



Single Electricity Market

FINAL RECOMMENDATION REPORT

MOD_01_20 PMEA NO ENERGY ACTION SAME DIRECTION AS NIV
18 JUNE 2020

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Document History

Version	Date	Author	Comment
1.0	7 July 2020	Modifications Committee Secretariat	Issued to Modifications Committee for review and approval
2.0	17 July 2020	Modifications Committee Secretariat	Issued to Regulatory Authorities for final decision

Reference Documents

Document Name
Trading and Settlement Code Proposal Presentation Analysis

Table of Contents

1. MODIFICATIONS COMMITTEE RECOMMENDATION 3

 RECOMMENDED FOR APPROVAL– UNANIMOUS VOTE 3

2. BACKGROUND..... 3

3. PURPOSE OF PROPOSED MODIFICATION 6

 3A.) JUSTIFICATION OF MODIFICATION 6

 3B.) IMPACT OF NOT IMPLEMENTING A SOLUTION 6

 3C.) IMPACT ON CODE OBJECTIVES 6

4. WORKING GROUP AND/OR CONSULTATION 6

5. IMPACT ON SYSTEMS AND RESOURCES..... 6

6. IMPACT ON OTHER CODES/DOCUMENTS..... 6

7. MODIFICATION COMMITTEE VIEWS..... 6

 MEETING 97 – 20 FEBRUARY 2020 6

 MEETING 98 – 23 APRIL 2020 8

 MEETING 99 – 18 JUNE 2020 9

8. PROPOSED LEGAL DRAFTING..... 10

9. LEGAL REVIEW..... 10

10. IMPLEMENTATION TIMESCALE 10

1 APPENDIX 1: MOD_01_20 PMEA NO ENERGY ACTION SAME DIRECTION AS NIV 11

1. MODIFICATIONS COMMITTEE RECOMMENDATION

RECOMMENDED FOR APPROVAL– UNANIMOUS VOTE

Recommended for Approval by Unanimous Vote		
Paraic Higgins (Chair)	Generator Member	Approve
Andrew Burke	Supplier Member	Approve
Mark Phelan	Supplier Alternate	Approve
Sinead O'Hare	Generator Member	Approve
Rochelle Broderick	Supplier Alternate	Approve
Cormac Daly	Generator Member	Approve
Sean McParland	Generator Alternate	Approve
Ian Mullins	Supplier Member	Approve
Robert McCarthy	DSU Alternate	Approve
Eoin Murphy	Assetless Alternate	Approve

2. BACKGROUND

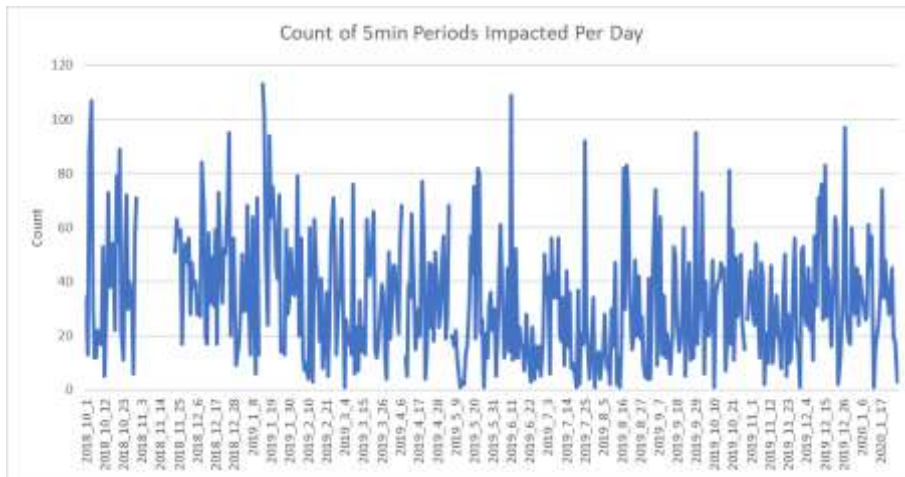
This Modification Proposal was raised by PPB and was received by the Secretariat on the 6th February 2020. The Proposal was raised at Meeting 97 and voted on at Meeting 99 on 18th June 2020.

This Modification seeks to expand the current T&SC logic for handling instances when there are no energy actions in the entirety of the ranked set to also cover scenarios where there are no energy actions in the same direction as the NIV. The Modification utilises both the PMEA and PRBO functionality to ensure imbalance price formation is reflective of the underlying system conditions and the associated price of balancing actions taken to resolve the NIV.

Due to the highly constrained nature of the SEM, instances where there are no energy actions in the ranked set have been frequently observed. The T&SC contains logic to handle these instances by setting PMEA to the price cap/price floor when the NIV is positive/negative. This functionality works well and ensures an imbalance price can be produced.

The current drafting of the algebra only requires a single energy action to be present in the stack to set PMEA. However, due to the constrained nature of the system, it is common to have ranked sets where there are no energy actions in the same direction as the NIV. Therefore, PMEA in these periods is set by an energy action in the opposite side of the stack i.e. a dec action setting PMEA when the NIV is positive and an inc action setting PMEA when the NIV is negative. This leads to prices which are not reflective of the actions on the NIV side of the stack.

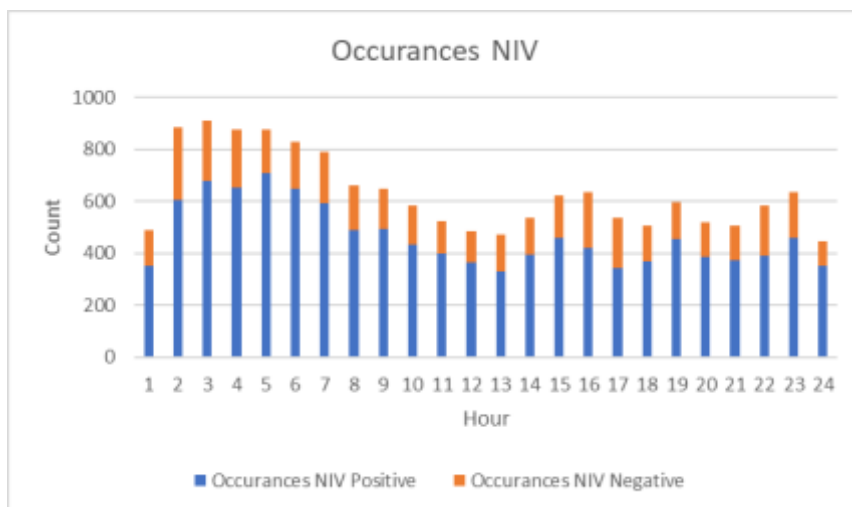
This has been an almost ever-present and volatile issue in the balancing market since go live:



Which has had a large impact on imbalance pricing:

Total IPPs impacted	11%
Total ISPs impacted	33%

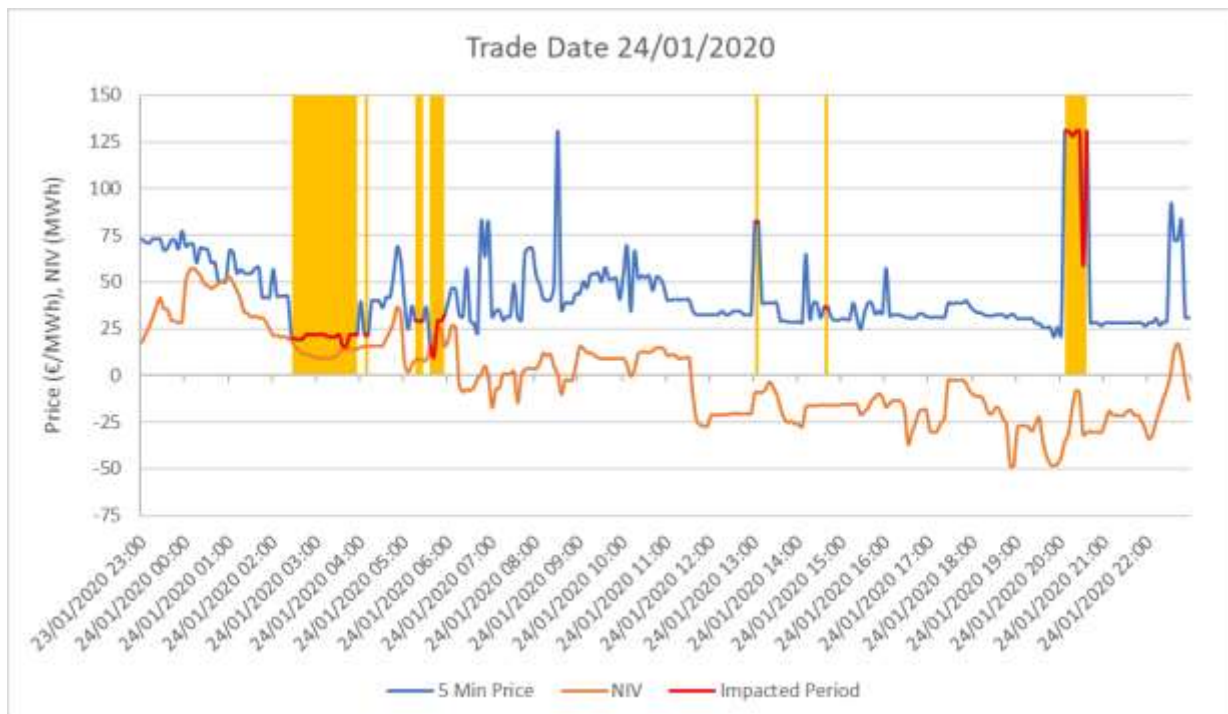
Having no energy actions in the same direction as the NIV occurs mainly during periods where the system is short (i.e. positive NIV) overnight:



However, the average price during positive NIV periods where the issue occurs is relatively static. The issue has a much bigger impact during periods where the NIV is negative, causing significant 5 minute price volatility especially leading up to the morning peak:



However, significant volatility can be introduced during both positive and negative NIV periods. Trade Day Jan 24th 2020 is an illustrative example, showing how impacted periods deviate from what would normally be expected given the bid offer stack at the time:



It is clear that a major driver of volatility on this day relates directly to having no energy actions in the same direction as the NIV and the associated handling of these instances by the current algebra to give a pricing outcome which is not reflective of the correct side of the bid/offer stack.

Extending the logic already present in the T&SC to set PMEA to price cap/floor when there are no energy actions in the same direction as the NIV is a narrow, targeted improvement to the algebra. Leveraging the replacement bid offer price functionality ensures that there are no unintended consequences on subsequent stages of the imbalance pricing process, as only the prices of the actions in the final PIIMB calculation are changing, not their volumes or tags.

3. PURPOSE OF PROPOSED MODIFICATION

3A.) JUSTIFICATION OF MODIFICATION

It is acknowledged that theoretically it is possible to have the true marginal energy action on the opposite side of the stack to the NIV. However, this Modification seeks only to ensure that the replacement bid offer price of each action is not more expensive than any action taken in the direction of the NIV. This is to reduce the impact of junk volatility due to the highly constrained nature of the power system and the resulting high level of flagged actions in the ranked set.

The proposed Modification strengthens the balance responsibility signal for Market Participants by delivering a price outcome that is reflective of the bid offer stack and underlying market fundamentals in specific instances where the flagging process has introduced unnecessary volatility.

3B.) IMPACT OF NOT IMPLEMENTING A SOLUTION

Pricing outcomes may not follow market fundamentals in periods where there are a large number of flagged actions, and will have a distortive impact on imperfections charges driven by the premium and discount components in settlement.

3C.) IMPACT ON CODE OBJECTIVES

- (b) to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner;
- (c) to facilitate the participation of electricity undertakings engaged in the generation, supply or sale of electricity in the trading arrangements under the Single Electricity Market;
- (d) to promote competition in the Single Electricity Market;
- (e) to provide transparency in the operation of the Single Electricity Market;
- (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.

4. WORKING GROUP AND/OR CONSULTATION

N/A

5. IMPACT ON SYSTEMS AND RESOURCES

N/A

6. IMPACT ON OTHER CODES/DOCUMENTS

N/A

7. MODIFICATION COMMITTEE VIEWS

MEETING 97 – 20 FEBRUARY 2020

The Proposer delivered a [presentation](#) providing a background on this Modification Proposal which seeks to amend how the Marginal Energy Action Price (PMEA) is determined when there are no un-flagged energy actions in the same direction as the Net Imbalance Volume (NIV). The Proposer noted that this happens frequently when the system is short (positive NIV). Under the current drafting of the Code only one un-flagged energy action is needed to set the PMEA regardless of the direction of the action. The proposed change would utilise the PMEA and Replaced Bid Offer Price (PRBO) logic to change pricing outcomes where there is no un-flagged action in the direction of the NIV regardless of whether or not there are un-flagged actions in the opposite direction.

The Proposer went through the slides discussing the frequency of instances where there is no un-flagged action in the direction of the NIV. They described the proposed change and presented calculations for a worked example. They noted that this Modification would expand on the application of existing PMEA functionality, which sets the PMEA to either PCAP or PFLOOR where there are no un-flagged energy actions in either direction and the NIV is either positive or negative. The proposal is that this logic will cover another set of scenarios so that the PMEA is set to either PCAP or PFLOOR whenever there is no un-flagged energy action in the same direction as the NIV.

The worked example presented by the Proposer detailed how the PMEA would change for an Imbalance Pricing Period with a negative NIV with no un-flagged actions in the direction of the NIV and a single un-flagged incremental action in the opposite direction. The existing logic resulted in the price of the un-flagged action setting the Imbalance Price as a result of becoming the PMEA and replacing the price for the all price setting actions via the PRBO logic since that price is greater than all of the prices of the flagged actions in the direction of the NIV.

The example continued by illustrating how this would differ with the proposed Modification in place since PMEA would become PFLOOR so that the PRBO logic results in the prices of the flagged actions in the direction of the NIV being used since they are greater than the PRBO at PFLOOR. In the presented example the Imbalance Price based on the current rules would have been 250 €/MWh based on the price of the un-flagged action but with the proposed change this would have been 35€/MWh based on the re-introduction of the flagged incremental actions.

The Proposer noted that the change they were seeking was targeted in a way that would only affect Imbalance Pricing outcomes where there are no un-flagged actions in the Direction of the NIV but there are un-flagged actions in the direction opposite to the NIV, noting that this meant that where there are un-flagged actions in both directions it was still possible for actions in the opposite direction to the NIV to be used in calculating the Imbalance Price.

An RA Alternate noted that there is currently a Workshop to take place reviewing compliance with the EU Electricity balancing Guideline (EBGL) and that this Modification will be discussed in terms of whether it interacts with EBGL requirements on setting the Imbalance Price. There was also discussion on what the impact of the proposal was on Imperfection costs via the interaction of changed prices with Premium and Discount payments. The Proposer noted that for their three units they anticipated a reduction in these payments based on some analysis they had completed. A TSO Alternate indicated that they would have to investigate further in order to ascertain the potential impact on Imperfections more generally. The potential for interactions with the Clean Energy Package was also noted. A SEMO Member echoed the need to fully understand the implications of the Modification Proposal. They noted that EBGL compliance could necessitate changes to the pricing logic so that it would be efficient to consider this change in that context to avoid potentially making multiple separate changes in the same area. They also expressed the view that it was important to understand the principles underpinning all of the pricing scenarios which the proposal would impact. This was in the context that the instances where there are no un-flagged actions in the direction of the NIV may be indicative of the constrained nature of the system and therefore the pricing signals which this proposal seeks to address could actually be considered appropriate. This was echoed by a number of Generators Members adding that that if this is the case and the price outcomes are

considered an issue, then the appropriate way to address them may be the introduction of more flexibility on the system and within the generation fleet in response to this signal. A Generator Member acknowledged this view and noted their concern that making this change might mean that in future, a valid price signal could be lost were there to be instances whereby there are no un-flagged actions in the direction of the NIV but multiple un-flagged actions in the opposite direction that do not set the price as a result of the proposal. An Assetless Alternate stated that they shared this concern.

A number of Members noted that whilst the Proposed Modification appears targeted and they welcomed the efforts to propose an elegant change, they would need to investigate further in order to fully understand the detail of the change both in terms of its material impact and the fundamental pricing principles with which it interacts.

Members of the Committee discussed the analysis that was required to explore the impact of the Proposed Modification on Imbalance Prices and Premium and Discount payments and the time that was needed for this. The Proposer confirmed that they had carried out some analysis on a limited range of dates. Both SEMO and the Proposer agreed to work together on this analysis and it was noted that Members should seek to also carry out some analysis to better understand the implications of the proposal. It was noted that the EBGL and Clean Energy Package should also be reviewed for any interaction. A SEMO Member suggested that, since the pricing analysis would be onerous to be carried out on large date ranges, they would seek to try to target the analysis to a broad range of different Imbalance Pricing scenarios in terms of NIV size and direction, high/low wind and load scenarios etc. as opposed to looking solely at a broad and continuous date range.

A discussion took place around the timeline for an impact assessment and system changes following this were the proposal to be pursued. A Generator Member suggested that a system impact assessment could be pursued in parallel with the further analysis in order to avoid any unnecessary delay if the proposed Modification is to be progressed. A SEMO member stated that, although they are guided by the Committees' preference they had some concerns with this. They noted that were the proposal to change before being voted, then a further impact assessment would be required and that given the current environment whereby there are so many changes being progressed this might divert vendor resources from other important work. They also noted that given the large body of work that is being undertaken that it was likely that it would take time for an impact assessment to be progressed, even if it were requested immediately, so that it may be more efficient to wait until further analysis is presented at the next meeting to further inform any potential system change, particularly given that this was unlikely to have any significant impact on the delivery timeline for any change, which would have to go through a prioritisation process for consideration in a future release in any event. SEMO provided assurance that the vendor has seen a reduction in new defects being identified which could free up more time for change requests going forward. The Committee agreed to delay pursuing an impact assessment for the time being and also to defer the proposal pending follow up actions to further investigate the implications of the change. It was agreed that to avoid further delays any analysis should be circulated as soon as available as opposed to wait until the next Modification meeting.

MEETING 98 – 23 APRIL 2020

The Market Operator Member gave a [presentation](#) on data collated over a 5 day period noting that this was shared with the Proposer, who was not able to attend, and that further data would be gathered over the next few weeks. It was also advised that they were not at a point in time where the RAs could make a decision if the Modification was compliant with the Electricity Balancing Guideline (EBGL).

The RAs provided an update on EBGL advising that they were currently working with SEMO analysts in weekly workshops on EBGL compliance. It was confirmed that the Network Code update was scheduled to be issued for July and this would show the timelines with the TSOs. There would also

potentially be a webinar or other forum on compliance work on EBGL during July based on current workshops with TSOs.

A Generator Member asked if ENTSOE were still consulting on EBGL and RA Alternate advised that they were still considering some elements. The RAs also noted that it would be a number of months before compliance analysis with EBGL would be completed and that discussions with ACER were also ongoing on the matter. A potential webinar session for the beginning of July was mentioned to provide more up to date information.

MO Member advised that, in their view, more analysis was needed before a vote could be taken on this Modification. It was confirmed that the timelines for implementation in systems are long, noting that the scope for the April 2021 release would likely be closed before this could be included. It was also stated that the next subsequent release would be October 2021, noting that it would have to go through the usual prioritisation and scoping process should the Modification to be approved. A TSO Member welcomed a larger set of data noting that based on the limited set available there would be changes to both discount and premium payments, but that there was not enough data yet available to determine a good approximation of the overall impact on Imperfections.

The Chair noted that clarification on EBGL compliance was essential in this case. MO Member gave assurance that more analysis over the next few months would also help to indicate if there was likely to be a bias between the changes in premium and discount payments to indicate whether, in aggregate, there is evidence of an increasing or decreasing impact for Imperfections based on historic trends. Assetless Member also gave support to further analysis stating it would provide clarification on compliance with EBGL and they indicated that their preference was for the proposal to be considered on the basis of the principles as guided by EBGL.

MEETING 99 – 18 JUNE 2020

SEMO provided an update on the action for this Modification noting that a spreadsheet was circulated with analysis compiled by SEMO to illustrate the potential impact on Price by this Modification Proposal. The analysis showed that the impact was relatively low and it was dependant on bid/offer acceptance capacities. SEMO advised that the analysis completed was already a sizeable undertaking and while the corresponding analysis on Imperfection (including Premium and Discount) was not completed, asked if what has been provided was sufficient.

There was an agreement from the Committee that the data provided was good and gave assurance that the Modification was doing as it was designed to do.

A Supplier Member noted that it seems from the initial data that the impact of imperfections wouldn't be big as there aren't large outliers in the Price variations. A discussion ensued around the overall impact of seasonal factors on the period analysed. SEMO advised that the main driver would be the overall increase in average price when the NIV is positive which could occur throughout the year and wouldn't be that closely linked to seasonal changes. The Proposer confirmed it provided more market balance by incentivising clarity.

An Assetless Alternate queried the implementation time for this Modification and if there was currently a backlog to implement. SEMO confirmed it was not possible to say when the release would occur but that it would most likely that the first available slot would be in Release H scheduled for October 2021. It was also noted that not enough energy actions were flagged and a question was raised on whether unflagged actions would be resolved in the meantime due to new technologies on board, such as Batteries, making the proposal redundant.

SEMO noted that there was also a further action to review the guideline piece. The RAs advised that they were continuing to attend weekly meetings to review compliance with EBGL and confirmed that decisions are evolving through ACER. Assurance was provided that this Modification can be

considered on its own merit. The RAs advised that more concrete views are available and before decisions are made on Code compliance, they would be engaging further with Market Participants.

The Chair gained agreement from the Committee that enough information was provided to proceed to a vote.

8. PROPOSED LEGAL DRAFTING

As set out in Appendix 1.

9. LEGAL REVIEW

N/A

10. IMPLEMENTATION TIMESCALE

N/A

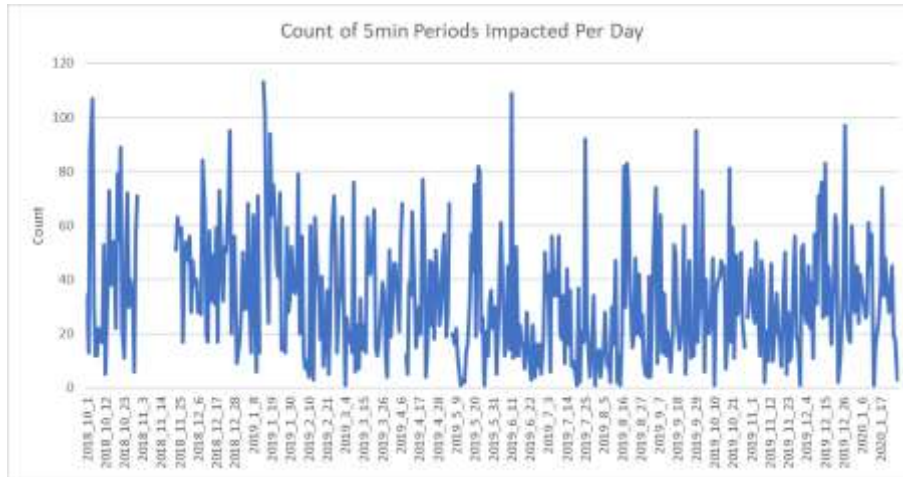
1 APPENDIX 1: MOD_01_20 PMEA NO ENERGY ACTION SAME DIRECTION AS NIV

MODIFICATION PROPOSAL FORM

Proposer <i>(Company)</i>	Date of receipt <i>(assigned by Secretariat)</i>	Type of Proposal <i>(delete as appropriate)</i>	Modification Proposal ID <i>(assigned by Secretariat)</i>
PPB	06/02/20	Standard	Mod_01_20
Contact Details for Modification Proposal Originator			
Name	Telephone number	Email address	
Joe Devlin		joseph.devlin2@powerni.co.uk	
Modification Proposal Title			
Setting the price of the marginal energy action when there are no energy actions in the same direction as the NIV			
Documents affected <i>(delete as appropriate)</i>	Section(s) Affected	Version number of T&SC or AP used in Drafting	
T&SC Part B	E.3.4.2	Version 21.0	
Explanation of Proposed Change <i>(mandatory by originator)</i>			
<p>This modification seeks to expand the current T&SC logic for handling instances when there are no energy actions in the entirety of the ranked set to also cover scenarios where there are no energy actions in the same direction as the NIV. The modification utilises both the PMEA and PRBO functionality to ensure imbalance price formation is reflective of the underlying system conditions and the associated price of balancing actions taken to resolve the NIV.</p> <p>Due to the highly constrained nature of the SEM, instances where there are no energy actions in the ranked set have been frequently observed. The T&SC contains logic to handle these instances by setting PMEA to the price cap/price floor when the NIV is positive/negative. This functionality works well and ensures an imbalance price can be produced.</p> <p>The current drafting of the algebra only requires a single energy action to be present in the stack to set PMEA. However, due to the constrained nature of the system, it is common to have ranked sets where there are no energy actions in the same direction as the NIV. Therefore, PMEA in these periods is set by an energy action in the</p>			

opposite side of the stack i.e. a dec action setting PMEA when the NIV is positive and an inc action setting PMEA when the NIV is negative. This leads to prices which are not reflective of the actions on the NIV side of the stack.

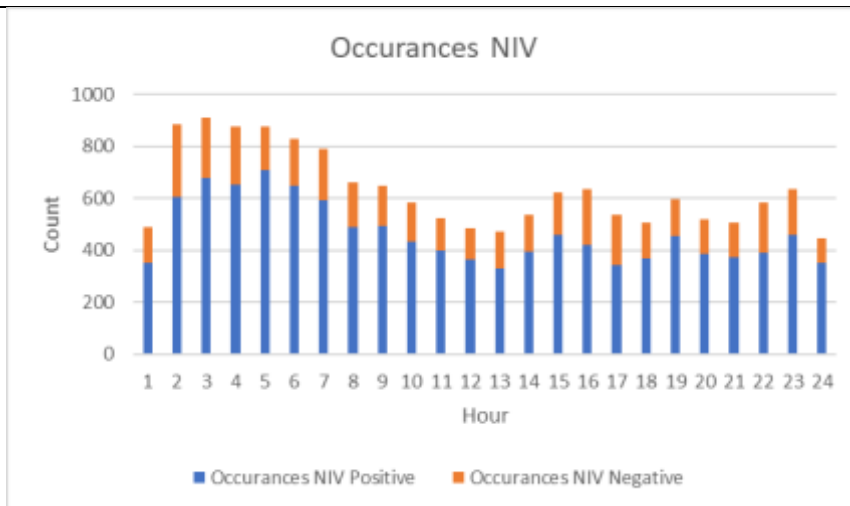
This has been an almost ever-present and volatile issue in the balancing market since go live:



Which has had a large impact on imbalance pricing:

Total IPPs impacted	11%
Total ISPs impacted	33%

Having no energy actions in the same direction as the NIV occurs mainly during periods where the system is short (i.e. positive NIV) overnight:

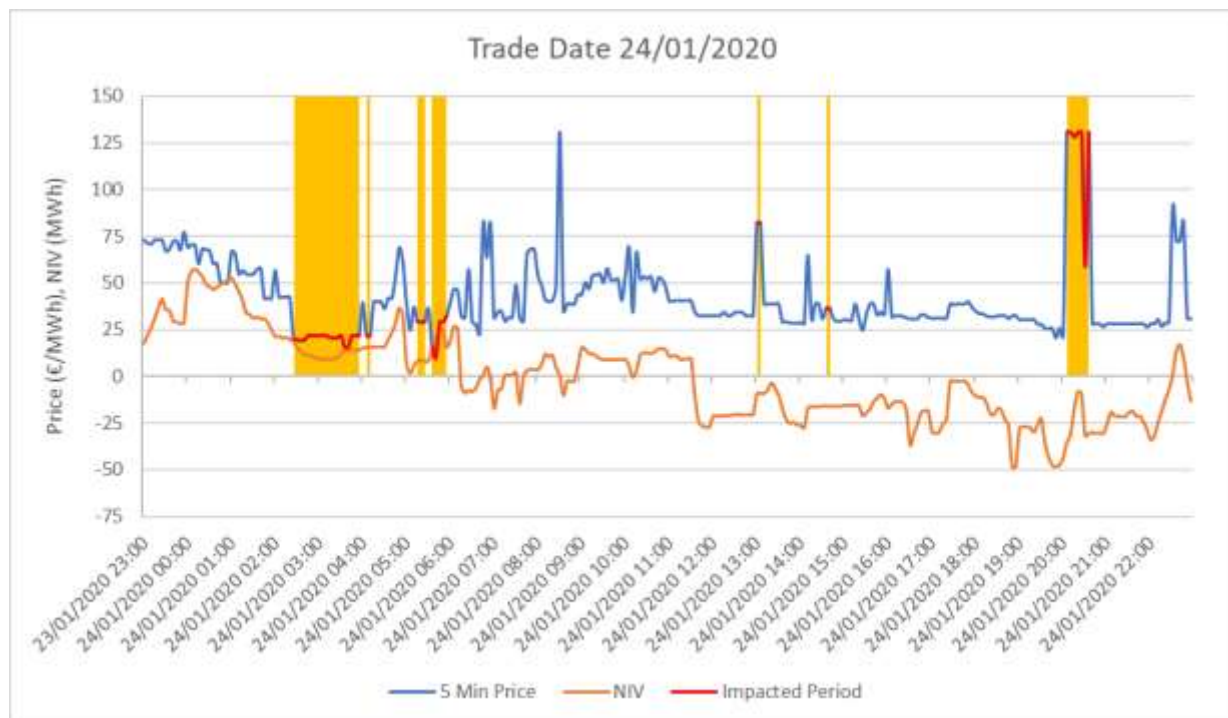


However, the average price during positive NIV periods where the issue occurs is relatively static. The issue has a much bigger impact during periods where the NIV is negative, causing significant 5 minute price volatility especially leading up to the morning peak:



However, significant volatility can be introduced during both positive and negative NIV periods. Trade Day Jan 24th 2020 is an illustrative example, showing how impacted periods deviate from what would normally be expected

given the bid offer stack at the time:



It is clear that a major driver of volatility on this day relates directly to having no energy actions in the same direction as the NIV and the associated handling of these instances by the current algebra to give a pricing outcome which is not reflective of the correct side of the bid/offer stack.

Extending the logic already present in the T&SC to set PMEAs to price cap/floor when there are no energy actions in the same direction as the NIV is a narrow, targeted improvement to the algebra. Leveraging the replacement bid offer price functionality ensures that there are no unintended consequences on subsequent stages of the imbalance pricing process, as only the prices of the actions in the final PIIMB calculation are changing, not their volumes or tags.

Legal Drafting Change

*(Clearly show proposed code change using **tracked** changes, if proposer fails to identify changes, please indicate best estimate of potential changes)*

E.3.4.2 For each Imbalance Pricing Period, φ , the Market Operator shall calculate the Marginal Energy Action Price ($PMEA_{\varphi}$) as follows:

If $QNIV_{\varphi} > 0$ and there are no $PBO_{uk\varphi}$ in the same direction as the NIV where $FIP_{uk\varphi} = 1$, $PMEA_{\varphi} = PCAP$; or

If $QNIV_{\varphi} > 0$ and there is at least one $PBO_{uk\varphi}$ in the same direction as the NIV where $FIP_{uk\varphi} = 1$, $PMEA_{\varphi} = \text{Max}(PBO_{uk\varphi} \text{ for all values of } PBO_{uk\varphi} \text{ where } FIP_{uk\varphi} = 1)$; or

If $QNIV_{\varphi} < 0$ and there are no $PBO_{uk\varphi}$ in the same direction as the NIV where $FIP_{uk\varphi} = 1$, $PMEA_{\varphi} = PFLOOR$; or

If $QNIV_{\varphi} < 0$ and there is at least one $PBO_{uk\varphi}$ in the same direction as the NIV where $FIP_{uk\varphi} = 1$, $PMEA_{\varphi} = \text{Min}(PBO_{uk\varphi} \text{ for all values of } PBO_{uk\varphi} \text{ where } FIP_{uk\varphi} = 1)$

where:

- (a) $QNIV_{\varphi}$ is the Net Imbalance Volume Quantity;
- (b) $PBO_{uk\varphi}$ is the Bid Offer Price for Generator Unit, u, and rank, k;
- (c) $FIP_{uk\varphi}$ is the Imbalance Price Flag for Generator Unit, u, and rank, k;
- (d) PCAP is the Market Price Cap; and
- (e) PFLOOR is the Market Price Floor.

E.3.4.3 For each Imbalance Pricing Period, φ , the Market Operator shall calculate Replaced Bid Offer Prices ($PRBO_{uk\varphi}$) for Generator Unit, u, and rank, k, as follows:

If $QNIV_{\varphi} > 0$, $PRBO_{uk\varphi} = \text{Min}(PBO_{uk\varphi}, PMEA_{\varphi})$; or
 If $QNIV_{\varphi} < 0$, $PRBO_{uk\varphi} = \text{Max}(PBO_{uk\varphi}, PMEA_{\varphi})$

where:

- (f) $QNIV_{\varphi}$ is the Net Imbalance Volume Quantity;
- (g) $PMEA_{\varphi}$ is the Marginal Energy Action Price; and
- (h) $PBO_{uk\varphi}$ is the Bid Offer Price for Generator Unit, u, and rank, k.

Modification Proposal Justification

(Clearly state the reason for the Modification)

It is acknowledged that theoretically it is possible to have the true marginal energy action on the opposite side of the stack to the NIV. However, this modification seeks only to ensure that the replacement bid offer price of each action is not more expensive than any action taken in the direction of the NIV. This is to reduce the impact of junk volatility due to the highly constrained nature of the power system and the resulting high level of flagged actions in the ranked set.

The proposed modification strengthens the balance responsibility signal for market participants by delivering a price outcome that is reflective of the bid offer stack and underlying market fundamentals in specific instances where the flagging process has introduced unnecessary volatility.

Consider the following notional ranked set where QNIV= -0.5 (long system):

PBOA	QBOA	FIP	PRBO as per TSC	PRBO with Mod
490	7	0	490	490
250	6	1	250	250
120	0.5	0	250	120
80	3	0	250	80
35	-4	0	250	35
30	-8	0	250	30
29	-0.5	0	250	29
27	-3	0	250	27
-2	-1.5	0	250	-2

As a generalisation, it would be expected that the price in this period would be set somewhere between €35 MWh and -€2/MWh, given the prices of the dec actions in a long system. However, PMEA in our example cannot be set in the dec price range since there are no energy action on this side of the stack.

In this instance, as per the current drafting, PMEA will be set as the minimum price of the actions with FIP=1. In this case, €250/MWh. The next stage of the pricing process then uses this PMEA as part of the bid offer replacement price functionality. Given the negative NIV and the algebra in E.3.4.3, each dec action in our notional

ranked set gets its price replaced from its original dec price to the PRBO price of €250/MWh. This results in an imbalance price of €250/MWh. Given the prices of the dec side of the stack, €250/MWh is not reflective of those actions or the state of the system at that time.

However, if the setting of PMEA was conducted in a manner which respected the direction of the NIV then the primary driver of junk volatility in the imbalance pricing process would be eliminated. Extending the already present functionality for handling instances where there are no energy actions in the entirety of the stack achieves this goal in a targeted manner, minimising the risk of unintended consequences and improving balancing market pricing outcomes.

In our example pricing period above, setting PMEA to price floor (which is what would happen if there were no energy actions in the ranked set when the NIV is negative) ensures that the prices of dec actions are retained at their original level and an imbalance price which is more reflective of system fundamentals (€35/MWh).

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)

- (b) to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner;
- (c) to facilitate the participation of electricity undertakings engaged in the generation, supply or sale of electricity in the trading arrangements under the Single Electricity Market;
- (d) to promote competition in the Single Electricity Market;
- (e) to provide transparency in the operation of the Single Electricity Market;
- (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.

Implication of not implementing the Modification Proposal

(State the possible outcomes should the Modification Proposal not be implemented)

Pricing outcomes may not follow market fundamentals in periods where there are a large number of flagged actions, and will have a distortive impact on imperfections charges driven by the premium and discount components in settlement.

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 Market Code, Grid Code, Exchange Rules etc.)

<i>Please return this form to Secretariat by email to balancingmodifications@sem-o.com</i>	