

Single Electricity Market

Transmission Loss Adjustment Factors for 2010

Decision Paper

17 December 2009

SEM-09-113

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1 Introduction

1.1 Background

In June 2005 the Commission for Energy Regulation (“CER”) and the Northern Ireland Authority for Utility Regulation (“NIAUR”), collectively known as the RAs, published a decision paper¹ entitled “SEM High-Level Design Decision Paper”. This paper outlined the design of the Single Electricity Market (the “SEM”) for the island of Ireland, and included a decision requiring that transmission losses in the SEM be accounted for on an all island basis, using a consistent methodology involving the application of locational Transmission Loss Adjustment Factors (“TLAFs”) to the outputs of generators.

Following the publication of this paper, the RAs had extensive discussions on the issue with EirGrid and the System Operator for Northern Ireland (“SONI”), the transmission system operators in the Republic of Ireland and Northern Ireland respectively, leading to the publication in May 2006 of a consultation paper on the treatment of transmission losses². Following consideration of the comments received to the consultation paper, in August 2006 the RAs published a decision paper³ on the matter.

TLAF values are derived by modelling the increase or decrease in transmission system losses that arise as a consequence of an increase or decrease in the output of each generator, against a background of generation and demand that is representative of the month and day/night condition to which TLAFs are to be applied. The TLAFs for each particular month and day/night condition are then shifted uniformly, in order to recover in aggregate the overall transmission losses that are estimated to occur for that condition, whilst retaining differentials between TLAFs at each location.

1.2 Previous Documents

The methodology used to calculate the transmission loss adjustment factors for SEM have been developed through a number of consultation and decision documents. These papers are available on the All Island Project website via this [hyperlink](#):

¹The Single Electricity Market (SEM) High Level Design Decision Paper”, 10 June 2005, AIP/SEM/42/05

² The Single Electricity Market: Treatment of Transmission Losses. A Consultation Paper”, 24 May 2006, AIP/SEM/58/06.

³ “The Single Electricity Market: Treatment of Transmission Losses. Decision Paper”, 31 August 2006, AIP/SEM/112/06.

- High Level Design – Stated that TLAFs will be used to provide a locational signal in SEM;
- May 2006 – Consultation on the method for calculating and applying TLAFs in SEM;
- August 2006 - Decision paper on treatment of transmission losses;
- March 2007 – Consultation regarding the calculation of TLAFs for November and December 2007;
- April 2007 – Decision regarding the calculation of TLAFs for November and December 2007;
- October 2007 – Consultation regarding the TLAFs to apply for 2008;
- December 2007 – Decision regarding the TLAFs to apply for 2008;
- September 2008 – Consultation regarding TLAFs to apply for 2009;
- November 2009 – Decision regarding the TLAFs to apply for 2009; and
- October 2009 – Consultation regarding TLAFs to apply for 2010.

In addition, the System Operators are currently undertaking a review of the Locational Signals in SEM which includes a review of TLAFs. A paper (SEM-09-107)⁴ summarising their preferred options was published in November 2009. Responses are due by 8th January 2010. This will be followed by a regulatory decision in March 2010 which will include a decision in relation to TLAFs (see Section 4).

1.3 TLAFS from 1 January 2010

The RAs have already consulted on and published the all-island TLAFs which apply up to December 2009. EirGrid and SONI submitted to the RAs, in accordance with section 4.41 of the SEM Trading & Settlement Code, a set of draft all-island TLAFs to apply from 1st January 2010 until the implementation of the methodology approved under the Locational Signals in the SEM workstream. These were calculated jointly by EirGrid and SONI in accordance with the RAs' decision on the treatment of transmission losses published in August 2006. On 27th October 2009 the RAs published for consultation these draft all-island TLAFs (SEM-09-102). This current paper discusses the responses received to the consultation and provides the decision of the SEM Committee in relation to the proposed TLAFs.

⁴ [SEM-09-107](#) "Preferred Options to be considered for the Implementation of Locational Signals on the Island of Ireland". Consultation Paper, published 26 November 2009

1.4 Purpose of this paper

The purpose of this paper is to outline and describe the RAs' decision with regard to the TLAFs to be applied in SEM from 1st January 2010. The RA's have considered fully the comments and submissions received to the earlier consultation. Issues raised in the consultation are addressed in this paper as well as outlining the final decision on this topic. Any comments that overlap with the Locational Signals consultation will be forwarded to the System Operators and responded to through that workstream.

1.5 Comments Received

The RAs received 11 submissions to the consultation paper (SEM-09-102). Submissions were received from the following organisations:

- ESB International
- ESB Customer Supply
- Airtricity
- NIE Energy – PPB
- Viridian Power and Energy
- Bord Gáis Energy
- Saorgus Energy Ltd
- SWS Energy
- Tynagh Energy
- IWEA
- One confidential response

1.6 Structure of this paper

Section 2 outlines the comments received on the consultation paper and the RAs initial responses to these comments.

Section 3 contains an overall summary of the decision being made in this paper and the RAs' conclusions in this area.

Section 4 outlines the RAs' next steps with regard to this topic.

Attachments: The TLAFs to be applied from 1 January 2010 and the responses received to the consultation (where not identified as confidential) are presented in the attachments to this paper.

1.7 Other Relevant Information

Any queries on this decision and the calculation of TLAFs should be directed to John Lynch (jlynch@cer.ie) or Sarah Friedel (sarah.friedel@niaur.gov.uk).

2 Comments Received

2.1 Introduction

The comments that were received covered seven main topics. These are similar to the comments received to the 2009 TLAF consultation, which led to the inclusion of the TLAF methodology in the Locational Signals workstream. Each of these concerns will be addressed in turn below.

- Unpredictability;
- Volatility;
- Lack of transparency;
- Data or methodology implementation issues;
- Dispatch scenarios;
- Impact on revenue and investment;
- Question the cost reflectivity and/or efficiency of the locational signal;
- Suggestions for alternative methodologies.

2.2 Unpredictability

Seven respondents raised concerns about the unpredictability of the TLAFs. This compounds the effects of the other issues raised, such as volatility and the magnitude of the impact. A predictable method of calculating the TLAFs would mitigate against the volatility and allow generators to anticipate any future impacts.

2.2.1 Respondents' Comments

The comments received relating to the predictability of the TLAFs include:

- “It seems clear to us that, under the current methodology, it would be impossible for a potential generation investor to predict, at the time of the investment decision, the likely TLAF which would apply to their station at the date of commissioning, let alone through the critical early years of operation.”
- “The values have taken a significantly larger swing downwards than predicted by EirGrid in areas where wind power is connected, highlighting the unpredictability of TLAFs.”

- “there a large swing downwards for all regions that have wind power connected, larger than was even predicted by the 2011 report completed by Eirgrid last year. This demonstrates once again that the TLAFs are unpredictable (even by the people who make the rules and write the software), and as such do not (and never have) represented a usable locational signal”

However, one respondent did state that these values were consistent with their long term estimate of what TLAFs should be under the methodology and another stated that these now matched the values that they were expecting.

2.2.2 RAs’ Response to Comments

The RAs are aware that this particular method of calculating TLAFs is complex, which results in difficulties with prediction of individual TLAFs. However general trends can be explained and identified in advance. The commissioning of 800MW of new CCGT plant in the Cork region has had a significant impact on the distribution of TLAFs.

The balance between predictability and other criteria for an effective distribution of transmission losses will be progressed through the Locational Signals workstream.

2.3 Volatility

The volatility of the TLAFs was raised as a concern by eight respondents.

2.3.1 Respondents’ Comments

Their concerns include:

- The actions of third party generators can have a major impact (positively or negatively) on the TLAFs faced. The only way to manage the risk is by holding a portfolio of generation in diverse locations, as then the revenue impact of changes in one single TLAF are likely to be offset by the impact of changes elsewhere on the system.
- The volatility of the mechanism acts as an uncontrollable risk rather than a locational signal in generation investment decisions. It is also worth noting that the signal is not in any way linked to transmission investment plans.

2.3.2 RAs’ Response to Comments

In the decision paper for the 2008 TLAFs, the RAs stated that they were open to the need for volatility mitigation in SEM. “The RAs will therefore follow-up on volatility mitigation measures for the TLAFs post 2008”. This is being undertaken via the Locational Signals in SEM workstream.

The RAs accept that volatility is a fundamental issue with the current method of calculating TLAFs, as it uses scaled marginal loss factors and is therefore inherently volatile. They also note that the TSOs decisions regarding the minimisation of losses take place around the marginal plant. The balance between volatility, cost reflectivity and efficient dispatch will be progressed through the Locational Signals workstream.

It should also be noted, that this volatility means that generators who have been disadvantaged by their TLAFs in recent years, but whose locations are now reducing losses, will receive the benefits of this in a timely manner.

2.4 Lack of Transparency;

The complexity associated with modelling the marginal losses on the system mean that the calculation of TLAFs by this methodology is not replicable by market participants. Five respondents raised concerns about this.

2.4.1 Respondents' Comments

The lack of transparency was highlighted by the five respondents in the context of the volatility and unpredictability of the results. The interaction between these three aspects was identified as being of greater significance than the impact of any one of these on its own. This was summarised by one respondent:

“These swings negatively affect the financial assessments of all projects and reduce the likelihood of generation development on the island. Volatility and lack of transparency of the current methodology are a most serious concern that should be analysed by the RAs”

2.4.2 RAs' Response to Comments

The RAs and System Operators have published significant amounts of data to assist market participants in the understanding of the calculations that underlie their TLAF values. Only methodologies that meet a basic level of transparency have been included in the options being considered by the TSOs. The RAs believe that there are no further practicable steps that could be taken to improve the transparency of the current methodology, and note that this will be the final time that this methodology is used in SEM.

2.5 Data or Methodology Implementation Comments

Comments were received in relation to the appropriateness of certain data used in the derivation of the 2010 TLAFs and the implementation of the approved methodology.

2.5.1 Respondents' Comments

One respondent questioned the validity of the market data forming the generation dataset stating that the up-to-date 2009 data should have been used rather than 2008 data.

The respondent also commented that the current modelling does not reflect the current market or market rules whereby losses are (ref. SEM-08-179) included in the price of commercial offer data and thereby impact on the merit order. The respondent suggested that a second iteration of the PSSE should be carried out to include a re-running of the dispatch based on the output of the initial TLAFs/losses derived.

The respondent also made reference to errors in the data published by the SOs, citing the imbalance between generation and demand and problems with the input data.

2.5.2 RAs' Response to Comments

The SO has provided information that the market data forming the generation dataset was based on the same data that was used to determine the constraints budget and that it was reasonable and sensible to use a consistent model for the two workstreams as they both apply to 2010. Also, the SO has stated that updated market model was only finalised and made available in June 2009 and use of this more up-to-date data would not have been consistent with the timeline for the calculation of the draft 2010 TLAFs. It has also been the practice to-date to use the previous years data (Y-1) for the TLAFs for the forthcoming year (Y+1).

The RAs do not recognise the above as flaws in the process or in the implementation of the current methodology. The RAs consider that the SOs' implementation of the current methodology is consistent with the SEM Committee's August 2006 decision (AIP/SEM/112/06) on the all-island TLAF methodology.

The current modelling implemented by the SOs is based on non-loss adjusted dispatch. This methodology has been used by the SOs, with approval of the RAs, since the go-live of SEM on 1st November 2007 and has not heretofore included a second or subsequent iteration of the PSSE. The SOs have advised the RAs that each iteration of the calculation of the TLAFs takes at least a month to carry out and that several iterations would be necessary to get convergence to the final TLAFs. The SOs have also stated, and the RAs agree, that it would be inappropriate to introduce the iterative refinement to the methodology as it would be outside the bounds of the approved methodology. The RAs consider that the derivation of the 2010 TLAFs is consistent with the approved methodology. The iterative refinement process will be referred to and will be considered as part of the ongoing review of locational signals which is currently under consultation (refer to Section 4).

The SOs have confirmed that the published load and generation data did not include the total load on the island which was in the actual TLAF calculation. The SOs have informed the RAs that this was due to a formatting/transcribing error and have confirmed that it does not impact on the TLAF values themselves.

2.6 Dispatch Scenarios

Four respondents have queried the dispatch scenarios used in the calculation of the 2010 TLAFs, however one of these was also supportive of their adoption.

2.6.1 Respondents' Comments

- "Issues with the dispatch scenarios range from the approach adopted to solving the problem, through to concerns about the treatment of losses across the entire output of generating plants."
- "the development of TLAFs for 2010 should use the current methodology that has been used since SEM Go-Live. As in previous years, all participants will likely

have differing views on the despatch scenarios used in the analysis but, pending the outcome of the general review, we believe those proposed for 2010 should be adopted.”

2.6.2 RAs’ Response to Comments

The RAs have raised these concerns with the System Operators, who have explained that the method followed in determining the dispatch scenarios is consistent with the methodology specified in the RA decision paper of August 2006.

2.7 Impact on Revenue and Investment

Three respondents raised concerns about the magnitude of the impact that TLAFs have on their revenues.

2.7.1 Respondents’ Comments

- “It is clear that proposed TLAF values for 2010 would result in material economic transfers between generating plants, on the basis of the opaque assumptions underpinning implementation of the current methodology.”
- If [the proposed 2010 TLAFs are] implemented, they will have a major impact, not just on our business, but on the investment climate throughout the energy sector. While the regulatory regime on the island has, to now, been viewed positively by investors, we believe the current proposals will create the perception of a volatile and noninvestment friendly regime.
- “The volatility and lack of transparency of the TLAFs remain a matter of serious concern to IWEA members. Generators have experienced unexpected changes of 10-15% in TLAFs in recent years. Changes of this magnitude have the potential to eliminate the financial viability of generation projects and may lead to bankruptcy.”
- “Locational charges create a poor investment environment as they change from year to year. TLAF’s are a poor investment location signal because changes in TLAF are not controllable by generators and are also both unpredictable and commercially significant. For example, it is proposed in SEM-09-102 that the TLAF for the Tralee node, to which all of our operational projects are connected, will decline by almost 4% in a single year. This rate of decline significantly but needlessly affects our business case and the business case of all prospective generators”

2.7.2 RAs' Response to Comments

The impact on generators disadvantaged by the 2010 TLAFs is in proportion with that experienced in previous years by other generators located in relatively unfavourable locations.

The RAs note that, in the Locational Signals workstream, the System Operators' preferred option (see Locational Signals consultation paper; SEM-09-107) for the future treatment of TLAFs would significantly reduce the risk that generators are exposed to, with customers benefiting from this via a lower risk weighting applied to the rate of return required by the BNE Peaker used in the calculation of capacity payments to generators.

2.8 Question the cost reflectivity and/or efficiency of the locational signal;

2.8.1 Respondents' Comments

Eight respondents queried the cost reflectivity and efficiency of the locational signal generated by these TLAFs.

- The design of the current system attempts to be cost reflective. However, this is at the expense of stability and predictability. TLAFs change with each new plant that connects to the system and with transmission investments.
- Running more inefficient plant has two impacts. First, other things being equal, the wholesale power price will be higher than it otherwise would have been, creating an additional cost to customers. Second, more fuel is used to produce the same amount of electricity, and therefore total CO2 emissions increase.

One respondent also states a contrary opinion:

- The draft TLAFs for 2010 now recognises the lower losses of being located close to a major load centre. The 2010 TLAFs also reveal, as we expected, that the Cork region is a poor location from a transmission loss perspective for 800MW of new generation.

2.8.2 RAs' Response to Comments

This TLAF signal is intended as an ex-ante indication of the plant causing the marginal losses on the system. The balance between high merit plant and demand within a region determine if it is an importing or exporting region. All generation within importing regions will receive a beneficial TLAF while all plant located in an exporting region will have a TLAF that is strongly influenced by the marginal power flows from the plant that is

highest in the merit order in that region. For example, all plant in NI in 2008 received TLAFs that implied that all of the power they would be generating would be exported over the N-S tie line, even though the capacity of that line is only a fraction of the generating capacity in NI. A similar effect has been seen for generation in the south-west of Ireland for 2010.

The purpose of ex-ante TLAFs calculated by this method and that are reflected in a generator's commercial offer data is to ensure that the System Operators make the correct dispatch decisions regarding the marginal plant on the island in any given trading period. Given the increasing volumes of wind on the system, the RAs acknowledge that there is a limit to how effective any ex-ante calculation of marginal losses can be. However, this method should produce the most cost effective dispatch for customers on average in each month. The early implementation of any revised methodology will be consulted upon in due course (assuming it is feasible to implement in advance of October 2010).

2.9 Suggestions for Alternative Methodologies.

Two alternatives to the 2010 TLAFs as consulted on were proposed in the responses received. These were:

- i. Roll over of 2009 TLAFs to 2010
- ii. Application of uniform TLAFS

2.9.1 Respondents' Comments

These proposals are summarised as:

- uniform transmission loss adjustment factors (uTLAFs) should be applied across all generator units in the SEM. However given the short lead time left till the start of the new year and the potential to frustrate the expectations of those participants who perceive advantageous treatment in this current round of the TLAF raffle, it would be acceptable to retain current 2009 TLAF values for 2010. As transmission losses are not measured, there is no reason why this would be less accurate overall than the current methodology based on simplifying assumptions.
- One respondent who has significantly worse TLAFs in 2010 than 2009 requested that the values for 2009 be carried forward.
- IWEA would also like to request that there be a flat TLAF introduced in the interim period in 2010 while the decision on the new methodology is being made.

2.9.2 RAs' Response to Comments

The primary objective of applying TLAFs to generators' commercial offer data is to ensure that the cost of the marginal losses is reflected in the System Operators' dispatch decisions.

The TLAFs calculated for 2009 do not reflect the power flows on the all-island transmission system that are expected to occur in 2010. In fact, the additional generation located in the south-west of the island will result in some of the dominant flows from 2009 being reversed. To roll over the 2009 TLAFs would actively discriminate against generators who are providing a benefit to customers by offsetting the new dominant flows and consequently reducing the overall losses on the system. The RAs do not consider this to be an option that would fulfil the System Operator's duties to dispatch generation in the least cost way across the entire island.

The option of uniform TLAFs is explored in the System Operators' preferred options paper. This would only comply with the requirement on the System Operators to dispatch at the lowest total cost, if they were able to include losses in their optimum dispatch algorithms separately from the submitted Commercial Offer Data. Should the RAs decision paper in the spring of 2010 favour the option of splitting TLAFs in dispatch from those used in the market systems, then the options for uniform TLAFs and subsequent settlement will be consulted upon. Please note, this consultation will be undertaken in the context of the current bidding principles, and any settlement options will respect the fact that any TLAFs charged to generators would have to be defined ex-ante to allow them to be reflected in their commercial offer data.

The implementation timescale for any splitting of TLAFs between dispatch and settlement will be dependent on the system changes that are required. These will be identified in conjunction with the RA decision process.

2.10 Support for the Proposed TLAFs

A number of respondents were in favour of the proposed TLAFs. These included:

- Viridian is satisfied that they have been correctly calculated by the transmission system operators (TSOs), using the standard methodology that has been applied in Ireland since 2000.

The RAs also note that not all generators responded to the consultation.

3 Decision

Having considered carefully the above comments the SEM Committee considers that it is appropriate that the TLAFs published in the attachments to this document be adopted for the period 1st January 2010 until the implementation of the revised methodology being consulted upon via the Locational Signals workstream. These TLAFs are the same as those which were published in the October 2009 consultation paper.

As noted in the consultation paper the TLAFs to apply in 2010 may also be subject to a modification request to the SEM Trading and Settlement code. This proposed modification, if approved, will change the period on which the TLAFs are calculated from a calendar year to a tariff year basis. The Modification Committee have recommended this modification and have sent it to the RAs for a decision which is expected in the near future.

Notable differences between 2009 and 2010 TLAFs are:

- (1) compared to 2009, TLAFs in Ireland tend to decrease and TLAFs in Northern Ireland tend to increase. This is due principally to the connection of new generation in the Cork with consequential reductions in other generation;
- (2) also due to the connection of new generation in Cork, TLAFs in the South West decrease during 2010, whilst TLAFs for generators in the Dublin area increase.

The TLAFs are shown in the attachments as follows:

- set of TLAFs for Republic of Ireland Market Participants;
- set of indicative TLAFs for nodes on the transmission system in the Republic of Ireland;
- set of TLAFs for Northern Ireland Market Participants; and,
- set of indicative TLAFs for nodes on the transmission system in Northern Ireland.

The above TLAFs are published in both PDF format and in Excel spreadsheet format to facilitate use of the TLAFs by market participants.

4 Conclusions and Next Steps

The RAs note that a number of respondents have expressed an opinion on the early implementation of the revised methodology. Five respondents welcomed this possibility, while three voiced concerns regarding the commercial impact of an early change as a result of its interaction with SEM contracts for differences. Two of these three respondents requested that the implementation be delayed until October 2011

The SOs are currently reviewing the methodology to be adopted for generator TUoS and TLAFs Locational Signals in the SEM. As part of this workstream the preferred methodology options for location signals, including TLAFs, are being consulted⁵ on. This SO review is considering the implementation of a new methodology from 1 October 2010. The date for implementation of the new methodology will depend on the outcome of responses to the aforementioned consultation and the RAs' views on the matter. A decision from the RAs is currently expected in March 2010.

⁵ [SEM-09-107](#); Preferred Options to be considered for the Implementation of Locational Signals on the Island of Ireland