EirGrid and SONI Analysis of SEM Compliance with Commission Regulation (EU) 2017/2195 of 23 November 2017 Establishing a Guideline on Electricity Balancing

V2.0 12/02/2021

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Document Version History

Version	Date	Author	Description of Changes
1.0	22/01/2021	EirGrid and SONI	First version for submission to RAs.
2.0	12/02/2021	EirGrid and SONI	Revised version following receipt of RA comments, primarily small text changes for additional clarity. Also a section was added to provide more information on the context and relevance of the Balancing Capacity obligations.

1. Introduction

1.1 Background and Purpose of this Document

Commission Regulation (EU) 2017/2195, establishing a guideline on electricity balancing (EBGL), entered into force on 18th December 2017. Under Article 64, Ireland and Northern Ireland had a derogation on aspects of the EBGL other than those related to participation in development of terms and conditions or methodologies, until 31st December 2019.

Following entry into force, EirGrid and SONI have undertaken an exercise to analyse the compliance of the SEM arrangements, and terms and conditions, with the individual requirements in EBGL in detail, including the relevant European methodologies developed under the EBGL.

As part of this exercise, EirGrid and SONI have engaged extensively with CRU and UR, through a number of in-person and remote workshops, discussing this analysis in general and particular topics from this analysis in detail. As part of that engagement, it was communicated by the RAs to the TSOs the intention to carry out a regulatory consultation on aspects of the analysis, as to whether or not the local arrangements are compliant with the EBGL regulation. It was requested that prior to this consultation, the documents related to this analysis would be submitted by the TSOs to the RAs, including analysis of all paragraphs within EBGL, and all further detailed analysis carried out on particular topics. Following this process, this document is intended to cover the submission of this analysis requested by the RAs, to be published alongside their intended consultation.

This document is intended to summarise and outline the analysis carried out of the SEM arrangements' compliance with the EBGL. This document will focus on those topics where there is sufficient suggestion that the local approach may be different to the EBGL requirement, or it is not clear enough to conclude that the local approach is in line with the requirement without more detailed analysis. The detailed considerations and justifications for the conclusions reached are outlined, and will assist readers with their own analysis by giving details and context to understand the relationship between the EBGL and the SEM arrangements. As part of this, some topics were considered to not have conclusive outcomes from this analysis. While views from respondents are welcome on all aspects of the document, they are particularly welcome on those topics categorised as being inconclusive.

Following this consultation, it is anticipated that the SEM Committee will make a decision which would include conclusions that the SEM arrangements are currently compliant in material respects with the EBGL requirements. Where this is not the conclusion for a particular topic, it is anticipated that the decision would state where changes are needed, and if possible what those changes need to be, in order to better meet the EBGL requirements for those topics.

1.2 High Level Summary of Outcomes

Analysis of each individual paragraph in EBGL was carried out to assess the level of compliance of the SEM market arrangements with the EBGL. This analysis was carried out by specifically identifying the aspects of the local terms and conditions, (i.e. documents including the SEM Trading and Settlement Code, the TSC, Glossary and Appendices, EirGrid and SONI Grid Codes, System Services terms and conditions, Metering Codes, and other related documents) which may be relevant to each paragraph of the EBGL. Next, a brief outline of the

local approach was provided with respect to each identified paragraph of EGBL. Where it was determined from the outline of the local approach that the local arrangements met the relevant EBGL requirements, then those SEM arrangements were considered as being compliant with the relevant paragraphs of the EBGL.

In a limited number of cases where the local approaches were considered to be compliant, it was acknowledged that it was not easy to determine that the SEM arrangements meet the requirements without significant knowledge of the SEM arrangements. In such cases, a change was proposed despite the existing approach being considered compliant, as it was considered beneficial to increase transparency around compliance with requirements from the point of view of someone unfamiliar with the SEM. In some cases considered to be compliant, it was also acknowledged that compliance could be achieved in a number of ways.

Where it appeared through the outline of the SEM arrangements that the local approach may be different to the EBGL requirement, or that it was not clear enough to conclude that the local approach was in line with the requirement without further detailed analysis, then these were marked to be considered in more detail with further analysis.

Out of 400+ paragraphs analysed in the first pass, 271 were found not to be applicable directly to the SEM at this time. For instance, there are many paragraphs relevant to the process of drafting harmonised methodologies through ENTSO-E, or on requirements on developing the algorithms for the European energy balancing exchange platforms, which do not need to be directly complied with in the SEM.

Some paragraphs may also only become relevant to the SEM in the future if certain developments are pursued, but they are not relevant for compliance now. An example of this includes the implementation of the cross-zonal balancing energy platforms in the SEM. In particular, the European Commission's opinions on Ireland's and Northern Ireland's market implementation plan outlines the position that these platforms are not expected to be used in the SEM at the present time[1]. Therefore, the obligations relating to these platforms are not currently relevant for compliance, but may become relevant in the future. Another example of this is the obligations relating to Balancing Capacity, which are not considered relevant to the current SEM arrangements and are not considered further in the scope of this analysis (more information on this is outlined in Section 1.3).

Of the remaining paragraphs, the SEM arrangements were considered to be compliant with 96 of the paragraphs, and 46 paragraphs were found to warrant more in-depth discussion.

These 46 paragraphs were combined where they aligned by topic, and outlined into 23 potential issues to be discussed and analysed in more detail. These are the potential issues outlined and discussed in this document. Of these 23 potential issues, following further analysis and consideration:

- 9 were considered to be outright compliant in material respects with no change necessary;

[1] https://ec.europa.eu/energy/sites/ener/files/documents/adopted_opinion_ireland_en.pdf https://ec.europa.eu/energy/sites/ener/files/documents/adopted_opinion_ni_en.pdf

- 6 were considered to be compliant in material respects, but where small changes (e.g. additional explanation through changes to the text of the legal drafting through a modification proposal in the TSC) would add greater clarity or transparency which would be worth pursuing;
- For 4 of the issues it was not possible to determine a conclusive finding on compliance; the thinking on these topics has been included in this document and participant views are particularly welcomed on these topics; and
- There were 4 issues where it was considered that the SEM arrangements would require changes or improvements to meet the EBGL requirements.

After this careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the SEM arrangements are considered by the TSOs to be substantially compliant in material respects with the relevant requirements of the EBGL. There are a small number of areas highlighted in this document where potential uncertainty is addressed, and where changes or improvements the TSOs believe may be needed in order to meet certain requirements are outlined. However, the TSOs do not believe these to adversely affect the substantial compliance in material respects of the SEM arrangements with the EBGL requirements.

1.3 Balancing Capacity Obligations

The EBGL in general is written in the context of Balancing Capacity being procured on an ex-ante firm basis. This is reflected in the definition of Balancing Capacity in the EBGL (emphasis added):

- "'balancing capacity' means a volume of reserve capacity that a balancing service provider has **agreed to hold** and in respect to which the balancing service provider has **agreed to submit bids for a corresponding volume of balancing energy** to the TSO for the duration of the contract."

In the SEM there is a model used for procurement of System Services under a tariff based framework. An important principle for the current System Services arrangements is that service providers are paid on an availability basis, and that tariffs are put in place to incentivise providers to provide this service availability. Their availability is taken from either their final market schedule or their final physical dispatch schedule, whichever would result in the most beneficial outcome to the participant, and is settled against a pre-determined tariff. Service providers qualify onto a framework which defines the characteristics of the services, with the units' capability to provide the service and the volume of service it can provide being determined by compliance tests. All units also have Grid Code obligations obliging them to declare their true capability to provide availability for these System Services. The EirGrid and SONI Synchronous Area Operational Agreement (SAOA)[2] outlines the mapping between the DS3 System Service products and the EBGL categories, considering the aligning of the technical response timings of the product, the Full Activation Times (FAT) considered for the product, activation mode, and definition for dimensioning under the System Operations Guideline (SOGL).

[2] http://www.eirgridgroup.com/site-files/library/EirGrid/S1-SAOA-for-the-Ireland-and-Northern-Ireland-Synchronous-area-16.12.2019-(post-Title-2-approval).pdf

The provisions related to Balancing Capacity under the EBGL do not apply to the SEM, given that the DS3 System Service volumes considered are based on real-time availability and are therefore determined ex-post, they are not firm ex-ante as is the case for Balancing Capacity. Providers may trade freely in the wholesale electricity markets, are not obligated to withhold any volumes from the ex-ante energy markets in order to leave the volume to be available only to the Balancing Market ("agreed to hold…agreed to submit bids for a corresponding volume of balancing energy" from EBGL Balancing Capacity definition), and may determine their own availability. In the SEM, system security is maintained not through firm ex-ante procurement of service volumes, but rather the TSOs ensure that minimum margins for these services are maintained in scheduling forecasts and real-time dispatch at least cost in a co-optimised manner as part of the Integrated Scheduling Process, which may output suggested dispatch actions which meet the combination of service margin requirements, other non-energy system security considerations, and energy balancing needs. This process is based on each unit's submitted Integrated Scheduling Process Bids, technical capabilities, and overall system minimum margin requirements. If a dispatch instruction is required to maintain the minimum margins in real-time, the resulting volume difference versus the final ex-ante traded market position will be settled in the normal way through the Balancing Market.

Reserves are also not "exchanged" or "shared" as considered under the EBGL. As outlined in the EirGrid and SONI SAOA, there is no sharing or exchange of reserves between the two TSOs given the single Synchronous Area. While reserves are shared with Great Britain through the interconnectors, there is currently no process in place to hold capacity or change the flow on the interconnector to exchange specific reserve margins. The sharing on EWIC and Moyle is different to what is considered in the EBGL, in that there is no agreement or methodology to explicitly withhold an amount of available capacity on the interconnectors for reserves in a way which impacts on the flow results from the ex-ante energy markets. Instead, the amount of reserves counted is implicit following the ex-ante market results, in that the interconnector market schedule (which is not limited by any requirement to withhold a certain amount of capacity) may give rise to room to move in either direction, and if it does so then it may be counted as shared reserve up to a certain MW maximum amount. However, if the market schedule is such that this room to move is not available, then the reserve in the direction not available cannot be counted as shared, and there is nothing done to explicitly allocate capacity on the interconnector to ensure a certain amount of shared reserves.

Therefore, the current SEM approach to System Services differs to that considered for Balancing Capacity in the EBGL. Because of this, the obligations for Balancing Capacity under the EBGL are not currently considered applicable to the SEM. It is not currently possible to determine whether the Balancing Capacity obligations may become relevant in the future through the System Service Future Arrangements. Some procurement design options may have similar characteristics to that of the current arrangements, meaning that the EBGL obligations would remain not applicable, while other procurement options may have characteristics similar to those considered in the EBGL such as ex-ante firm commitment volumes with requirements to reflect these in energy trading, in which case the EBGL obligations may become relevant. Therefore, only the current arrangements are considered within the scope of this analysis, with the result that the Balancing Capacity requirements are not currently considered applicable to the SEM. Any potential need to comply with Balancing Capacity requirements in the EBGL in the future should be considered through the System Services Future Arrangements work.

1.4 Links to Relevant Documents

The following is a list of the relevant documents, including the Recast Electricity Regulation, the Electricity Balancing Guideline regulation, and subsidiary documents (methodologies and proposals) under the EBGL which are / may be relevant to Ireland and Northern Ireland, with a link provided to the latest publically availably version.

"Clean Energy Package" (CEP) Recast Electricity Regulation (EU) 2019/943: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN

Electricity Balancing Guideline regulation (EBGL): https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2195&from=EN

Manual Frequency Restoration Reserve Implementation Framework (mFRRIF): http://www.acer.europa.eu/en/Electricity/MARKET-CODES/ELECTRICITY-BALANCING/05%20mFRR%20IF/Action%203%20-%20mFRR%20IF%20ACER%20decision%20annex%20I.pdf

Replacement Reserve Implementation Framework (RRIF): http://www.acer.europa.eu/en/Electricity/MARKET-CODES/ELECTRICITY-BALANCING/02%20RR%20IF/Action%201%20-%20RR%20IF%20proposal%20approved.pdf

Activation Purposes methodology (AP): https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Annexes%20to%20the%20DECISION%20OF%20THE%20AGENCY%20FOR%20THE%20C13/ACER%20Decision%2016-2020%20on%20balancing%20APP-%20Annex%20I.pdf

Pricing Proposal methodology (PP): https://www.acer.europa.eu/en/Electricity/MARKET-CODES/ELECTRICITY-BALANCING/07%20Pricing/Action%203%20-%20Pricing%20ACER%20decision%20annex%20I.pdf

Imbalance Settlement Harmonisation Proposal methodology (ISHP): https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Annexes%20to%20the%20DECISION%20OF%20THE%20AGENCY%20FOR%20THE%20C15/ACER%20Decision%2018-2020%20on%20balancing%20ISHP%20-%20Annex%20I.pdf

Settlement Proposal (all TSOs intended exchanges IN, aFRR, mFRR, RR) (SP): https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Annexes%20to%20the%20DECISION%20OF%20THE%20AGENCY%20FOR%20THE%20C14/ACER%20Decision%2017-2020%20on%20balancing%20SP%20-%20Annex%20I.pdf

2. Analysis of Potential Issues

The following section outlines each potential open issue identified during the EBGL compliance analysis, including references to the relevant paragraphs within EBGL and the relevant methodologies under EBGL (in particular the Imbalance Settlement Harmonisation Proposal, ISHP, and Pricing Proposal, PP). The intention of this section is to provide an outline of the potential issue, provide a reference for the relevant paragraphs, and outline further detailed information explaining the issue. A clear statement of whether or not the issue was considered compliant in material respects, not compliant in some respect (in this analysis each instance found were thought to be relatively minor, not affecting the overall compliance in materials respects with the EBGL), or inconclusive, has been included at the top of the subsection of each topic, with the rest of each section outlining the detailed considerations and justifications for the conclusions reached. This will also assist readers with their own analysis by giving details and context to understand the relationship between the EBGL and the SEM arrangements.

Topics are grouped into a number of broad categories to highlight which issues are interlinked or aligned throughout the EBGL. Within these categories more detailed themes or topics are associated with the individual issue. The topics discussed are broadly categorised as follows:

- Pricing open issues;
- Settlement open issues;
- General terms and conditions open issues.

2.1 Pricing Open Issues Considered Inconclusive or Needing Improvements

2.1.1 Core Pricing Issues: Non Marginal Flagging Functionality

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Non-Marginal Flagging functionality discussed in this section, were considered by the TSOs to be inconclusive in the respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 30(1), 30(4);
- EBGL Article 44(1);
- EBGL Article 52(2);
- EBGL Article 55(4), 55(5), 55(6);
- ISHP Article 9(1), 9(2);
- PP Article 1(2);
- PP Article 3(5), 3(6);
- PP Article 4(2);
- PP Article 5(2);
- PP Article 6(1).

The issue which arises is due to uncertainty -with regard to the European understanding or interpretation of a “marginal” action. There are requirements in the EBGL and associated methodologies around balancing energy and imbalance prices being marginal. In the SEM the

marginal imbalance price has been considered using the general economic definition of marginal, being based on the price of the next action which could be taken to resolve an imbalance in either direction. This was included in the SEM-14-085 High Level Design decision[3]: "*4.5.14 The I-SEM will employ a marginal pricing mechanism for energy balancing actions taken through the BM. The marginal price reflects the cost for generating one more or one fewer MWh of electricity within the BM timeframe. This means that, if aggregate load on the system is higher in the BM than DAM, the incremental bid of the nextmost expensive resource (generation or DSU) used to meet demand (i.e., provide balancing energy) will set the balancing energy. If aggregate load on the system is lower in the BM than the DAM, the decremental bid of the next resource (Generation or DSU) that would be dispatched down, will set the balancing energy price. Marginal pricing is in line with the thrust of the EU target model for balancing.*". There was also wording to this effect in the Detailed Design decision paper SEM-15-065[4] section 8.5 pages 117-118: "*The SEM Committee remain of the view that "marginal" means the marginal cost of meeting the next increment of demand (up or down).*".

On the basis of these decisions, the concept of Non-Marginal Flagging was introduced to the rules for the calculation of the Imbalance Settlement Price in the SEM Balancing Market. It works on the assumption that the most expensive price of the last action on a unit which is not constrained from changing its output either upwards or downwards would be the price of the next theoretical action which would be taken. Non-Marginal Flagging is used to find the last action taken which represents the next action which would be taken and therefore represents the marginal cost. Actions on units which have their generation output against unit constraints (such as maximum generation level, minimum stable generation level, ramping up or down at ramp rate limit), or actions in price bands or orders prior to the latest order which do not represent the current output level of the unit, are flagged out as they cannot be the "next action". This is particularly important in a "unit-based" market where such individual unit constraints exist on the individual actions taken, which may not exist in "portfolio-based" markets.

However, the practice as outlined in the EBGL, and in particular the PP and ISHP requirements for how prices are to be calculated, do not seem to consider similar restrictions on bids. It appears to more simply take the most expensive action meeting the energy requirement (either highest priced or lowest priced, depending on direction) as being marginal. There is no explicit definition in the EBGL of what is meant by marginal, which would suggest that the general economic principle definition should be the one considered. Therefore, it is unclear if this practice outlined in the methodologies is intended to require that restrictions such as the Non-Marginal Flags are not considered in the calculations, or if it is simply that such restrictions are not relevant to most European jurisdictions (for example due to "portfolio-based" approaches) and therefore were not explicitly considered in the requirements.

Since certainty cannot be found in the specifics of the calculation requirements from the EBGL and methodologies, more general views are sought in terms of the impact the approach taken to

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[3] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14-085a%20I-SEM%20SEMC%20Decision%20on%20HLD.pdf

[4] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-065%20I-SEM%20ETA%20Markets%20Decision%20Paper.pdf

determining the “marginal” action has locally. For instance, whether price signals provided by this Non-Marginal Flagging functionality incentivises an intended response which matches the principles for the Balancing Market, and what respondents view as the fundamental of what should be considered “marginal” in the SEM Balancing Market.

In addition to the earlier explanation of generally what is considered “marginal” in economic theory and how this was applied to the SEM, in terms of the ability for a unit’s action to be the next action which would be taken to resolve an imbalance in either direction, the following outlines further thoughts on the impact of these flags on price signals, and the potential impact of removing them.

If this Non-Marginal Flagging functionality is removed, the price could be influenced or set by a more expensive unit which is against its max, min gen, or ramp limits, which would otherwise have not influenced the price. Some Non-Marginal flagged actions which were in-merit would be able to influence the price in both scenarios, if the flags remain or if they were removed. It would also mean that the signal of the action in the opposite direction to the Net Imbalance Volume (NIV) being the actual marginal action, when it is making room for a unit commitment block of energy, would not be as strong in the price if these flags were removed. However, if Mod_01_20 to the TSC is implemented (currently recommended for approval but pending a final decision from the SEM Committee), such a signal may not be as important in the future. This is because it would result in the price always being set based on those in the direction which corrects the net imbalance on the system (for example, a price from the set of positive bid offer acceptances if the system is short), meaning that actions in the opposite direction to that correcting the net imbalance, while influencing the price through its volume, cannot set the price.

It would greatly increase the number of actions available to set the price and decrease the number of actions “Initial NIV Tagged”. This is because all System Operator Flagged and Non-Marginal Flagged actions are taken to be initially tagged, and if Non-Marginal Flags are removed, in particular from the large number of flags which are considered for all actions prior to the latest order and price quantity pair band for a unit, this would be a large increase in the number of unflagged actions. Therefore, the removal of these flags has the potential influence both the Marginal Energy Action Price step, by having more unflagged actions available, and influence the NIV Tagging step, by having less Initially NIV Tagged actions. This greatly changes the NIV Tagging situation, and would result in more periods of needing to tag additional actions to reach the NIV, rather than current majority of periods of needing to untag actions to reach the NIV.

If the Imbalance Settlement Price were to be calculated following the TSC rules but with all Non-Marginal Flags set to a value of one (equivalent to removing these flags), it is likely to have a relatively large impact on the price. This is primarily because of the impact removing Non-Marginal Flags would have on NIV Tagging – where a much smaller number and volume of actions would be included as being considered Initially NIV Tagged. The effect would also be greater when the price is based on a weighted average approach with a larger value for the Price Average Reference Quantity, as a different set of actions would have been NIV Tagged, and therefore a different set of actions included in the final calculation of the price. The effect on the Marginal Energy Action Price would be expected to be not as large, as this is currently based on an action which is already not Non-Marginal Flagged. If Non-Marginal Flags are not included in the process, it could both increase and reduce the price in individual periods depending on the scenario.

Views of respondents are welcomed on this topic, in particular their views on what to consider a marginal action in the SEM, and the extent to which the application of Non-Marginal Flags in Imbalance Settlement Price calculation is consistent with this.

2.1.2 Less Core Pricing and Settlement Issues: Market Backup Price

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Market Backup Price discussed in this section were considered by the TSOs to be not compliant in some minor respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 44(1);
- EGBL Article 52(2);
- EGBL Article 55(1), 55(2), 55(3), 55(4), 55(5), 55(6) ;
- ISHP Article 10(1), 10(2), 10(4).

In the EBGL articles mentioned, there is a requirement for a Value of Avoided Activation to be defined in accordance with the ISHP, and to be used in the event of no activation of balancing energy in either direction. In the SEM, having a Net Imbalance Volume (NIV) of zero would be equivalent to this situation. The ISHP outlines a requirement that the inputs allowed to feed into the calculation of the Value of Avoided Activation are only those bids available to the TSO from the Manual Frequency Restoration Reserve (mFRR) bids, Replacement Reserve (RR) bids, or Integrated Scheduling Process Bids. The Integrated Scheduling Process Bids are equivalent to the Commercial Offer Data submitted by participants in the SEM, and therefore are the only bids relevant in this context

In the SEM, in the event of the NIV being 0MWh, the Market Backup Price would be used. This Market Backup Price is currently calculated as a volume weighted average of the trades cleared in all ex-ante market arrangements (Day-ahead and Intraday) within the relevant Imbalance Settlement Period. This price is used in a variety of instances where the normal Imbalance Settlement Price cannot be calculated, in addition to the one scenario of relevance to this issue where the NIV is 0MWh.

Therefore, it appears clear that the Market Backup Price as used when the NIV is 0MWh does not meet the EBGL and ISHP requirements. However, further thinking is required to determine what changes may be needed.

The current Market Backup Price approach was designed with the rationale that ex-ante prices are a reasonable proxy for the Imbalance Settlement Price, since participants are trading in those markets in part to hedge against that price. Also, efficient bidding would mean that the prices closest up and down from a balanced position would be expected to be close to the ex-ante prices which resulted in that balanced position. The difference between the outcomes under the current Market Backup Price approach and that outlined in EBGL and ISHP of using the available Balancing Market bids is not likely to be very large. The difference would also not be expected to be in any particular direction, or to result in any noticeable net benefits to participants.

There is a benefit in the current Market Backup Price approach where some form of ex-ante price would always be available to use to ensure a price is available to settle the market, following the priority order which includes the possibility of using results from prior similar days if

there are no trades available for the day in question. In cases where it is known that the Market Backup Price will be used, it is more easily forecasted when it comes from cleared ex-ante trades which have publically available data to aid with this forecast in advance of balancing gate closure times.

ISHP does not detail the exact calculation for the Value of Avoided Activation, and therefore the most appropriate approach for the SEM needs to be considered before any change is implemented. Different jurisdictions use different approaches, but we understand that one approach used generally is to take the average price of the most in-merit inc bid and dec bid away from a unit's ex-ante market position, i.e. the average of the lowest price to inc above FPN and highest price to dec below FPN.

Therefore, while it is considered that a change may be needed for the NIV = 0MWh scenario, more consideration will be needed to determine if this is the only scenario where a change would be made or if a change would be needed in all scenarios where a backup price is used, whether it would be possible to retain some form of the current Market Backup Price for other scenarios or as further backup to the Value of Avoided Activation, and the exact formulation of the Value of Avoided Activation. Views of respondents are welcomed on this topic.

2.1.3 Less Core Pricing and Settlement Issues: Administered Scarcity Price

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Administered Scarcity Price discussed in this section were considered by the TSOs to be inconclusive in the respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 44(1);
- EBGL Article 52(2);
- EBGL Article 55(4), 55(5), 55(6);
- ISHP Article 9(1), 9(2), 9(6).

The Administered Scarcity Price in the SEM arrangements could be considered an "additional component" under the EBGL / ISHP. This component acts to guarantee at least a minimum increase in the Imbalance Settlement Price in situations where the metrics related to the security and scarcity on the system are triggered. There are two primary triggers of the function. One is where reserves are depleted, where depending on the extent of depletion of certain reserves this administered price would cause the imbalance price to increase following a Reserve Scarcity Price Curve (e.g. based on the current parameter values for this function, rising to a price of at least 500€/MWh if the relevant reserves begin to be depleted, and following linear interpolation up to a price of 25% of the Value of Lost Load, i.e. at least above 3000€/MWh, if all the relevant reserves are depleted). The other trigger is if there is load shedding, where the function ensures the price at least rises to the Full Administered Scarcity Price (e.g. based on current parameter values this would be 25% of the Value of Lost Load, i.e. at least above 3000€/MWh).

The concern here is around the explicit reference in ISHP Article 9 to allowing additional components so long as the boundary conditions under EBGL Article 55 are maintained. This appears to mean that the scarcity components as explained cannot be applied when the imbalance situation is such that the system is long (positive imbalance), because the final price

must be below the weighted average of the activated negative actions according to Article 55, while the scarcity price would most likely cause the price to be higher than this. ACER also further clarified in their decision paper on ISHP the view that the final Imbalance Settlement Price after additional components must comply with the Article 55 boundary conditions[5].

These Administered Scarcity Price arrangements are important to ensure that the price reflects the cost and value of power in times of scarcity in case the normal pricing process may not reflect this. These arrangements are also important to the functioning of the Capacity Market which is structured based on "Reliability Options", where the price increase caused by the Administered Scarcity Pricing function helps tie the Capacity Market to the functioning of the energy markets, to incentivise the reliable delivery of capacity. Scarcity components in general can be driven by fundamental aspects of the power system other than the imbalance on the system, which require the price to be at a certain level to be reflective of the value of energy and scarcity in that period. In the case of Ireland and Northern Ireland, the component is driven and triggered by scarcity of reserves and of available capacity (when load shedding occurs), requiring a price signal where the price goes to a large positive value, which could occur regardless of whether the imbalance situation is negative or positive.

The Administered Scarcity Price mechanism was also considered as part of the State Aid decision by the European Commission approving the Capacity Market[6]. For example in recital 113 the European Commission states as follows:: "*Finally, the Commission welcomes that the authorities are in parallel taking steps to improve price signals in the electricity market by reforming the market framework so that prices will more accurately reflect scarcity situations. Moreover, the implementation of a system of Administrative Scarcity Pricing ('ASP') as described in recital (13) ensures that prices are high at times of scarcity and enhances the confidence of future capacity providers that their availability at times of scarcity will be duly rewarded.*", and in recital 167 they state the following: "*The Commission is of the opinion that the CRM and the I-SEM, and in particular the 'administrative scarcity pricing' referred to in recital (107), enable the market to reflect the value of electricity at times of scarcity and thus send appropriate investment signals.".* All of this suggests that the signals as they currently exist from the Administered Scarcity Price in the SEM Capacity Market design were considered important in the State Aid approval, , and therefore ways of continuing these signals should be considered.

For these reasons it seems clear that it is important to continue to have signals such as Administered Scarcity Pricing in place in the Capacity Market. This being said, it does not appear possible to do so through the Imbalance Settlement Price while continuing to be compliant with the EBGL and ISHP requirements. This issue therefore warrants further consideration as it is possible that the current approach may not be compliant in the scenario

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5 https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Individual%20decisions/ACER%20Decision%2018-2020%20on%20the%20harmonisation%20of%20the%20main%20features%20of%20imbalance%20settlement%20(ISHP).pdf

6 https://ec.europa.eu/competition/state_aid/cases/267880/267880_1948214_166_2.pdf

where the system imbalance is long (if a trigger for the Administered Scarcity Price were to apply in such a period, which while not frequent is theoretically possible), but it is not clear what alternative approach should be taken. One avenue to consider may be a separate standalone charge targeted at non-performing Capacity Market units, which does not use the Imbalance Settlement Price but applies some equivalent treatment as the Administered Scarcity Pricing would have applied, to keep the incentive on Capacity Market units. This would mean that the market signal from the Imbalance Settlement Price would meet the boundary condition requirements, and the important signal for scarcity is applied more purely as a Capacity Market mechanism.

Views of respondents are welcomed on this topic.

2.2 Pricing Open Issues Considered Compliant in Material Respects

2.2.1 Core Pricing Issues: PMEA and PRBO Functionality

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the PMEA and PRBO functionality discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 30(1), 30(4);
- EBGL Article 44(1);
- EBGL Article 52(2);
- EBGL Article 55(4), 55(5), 55(6);
- ISHP Article 9.

In conducting an analysis of the above EBGL articles, and considering the current working of the Marginal Energy Action Price (PMEA), and Replacement Bid Offer Price (PRBO) functionality, in the SEM arrangements, it was not immediately clear whether using this element of pricing functionality is compliant with the requirements. Two considerations are relevant here in particular:

- Would the fact of PMEA replacing the price of out-of-merit actions through the PRBO functionality be contrary to the requirement to set the price based on the energy actions which is present in a number of articles and the ISHP methodology; and
- Would the functionality result in a price which meets the boundary conditions in Article 55.

Both of these considerations depend on the interpretation of which actions are considered energy or non-energy.

There are a range of relevant documents in place for how energy and non-energy actions are to be determined. The primary documents are policies and regulatory decisions from the Regulatory Authorities and SEM Committee. This includes the I-SEM High Level Design

decision (SEM-14-085[7]), which guided the I-SEM Energy Trading Arrangements Detailed Design decisions. Of these detailed design decisions, the Building Blocks Detailed Design decision (SEM-15-064[8]) states that Priority Dispatch generation should not be able to set the imbalance price but instead influence the price through the calculation of the Net Imbalance Volume. The Markets Detailed Design decision (SEM-15-065[9]) states that a Flagging and Tagging methodology will be the primary means through which non-energy actions are identified. Various other policies and decisions published over the years relate to this also, in particular those related to Priority Dispatch generation including SEM-11-105[10], SEM-13-010[11], and SEM-13-012[12].

These higher level policies are then implemented with further detail by the TSOs and the Market Operator in such a way that these implementations are consistent with the relevant policies. The details of these implementations are described in various documents, including the TSC itself (in particular Section E and Appendix N for the flagging and tagging process), and operational policies, process descriptions, and methodologies from the TSOs. Other examples include the Balancing Market Principles Statement[13], the Methodology for Determining System Operator and Non-Marginal Flags[14], the Summary of TSO Interpretation of Key Issues[15], and the regular publication of Monthly and Weekly Constraint Updates.

Most of the regulatory policies and operational process descriptions and methodologies on what is considered a non-energy action are reflected in operational constraints in the scheduling systems of the TSOs. Other non-energy actions, however, are implemented in a different way, for example, redispatch of priority dispatch units which operate on the basis of the hierarchies

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[7] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14-085a%20I-SEM%20SEMC%20Decision%20on%20HLD.pdf

[8] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-064%20I-SEM%20ETA%20Markets%20Building%20Blocks%20Decision%20Papers.pdf

[9] https://www.semcommittee.com/publication/sem-15-065-i-sem-eta-markets-decision-paper

[10] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-11-105%20Tie%20Break%20decision%20paper_0.pdf

[11] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-13-010%20Final%20Decision%20-%20Treatment%20of%20Curtailment%20in%20Tie-break%20Situations.pdf

[12] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-13-012%20SEMC%20Decision%20on%20Constraint%20Groups%20V1.pdf

[13] http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V4-0-(final).pdf

[14] https://www.sem-o.com/documents/general-publications/Determining-System-Operator-and-Non-Marginal-Flags-v1.0.pdf

[15] http://www.soni.ltd.uk/media/documents/TSO%20Interpretation%20of%20SEM%20Decisions%20on%20Treatment%20of%20Price%20Taking%20Generation%20in%20Tie-Breaks%20in%20Dispatch%2008%20May%202013.pdf

outlined in the existing regulatory policy; and system operator to system operator cross-zonal trades across interconnectors taken for security or emergency reasons. These non-energy actions may also contribute to some operational constraints reflected in the scheduling systems of the TSOs, and therefore in those interactions may be treated the same as other units in determining whether they should be flagged against that constraint. However, not all of the non-energy reasons for these actions being taken can be reflected in these kinds of operational constraints, in particular where it relates to existing regulatory policies such as minimising dispatch down of renewables.

For other actions which are taken according to the economic merit order of market based units (either all units, or a subset if the solution is constrained), determining which actions are for energy reasons or non-energy reasons is complicated by the application of the central dispatch Integrated Scheduling Process in the SEM system. Under such an approach, all actions taken could be seen to contribute to a greater or lesser extent to both energy and non-energy requirements.

In the SEM, the fact that both energy and non-energy requirements need to be managed at the same time was recognised as part of the I-SEM High Level Design Decision (SEM-14-085), which stated that the single mechanism for managing all of these aspects would be the Balancing Market, and the Energy Trading Arrangements Markets Detailed Design decision (SEM-15-065) which considered further detail in how this is to be carried out and its impacts on imbalance pricing. The approach followed by the SEM of the central dispatching model Integrated Scheduling Process is allowed for under Article 14 of the EBGL, and regulatory approvals to extend the use of such an approach into the future have been provided[16].

Because energy and non-energy actions are taken on the same set of units at the same time, through the Integrated Scheduling Process allowed for under the central dispatching model, for the SEM the process which determines whether an action is finally considered energy or non-energy for setting the imbalance settlement price needs to take this additional complexity into account. The ex-post Flagging and Tagging process is the primary means for determining the extent to which the actions taken according to the merit order are taken for energy or non-energy purposes. A detailed explanation of the entire Imbalance Settlement Price calculation, and how the Flagging and Tagging process works within it, is available through the training materials on the SEMO website[17]. For the purposes of this discussion, the following paragraphs focus on the elements relevant to the potential issue with a particular emphasis on relating the local calculation approach to the European understanding of what actions are considered energy or non-energy.

Determining whether a price should be able to set the Imbalance Settlement Price and Balancing Energy Price by virtue of being taken for energy reasons, and whether the final

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[16] CRU decision letter: https://www.cru.ie/wp-content/uploads/2020/07/CRU20070-CRU-letter-to-Eirgrid-re-Central-Dispatch-Notification.pdf, UR decision letter: https://www.uregni.gov.uk/sites/uregni/files/media-files/Utility%20Regulator%20to%20SONI%20-%20re%20Central%20Dispatching%20Model%20Notification.pdf

[17] https://www.sem-o.com/documents/training/Imbalance-Pricing.pdf

https://www.sem-o.com/documents/training/TSO-Scheduling-Imbalance-Pricing.pdf

calculated price is within the bounds of what is required under Article 55, depends on a combination of three primary pieces of data used in that ex-post energy/non-energy identification process: System Operator Flags, Net Imbalance Volume Tags, and the prices used for the energy actions in setting the final price, including the Bid Offer Price, Marginal Energy Action Price, and Bid Offer Replacement Price.

Both System Operator Flags and Net Imbalance Volume Tags are part of an iterative process to determine which actions were primarily for energy purposes and which actions were primarily for non-energy purposes. System Operator Flagging identifies units which appear to be meeting binding system requirements and are therefore having their dispatch influenced at least partially by non-energy reasons. Non-Marginal Flagging identifies units and actions which cannot be considered marginal because they are not representative of the price of the next theoretical action which would be taken, either due to not being in the range of the unit's commercial submission where the unit is dispatched, or the unit cannot move further due to higher, lower, or ramping operating limits. The most expensive action which is not System Operator or Non-Marginal Flagged sets the Marginal Energy Action Price. This price replaces the bid offer price for the remainder of the calculation for any action with a price that was out of merit against this price. Net Imbalance Volume (NIV) Tagging calculates which actions meet the imbalance requirement, starting by considering all previously flagged actions as initially tagged, and then determining the final tagging of each action based on the amount needed to be untagged to meet the Net Imbalance Volume. If additional actions need to be tagged, then this is done in order from most to least expensive. If initially tagged actions need to be untagged, then this is done in order from least to most expensive.

The System Operator Flagging element identifies actions which are influenced by operational constraints, by determining where these constraints are binding units to certain output levels according to the Indicative Operations Schedule. Such information is useful in identifying potential non-energy actions, as a unit whose schedule is influenced by a non-energy constraint is likely to be non-energy. This approach captures the most information it can about the extent to which TSO operational constraints influence this output, which improves the accuracy of determining non-energy actions, but it cannot capture all potential non-energy actions, particularly where those non-energy actions are not being reflected in the TSOs' schedules through operational constraints.

Generally, NIV tagging attempts to cover the rest, through a process which ensures that there is a sufficient volume of actions in the ranked set which are untagged (and therefore can be included in the final Imbalance Settlement Price calculation) equal to the volume of the net imbalance on the system. In this process, it is assumed that the most expensive of the remaining unflagged actions are taken to meet non-energy requirements, and therefore further tagged as non-energy, or the least expensive initially flagged actions are untagged, until there is sufficient volume of untagged actions to meet the Net Imbalance Volume. This shows that in the NIV Tagging element of the process, the determining factor for being considered non-energy relates to the expense of the action in the merit order.

If an action is both System Operator Flagged and NIV Tagged, then both measures determine that the action was taken primarily for non-energy reasons, and it is excluded from setting the price.

If a unit was System Operator Flagged, and out of merit versus the marginal energy action (had a more expensive price than the marginal action), but was subsequently found to be meeting

the NIV and was therefore not NIV Tagged, it could be deemed to be primarily driven by non-energy reasons. The action would not have otherwise been taken on that particular unit if the non-energy driver had not influenced its scheduled output, but since the action was taken on that unit and the energy requirement was met through that action, another more in-merit action was not required or possible. Therefore, this action's price cannot influence the final price as it is not primarily for energy balancing purposes – even though it meets the energy requirement, the primary driver for taking that particular action was non-energy. However, all non-NIV Tagged actions are included in the final price setting calculation. Therefore, that action's price is replaced with that of the price of the marginal energy action to remove the influence of the price of the non-energy action. There does not appear to be anything in the EBGL or the methodologies which would mean replacing the price of the non-energy action for the purposes of price setting would cause an issue with compliance, as EBGL covers requirements for energy actions.

A previously SO-Flagged action which was in merit and not NIV Tagged could be deemed to be primarily driven by energy reasons, and therefore its own price can be allowed in setting the marginal price of balancing energy. The action on the unit was identified as having met a binding operational constraint, but because the price of the action is less expensive than that of the marginal action which was not meeting a system operator constraint, even if that operational constraint was not binding then that action would still have been taken anyway to meet the energy requirement.

In replacing the price of out-of-merit volumes with the marginal price and including them in the average, this makes the calculated price move more towards the marginal price when calculating a weighted average than if only the volumes and prices of the actions which were found to be energy and in-merit were used in the calculation. Therefore, the requirements of Article 55 would be met in all situations, i.e. that the price should be:

- Greater than the weighted average price of all energy actions in the ranked set if the system is "short"; or
- Less than the weighted average price of all energy actions in the ranked set if the system is "long".

This would be true whether:

- A marginal price approach is taken, with a smaller value for the Price Average Reference Quantity parameter; or
- If the "volume weighted average of the energy action prices", considered in Article 55, only considers all, or a subset, of the volumes of in-merit actions, with a larger value for the Price Average Reference Quantity parameter.

In Appendix A, a number of simplified examples are outlined to explain how this approach in the SEM could be considered compliant with the Article 55 boundary requirements.

This discussion outlines how the SEM arrangements to determine if actions are considered energy or non-energy in the context of setting the final imbalance price relates to the EU requirements. The SEM approach appears to be compliant in material respects with the EBGL and methodology requirements, in particular with the Article 55 boundary requirements, and there does not appear to be an issue with replacing the prices of non-energy actions given that there is only reference to the requirements for the prices of energy actions. The following is a

summary of the interpretation of which actions are considered energy or non-energy in the SEM:

- All actions in the ranked set which are taken according to a normal market-based common merit order approach, which are in the direction of the NIV, which are not NIV Tagged, and which are in-merit against the marginal energy action price, are considered energy. All other actions are considered non-energy.

While this approach to determine which actions are energy or non-energy is considered compliant in material respects, there may be other approaches which would also be compliant with the same requirements of EBGL, in particular given that the primary requirements for the detailed outcomes of the imbalance price in Article 55 are only a lower or upper boundary, not an exact value. Views of respondents are welcomed on this topic.

2.2.2 Core Pricing Issues: 5 Minute versus 30 Minute Periods

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the calculation on a 5 minute basis vs a 30 minute basis discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 30(1), 30(4);
- EBGL Article 44(1);
- EBGL Article 52(2);
- EBGL Article 55(3), 55(4), 55(5), 55(6);
- ISHP Article 9(1), 9(2), 9(3), 9(5).

In the EBGL and methodology articles, the Imbalance Settlement Period is the only period mentioned for the requirements on calculation of the Imbalance Settlement Price or in meeting the requirements for the outcome of this price, such as the Article 55 boundary conditions. The Market Time Unit is mentioned in documents with reference to the balancing energy platforms, which suggests there can be differences between the duration of the periods for the products in those platforms and the Imbalance Settlement Period. In the SEM, the Imbalance Settlement Period is 30 minutes, and the prices submitted by a participant are relevant to an Imbalance Settlement Period.

However, the SEM arrangements for calculating the Imbalance Settlement Price have two separate steps. The calculations considering the ranked set of actions, flagging and tagging to determine energy actions, determining the marginal energy action price, and calculation of a final price considering the Price Average Reference Quantity, is carried out on a 5 minute period basis. All of the information required for this process is either input on a 5 minute period basis (for instance this granularity of information on system constraints is available for the flagging process), or is calculated to fit the 5 minute period (for instance the volumes of actions taken is calculated based on the Physical Notification and profiles representing each instruction’s orders within that period). This results in an Imbalance Price for each 5 minute Imbalance Pricing Period. In order to have a price for the 30 minute Imbalance Settlement Period, a simple average of the prices calculated for each of the 5 minute periods within the relevant half hour is taken as the final Imbalance Settlement Price.

It is not immediately obvious if this approach meets every detail of the requirements of the EBGL and methodologies. However, it is believed that the 5 minute calculation periods allow for a more accurate representation of what is happening on the system in those periods than calculating over a larger granularity period, and best meets the principles of the EBGL for providing an economic price signal, in particular when considering Articles 30 and 44. Within those 5 minute periods the SEM calculations follow the approaches outlined in the EBGL and methodologies and meet the detailed requirements.

Each input to the half hour average price is providing a signal of what happened in each of the five minutes over the half hour. The strongest and most persistent signals will influence the price more, weaker or short lived signals will influence the price less, and no one signal from any individual five minute period can dominate the entire price. The overall effect is averaged out in a similar way to the metered quantity at the Imbalance Settlement Period granularity, where balancing actions across the thirty minute period may have been different but are settled as one imbalance volume. The averaging of 5 minute periods over the half hour ensures that the principles that “imbalances are settled at a price that reflects the real time value of energy”, and that the imbalance price reflects the imbalance situation, are upheld.

If calculating prices were to be carried out only on a 30 minute period basis, some relationship between the 5-minute System Operator Flags and Non-Marginal Flags to what should be assumed to apply over the whole half hour would be needed. Also, an action with a small volume and/or short duration could set the price for the entire half hour, at a relatively high or low level, despite not being representative of the imbalance situation over the whole period, or could end up not influencing the final price at all despite being representative of the imbalance situation in at least some of the period.

Other jurisdictions mitigate the effects of shorter duration actions having undue impact over the entire 30 minute price through functionality such as Continuous Acceptance Duration Limit (CADL) parameter in the GB arrangements, a parameter which prevents actions without sufficiently long continuous duration within the half hour from setting the price.

In terms of balancing energy pricing and settlement, in theory it would be possible to settle balancing actions in smaller granularity periods (e.g. actually at the 5 minute period basis rather than the current 30 minutes needed for imbalances), and indeed this approach is sometimes taken in the EBGL arrangements, such as settlement of cleared volumes from the balancing energy platforms for aFRR, mFRR and RR. However, in the context of the SEM and its Integrated Scheduling Process Bids, this would remove the strong economic signals from creating a relationship between balancing actions and imbalances, coupling the imbalance price to the balancing energy prices of actions. This would move away from the settlement principles set out in Article 44 of EBGL which establishes a number of general principles which shall govern settlement processes. These specific obligations with respect to settlement processes include: the obligation to establish adequate economic signals which reflect the imbalance situation (EBGL Article 44(a)); on avoiding distorting incentives (EBGL Article 44(f)); to support competition among market participants (EBGL Article 44(g)); and to ensure financial neutrality of the TSOs (EBGL Article 44(i)). For these reasons, the Market Time Unit for Integrated Scheduling Process Bids is aligned with the Imbalance Settlement Period of 30 minutes.

Having all calculations determined on a 30 minute period basis would result in a loss of more detailed and accurate pricing signals available from an averaging of the 5 minute periods in each half-hour period, and would result in a move further away from, or potential non-

compliance with, the settlement principles detailed in Article 44 of the EBGL. The specific obligations for price determination are met through the calculation of the imbalance price for every 5 minute period, which are then averaged in each half-hour. Based on these reasons, the relevant local arrangements in operation in SEM are considered to be compliant in material respects.

2.2.3 Less Core Pricing Issues: Congestion and Price Setting

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning congestion and price setting discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 30(1), 30(4);
- EGBL Article 44(1);
- EBGL Article 52(2);
- PP Recital (5);
- ISHP Article 9(3), 9(5).

There are references in the EBGL and the methodologies to preventing certain actions from being able to set the balancing energy and imbalance prices. In particular, EBGL Article 30(1)(b) requires that actions taken for internal congestion reasons shall not set the marginal price of balancing energy, which is also mentioned in PP Recital (5). The Flagging and Tagging methodology is the primary means by which non-energy actions taken for system reasons are identified in the price setting process. The System Operator Flagging step does not consider flagging in regard to internal congestion, for a combination of:

- Practical inability to do so using a network model (as was discussed in detail during the Rules Working Group process of the I-SEM project), and
- Due to a number of fundamental reasons to prevent distortions to price setting (as was considered in detail for Mod_09_19 where locational-based constraints were removed from the Operational Constraints considered for System Operator Flagging).

Initially, given that System Operator Flagging does not consider internal congestion, this may appear to be an issue. However, the NIV Tagging step would result in out-of-merit actions taken for reasons which cannot be identified as being needed for any particular non-energy reasons through System Operator Flagging, including for internal congestion reasons, being removed from being able to set the Imbalance Settlement Price. If an action taken for congestion reasons also happened to be in-merit when considering energy actions, then this action can be considered primarily for energy balancing reasons (i.e. would have been taken anyway in the economic merit order, and just so-happened to relieve a congestion issue when it did so). Because it is considered energy balancing, no mechanism for identifying it as a non-energy action would be required, and therefore not having System Operator Flags or NIV Tagging apply to it can be considered compliant in material respects. This means that there is a mechanism for removing the influence of these actions from setting the price, and since there is no specification from the EBGL or methodology requirements of how such actions must be treated, having a mechanism which has this result is seen as sufficient and it is considered that the SEM arrangements are compliant in material respects in this regard.

2.2.4 Less Core Pricing Issues: Pricing Parameters

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the pricing parameters discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 30(1), 30(4);
- EBGL Article 44(1);
- EBGL Article 52(2);
- EBGL Article 55(4), 55(5), 55(6);
- ISHP Article 9(1), 9(2), 9(3), 9(4), 9(5).

The articles require reflection on the appropriateness of the use of the pricing parameters De Minimis Acceptance Threshold (DMAT) and Price Average Reference Quantity (QPAR).

The DMAT functionality in the SEM, which is similar to functionality in other jurisdictions (in particular the GB arrangements) removes actions whose volumes are below a very small threshold from the ranked set included in setting the Imbalance Settlement Price. There is nothing explicit in the EBGL or methodologies which either mentions its use or requires it not to be used, and therefore it is uncertain how and whether it can be used within the general framework of the requirements. In general, all actions taken by TSO for energy reasons need to be included in setting the Imbalance Settlement Price and balancing energy price.

However, the calculation of volumes for actions in the SEM is quite different to how it is done elsewhere. In other jurisdictions, and as described in the proposals for the design of cross-zonal balancing platforms, the approach is based on the clearing of volumes of bids, which would then be followed by the TSOs or the units themselves dispatching to attempt to provide that cleared volume. In the central dispatch Integrated Scheduling Process of the SEM, the TSOs issue dispatch instructions which must be followed to the units. After the fact the volumes which arise from the detailed technical data and instruction profiles representing those instructions are calculated. These profiles operate at a much higher level of granularity than considered in the balancing platforms (minute-by-minute differences between Final Physical Notification profile and Instruction Profile, vs. 15 minute granularity block volumes). In the balancing platforms, there are also technical requirements including a minimum bid granularity of 1MW, which does not exist in the SEM where the bids can be considered with volume values up to three decimal places, as can Physical Notifications and Instruction Profiles. This means there is a much greater potential for volumes to arise which are not intentionally for balancing energy purposes in the SEM arrangements than in other jurisdictions, where a mechanism such as the DMAT may be needed in the SEM while it may not be considered elsewhere.

For QPAR, the difficulty arises with this because of the Imbalance Settlement Price's use as both the price for imbalances and the balancing energy price for actions taken (these can be different prices, as is the case in a number of other European jurisdictions). From the ISHP, and from Article 55 of the EBGL, the Imbalance Settlement Price can use a weighted average approach, using any of the volumes and prices from the accepted Integrated Scheduling Process Bids, and as long as the Imbalance Settlement Price is greater than (for negative imbalances) or less than (for positive imbalances) the average price considering all volumes, then can be considered compliant in material respects. Considering QPAR functionality includes a subset of actions, which at most will include all volumes for large values of QPAR, and can

then include a smaller number of volumes which are closer to the marginal action, or just the marginal action for very small values of QPAR, then this should always be ok from Imbalance Pricing point of view.

For balancing energy pricing, in general all energy actions should be settled paid-as-clear, at the marginal price, which is the highest or lowest priced energy action (in the case of the SEM, after determining what actions are predominantly for energy purposes, primarily via the flagging and tagging process). If a larger value for QPAR results in a price which is based on an average price which does not equal the price of the marginal energy action, then the energy actions with prices that are now considered non-marginal against the new average price would be paid-as-bid rather than paid-as-clear, in order to ensure cost recovery.

If it were thought necessary, it is possible to completely remove the potential influence of these parameters by setting them to particular values. For the DMAT, a value of zero would remove its influence (i.e. no actions would be removed from the ranked set). For the QPAR, a very low value which is lower than the lowest expected volume of an action in the ranked set would ensure only the single most marginal action would ever be included in setting the final price. Therefore, the rules can be considered compliant in material respects, where with various values for the parameters they meet the requirements as discussed. Any nuance in whether or not a particular value for the parameter correctly meets both the European requirements and the local considerations (such as the need to have parameters to manage outcomes such as volatility which impact on the efficient price signals) can be taken during the parameter setting process.

Based on this, despite the initial appearances of a potential issue, it is considered that the SEM arrangements are compliant in material respects in this regard.

2.2.5 Less Core Pricing Issues: Imbalance Positive and Negative Sign Convention

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the imbalance positive and negative sign convention discussed in this section were considered by the TSOs to be compliant in material respects, but where a change to the TSC would be useful for clarity, as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 52(2);
- ISHP Article 8(1), 8(2);
- ISHP Article 9(5).

The ISHP outlines that a negative total system imbalance volume means more positive (incremental) actions have been taken than negative (decremental) actions, which ISHP considers a negative imbalance scenario, i.e. when the system is “short”. A positive value for total system imbalance volume represents a “long” system. In the SEM, the variable used to determine the direction of imbalances on the system is the Net Imbalance Volume (NIV), which is calculated based on the net of the actions taken. Therefore the sign convention of the NIV is the opposite to what is considered in the ISHP’s total system imbalance: e.g. when the system is “short” and more positive actions have been taken than negative, the NIV is positive, while under the ISHP, the imbalance represented by this net positive volume of actions taken would be a negative imbalance volume.

Despite this, the outcome of using the NIV as it is currently designed is the same outcome intended in the ISHP. The SEM arrangements can be considered compliant in material respects in this regard, i.e. when the system is “short” the Imbalance Settlement Price is set considering positive actions taken with the most expensive being the highest prices, and when the system is “long” the price is set considering negative actions taken with the most expensive being the lowest prices. Therefore, no change would be needed to the definition of the NIV or to pricing rules or systems to create the correct outcome. However, for stakeholders from jurisdictions where the value used for establishing the direction of system imbalance uses the opposite sign convention, the results using the NIV may appear confusing. Therefore, while the current approach can be considered compliant in material respects, introducing something which explains that the value of the NIV is the same as what is considered in the ISHP but with the opposite sign would increase transparency of the arrangements.

Respondents’ views are welcomed with regards to what new terminology could be introduced for this increased transparency. For example, a term similar to that in ISHP could be defined, “Total System Imbalances”, with a paragraph in the interpretation section of the TSC which states that the Total System Imbalance referred to in European regulation is equal to the NIV but with the opposite sign. This would allow for the NIV to continue being used as-is, and understanding of what this means in the European context to be understood through direct reference to the ISHP terminology.

2.3 General Terms and Conditions Open Issues Considered Inconclusive or Needing Improvements

2.3.1 Governance and Changes: Modifications Processes

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the modifications process discussed in this section were considered by the TSOs to be inconclusive in the respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 4(1);
- EGBL Article 5(1), 5(4);
- EGBL Article 6(3);
- EGBL Article 10(1), 10(2), 10(5), 10(6).

The potential issue arising from these articles is around the interpretation of the local modifications processes, specifically whether these processes constitute a “public consultation” as required under EBGL for proposing or amending terms and conditions. If they do, then it needs to be determined if it would meet the timelines required by the EBGL, which require a minimum of one month of public consultation for proposing and amending these terms and conditions. If this is not the situation, an additional consultation step may need to be included in the local modifications processes.

The TSC and EirGrid and SONI Grid Codes outline the procedures and rights for raising amendments to the local Terms and Conditions under each separate set of arrangements. Each consists of a step involving a panel from industry representatives, with sufficient time for industry review and opportunities to comment and shape the proposal. For the TSC, this includes:

- Publishing the proposal a number of weeks before a panel meeting;
- The meeting of the panel itself, which includes opportunities to discuss, and vote on approving or rejecting the proposal, suggesting changes, or establishing a working group to further work on the proposal;
- Drafting of minutes and final recommendation reports which can be reviewed and updated by industry representatives; and
- Ultimately a decision from the SEM Committee, which includes the possibility of sending the proposal back into the process to be further developed.

The DS3 System Services Protocol – Regulated Arrangements document states in Section 2 that changes to the document must be done with industry consultation, to a certain timeline, and be approved by the RAs. Therefore, while the process steps are not as explicitly laid out as in the other rules documents, so long as the required consultation process is public and lasts at least one month then the EBGL requirements would be met. The potential issue seems to be only with the TSC, and the respective EirGrid and SONI Grid Codes.

The timelines are not explicit in the various codes for all of their steps, and where they appear, not all deadlines are strict. The typical timelines of a TSC modification can be taken as an example to explore whether the process could be considered to have at least one month of public consultation. In Agreed Procedure 12 for Modifications Committee Operation, the following timelines can be estimated for the normal process (acknowledging the possibility of the progression of a modification under a speedier and more challenging timeline where a modification proposal is considered to be urgent by the Regulatory Authorities as outlined in TSC paragraph B.17.16.6):

- 2.3.6 Minutes of Meetings, has a requirement to circulate draft minutes within 5 Working Days (WD) of meeting (or 2 WD if emergency meeting), giving 5 WD for comments, then taking on board the comments and publishing within 2 WD;
- 3.1 procedural steps for Submission and acceptance of a New or Revised Standard Modification Proposal
    - 2. Send modification form at least 10 WD before the meeting at which it is to be considered;
    - 6. Publish it to the website;
- 3.3 procedural steps for ordinary meetings of the Modifications Committee
    - 1. Circulate agenda at least 5 WD before meeting;
    - 14. Finalise Final Recommendation Report and submit to RAs (“In accordance with Secretariat timetable”, under TSC B.17.14.5 “At the Committee Meeting where it first considers a Modification Proposal, the Modifications Committee may decide that the Secretariat should prepare the procedure and timetable to be followed in making a recommendation in respect of such Modification Proposals.”. Since the minutes are finalised for publication within 7 WD of the meeting it would be reasonable to expect that the Final Recommendation Report wouldn’t be complete until after that. There would normally be a time given for the committee to review the Final Recommendation Report before it is sent to the RAs. The time can follow anything decided in the timetable, but optimistically say 5 WD following the minutes being finalised for the Final Recommendation Report draft to be completed, then another 5 WD for the committee review before sending to the RAs).

- 15. RAs make determination on the Final Recommendation Report, either to reject, approve, or request changes, within 5 WD of receipt of modification Final Recommendation Report.

With all these timelines, the likely minimum time for a TSC modification to be considered in the public sphere is: on website at least 8 WD before meeting, then the day of the meeting 1 WD, then minutes to the meeting available by 7 WD after meeting, then FRR optimistically by 5 WD (but likely longer), then 5 WD for committee to review the FRR, then 5 WD for decision letter from RAs. 8 + 1 + 7 + 5 + 5 + 5 = 31 working days, meaning over a month in calendar dates. Even if the 5 days FRR drafting and 5 days FRR review were extremely contracted into the minutes stage, it would be 21 working days, meaning over 4 working weeks. Even though there is scope and flexibility for a quicker turnaround, the normal turnaround would be greater than a month. Therefore, if the TSC modifications process is found to be a "public consultation", it could be seen to meet the requirements under Articles 4 – 7 and 10 of EBGL. It is less certain how the processes in the EirGrid and SONI Grid Codes should interact with this, given that the EBGL is not relevant to the majority of the Grid Code aspects, where it is only relevant for a relatively small number of the Operating Conditions and Scheduling and Dispatch Code aspects.

The standard approach in some other European jurisdictions is to hold an explicit month long public consultation, where a proposal for an amendment to rules is published on a website such as the TSO's, and all stakeholders are given one month to respond with their views. This much more clearly matches with the EBGL requirements for public consultation, and therefore may be an option worth considering in the SEM if it is not considered that the current modifications processes sufficiently represent public consultation of amendments to terms and conditions. If an explicit additional public consultation step were to be added to the current process, it may be best to do so when the legal text changes are as near final as possible, i.e. at Final Recommendation Report stage. However, this may have the effect of delaying the implementation of rules modifications. Where these are implemented through system changes, this may not make much difference as the timelines for systems changes are normally a number of months following the decision on a modification. However, for modifications which would normally be able to enter into force and be implemented immediately, this would delay their entry into force by over one month, as further time is needed to consider the consultation responses in potential changes to the final form of the modification. Whether or not an additional month needs to be added to the quicker processed allowed for through urgent proposals and emergency meetings also needs to be considered.

Following this analysis, there does not appear to be a conclusive approach to compliance, rather there appears to be two options available:

- Add an explicit month of public consultation after the Final Recommendation Report has been drafted and before the report has been submitted to the RAs (with potential for flexibility in the case of urgent proposals to be determined on an ad-hoc basis), for a Trading and Settlement modification. EirGrid and SONI Grid Code modifications are seen as not relevant for this EBGL requirement; or
- Interpret that the current modifications processes are sufficient to meet the public consultation requirements of the EBGL, and no changes needed.

Views of respondents are welcomed on this topic.

2.3.2 Governance and Changes: General Governance of Terms and Conditions Proposal

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the general governance of the Terms and Conditions Proposal discussed in this section were considered by the TSOs to be inconclusive in the respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 4(1);
- EGBL Article 5(1), 5(4);
- EGBL Article 6(3);
- EBGL Article 10(1), 10(2), 10(5), 10(6).

The consultation on the proposal for terms and conditions under Article 18 of EBGL[18], which mapped requirements for terms and conditions to references in the relevant SEM terms and conditions documents, outlined a proposal that the ongoing maintenance for this proposal would be managed through a modification to the TSC to incorporate it as an appendix. However, following further discussion as part of this general compliance analysis, another option of considering a standalone document was considered as potentially appropriate, in particular since it references a number of documents outside of the TSC framework. This is the approach taken in other similar local documents required to be created under European Guidelines, such as the Synchronous Area Operational Agreement under the System Operations Guideline. Therefore, both options are explained in this section in more detail (with similar wording used in the final Article 18 terms and conditions proposal submitted to the RAs).

It is important to ensure continued consistency between local terms and conditions and the EBGL. There are two potential options for how this can be done, both of which are included here for consideration:

- Creating a document, based on the proposal submitted, with an obligation to maintain this document coming from the TSC, e.g. like the requirement to publish and maintain the “Methodology for determining System Operator and Non-Marginal Flags” document;
- Incorporate the mapping directly into a local rules document, such as the TSC, e.g. like an “Appendix P”.

Under the first of these options, it would still be desired to have an obligation placed on the Market Operator or TSOs in a local document. This could be achieved by introducing a paragraph into the TSC. The wording of this paragraph could be similar to that of Appendix N.4, but with additional requirement on the Market Operator or TSOs to update the document where changes to the EBGL or its methodologies, or modifications to the relevant local Terms and Conditions documents, require updating of mapping requirements. Legal drafting of the TSC could also be modified to require that Parties to the TSC have regard to the EBGL and / or the specific local document when raising TSC Modification Proposals. The process for updating and publishing the local document in question could be flexible, with an overall TSC requirement that

[18] http://do-ccs-app10/site-files/library/EirGrid/EBGL-Article-18-Local-Terms-and-Conditions-Proposal.pdf

the Market Operator or TSOs endeavour to maintain an up to date version of the document with ad-hoc updates and publishing as required and / or that the Regulatory Authorities monitor the update of the local document as required. Any governance arrangements including any mechanism for changes of that document should be self-contained within that local document and include the following without limitation:

- Process for participants raising their views of changes they believe are needed;
- Process and timings for changing (or rejecting changes) to this document based on relevant modifications;
- Requirements around further public consultation with a minimum consultation period of one month;
- Requirements for RA approval of changes.

Under the second of these options, is an approach which would incorporate any mapping of local requirements against EBGL obligations directly into a local rules document, most suitable being through the addition of a new appendix (e.g. “Appendix P”) to the TSC.

Incorporating the mapping directly into a local rules document is similar to how this was managed in the equivalent process for in the GB Balancing Market. The Final Recommendation Report for the GB Balancing and Settlement Code modification P392[19] states the following:

“*We will publish the EBGL Article 18 mapping on the ELEXON website which will detail the parts of the BSC that also constitute Article 18 terms and conditions, in order to create clarity for market participants.*

The BSC Article 18 mapping will be incorporated into the Code (through a new Annex to Section F ‘Modification Procedures’, as Annex F-2), and will be updated as applicable following Authority approval of any BSC Modifications which amend the mapping of the Article 18 terms and conditions in the BSC.”

The table from their equivalent mapping exercise was then contained in the redlined version of the legal wording of the modification. A similar approach could be taken in the TSC for the SEM, such as raising a modification to incorporating this as a new “Appendix P” to Part B of the TSC. This appendix would contain the Requirements Mapping outlined in the proposal, and the Definitions Mapping would be placed into the glossary document for Part B of the TSC.

This approach of incorporating the mapping into the TSC has the benefit of having a clear governance and change control process. It also means that requirements can be directly placed on parties to the TSC to ensure any impacts or changes to the mapping arising from a TSC modification must be considered and included in the legal text of that modification.

Views of respondents are welcomed on this topic.

2.3.3 Gate Closure Time: Integrated Scheduling Process Gate Closure Time

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Integrated Scheduling Process Gate Closure

[19] https://www.elexon.co.uk/documents/change/modifications/p351-p400/p392-final-modification-report/

Time discussed in this section were considered by the TSOs to be not compliant in some minor respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 2(19);
- EBGL Article 24(5).

The EBGL requirement states that the Integrated Scheduling Process Gate Closure Time must be less than 8 hours before real time. In the SEM arrangements, the gate closure for Physical Notifications and Commercial Offer Data is Gate Closure 2, which is an hour before the start of each Imbalance Settlement Period, and therefore could be considered compliant in material respects. However, the gate closure time for Technical Offer Data (TOD) is Gate Closure 1, 13:30 day-ahead at which time the TOD to be used for the whole next day is locked in. If TOD is considered part of the Integrated Scheduling Process Bids, then it would appear that the 8 hour maximum requirement is not met.

The definition of the Integrated Scheduling Process in the EBGL mentions using Integrated Scheduling Process Bids which contain "*commercial data, **complex technical data of individual power generating facilities or demand facilities** and explicitly includes the start-up characteristics*" (emphasis added). Based on this, Technical Offer Data could be interpreted as being part of Integrated Scheduling Process Bids.

Because of the lack of certainty on whether TOD is considered a part of the Integrated Scheduling Process Bids against which this 8 hour maximum gate closure time requirement is relevant, views were sought from other Central Dispatch System operators. The views received were that the equivalent to TOD had not generally been considered as constituting part of the Integrated Scheduling Process Bids, and that the commercial elements only were considered. However, this may be because practically this 8 hour maximum is not an issue with the equivalent for TOD, because their Balancing Markets are a number of shorter duration runs throughout the day (e.g. 6 runs of 4 hour periods each), where all data can be updated prior to each run, as opposed to the continuous operational process carried out in the SEM with a daily run for calculating final volumes.

Therefore, in principle, the TSOs are open to the idea of having TOD changes closer to real time, perhaps similar to the experience in other central dispatch jurisdictions where it is done in more manageable tranches of time rather than allowing continuous changes. The TSOs are of the view that this would add value in the control centre, and would allow participants to give more flexibility including changing modes from Open to Closed Cycle during the day. However, the TSOs are concerned about the practical ability to implement such a change. Based on experiences of discussing changes similar to this with vendors in the past, it would require a very large change to the architecture of the systems, in particular the instruction profiling functionality. Given the likely large impact on resources this would entail, and the likely long implementation lead time, it would need to be carefully considered where in the priority of all market development work this would lie.

Views of respondents are welcomed on this topic.

2.4 General Terms and Conditions Open Issues Considered Compliant in Material Respects

2.4.1 Governance and Changes: Formal Complaints Channel

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the formal complaints channel discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant article in the EBGL on this issue is Article 5(8).

When considering the details of EBGL Article 5(8), there were initially concerns about whether there should there be a formal channel for complaints about the TSO under the EBGL for aspects which are not currently covered under the local terms and conditions, in particular TSC queries and disputes.

There are arrangements in place in the terms and conditions for complaints escalation on a subset of matters relevant to the operation of the market, including settlement queries, settlement disputes, pricing disputes, general queries and disputes. These overlap with obligations in EBGL to be able to query such results. There may currently be some aspects of EBGL obligation compliance which do not currently have a formal means of disputing under the local terms and conditions in the SEM. Based on a concern about whether this would be against the requirements in Article 5(8), the TSOs discussed this with the RAs.

Based on this discussion with the RAs, it was concluded that a participant, or any interested stakeholder, can always directly raise ad hoc concerns to the RAs for any issues they perceive, including EBGL compliance by the TSOs. If any such concern was to be raised, the RAs would act in keeping with the EBGL requirements on timelines, etc. Therefore, there is no further need for any additional rules with respect to a formal EBGL compliance process. In fact, there may be benefits in not formalising such a process, where the ad hoc nature means that market participants would not be constrained by formats or timelines but that compliance with EBGL itself might be the paramount consideration. This greater freedom better reflects the less certain nature of ad hoc concerns which may not be easily formalised in contrast to issues such as pricing or settlement queries or disputes.

2.4.2 Data Requirements: Publishing Offer Prices and Quantities

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the publishing of offer prices and quantities discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 12(3), 12(4);
- EBGL Article 18(7).

These articles outline some of the data which must be made available by the TSOs, and the rights to withhold some of this data, if justified, for reasons of potential market power concerns. The data highlighted during this review as requiring further consideration was that of the offered balancing energy bid volumes and prices, particularly under Article 12(3)(b). In the SEM, data on offer prices and quantities are published the next day, and are not published closer to real-

time such as within 30 minutes of the Imbalance Settlement Period as considered in EBGL. However, this is based on precedent from the previous market arrangements, which were continued after the I-SEM project delivery, namely that submitted COD would not be published in advance or close to real-time in a way that can be associated with the relevant individual units. Because of this, the TSOs engaged in discussions with the RAs to develop an understanding of the drivers for this original precedent, to establish if this approach was adopted due to market power concerns.

It appeared that the precedent in question was established based on concerns about larger organisations having a potential unfair advantage by having more scope and resources for using such real-time information, which would in turn leave newer and smaller organisations at a considerable disadvantage. However, there was also a focus on transparency in the previous SEM arrangements, which had continued after the I-SEM project delivery, through making information and market data in particular available. It is for this reason that the data is published ex-post the next day, to strike a balance between concerns about publishing it too close to real-time (with consequent potential market power issues) and concerns about not having sufficient information published for the market to analyse.

Based on this analysis, this data is not published within 30 minutes of the Imbalance Settlement Period due to market power concerns ("market abuse concerns" as phrased in the EBGL), and therefore can be considered as withheld under Article 12(4). The data will continue to be published as per the established practice and TSC requirements ex-post the next day. Despite the initial appearances of a potential issue, it is considered that the SEM arrangements are compliant in material respects in this regard.

2.4.3 Data Requirements: Anonymised Incremental / Decremental Prices

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the publishing of anonymised incremental and decremental prices discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EBGL Article 12(3), 12(4);
- EBGL Article 18(7).

Similar to the previous potential data publication issue, the requirements under Article 12(3)(e) to publish aggregated information on balancing energy bids was also highlighted as an area requiring further consideration. In the SEM, there is a report for anonymised composite inc / dec curves which is published hourly close to real time. In other European jurisdictions, the bid prices submitted normally represent increasing or decreasing output from a market position, and represent the quantities those participants expect to be able to deliver in the relevant timeframes. However, in the SEM the Integrated Scheduling Process Bid Commercial Offer Data submitted have incremental and decremental prices representing the entire output range of a unit, not just increases or decreases from the market position (or Physical Notification). Separate Technical Offer Data and Physical Notifications are then also included in the operational planning and dispatch optimisations which determine the costs of dispatching units away from their PNs within technical limits.

Since the local anonymised inc / dec curve reports are based on compiling the submitted data, which includes incremental prices below PN and decremental prices above PN, there was initially a concern about this representing something different than the current established practice in other European jurisdictions. However, following further discussions, it is determined that the report represents the data submitted in the SEM through the Integrated Scheduling Process Bids in a way which meets the EBGL requirements.

If Integrated Scheduling Process Bids are being converted into Standard Product bids for use in the cross-zonal balancing energy platforms, there would be information available from the results of that conversion which would more closely match the current practice in other jurisdictions. In that conversion, the prices for increasing above PN, and decreasing below PN, limited by the Technical Offer Data over the timeframes required, can be established. However, given that the cross-zonal balancing platforms, which this conversion process is intended to feed into, are not expected to be used in the SEM at the present time, this information is not available, and the current report represents the only sensible way for the information to be made available in a way which meets the EBGL requirements.

Based on this, despite the initial appearances of a potential issue, it is considered that the SEM arrangements are compliant in material respects in this regard.

2.4.4 Definitions: Calculations of Imbalance and Imbalance Adjustment

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the calculation of Imbalance and Imbalance Adjustment discussed in this section were considered by the TSOs to be compliant in material respects, but where a change to the TSC would be useful for clarity, as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- EGBL Article 18(6);
- EGBL Article 49(1);
- EGBL Article 52(2);
- EGBL Article 54(1), 54(4);
- ISHP Article 5(1), 5(2), 5(3), 5(4).

In the EBGL and its methodologies there is a requirement to calculate the “imbalance adjustment” and "imbalance", with information provided on the inputs required and general approach for such calculations, but short of explicit formulas to determine their calculation.

The end result of settlement in the SEM is the same as that intended in EBGL, but explicit volume values called "imbalance adjustment" or "imbalance" are not calculated. Instead, the inputs that would be considered relevant to the calculation of those volumes (including Metered Quantity, Ex-ante Quantity, Accepted Offer and Bid Quantities) are used directly in the formulas to calculate the cashflow settlement amounts themselves.

Having separate definable concepts for “imbalance adjustment” and “imbalance”, with quantities for these being calculated, may be more straightforward in settlement for other jurisdictions where balancing actions are settled separately at a different balancing energy price depending on the market or product for which it cleared, and imbalances are settled afterwards at the Imbalance Settlement Price. In these arrangements, the sum of all balancing volumes would need to be removed from the difference between the final position and the allocated volume to give the imbalance volume which is settled at the Imbalance Settlement Price. However, in the

SEM all balancing actions are settled at the “better” of Imbalance Settlement Price or Bid Offer Price (generally energy would be seen as “in-merit” and settled at the Imbalance Settlement Price, while balancing actions which were “out of merit” versus this price would be settled at their Bid Offer Price).

This is reflected in the approach taken to the formulas for imbalance settlement and balancing action settlement, where the approach of settling all differences between final position and allocated volume (between Ex-ante Quantity and Metered Quantity using SEM terminology) is settled at the Imbalance Settlement Price through the Imbalance Component Payment or Charge. If a unit needs to be paid-as-bid for out-of-merit balancing actions, this is done through a Premium or Discount Payment, which calculates the difference between the Bid Offer Price and the Imbalance Settlement Price which also needs to be settled for that action’s volume to have it settled at the correct price when this cash flow component is netted with the Imbalance Component. This format implemented for the SEM comes from the SEM Committee detailed design decision, based on equation 9.2 outlined in the SEMC consultation paper[20].

Based on the fact that the overall settlement outcomes are the same as required by the EBGL, and that there would be no functional use for a calculated value of “imbalance” or “imbalance adjustment” given the current format of the calculations, the current arrangements can be considered compliant in material respects with the requirement to settle the volumes mentioned in the EBGL in the correct way. However, in order to improve clarity, particularly for stakeholders more familiar with other European jurisdictions than the SEM, formulas which outline how the volumes considered in EBGL can be calculated using the data published in the SEM will be included in the EBGL Article 18 proposal for terms and conditions. The formulas included in the proposal submitted to the RAs are also included below for information.

Views of respondents are welcomed on this topic.

EBGL Term	EBGL Definition	Equivalent SEM Term	Equivalent SEM Definition
imbalance	an energy volume calculated for a balance responsible party and representing the difference between the allocated volume	Imbalance [less Imbalance Adjustment]	From the SEM Glossary: In relation to a Unit for an Imbalance Settlement Period, means the difference (if any) between the Unit’s Ex-Ante Quantity and Metered Quantity. Further explanation and workings required: For settlement in other jurisdictions, balancing volumes are settled separately to imbalance volumes, at a different balancing energy price depending on the market or product for which it cleared. Imbalance volumes are then settled afterwards at the imbalance price. Therefore, the imbalance adjustment needs to be subtracted from the difference between the final position and the allocated volume to give the imbalance volume which is settled at

[20] https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-026%20I-SEM%20ETA%20Markets%20Consultation%20Paper_0.pdf

EBGL Term	EBGL Definition	Equivalent SEM Term	Equivalent SEM Definition
	attributed to that balance responsible party and the final position of that balance responsible party, including any imbalance adjustment applied to that balance responsible party, within a given imbalance settlement period		the imbalance price. However, in the SEM the balancing energy price is the better of the Imbalance Settlement Price or the balancing volume's Bid Offer Price. Generally energy actions would be settled at the Imbalance Settlement Price "in-merit", while balancing actions which were non-energy "out of merit" would be settled at their Bid Offer Price. Therefore in the SEM, the net settlement result is the same as that considered in EBGL, just with different input volumes. The Imbalance Component Payment or Charge settles all imbalance volumes and delivered non-biased balancing energy volumes at the imbalance price (which is also the balancing energy price), and the Premium and Discount Payments ensure the correct treatment of balancing actions which are out-of-merit non-energy and need to be paid-as-bid rather than at the balancing energy price. This is the same outcome as paying each delivered non-biased balancing energy volume the better of imbalance price and bid offer price, taking those volumes away from the total difference between the final position and allocated volume, and settling the remaining volume at the imbalance price. To calculate the EBGL defined imbalance quantity using SEM variables, the following equation should be used (referencing $QIMBADJ_{u\gamma}$, the formula for which is provided in the Imbalance Adjustment entry in this table, using SEM variables): The Imbalance Quantity for a Generator Unit, u, for an Imbalance Settlement Period, γ, is calculated as follows: $$QIMB_{u\gamma} = \left(QMLF_{u\gamma} - QEX_{u\gamma}\right) - QIMBADJ_{u\gamma}$$
imbalance adjustment	an energy volume representing the balancing energy from a balancing service provider and applied by the connecting	[Sum of all] Accepted Bid Offer Quantity [Quantities, less their relevant Undelivered Quantities, Biased Quantities, Non-firm	From the SEM Glossary: an Accepted Bid Quantity or an Accepted Offer Quantity, as applicable. Further explanation and workings required: For settlement in other jurisdictions, balancing volumes are settled separately to imbalance volumes, at a different balancing energy price depending on the market or product for which it cleared. Imbalance volumes are then settled afterwards at the imbalance price. Therefore, the imbalance adjustment needs to be subtracted from the difference between the final position and the allocated volume to give the imbalance volume which is settled at

EBGL Term	EBGL Definition	Equivalent SEM Term	Equivalent SEM Definition
	TSO for an imbalance settlement period to the concerned balance responsible parties, used for the calculation of the imbalance of these balance responsible parties	Quantities, and Trade Opposite TSO Quantities]	the imbalance price. However, in the SEM the balancing energy price is the better of the Imbalance Settlement Price or the balancing volume's Bid Offer Price. Generally energy actions would be settled at the Imbalance Settlement Price "in-merit", while balancing actions which were non-energy "out of merit" would be settled at their Bid Offer Price. Therefore in the SEM, the net settlement result is the same as that considered in EBGL, just with different input volumes. The Imbalance Component Payment or Charge settles all imbalance volumes and delivered non-biased balancing energy volumes at the imbalance price (which is also the balancing energy price), and the Premium and Discount Payments ensure the correct treatment of balancing actions which are out-of-merit non-energy and need to be paid-as-bid rather than at the balancing energy price. This is the same outcome as paying each delivered non-biased balancing energy volume the better of imbalance price and bid offer price, taking those volumes away from the total difference between the final position and allocated volume, and settling the remaining volume at the imbalance price. To calculate the EBGL defined imbalance adjustment quantity using SEM variables, the following equation should be used: The Imbalance Adjustment Quantity for a Generator Unit, u, for an Imbalance Settlement Period, γ, is calculated as follows: $QIMBADJ_{u\gamma} = \sum_{(o \text{ and } i) \in \gamma} \left(\left(QAOLF_{uoi\gamma} - Max\left(QAOBIAS_{uoi\gamma}, QAOUNDEL_{uoi\gamma}, QAOTOTSOLF_{uoi\gamma}\right)\right) + \left(QABLF_{uoi\gamma} - Min\left(QABBIAS_{uoi\gamma}, QABUNDEL_{uoi\gamma}, QABNFLF_{uoi\gamma}, QABTOTSOLF_{uoi\gamma}\right)\right)\right)$

2.4.5 Definitions: EBGL Objectives

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the EBGL objectives discussed in this section

were considered by the TSOs to be compliant in material respects, but where a change to the TSC would be useful for clarity, as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follow:

- EGBL Article 3(1), 3(2)
- EGBL Article 5(5)

The initial concern arising from these articles were that there is no explicit reference in local terms and conditions to the EBGL objectives. There are requirements to describe the expected impact on the objectives of the EBGL from the proposal of terms and conditions, and amendments to the terms and conditions should also take this into account. This is similar to the need in the modifications process in the TSC to consider the impacts on the objectives of that code. Because of this, it was considered whether the EBGL objectives should be referred to or incorporated into the TSC objectives, to be similarly considered within such processes. However, the EBGL is a document which has higher priority in governance than the TSC, being "requirements under Applicable Laws" as stated in Paragraph B.4.1.1 of the TSC, and therefore its objectives would be expected to apply even without explicit reference within the TSC.

On this basis, it was determined that because the EBGL objectives are applicable and must be taken into account without explicit reference within the TSC, the current arrangements can be considered compliant in material respects with the requirements. However, in order to increase clarity and transparency around the SEM's Balancing Market operating within the harmonised European context and needing to comply with the EBGL, it was thought that some reference to the need to take account of the EBGL could be incorporated into the TSC. This would not need to be an incorporation of the objectives as stated in the EBGL (in any case, the principles of these objectives are largely aligned with those already existing in the TSC), but instead could be a more high level obligation recognising the specific need to take account of the EBGL. It is noted that the CACM regulation is explicitly referenced in a similar high level way in the SEMOpx Rules, as those rules are primarily governed by that regulation in a similar way to how the Balancing Market rules are primarily governed by the EBGL.

Views of respondents are welcomed on this topic.

2.4.6 Definitions: Balance Responsibility

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning balance responsibility discussed in this section were considered by the TSOs to be compliant in material respects, but where a change to the TSC would be useful for clarity, as outlined in this section. The relevant article in the EBGL on this issue is Article 18(6).

Article 18(6) of the EBGL contains the requirement to have a definition of balance responsibility in the local terms and conditions, and it was noted during the initial analysis that a definition for the term "Balance Responsibility" does not exist in the SEM TSC Glossary. However, it was felt that there is an implicit definition of balance responsibility, in that each participant is at least financially responsible for the payments and charges calculated for their imbalances, in particular through sections F.5.1, F.5.2, F.5.3, and F.6.8, of the SEM TSC. The SEM Committee

information paper on balance responsibility[21] also noted in relation to the obligation for all parties to be balance responsible in the recast Electricity Regulation (EU) 2019/943: "*…there is a market participant responsible in some way for all electricity generated in the SEM, whether it be directly or through delegation of responsibility through contractual arrangements…This has led to the RAs' current view that the SEM is compliant with concept of balance responsibility in the Regulation…*". This further supports this view that balance responsibility in the SEM comes from the requirement for all participants to be responsible for their energy, and therefore imbalances, which is codified in the settlement rules where the participants are balance responsible parties.

It was also acknowledged that it is established practice in other European jurisdictions to describe the imbalance mechanism using different characteristics, where different jurisdictions have different approaches. Some examples of such characteristics include whether the nature of the balancing obligation is purely financial or also has a legal requirement, whether the general approach to balancing is based on central or self-dispatch, whether the TSOs' focus is on proactive or reactive balancing, which includes a consideration of whether there is an expectation of proactive balancing actions being taken by balancing service providers based on price signal incentives, or if the TSO has a more singular role in taking actions to resolve imbalances. The regular Ancillary Services surveys carried out by ENTSO-E are a source showing such descriptions being used, and that they are important for understanding the differences between jurisdictions in the harmonised approach to Balancing Markets and imbalance settlement[22].

Based on these points, it is considered that the current arrangements are compliant in material respects in having sufficient consideration for defining balance responsibility in the TSC, However, it would be useful for improved clarity and transparency, particularly for stakeholders more familiar with other European jurisdictions than the SEM, to include an explicit definition for Balance Responsibility in the glossary. This definition can make reference to the characteristics of balance responsibility within the SEM using similar terminology to that used to discuss the nature of balancing in other jurisdictions, and can then reference where the detail of the application of balance responsibility is contained within the TSC, particularly within the underpinning settlement calculations.

Views of respondents are welcomed on this topic.

2.4.7 Specific Products: Integrated Scheduling Process Bids

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the potential relationship between Integrated Scheduling Process Bids and Specific Products discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

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[21] https://www.semcommittee.com/sites/semc/files/media-files/SEM-20-027%20Information%20Paper%20on%20Balance%20Responsibility%20in%20the%20SEM.pdf

[22] https://eepublicdownloads.entsoe.eu/clean-documents/mc-documents/200505_WG_AS_survey_ancillary_services_2019.pdf

- EBGL Article 16(5);
- EBGL Article 26(1), 26(2), 26(3), 26(4);
- EBGL Article 27(1), 27(2), 27(3);
- EBGL Article 30(4);
- EBGL Article 59(3), 59(4);
- EBGL Article 60(2).

Based on initial analysis of these articles in the EGBL, it was considered unclear as to whether Integrated Scheduling Process Bids could be considered their own product type which generally follows the same principles as Standard and Specific Products, or if they need to be defined as a Specific Product and follow the requirements of those products in terms of justifying their use. This is important because requirements outlined in the EBGL on Specific Products seem to carry an assumption that the intended outcome is for the use of those products to be reduced to the greatest extent possible. If Integrated Scheduling Process Bids need to be interpreted as Specific Products, then there needs to be a proposal submitted to the RAs for them to approve their use, with Articles 26, 59, and 60, setting out a number of requirements including:

- Defining the Specific Product as to how it is different to a Standard Product;
- Demonstrating that the Standard Products available are not sufficient to ensure operational security;
- Conversion of Specific Products to Standard Products, to the extent possible, to enable their use on the cross-zonal balancing energy platforms;
- Continual reporting to assess and justify the existence of Specific Products and their effect on the integration of Balancing Markets, the volumes procured and used, including specifically measuring indicators of efficiency losses, inefficiencies and distortions due to these products.

This lack of clarity arises due to inconsistent uses of the terms Integrated Scheduling Process (Bids) and Specific Products throughout the EBGL and its methodologies. While there are aspects of these documents which suggest Specific Products and Integrated Scheduling Process Bids are considered the same conceptually, there are also aspects which seem to treat them as being conceptually separate. One example is that Specific Products need to be justified on the basis that Standard Products are not sufficient to ensure operational security, necessitating these Specific Products. However, Integrated Scheduling Process Bids already seem to be recognised within EBGL as being allowed for ensuring operational security (Article 27(2)), and are explicitly called out as needing to be converted into Standard Products (Article 27(1) and Article 27(3)) separate to where Specific Products are called out as needing to be converted into Standard Products (Article 26(2) and Article 26(4)). Another example is that the ISHP recognises that prices of actions taken for energy balancing from Standard Products, Specific Products, or the Integrated Scheduling Process, used for the Frequency Restoration Process and Replacement Reserve Process can set the imbalance price. Article 16(5) also appears to refer to Standard, Specific, and Integrated Scheduling Process, as separate concepts.

However, there are multiple areas throughout the documents, including where the principles and details for the settlement of balancing energy actions are outlined, which mention that such requirements apply to Standard and Specific Products, not mentioning the Integrated Scheduling Process. Also, the Integrated Scheduling Process Bids are not separately defined in

the glossary section, rather their use is mentioned in the definition of the Integrated Scheduling Process. This would suggest that the context for the document seems to have assumed Standard Products and Specific Products as being the two kinds of products to be considered.

Because of the lack of certainty on this, views were sought from other Central Dispatch System operators. The views received were that there was agreement that the EBGL was not sufficiently clear on this matter, but that since operating a Central Dispatching Model is explicitly allowed within the EBGL, with the Integrated Scheduling Process Bids being an integral part of this, then those bids are allowed to be used following approval of the Central Dispatching Model from the relevant RAs under Article 14. This means that the requirements for a separate proposal, separate continual justification and reporting, which are relevant to Specific Products, could not be relevant to Integrated Scheduling Process Bids. Therefore, the Integrated Scheduling Process Bids would not be seen as Specific Products.

On the basis of all of these considerations, it is considered that Integrated Scheduling Process Bids do not need to be considered Specific Products, and their continued use following the approval granted by the RAs to continue using the Central Dispatching Model under Article 14 is considered compliant in material respects without further action being required.

2.5 Settlement Open Issues Considered Inconclusive or Needing Improvements

2.5.1 Core Settlement Issues: Pumped Storage Units

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Pumped Storage Units discussed in this section were considered by the TSOs to be not compliant in some minor respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- Clean Energy Package Article 5(1);
- Clean Energy Package Article 6(5);
- EBGL Article 44(1);
- EBGL Article 52(1), 52(2);
- EBGL Article 54(1), 54(4);
- ISHP Article 6(1).

A pumped storage unit's imbalance settlement is generally the same as for other types of dispatchable units, except in periods where the unit is in pumping mode or transitioning out of / into pumping mode. When this is the case, a different equation for the Imbalance Component Payment or Charge is used, where only Balancing Market activated volumes are settled, not any other imbalances (paragraph F.5.3.3 in the TSC). This is based on legacy arrangements in the previous SEM arrangements which recognised that the pumped storage units cannot control the exact level to which they consume power when dispatched to pump – these units were implicitly exempted from settlement of uninstructed imbalance volumes. This was done through a combination of TSC Part A paragraphs 5.127, 5.128, and 5.128A. The first two of these, when they interact with the clauses for the calculation of energy payments, result in differences between dispatched position and market position not being settled. The last of these states that it is assumed that the dispatched position of the unit is equal to the actual output position of the

unit, resulting in the uninstructed imbalance charges for differences between dispatched position and metered position to have a result of zero when the unit is in pumping mode.

This means that in these scenarios, if there is a difference between the traded position of the unit, and the metered position of the unit, which is not due to a balancing activation, there is no settlement of that difference in volume. This appears to be clearly different to the requirements outlined in the Clean Energy Package (recast Electricity Regulation (EU) 2019/943), EBGL, and ISHP, around all Balance Responsible Parties needing to be balance responsible (i.e. to be at least financially responsible for their imbalances), with very small scope for exceptions to this balance responsibility.

In addition to this difference in general imbalance settlement, pumped storage units are not subject to Uninstructed Imbalance Charges in these scenarios. The general imbalance settlement approach is concerned with the settlement of the differences between the unit's traded position and its metered position at the Imbalance Settlement Price, while these Uninstructed Imbalance Charges are an additional mechanism which charges the unit an additional proportion of the market price if its metered position diverges from its instructed dispatch position in excess of a calculated tolerance. This is to provide an incentive to run in a way which meets dispatch instructions as close as possible. However, these charges are not governed by EBGL requirements (other than allowing such "additional settlement mechanisms" to be developed), as they relate to incentives around complying with dispatch instructions rather than relating to balance responsibility. Therefore, this is not an issue for Uninstructed Imbalance Charges, meaning Pumped Storage units can continue to be exempt from these charges in pumping or transition modes. Based on this analysis, it is considered that the current difference in imbalance settlement approach for pumped storage units in pumping or transition modes does not meet the requirements in the recast regulation or the EBGL. Therefore, the different arrangements included in paragraph F.5.3.3 need to be removed, with the same approach as applies to other units in calculating the Imbalance Component Payment or Charge applying instead. However, the exemption to Uninstructed Imbalance Charges in these scenarios can continue.

While all discussion in this section has concerned Pumped Storage units, it must be recognized that the settlement approach for Battery Storage units is the same as that for Pumped Storage units in the matters considered. Therefore, the same issues and the same suggested responses apply to Battery Storage Units also.

Views of respondents are welcomed on this topic.

2.5.2 Core Settlement Issues: Demand Side Units

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the Demand Side Units discussed in this section were considered by the TSOs to be not compliant in some minor respects outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- Clean Energy Package Article 5(1);
- Clean Energy Package Article 6(5);
- EBGL Article 44(1);
- EBGL Article 52(1), 52(2);

- EBGL Article 54(1), 54(4);
- ISHP Article 6(1).

This is a similar concern to that of pumped storage units, where there are a number of scenarios in which the requirement for settlement which exposes Demand Side Units to balance responsibility (i.e. financial responsibility for their imbalances) does not appear to be met.

For Demand Side Units (DSUs), arrangements are not yet in place to be able to have them take title to the change in energy consumption experienced by the demand sites, which shows up through that demand site's Supplier Unit metered quantity. Due to the need to not double-count that energy in settling units, and because they will be settled on the Supplier units, there are specific rules on DSUs which result in the quantity associated with their activation being removed through settlement. This is done by having the metered quantity of the Trading Site Supplier Unit (TSSU) associated with the DSU be made equal to the same magnitude as that of the DSU, but with a negative sign. Depending on trading approach on the ex-ante markets between the DSU and the TSSU, if they trade as expected (i.e. no trades if operating primarily in the Balancing Market, or equal and opposite trades to cancel net position between the two units to zero), this treatment would have the net effect of removing the settlement of the imbalances on the DSU. Only the net settlement of the premium or discount for some activated balancing actions would remain.

DSUs also cannot currently have their metered position determined. Because the metered quantity cannot be determined, it is assumed that the metered quantity is equal to the dispatched quantity and that all of what was instructed was delivered. Therefore, actual imbalances are difficult to determine even if the energy activation were to stay settled on the DSU.

In this case the energy imbalance is settled on the demand site's Supplier Unit, meaning there is balance responsibility through settlement of an imbalance on a particular balance responsible party. However, it is clear that the settlement approach for DSUs will need to change. The need for these changes is already acknowledged in the SEM Committee's decision on arrangements required for DSUs related to state aid compliance[23].

The interim approach decided on by the SEM Committee has been implemented in the rules and systems. When the enduring approach design and implementation has been completed, this will represent satisfying the requirements of both the EBGL and state aid requirements.

[23] https://www.semcommittee.com/sites/semc/files/media-files/SEM-19-029%20-%20DSU%20State%20aid%20compliance%20-%20Decision%20paper_0.pdf

2.6 Settlement Open Issues Considered Compliant in Material Respects

2.6.1 Core Settlement Issues: Settling Units at "Better" of Imbalance Settlement Price and Bid Offer Price

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the settlement of units on the "better" of the Imbalance Settlement Price and Bid Offer Price discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant articles in the EBGL and related methodologies on this issue are as follows:

- Clean Energy Package 6(4);
- EBGL Article 30(1);
- PP Recital (11)(a), Article 1(2), Article 4(2), Article 5(2), Article 6(1).

In these articles, the requirement of the principle for balancing energy actions to be settled "pay-as-clear" is outlined, meaning that the balancing energy actions would be settled at the price calculated to be the marginal price for the relevant balancing energy product. In other European jurisdictions, and in the future for the SEM, there may be multiple relevant balancing energy products and therefore prices, but for the time being there are only Integrated Scheduling Process Bids relevant to the central dispatch system of the SEM, and therefore a single price is required for all balancing energy in any period. The Imbalance Settlement Price also acts as the balancing energy price, giving a single price for the Balancing Market and imbalance settlement – these are not considered to be separate concepts in the SEM like they are in other jurisdictions.

However, the SEM also has a general settlement approach that all actions in the Balancing Market would be settled on the "better" of the Imbalance Settlement Price or the action's own Bid Offer Price. In particular, this means that if an incremental action has a higher Bid Offer Price than the Imbalance Settlement Price, it would be paid the higher price, and if a decremental action has a lower Bid Offer Price than the Imbalance Settlement Price then it would pay the lower price. There was a concern that, on the surface, it is not immediately clear that this settlement approach would mean that the pay-as-clear requirement for balancing energy would be complied with, and therefore more detailed analysis was carried out.

The investigation of whether the pay-as-cleared requirement is complied with overlaps with two of the other issues mentioned in this paper. It overlaps with issue outlined in Section 2.2.1, because both of these depend on the interpretation of which actions are considered energy or non-energy. The requirement for pay-as-clear only applies to energy balancing actions, and there is no requirement in the EBGL arrangements for how non-energy actions need to be settled. It also overlaps with the issue outlined in Section 2.2.4, because as outlined there, the value of the Price Average Reference Quantity would determine if the Imbalance Settlement Price has a value which is averaged over a number of balancing energy actions, therefore resulting in some of those energy actions becoming out-of-merit and needing to be paid-as-bid to ensure cost recovery.

With the explanation of what is considered an energy action as outlined in Section 2.2.1, so long as the value for QPAR is not so large as to result in a price which is averaged over a number of

actions causing it to move away from the marginal price (as outlined in Section 2.2.4), then it should always be the case that those actions considered as energy would be paid-as-clear. All actions which were in merit against the Marginal Energy Action Price, and which were not NIV Tagged, would be able to set the final imbalance price. If the price is set purely marginal, then this price should be the highest (or lowest) of the energy prices (meeting the Pricing Proposal requirement). This would mean it is the price of the most marginal energy action, and therefore the marginal energy action can be paid-as-clear while recovering their costs, and other energy actions would be paid-as-clear while making inframarginal rent since their price was more in-merit. These energy balancing actions would not be required to be paid-as-bid, despite the appearances of that potential outcome from the general settlement approach.

Actions which were not NIV Tagged and not in merit, being seen as non-energy actions, would be paid-as-bid as their prices would be above the pay-as-clear marginal price. Even though they were included in the NIV they would be seen as a non-energy action and therefore can be paid-as-bid while being considered compliant in material respects. Some non-energy actions would also be paid-as-clear if they were in-merit against the Imbalance Settlement Price, but there are no requirements preventing this. The Clean Energy Package allows for market-based redispatch, against which no specific requirements are placed such as pay-as-bid or pay-as-clear, and allows for non-market based redispatch, where it is required that at least some element of ensuring costs are covered, which is ensured by the “better” of pay-as-bid or pay-as-clear approach.

While this may need to be considered in setting values for the QPAR parameter, as outlined in Section 2.2.4, it is considered that the SEM arrangements are compliant in material respects in this regard. Views from respondents are welcome on this topic, including more general views on the application of the current approach of settling on the “better” of Imbalance Settlement Price and Bid Offer Price in the context of the harmonised European Balancing Market and imbalance settlement arrangements.

2.6.2 Less Core Settlement Issues: Additional Settlement Items

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the additional settlement items discussed in this section were considered by the TSOs to be compliant in material respects as outlined in this section. The relevant article in the EBGL on this issue is Article 44(3).

There are a number of settlement approaches in the SEM which are neither mentioned in terms of any requirements for their use, or preventing their use, in the EBGL and its methodologies. The relevant settlement approaches include:

- Uninstructed Imbalance Charges;
- Fixed Cost Payments and Charges;
- Non-Firm Quantities;
- “Undo” actions.

The settlement approach for RES curtailment is also an additional one to those outlined in the EBGL, but it is considered outside the scope of this analysis given the current work being undertaken by the RAs in analysing the settlement treatment of RES curtailment in the context of the Clean Energy Package Recast Electricity Regulation (EU) 2019/943.

Therefore, on the other items a concern was initially raised about whether there was a basis for continuing to use these settlement approaches in the SEM if they are not considered in the overarching EBGL framework. However, upon further analysis it was determined that such settlement approaches are allowed to be proposed and approved under Article 44(3) of the EBGL. This article allows for "*other costs related to balancing*" to be settled through an "*additional settlement mechanism*" approved by the relevant RAs. Given that these arrangements have already been approved as part of the I-SEM project, this can already be considered compliant in material respects, and an explicit reference to this has been included in the Article 18 terms and conditions proposal, mapping the sections in the TSC which are considered these "additional settlement mechanisms" under Article 44(3) in the EBGL.

2.6.3 Less Core Settlement Issues: Clarifying the Default Values for Variables When No Data Available

After careful review and consideration of the SEM arrangements in the context of compliance with the EBGL, the arrangements concerning the default values discussed in this section were considered by the TSOs to be compliant in material respects, but where a change to the TSC would be useful for clarity, as outlined in this section. The relevant article in the EBGL on this issue is Article 18(2).

When analysing the relevance of EBGL Article 18(2), which requires for terms and conditions relating to market suspension, it was concluded that no specific rules are required as the market would not be suspended. This conclusion was reached in conjunction with work ongoing under the Emergency and Restoration Network Code, details of which were included in a public consultation from the TSOs[24], which concluded that the Administered Imbalance Settlement and other arrangements in place in the TSC allow for the markets to continue in the scenarios considered by the Network Code sufficiently well that market suspension would not be required.

However, during this analysis, it was highlighted that it may not appear clear what values should be used for a number of variables when no data is available. This would be of particular importance to those variables used in the Administered Imbalance Settlement approach. For example, where trading in the ex-ante markets cannot be carried out, a default value for the Ex-ante Quantity of zero would be used, and therefore it is important that the arrangements are clear about this. Where specific non-zero values need to be used, for example where Technical or Commercial Offer Data has not been submitted and the Default Data needs to apply, there are arrangements outlined in the TSC for how this would need to happen. Some variables which require a default value at zero are also explicitly considered in the TSC, for instance for Physical Notification Quantities (D.7.1.6).

There is also a general provision, through F.2.1.2, that where the variable is a result of a provision which does not apply to a unit but the value for which needs to be used in some other process downstream, then a value of zero would be used. However, it was felt that this may not be clear enough to make it obvious what default value to use for those Administered Imbalance Settlement Scenarios where no data is available, such as the default Ex-ante Quantity value of

[24] https://www.eirgridgroup.com/site-files/library/EirGrid/RulesForTheSuspensionAndRestorationMarketActivities_Ireland-Re-submission.pdf

zero for example. It was felt that clarity could be improved if this general approach were to be made more explicit, including stating that it includes scenarios where data is not available, and possibly with explicit reference to the variables to which it applies.

There may be a number of instances where non-zero default values may be required for certain variables. Therefore, a careful approach to the drafting of a modification to establish this improved clarity would be needed to ensure it meets all requirements.

3. Next Steps

This document is intended to cover the submission of the analysis of compliance of the SEM arrangements with the EBGL regulation requirements as requested by the RAs, to be published alongside their intended consultation. Views from respondents are welcome on all aspects of the document, and they are particularly welcome on those topics categorised as being inconclusive.

Following this consultation, it is anticipated that the SEM Committee will make a decision which would include conclusions that the SEM arrangements are currently compliant in material respects with the EBGL requirements. Where this is not the conclusion for a particular topic, it is anticipated that the decision would state where changes are needed, and if possible what those changes need to be, in order to better meet the EBGL requirements for those topics.

The TSOs look forward to further working with the RAs on this topic.

Appendix A: Examples of Compliance with Article 55

In this Appendix, a number of examples are provided to illustrate how the SEM arrangements for calculating the Imbalance Settlement Price meet the requirements to meet a minimum or maximum boundary condition through Article 55 in the EBGL.

The title of each example gives a high level commentary on what is happening in that example, which is followed by a graphical outline of the example which should be read from left to right.

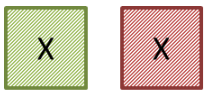
The Flagged Ranked Set includes all balancing actions, for energy and non-energy, considered in the price setting exercise, identifying which balancing actions (energy or non-energy) have been System Operator Flagged. Notes are provided next to this to indicate which action would be determined as the Marginal Energy Action Price, and some examples of reasons for actions being System Operator Flagged, or for being taken in the opposite direction to that need to correct imbalances.

Next, the Tagged Ranked Set includes the final categorisation of each of those actions after the NIV Tagging step of the process has been completed, and the price that would be considered for each action in the final Imbalance Settlement Price calculation following the Replacement Bid Offer Price functionality. Next to this is a clear statement of which actions in that Tagged Ranked Set are considered energy, and which are considered non-energy, based on the interpretation for this outlined in Section 2.2.1.

The Article 55 boundary is then considered, where the boundary condition that the final Imbalance Settlement Price must meet is outlined based on the volume weighted average of the prices associated with those actions designated as “energy”. The Price Outcomes then consider what the potential calculated results for the final Imbalance Settlement Price would be, based on two potential approaches: One where the Price Average Reference Quantity is a very small value, in which case the price would be purely marginal; and one where the Price Average Reference Quantity is a larger value, in which case the price would be based on an average. This could be an average over all energy actions, or a subset, depending on the exact parameter value, but for the purposes of meeting the Article 55 requirement, the situation where all energy actions is considered, because taking an average over any smaller subset would mean the price would move closer to the marginal price, and if this average over all energy actions meets the EBGL Article 55 requirement, then any other subset would do. The arrow in the illustration shows the direction that the Price Average Reference considers the subset of actions, from the marginal action towards a certain direction until the volume included in the calculation equals that of the Price Average Reference Quantity parameter.

Legend:

Unflagged or untagged balancing action with own price
(Green: positive, Red: negative)

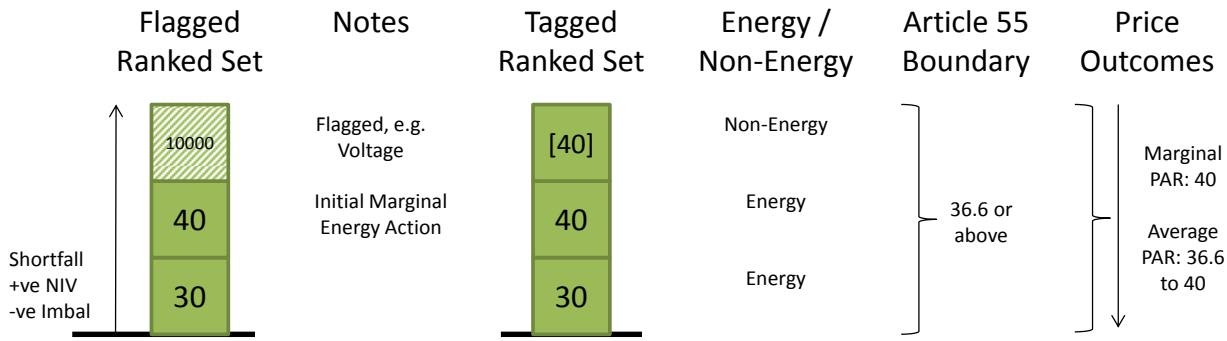


Flagged balancing action with own price (Green:
positive, Red: negative)

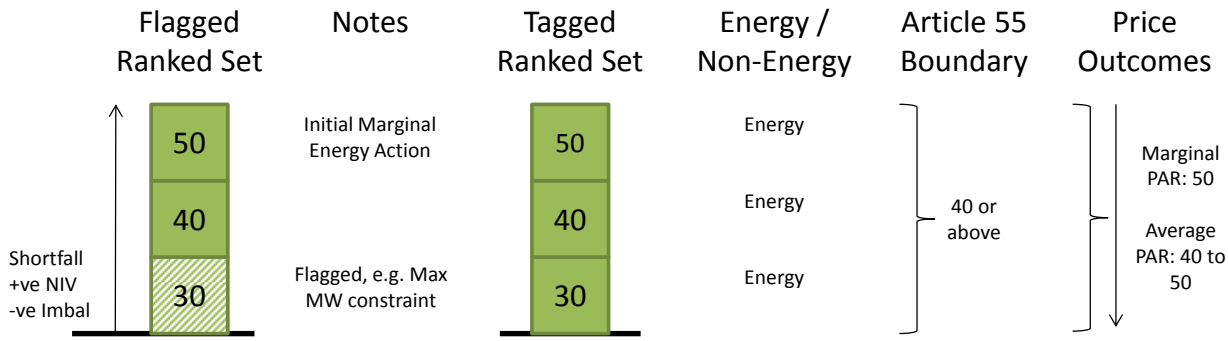
Unflagged or untagged balancing action with replaced price
(Green: positive, Red: negative)

Tagged balancing action
(Green: positive, Red: negative)

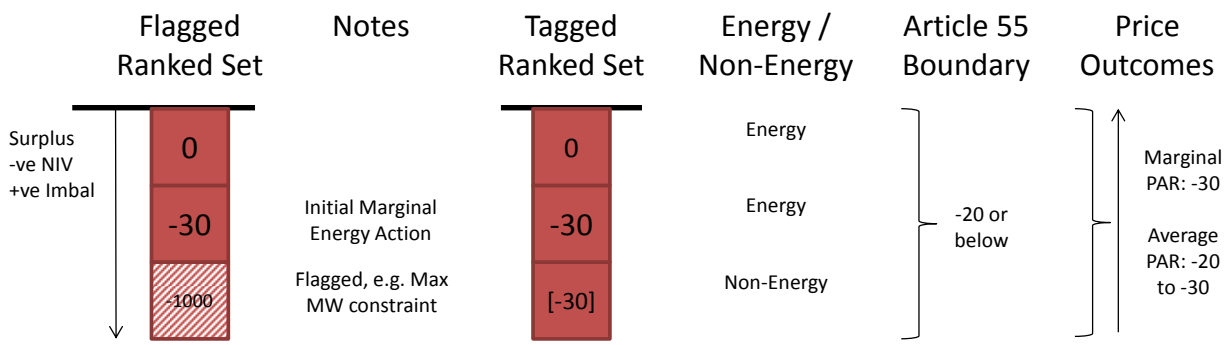
Example 1: Only actions in one direction, out of merit action meets energy need but primarily driven by non-energy system shortfall:



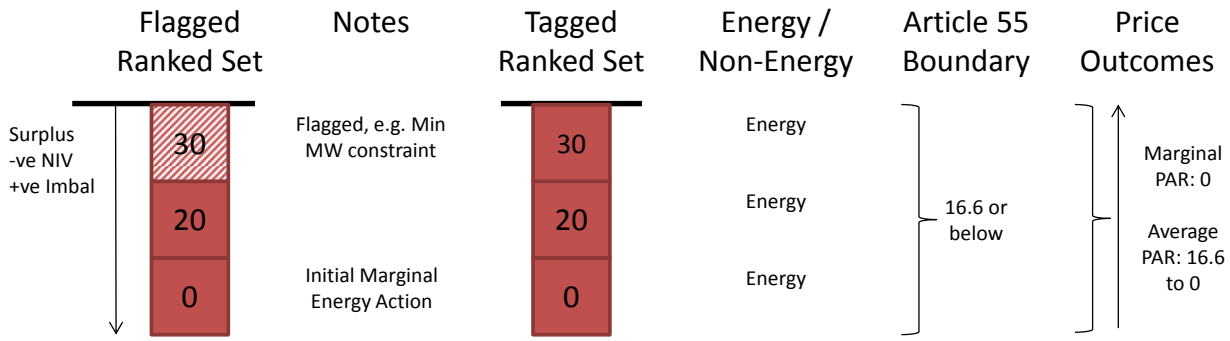
Example 2: Only actions in one direction, in merit action initially flagged but meets energy need so primarily driven by energy, system shortfall:



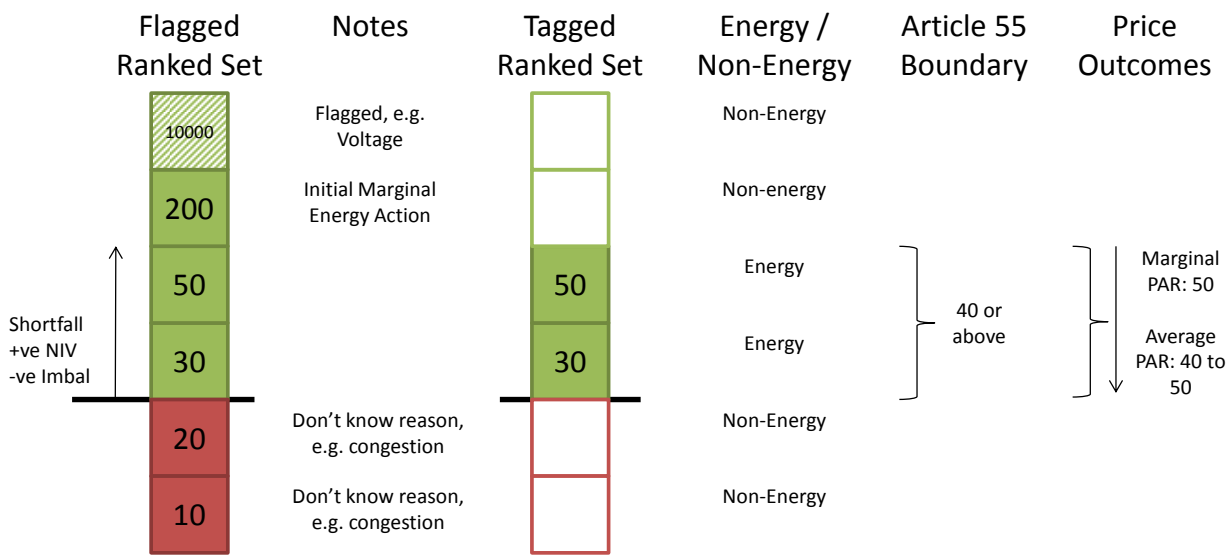
Example 3: Only actions in one direction, out of merit action meets energy need but primarily driven by non-energy, system surplus:



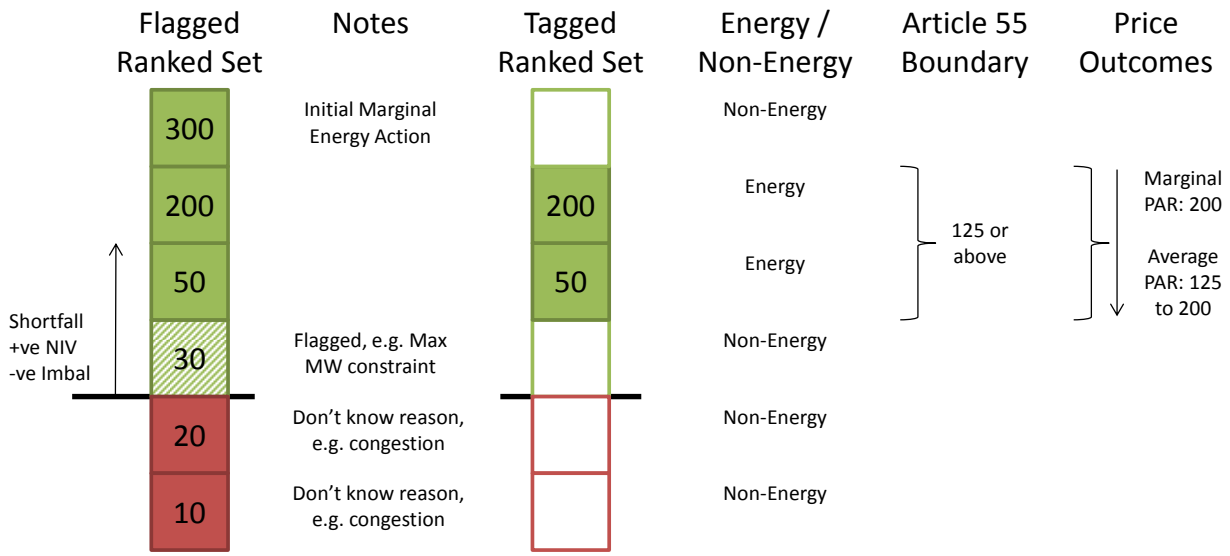
Example 4: Only actions in one direction, in merit action initially flagged but meets energy need so primarily driven by energy, system surplus:



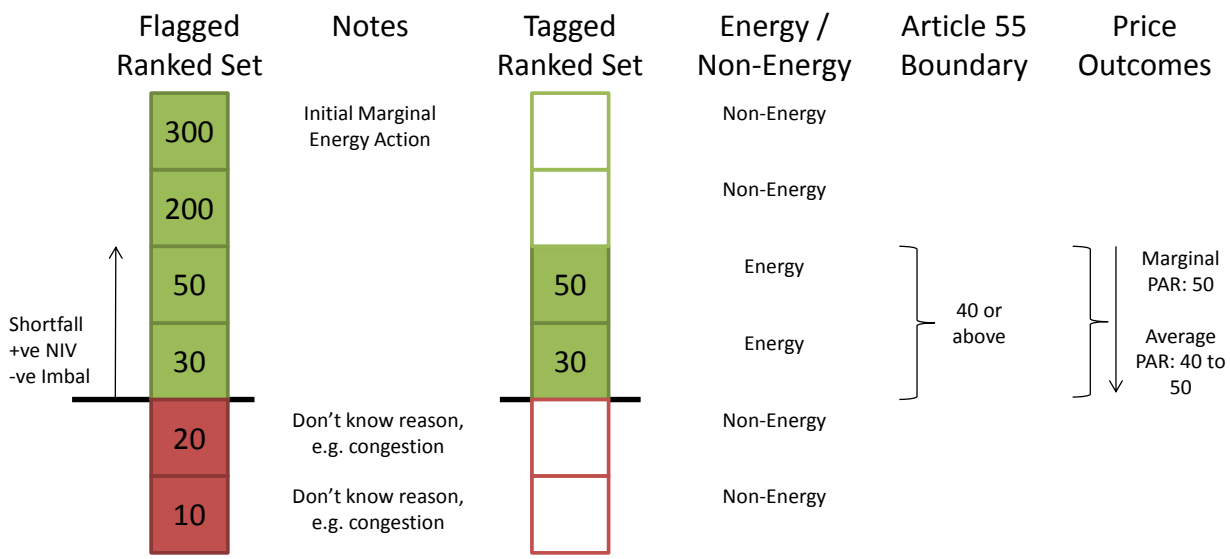
Example 5: Tag additional actions, out-of-merit action already flagged then tagged, system shortfall:



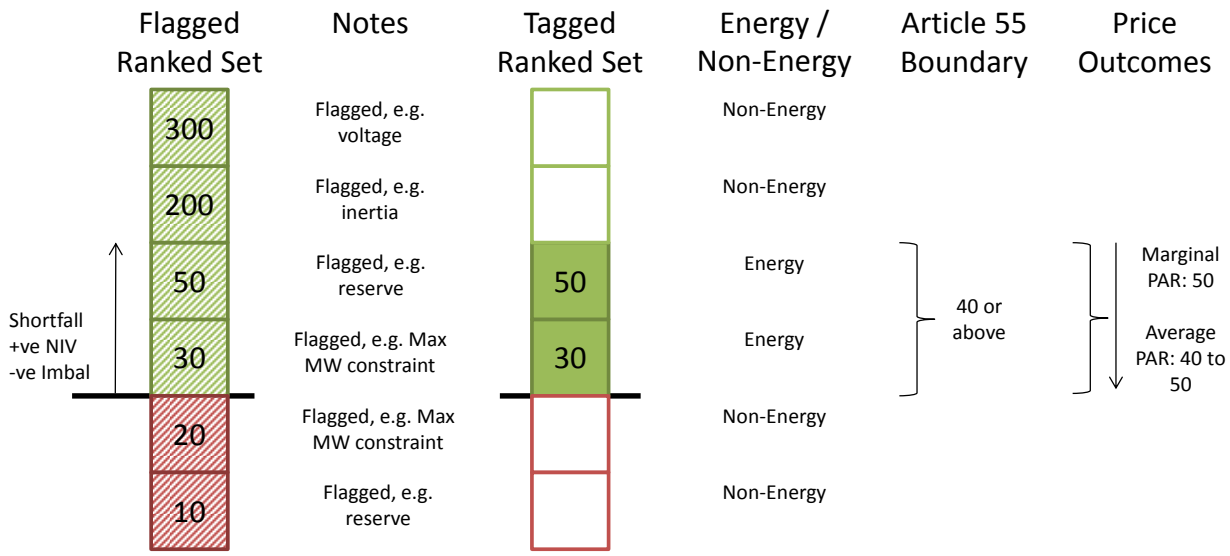
Example 6: Tag additional actions, in-merit action already flagged then tagged, system shortfall



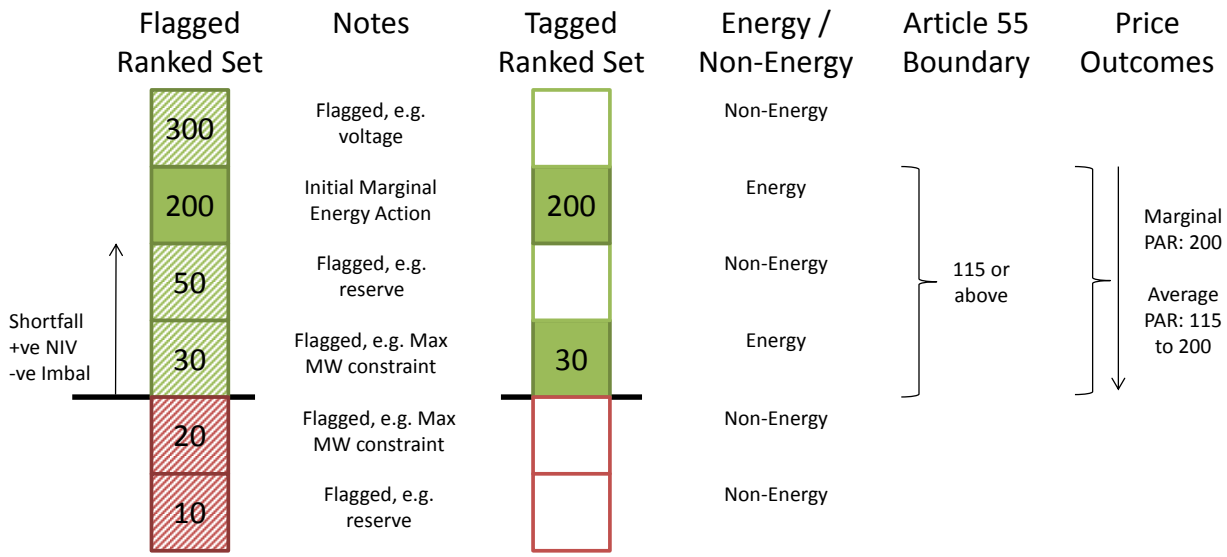
Example 7: Tag additional actions, no actions already flagged, rely on tagging only, system shortfall:



Example 8: Untag actions to match imbalance, all actions already flagged, no initially marginal energy action, rely on tagging only, system shortfall:



Example 9: One unflagged action in direction to meet imbalance, untag in-merit actions to match imbalance, system shortfall (This case may appear unintuitive, where there is the action at 50 which is “in-merit” against 200 but is not considered energy. The combination of “Not NIV Tagged, and in-merit” is important – only need to untag until match NIV volume, therefore the 30, the most in-merit, is included, but not the 50):



Example 10: One unflagged action in direction to meet imbalance, untag in-merit and out-of-merit actions to match imbalance, system shortfall: