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Commission for Energy
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Utility Regulator of Northern Ireland
Queens House
14 Queen Street
Belfast
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26th of November 2014

RE: EAI feedback on RLG meetings 1.1, 1.2 and 1.3 and EUPHEMIA testing

Dear Clive/Jean Pierre,

The Electricity Association of Ireland (EAI) welcomes the opportunity to comment on the first three meetings of the I-SEM Rules Liaison Group (RLG) and to feedback on SEMO's proposals for industry engagement in EUPHEMIA testing. In our most recent correspondence to the RAs dated 6th of October 2014, EAI expressed concern that the High Level Design (HLD) for I-SEM and the intended plan for its detailed design and implementation carried considerable risk and uncertainty that needs to be formally recognised and carefully managed. We trust this further submission is timely and will be informative in that regard for the updated I-SEM Project Plan to be published in January 2015.

EAI members believe the detailed design process for I-SEM would significantly benefit from the procedural improvements as proposed in this submission. Such improvements will make for a more collaborative design process and will ultimately lead to a less contentious implementation phase. In this submission EAI members also provide agreed feedback on the approach to EUPHEMIA testing presented by SEMO at RLG workshop 1.1 (see Appendix 1).

EAI Proposals to Improve the Current I-SEM Detailed Design Process

1. An Iterative Design Process

The grouping of building block and market design topics into discrete workshops offers a limited opportunity for the discussion of possible solutions under each topic. We suggest that an iterative design process in advance of any formal consultation would be more effective and would encompass the following steps:

1. Identification of issues (scoping at workshops as provided for in 3 below),
2. Search for alternative solutions (discovery at workshops as provided for in 3 below),



3. Analysis to reduce the number of options and consider alternatives (post individual workshops and in advance of 'wash-up workshop),
4. A 'wash-up' of outstanding matters and final recommendation (final workshop to discuss analysis and alternatives from all previous workshops, as provided for in 3 below).

2. Tracking mechanisms

During the RLG workshops issues are raised, questions asked, tasks assigned, and the scope of consensus is explored. Whilst we understand that the objective of these meetings is to inform the various consultation papers, we feel that the process would benefit from a formal secretarial function in order to; document the discussions; create, maintain and disseminate logs of questions, issues, actions, decisions and to follow-up on those according to set and agreed upon timelines. All those outputs are useful for the workshop participants and the broader industry, but beyond that they provide an enduring record of a design/analysis process that can be referred back to and re-used in future design processes.

The need for secretariat support in RLG workshops is also underlined by the need to track and document issues that arise with relevance to future workshops and workstreams. Thus tracking of issues should extend to capturing and ensuring inter-relationships are captured, tracked and addressed.

3. More intensive stakeholder engagement

EAI calls for more intensive stakeholder engagement in the remaining workstreams of the detailed design phase. The proposals for stakeholder engagement in the forthcoming "markets" workstream do not provide for sufficient time to discuss, debate and explore solutions around significant areas of the market design. As an example, it is insufficient to allocate only one third of a one day workshop to the balancing market.

In our proposals below we request that that three additional workshops be added to the three proposed in the forthcoming "markets" workstream to allow greater time for consideration of fundamental design issues such as the balancing market;

Table 1: EAI proposals for "Markets" workstream

Workshop a	Day Ahead Market & EUPHEMIA
	Participant Nomination Process
Workshop b	Intraday Market
	Fallback Procedures
Workshop c	Reaching a Feasible Dispatch
	Tagging & Flagging
	Classes of non-energy actions
	Local market power considerations
	Reserves
Workshop d	Balancing Market
	Imbalance Settlement
Workshop e	Shipping (Physical)
	Units Under Test
	Metering
	Global Aggregation
	Instruction Profiling
Workshop f	Outstanding topics raised
	Review of Building Blocks in context of Markets workshop, particularly: <ul style="list-style-type: none"> • Treatment of Firm Access • Priority Dispatch • De-minimis level • Constraint & curtailment • <i>Consideration of building blocks topics in the context of future work streams incl but not limited to; market power, forward market, CRMs</i>
	RLG Review



4. Project Plan Checkpoints

As noted in our previous correspondence dated 6th of October 2014 there is a clear need to include within the project plan the key points at which a decision whether to progress, proceed to contingency arrangements or amend the high level design is considered. The staged progressions and conclusions of the EUPHEMIA testing are important examples of these checkpoints.

5. Renewable Support Mechanisms / REFIT Reference Market

A decision as to which market timeframe the REFIT and FiT with CfD support mechanisms are referenced has clear implications for the robustness of the price signal at the day ahead stage, the forwards market and the balancing mechanism. There is currently no clarity within the project plan regarding how or when such decisions will be taken on this important topic (presumably in conjunction with government departments). Due to the knock on implications of these decisions, the EAI calls for immediate clarity on the process to be employed and the timeframe in which the RAs expect to have these decisions and this should be cross-referenced in the RAs' Project Plan for I-SEM.

6. EAI Feedback on EUPHEMIA Testing

The focus on financial trading, efficient day-ahead market coupling and the proposed implementation of reliability option contracts combined with a market integrated dispatch process (whereby DAM schedules are the starting point for dispatch) means that the integrity of the I-SEM HLD is conditional upon the quality of the outcomes produced by the EUPHEMIA algorithm.

Over the course of the HLD process a strong consensus has emerged across industry (including market participants & market operator) and regulators that testing of EUPHEMIA is essential. The strength of the consensus reflects the broad recognition of the potential risks inherent in the I-SEM HLD. To ensure that these risks are adequately managed the EAI reiterates its recommendation in its letter to the RAs of 6th October 2014 that formal review check points are introduced into the I-SEM project plan at key milestones in the EUPHEMIA testing process to ensure that the direction of the detailed design remains feasible.

Appendix 1 of this letter provides detailed feedback from our members on the recommended approach to EUPHEMIA testing.



Conclusion

EAI members welcome the RAs' commitment to industry engagement in the ongoing design and implementation of I-SEM. In this correspondence, we have proposed improvements to the detailed design process and have provided detailed feedback from our members on the approach to EUPHEMIA testing. We are available to meet with you to discuss this letter at the earliest opportunity.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Stephen Douglas', is positioned below the closing text.

Stephen Douglas
Senior Advisor
Electricity Association of Ireland (EAI)



APPENDIX 1: EUPHEMIA Testing

This section provides agreed feedback on the approach to EUPHEMIA testing presented by SEMO at RLG workshop 1.1.

Requirement for EUPHEMIA testing

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Over the course of the HLD process a strong consensus has emerged across industry (including market participants and market operators) and regulators that testing of EUPHEMIA is essential. The strength of the consensus reflects the broad recognition of the potential risks inherent in the I-SEM HLD. To ensure that these risks are adequately managed the EAI reiterates its recommendation in its letter to the RAs of 6th October 2014 that formal review check points are introduced into the I-SEM project plan at key milestones in the EUPHEMIA testing process to ensure that the direction of the detailed design remains feasible.

Objective of EUPHEMIA Testing

The core aim of EUPHEMIA testing should be to establish that the proposed use of EUPHEMIA under the I-SEM HLD will produce efficient and stable DAM outcomes to provide a strong reference price and efficient initial schedule for dispatch, recognising the uniqueness of EUPHEMIA's application in I-SEM. This can be achieved by ensuring that the HLD does not:

- Undermine the integrity of the EUPHEMIA algorithm – i.e. will not break the EUPHEMIA algorithm;
- Undermine the stability of the EUPHEMIA algorithm – i.e. will not regularly de-couple from the rest of Europe having failed to find a solution;
- Result in erratic, unpredictable and inefficient generator scheduling – i.e. scheduling risk;
- Result in inefficient interconnector scheduling; or
- Result in unnecessarily volatile and inefficient pricing.

These potential issues can only be conclusively tested through full commercial testing under I-SEM operating conditions. This is because the HLD requires generators to formulate EUPHEMIA order types to achieve efficient scheduling of their units by anticipating underlying market dynamics, such as the level of wind generation and the volume of demand that will participate in the DAM on any given day. The complexity of the problem presented to EUPHEMIA and the overall efficiency of the market solution will therefore depend upon the interactions of order formats and these underlying assumptions across all participants. The EAI therefore proposes a three phase approach to EUPHEMIA testing to ensure all potential risks are properly assessed. These are:



1. Proof of Concept Testing;
2. Regression Testing; and
3. Commercial Testing

Time Period for Historical Testing

To build market confidence in the I-SEM HLD the testing of EUPHEMIA needs to be robust and extensive. The EAI therefore proposes that EUPHEMIA testing is conducted on at least a year's worth of SEM historical market data. This is in line with the testing regimes carried out in other markets – e.g. the Iberian market. The EAI furthermore recommend that scenario stress testing is carried out to ensure the integrity of the I-SEM DAM under unusual / exceptional events if such events are not captured in the historical data – e.g. low system availability, extremely high / low wind, IC outages, combination of these.

Use of an extensive historical data set and scenario stress testing will:

- Provide a wide range of results across seasons and with different wind and availability profiles;
- Build market confidence in the I-SEM HLD;
- Improve market participants' understanding of the EUPHEMIA algorithm;
- Improve market participants' understanding of EUPHEMIA order formats;
- Allow regulators to assess the potential outcomes of the new proposed Energy Trading Arrangements for customers;
- Inform the debate on forward liquidity (in particular, the balance between effective forward liquidity and the need to provide appropriate flexibility to facilitate adequate risk management);

Benchmarking

The results of testing should be benchmarked against the SEM market outcomes for historical test periods. In interpreting the results Eirgrid should take into account any relevant factors that may affect schedules and prices – e.g. changes in IC flows etc.

1. Proof of Concept Testing (Single Order Format)

Proof of concept testing should seek to confirm that the proposed use of the EUPHEMIA algorithm to schedule the I-SEM DAM at a unit based level is feasible. This could be achieved by using actual SEM data for a typical year – e.g. Feb 2014-Feb 2015. The TSO would create a data map to translate the actual generator offers submitted to SEM into a compliant EUPHEMIA order type. An assumption around how this translation is carried out for each order format would have to be made for example applying perfect foresight. The process would then be repeated for each EUPHEMIA order type. For the purposes of this stage of testing all generators would be assumed to use the same order type for each cycle of testing.



Responsibility: Eirgrid

Objective:

- Obtain an understanding of the potential impacts of EUPHEMIA order formats on the functioning of the I-SEM DAM. Improve participant understanding of EUPHEMIA order formats and I-SEM DAM dynamics. Analyse market results and identify potential issues.

Assumptions:

- All non de-minimis wind generation participates in DAM with perfect foresight
- All market demand participates in DAM with perfect foresight
- DAM demand is assumed to be the sum of all MSQs – IC flows and pumped storage operation should be scheduled through the EUPEHMIA algorithm (netted from demand)
- Wind and demand enter DAM as price takers

Inputs:

- 2014-15 SEM generator bids translated to a EUPHEMIA order format.
- Wind generation is offered as price taking orders based on actual MSQs
- Market demand is represented as pricing taking bids from suppliers

Outputs:

- All Input data
- Data map used by TSO for each order type
- Hourly market schedules (EUPHEMIA contract positions) for each unit
- Hourly market prices (this should include price and uplift if MIC orders are used)
- Any other data deemed useful for participants to improve their understanding of the operation of EUPHEMIA.

2. Full Regression Test (Multiple Order Formats)

Eirgrid in consultation with market participants would create a test plan designed to stress test combinations of order formats. This could be achieved by using the same actual SEM data as for the proof of concept testing. The test plan could be informed by the results of the proof of concept testing. For set time intervals individual generators or sub sets of generators would be allocated a certain EUPHEMIA order format. To comprehensively test the enduring capability of EUPHEMIA (i.e. for the situation where wind penetration has substantially increased and generation profiles become more unpredictable) to produce a feasible despatch within the solution time limits, such mapping should provide that a large proportion of generating units submit a substantial number of exclusive, complex bids such that their underlying complex costs can be replicated in EUPHEMIA such that they would not operate at a loss whatever their outturn schedule (i.e. that units do not operate at a loss



regardless of whether they operate for 1 or 24 hours or at mingen or full). This would entail rigorous extremity testing of the capabilities of the algorithm and may help identify what impact such an approach by generators impacts the performance of the EUPHEMIA algorithm, either in terms of runtime or in terms of the solution it can derive in the time available and hence may provide some indication as to whether bidding restrictions could be imposed to ensure EUPHEMIA can reach a viable solution. Actual historic generator order formats would then be translated using the data maps created during proof of concept testing. The focus of the testing would be to analyse the interaction of EUPHEMIA order types and their effect on DAM outcomes.

Responsible: Eirgrid

Objective:

- Obtain an understanding of the potential impacts of EUPHEMIA order formats on the functioning of the I-SEM DAM. In particular, how the interaction of different types of order formats by market participants affects market outcomes. Improve participant understanding of EUPHEMIA order formats and I-SEM DAM dynamics. Analyse market results and identify potential issues and risks to EUPHEMIA performance and/or risks to the imposition of limits on bids.

Assumptions:

- EUPHEMIA order formats used by each market participant determined by a test plan (including scenarios to extremity test the algorithm)
- Data maps developed for proof of concept testing used to generate EUPHEMIA order submissions for participants as per the test plan (including the generation of exclusive orders)
- All non de-minimis wind generation participates in DAM with perfect foresight and then scenarios developed to replicate wind forecasting errors to facilitate stress testing
- All market demand participates in DAM with perfect foresight and then scenarios developed to replicate demand forecasting errors
- DAM demand is assumed to be the sum of all MSQs – IC flows and pumped storage operation should be scheduled through the EUPHEMIA algorithm (netted from demand)
- Wind and demand enter DAM as price takers

Inputs:

- Test Plan devised by Eirgrid determining how each market participant's data will be submitted to EUPHEMIA.
- 2013 SEM generator bids translated to a EUPHEMIA order format as per the test plan.



- Wind generation is offered as price taking orders based on actual MSQs
- Market demand is represented as pricing taking bids from suppliers

Outputs:

- All Input data
- Data map used by TSO for each order type
- Hourly market schedules (EUPHEMIA contract positions) for each unit
- Hourly market prices (this should include price and uplift if MIC orders are used)

Any other data deemed useful for participants to improve their understanding of the operation of EUPHEMIA.

3. Full Commercial Testing

Market participants are provided with an opportunity to submit orders into EUPHEMIA using any EUPHEMIA order format. These are carried out for sample periods – e.g. a week at a time. There are no restrictions applied to bidding however Eirgrid will be required to complete some sort of sense checking to ensure the end market scenario is reasonable. Participants must seek to behave how they would have behaved during the historic period in question if the I-SEM ETA had been in place. They bid based on actual wind and demand levels but the TSO run additional scenarios with different demand and wind assumptions to introduce the element of forecast error. This approach is limited as under real I-SEM conditions each participant may have a different forecast of wind or demand.

Responsibility: Eirgrid and Market Participants

Objective:

- Obtain an understanding of the potential impacts of EUPHEMIA order formats and forecasting errors on the functioning of the I-SEM DAM. In particular, how the interaction of different types of order formats in conjunction with participant forecasting errors affects market outcomes. Improve participant understanding of EUPHEMIA order formats and I-SEM DAM dynamics. Analyse market results and identify potential issues.

Assumptions:

- EUPHEMIA order formats determined by market participants for the time periods identified in the test plan
- All non de-minimis wind generation participates in DAM with perfect foresight and then scenarios developed to replicate wind forecasting errors to facilitate stress testing
- All market demand participates in DAM with perfect foresight and then scenarios developed to replicate demand forecasting errors



- Base DAM demand is assumed to be the sum of all MSQs – IC flows and pumped storage operation should be scheduled through the EUPEHMIA algorithm (netted from demand)
- Wind and demand enter DAM as price takers

Inputs:

- Test Plan devised by Eirgrid.
- EUPHEMIA orders received from participants for the periods identified in the test plan. Orders should reflect how participants would have behaved under the I-SEM ETA during the historical period.
- Wind generation is offered as price taking orders based on actual MSQs
- Market demand is represented as pricing taking bids from suppliers

Outputs:

- Wind and demand scenarios used by Eirgrid to simulate forecasting error
- Hourly market schedules (EUPHEMIA contract positions) for each unit
- Hourly market prices (this should include price and uplift if MIC orders are used)

Demand Side Price Setting Bids

- The commercial testing should be developed to determine the impact from price setting demand side bids into Euphemia. In this regard scenarios should be developed whereby demand participates in the DAM in proportion to varying levels of unhedged volume (for example 85% hedged /price taking and 15% unhedged / price setting bids) under different wind and demand forecasts. Suppliers could then submit commercial demand side bids in proportion to their unhedged volume

Further Testing:

- The commercial testing could be further developed to replicate differing views of wind and demand forecast for the DAM. This could be achieved by Eirgrid centrally issuing wind and demand scenarios to participants prior to submission of EUPHEMIA order formats.

Detailed Testing Plan

To enable resource planning, a detailed testing project plan should be developed and published for comment. This will ensure that market participants can organise resourcing to ensure engagement and allow the testing to deliver upon its aims. The plan should ensure that there is sufficient interval between test stages to allow participants to analyse outputs of previous stages and amend inputs to the following stages. The latter phases of the plan should also be adaptable in order to allow for any changes that may be required as a result of the outcomes of earlier stages.

