

Single Electricity Market

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| Final REcommendation ReportMod\_09\_19 removal of locational constraints from imbalance pricing calculation18 April 2019 |

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Document History

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| **Version** | **Date** | **Author** | **Comment** |
| 1.0 | 18 April 2019 | Modifications Committee Secretariat | Issued to Modifications Committee for review and approval |
| 2.0 | 24 April 2019 | Modifications Committee Secretariat | Issued to Regulatory Authorities for final decision |

Reference Documents

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| **Document Name** |
| [Trading and Settlement Code](http://www.sem-o.com/MarketDevelopment/MarketRules/TSC.docx) |
| [Modification Proposal Form](https://www.sem-o.com/documents/market-modifications/Mod_09_19/Mod_09_19RemovaloflocationalconstraintsfromImbalancePricingcalculation.docx) |
| [Presentation](https://www.sem-o.com/documents/market-modifications/Mod_09_19/Mod_09_19-BOSslides.pptx) |
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# MODIFICATIONS COMMITTEE RECOMMENDATION

## Recommended for approval– Majority vote

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| **Recommended for Approval by Majority Vote** |
| Julie Anne Hannon | Supplier Member (Chair) | Approve |
| William Steele | Supplier Member | Reject |
| Cormac Daly | Generator Member | Approve |
| Sean McParland | Generator Alternate | Reject |
| Philip McDaid | Supplier Member | Reject |
| Paraic Higgins | Generator Member | Approve |
| Sinead O’Hare | Generator Member | Reject |
| Robert McCarthy | DSU Alternate | Approve |
| Mark Phelan | Supplier Alternate | Approve |
| Siobhan O’Neill | Interconnector Member | Approve |

# Background

This Modification Proposal was raised by SEMO and was received by the Secretariat on the 05th April 2019. This proposal was raised at Meeting 90 and voted on at Meeting 91 on the 18th April 2019.

Locational constraints are not considered in the ex-ante market design of the new SEM arrangements; however, the drafting of paragraph N.1 of the Trading & Settlement Code meant that these same constraints could be brought to bear on the calculation of the Imbalance Price and exert a level of influence on the Imbalance Price beyond that considered during the market design. This was most prevalent in the market on January 24th where the Imbalance Settlement Price exceeded the RO Strike Price in four Imbalance Settlement Periods.

SEMO have completed detailed analysis on key high price events since the transition to the new SEM arrangement and have concluded, following further feedback from industry and discussions with the SEM RAs, that the application of locational constraints in the Imbalance Price calculation where these same restrictions are not present in the ex-ante markets has been a contributing factor to some market outcomes.

This modification sets out to remove these specific constraints from the Imbalance Pricing calculation. For the avoidance of doubt, these constraints will still be used by the TSOs in their scheduling and dispatch processes.

To achieve this, it is necessary to address the concept of “Operational Constraints” as they appear in Appendix N of Part B of the T&SC. The modification seeks to amend the wording of Paragraph N.1 to exclude upper MW limits on the Transmission System, which under the TSC includes both Ireland and Northern Ireland transmission systems and the tie-line.

* “upper MW limit” includes any max MW thermal constraints but not min MW thermal constraints, which are effectively, must run constraints (e.g. Cork Min) or must run thermal constraints (e.g., some Dublin must runs).

“on the Transmission System” is Cork and South MW constraint and also network model DC load flow constraints, which are also upper MW constraints. This is to distinguish from MW limits that may apply for reserve reasons.

# PURPOSE OF PROPOSED MODIFICATION

**3A.) justification of Modification**

The following paragraphs explain in more detail the main justification, which can be summarised as follows:

* The market design did not foresee the inclusion of locational signals in the single imbalance price to have a significant impact on price formation;
* The locational signals in the imbalance price cannot be acted upon in ex-ante trading in a way which makes things better (by reducing congestion) and in fact it could be made worse while attempting to make it better, so the locational signal appears to have unintended consequences;
* Other units whose output is influenced by locational congestion in the network model have not been flagged to date.

During the development of the wholesale market rules, it was the position, based on the SEMC decisions and industry feedback, that any units whose output could be identified as constrained for non-energy reasons should be flagged out of the pricing process. This resulted in any possible transmission system based constraint being flagged on the units whose output is restricted by the constraint.

However, it was found that it was not possible to accurately identify which units contribute to which thermal limit constraints on the transmission network model. This is because on a meshed network every generator has some influence on every network line and without a locational signal to determine where an imbalance arises, it is not possible to determine the units which should be flagged out. Therefore, network constraints highlighted through the network model are not flagged.

For other network constraints a Transmission Constraint Group is modelled, which includes the MWR constraint on the North South tie-line and the MW Max constraints for certain locations which limit the output of units in a certain area of the system. Because of how these are modelled, it is possible to identify which units are contributing to the constraint (i.e., the list of units stated in the Transmission Constraint Group); therefore, based on the position that any actions influenced by non-energy reasons should be flagged out of pricing, these constraints were included in the list of those for whom SO Flags are calculated in pricing.

The intent of the market design for SO Flagging was to remove the influence of non-energy actions from the Imbalance Settlement Price. It should be possible for Market Participants to react to the signals provided in the imbalance price in the ex-ante markets, trading in a way which prevents the same thing happening again.

However, locational restrictions are not modelled in the ex-ante markets. As a result, it may not be possible for Market Participants to act on the locational signals in the imbalance price through ex-ante trading. It can be suggested that there is no practical means by which participants can act on this locational market signal to correct it, which would be an unintended consequence of the inclusion of this signal in the price calculation.

Based on industry feedback, discussions with the SEM RAs, we believe that the flagging of locational constraints can be removed without affecting the detailed market design. This would align with the approach taken already for the network model thermal limit constraints, where units whose output is influenced by the network model are not flagged.

Note separately that since SO Flags are an input to the methodology for determining if a unit has potential market power and therefore should be settled based on its Complex Bid Offer Data, the decision not to SO Flag for the locational constraints would have an influence on the COD used for settlement and, therefore, on Dispatch Balancing Costs.

**3B.) Impact of not Implementing a Solution**

The Imbalance Price calculation will still be subject to locational constraints with the potential for a repeat of the events where the Imbalance Settlement Prices are produced are unduly impacted by these constraints while participants are unable to react appropriately in the available trading platforms of the ex-ante markets.

**3c.) Impact on Code Objectiv****es**

This modification serves to further the following objectives by removing elements indirectly included in the Imbalance Price calculation which are directly excluded from the ex-ante wholesale market –

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| *(b) to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner:* | we believe that the removal of locational constraints will remove potential financial uncertainty which can arise when price events are driven by design elements not present consistently across the market; |
| *(d) to promote competition in the Single Electricity Market:* | the removal of these elements from the imbalance price calculation should remove any potential disconnect between the formulation of ex-ante market prices and imbalance prices, thereby removing any perverse incentives that could affect public trading; |
| *(e) to provide transparency in the operation of the Single Electricity Market:* | the undue influence of locational constraints has the potential to create imbalance prices that are not predictable by market participants and that cannot be responded to in the ex-ante markets. The removal of these elements will provide an imbalance price that participants should find more transparent; |
| *(g) to promote the short-term and long-term interests of consumers of electricity on the island of Ireland with respect to price, quality, reliability, and security of supply of electricity:* | the application of locational constraints have driven extreme pricing events which have potentially negative impacts on consumers on the island or Ireland. Their removal should see a reduction of extreme prices which will better serve the interests of consumers; |

# Working Group and/or Consultation

N/A

# impact on systems and resources

This change may be implemented by the Market Operator through a system configuration without any need for a change request to the system vendors. The choice of approach (e.g., whether changing Appendix N or the Glossary) indicates where this is a global change to how Operational Constraints are applied under the Code (which will affect all of Appendix N) or whether it is just intended to apply specifically in the calculation of Imbalance Price.

# Impact on other Codes/Documents

N/A

# MODIFICATION COMMITTEE VIEWS

## Meeting **90 – 11 April 2019**

The proposer delivered a [presentation](https://www.sem-o.com/documents/market-modifications/Mod_09_19/Mod_09_19-BOSslides.pptx) explaining the rationale for this proposal and the prudent reason for the urgency.

After the publication of high prices affecting January 24th, there were conference calls with industry as soon as January 25th to advise what drove up the prices. From these calls, SEMO committed to produce a detailed report on the event which was published on Feb 21st with a follow-up Special Topic Market Operator meeting (MOST) on Feb 27th. Following from this work and the feedback received, SEMO began a review of the imbalance price calculation through a series of workshops including the SEM RAs and the TSOs. From these, a list of design items was created for further consideration.

The proposer went through the slides noting design changes that could be considered but also highlighting what SEMO could complete in the short term. It was decided at this time to focus on what could be done quickly. The proposer confirmed that by putting this modification through it would remove the risk that local constraints can drive the price across the island.

The proposal solves one problem but doesn’t address all design items that were considered. It can be considered a step on the road to refinement, focussed on what needs to be done immediately. The key theme was that this constraint could become binding again tomorrow and have further impact on the pricing calculation.

A concern was raised that not enough supporting analysis was put forward and that the short review period left Members unable to fully assess the implications of this proposal. Concern was also raised as to whether this proposal could trigger unforeseen occurrences or implications in the market. The proposer confirmed that he could provide the data used to develop the presentation in order to facilitate further analysis from Participants as, due to time constraints, detailed analysis could not have been carried out by SEMO. This would contain five minute and half hour prices calculated as per the original rules and how they would have been determined if locational constraints were removed from the tagging and flagging process. This data would cover a period of up to 5 months. It was queried if there would be a change to the level of flagging, what would be the net effect on the Imbalance price. It was noted that some of this could and will be derived from the additional data to be provided; however, flagging and tagging information used was based on the publicly available 5min Imbalance Pricing Supporting Information Reports.

RA Member was keen to stress how concerned the RAs were that this issue remained unaddressed so far. It was advised that such an event could occur at any time and that this proposal aims to specifically provide immediate action to rectify this issue. RA analysis had also been undertaken on this data and they were satisfied that there would be no significant unintended consequences. The SEMC had been presented with a number of potential ways to address issues regarding the evolution of Imbalance Prices since Go-Llive and SEMC have endorsed the approach which this Modification is based on, in addition to a consultation process on other potential solution.

It was also noted that Dispatch Balancing Costs (and consequently Imperfection) would be expected to increase with this modification – high level analysis completed by the TSOs showed simple bids will be used more often. On the flip side, less exposure to extreme imbalance price event is expected.

It was agreed that this proposal would be discussed at Extraordinary Meeting 91 to be convened on Thursday 18th April via conference call.

## Meeting **91 – 18 April 2019**

The proposer gave an update on the supporting data that was circulated to the committee and observers who attended Meeting 90.

It was confirmed that the only question that was not addressed when supporting data was previously circulated was in relation to a number of instances of large negative values in the original prices which were not present when the proposed update to remove locational constraints was modelled. These weren’t explained at the previous meeting and an update was provided by the proposer indicating that these were the result of the replacement bid offer price having applied in the original pricing but not in the model based on the proposed modification.

An observer spoke of analysis that was carried out on the changes to 5 minute prices. They noted that they had observed a number of examples of changes in the prices where the affected locational constraints were not binding and that such changes had not been expected. The proposer stated there may be some differences in how constraints were binding and that they have not fully investigated these yet. They noted that they suspected that this was the result of knock on effects through the various pricing mechanisms and further investigation was ongoing.

There was a concern that whilst there are items still to be further investigated there is the potential for unforeseen consequences of the proposal. An additional concern was raised by a Supplier Member that the impact on prices was more pronounced than anticipated and that a lot of the changes were increases to prices. A discussion ensued around the need for more analysis on this modification to address potential unintended consequences. The RAs confirmed that the genesis of this modification was to look at implementing something that could be actioned quickly and SEMO will provide further analysis in due course. They noted that the unintended consequences of not implementing the proposal could be greater than those of implementing it which was echoed by other committee members but detailed analysis could take a long time while the risk of the event re-occurring still persists.

Discussion also took place regarding the interaction of this proposal with a wider RA consultation on some related issues with some expressing concerns that those interactions may form the basis of an argument against implementing the proposal. SEMO and the Regulatory Authorities noted that this proposal is only one of a number of potential items that will be looked at while reiterating that implementation of this proposal does not preclude consideration of any of the other options. It was also noted in this context that the Regulatory Authorities and the SEM Committee have expressed support for implementing the provisions of this proposal as a matter of urgency. It was further noted by the RAs that, in the context of the upcoming consultation, should the process/ outcome of that consultation show that there may be better ways to address the underlying issue here then as long as the underlying issue continues to be addressed then the RAs are open to alternatives arising from the consultation including the consideration of alternative mods even if it means a row-back on this particular Mod\_09\_19.

Some members reiterated that they remained uncomfortable with the approach of implementing the proposal while the unexpected price changes in the model where locational constraints were not binding were yet to be fully investigated. Following a question from a Supplier Member the RA Representative confirmed that their analysis focussed on the 24th January specifically and at a more macro level for the remainder of the data set and therefore they had not had the opportunity to identify the instances of price changes when the locational constraints were not binding. One member stated their view that since there is only six months’ worth of data since the start of I-SEM, and a majority of the prices may be subject to repricing, that further analysis was warranted. They went on to state their concerns as to where the locational signal will come from in future if the balancing market signal that the high prices observed have given in relation to generation shortfall in Northern Ireland are removed via this proposal.

The Regulatory Authorities noted that their concerns around locational signals being in the balancing market and the risks associated with maintaining the north-south locational constraint whilst acknowledging the importance of locational signals in the general sense and noting that they would continue to take this into consideration in their decision making. The RAs stated that the energy market should reflect the all-island SEM price and was not intended to represent locational issues. Locational issues do not appear in the ex-ante markets, and it was noted that the Capacity Market and Ancillary Services payment schemes were the proper mechanisms intended to reflect locational issues..

SEMO noted that they are largely agnostic to the issues involved in terms of not experiencing a direct financial impact and noted that the proposal was raised on the basis that it was fundamentally the correct thing to do and was done as an urgent proposal due to the sense of urgency communicated from Participants, the Regulatory Authorities and industry in general via disputes, queries, Market Operator User Groups and other forums.

RA Member noted that a number of Participants have strongly expressed a need for something to be done to address the pricing issues with which this proposal is concerned as a matter of urgency

The chair summarised the discussion which was noted by a number of members as a helpful and accurate summary and members agreed to move to a vote with a view also that further analysis would still be ongoing.

# Proposed Legal Drafting

As set out in Appendix 1.

# LEGAL REVIEW

# IMPLEMENTATION TIMESCALE

It is proposed that this Modification implemented as the Modifications Committee have Recommended it for Approval following receipt of the RA Decision. Please note that this parameter change can’t be forward dated and must be carried out at the exact time of the first applicable five minute run taking place. Therefore it would be appropriate that this is carried out within trading operational hours (between 07:00am and 19:00) and not at the beginning of a Trading Day.

# Appendix 1: Mod\_09\_19 removal of locational constraints from imbalance pricing calculation

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| **MODIFICATION PROPOSAL FORM** |
| **Proposer***(Company)* | **Date of receipt***(assigned by Secretariat)* | **Type of Proposal***(delete as appropriate)* | **Modification Proposal ID***(assigned by Secretariat)* |
| **SEMO** | **5 April 2019** | **Urgent** | **Mod\_09\_19** |
| **Contact Details for Modification Proposal Originator** |
| **Name** | **Telephone number** | **Email address** |
| **Brendan O’Sullivan** |  | Brendan.osullivan@sem-o.com |
| **Modification Proposal Title** |
| **Removal of locational constraints from Imbalance Pricing calculation** |
| **Documents affected***(delete as appropriate)* | **Section(s) Affected** | **Version number of T&SC or AP used in Drafting** |
| **Appendices Part B** | **Appendix N.1** | **20** |
| **Explanation of Proposed Change***(mandatory by originator)* |
| Locational constraints are not considered in the ex-ante market design of the new SEM arrangements; however, the drafting of paragraph N.1 of the Trading & Settlement Code meant that these same constraints could be brought to bear on the calculation of the Imbalance Price and exert a level of influence on the Imbalance Price beyond that considered during the market design. This was most prevalent in the market on January 24th where the Imbalance Settlement Price exceeded the RO Strike Price in four Imbalance Settlement Periods.SEMO have completed detailed analysis on key high price events since the transition to the new SEM arrangement and have concluded, following further feedback from industry and discussions with the SEM RAs, that the application of locational constraints in the Imbalance Price calculation where these same restrictions are not present in the ex-ante markets has been a contributing factor to some market outcomes.This modification sets out to remove these specific constraints from the Imbalance Pricing calculation. For the avoidance of doubt, these constraints will still be used by the TSOs in their scheduling and dispatch processes. To achieve this, it is necessary to address the concept of “Operational Constraints” as they appear in Appendix N of Part B of the T&SC. The modification seeks to amend the wording of Paragraph N.1 to exclude upper MW limits on the Transmission System, which under the TSC includes both Ireland and Northern Ireland transmission systems and the tie-line.* “upper MW limit” includes any max MW thermal constraints but not min MW thermal constraints, which are effectively, must run constraints (e.g. Cork Min) or must run thermal constraints (e.g., some Dublin must runs).
* “on the Transmission System” is Cork and South MW constraint and also network model DC load flow constraints, which are also upper MW constraints. This is to distinguish from MW limits that may apply for reserve reasons.
 |
| **Legal Drafting Change***(Clearly show proposed code change using* ***tracked*** *changes, if proposer fails to identify changes, please indicate best estimate of potential changes)* |
| N.1 For each Imbalance Pricing Period, φ, the System Operators shall use information from the most recent Indicative Operations Schedule to identify whether a Generator Unit’s scheduled output is bound by the presence of an Operational Constraint, with the exception of those Operational Constraints relating to upper MW limits on the Transmission System, and where they determine that the Generator Unit is so bound, shall set the System Operator Flag (FSOuφ) for that Generator Unit, u, equal to zero for that Imbalance Pricing Period, φ. Otherwise, the System Operators shall set the System Operator Flag (FSOuφ) for that Generator Unit, u, equal to one for that Imbalance Pricing Period, φ. |
| **Modification Proposal Justification***(Clearly state the reason for the Modification)* |
| The following paragraphs explain in more detail the main justification, which can be summarised as follows:* The market design did not foresee the inclusion of locational signals in the single imbalance price to have a significant impact on price formation;
* The locational signals in the imbalance price cannot be acted upon in ex-ante trading in a way which makes things better (by reducing congestion) and in fact it could be made worse while attempting to make it better, so the locational signal appears to have unintended consequences;
* Other units whose output is influenced by locational congestion in the network model have not been flagged to date.

During the development of the wholesale market rules, it was the position, based on the SEMC decisions and industry feedback, that any units whose output could be identified as constrained for non-energy reasons should be flagged out of the pricing process. This resulted in any possible transmission system based constraint being flagged on the units whose output is restricted by the constraint.However, it was found that it was not possible to accurately identify which units contribute to which thermal limit constraints on the transmission network model. This is because on a meshed network every generator has some influence on every network line and without a locational signal to determine where an imbalance arises, it is not possible to determine the units which should be flagged out. Therefore, network constraints highlighted through the network model are not flagged.For other network constraints a Transmission Constraint Group is modelled, which includes the MWR constraint on the North South tie-line and the MW Max constraints for certain locations which limit the output of units in a certain area of the system. Because of how these are modelled, it is possible to identify which units are contributing to the constraint (i.e., the list of units stated in the Transmission Constraint Group); therefore, based on the position that any actions influenced by non-energy reasons should be flagged out of pricing, these constraints were included in the list of those for whom SO Flags are calculated in pricing.The intent of the market design for SO Flagging was to remove the influence of non-energy actions from the Imbalance Settlement Price. It should be possible for Market Participants to react to the signals provided in the imbalance price in the ex-ante markets, trading in a way which prevents the same thing happening again.However, locational restrictions are not modelled in the ex-ante markets. As a result, it may not be possible for Market Participants to act on the locational signals in the imbalance price through ex-ante trading. It can be suggested that there is no practical means by which participants can act on this locational market signal to correct it, which would be an unintended consequence of the inclusion of this signal in the price calculation.Based on industry feedback, discussions with the SEM RAs, we believe that the flagging of locational constraints can be removed without affecting the detailed market design. This would align with the approach taken already for the network model thermal limit constraints, where units whose output is influenced by the network model are not flagged.Note separately that since SO Flags are an input to the methodology for determining if a unit has potential market power and therefore should be settled based on its Complex Bid Offer Data, the decision not to SO Flag for the locational constraints would have an influence on the COD used for settlement and, therefore, on Dispatch Balancing Costs.  |
| **Code Objectives Furthered***(State the Code Objectives the Proposal furthers, see Section 1.3 of Part A and/or Section A.2.1.4 of Part B of the T&SC for Code Objectives)* |
| This modification serves to further the following objectives by removing elements indirectly included in the Imbalance Price calculation which are directly excluded from the ex-ante wholesale market –

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| *(b) to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner:* | we believe that the removal of locational constraints will remove potential financial uncertainty which can arise when price events are driven by design elements not present consistently across the market; |
| *(d) to promote competition in the Single Electricity Market:* | the removal of these elements from the imbalance price calculation should remove any potential disconnect between the formulation of ex-ante market prices and imbalance prices, thereby removing any perverse incentives that could affect public trading; |
| *(e) to provide transparency in the operation of the Single Electricity Market:* | the undue influence of locational constraints has the potential to create imbalance prices that are not predictable by market participants and that cannot be responded to in the ex-ante markets. The removal of these elements will provide an imbalance price that participants should find more transparent; |
| *(g) to promote the short-term and long-term interests of consumers of electricity on the island of Ireland with respect to price, quality, reliability, and security of supply of electricity:* | the application of locational constraints have driven extreme pricing events which have potentially negative impacts on consumers on the island or Ireland. Their removal should see a reduction of extreme prices which will better serve the interests of consumers; |

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| **Implication of not implementing the Modification Proposal***(State the possible outcomes should the Modification Proposal not be implemented)* |
| The Imbalance Price calculation will still be subject to locational constraints with the potential for a repeat of the events where the Imbalance Settlement Prices are produced are unduly impacted by these constraints while participants are unable to react appropriately in the available trading platforms of the ex-ante markets. |
| **Working Group***(State if Working Group considered necessary to develop proposal)* | **Impacts***(Indicate the impacts on systems, resources, processes and/or procedures; also indicate impacts on any other Market Code such as Capacity Marker Code, Grid Code, Exchange Rules etc.)* |
| N/A | This change may be implemented by the Market Operator through a system configuration without any need for a change request to the system vendors. The choice of approach (e.g., whether changing Appendix N or the Glossary) indicates where this is a global change to how Operational Constraints are applied under the Code (which will affect all of Appendix N) or whether it is just intended to apply specifically in the calculation of Imbalance Price. |
| ***Please return this form to Secretariat by email to*** balancingmodifications@sem-o.com |