

Stage 03: Draft Solution to Identify Impacts

P278 'Treatment of Transmission Losses for Interconnector Users'

P278 proposes to always apply a fixed Transmission Loss Multiplier (TLM) of 1 to Interconnector BM Units, so that the BSC does not adjust their Metered Volumes for GB transmission losses.

The Proposer argues that because Great Britain (GB) participates in the European Inter-TSO Compensation (ITC) scheme, which includes GB transmission losses which occur from hosting cross-border flows, it is anomalous to additionally 'charge' Interconnector Users for GB transmission losses under the BSC.

The Impact Assessment for P278 closes:

5pm on Monday 5 December 2011

The Workgroup may not be able to consider late responses.

High Impact:



- Interconnector Users
- Interconnector Error Administrators
- Settlement Administration Agent (SAA)
- Possibly Balancing Mechanism Reporting Agent (BMRA)

Medium Impact:



- Lead Parties of non-Interconnector BM Units (as the GB transmission losses which are not allocated to Interconnector BM Units would be allocated across all other BM Units)

Low Impact:



- ELEXON

What stage is this document in the process?

- 01 Initial Written Assessment
- 02 Definition Procedure
- 03 Assessment Procedure
- 04 Report Phase

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Any questions?

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About this Document

This document is the Draft Solution to Identify Impacts for P278. It summarises the proposed P278 solution requirements. It also summarises the changes – to the extent the P278 Workgroup has been able to identify them – that will be required to participants' systems, BSC Central Systems, Code Subsidiary Documents and Configurable Items to implement the proposed P278 solution.

We are issuing this document for impact assessment by ELEXON, BSC Agents (AM/Dev service provider and BPO/Host service provider), BSC Parties and Party Agents in order to establish the impacts, costs and lead times of P278 (including any impacts which are not identified in this document). At this stage the Workgroup is not seeking your views on the scope/nature of the issue, the exact requirements of the relevant European regulations or the pros or cons of P278. These will be the subject of a subsequent industry consultation, which will provide further information and worked examples in these areas.

Please provide your response using the attached response form.

You can find more details on the scope of this impact assessment in Section 2.

Further Information

You can find further documentation and information on P278 on the [P278 page](#) of the ELEXON website.



What is...

The issue?

The BSC currently adjusts the Metered Volumes of Interconnector BM Units for GB transmission losses. This could be seen as anomalous in light of recently introduced European regulations on cross-border flows.

The proposed solution?

The TLM applied to Interconnector BM Units would be fixed as 1. The BSC would therefore no longer allocate GB transmission losses to any Interconnector BM Units.



What are Trading Units?

A Trading Unit is a collection of one or more BM Units.

If the sum of the Metered Volumes across all of the BM Units in a Trading Unit is greater than zero for a given Settlement Period, the Trading Unit is a **'delivering' Trading Unit**.

If the sum of the Metered Volumes across all of the BM Units in a Trading Unit is less than or equal to zero for a given Settlement Period, the Trading Unit is an **'offtaking' Trading Unit**.

For more information, please see BSC Section T2.1.

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How does the BSC currently treat GB transmission losses?

As energy is transported across the GB Transmission System, some of it is lost (for example, through heat caused by the current flowing through overhead lines). The total metered energy which can be drawn from the GB Transmission System to meet demand will therefore always be less than that delivered onto the GB Transmission System by generation. The difference between total metered generation and total metered demand in a Settlement Period is therefore referred to as 'GB transmission losses'. The BSC adjusts the Metered Volumes of all BM Units through the application of Transmission Loss Multipliers (TLMs) to ensure that the total (adjusted) generation matches the total (adjusted) demand in any given Settlement Period. In doing so, it effectively allocates a share of the total GB transmission losses in that Settlement Period to every BM Unit (and thereby to BSC Trading Parties through their Trading Charges).¹

Under the current BSC arrangements, 45% of the total GB transmission losses in a Settlement Period are allocated to 'generation' BM Units, and the remaining 55% to 'demand' BM Units. Within this split, the 'lost' energy is distributed evenly across all BM Units in proportion to their Metered Volumes.² This is often referred to as a 'uniform' allocation of losses.

For each Settlement Period, the Settlement Administration Agent (SAA) calculates two TLMs in accordance with Section T2 of the Code: the 'delivery' TLM and the 'offtake' TLM. An individual BM Unit's Metered Volume is multiplied by either the 'delivery' TLM or 'offtake' TLM for that Settlement Period as follows.

- The **'delivery' TLM** (which is less than 1) is applied to all BM Units that are part of 'delivering' (exporting) Trading Units in that Settlement Period. This scales down the BM Units' Metered Volumes to account for GB transmission losses, meaning that their Lead Parties must generate more to meet their contracted positions.
- The **'offtake' TLM** (which is greater than 1) is applied to all BM Units that are part of 'offtaking' (importing) Trading Units in that Settlement Period. This scales up the BM Units' Metered Volumes to account for GB transmission losses, meaning that their Lead Parties must contract more to meet expected demand.

¹ Losses on Distribution Systems are separately accounted for through the application of Line Loss Factors (LLFs) and GSP Group Correction.

² In practice, this split is designed to be equivalent to a 50:50 allocation, but with allowance for the fact that metering for most generation connections is on the high-voltage side of the supergrid transformer, whereas that for demand is on the low-voltage side. The 45:55 allocation of transmission losses is intended to allow for supergrid transformer losses for demand connections which are in addition to the metered flow.

What are the European regulations for the treatment of cross-border flows?

National Grid, as the GB Transmission System Operator (TSO), participates in the mandatory European Inter-TSO Compensation (ITC) scheme on behalf of GB. The intention of this scheme is to compensate the national TSO for each EC Member State for the transmission losses which occur on its national transmission system as a result of hosting cross-border flows across Interconnectors, thus removing the need for individual national charges. Specifically, within this scheme, there is a mechanism that is intended to compensate the GB market (via National Grid as the GB TSO) for the transmission losses which occur on the GB Transmission System as a result of hosting cross-border flows. This scheme is part of the wider European Commission (EC) objectives of creating a single market in electricity, and thus facilitating greater competition and benefits for consumers.

EC Regulation 838/2010³ establishes guidelines under which countries are compensated for the costs of losses that are incurred on their national transmission systems as a result of cross-border flows. Article 14 (Charges for access to networks) of EC Regulation 714/2009⁴ requires that ITC payments and receipts are taken into account when setting network charges. These regulations came into force on 3 March 2011, and are mandatory for all EU Member States.

National Grid made adjustments to its Transmission Network Use of System (TNUoS) charges for Interconnector flows during 2010. They consider that this has fully taken the ITC payments into account as per the requirements of EU Regulation 714/2009.

What problem does P278 identify with the current rules?

Under the recent European regulations, GB (via National Grid as the national TSO) participates in the European Inter TSO Compensation (ITC) scheme, which is intended to compensate TSOs for losses on their national transmission systems caused by hosting cross-border flows. National Grid accounts for this through its TNUoS charges to GB Transmission System users,⁵ and has amended its Use of System Charging Methodology so that it no longer levies specific TNUoS charges on Interconnector Users.⁶ However, under the current BSC arrangements, a 'charge' for GB transmission losses manifests itself as an adjustment to Metered Volumes in the form of TLMs. TLMs are currently applied across all BM Units, including Interconnector BM Units.

The Proposer argues that, as GB participates in the mandatory ITC scheme which includes an element for GB Transmission Losses, it is anomalous to additionally 'charge' Interconnector Users for these losses under the BSC. They believe the BSC should be amended to remove any apparent anomalous treatment of GB transmission losses in the context of the requirements of EC Regulations and the changes already made to TNUoS charging.

³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:250:0005:0011:EN:PDF>

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF>

⁵ In reality, GB is a net contributor to the ITC because overall it is deemed to cause more losses on other Member States' national transmission systems than these Member States cause on the GB system. In addition, as Interconnector flows are mainly in the south and so help to reduce GB losses, GB tends to receive negative compensation. National Grid recoups this net contribution from all GB Transmission System users through TNUoS. However, the compensation which GB receives through the ITC means that users' resulting TNUoS charges are lower than they would otherwise be.

⁶ Following Ofgem's approval of change [ECM-26 'Review of Interconnector Charging Arrangements'](#).

What is the proposed solution?

P278 proposes to remove this apparent anomaly from all Interconnector metered flows on the GB Transmission System. The Proposer suggests that, to achieve this, the BSC should be amended to apply a fixed TLM of 1 to all Interconnector BM Units. This would mean that Interconnector BM Units' Metered Volumes would no longer be adjusted by the TLM, and the BSC would therefore no longer allocate GB transmission losses to any Interconnector BM Units.

The GB transmission losses which are no longer allocated to Interconnector BM Units would instead be allocated across all other BM Units (proportional to their Metered Volumes and the overall 45:55 split between 'delivery' and 'offtake'). This would involve adjusting the equations for calculating the 'delivery' Transmission Losses Adjustment (TLMO⁺) and the 'offtake' Transmission Losses Adjustment (TLMO⁻) used in the calculation of the 'delivery' and 'offtake' TLMs.

This proposed solution does not impact the Isle of Man Distribution Interconnector. This is because it has a derogation from the Panel under BSC Section K5.2 such that it is not treated as an Interconnector (i.e. it does not have Interconnector BM Units or an Interconnector Error Administrator). Any other future Distribution Interconnector with such a derogation would also not be impacted. However, any future Distribution Interconnectors without such a derogation would be treated the same as a Transmission Interconnector, and so would be impacted by P278.

Scope of issue and P278 solution

The GB Transmission System stops just before the shore, on the Transmission System side of the AC/DC conversion equipment. Losses occurring on the Interconnector cables themselves (including the conversion equipment) are allocated to Interconnector Users by the relevant Interconnector Administrator, and fall outside the scope of the ITC, BSC and P278. References to 'GB transmission losses' or 'losses on the GB Transmission System' therefore exclude these cable and equipment losses, the allocation of which will be unaffected by P278.

2 Summary of Impact Assessment Requirements

Scope of Impact Assessment

The Workgroup is only currently considering one solution for P278, which is the Proposer's preferred solution (see Section 1). The detailed requirements of this solution are listed in Section 3.

The solution will impact the following participants in the BSC arrangements:

- Interconnector Users and Interconnector Error Administrators, who would no longer have their Interconnector BM Unit Metered Volumes scaled for GB transmission losses through the TLM and who may need to amend their systems and contracts to reflect this;
- The Lead Parties for all non-Interconnector BM Units, who would be allocated a proportion of the GB transmission losses which are no longer allocated to Interconnector BM Units and who may need to amend their contracts to reflect this;
- ELEXON, who would need to amend the relevant BSC documentation and manage the implementation of P278; and
- BSC Agents (specifically the Settlement Administration Agent (SAA)). We anticipate that the main SAA impacts will be on the BSC Application Management and Development (AM/Dev) service provider, who will need to amend the calculation of TLMs and TLMOs. We expect the impact on the Business Process Outsourcing/Host (BPO/Host) service provider to be limited to document changes and testing. However, we seek confirmation of this through this impact assessment. We have also identified a possible impact on the Balancing Mechanism Reporting Agent (BMRA). We request that the AM/Dev and BPO/Host service providers provide costs and lead times both with and without this BMRA element so that the Workgroup can decide whether to include it in the P278 solution.

This impact assessment seeks to identify the full impacts of the P278 solution on affected participants, including the following:

- The changes which participants would need to make to systems, documents and/or processes to implement the requirements of P278 (including any not identified in this document);
- The implementation effort/costs which participants would incur in making these changes; and
- The lead times (from the point of Ofgem approving P278) that participants would need to make these changes.

For the purposes of this impact assessment, please provide costs/lead times for the following implementation approaches:

- **Implementation Approach A** – implement P278 on its own as a stand-alone change outside a normal BSC Release; and
- **Implementation Approach B** – implement P278 in a normal BSC Release.

We are also simultaneously issuing related Modification Proposal P277 'Allow Interconnector BM Units to choose their P/C Status' for industry impact assessment. The solutions for these two changes are not dependent on each other, and will work separately or together. However, there may be cost-savings if the two changes are delivered at the same time. Please therefore indicate in your impact assessment responses whether there

would be any reduction in your total combined cost/lead time for P277 and P278 if the two changes are implemented in parallel.

For the purposes of this impact assessment, please assume that (with the exception of the redlined changes to the BSC itself) the changes to all impacted documents will only be developed following Ofgem's approval of P278. You can find a full list of the likely impacts in Section 4. Please highlight in your response if there are any additional impacts not identified in this Draft Solution.

3 Requirements for Impact Assessment

Requirements for proposed solution

The Workgroup has identified the following solution requirements for P278.

The P278 solution is not intended to impact any reporting flows. For example, the SAA-I014 will still report each BM Unit's TLM value in the same way as currently.

Requirement 1	
The TLM for Interconnector BM Units will be fixed at 1	
1.1	<p>The SAA (AM/Dev service provider) shall amend its systems so that the TLM value for each Interconnector BM Unit (i.e. each BM Unit with a BM Unit Type of 'I' and a BM Unit ID beginning 'I_') is no longer dynamically calculated. Instead, the TLM value for each Interconnector BM Unit shall be fixed as 1 for each Settlement Period, beginning with the first Settlement Period on the P278 Implementation Date.</p> <p>SAA systems shall therefore no longer calculate the TLM for an Interconnector BM Unit using the existing rule of $TLM_{ij} = 1 + TLF_{ij} + TLMO^{+/-}_j$. Instead the systems shall apply the rule that $TLM_{ij} = 1$ for each Interconnector BM Unit in each Settlement Period, regardless of whether the Interconnector BM Unit was part of a 'delivering' or 'offtaking' Trading Unit in the relevant Settlement Period. This rule shall apply to all Interconnector BM Units, regardless of whether they are registered by Interconnector Users or by Interconnector Error Administrators.</p> <p>The TLM calculation for all other (non-Interconnector) BM Units shall remain unchanged as $TLM_{ij} = 1 + TLF_{ij} + TLMO^{+/-}_j$. However, the SAA (AM/Dev service provider) shall be required to amend the calculation of $TLMO^+_j$ and $TLMO^-_j$ values as described below.</p>
1.2	<p>The Lead Parties for Interconnector BM Units (i.e. Interconnector Users and Interconnector Error Administrators) who load their TLM values from the SAA-I014 flow into their own systems to monitor/validate their Trading Charges may need to amend their systems to accept TLM values of 1. They may also need to amend their advance contracts to take account of their revised TLM values.</p>



The losses previously allocated to Interconnector BM Units will be redistributed across all other BM Units

- 2.1 The SAA (AM/Dev service provider) shall amend the calculation of $TLMO_j^+$ and $TLMO_j^-$ within its systems to deliver the revised equations given in Appendix 1. These revised equations will redistribute the GB transmission losses that would have been allocated to Interconnector BM Units across all other BM Units instead, in proportion to each non-Interconnector BM Unit's Metered Volume and the overall 45:55 split between 'delivery' and 'offtake'.
- The SAA shall apply these equations, and shall use the resulting $TLMO_j^+$ and $TLMO_j^-$ values in the TLM_{ij} calculation for each non-Interconnector BM Unit, from the first Settlement Period on the P278 Implementation Date.
- As now, the calculation of TLM_{ij} for a non-Interconnector BM Unit in a given Settlement Period will use either the $TLMO_j^+$ (if the BM Unit is in a 'delivering' Trading Unit) or the $TLMO_j^-$ (if the BM Unit is in an 'offtaking' Trading Unit).
- 2.2 The Lead Parties for non-Interconnector BM Units who load their TLM values from the SAA-I014 flow into their own systems (e.g to monitor/validate their Trading Charges) should not need to amend their systems as their TLM values will still be either <1 or >1 in any given Settlement Period, depending on whether the BM Unit is part of a 'delivering' or 'offtaking' Trading Unit in that Settlement Period. However, they may need to amend their advance contracts to take account of their new TLM values.
- 2.3 The BMRA uses Estimated TLMO values ($ETLMO^+$ and $ETLMO^-$) in the derived data calculations on the Balancing Mechanism Reporting Service (BMRS), because the actual metered data used to calculate TLMOs is not available in time for these calculations. BSC Section V2.6.3 allows the BSC Panel to set these ETLMO values, and in practice the Panel delegates this responsibility to the Imbalance Settlement Group (ISG). The ISG will need to amend its methodology for calculating ETLMOs to take account of the revised TLMO calculation under P278. ELEXON shall develop a revised ETLMO calculation methodology, and shall take this to the ISG for approval. This will not impact the BMRA itself, who simply uses the ETLMO values provided by ELEXON.
- 2.4 The BMRA also uses TLMs in the BMRS calculations. In principle, the BMRA should therefore amend these BMRS calculations to use TLM values of 1 for Interconnector BM Units under P278. However, the calculations concerned relate to Bid-Offer Acceptances. As there are no Bid-Offer Acceptances for Interconnector BM Units,⁷ it may be disproportionate to incur the costs of changing these calculations for no practical benefit. We therefore ask the AM/Dev and BPO/Host service providers to provide costs and lead times for P278 both with and without this BMRA element, so that the Workgroup can decide whether to include it in the P278 solution.

Equations for $TLMO^+$ and $TLMO^-$

The current and proposed calculations for $TLMO_j^+$ and $TLMO_j^-$ can be found in Appendix 1.

⁷ The BSC allows for Bid-Offer Acceptances on Interconnector BM Units; however the cross-border commercial arrangements to support them are not currently in place.

4 Likely Impacts

Impact on BSC Systems and process

BSC System/Process	Potential impact
SAA	Changes will be required to amend how the SAA systems calculate TLMs and TLMOs.
BMRA	Changes may be required to amend the TLMs used in the derived data calculations on the BMRS. BSC Agents are requested to provide costs and lead times both with and without this BMRA element, so that the Workgroup can decide whether to include it in the P278 solution.

Impact on BSC Parties and Party Agents

The BSC will no longer adjust the Metered Volumes of Interconnector BM Units for GB transmission losses through the TLM (reducing the Trading Charges of Interconnector Users and Interconnector Error Administrators). The Metered Volumes of other non-Interconnector BM Units will therefore be scaled by a greater amount through the TLM (increasing their Trading Charges) in order to still allocate the total amount of GB transmission losses in a Settlement Period.

The Workgroup's subsequent industry consultation will contain further details of the total distributional effect (movement of money) which would occur under P278.

Impact on Transmission Company

It is not anticipated that the Transmission Company will need to undertake any implementation activities for P278.

Impact on ELEXON

Area of ELEXON	Potential impact
Release Management	ELEXON will manage the implementation project.
Market Operations	ELEXON will develop a revised ETLMO calculation methodology and will present this to the ISG for approval.

Impact on Code

Code Section	Potential impact
Section T	Changes will be required to implement the solution.

Impact on Code Subsidiary Documents

CSD	Potential impact
SAA Service Description	Changes will be required to implement the solution.
BMRA Service Description	Changes may be required to amend the TLMs used in the derived data calculations on the BMRS. BSC Agents are requested to provide costs and lead times both with and without this BMRA element, so that the Workgroup can decide whether to include it in the P278 solution.

Impact on other Configurable Items	
Configurable Item	Potential impact
SAA System Documentation	Changes will be required to implement the solution.
BMRA System Documentation	Changes may be required to amend the TLMs used in the derived data calculations on the BMRS. BSC Agents are requested to provide costs and lead times both with and without this BMRA element, so that the Workgroup can decide whether to include it in the P278 solution.

Other Impacts	
Item impacted	Potential impact
ELEXON Info Sheets	Updates will be needed to the Transmission Losses Information Sheet.

Appendix 1 – Calculation of TLMO⁺ and TLMO⁻

Current equations for TLMO⁺ and TLMO⁻

The current equations for calculating the Delivering and Offtaking Transmission Losses Adjustment (TLMO⁺ and TLMO⁻), which are given in Section T2.3 of the Code, are as follows:

$$TLMO^+_j = -\{\alpha(\Sigma^+QM_{ij} + \Sigma^-QM_{ij}) + \Sigma^+(QM_{ij} * TLF_{ij})\} / \Sigma^+QM_{ij}$$

$$TLMO^-_j = \{(\alpha-1)(\Sigma^+QM_{ij} + \Sigma^-QM_{ij}) - \Sigma^-(QM_{ij} * TLF_{ij})\} / \Sigma^-QM_{ij}$$

Where:

- Σ^+ is the sum over all BM Units which are in delivering Trading Units in the Settlement Period;
- Σ^- is the sum over all BM Units which are in offtaking Trading Units in the Settlement Period; and
- All other symbols and acronyms are as defined in the Code.

For TLMO⁺, this equates to:

$$\frac{45\% \text{ of the total metered volumes of all BM Units}}{\text{total metered volumes of all delivering BM Units}}$$

For TLMO⁻, this equates to:

$$\frac{55\% \text{ of the total metered volumes of all BM Units}}{\text{total metered volumes of all offtaking BM Units}}$$



Calculation Parameters

The Transmission Loss Factor (TLF_{ij}) is fixed at zero for all BM Units.

The value of α is fixed at 0.45.

Proposed equations for TLMO⁺ and TLMO⁻

P278 requires a change to the TLMO algebra to ensure that the total volume of GB transmission losses is recovered from non-Interconnector BM Units. To do this requires excluding the Interconnector BM Units from some (but not all) of the summations.⁸

The proposed equations for calculating TLMO⁺ and TLMO⁻, which would be used if P278 is implemented, are as follows:

$$TLMO^+_j = -\{\alpha(\Sigma^+QM_{ij} + \Sigma^-QM_{ij}) + \Sigma_{(non-I)}^+(QM_{ij} * TLF_{ij})\} / \Sigma_{(non-I)}^+QM_{ij}$$

$$TLMO^-_j = \{(\alpha-1)(\Sigma^+QM_{ij} + \Sigma^-QM_{ij}) - \Sigma_{(non-I)}^-(QM_{ij} * TLF_{ij})\} / \Sigma_{(non-I)}^-QM_{ij}$$

Where:

- $\Sigma_{(non-I)}^+$ is the sum over all BM Units other than Interconnector BM Units which are in delivering Trading Units in the Settlement Period;
- $\Sigma_{(non-I)}^-$ is the sum over all BM Units other than Interconnector BM Units which are in offtaking Trading Units in the Settlement Period;
- Σ^+ and Σ^- are as defined above; and
- All other symbols and acronyms are as defined in the Code.

⁸ The only summation that still includes Interconnector BM Units is $(\Sigma^+QM_{ij} + \Sigma^-QM_{ij})$, which is calculating the total volume of GB transmission losses and therefore remains unchanged.

For $TLMO^+$, this equates to:

$$\frac{45\% \text{ of the total metered volumes of all BM Units}}{\text{total metered volumes of all non-Interconnector delivering BM Units}}$$

For $TLMO^-$, this equates to:

$$\frac{55\% \text{ of the total metered volumes of all BM Units}}{\text{total metered volumes of all non-Interconnector offtaking BM Units}}$$