Integrated Single Electricity Market (I-SEM)
Energy Trading Arrangements Detailed Design

Markets Consultation Paper SEM-15-026

A Submission by EirGrid plc.

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1 EXECUTIVE SUMMARY

EirGrid Plc welcomes the publication of the I-SEM ETA Detailed Design Markets Consultation Paper and the opportunity to respond to the consultation. The Markets consultation paper on the Energy Trading Arrangements represents a significant step in the development of the detailed design of the I-SEM.

EirGrid is supportive of the process undertaken to date by the SEM Regulatory Authorities which has seen the development of thinking around individual building blocks of the market in addition to the broader holistic design through both discussion papers and workshops held over the last circa six months.

The I-SEM Energy Trading Arrangements represent a major change for the electricity industry with the new energy markets having a significant impact on market and system operations. While the responsibility for operational security remains with the TSOs, under the principle of balance responsibility participants will be more responsible for balancing supply and demand. The market trial exercises will assist in understanding market processes before go-live and EirGrid believes that other transitional arrangements may be appropriate in the first years of the I-SEM as experience is gained in the evolving behaviour of the energy markets.

Throughout the I-SEM design process, the TSOs have stated that operational security could be maintained while operating under any of the design options. This is still the case and EirGrid welcomes the discussion around the interaction between the TSOs' actions and the energy markets. The TSOs' scheduling and dispatch objectives in the I-SEM will be to ensure the safe and secure operation of the power system, facilitate priority dispatch generation and to meet the objective defined in the I-SEM HLD (to minimise the cost of deviating from the notified position of participants). The TSOs' processes for achieving these objectives should also consider their impact on market behaviour, particularly during the intraday timeframe; however, given the experiences of the SEM and of other markets, the TSOs do not believe that placing limitations on the TSOs' actions before the intraday gate closure will necessarily deliver the best overall solution for consumers. This needs to be considered in conjunction with dispatch balancing costs and incentives on TSOs.

Industry concerns have been expressed about the impact of 'early' TSO actions on their intraday activity. Actions by the TSOs before intraday gate closure are more likely to centre on start-up of generators with greater than one hour start-up times because other actions can generally be instructed much closer to the time they are required. The timing of the TSOs' start-up actions would be in line with the start-up characteristic of participants and would not preclude trading in advance of these times.

The I-SEM detailed design should allow for integration with the new European balancing market and, while some aspects of the Network Code for Electricity Balancing can be incorporated into the I-SEM design and a certain level of 'future proofing' is possible, this network code is still in draft format and envisages further developments that will be required to deliver full integration of the European Target Model timeframes after I-SEM go-live.

While a key focus has been on the arrangements for the balancing market given that the day-ahead and intraday markets will be significantly governed by European arrangements, we believe it needs to be considered that the EUPHEMIA trials currently underway may demonstrate ways of using the algorithm that deliver the principles of the I-SEM in an effective manner and that the findings of the trial should be the subject of further consideration. With respect to the implementation of the XBID, given that the go-live date of this project has been put back to mid-2017, it is important that the I-SEM development takes account of this and explores alternative solutions such as local or regional intraday solutions which can be available to I-SEM participants.

EirGrid reaffirms its commitment to working with both the industry and the Regulatory Authorities to assist in the development of effective and appropriate I-SEM arrangements and to support the delivery of the new market arrangements by Q4 2017.

2 INTRODUCTION

2.1 EIRGRID PLC

EirGrid holds licences as independent electricity Transmission System Operator (TSO) and Market Operator (MO) in the wholesale trading system in Ireland, and is the owner of the System Operator Northern Ireland (SONI Ltd), the licensed TSO and MO in Northern Ireland. The Single Electricity Market Operator (SEMO) is part of the EirGrid Group, and operates the Single Electricity Market on the island of Ireland.

Both EirGrid, and its subsidiary SONI, have been certified by the European Commission as independent TSOs, and are licenced as the transmission system and market operators, for Ireland and Northern Ireland respectively. EirGrid also owns and operates the East West Interconnector, while SONI acts as Interconnector Administrator for both of the interconnectors that connect the island of Ireland and GB.

EirGrid and SONI, both as TSOs and MOs, have roles defined within the draft EU regulations that the I-SEM is required to comply with. We are committed to delivering high quality services to all customers, including generators, suppliers and consumers across the high voltage electricity system and via the efficient operation of the wholesale power market. EirGrid and SONI therefore have a keen interest in ensuring that the market design is workable, will facilitate security of supply and compliance with the duties mandated to us and will provide the optimum outcome for customers.

This response is submitted on behalf of all of the EirGrid licensees.

2.2 STRUCTURE OF THE MAIN RESPONSE

Section 3 of our response provides an overview of EirGrid's opinions, particularly as they relate to system operations in the I-SEM. This should give the reader a clear view of the key issues that EirGrid believes need to be addressed.

Section 4 of our response provides an overview of a possible end to end process of system operations in the I-SEM. Here, we hope to convey how our views in relation to a number of the considerations put forward in this consultation paper can be applied practically and in a consistent and coherent manner in the operation of the power system.

Section 5 of our response provides our detailed comments on the specific chapters and sections of the consultation paper which underpin our proposals in Section 4.

Section 6 of our response provides additional comments in relation to topics not included in the consultation paper which we believe may need to be addressed over the course of the I-SEM implementation.

3 KEY POINTS

This section sets out the key points that EirGrid wishes to make with respect to the Energy Trading Arrangements Detailed Design consultation paper.

- To facilitate the new market design, the TSOs' scheduling and dispatch process for the I-SEM will fundamentally change, aligning with the objective of minimising the cost of deviation from the notified position of participants, while maintaining the objectives of system security and priority dispatch.
- Given that other actions (changes to MW dispatch and shut-downs) can generally be instructed much closer to the time they are required, actions taken by the TSOs while the intraday market is open are likely to centre on start-up of generators with longer than one hour start-up times. The timing of the TSOs' start-up actions would be in line with the start-up characteristics of participants and would therefore not preclude them from trading in advance of these times. The TSOs would consider their actions as 'on time' rather than 'early'.
- The I-SEM detailed design should allow for integration with the new European balancing market and, while some aspects of the Network Code for Electricity Balancing can be incorporated into the I-SEM design and a certain level of 'future proofing' is possible it should be recognised that additional effort will be required to deliver full integration with the European Target Market Model timeframes after the I-SEM goes live.
- The transition to the I-SEM represents a significant step change for market and system operations on this island, impacting participants as well as TSOs and Market Operators. EirGrid believes that transitional or evolving system operational arrangements should be considered for I-SEM go-live to ensure a secure move to the new market. This would allow for the market to evolve over time and manage the risk that comes with a single step change approach.
- We have stated in previous consultation responses that the I-SEM has the potential to result in increases in dispatch balancing costs. Given this, we believe incentives on the TSOs with respect to all-island balancing costs needs further consideration and that the existing incentives may not be appropriate, particularly over the transition period, as sufficient experience of the impact of the new balance responsibility requirements on market participants is required to establish a relevant baseline.
- The I-SEM project needs to give consideration to interim arrangements for intraday trading which may take the form of coupling with the intraday project for GB.
- In the absence of certainty around what tools may be used to mitigate against local market power, a broad range of solutions, including bid replacement, out of market contracts for transmission constraints, price/cost curves, etc., should be considered as potentially making up the solution in the I-SEM.
- While the EirGrid believes that access to participants via the I-SEM balancing mechanism will be the main tool open to the TSOs for ensuring operational security, other tools, such as

contractual arrangements between the TSOs and participants, should not be ruled out at this stage where a requirement can be identified and an overall benefit obtained.

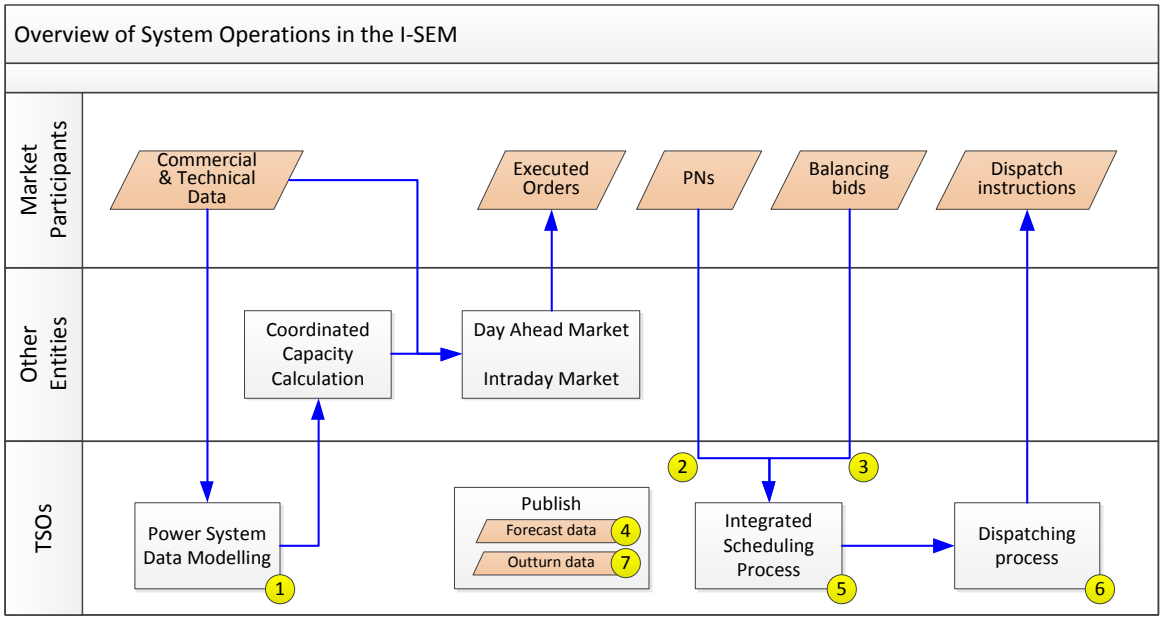
- In terms of the operational detailed items suggested -
    - EirGrid believes that the market design should incentivise the appropriate approach to linking of notifications to contracted values. If the imbalance pricing mechanism is designed appropriately to incentivise balance responsibility and participation in the ex-ante markets, then it would seem that participant behaviour will follow on from this to ensure their Physical Notifications (PNs) are feasible and best represent their contracted positions from the ex-ante markets.
    - We believe that the PN represents the starting point for the scheduling and dispatch process and should represent the baseline from which a participant's inc and dec prices are applied. Given the importance of this data item in the scheduling process, it is important that it is representative of a physical reality. EirGrid therefore believes that updates to PNs post TSO actions should reflect these actions as well as any market positions achieved.
    - EirGrid believes that the use of explicit start-up costs should be a part of the I-SEM with further work to be done to finalise how these costs are reimbursed.
    - Of the approaches presented in the consultation paper for rebidding of offer and bid prices, we would view the Fixing Price of Accepted Bids and Offers approach as the minimum which should be expected. We agree there is also merit in considering the fixing of prices of a bid which would reverse the effect of a previously accepted offer and vice versa.
    - EirGrid believes that the 'open' format should be used in communication with the participants' unit operators (as per current practice), and the 'closed' format should be used for cross border exchanges of energy (as per current practice and in keeping with the future product based approach to dispatch).
    - We consider the additive option for the interaction between balancing actions and intraday market trades in the same direction as having the greatest merit.
    - EirGrid agrees that a participant constrained to provide System Services (or as a result of other system constraints, e.g. a transmission circuit outage causing a thermal constraint) should be able to trade in the intraday market.
    - With respect to the imbalance pricing options, we believe the unconstrained stack with plant dynamics and the unconstrained unit from the actual dispatch represent the better options with the latter potentially reflecting the real cost of balancing actions arising from energy imbalances.
    - EirGrid's preference is for a half-hour settlement period duration. For reconciling the hourly ex-ante market trading period with the sub-hourly imbalance settlement periods, EirGrid has a preference for option (iii), where the imbalances are calculated on an hourly basis, with a non-weighted average of the imbalance prices in each of the imbalance settlement periods.

4 OVERVIEW SYSTEM OPERATION IN THE I-SEM

The I-SEM represents a fundamental shift in approach to the operation of the all-island power system. The responsibility for balancing supply and demand is moving from the TSOs towards the participants while responsibility for operational security remains with the TSOs. Throughout the I-SEM design process, the TSOs have stated that operational security could be maintained while operating under any of the design options. This is still the case and EirGrid welcomes the discussion around the interaction between TSO actions and the energy markets. This section of our response outlines how system operations could function in the I-SEM based on the emerging design and it elaborates on some parts of the process. The step change from the current SEM intraday gate closures to one hour for the I-SEM is substantial for the industry as a whole and a transitional operational arrangement which would be in keeping with the market design may be required. Operational processes may also need to be modified based on experience of the I-SEM.

The I-SEM HLD provided important market design features related to the operation of the power system. The design of an extended balancing timeframe provides the TSOs with a mechanism to schedule participants before the last hour and the use of the scheduling and dispatch process, based on results of the day-ahead market, provides the TSOs with an important tool for managing the real time operation of the power system. EirGrid welcomes the further detailed consideration of system operations issues in this consultation paper and the discussion around the interaction between the energy markets and system operation.

The following is an overview of the potential system operations process. It is based on the details contained in the consultation and Network Code requirements. The diagram below presents an overview of steps covered in the following sections.



The process is set out from the perspective of the TSOs and describes the TSOs' interfaces with both participants and European entities under the proposed arrangements. It defines steps that will be taken for every trading day. For simplicity, the overview omits steps that are taken infrequently. Further commentary is provided in Section 5.1 on each step and on some steps omitted from the overview.

The main steps that will be followed are:

1. TSOs will provide data to the Coordinated Capacity Calculator in order to calculate cross zonal capacity for the day-ahead and intraday markets.
2. After the day-ahead market and throughout the intraday market, participants will submit Physical Notifications to the TSOs.
3. TSOs will receive balancing bids and offers from participants.
4. TSOs will publish information on forecast system state.
5. TSOs will run the integrated scheduling process.
6. TSOs will issue dispatch instructions to controllable participants.
7. TSOs will publish transparency data on their actions.

As imbalance settlement is subject to the I-SEM Roles and Responsibilities SEM-15-016 consultation paper, it is omitted from this process overview and the activity is not considered further in this section.

4.1 CROSS ZONAL CAPACITY

A key feature of the EU Target Model is that the maximum cross zonal capacity is made available to the EU Internal Energy Market. This is already the case today where the TSOs seek to maximise the SEM/BETTA cross-border capacities. This will continue and will be harmonised on a regional basis in accordance with an agreed CACM guideline methodology for coordinated cross-border redispatching or countertrading which will be developed for the I-SEM's capacity calculation region. In the longer term, this process may also include an I-SEM/France border.

For the day-ahead market and intraday market, the I-SEM process to maximise cross-border capacity will start two days prior to the target day. On D-2, participants will provide commercial and technical data to the TSOs for the purposes of capacity calculation[1]. The TSOs will process the data combined with transmission system data and produce various inputs for cross zonal capacity calculation: generation shift keys (effectively a merit order), hourly individual grid models (a representation of the all-island power system), allocation constraints (constraints that need to be respected in the capacity allocation process), reliability margins (a potential reduction in cross-zonal capacity to cover uncertainties), critical network elements, a contingency list, operational security limits and potential remedial actions (possibly including non-energy balancing actions). These products will be provided to the Coordinated Capacity.

[1] In accordance with generation and load data provision methodology to be developed on a pan-European basis as per CACM Guideline Article 15(1)

The Coordinated Capacity Calculator will then use the data to develop the European common grid model. The Coordinated Capacity Calculator will perform operational security analyses using the common grid models in order to determine the maximum permissible cross-border flows for each hour (i.e. the cross-zonal capacity). These cross-zonal capacity values will be used in the day-ahead market, subject to TSO validation. The process of common grid model creation and cross-zonal capacity calculation will be repeated at day-ahead, with the updated cross-zonal capacity values being used in the pan-European intraday market. The process may be repeated and cross-zonal capacity values updated within day also, if necessary.

4.2 PHYSICAL NOTIFICATIONS

The TSOs are expected to be required under the Network Code on Operational Planning & Scheduling to perform Operational Security Analyses including at day-ahead stage and during intraday. In order to do so, the TSOs will require information from participants on their likely schedules. The Physical Notifications as proposed in the I-SEM design represent the schedule of generation or consumption for at least the trading day. The TSOs will validate the Physical Notifications and will include them in the input data for the integrated scheduling process.

4.3 BALANCING OFFERS AND BIDS

The TSOs will receive bids from participants. It could be considered that the TSOs could validate the data against default data and, once this step is complete, these bids will be used in the downstream process (See Section 5.4 for further description and discussion). The bids submitted for the balancing mechanism will be of a different format from those currently used in the SEM and will need new IT systems to process.

4.4 PUBLISH INFORMATION

As some of the financial risk associated with supply and demand being imbalanced ahead of real time will move towards the participants, it is critical that they have the latest valid information available to them to inform their market behaviour up to the last hour.

In the I-SEM, the TSOs expect to publish data as required to comply with the regulations relevant to data publication (e.g. total imbalance volume per balancing time unit). More relevant local data would also be published if deemed to be useful for the efficient functioning of the market and operation of the power system. Information may include aggregate forecast demand, forecast wind generation, aggregate contracted volumes from the day-ahead and intraday markets, or aggregate Physical Notifications. The TSOs will update and publish this data in parallel with the other continuous operational processes across the intraday timeframe.

4.5 INTEGRATED SCHEDULING PROCESS

The TSOs are responsible for operating a physically balanced and secure system. In this regard, to the extent that the market does not provide for the necessary services to run a balanced and

secure system, the TSOs will need to take actions to ensure that these services are scheduled in a timely manner, recognising the need to facilitate competition and therefore avoid undue impact on the efficient functioning of the market.

Due to the level of interaction between the energy market and the System Services necessary for a secure system, an integrated scheduling process involving the use of dynamic optimization tools is in our view the best approach to ensuring our actions will be best informed with respect to cost and impact, and ensuring we are able to discharge our obligations under the Grid Code (as expected to be modified to define the I-SEM merit order).

The TSOs are committed to both the principle of balance responsibility that will exist in the I-SEM design and to the continued secure operation of the system.

The optimisation tool used for the integrated scheduling process will have similar inputs to today. These include:

- Participant technical offer data and operational data;
- Participant balancing mechanism commercial data in the form of submitted bids and offers (inc and dec prices);
- Forecast data (demand, wind, scheduled exchanges with BETTA, distribution activity, possibly solar in future);
- Power system limits (modelled network topology, operational security limits);
- Optimiser configuration (start time, time horizon).

In contrast to today, the tool will also take participants' Physical Notifications as an input and will have the objective function to minimise the cost of deviation from notification while respecting operational security and priority dispatch requirements. Prices will be applied to priority dispatch plant to give effect to the objective of facilitating these units in the optimisation process. The process will generate an indicative active power output schedule. This will guide the dispatch decisions; however, the TSOs may have to deviate from this to ensure system security and to reflect other constraints or short notice outages that are not included in the model.

With the one hour intraday market gate closure time, the market will facilitate participants refining their market position closer to real-time based on the latest information available to the market. The Physical Notifications (PNs) may therefore continually change up until this gate closure time. On account of the expected more dynamic market behaviour, the TSOs' integrated scheduling process will need to be a continual process which accounts for these market changes whilst ensuring that operational security is retained over its time horizon. As a result, the indicative active power output schedule will be continually updated.

This schedule will contain reserve 'headroom' on units to meet the expected requirements of the Network Code on Load-Frequency Control & Reserve obligations. The units which hold the reserve and can also provide balancing energy if required will be known as the balancing service providers. Their balancing bids will be used as shared cross border bids between the two TSOs on the island and National Grid and will be available for activation by any of the three TSOs.

Once larger coordinated balancing areas are established, bids for balancing energy will be placed on the more standardised common merit order list.

Some additional tools will also be used by the TSOs from time to time to support their operational processes with the ultimate aim to minimise the cost of deviation from PNs and to facilitate priority dispatch while ensuring operational security. See Section 6.4 for a description of these other tools.

4.6 DISPATCH INSTRUCTIONS

The TSOs will continue to be responsible for the dispatch of all controllable participants on the power system. The effect of individual units' ramping on system frequency continues to be such that the timing of the start of any ramp must be directed by the TSOs as part of the coordination of the dispatch in order to adhere to frequency quality standards on the island.

The 'open' format will be used in communication with the participants' unit operators (as per current practice). The 'closed' format will be used for cross border exchanges of energy with National Grid (as per current practice and in keeping with the future product based approach to dispatch).

There will be an increase in the number of dispatch instruction issued due to cross border balancing actions with the transition to the EU Target Model for electricity balancing in the early years of I-SEM. The rules for this last-hour marketplace will oblige the sharing of the lowest bids for balancing energy with neighbouring TSOs. This should lead to enhanced competition among regional balancing service providers and should lead to a more dynamic use of the interconnectors.

4.7 PUBLICATION OF INFORMATION ON TSO ACTIVITY

The TSOs will publish transparency data on actions taken prior to intraday market gate closure time and during the last hour up to real-time. There is no known standard approach to this reporting. While of great value to participants, it is not yet mandated at an EU level. Therefore it will be an activity that would benefit from starting in a basic way during the early operation of the I-SEM and evolve based on stakeholder preference and eventual pan-European standardisation. It is expected that the I-SEM will require a significant increase in reporting activity by the TSOs, in particular soon after real-time. This will require IT systems to facilitate the timely delivery of accurate information.

5 EIRGRID VIEWS ON THE CONSULTATION TOPICS

In the following section, EirGrid provides its comments on the topics discussed in the consultation paper and puts forward its views on the consultation paper proposals.

5.1 DISCUSSION ON SYSTEM OPERATIONS ISSUES

This section of the paper presents EirGrid's response to the issues raised in the SEMC consultation paper, and some additional issues that EirGrid wishes to raise, in relation to the approach to system operations.

The Integrated Scheduling Process and Interaction with the Intraday Market

The TSOs have statutory duties to operate an economic and secure system, while also facilitating competition in generation and supply of electricity. Where competition alone does not deliver system security, the TSOs will need to intervene ahead of gate closure to ensure that they comply with their other duties.

The focus of the 'System Operation in the I-SEM' section of the SEMC consultation paper is the processes by which the TSOs schedule and dispatch participants. This focus reflects the concerns raised by industry participants at various fora that the TSOs' actions could negatively impact on operation of the ex-ante markets, particularly the intraday market. EirGrid recognises these concerns and the need for the TSOs to consider the impact of their actions on market activity; however, EirGrid believes that these interactions should be aligned with the broader objectives driving the TSOs' actions, including those defined in statute and industry codes to maintain system security and to reduce the impact on costs to consumers.

There are two questions asked in this section of the consultation paper:

- What are the impacts of early actions by the TSOs on the Intraday Market? and,
- What measures can be taken to minimise early actions by the TSOs?

The SEMC consultation paper also considers the differences between energy and non-energy actions and possible approaches that the TSOs might take to minimise these actions. In order to address these issues, it is first necessary to consider the framework within which the TSOs operate their Integrated Scheduling Process.

As discussed in Section 4, the TSOs' Integrated Scheduling Process will be built around the ability of participants to submit and continually update their Physical Notifications and prices. Based on this information the TSOs will prepare schedules (plans) to meet the objective functions of this process while taking into account the technical characteristics of the power system. These schedules then result in actions (dispatch instructions) being taken by the TSOs to either align with a notified position or to deviate from a notified position to meet a constraint. The following sections discuss the TSOs' scheduling objectives and the technical characteristics of the power system.

Objectives of the TSOs' Integrated Scheduling Process: There are/will be three main objectives that define the TSOs' actions in the Integrated Scheduling Process: Security, Priority Dispatch and Economics. The objectives as implemented in the SEM, and as proposed for the I-SEM, are summarised in the table below.

Objective	SEM	I-SEM
Security	Statutory requirement to maintain system security (Source: EirGrid and SONI TSO Licenses)	No Change
Priority Dispatch	'Absolute' interpretation of Priority Dispatch generation (Source: European Directive 2009/28/EC, SEM-11-062)	No Change
Economics	Minimisation of the production cost of generation (Source: SEM-11-062)	Minimisation of cost of deviating from participant Physical Notifications (Source: I-SEM HLD)

The TSOs' scheduling and dispatch process in the I-SEM is fundamentally changing to align with the objective of minimising the cost of deviation from the notified position of participants while maintaining the objectives of system security and priority dispatch. In the SEM, this cost objective considers minimisation of the full cost of the schedule which will include the combined cost of production to meet demand (the pure energy cost) and production to meet system security requirements (Constraint or Dispatch Balancing Costs). In the I-SEM, the objective for the TSOs is to minimise the cost of meeting system security requirements only with participants being responsible for the costs of energy through their trades in the ex-ante markets. In the I-SEM, the cost of electricity to consumers will ultimately be the sum of the ex-ante market costs, balancing mechanism costs, imbalance charges and the TSOs' constraint costs (as well as Capacity and System Services).

Technical Characteristics of the Power System: Discussions at the ETA RLG workshops and in the SEMC ETA consultation paper have recognised some of the distinct characteristics of this island power system. These range from proportionally large reserve requirements, a number of localized 'must run' requirements and an inertial requirement all of which place constraints on the operation of the power system. Resolving these constraints is highly dependent on the resources available and the technical characteristics of these resources. One of the key characteristics required in a dynamic market is flexibility – the ability of resources to provide, or take, energy at short notice (e.g. short notice times to get to minimum load) and in a flexible manner (e.g. with short minimum on/off times and low minimum loads). Other markets have seen significant improvements in generator performance capabilities driven by the need to

provide flexible response to market signals. Improvements in the technical capability of resources on this island, driven by the I-SEM and System Services, will ultimately feed into the TSOs' decision making process and allow the timing of TSO actions to move closer to when they are actually required.

Meeting the TSOs' objectives within the technical characteristics of the power system is what determines the TSOs' actions. The volume, timing and categorisation of these actions are discussed below.

Volume of actions: Historically in the SEM, the level of constrained actions has been high when compared to unconstrained market positions. In 2013, this represented a 40%[2] energy difference between the constrained and ex-post unconstrained schedules. Experience of other markets would indicate that the volume of energy traded on intraday markets is of the order of 10%[3] of that traded at day-ahead stage. While a direct comparison of these figures is not possible given they are based on different market designs, they do at least give an indication of the respective energy volumes that might be reflected in actions taken by the TSOs when compared to intraday market activity in the I-SEM.

The TSOs' actions to ensure system security have a cost – the 40% energy volume figure discussed here results in constraint costs as all these actions are 'out of merit'. As discussed above, one of the TSOs' objectives is to minimise these costs which are ultimately borne by consumers. EirGrid recognises that there is a balance between minimising constraint costs through taking the most cost effective constraint actions available and allowing the market to optimise its position. However, the TSOs' constraint actions generally relate to specific 'out of merit' actions whereas the market will always seek the next cheapest bid/offer. Minimising the sum of the TSOs' costs and the market's costs produces the lowest cost for the end consumer. Experience of the relative volume and cost of TSO actions and market actions in the I-SEM will inform this position however at this point in time EirGrid believes that measures to limit TSO actions to later, less economic actions may not necessarily lead to a lowering of overall costs for the end consumer.

Timing of actions: The TSOs' actions are dispatch instructions to start-up, shut-down or adjust a MW output. The issue of these instructions must reflect the timing of when the system constraint becomes binding and the time it takes for the participant to respond. For example, a thermal generator is required on at 06:00 to provide local voltage support during the morning load rise. The generator has a combined notice and loading time (time to get to minimum load) of 5 hours, therefore the TSOs must issue a start-up instruction to the generator by 01:00.

Industry concerns have been expressed about the impact of 'early' TSO actions on their intraday activity. Intraday actions by the TSOs are likely to centre on start-up of generators with greater than one hour start-up times given that other actions (changes to MW dispatch and shut-downs)

[2] Constraint Analysis for 2013, SEM-15-013

[3] Based on ENTSO-E 2013 volumes traded in EPEX (DA: 351 TWh, ID: 31 TWh) and APX (DA: 76 TWh, ID: 16 TWh)

can generally be instructed much closer to the time they are required. The timing of the TSOs' start-up actions would be in line with the start-up characteristics of participants and would not preclude participants from trading in advance of these times. The TSOs would consider their actions as 'on time' rather than 'early'. It should be noted that the TSOs are more likely to constrain a generator 'on' intraday (a position that potentially provides a generator with an opportunity to trade intraday) than 'off' (given that the vast majority of generators can be shut down in less than one hour). Later discussions in this paper consider the ability of participants to continue trading intraday post TSO action.

Categorisation of Energy/Non-Energy Actions: The SEMC consultation paper considered how different scheduling and dispatch options might apply to energy and non-energy actions and asked how early actions might be avoided. Regarding the issue of distinguishing between energy and non-energy actions, EirGrid believes that there is not a firm basis for making this distinction in the intraday timeframe when these actions are being taken. It has been recognised in the consultation paper that there will be an element of post-processing required to perform this categorisation for certain imbalance pricing options once all information (including Final Physical Notification or FPN) is available. Categorisation of TSO actions taken in advance of FPNs would therefore be subject to change anyway depending on the final market outcome. Individual actions taken by the TSOs are likely to be based on a range of security requirements from the provision of inertia, local voltage support and reserves. For these reasons EirGrid believes that the actions the TSOs take in reference to the intraday positions notified by participants are for system security reasons only and that classification as energy or non-energy is not relevant in the intraday timeframe.

For example: if the sum of PNs is 300 MW short of the TSOs' expected net demand in four hours' time, the TSOs may need to start-up a generator and operate it at minimum load (with a 4 hour notice time) to provide the capability to meet this potential shortfall and ensure system security. Should the market positions evolve to fill this shortfall by intraday gate closure then this start-up action may be deemed a non-energy action. Should the shortfall remain at intraday gate closure then the TSOs may increment the unit from minimum load to 300 MW – in this scenario the TSOs' actions, start-up and increment, may be deemed energy actions.

EirGrid believes that the scheduling and dispatch process will evolve following the transition to the I-SEM; however, a number of factors must be considered before the details of processes become defined:

- Market power mitigation measures – will have a major impact on constraint costs;
- Market rules around the treatment of priority dispatch generation;
- Ex-ante market behaviour – the balance of trading between the day-ahead market and the intraday market, the timing of intraday trades and the volume of overall ex-ante trades will significantly impact on the TSOs' scheduling process;
- Whether or not priority dispatch generation, particularly wind, participates in these markets or simply 'spills' in balancing timeframes;

- The volume and cost of intraday trades relative to the volume and cost of constraint actions;
- Changes to the technical characteristics of participants that arise from System Services incentives to improve flexibility (e.g. reductions in notification times for thermal generation).

The first two points above will be determined as part of the I-SEM design; however, the impact of the other factors may only become known through experience of operating the I-SEM. EirGrid believes that, through appropriate monitoring and reporting, an overall view can be taken of the interaction between the TSOs' actions and market behaviour and processes adapted to deliver the best overall solution for consumers.

In summary, the TSOs' Integrated Scheduling Process is built around the ability of participants to submit and continually update their Physical Notifications and prices. The TSOs have defined objectives for, where necessary, adjusting the physical positions of participants based on the requirements of their respective Transmission Licences to maintain system security and SEMC decisions with respect to priority dispatch and economic dispatch. EirGrid believes that TSO actions that interact with the intraday market are limited and will not preclude participants from actively trading in these markets. Finally EirGrid believes that the TSOs' Integrated Scheduling Process will need to evolve and adapt with experience of the I-SEM.

Cross Zonal Capacity Limitations and Countertrading

Some aspects of current practice will be included in the methodology to be determined at European or regional level. For example, this methodology will include how cross zonal ramping restrictions are applied between synchronous areas in accordance with the Network Code on Load Frequency Control & Reserves; however some aspects will change from current practice. Today in the SEM, the TSOs manage the power system to maximise the combined Moyle/EWIC cross zonal capacity[4]. The outcome is that unnecessary curtailments of cross-border capacities are avoided, the full capacity of the HVDC interconnectors is made available to the market, and the transmission systems do not tend to impose binding restrictions on the trade between BETTA and the SEM. However, to facilitate this, at times the TSOs are required to trade with counterparties in BETTA after SEM gate closure.

For example, when the SEM schedules exports on Moyle and EWIC above specified values, the TSOs trade with a counterparty in BETTA to reduce these exports in order to respect the dynamic stability limit. In the I-SEM, intraday market gate closure times in the I-SEM and BETTA will align. Therefore, the TSOs will no longer have the facility to trade with counterparties in BETTA in the same manner as today.

In the I-SEM, for this scenario, the TSOs may have to take a remedial action such as performing a rolling countertrade with National Grid after the intraday market to manage this resultant interconnector schedule. The methodology will be agreed among the TSOs in the capacity

[4] in accordance with Regulation (EC) 714/2009 Article 16(2)

calculation region through the development of the common methodology for coordinated redispatching and countertrading under CACM Guideline Article 34(1). Should regular countertrading be required to maintain the cross zonal capacity limits in the I-SEM, further analysis, based on early I-SEM operational data, will be essential to develop the most cost effective approach to these trades.

Publication of Data

Across Europe TSOs already publish varying degrees of detail around their actions in the balancing market and there is a trend to increase the volume of data provided to the industry by the TSOs. This trend is reinforced by obligations through the regulations such as REMIT and Transparency.

Today, SEMO publishes information on forecast system state for a set time horizon (e.g. load and wind forecasts). SONI and EirGrid also publish information on reserve requirements and power system constraints.

The challenge for the I-SEM is how participants can use the information provided to them to support the secure operation of the system. It is clear that as the TSOs forecast future imbalances, participants can execute trades to fill the energy gap. However, for a more localised binding constraint, it is not clear how participants can respond to help manage the constraint. The balance responsible principle applies to the balance between supply and demand and not to operational security aspects.

Due to expected changes in status of the indicative operational schedule, the ability to trade up to 1 hour ahead of real time, the route to physical schedules and the increase in balance responsibility of participants, the TSOs may not continue the practice of providing the indicative operational schedules or gas nominations to participants.

5.1.1 DISPATCH BALANCING COSTS INCENTIVES

EirGrid does not support the proposal for the incentives on the TSOs with respect to all-island balancing costs. We have stated in previous consultation responses that the I-SEM has the potential to result in increases in dispatch balancing costs. This partly arises due to the nature of the day-ahead and intraday markets where contract positions may be less reflective of generators' physical capabilities than with the current Market Scheduling and Pricing software. Also, we believe moving from a market based on ex-post perfect hindsight to a market based on ex-ante forecasts will be a significant factor in potential increases to the dispatch balancing costs. In particular there will be uncertainty surrounding the resulting dispatch balancing costs in the first year post go-live.

We welcome appropriate incentives but would note that maintaining the current incentives could be perceived as driving the TSOs towards more early balancing actions which may have undesirable impacts on the intraday market. We note that some participants have also raised this concern at the public workshop on the ETA held by the SEM RAs, noting that the current

approach appears to contradict some of the intent of the proposals included in the consultation paper.

This should not be taken as EirGrid's opposition to incentives but it represents our belief that the factors influencing DBC are potentially changing with the transition to the I-SEM and a further review of incentives should be undertaken and different incentives may be appropriate for the first years of operation of the I-SEM.

5.2 EX-ANTE MARKETS

The work being carried out by SEMO in the EUPHEMIA trialling should help develop views on what order types deliver the best result and what limitations may be required in the final operational market. It is too early at this point to make any decisions in respect of this and we believe the order types should be the subject of further review and possibly consultation after the completion of the trials.

The current SEM provides participants with additional opportunities to trade after the day-ahead market and these opportunities extend to cross border trading. It would represent a backward step for the I-SEM to go-live with less trading opportunities than the SEM has. Removing cross border trading from the intraday process at the start of the I-SEM will mean that power flows determined based on day-ahead forecasts will be fixed as the final market position and only countertrading by the TSOs can be used to alter cross border exchanges.

To provide for a level of trading that is beyond that currently available in the SEM, it will be essential that the I-SEM is coupled with the intraday project for GB. These local implementation projects or LIPS will be progressing and will join together to make up the final XBID when this is complete. Joining the GB LIPS will ensure that participants in the I-SEM will have access to cross border capacity and will enable the market to address any issues arising from inefficient flows from the day-ahead based on longer term forecasts. The GB LIPS may also be a regional initiative involving access to the BritNed and IFA interconnectors.

With respect to proposals for cross border regional auctions with GB for the I-SEM, these would need to take the form of regional coupling rather than a local I-SEM only auction. Therefore this option would need to be explored with, and is dependent on, market operators and the system operator in GB. There are currently no plans for cross border auctions in GB and, given the implementation timelines for the I-SEM, we would suggest the effort for go-live should be focused on participation in the GB LIPS.

A regional auction could be developed with GB; however, we believe this is something that can be explored after the implementation of the I-SEM rather than being a day 1 solution. The focus for the intraday market for the I-SEM should be on implementation of a continuous implicit trading solution which will be delivered through cooperation with the GB local implementation project or with the XBID project itself.

5.3 PHYSICAL NOTIFICATIONS

The consultation paper acknowledges, and EirGrid agrees, that access to accurate information as early as possible is of paramount importance to the TSOs. In the stages of planning the operation of the power system, it is essential that the data used to develop schedules and which feeds into dispatch decisions represents insofar as possible the realities of the system. This is acknowledged in the requirement that PNs must be physically feasible and they will represent the baseline from which inc or dec orders will be applied. We believe that to ensure these requirements the PNs submitted by participants should not be limited to ex-ante trades but should take account of any TSO actions also.

This requirement feeds into a number of considerations when reviewing the requirement to submit Physical Notifications to the TSOs.

5.3.1 TIMINGS AND GRANULARITY OF PARTICIPANT PHYSICAL NOTIFICATIONS

EirGrid would believe that submission by 14:00 appears to provide a longer timeframe than necessary for participants to convert their day-ahead market positions into an initial PN. Given the requirement that the PN should by physically feasible and that the HLD envisages that the day-ahead is the exclusive route to Physical Notification, participants' offered trades to the day-ahead algorithm should be compliant with their potential running schedules. We would therefore expect that participants would have determined their preferred running before determining their offer. In this manner, participants would already have access to their proposed running, and therefore PN, when the day-ahead market run is executed. Given this, it is unclear why an additional two hours are necessary for the conversion of day-ahead positions into notifications. The current deadline operated across Europe is for notifications to be submitted by 14:30 CET or 13:30 GMT and for consistency, especially with respect to decoupling arrangements, we believe this should be considered.

Participants are also required to be able to create and submit updated PNs post an intraday trade with a 15 minute requirement suggested during the Rules Liaison Group meetings. There does not seem to be a need for a much longer conversion process at day-ahead compared to intraday. Given this position, it would seem appropriate that the updates from intraday trades are submitted to the TSOs as early as possible rather than being based on volume of deviation or some other gated standard.

The Final Physical Notification or FPN should be determined from the last PN received at gate-closure for the intraday market to facilitate operation of the balancing market. This means that the last time for submission of the FPN is the same as the last time for an intraday trade. While this would appear to limit late trading in the intraday market to financial contracting only, this is a limitation of the timings being driven by the European Network Codes. Given that some participants expressed a need for 30 minutes to convert intraday trades into Physical Notifications, the gate closures would mean that the last physical intraday trade would be 90

minutes ahead of delivery time. Participants who are able to convert trades into physical notifications in shorter times will be able to enter physical trades closer to gate closure.

With respect to the granularity of the PNs, while we agree that it is the TSOs' role to balance the generation and demand on the system instantaneously and at all times, it needs to be understood that the primary use of the PNs will be in the planning of the scheduling and dispatch process. While in real time, instructions are issued using actual spot data points, in the forward planning phase, scheduling tools used by TSOs around the world generally work at a half-hour granularity. Therefore, if spot data points are provided to the TSOs to reflect positions from the day-ahead market, the first step will be to convert these to half-hour average MWh values for input into day-ahead scheduling tools.

Granularity of the PNs should also be consistent with their intended usage. As noted here, the planning tools are likely to operate on a half-hour granularity. Elsewhere in the consultation paper, the PN or FPN is intended to be used in the imbalance settlement process and potentially in the determination of the Net Imbalance Volume (NIV). Therefore, the granularity of the imbalance settlement period should also feed into this discussion. If participants are to be settled on a half-hour imbalance settlement period, this would raise a question as to the value of PNs with a higher granularity and also whether a difference between the imbalance settlement period duration and the granularity of the FPN may lead to anomalies in the settlement calculations.

5.3.2 REQUIREMENTS ON DEMAND AND WIND PARTICIPANTS

When considering if Supplier Units and small wind Generator Units should be obliged to submit PNs to the TSOs, this needs to be considered not just in the context of the start of the I-SEM but also in terms of its longer term operation. As the market is intended to reflect the principle of balance responsibility, it will become increasingly important over time that suppliers and small scale generators develop accurate methods of forecasting. This will be needed to help them improve their ex-ante trading and to help avoid exposure to imbalance prices. The market design should drive better incentives for participants to improve their forecasts and develop them at a more granular level than the TSOs would use. Given the increases being observed in micro and other embedded generation installations, such as photovoltaic, on the supplier side of the market, it would be expected that the participant's forecasts will have better foresight of these installations than the TSOs and, therefore, there would appear to be a value in these participants submitting PNs based on their forecasts to the TSOs. While the TSOs would not attempt to dispatch these participants based on their PNs, no incremental or decremental prices should be included and the FPN should not be used in settlement processes, they can be useful to the TSOs in developing the indicative active power output schedule.

This would require, however, that all entities submitting forecasts would need to develop these to the same level of accuracy. If the quality of the forecasts varies across participants, then the value of this is reduced as the TSOs will be unable to determine which submission is inaccurate. Where the TSOs believe the forecasts are materially incorrect, it can still use its own forecasts

for this purpose while the participants will be exposed to the imbalance price for their forecast errors. As we note above and elsewhere, this may not have the value at the start of the I-SEM as it could after a few years of operation. Therefore, it would be suggested that transitional arrangements could see the TSOs continue to use their own forecasts for the first years of the new arrangements.

This should not be limited to just small wind Generator Units but to any small Generator Units.

5.3.3 PHYSICAL NOTIFICIATIONS AND EX-ANTE TRADES

With respect to whether PNs should be linked to a participants' contracted volumes, EirGrid would have concerns with options whereby participants can submit earlier PNs that can be subject to significant change in the last hour due either to a requirement to be linked to ex-ante trades at gate closure only (option 2) or a desire to avoid exposure to imbalance prices (option 3). While the consultation considers option 3 to have less risk of late changes, the description assumes that a participant submitting a PN under this option is not incentivised to adjust the PN to match its contracted trades at gate closure. This would seem to be contrary to the principle of balance responsibility as set out in the SEMC high level design decision. EirGrid would also be of the opinion that this option does permit a form of self-scheduling, outside of traded market positions gained in competitive markets, in the I-SEM. To preserve and promote liquidity in the ex-ante market timeframes, it is essential that participants are encouraged to the greatest extent possible to trade in the ex-ante markets and, therefore, options that permit spilling into imbalance settlement should be less desirable.

If the imbalance pricing mechanism is designed appropriately to incentivise balance responsibility and participation in the ex-ante markets, then it would seem that participant behaviour will follow on from this to ensure their PNs are feasible and best represent their contracted positions from the ex-ante markets. EirGrid believes that the market design should drive the correct and desired behaviour with respect to linking PNs to contracted volumes rather than this be a specific market rule; however, it is appropriate that, if the market design does not drive the desired behaviours, the SEM Regulatory Authorities should be able to take appropriate action through its market monitoring function.

5.4 FORMS OF OFFERS, BIDS AND ACCEPTANCES

5.4.1 FORMAT OF INC AND DEC ORDERS

EirGrid have a preference on the format of bids and offers for option 3 (MW Absolute).

We believe that the Simple MWh option may not be suitable for use in the I-SEM balancing market. One reason for this is that it may be less clear to reflect underlying costs in the formation of these orders, and as stated in the consultation paper, therefore may be problematic for units whose costs increase with output. Another reason is that it may be possible to arrive at the same MWh value from very different shapes in the dispatch instruction

profile. This means that the order accepted may not reflect the costs of the generation profile, even if the orders submitted managed to sufficiently reflect underlying costs.

In using the MW Absolute format, participants can interact with the balancing mechanism in a way which allows them to avail of the advantages of either the MW Absolute or MW Relative options as they wish. The default use of this format would allow participants to reflect their underlying costs in a clear, simple and more transparent structure, and allow them to update PNs without the additional overhead from a requirement to also update order quantities and prices.

Those participants who wish to avail of the additional flexibility of the MW Relative format can do so by using the MW Absolute format in a different way to the default. Participants are able to vary the absolute band quantity values and prices for each period, and can also update these during the day. This means they can replicate the effect of the MW Relative order format where bands are constructed in a way which makes them relative to the level of Physical Notification in each period.

The MW Absolute format would also have advantages in terms of the operation of the balancing market, for example their use in optimisation tools which are currently well understood as this is a similar format to the SEM COD. It could also have advantages in terms of market monitoring due to its structure allowing the underlying costs of participants to be more transparently represented.

The possibility of incorporating two separate order curves, one for incremental actions and one for decremental actions, depends on the imbalance pricing approach taken. It may be possible to use two curves in approaches where the price is taken from the point of intersection between the order stack and the balancing requirement (the NIV). This means it should be relatively simple to incorporate in the flagging and tagging, simple stack and one potential approach to the unconstrained stack with plant dynamics approaches.

However, in approaches where a “shadow price” from an optimisation is required, it may not be possible to incorporate more than one curve. This would affect the unconstrained stack with plant dynamics approach if the price taken was the shadow price directly from the optimisation, rather than using the optimisation to build a stack and using the point of intersection with the NIV for the price. This would also affect the unconstrained unit from the actual dispatch approach. This is because the calculation of a shadow price in optimisation relies on the slope of the continuous order curve, but having two curves in the same optimisation creates discontinuities which prevent this slope from being calculated. The practicality of incorporating two order curves should be further explored taking into account what is possible in the imbalance pricing approach chosen.

5.4.2 TREATMENT OF START COSTS

EirGrid have a preference for option 3 (Explicit Start Costs) as the method of treating start costs.

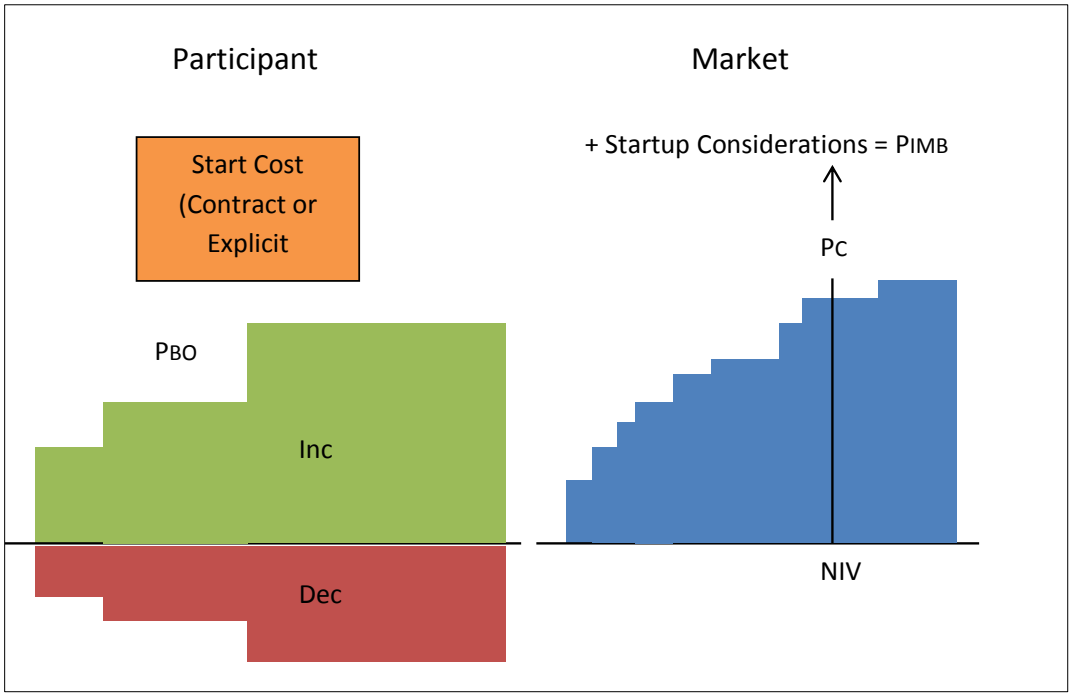
In keeping with our preference for the MW Absolute order format, we believe that the Explicit Start Costs approach is the most transparent, allowing participants to submit a clear representation of the underlying costs. This can be helpful in making decisions to operate the system in the most efficient manner possible.

While the SEM does not use a single explicit parameter for start costs, as it looks to reflect the changing heat state and therefore changing start costs of a unit with one value, the ability to resubmit commercial data up to gate closure gives participants the opportunity to reflect these changes of heat state and therefore removing the need for multiple start costs.

There is a potential problem with all approaches to the settlement of energy vs. non-energy actions and the treatment of start costs. In each of the approaches to imbalance pricing, it is envisaged that the settlement of the units will be on the basis of the best of the participants' price or the imbalance price, regardless of whether the action was classed as energy or non-energy.

However, it is also considered that start-up costs should be reflected in the imbalance price. Under the start-up contracts and explicit start costs options, it may be possible in all of the imbalance pricing approaches to include the start-up costs in the calculation of the imbalance price (e.g. through an uplift type calculation). However, the basis for settling on the better of the imbalance price or bid/offer price is then complicated. The bid/offer price, which may in some approaches exclude consideration of start-up costs, would be compared with an imbalance price which includes consideration of start-up costs.

In the following diagram, it would mean that the price from the participant, P_{BO}, would be compared with the price from the market, P_{IMB}, where P_{BO} only takes into account variable costs, while P_{IMB} takes into account variable costs and start costs.



Therefore it needs to be considered how fixed costs can be adequately compensated, while also ensuring that the prices compared are like-with-like. For example, it could be possible to calculate a fixed-cost-adjusted price for each participant. If the market system was able to detect when a unit was brought on, it could place a simple adder on their price for that hour to allow their costs to be recovered.

There may also be restrictions on the means of taking fixed cost considerations into account in the price. One of these could be the timing of publication of the imbalance price, where there will be a requirement to do this within an hour of the settlement period. This means that if, for example, an uplift type calculation were incorporated to include fixed costs in the imbalance price, it may not be possible to smear these costs over the running time of a unit and instead a larger uplift, potentially in a single hour, would be calculated instead. If closed instructions were to be used, it is possible that the start cost could be smeared over the running hours of the unit implied in the balancing order accepted; however, this could differ from the actual outturn running hours.

Another option for compensating for start-up costs could be considering a different mechanism other than including it in the price. Under the option for out-of-market start-up contracts, a tariff based approach could be implemented. Under the explicit costs option, a make-whole payment approach could be suitable.

5.4.3 REBIDDING OF OFFER AND BID PRICES

EirGrid believes that the principle to be followed in any approach to how bid and offer prices can be resubmitted should be that participants cannot change the terms which informed the decision to enter into a contract after the fact. This is present in the other markets at day-ahead and intraday, where participants cannot change the price of accepted positions once they have cleared. Should it be possible to change prices and quantities after the fact, this could allow participants to unfairly increase the revenue they receive or decrease the revenue they pay, to the ultimate detriment of consumers.

In the balancing mechanism, decisions to enter into agreements to trade would be made with the understanding of the prices for the orders being accepted, the quantities being procured, and the prices which would apply for subsequent trade agreements in the opposite direction to the initial trades. With this in mind, of the approaches presented in the consultation paper, we would view the Fixing Price of Accepted Bids and Offers approach as the minimum which should be expected to enact such a principle.

We agree there is merit in considering the fixing of prices of a bid which would reverse the effect of a previously accepted offer and vice versa. This would ensure that the principle of not changing the understanding on which an agreement to trade was made after the fact is upheld. It is important in helping ensure the safe and efficient operation of the system that it should not be possible for changes to be made which would prevent the most efficient decisions from being taken due to their cost, or would mean that actions which are unavoidable due to their impact on system security are charged unfairly.

We believe that Undo Prices would have limited use either as a solution in isolation, or if used with other approaches. In the I-SEM context it is analogous to the price in the opposite direction to a previously accepted order, and therefore the same means of enacting the principles stated would apply, meaning the inclusion of such a term would add complexity without any substantial advantages.

5.4.4 OPEN AND CLOSED INSTRUCTIONS

EirGrid believes that open instructions should be retained in the I-SEM for internal balancing actions, while closed instructions should continue to be used for cross-border interactions. This would be largely consistent with how the system is run today.

We agree that the continued extension of closed instructions may result in the disadvantages of closed instructions (additional overheads, information and communication requirements) arising without the potential advantages of these instructions (additional clarity on the intended duration of an action) being realised. It may not be possible to effectively and efficiently implement the additional information and communication requirements without either a large additional overhead on the TSOs and participants, or without moving to a more complex automated approach.

We recognise the link between these options and the approach to fixing prices of accepted orders. We believe that under open instructions, it should be possible for units in general to update their prices for trading periods subsequent to where an open instruction has been issued. If the change in prices for the subsequent periods would result in the continuation of that instruction becoming uneconomic, the decision to issue a further instruction to that participant to shorten the action would be taken in time to ensure the most economic dispatch possible. Persistent changing of prices with the intention of taking advantage of an open instruction should be subject to market monitoring considerations.

However, there are cases where a dispatch instruction which is subject to a constraint may be issued, for example where a unit is brought on but has a minimum on time of greater than a balancing market trading period duration. In these cases, it would be unfair for the prices in the subsequent trading periods related to the constraint to be changed, as the unavoidable action of maintaining an instruction over those periods could be unfairly charged. We believe that allowing participants in general to resubmit prices for subsequent trading periods, but for prices to be fixed where they relate to constraints with the unavoidable continuation of an instruction, allows for sufficient flexibility and certainty through the use of open instructions.

Closed instructions can be used for cross-border interactions, as it is likely that there will be a much smaller amount of these instructions compared with internal instructions on each unit. They will also likely continue to be highly systemised and automated (e.g. in issuing dispatch points for the flows on interconnectors).

5.5 INTERACTIONS BETWEEN THE BALANCING MECHANISM AND INTRADAY MARKET

As set out in the consultation paper, parallel operation of the intraday market and balancing mechanism is a distinguishing feature of the I-SEM. Compared to other European wholesale markets in which the TSOs often take actions outside the balancing mechanism before intraday market gate closure, the concurrent operation of the intraday market and balancing mechanism in the I-SEM should provide greater transparency to participants regarding the TSOs' balancing actions. Nevertheless, it is recognised that there are a number of key questions to consider in the detailed design, including:

- How do TSO actions impact a participant's ability to trade in the intraday market?
- Do early TSO actions remove potential counterparties for other participants (such as demand or intermittent generators) seeking to hedge imbalance risk?
- Can a participant trading in the intraday market unwind a previous TSO action, or potentially exaggerate the quantities to be settled at balancing market prices?

Where the balancing actions and intraday market trades are in the same direction, the consultation paper presents two main options for their interaction, additive and substitutive (discounting the third option of freezing PNs following a TSO action). Separate options are presented for treating intraday market trades in the opposite direction to a balancing action.

5.5.1 ADDITIVE AND SUBSTITUTIVE PN CHANGES

As described in the consultation paper, the additive and substitutive approaches each have potential merits and drawbacks with implications for subsequent intraday market trading activity and TSO actions.

On balance, we consider that the additive option has greater merit. By treating balancing contract volumes as firm at the time of the instruction, the additive approach arguably provides greater clarity for both participants and TSOs on the quantities to be settled in the balancing mechanism. It also implies that balancing actions are treated consistently with ex-ante market positions; whereas the substitutive approach has the effect of unwinding balancing quantities retrospectively.

We note that the examples of additive or substitutive actions presented in the paper may be unlikely to occur in normal operation, given the approach discussed in Section 4 of 'on time' TSO actions reflective of plant dynamics. The illustrative examples imply that the TSOs will be taking early actions to reposition generators which already have committed positions from the day-ahead market. In practice, it is likely that such actions could usually be deferred until after gate closure, thereby avoiding any disruption of intraday trades.

One of the potential drawbacks of the additive approach highlighted in the consultation paper is the possibility that the TSOs may find themselves needing to take actions to offset the consequences of intraday market trades near to real-time. In practice, this possibility exists in

both the additive and substitutive cases, and applies to PN revisions for all generation units, irrespective of whether the TSOs have taken a security action.

In the additive case, a revised PN following an intraday market trade will always imply a change in the expected output level, pending confirmation by TSO instruction. In the substitutive case, a revised PN may or may not imply a change in expected output, depending on the size of the PN change relative to any previous bid/offer acceptances by the TSOs.

One of the advantages presented for the substitutive approach in the consultation paper is that netting the intraday trade against a previous bid/offer acceptance leaves the net system position unchanged, with the prospect of greater stability for the TSOs. In practice, however, the intraday market trade and balancing action are not direct substitutes and there will be circumstances in which a substitutive intraday trade creates the need for further TSO action. If the participant's intraday trade is matched cross-border, interconnector flows will change and this may necessitate TSO action. Conversely, if the intraday trade is matched within the I-SEM, this could reposition another resource away from its optimal level for system security and prompt further TSO action. It therefore appears unlikely that the substitutive approach will be advantageous to the TSOs compared to the additive in terms of minimising the need for consequential actions.

Two variations of the substitutive approach are presented, distinguished by whether the intraday price is swapped for the balancing market price as a whole or just the imbalance price component (in which case any premium to the imbalance price will be locked in for the original volume of the balancing action). The second of these options arguably maximises the opportunity to trade around expectations of the imbalance price, even for "out of merit" generator units on which the TSOs have taken actions for non-energy reasons. This offers the prospect of generators being brought on by the TSOs for "non-energy" reasons and then becoming counterparties to demand or wind participants seeking a hedge against imbalance prices. In practice, however, such generators may have little incentive to trade in the intraday market, given they are already guaranteed to receive the higher of their offer price and the marginal imbalance price for the balancing action.

We note that under the other variation of the substitutive approach, an "out of merit" participant is less likely to find a counter party in the intraday market willing to pay a more advantageous price than that obtained for the balancing action. Indeed, such a participant would be more likely to trade in the intraday market under the additive approach (assuming that the early balancing action has covered the unit's start costs).

5.5.2 TRADING IN THE OPPOSITE DIRECTION

We support the consultation paper proposal to develop imbalance settlement logic to prevent changes in PNs from increasing the quantity on which any bid or offer premium is payable in the balancing mechanism.

Such an approach provides for the balancing mechanism to be treated consistently with the ex-ante markets. Day-ahead and intraday participants cannot change the price and quantity of accepted positions once they have cleared. It would therefore seem perverse to allow participants to retrospectively inflate the volume of balancing actions settled at premium prices, creating additional costs for other participants, the TSOs and ultimately consumers.

In practice, PNs representing trades in the opposite direction to a TSO balancing mechanism action are unlikely to be physically accommodated, given the operational security requirement for the initial TSO balancing action. Moreover, there will be consequential impacts arising from the intraday trade, whether the counterparty to the trade is another I-SEM participant or overseas, which may necessitate further TSO action. It can be noted that these consequential impacts and costs could be avoided under the alternative option discussed in the consultation paper, namely preventing PN changes in the opposite direction to TSO actions.

Subject to consideration of any complementary measures introduced in the forthcoming market power work stream, the proposed imbalance settlement functionality should be implemented for I-SEM go-live.

5.5.3 PN CONVENTIONS & PHYSICAL FEASIBILITY

The consultation paper adopts a convention in which PNs do not include prior TSO actions. We note that different conventions are used elsewhere. In GB, for example, participants are generally required to submit FPNs which reflect the consequence of any pre-gate balancing actions taken by National Grid. In many respects, this is a matter of convenience for communications and settlement algebra. It is however essential that there is no ambiguity for participants and the TSOs in communicating intended output levels.

The consultation paper also makes the assumption that PNs must be physically feasible at all times, but notes that this requirement could limit the ability of participants to make intraday trades. We suggest below a refinement of the physical feasibility requirement to provide clarity for the TSOs and participants, as well as facilitating intraday trades.

The initial PN profile submitted after the day-ahead market should be physically feasible. Participants are better placed than the TSOs to manage the conversion of their day-ahead market results to a physically feasible schedule. In the event that the TSOs have taken an early balancing action, we propose that the combination of PNs and TSO actions must be physically feasible. It may not be necessary for the revised PN in isolation to be physically feasible, as described in the following scenario:

- Assume the TSOs take an early action to commit a participant which has no day-ahead market position.
- The participant takes the opportunity to trade in the intraday market and submits revised PNs prior to gate closure.

- Given the nature of the intraday market in which bids and offers are matched on a continuous basis, these intraday market trades may be for individual hour periods and for relatively small quantities.
- The PN revision following an intraday market trade could therefore imply a running period shorter than the generator's declared minimum on time and for less than the unit's minimum stable output level, and be deemed physically infeasible if considered in isolation.
- However, irrespective of whether the additive or substitutive convention is adopted, the revised PN may be acceptable when considered in combination with the early TSO action.

The participant's operational status and early TSO actions (if any) should therefore be taken into consideration in assessing whether a PN is physically feasible.

5.6 TREATMENT OF SYSTEM SERVICES

System Services are essential to delivering Ireland and Northern Ireland's renewable energy policy objectives and their consideration as part of the I-SEM ETA development is welcomed by EirGrid. We agree with the SEMC's understanding of the treatment of System Services being similar to how Ancillary Services and the SEM currently interact. In summary, this understanding is that the System Services arrangements are designed to incentivize enhanced technical capability of participants and that the I-SEM ETA will deliver the mechanisms by which these services will be deployed by the TSOs in actual dispatch.

The deployment of reserve examples in this section of the consultation paper (Section 7.6.1 and 7.6.2) may not reflect the process by which such reserves are actually deployed by the TSOs. From a scheduling perspective the TSOs will need to ensure that there are sufficient participants on-line or able to come on-line to provide reserve. At times this will necessitate the TSOs instructing a participant that is off to come on and, given notice time of thermal generation, this instruction may need to be given during the intraday timeframe. Once a participant is on at their minimum generation level it can generally be positioned to provide a particular level of reserve within its operating range relatively quickly, meaning there would be no need for the TSOs to take 'MW' actions (i.e. moving the resource up or down) while the intraday market is still open. For example, obtaining 50 MW of reserve from a 400 MW CCGT with a FPN of 400 MW would only take 5 minutes at a 10 MW/min ramp rate.

The actions to deploy System Services can be split into two main categories:

- Commitment – ensuring the participant is available to provide the service – this may require the TSOs instructing a start-up during the day-ahead or intraday timeframes to be at their minimum generation level by the last hour.
- Dispatch – achieving a particular MW position or range within which the participant should operate – this would generally be feasible as a TSO dispatch instruction post closure of the intraday market.

EirGrid believes that this clarification would help in addressing some of the concerns that participants have expressed in relation to TSO actions impacting on their ability to trade intraday.

The following sections provide EirGrid's response to the specific comments sought in Section 7.8 of the consultation paper.

5.6.1 IMPACT OF SYSTEM SERVICE DEPLOYMENT ON INTRADAY TRADING

EirGrid agrees with the SEMC position that a participant constrained to provide System Services (or as a result of other system constraints e.g. a transmission circuit outage causing a thermal constraint) should be able to trade in the intraday market. However it should be noted that trades in the opposite direction to a TSO balancing mechanism action are unlikely to be physically accommodated given the operational security requirement for the initial TSO action. There are two potential constraints or limits that the TSOs' requirements for System Services may place on a participant's physical output – a maximum output limit and a minimum output limit. These limits may also be combined to define a range within which the participant should operate.

Limit Type	Examples of TSO Requirements
Maximum Output Limit	Provision of upward reserve / ramping capability / export constraint
Minimum Output Limit	Provision of fast frequency response, inertia, voltage support, downward reserve / ramping capability / import constraint

Currently, when the TSOs dispatch a generator the instruction consists of a sync, de-sync or MW set-point. The instruction does not explicitly state what System Services the generator is expected to provide – rather this is inferred from its contracted capability / Grid Code requirements and the operating conditions of the generator.

In the I-SEM, when the TSOs accept an offer from a participant, resulting in the dispatch of that participant, as today the participant will not be explicitly aware of the reasons for their dispatch. The participant will be able to continue to trade in the intraday market but any updates to trades may only be physically accommodated if they are in the same direction, and in addition to, the TSOs' last balancing action.

- A participant that is dispatched on/up by the TSOs during intraday market should treat this dispatch instruction as a minimum physical output limit.
- A participant that is dispatched down/off by the TSOs during intraday market should treat the dispatch instruction as a maximum physical output limit.

Example of Generator Constrained On

A 400 MW generator that has a PN of 0 MW is constrained on by the TSOs (an inc or start-up offer is accepted) to provide a range of System Services (inertia, voltage support, reserve). The generator is initially instructed to its minimum load, 200 MW, at which it is capable of providing the System Services the TSOs require. Once on, the generator would still be free to trade in the intraday market. However the TSOs may only be able to physically accommodate an updated PN between its minimum load of 200 MW and its full capacity of 400 MW as between these ranges the generator can continue to provide inertia and voltage support services. Should the

generator subsequently achieve an intraday market trade up to its full 400 MW, the TSOs may, subject to requirements at the time, instruct the unit back to 350 MW to also provide reserve – this instruction would effectively be acceptance of a 50 MW decrement bid. Following this second TSO instruction the generator would be physically bound by a range from 200 MW to 350 MW.

Further consideration of 'trading in the opposite direction' is given in Section 5.5.2.

5.6.2 MARKET POWER IN DEPLOYMENT OF SYSTEM SERVICES

The SEMC decision on System Services SEM-14-108 of December 2014 recognised that the lack of competitive pressure in the existing market place for the provision of System Services could expose consumers to significant costs in the procurement of such services. Consequently the SEMC approved the introduction of an additional 'regulated tariff' approach to the provision of those services where it is deemed that there is insufficient competition.

The System Services arrangements are designed to deliver enhanced performance capabilities in existing and new service providers. However these arrangements will not explicitly result in the deployment of the services. In the I-SEM, as in the SEM, it is envisaged that many of the services would be deployed by constraining service providers on (say to provide reactive power capability) or restricting outputs (say to provide frequency response capability). In the I-SEM deployment will be achieved by the TSOs accepting inc and dec offers from participants.

EirGrid believes that the same competition concerns apply to the deployment of the services as apply to the procurement of the service capability. If there is seen to be insufficient competition in the procurement of the service capability, then there will also be insufficient competition in the deployment of this capability. How the deployment of the services is remunerated has no bearing on the level of competition.

Given the current lack of competition for the provision of System Services, EirGrid believes that market power mitigation options should be considered by the SEMC, see further discussion of market power issues in Section 5.9.2. Any arrangements developed could be kept under review as the System Services market develops and competition evolves. EirGrid believes that this approach would be consistent with the SEMC position on maintaining a 'regulated tariff' option for the procurement of System Services capability where sufficient competition does not exist.

5.6.3 PRE-INTRADAY MARKET ACTIONS

EirGrid believes that Option B (using the latest offer data) makes best use of the proposed I-SEM design and avoids the need to create a new System Service for a facility that is not expected to be frequently required. This position was also indicated by some industry representatives at the ETA RLG workshops. Advantages for this option are that it:

- Allows the start-up to be instructed, accepted and monitored in a manner consistent with any other intraday start-up instruction;

- Will enable the cost of the start-up to be settled through the I-SEM balancing settlement mechanism (it should be noted that there is currently no allowance made in the System Services budget to fund additional services such as that suggested in Option A);
- Provides transparency to other participants (based on potential I-SEM and existing European Regulation requirements to report balancing actions taken by the TSOs);
- Avoids the need for the development of a new System Service which would require further consultation and the subsequent development of procurement, contractual and settlement systems; and
- Will avoid potentially perverse signals to longer notice generation that a specific start-up contract might indicate (rather than incentivising shorter notice generation).

The following presents a high level example of how Option B might work: take the case of a generator in a cold state with a 15 hour combined notice/loading time to get to minimum load. If the TSOs require this generator to be available from 01:00 on Saturday morning (say to replace a generator required for local voltage support that is coming off on a scheduled outage) the TSOs must issue a 'sync' instruction to the generator by 10:00 on Friday morning. The balancing offer available to the TSOs at this time on Friday morning (an inc or potentially a start-up offer) should reflect the fact that the generator will take 15 hours to get to minimum load and that this will extend into the next trading day. This offer should therefore reasonably reflect the generators start-up costs even if the generator actually comes on-line in the next trading day. The start-up and subsequent running would be settled through the I-SEM balancing mechanism – presumably as a non-energy action (and therefore not impacting on the imbalance price) with the cost recovered through the I-SEM equivalent of today's Dispatch Balancing Cost (DBC) mechanism.

While EirGrid believes this approach is appropriate to enable this particular requirement for a start-up, in other cases contractual arrangements between the TSOs and participants may be more suitable. Discussions related to these other options are contained in Section 6.4 and 5.9.2.

5.7 IMBALANCE PRICING

The methodology for setting imbalance prices is a critical feature of the I-SEM detailed design. The incentives provided by the imbalance price will determine how participants manage their obligation to be balance responsible. Expectations of the imbalance price drive participants' contracting and trading activities in all forward timeframes, including the day-ahead market and intraday market.

It is therefore key that the marginal imbalance price accurately reflects the costs incurred by the TSOs in balancing the system, both during normal conditions and at times of system stress. If the pricing methodology results in an imbalance price which is too benign, participants will be less inclined to take actions to reduce their imbalance exposure, undermining day-ahead market and intraday market liquidity and potentially placing a greater burden on the TSOs to resolve imbalances after gate closure. If, on the other hand, the imbalance price is too volatile or not

reflective of the underlying fundamentals, participants may take uneconomic decisions to avoid imbalance exposure, potentially increasing costs throughout the value chain.

While the intended effect of the imbalance price is clear (i.e. to incentivise balance responsibility), it would be useful if the high level principles for how the price setting could enact this were outlined. An example of an underlying principle might be if a participant could have reasonably predicted an imbalance at a high price and did not act to correct this in the mechanisms afforded, they could be exposed to high prices.

The timeliness of price publication is also an important factor. We note that the EU Transparency Regulation (543/2013) implies that balancing prices should be published within an hour of the operating period. Timely publication of prices will inform participants' trading for subsequent delivery periods, but will constrain the implementation of some of the imbalance pricing methodologies under consideration (e.g. under flagging and tagging, a comprehensive ex-post review of TSO applied flags would not be feasible within an hour).

The consultation paper presents four imbalance pricing options for comments. The table below summarises our views on the pros and cons of each option. We then discuss each option in turn.

Option	Pros	Cons
1. Flagging and tagging	• Reflects the actual dispatch • Builds on established GB methodology	• Risk of over-tagging, leaving few or no units to set price • Challenge of distinguishing different actions on the same unit • Potential reliance on manual processes, with implications for system operations resourcing • Scope for ex-post review processes limited by publication timings • Likely perceived as discretionary
2. Simple stack	• Simple • Avoids flag and tag complexities	• Not reflective of reality (prices potentially set by actions that were unavailable in practice) • Unlikely to signal system stress events • Vulnerable to market power
3. Unconstrained stack with dynamics	• Relatively simple • Avoids flag and tag complexities	• Likely to be highly sensitive to parameter choices (TOD, horizon) • Starting point unlikely to represent a secure system (risk of price spikes or even infeasibilities) • New algorithm required
4. Unconstrained unit from actual	• Reflects the actual dispatch • Avoids manual and	• Dependency on implementation of TSO

dispatch	discretionary complexities of flag and tag • Builds on established systems and methodologies in international markets	dispatch tools (SCED) • Potentially perceived as a black box

5.7.1 FLAGGING AND TAGGING

The flagging and tagging methodology has become established in GB after a number of refinements. However, we have reservations about the application of the methodology to the I-SEM, for the reasons summarised in the consultation paper. The all-island system is typically a more constrained system than GB, and the current GB methodology does not cover many of the categories of non-energy action that are likely to be prevalent in the I-SEM (e.g. reserve, inertia, SNSP). Many generation units are likely to be used for both energy and non-energy balancing, with the majority of units providing operating reserve and associated with active transmission constraint groups. As outlined in the consultation paper, this leads to the risk of over-tagging, with insufficient energy actions remaining to set an imbalance price.

From a TSO implementation perspective, the requirement for timely publication of prices will rule out a comprehensive ex-post process to review the application of flags on balancing actions. The potentially manual nature of the flagging process has implications for control room resourcing and detailed rules and procedures will need to be developed to remove any discretion.

In our view, these concerns over control room discretion and resourcing can be avoided under the other three imbalance pricing options.

5.7.2 SIMPLE STACK

While the simple stack avoids the complexities of flagging and tagging, we share the concerns identified in the consultation paper about the pricing methodology ignoring plant dynamics. This could result in imbalance prices being set by generating units that in practice were inaccessible to the TSOs on account of their technical characteristics (such as notice times and ramp rates).

The divergence between the hypothetical simple stack and the real stack of TSO balancing actions is likely to be most acute during periods of system stress (e.g. following a generator forced outage). The simple stack is unlikely to signal the true cost of balancing the system at these times, significantly diluting the incentives for participants to take balance responsibility and undermining the drivers of liquidity in the ex-ante markets.

We note the concerns expressed during the consideration of the P211 proposal in GB that a simple stack could be vulnerable to manipulation. For example, if a participant knew it was going to be short in a particular period, it could submit an attractively priced but technically inaccessible offer to the balancing market just before gate closure. This would likely depress the imbalance price established by the simple stack, while in reality the TSOs would be unable to call

the participant's balancing market offer and more expensive actions would be required to resolve the system shortfall.

5.7.3 UNCONSTRAINED STACK WITH DYNAMICS

The third pricing option seeks to address the deficiencies of the simple stack by incorporating plant dynamics in the methodology. We agree with the expressed SEMC view that this option has merit.

A potential drawback of this methodology is that the resulting imbalance prices may be highly sensitive to the choice of parameters, such as the optimisation horizon and the form of plant dynamics. If the optimisation horizon is too long or a limited subset of dynamics is considered, the unconstrained stack may have the same disadvantages as the simple stack and overly dampen the imbalance price signal, particularly during system stress events. For example, depending on the formulation of the pricing algorithm, the methodology could assume the TSOs had perfect foresight of plant forced outages and schedule low-priced plant with slow dynamics to address the shortfall. In practice, the TSOs may need to have taken more expensive balancing actions in real time.

Conversely, if the methodology only considers actions accessible to the TSOs at, say, gate closure (ignoring any early TSO balancing actions), imbalance prices could be more extreme in some circumstances than the actual actions taken by the TSOs. For example, the unconstrained stack may see prices being set by fast-starting OCGT peakers, whereas in practice the TSOs were able to call upon a cheaper part-loaded CCGT to meet a short net imbalance volume (assuming the CCGT had been committed by the TSOs to address a non-energy issue).

This last example points to a key difference between the third and fourth imbalance pricing options in our view. The starting point for the unconstrained stack is assumed to ignore any early TSO balancing actions, and is therefore likely to imply the system is insecure at gate closure (e.g. insufficient inertia or operating reserve). The starting point for the fourth option is actual dispatch: if the TSOs had re-positioned plant for reserve or committed an extra unit for inertia, these resources will appear in the stack and potentially be available for price-setting (if not bound by non-energy constraints). Depending on the parameters chosen, there is a risk the unconstrained stack would be infeasible in extreme conditions with a large NIV shortfall (i.e. there are insufficient short notice plant available to meet NIV, ignoring the resources made available by prior TSO actions).

5.7.4 UNCONSTRAINED UNIT FROM ACTUAL DISPATCH

The fourth option has a number of potential advantages, as set out in the consultation paper. It builds upon established methodologies and tools that have been widely implemented in international markets. It excludes non-energy actions from price-setting while avoiding the issues of flagging and tagging (such as the risk of over-tagging and dependency on manual

processes), and supports the timely publication of prices. This option therefore appears to have considerable merit.

There are a number of similarities between this option and the unconstrained stack with dynamics. Both options apply an algorithm to determine the marginal price, taking account of plant dynamics over the optimisation horizon. A key difference, as described above, is the assumed starting point and the treatment of prior TSO actions. The unconstrained unit that sets the marginal price will be the unit the TSOs would choose in actual dispatch to meet an energy imbalance in real time. This unit may not be available under the unconstrained stack approach (depending on the horizon and dynamic parameters modelled) which could at times result in price spikes under Option 3 which do not reflect the underlying dispatch, as described above.

In practical implementation terms, the imbalance pricing algorithm in Option 4 would leverage systems that are already required by the TSOs for system operations and decision support. Under Option 3, the unconstrained stack algorithm is more likely to be stand-alone.

As with Option 1 (flagging and tagging), the imbalance pricing methodology would be closely tied to the balancing actions actually available to the TSOs. Under Option 4, units that are providing a System Service such as reserve or inertia will be available to set the system price, but only if they are not bound by system constraints. This approach overcomes one of the key challenges of Option 1 in distinguishing energy and non-energy balancing actions on the same generating unit which for our system may not necessarily be clear when initially made.

We believe that on merit the Unconstrained Unit from the Actual Dispatch represents the most efficient approach for the I-SEM. Under this approach the price for imbalances reflects the cost of the actions that would be used to address those imbalances.

5.8 IMBALANCE SETTLEMENT

As previously noted, EirGrid believes that the Physical Notification should be linked to contracted positions, both from the ex-ante markets and the balancing mechanism, thereby representing the actual running of a unit. Given this, we believe the primary use of the Physical Notification is in the scheduling processes and that this should not be considered in settlement calculations.

The concept of a “notified imbalance” is not one with which we consider appropriate. A notified imbalance would allow a participant to submit a volume which does not reflect a firm position in any market, which could be perceived as self-scheduling. As the PN is the reference point for the operation of the balancing mechanism, having a notified imbalance could affect the level to which a unit is actually dispatched. This is most easily seen in the MW Relative format: if the first increment offer band for a unit is economic for meeting a shortfall but the second band is not, the TSOs should use the entire volume in the band. If the PN referenced for this decision was higher than a PN which reflects their positions in the ex-ante markets, a participant could be dispatched to a higher level than they would have been dispatched had this PN reflected their market positions.

This gives that participant additional revenue which they otherwise would not have received, through a larger volume to be settled at the imbalance price, which only arises because of the PN figure submitted. While we acknowledge the intention in the consultation paper of reducing the incentive to do this through taking the PN into account in calculating the volume for the premium/discount component of settlement, the approach does not mitigate the fact that the volume for the imbalance component of the settlement can be increased.

While we agree that the calculations put forward represent the intent of the I-SEM, we would like to have some consideration given to settlement calculations based on positions derived from the ex-ante markets, the balancing mechanism and the metered generation. This would be consistent with our view that the PN, including FPN, should take account of any TSO actions while the intraday market is still open. These actions are known as the Bid Offer Acceptance or BOA in the SEMC consultation paper while, in the terminology of the European Network Code on Electricity Balancing, this equates to the Imbalance Adjustment. Adopting an approach based on the positions from the ex-ante markets, the BOA and metered generation would align with the process set out in the Network Code which considers the imbalance settlement volume to be based on the final Position (aggregate ex-ante market trades), the Imbalance Adjustment (the BOA) and the Allocated Volume (the metered generation).

EirGrid would welcome the opportunity to further explore options for developing the detailed algebra for the final market rules in the next phase of the I-SEM project and look forward to working with the industry and RAs to arrive at an efficient and transparent approach to imbalance settlement.

5.8.1 SETTLEMENT OF CURTAILED VOLUMES

While the introduction of a "deemed decremental bid" mitigates one of the concerns put forward in our Building Blocks response for not supporting the option of mandated bidding, we maintain our support for option 3 in the consultation paper (Settled with no special rules for curtailment).

The Mandated Bidding Behaviour approach would mean that a signal of the imbalance price to curtailed units is lost: they would be benign to whether the volumes cleared in the day-ahead market are actually realisable, because if they are curtailed then only revenues earned need to be paid back. This is an important signal for ensuring balance responsibility.

The “deemed decremental bid” may also be difficult to implement in the systems, for example in the passing of price and volume data from the NEMO to the TSOs for particular units, which may breach the confidentiality requirements. There may be difficulty in determining which prices must be used. For example, a unit could clear in the day-ahead market and clear multiple times for volumes in the intraday market which change their market position to being above or below their actually dispatched level at different stages of the day and at different prices. It would need to be determined whether the system should only take prices for those trades

which caused the market position to go over the level to which they were curtailed, and of those trades only for the proportion of the total trade volume which was over the curtailment level, or if it should take the prices from all ex-ante trades.

5.8.2 SETTLEMENT OF PRIORITY DISPATCH

We have previously stated in our Building Blocks consultation response the belief that priority dispatch units should not submit inc and dec orders. In the context of this consultation paper, we maintain this view in that we believe that priority dispatch units which do not submit a PN should not be able to submit dec bids to the balancing market, for the same reasons as outlined in the previous response. We agree that it is considered very likely that a solely price-taker option will be required for the I-SEM. The use of a "deemed decremental price" of 0 would appear to adequately implement the intention of allowing participants retain revenues for firm volumes which have been dispatched down.

5.8.3 TREATMENT OF UNINSTRUCTED IMBALANCES

EirGrid's preference would be for the current treatment of uninstructed imbalances, with the concept of the Premium for Under Generation and Discount for Over Generation (PUG and DOG) to be maintained. We believe there is a strong rationale for retaining this functionality, especially given the increased focus in the I-SEM on balance responsibility, including but not limiting to:

- It provides clear distinction between notified and un-notified imbalances should these concepts exist, particularly in de-linked PN case;
- A single energy imbalance charge does not discourage portfolio rebalancing after gate closure (e.g. deviating from DQ on one unit to offset shortfall elsewhere);
- It builds on established and sophisticated SEM functionality which is arguably more sophisticated than in other markets such as BETTA (e.g. in defining tolerance bands, considering outturn frequency etc.).

We believe that maintaining this concept negates the need to introduce the concept of an imbalance information charge, as the incentive intended with the imbalance information charge seems to be largely the same as that of the treatment of uninstructed imbalances. While the imbalance information charge may be used in some additional situations to the PUG and DOG, the disadvantages of its additional complexity may outweigh the benefits of incentivising behaviour in those situations, when the general behaviour desired is already incentivised.

5.8.4 SETTLEMENT PERIOD DURATION

EirGrid's preference is for a half-hour settlement period duration. This would mean that the I-SEM would be harmonised in this regard with the BETTA market when it goes live. The granularity provided would also be sufficiently small to allow the reality of the operation and

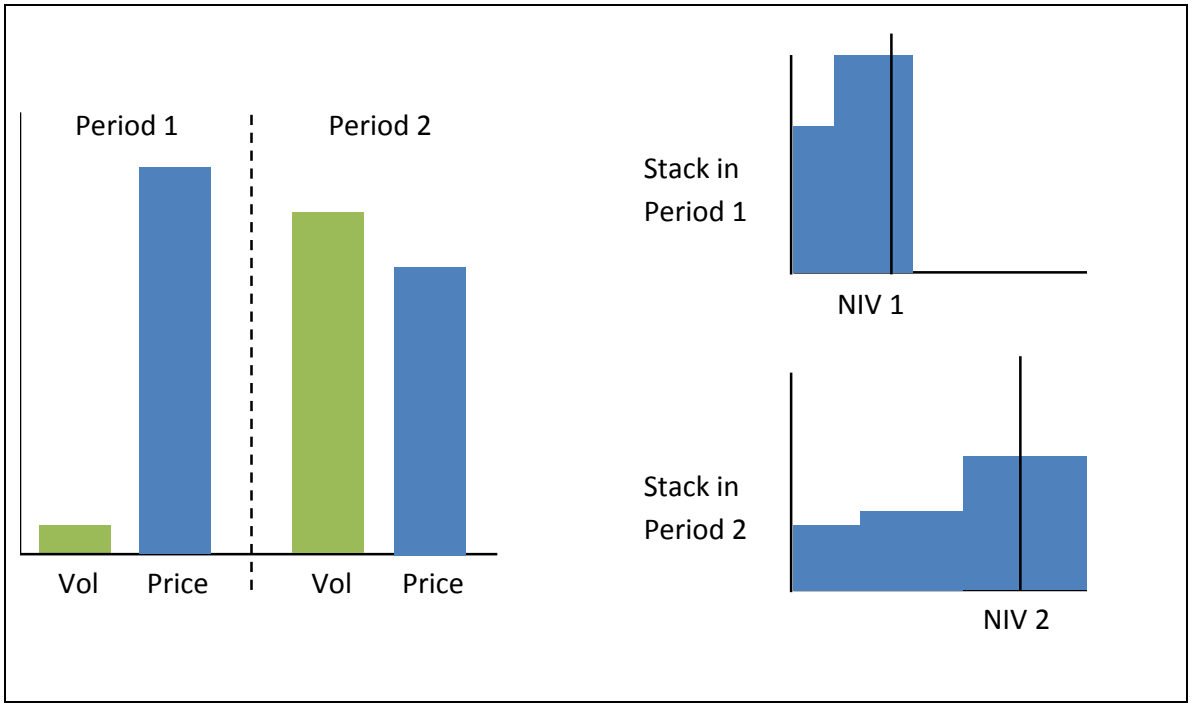
balancing of the system to be reflected in the orders, pricing and settlement, which will have the effect of incentivising balance responsibility.

We believe that the large changes which quarter hourly settlement would require on metering in Northern Ireland make it impossible to implement settlement to this granularity in the initial implementation of the I-SEM.

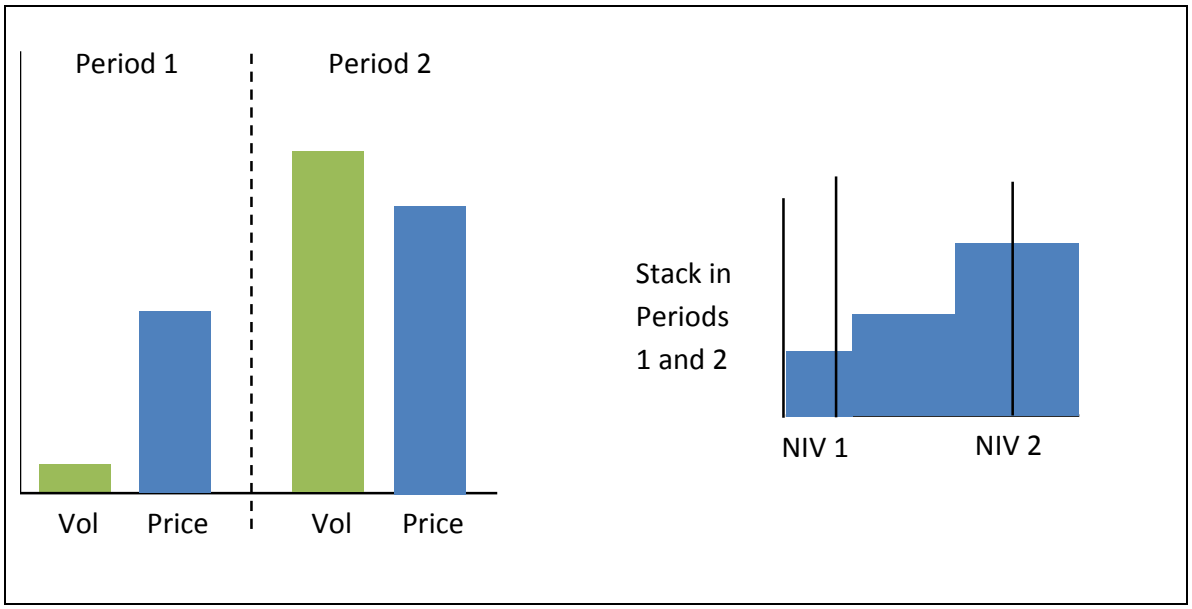
We believe that of the suggestions put forward in the consultation for reconciling the hourly ex-ante market trading period with the sub-hourly imbalance settlement periods would be option (iii), where the imbalances are calculated on an hourly basis, with an average of the imbalance prices in each of the imbalance settlement periods. This would allow the cash flows in settlement to most accurately reflect what occurred in the operation and balancing of the system.

Our preferred option in the choice within that option between a weighted or non-weighted average would be for a non-weighted average. The following examples explain the rationale behind this preference.

Situation A (Different stacks in each period):



Situation B (Same stack in each period):



In Situation A, Period 1 has a system stress event, where even though the balancing requirement is very low in terms of volume, there are only very few, expensive orders to help meet it. However in Period 2, despite the balancing requirement growing in terms of volume required, better orders are available so that it can be met at a cheaper price than in Period 1. In this situation, in order to incentivise balance responsibility and the greater value placed on being able to balance at times of system stress, the average price between the two periods should not dilute the higher price in Period 1. Therefore in this situation, the preference would be for an average which is not weighted by volume.

In Situation B, since the same stack of orders are available in both periods, procuring extra balancing energy in Period 2 means moving further along the order stack, resulting in a higher price in Period 2. In this situation, the cash flow should reflect the additional cost and value of the larger volume of balancing energy procured in Period 2 – if this volume were to be settled at a price lower than that for which it was procured, it could be possible that revenue earned for providing this energy does not reflect costs incurred in generating it. One way of doing this would be through weighting the price by the volume, which would mean that the intended incentives highlighted in Situation A could not be maintained.

However, since in the settlement each participant receives the better of the imbalance price or their order price, this intended effect highlighted in Situation B of ensuring the cash flow reflects the value or cost of the energy procured is already incorporated into the design. It is done through the premium/discount component of the settlement rather than the imbalance component of the settlement. Therefore the price should be averaged without weighting to ensure the correct incentives are incorporated, since the intended impacts of weighting the average are already incorporated elsewhere in the design.

5.9 OTHER ISSUES

5.9.1 GLOBAL AGGREGATION

Previously the RAs have stated that the primary factor contributing to the residual error volume in the SEM is differences between the profiled demand for non-interval meters and the actual consumption of these consumers. The costs associated with the residual error volume are currently apportioned between suppliers based on this assumption. However, the consultation paper includes ex-ante loss forecast errors for both distribution and transmission losses as well as unmetered generation and supply, and theft, without reflecting the relative materiality of these. In addition, the paper does not include any clear evidence that the losses calculations as approved by the RAs have become a more significant contributor to the issue since the current solution for Global Aggregation was implemented in the SEM in 2011 and 2012[5]. We are not aware of any analyses that have been undertaken that would underpin a change in policy of this materiality and therefore it is not clear if there are any grounds on which to change the current SEMC position on the residual error volume and in particular the cost allocation. We are therefore of the opinion that the current cost and risk allocation should be mirrored as closely as possible under the I-SEM arrangements.

When considering the options presented in the paper, the first option proposed is closest to the current implementation and best reflects the principle of the least change from the current SEM arrangements and is therefore most consistent with the SEM Committee's stated aims.

Both options 1 & 2 would permit suppliers to mitigate their exposure to imbalance prices by trading ex-ante up to their total volume including an estimate of their share of the residual error. While the options set out imply that the TSOs will have to take balancing actions in response to the participants trades, this is unlikely to be the case. The TSOs' actions will be based on the real time requirements of the power system, coupled with the submitted PNs from generators and it would be unlikely that the TSOs will react to supplier trades. Therefore, there is potentially no difference in the exposure to imbalance settlement in either option.

A version of option 3 was previously considered under the Global Aggregation modification to the SEM in 2010 and was rejected at that time when the RAs approved an implementation similar to option 1 for a range of reasons that will still be valid for the I-SEM. This approach involves a central body taking responsibility for the actual error while participants pay or are refunded through an explicit tariff. The consultation suggests that in the context of option 3 that this would be the two TSOs; this would represent a significant change in terms of financial risk and exposure. While such challenges are not necessarily insurmountable it would require the RAs to reassess the financeability of the TSOs to ensure they remained financeable under any change in the arrangements. This would potentially introduce additional complexity into an

[5] The Global Aggregation solution was implemented in Ireland in 2011 and Northern Ireland in 2012. Each implementation included a separate consultation on setting the Residual Meter Volume Interval Proportion (RMVIP) which allocated the error based on non-interval meters under a Supplier Unit.

already challenging programme of work. Moreover, should such an approach be adopted there may be unavoidable differences in implementation between Northern Ireland and Ireland due to differences in the licencing and statutory framework between the two jurisdictions.

Given the current RA position that the residual error is predominantly the result of profiled demand errors and not a material result of any error in the approved transmission loss factor methodology, a change in the allocation of the residual error volume is unlikely to be justified at this time.

5.9.2 LOCAL MARKET POWER

EirGrid acknowledges that a separate workstream has been set up to review market power in the I-SEM and this will take account of local market power questions. We look forward to participating in and contributing to this workstream as it progresses; however, the timelines for decisions of this workstream a significantly further down the road with final decisions on market power mitigations being made in Q3 2016. EirGrid will be required to begin its implementation program for systems required for the balancing market long in advance of these decisions and in this light it is important that consideration is given to local market power issues that may need to be addressed in the balancing market design as part of the ETA workstream.

While it may be considered that some of the measures suggested may make up part of the final decision on market power, we believe it is important that these proposals are not excluded at this early stage. As such, we welcome the discussion with respect to the use of price and cost curves and believe this should be included in system procurement. Inclusion of this functionality does not mandate its use in I-SEM operation. If a later decision is made not to use this functionality, then the price and cost curves will be the same based on the single submitted curve.

EirGrid believes strongly that this should also apply with respect to out of market contracts. While these have been explored in the context of pre-balancing mechanism contracts and the SEM RAs are minded that the existing System Services framework should cover this, we believe that other out of market contracts should not be discounted at this point. This could be used to manage scenarios such as that suggested in the consultation paper where a participant has local market power on a long-term basis. This could refer to a generator who needs to be or who cannot be dispatched on for system reasons over a prolonged period. Rather than have to manage this on a day to day basis in the balancing mechanism, it may be a preferable solution for a generator in this situation to enter into a long term contract with the TSOs to either limit their market activity or to arrange for them not to act in the ex-ante markets. It is important that an option such as this is not ruled out at this stage before it is fully explored in the market power workstream.

A number of other solutions could mitigate these issues such as the application of a Bidding Code of Practice (BCoP) in the balancing timeframe; however, in the absence of certainty around what tools may be used to mitigate against local market power, a broad range of solutions,

including bid replacement, out of market contracts, price / cost curves, etc., need to be maintained as potentially making up the solution in the I-SEM.

5.9.3 METERING

EirGrid support the proposed approach for the development of the metering requirements for the I-SEM. These will need to be developed between the implementation team for the balancing market and the four Meter Data Providers. EirGrid supports the principle of minimal change while acknowledging that some technical changes are likely to be inevitable; however, we should endeavour to keep these as limited as possible. Existing file definitions should be retained where possible.

Current agreements in terms of meter data submission will need to be reflected in the new market rules for the I-SEM. The current metering governance is based on the requirement for "price effecting metering" which supports the ex-post pricing process in the SEM. This will not be required in the I-SEM as prices will be based on ex-ante contracts or TSO actions. This should not result in a relaxation in the timing of meter data submissions. Timely settlement is still required to allow participants quickly adjust trading strategies which may be driving exposure to imbalances. Longer settlement timelines will reduce a participant's ability to meaningfully respond to the imbalance pricing signal.

A robust "terms of reference" and scope is required for any working arrangements between the implementation team and the Meter Data Providers. It is essential that the scope is clearly focused on delivering the requirements of the I-SEM and does not stray into wider discussions which are not needed for the I-SEM and have the potential to impact on timelines.

5.9.4 INSTRUCTION PROFILING

The proposals around instruction profiling note the need for better accuracy in the instruction profiling calculation, potentially taking account of additional load up rates or ramp rates as well as intermediate heat states. We recognise that during the operation of the SEM there have been a number of formal queries from participants where the Dispatch Quantity calculated by SEMO did not align with the metered output of a particular unit; however, on examination it was found in a number of instances that the Dispatch Quantity had been calculated correctly based on the technical data provided and that the unit was actually able to generate at a different profile in real time. This would appear to support taking account of additional data in the process.

However, the introduction of intermediate heat states was previously discussed as a Grid Code modification in 2011 and was withdrawn after debate with the industry. The discussion at the time was that the introduction of intermediate heat states would not solve the problems that were being observed as the instruction profiling tool would never be able to achieve the exact granularity to match the physical operation of a generating unit. The discussion was unable to resolve what granularity the cooling time boundaries would need to be set at to ensure the best accuracy and any modification that retained boundaries in the hours would retain a level of

inaccuracy. Boundaries of higher resolution would push the limitations of the instruction profiling tool.

A key consideration has to be the intended usage of the output of the instruction profiling tool in the I-SEM. In the SEM, the output Dispatch Quantity is used in the settlement of constraint payments and uninstructed imbalances to generators. In the I-SEM, these elements are replaced by the settlement of balancing actions and imbalance settlement. In terms of balancing actions, these may be based on the activated bids/offers by the TSOs, discussed as the Bid Offer Acceptance (BOA) in the consultation paper. It could be considered that if the BOA is an explicit volume of energy contracted by the TSOs then this should be the volume used in the settlement of balancing actions. Equally, imbalance settlement could be determined as the variance between ex-ante trades, BOAs and the metered output of the generator. This approach could see the removal of the need for instruction profiling in the I-SEM as generators will be measured against contracted volumes of energy rather than volumes implied from dispatch instructions. This potential is discussed further in our analysis of the imbalance settlement proposals.

5.9.5 UNITS UNDER TEST

The consultation paper sets out options for managing units under test in the I-SEM that are broadly in line with the current SEM implementation. Specifically, the two options set forward propose methods to ensure that the Physical Notification of a Generator Unit when testing is considered differently from a standard Physical Notification with inc and dec prices. One option is to consider the Generator Unit as an explicit price-taker in the TSOs' systems which should ensure that the testing profile as submitted is adhered to with no deviations except as allowed under the Grid Code. This approach is consistent with the current implementation in the SEM. The other option allows the Generator Unit to act as a price-taker by submitting inc and dec orders set at price cap and floor which would be consistent with how price taking arrangements are intended to be implemented in the day-ahead market in the I-SEM.

Given that the principal intention is that the testing profile is respected as much as possible, the option of using commercial offers associated with the Physical Notification would have some degree of risk. Theoretically, it would be possible in extreme circumstances where the price in the balancing mechanism tended towards price floor or cap for the scheduling tools used by the TSOs to begin to change the output thereby altering the testing profile as it may have become economic to do so. Where an explicit price-taker mechanism is in place, the unit's testing profile can remain fixed, independent of the actual prices in the balancing mechanism.

In this light, it is worth considering if the explicit price taking approach better delivers the intended objective.

The I-SEM arrangements for Units Under Test should also consider the broader range of participant testing that may be required and not just be limited to Generator Units. This should see the arrangements being considered for other installations currently not considered such as storage facilities, interconnectors, demand side response, etc.

6 ADDITIONAL ISSUES NOT RAISED IN THE CONSULTATION

In addition to the items addressed in the detailed design consultation paper, EirGrid would like to make some additional points with respect to other issues of relevance to the market design. Some of these items have been the subject of discussions with industry and other parties during the development of the I-SEM detailed design but also across the lifetime of the SEM itself. We believe it is appropriate to flag these issues here and to give them further consideration during the implementation of the I-SEM.

6.1 INTEGRATION WITH EUROPEAN BALANCING ARRANGEMENTS

The I-SEM design has focused on integration with European markets in the day-ahead and intraday timeframes. The I-SEM will also need to integrate with the European balancing market arrangements; however, these are currently less well developed and the standardisation of cross border trade of balancing energy products is likely to come after I-SEM go-live.

The I-SEM 'balancing mechanism' is distinct from the European 'balancing market'. The I-SEM balancing mechanism, which overlaps with the intraday market, provides the means by which the TSOs manage system security which means it is a constraints mechanism rather than a means of balancing the system. The European balancing market represents the arrangements for cross-zonal exchanges of energy that occur post intraday market gate closure. While the entry into force of the Network Code for Electricity Balancing is behind some of the other Network Codes, efforts are underway across Europe to develop compatible cross-zonal market arrangements. These include efforts by TSOs across Europe to establish 'Coordinated Balancing Areas' and mechanisms to allow cross-zonal sharing of balancing energy through 'Common Merit Order Lists'.

The I-SEM detailed design should allow for integration with the new European balancing market and, while some aspects of the Network Code Electricity Balancing can be incorporated into the I-SEM design and a certain level of 'future proofing' is possible, it should be recognised that additional effort will be required to deliver full integration with the European Target Market Model timeframes after the I-SEM goes live.

6.2 TRANSITIONAL SYSTEM OPERATIONAL ARRANGEMENTS

Market arrangements that enable trade that alters production and consumption patterns close to real time present challenges for the operation of a small island power system when compared to larger European systems. Other European markets have evolved in a more gradual way towards these more dynamic arrangements and, while an intraday gate has been introduced in the SEM, a move toward continuous trading with participant balance responsibility represents a significant step change for market and system operations on this island.

These new arrangements may also have impacts on the wider energy sector. The design and operation of the gas transmission network, for example, is closely related to the operation of

gas fired power stations. The combined impact of I-SEM and the new System Services arrangements are likely to incentivise more flexible operation of these gas fired stations with potential knock-on impacts on the gas network. More active participation of demand in the markets could also have impacts on the operation of the power system, particularly on the distribution network.

Market trials have been factored in to the I-SEM timelines to prepare and test industry for go-live of the new market arrangements. While elements of this trial will also test new system operational arrangements, it will not be until actual market go-live and after an initial bedding-in period that some of the system operations impacts of the new market can be fully assessed and acted on. EirGrid believe that transitional or evolving system operational arrangements will be required on I-SEM go-live to ensure a secure move to the new market. These arrangements might include:

- **Considerations of the timing of I-SEM go-live with major changes in operational policy**: The delivery of new System Services and changes to the system RoCoF capability will lead to new operating capabilities for the power system and increases in SNSP. Careful consideration will need to be given to the timing of such changes close to I-SEM go-live.
- **Arrangements with major System Service providers**: The position that some critical providers of System Services might achieve in the energy markets may be significantly different to the way in which this plant is currently used to support the provision of services such as reserve, reactive power and black start capability. Arrangements should be considered to ensure that major sources of the System Services required to maintain operational security remain available.
- **Use of TSOs' forecasts of demand and wind in the TSOs' scheduling process:** At the beginning of the I-SEM, the TSOs are likely to continue to use their own forecasts of demand and wind in the integrated scheduling process. As these participants, who are balance responsible, gain experience of the I-SEM and their PNs more accurately reflect their expected production/consumption, the TSOs will increase the reliance on the submitted PNs.
- **Continued publication of the TSOs' indicative operational schedule**: This information has historically assisted power stations to better prepare for their expected running including the notification of gas requirements to the gas network operator. While in the I-SEM such arrangements may be considered incompatible with proper functioning of the energy markets, it should be considered if there is value to continuing the practice on an interim basis.
- **Transitional cross-border trading arrangements:** The existing intraday arrangements by which the TSOs can trade with a counter party in BETTA on the interconnectors to facilitate priority dispatch and economically manage system security will not be available post implementation of the pan-European continuous intraday market (XBID). However, consideration may be given to transitional cross-border trading arrangements under an interim intraday solution if XBID is delayed.

- **Evolution of operational policy**: Confidence and stability in the volume of participation in the ex-ante markets (e.g., how much is traded in day-ahead market compared to intraday market) and pattern of intraday market activity (e.g., does intraday market activity occur early or late) is likely to lead to an evolution in the TSOs' operational policies for scheduling and dispatch. For example, the level of ramping capability that the TSOs maintain could be impacted by the level of uncertainty associated with updates to PNs. Increased demand side activity in the markets may also impact on the operation of the system and potentially present issues for the DSOs which will need to be considered in this space.

6.3 CLASSIFICATION OF SCHEDULING AND DISPATCH ARRANGEMENTS

Across Europe it is common for TSOs to consider operational security limits individually and resolve each binding limit in isolation. For example, TSOs run monthly tenders for reserve which guarantee deployment of reserve in real time. Another example is negotiating a bilateral contract with monopoly providers to resolve a localised transmission constraint. However the binding nature of the operational security limits of the island, which ultimately stems from the physical and technical characteristics of the power system, are such that on a regular basis specific units provide multiple services to support the power system. For example a unit that is on to provide voltage support can also provide operating reserves, inertia etc. The integrated scheduling process is not widely used by European TSOs. It is used in Poland where there is a reliance on inflexible generation and there are issues with through flows. The process is also used in Italy where similar constraints apply as experienced on this island due to the geography of its peninsula, although the constraints issues are not as acute. Whereas in Italy there is circa 10% TSO intervention in the energy market (which is at a comparable in GB), in the SEM/I-SEM there is greater than 40% TSO intervention. This level of intervention justifies the use of the more centralised approach to deriving an operational schedule resulting in a solution which is more economic and delivers greater social welfare.

A pan European issue that relates to this commentary on the integrated scheduling process is the classification of the all-island scheduling and dispatch process. This is relevant as there is a strong desire among European regulators to identify the 'central dispatch TSOs' and implicitly all 'self-dispatch TSOs'. The reason for this is that generally in 'self-dispatch' arrangements balancing energy bids are made directly by participants whereas in centralised arrangements, balancing energy bids are calculated from bids used in the integrated scheduling process which allows for TSO conversion of bids.

The classification process considers local market arrangements, scheduling arrangements and dispatch arrangements. The I-SEM design provides for participants to nominate feasible generator schedules to the TSOs based on the results of the ex-ante markets and for the TSOs to dispatch controllable participants. From a participant perspective, their forecast operational schedule and real time dispatch are dictated by both the day-ahead and intraday market results

and the TSO scheduling process. The requirement to await dispatch instructions before moving to an agreed notification would suggest a 'central dispatch' classification.

Given the use of the integrated scheduling process at the core of the scheduling and dispatch arrangements, it seems reasonable to classify the I-SEM as a central scheduling and dispatch model. This classification will allow further flexibility in the development of arrangements for cross border balancing by the TSOs in how they interact with the common merit order list of balancing energy bids under the Network Code for Electricity Balancing.

6.4 SYSTEM OPERATIONS SUITE OF TOOLS

All TSOs have multiple tools to ensure operational security and these are commonplace across all electricity markets. Some tools are provided for through the pan-European design of the EU Target Model and the provision of the Networks Codes. Other tools are or may be provided for through local arrangements.

EirGrid believes that some pre-day-ahead market optional tools are suitable for the I-SEM where a requirement can be identified and an overall benefit obtained. In general however, EirGrid recognises that the uncertainty associated with operating this power system (with high penetrations of variable generation, variable largest system infeed/outfeed and proportionally large units relative to system demand) make pre-day-ahead arrangements potentially inefficient. The table below lists the various tools available to European TSOs to schedule the power system in order to ensure a feasible dispatch in real-time. The table also indicates whether the TSOs believe the tool is likely to be useful in the I-SEM.

Timeframe	Operational Security Tool used in other markets	Tool in I-SEM?
Pre-balancing mechanism	Internal bidding zones	Not expected at this point
	Grid Code mandatory deployment of reserve capacity	Discounted
	Monthly contracting of online balancing capacity	Discounted
	Monthly contracting of offline balancing capacity	Not discounted at this point
	Contract for transmission constraint (voltage/thermal)	Should be considered
	Start-up contract	Not discounted at this point
	Contract for System Services (capability, not deployment)	Part of broader I-SEM
	Allocation constraints	EU Target Model
	Cross zonal capacity calculation	EU Target Model
During intraday market	Constraints mechanism mandatory participation (The "BM")	Part of I-SEM design
	Physically feasible PNs	Part of I-SEM design
	Integrated Scheduling Process	EU Target Model option
	Provision of system information	EU Target Model
	Remedial actions including countertrading & redispatch	EU Target Model
	TSO trading in intraday market	Not expected at this point
Last hour & real time	Activation of balancing energy bids	EU Target Model
	Starting with a secure dispatch in real time	Part of broader I-SEM
Ex-post	Imbalance charge	Part of I-SEM design

	Imbalance price areas	Discounted
	Grid Code compliance incentives	Part of broader I-SEM
	Performance monitoring	Part of broader I-SEM
	Premium payments for deployed System Services	Part of broader I-SEM

There are two tools which are classified as “Not discounted at this point” in the table above. The first relates to procurement of balancing capacity through periodic tenders. This approach guarantees that a volume of balancing energy is available to meet reserve requirements in the last hour, although the price may not be fixed. This approach is popular in many power systems, although it is more suited to portfolio based markets where participants would hold their own reserve capacity within their portfolio. In the unit based I-SEM design, participants may not see the economic benefit to withhold capacity in the day-ahead market and intraday market for a potential use in the balancing timeframe. However, it may be optimal to implement the balancing capacity contracts for a subset of reserve – replacement reserve from offline fast start units. This is analogous to the National Grid STOR contracts in the BETTA arrangements.

The second option listed as “Not discounted at this point” is the use of start-up contracts. This is discussed further in Section 5.6.3.

Contract for transmission constraints is an option under consideration and should not be discounted prior to gaining experience of I-SEM operation. These pre-balancing mechanism contracts would cover scenarios where there is a known requirement to address a localised operational limit (i.e. thermal, voltage, or even short-circuit limit). An example would be if the transmission connection for a generator is on outage for a week and the unit cannot synchronise to the power system. The TSOs could manage this by through a rolling ‘dec’ instruction to keep the unit off. Alternatively and possibly better information for the market might be for the TSOs to contract the unit off for the duration of the outage. This is discussed further in Section 5.9.2.

6.5 DISTRIBUTION AND TRANSMISSION CONSTRAINT IDENTIFICATION

EirGrid believe that the I-SEM design should allow for transmission and distribution constraints to be distinguished so that only participants constrained for transmission reasons are compensated through the TSOs’ Dispatch Balancing Cost mechanism. EirGrid believes that the TSOs should not be liable for costs associated with distribution network constraints.