efficiency. Uniform in MS promotes stability.

The RAs will choose a robust sample of options from this spectrum and carry out the required market schedule and dispatch schedule modelling. This will be completed with the assistance of the TSOs, in particular regarding provision of input data such as modeled 'real-time' TLAFs (moving towards real time) for dispatch schedule modelling.

The SEM Committee has decided that the modelling to be carried out should look at a number of different years in order to ensure that the full potential impact of Splitting is assessed. Modelling will be carried out on a selection of the following years, subject to receipt of required inputs from the TSOs in a timely manner:

Backcast Modelling:
- 2008/2009
- 2009/2010

Forecast Modelling:
- 2010/2011 (current tariff year)
- 2011/2012
- 2012/2013 (in order to take account of the potential impact of the East-West Interconnector on transmission losses)
- 2013/2014

The RA's Market Monitoring Unit (MMU) will carry out market schedule modelling and dispatch schedule modelling, with the assistance of the TSOs. The TSOs will provide all relevant TLAFs, compressed TLAFs, uniform TLAF and 'real-time' granular TLAFs to the MMU. In addition, the TSOs will be tasked with assessing the impact of the various Splitting scenarios on dispatch balancing costs, once the results of the modelling have been obtained.

The modelling will be carried out using the RA's validated Plexos model for 2009/10 with updated demand, generation, fuel costs etc. assumptions for each of the relevant years to be modeled.

5. Decision to implement Splitting or not

The RAs (with assistance from the TSOs) will prepare a report for the SEM Committee following completion of the modelling work. The SEM Committee will make its decision to implement or to not to implement Splitting (full consultation to be carried out) on the basis of the impact of Splitting on the four measurement criteria outlined above, as shown in the modelling results.

Where there is deemed to be a net benefit or advantage to the all-island customer or customers are not materially worse off through the implementation of Splitting, the SEM Committee will decide to implement Splitting. Where there is deemed to be a net cost or material disadvantage to the all-island customer of pursuing Splitting, then the SEM Committee will not implement Splitting.

6. Negative Impact Analysis

If the results of the impact analysis do not prove the case for Splitting or shows that Splitting should not be implemented, then the SEM Committee will propose an alternative solution for implementation in October 2011, using the data and results from the modelling carried out to help inform a decision.

7. Timetable for Impact Analysis

- RA's Modelling: February – April 2011
- Consultation period on TLAFs for implementation in October 2011: mid/ end May – end June/ early July 2011
- SEM Committee decision on TLAFs: August 2011

- Implementation of decision: 1 October 2011

8. Contacts

For further information on this information paper, please contact Jamie Burke (jburke@cer.ie) in CER or Billy Walker in UREGNI (billy.walker@uregni.gov.uk).

APPENDIX A: DEFINITION OF THE DIVERGENCE OF THE MARKET SCHEDULE FROM DISPATCH

The divergence of the market schedule from dispatch' would clearly be 0 if the market schedule and dispatch schedule/actual running were identical, i.e. the plant that actually ran was in the market schedule and only it. It would clearly be 1 or 100% if there was no overlap between the market schedule and dispatch schedule/actual running. This would equate to a completely different set of generation between what was in the market and dispatch schedules, i.e. no plant that ran getting into the market schedule and no plant in the market schedule actually running in dispatch.

So if:

D&S = volume of energy from plant scheduled and dispatched

SND = volume of energy from plant scheduled but not dispatched

DNS = volume of energy from plant dispatched but not scheduled

Then the divergence DIV is given by

$$DIV = \frac{SND + DNS}{SND + D\&S + DNS}$$

To take an example:

GEN A	MSQ = 50	DQ = 100
GEN B	MSQ = 100	DQ = 50

$$DIV = \frac{50+50}{50+100+50}$$

$$= 100/200$$

$$= 50\%$$

Note that SND will always be equal to DNS.