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SEMO Response to the SEM Committee's Consultation – SEM-21-046- Redacted Version

21 July 2021

This document outlines SEMO's response to the SEM Committee's proposed approach outlined in Consultation SEM-21-046 regarding the SEMO 2021 – 2024 Price Control for the period 01 October 2021 to 30 September 2024.

Contents

Executive Summary

SEMO welcomes the opportunity to respond to the SEM Committee's consultation on the SEMO price control 2021-24, SEM-21-046, (the 'Consultation Paper'). SEMO recognises that its Operational Expenditure (OpEx) and Capital Expenditure (CapEx) submissions were significant in their ask compared to the previous price control, however, the previous price control was set prior to the new SEM arrangements coming into force against assumptions that have proven to be inadequate for the complexity of the new market arrangements. The increase sought is necessary to enable SEMO to efficiently operate the SEM delivering market stability and the service levels expected by market participants.

Unfortunately the Regulatory Authorities' ('RAs') proposed allowances, if unchanged in the final decision, will result in SEMO being unable to perform to the standard it believes is required, and the market participants expect. The proposed allowances in many cases are set below this year's run rate and fail to take into account known drivers of cost growth. What can be delivered in that context is clear in SEMO's KPI reports and leaves little opportunity for improvement on today's service levels.

As set out in the OpEx price control submission, SEMO's OpEx request resulted in an annual impact of approximately €1.34 on the average domestic customer across Ireland and Northern Ireland. The RAs' proposed OpEx allowance, as set out in their Consultation Paper, results in an annual impact of approximately €1.07 per average domestic customer. While this difference may seem minor (€0.27 per annum per customer), the RAs' proposed disallowances have very real and significant implications on SEMO's ability to operate and develop the market.

The RAs' proposals are insufficient to enable SEMO to provide even the most basic of service levels to market participants and, if unchanged, SEMO will have to reallocate provisions to service fixed costs to which it is committed, particularly in IT, without which the most fundamental operability and security of the systems would be at risk.

Significantly, the RAs' proposals diminish or undermine entirely the core regulatory framework as provided for under the current price control. The changes proposed to the framework, if left unchanged in the final decision, significantly undermine SEMO's ability to invest in the development of SEM or deliver its ambition as set out in the SEMO Business Plan.

Framework

It will come as no surprise to the RAs that SEMO is very concerned with the proposed disallowances as they undermine the financeability of SEMO. The RAs have proposed that no remuneration is required for the collection agent role. SEMO manages cash flows relating to the Capacity Market, Capacity Socialisation Fund and Residual Error as the market operator. SEMO therefore faces significant exposure to cash shortfalls due to revenue risks associated with variation in either receipts or payments as part of the tariff-based approach in SEM.

In the 2018-2021 Price Control the RAs recognised these potential risks and provided remuneration for them. The principle of remuneration for Collection Agent responsibilities has also in the recent past been confirmed by the Competition and Markets Authority which is referenced in the accompanying expert report from KPMG. Information regarding actual market cash flow volatility has been provided which demonstrates that these risks are very real, and in this regard we find it very difficult to accept that the RAs are now proposing to dismiss these risks and disallow the associated mitigating revenue. This is a significant portion of SEMO's revenue, amounting to c. €2.4m over the three year period and SEMO is very concerned on its enduring impact on SEMO.

As set out by SEMO there remains a significant amount of uncertainty regarding the capital projects that will ultimately be advanced. While the RAs has sought to provide flexibility to SEMO as to what projects are progressed, the proposed ex-post CapEx framework without guidance places a significant level of uncertainty on SEMO regarding the recovery of the CapEx spend. In addition, the total disallowance of asymmetric risk on CapEx spend increases the risk borne by SEMO on future capital spend. In order to reduce this risk and uncertainty, SEMO require that elements of the Agreed Approach Document, that governed the ISEM Implementation Capital project are introduced, in particular the principle of DIWE and the application of Net Present Value (NPV) Neutral adjustment to all CapEx spend up to the point of addition to the RAB are required as part of the framework. These elements, along with allowing the margin against the down-side only asymmetric risk on CapEx would provide SEMO the necessary support to develop our capital programme.

OpEx

The proposed disallowances by the RAs for OpEx during the 2021-24 period will need to be revisited in advance of the Final Decision. The proposals conflict with the RAs' explicit assertion that further efforts need to be made to stabilise SEMO's "business as usual" activities. There is no OpEx funding to facilitate this and the current "unstable" setup has inappropriately been taken as a cost benchmark.

That proposed, if unchanged in the final decision, will result in SEMO being extremely challenged to provide even the most basic of service levels to market participants, impacting not only day to day operations but the ability to advance the programmes and projects sought by market participants and required under Market and European requirements.

In particular SEMO has serious concerns with the proposed disallowances and in particular with reference to the IT and Managed Services and Labour Costs.

In its OpEx submission, SEMO set out the requirement for €14.9m to support ***IT and Managed Services*** over the price control; the RAs have set out a proposed allowance of €9.9m (-33%) in their Consultation Paper. The IT and Managed Services spend is the second largest OpEx category, after labour costs. The IT infrastructure is critical to not only the smooth running of the ISEM on a daily basis, but also to ensuring the market and market participants are not at risk from potential IT security threats.

> The ***Hardware and Software support*** element of the IT costs currently has a proposed deficit of €1.3m. These costs are largely fixed (under the competitively tendered contracts currently in place) for the level of support required and reflect the current run rate for these costs. Contrary to the views of the RAs these costs will not be reduced by the delivery of CapEx projects and indeed where new systems or functionality is introduced are likely to increase. If

this disallowance is not reversed the proposals would necessitate SEMO to reduce or remove entirely support for a number of critical hardware and software components, thus compromising our systems in the event of any issues arising. This would leave our underlying infrastructure unsupported with potentially serious market consequences or force SEMO to reallocate provisions intended to support labour or other costs to service these fixed cost commitments without which the most fundamental operability and security of the systems would be at risk. The reallocation of provisions for other areas would impact on system stability and/or the overall services provided, including KPI's not being met, delayed or extend timeframes for issue resolution, query management etc. and reduced capital programme development.

Globally, cyber security threats are escalating, and attacks are becoming more sophisticated. We have had sufficient warnings to suggest that our sector (e.g. US Fuel pipeline), markets and exchanges (e.g. New Zealand stock exchange) are not immune from cyber-attacks, nor is Ireland any longer a benign target (e.g. HSE). Operating a market with unsupported hardware and software in any situation, never mind in the context of our current threat landscape is an action which SEMO simply cannot condone. Thus, it is essential that the RAs review their proposals in this regard and restore in full the revenues sought of €2.3m by SEMO for this critical spend to protect our electricity market.

In terms of ***Managed Services*** SEMO required [redacted] additional managed service resources[1] (over the [redacted] provided for in the current PC) to support the market. The RAs proposal to disallow these resources will have a significant impact on SEMO IT operations and the support of the market and poses a significant risk that market participants' critical needs and delivery on our mandated service levels will not be achievable, effectively running the risk of inadequate application, database and infrastructure support capability which could result in service outage or impairment. Provision for the full amount sought for these services €2.5m must be restored in the final decision.

SEMO sought an additional 15 FTEs on top of the current baseline of 59.5 FTEs as part of its forecast ***Labour Costs***. Of these 15 FTEs, the RAs propose to disallow 10. While all 10 FTEs are required if SEMO is to make a step change in its service levels to the market and deliver the expansive programmes of work ahead, it is critical that, at a minimum, provision is included for the 5 Testing FTEs and 1 Legal FTE in the final decision, on top of the 5 additional FTEs provided for by the RAs. Furthermore, the RAs must review and reverse the proposed reduction in the average payroll FTE rate and provide for the FTE rates as set out by SEMO, in order for SEMO to meet fixed uncontrollable costs associated with staff obligations.

The RAs propose to disallow ***5 Testing FTEs*** sought by SEMO for the purposes of Market Operations Functional Testing. Due to ever-increasing market and system complexity, this disallowance of essential FTEs is fundamentally unsupportable given the market challenges ahead. The absence of suitable Market Operations Subject Matter Experts (SME) test resources has significantly constrained SEMO's ability to deliver a stable market along with

1 [redacted]

substantial biannual releases under the current price control. As noted by the RAs and the participants ISEM is not where it would be expected to be three years post implementation. Due to the complexity of the ISEM market and supporting systems there is a need for both IT SMEs resources and Market Operations SMEs resources – in order to work in tandem to maintain market stability while delivering the necessary changes.

This approach runs contrary to the views of participants as noted by the RAs - "*There was also recognition that an improved testing and change management process is necessary, with sufficient resources to design, test and monitor post-deployment and with scope to involve participants*." [2]

The proposed disallowance of these resources appears to be premised on a view that there is a potential duplication of testing resources. This is a misunderstanding on the part of the RAs and the conflation of very different testing functions. SEMO has set out in Appendix 3 detailed information as to the requirements for these 5 additional Testing FTEs including what elements of the testing have been provided for by the RAs in the proposed allowances and which elements of the testing processes the RAs have currently not included any provision for. There is no duplication of testing resources, the additional resources are required in order to ensure the necessary Market Operations functional testing is performing as needed, i.e. is the change giving the expected outcome, has the change fixed the problem it set out to fix for example; has it had any unintended consequences somewhere else, do the new results align with the requirements of the TSC etc.

It is a fact that the market has become more complex and market participants expectations have similarly increased as regards secure services levels. Should SEMO fail to adequately test changes to the market systems increases the risk of market instability. The RAs must consider this decision and make provision for the 5 Testing FTEs, not only from a functional business perspective, but also taking into account the market and strategic implications of a failure to do so.

In regard to the 1 ***Legal FTE*** that is proposed to be disallowed, contrary to the views of the RAs, there are significant drivers that warrant the provision for this resource. SEMO is of the view that the on-going legal workload will not be "short-term" as suggested by the RAs. The workload and legal input required as a result of Brexit will be significant over the next three years, including the legal basis of the on-going relationship with service providers in the UK post-Brexit. A substantial legal review of all ex-ante related contracts will be required, following any changes in the frameworks that arise as a result. Technical procedures for future arrangements must also be developed as part of this process which will require legal review and sign-off.

This work is in addition to the existing workload of providing day-to-day legal advice across the markets space, concerning issues such as registration, accession, formal queries, settlement queries, providing an interpretation of provisions of various codes, pricing and general disputes

[2] Consultation Paper, page 22.

across the capacity markets, advices on the drafting of modifications across all markets, in parallel with the substantial work of ensuring compliance with network codes.

In that context, it is neither prudent nor practical for one legal resource to manage all market related queries and address legal issues relating to compliance obligations. The outcome of this is a substantial risk of non-compliance and delay in progressing legal disputes. The RAs must include provision for this essential role in the final decision.

The proposed ***payroll costs*** and indeed the proposed basis for its assessment are also of significant concern. SEMO is not a corporate entity but a joint venture between EirGrid and SONI and SEMO staff are either employed by SONI Ltd or EirGrid plc. with the relevant SONI or EirGrid contract of employment. Specific corporate obligations, such as staff pension arrangements flow from the relevant parent company and must be taken into account. The proposed methodology by the RAs' [redacted] is wholly inappropriate in setting that which is now required and inconsistent with any established regulatory framework.

[redacted]

In addition to the two areas highlighted above, the RAs have proposed to disallow in full the costs sought to support High Level Analysis and Design and Strategic Initiatives.

The RAs further propose to disallow in full the provision sought for ***High Level Analysis and Design***. SEMO has notable concerns with the RA's approach. SEMO has sought this provision so as to ensure that technical specialism could be introduced to the planning and design phases of the projects detailed in the Capital Programme. High Level Analysis and Design is a key driver in the efficient delivery of projects. Initiating projects in the absence of robust High Level Analysis and Design can lead to significant additional costs being incurred during a projects development and can also lead to significant delays.

To effectively and efficiently carry out this High Level Analysis and Design activity SEMO will require support from industry experts, technical specialist etc. across a range of subject specific areas and requires the revenues sought to procure these services. Should the RAs not restore the provision for High Level Analysis and Design fees, SEMO will be unable to advance critical projects (e.g. Batteries) in a timely manner nor indeed the scope and scale of projects currently envisaged.

A failure to provide for the costs associated with ***Strategic Initiatives*** will impact SEMO's security and its ability to deliver and utilise projects due to be advanced under the Capital

Programme. Strategic initiatives have both CapEx and OpEx elements. The costs proposed by SEMO for Strategic Initiatives within IT OpEx have not been provided for by the RAs, notwithstanding the fact that the CapEx associated with these Strategic Initiatives has been allowed. This approach is inherently unworkable. For example; the proposed disallowances of OpEx associated with Data & Analytics Services will render the proposed data platform a "white elephant", in an effect a data platform will be built but users will not be licenced to use the tools to help extract information and the underlying infrastructure will not be maintained. In addition, both RAs respectively approved in its entirety the allocation of the Cyber initiative costs (both OpEx and CapEx) in the SONI and EirGrid price controls but the OpEx related costs have not been approved for SEMO.

CapEx

While the predictable and unpredictable CapEx pots are considerable and SEMO welcomes the RAs' recognition of the scale of potential capital investment required, the necessary support mechanisms, in terms of a financeable framework and associated OpEx activities (Testing FTEs and High Level Analysis and Design Fees), required to enable SEMO to develop the necessary CapEx projects are not provided for under the current proposals. As a result, if these support mechanisms are left unchanged regardless of the proposed CapEx provision set out SEMO is unlikely to be in a position to deliver the scale and complexity of projects envisaged.

From a capital framework point of view, as noted above, there is a considerable lack of certainty regarding the recovery of the CapEx spend. The RAs have dismissed the proposed DIWE mechanism in the assessment of outturn CapEx notwithstanding it is and has been an established framework employed by both CRU and UR respectively and jointly where an *ex post* review of costs has been required. Rather, the RAs have proposed to put the onus on SEMO to prove that expenditure has been efficiently incurred without any rule-set as to how this would be assessed. Such an approach is unworkable, effectively SEMO is being asked to prove that costs are not inefficient, as it is not possible to prove a negative; the approach leaves SEMO open to arbitrary disallowances and asymmetric risk. As noted in the section on the Framework above, the RAs have also proposed disallowance of the NPV neutral adjustment for capital projects and have not provided for asymmetric risk, thus reducing the financial incentive for SEMO to develop any CapEx projects.

KPIs

For KPIs to operate effectively, they should encourage the investment of discretionary capital and should be designed such that they complement the incentive placed on input and cost management. If applied effectively, the regulated business should not have a greater incentive to reduce costs at the expense of service quality if the service quality is ultimately, and demonstrably, that which is valued by participants. While SEMO supports the proposed KPI incentives for the 01 October 2021 – 30 September 2024 period, SEMO fundamentally does not agree with applying contingencies on KPI returns. Indeed the contingencies would not drive the desired outcomes.

To make the 'resolution of known issues' a pre-condition to any KPI reward would have a detrimental impact on the market. It would place a clear focus for SEMO on the resolution of issues that may be of high cost but low value or impact to the market participants to the detriment of high priority or urgent issue resolution.

If the resolution of known issues is of significant concern to the RAs and industry then we suggest making it a separate incentive, in a manner that did not detract SEMO from addressing high priority issues/defects, noting of course that it would be extremely difficult for SEMO to rectify an increased number of issues without having the necessary testing resources available to carry out the necessary work.

In regard to the proposed contingency linked to resettlement queries, there appears to be a misunderstanding by the RAs regarding how and when resettlement queries can arise and be processed. Instead of the proposal for an *'improvement of 12 months on the current ad-hoc schedule by the end of year 2021/22,* SEMO suggests that a more appropriate mechanism would be to incentivise the rate at which ad-hoc billing periods are processed through a separate KPI, rather than a contingent factor bases on an absolute time period (ref Appendix 5).

SEMO would welcome engagement with the RAs on the feedback received from Industry regarding the proposed KPIs prior to their finalisation.

Summary
The proposals as set out in the Consultation Paper, if unchanged in the final decision, will result in SEMO being unable to perform to the standard it believes is required and that market participants expect.

While SEMO still believes that its original OpEx and CapEx submissions represent what is required to deliver for the Market, the following minimum adjustments must be made:

- Restoration of a financeable framework for SEMO including the Collection Agent Margin **(€2.7m)** and DIWE arrangements
- Full restoration of the proposed disallowance of IT Hard ware and Software Support (**€1.3m** over and above the €1m provided for in the draft determination) and Managed Services costs (**€1.7m** over and above the €0.8m provided for in the draft determination**)**
- Provision of 6 additional FTEs from the 10 proposed to be disallowed
- Reinstatement of the necessary pension costs as set out in the BPQ [redacted]
- Provision for Strategic Initiatives and High Level Analysis and Design.

The implications of not providing for the above in the final decision include:
- Continued suboptimal levels of services for market participants
- Significant doubt if any capital projects can be developed
- Increased risk to system security (Cyber-attack) and market operability and stability
- Resocialisation of risks to participants

1. Introduction

As set out by SEMO as part of this price control process, the ambition and desired outcomes from SEMO in the 2021-2024 period were:

1. A well-functioning market (including the necessary systems to support it)
2. Good service levels and user experience for participants
3. Adherence to European Legislation, and Governmental and regulatory direction
4. An arrangement that is under-pinned by a financeable regulatory settlement and framework

SEMO is disappointed by the proposed allowances included in the RAs' Consultation Paper, which will put some of these outcomes at risk. The proposed allowances in many cases are set below this year's run rate and fail to take into account known drivers of cost growth. As a result, the RAs' proposals are insufficient to enable SEMO to provide even the most basic of service levels to market participants and, if unchanged, SEMO will have to reallocate provisions to service fixed cost requirements, particularly in IT, without which the most fundamental operability and security of the market systems would be at risk.

The feedback shared by market participants during the Participant Consultative Forum (PCF) included a general sentiment that the ISEM is not where it would be expected to be three years post implementation. The approach taken by the RAs in setting the proposed allowances will make it extremely difficult for SEMO to improve the service levels; hence the stability concerns relating to market operation will remain a challenge.

As set out above, SEMO's focus is a well-functioning market and reaching stable operations, however this is set against the backdrop of a market that will not stop evolving. The forthcoming price control period will involve "evolution not revolution" of the market; SEMO is cognisant of the unavoidable need to further develop the market as a result of governmental, regulatory and European-driven change, which is expected to ramp up significantly. SEMO will be required to meet the aggressive targets being set by the relevant governing bodies and industries. Some of the targets are set out in documentation from governments, government departments, multiple regulatory authorities and the EU.

There are some big changes expected in the pipeline (e.g. post-Brexit trading arrangements, the continuing implementation of the Clean Energy Package and European Network Codes, the introduction of batteries into the market, etc.) which will require initial analysis and scoping during the forthcoming period. While SEMO will seek to continue to improve the day-to-day operations of ISEM, it is imperative that SEMO has the necessary support to begin such analysis also if it is to be in a position to keep pace with the changes required as we move from one price control period to another.

In that context, SEMO welcomes the RAs' proposals in regard to the CapEx provisions for the forthcoming period. There is, however, a misalignment between the OpEx and CapEx allowance; the two should be considered in unison. While the CapEx allowance appears to provide for the Capital

Programme, the necessary support to the CapEx programme is not reflected in the OpEx allowances (specifically in the proposed disallowances of the High Level Analysis and Design that precedes the commencement of a project, the OpEx provisions required to enable SEMO to robustly test the changes delivered and the IT OpEx to support the associated licencing and services costs).

SEMO welcomes the RAs proposals in regard to the CapEx provisions for the forthcoming period however, there seems to be a misalignment between the OpEx and CapEx allowance. While the CapEx allowance appears to provide for the Capital Programme, the scale of uncertainty associated with the CapEx framework is of significant concern. The RAs are proposing to disallow:

- the framework necessary to support the Capital Investment;
- the OpEx provisions to provide the High Level Analysis and Design that precedes the commencement of a project;
- the OpEx provisions required to enable SEMO to robustly test the changes delivered; and
- the IT OpEx to support the associated licencing and services costs.

1.1 SEMO Consultation Response

In this response, SEMO sets out its concerns and the expected implications as a result of the RAs' proposed disallowances as set out in the Consultation Paper. The paper is supported by a number of appendices including a detailed report from KPMG, *"Independent Report on the Price Control Approach for SEM's Collection Agent Role"*.

1.2 SEMO Price Control Principles

SEMO set out the principles against which it formulated its forecast of costs[3] in the SEMO OpEx Submission. A number of those key principles have effectively been overturned by the RAs proposed approach and disallowances, in particular with reference to the RAs' proposed changes to the framework[4]. Of significant concern are the RAs proposals that diminish, or undermine entirely, the following principles as set out by SEMO:

- Continuation of the Collection Agent Revenue Margin framework as applied as implemented in the current control, calibrated at 0.25%;
- Uncertainty mechanisms to be developed in relation to capital expenditure; such uncertainty mechanisms to be clear and defined (to be further developed/ articulated as part of the SEMO CapEx submission paper); and
- Application of an appropriate suite of KPIs which recognises the operational performance of the business and provides an appropriate reward.

The changes proposed to the core principles above will, if left unchanged in the Final Decision, significantly undermine SEMO's ability to deliver its ambition as set out in the SEMO Business Plan

[3] Refer to Section 4.1.1 of SEMO's Price Control Operational Expenditure submission for a list of the revenue control principles.
[4] While the RAs have explicitly confirmed a number of the assumptions set out by SEMO, where an assumption is not directly addressed by the RAs SEMO assumes the principles will apply for the forthcoming price control period.

both in terms of OpEx and CapEx related activities. SEMO addresses these fundamental issues further in body of this response.

1.3 Licence Codification

SEMO notes that the RAs have indicated in Section 8.4 of the Consultation Paper the need for modification to the Market Operator Licences[5]. While SEMO welcomes the opportunity to engage with the RAs on any such proposals, SEMO notes that outside of such structural requirements there is a requirement to modify the SONI MO licence to reflect the Final Decision.

SEMO notes that any revenue restriction will need to be consulted upon and codified in the SONI Market Operator licence in accordance with the discharge of the Utility Regulator, or its SEM Committee's functions, if it is to have effect, and that this is a separate process to this Draft Decision or the proposed modifications indicated in Section 8.4. SONI looks forward to engaging with the Utility Regulator in this regard. In the absence of such codification the existing text as set out in Annex 1 of the SONI Market Operator licence will continue to apply. Any codification for SONI must reflect SONI's revenue entitlement and cannot simply represent a percentage of any overall SEMO allowance.

[5] Consultation Paper, page 108.

2. Financeability / Regulatory Framework

The proposed changes and disallowances in the regulatory framework for SEMO undermine the financeability of the business.

As set out in this section, although the RAs have provided for an ex-post CapEx framework, the significant level of uncertainty regarding the recovery of the CapEx is a concern for SEMO. In addition, the total disallowance of remuneration for asymmetric risk on CapEx spend increases the risk borne by SEMO on future capital spend.

To reduce this risk and uncertainty, SEMO are proposing to reintroduce elements of the Agreed Approach Document, in particular DIWE and the Net Present Value neutral adjustment.

The Net Present Value adjustment is made in the TSO price control for EirGrid. However, in the RAs' consultation paper, they advise that this *"is not considered relevant to this SEMO price control"* [6], offering no justification of this approach to overtly ignore this cost of capital.

The RAs also acknowledge the asymmetric CapEx risk but do not provide for a margin against it. SEMO has very similar capital development characteristics to SONI TSO including comparable features of asymmetry. It is not clear why no asymmetry premium is provided for SEMO despite the UR approving the remuneration against asymmetric risk in the recent SONI TSO price control. SEMO proposes that remuneration should be provided to price this risk.

The Regulatory Authorities also propose that no remuneration is provided for the collection agent role. These risks are not priced under the current proposals which threaten the overall financeability of SEMO. In the 2018-2021 Price Control the RAs recognised these potential risks and provided remuneration for them. The principle of remuneration for Collection Agent responsibilities has in the recent past been confirmed by the Competition and Markets Authority, which is referenced in a separate Expert Report from KPMG.

SEMO continues to collect revenues associated with the market tariff and the RAs' proposed disallowance for revenue associated with the collection agent role removes any return for the real risks associated with these activities under this role. The risks are recognised by the RAs and provided for in the current price control and this revenue is required to be reinstated (amounting to c. €2.4m over the next three-year period).

[6] Consultation Paper, page 30.

2.1 Overview of the Regulatory Framework

SEMO has a number of concerns with the approach taken by the RAs in its Consultation Paper in relation to the regulatory framework and financeability of SEMO.

Delivering the Capital Programme as part of the current price control period offers significant value to market participants, both in today's present value terms and enduring. To unlock this value, the CapEx framework must support SEMO in delivering this programme and the expected return in relation to this investment. This involves managing the risk and uncertainty that is associated with an *ex post* framework.

The market participants themselves indicated in the Participant Consultative Forum (PCF) they were "*encouraged by the necessity for a flexible framework for capital projects*".[7]

For successful delivery of the Capital Programme there must be appropriate *ex ante* certainty of what will happen *ex post*. The current proposal does not accommodate this. As such, SEMO proposes that sufficient ex ante certainty can be provided by considering the principles of the Agreed Approach Document (AAD)[8]. The principles of Demonstrably Inefficient or Wasteful Expenditure (DIWE) and Net Present Value (NPV)-neutral adjustment should be applied as part of SEMO's regulatory framework.

In 2015, the RAs and SEMO jointly agreed upon and signed up to the AAD. SEMO suggests that elements of the AAD should be agreed upon again as part of the cost recovery principles.

An ex post mechanism does however leave the recovery of costs vulnerable to asymmetric risks. In the best-case scenario, SEMO can recover its costs and in the worst-case SEMO would make an uncapped loss. These risks are recognised and if they are to be taken on, they require an appropriate margin.

The collection agent margin, which was in place for the current price control period, provided SEMO with the necessary protection against cashflow risk. The proposed disallowance of this margin makes SEMO more vulnerable to potential variation risk regarding the Capacity Market, the Capacity Socialisation Fund and the Residual Error.

A working capital buffer is therefore needed to cover any potential shortfall associated with the risks which has not been recognised in the current proposals. The SEMO business is based on providing services under a number of activities. Collecting revenue under the Capacity Market, Capacity Socialisation Fund and Residual Error are some of those activities. While these activities are not risk free, no remuneration has been provided by the RAs for this. This is despite the recognition of these risks and provision by RAs of a return to mitigate these risks under the current Price Control. This change in approach by RAs and removal of this risk related return undermines the overall financeability of SEMO.

[7] Consultation Paper, page 28.

[8] SEM-15-004, *Design and Implementation of Integrated Single Electricity Market (I-SEM)*, Agreed Approach Document, 9 January 2015 - https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-004%20Published%20AAD%209%20Jan%202015.pdf

In its report on the *Assessment of SEMO Financeability*, Yellow Wood Energy suggest that the Competition and Markets Authority (CMA) decision made in respect of the SONI appeal was not made upon robust evidence and therefore speculate that should this decision be revaluated, the decision may be different now and by extension argue that the approach made by the CMA cannot be applied to SEMO.

This is highly inconsistent with the decision made by the CMA and highly speculative to assume that there would now be a different outcome. The Yellow Wood report is inconsistent with the approach made by the UR in December 2020 to reaffirm the CMA decision as part of the SONI price control for 2020-25. Yellow Wood's report directly contradicts the decision made by the CMA, represents an inconsistent approach and fails to consider the overall financeability of SEMO by focusing on a narrow layers approach to SEMO's finances.

2.2 Implications of the Regulatory Framework proposal

The current proposals put the overall financeability of SEMO at risk. The proposed Regulatory Framework would have severe implications for the SEMO business and ultimately the market participants.

These implications include:

a) Promoting risk averse spending decisions which do not align with market participants' interests,
b) Risk associated with significant cost recovery disallowances are not priced,
c) Risks associated with the collection agent activities are not priced,
d) The overall financeability of SEMO is undermined.

As a result, the proposed regulatory framework threatens to undermine the operation of SEMO.

2.3 Reinstate the Agreed Approach Document

In order to address SEMO's concerns regarding the financeability of SEMO for the forthcoming price control period, elements of the Agreed Approach Document (AAD) should be reinstated.

SEMO is proposing to reinstate the AAD which includes the following elements;

- Three criteria for expenditure,
- The principle of Demonstrably Inefficient or Wasteful Expenditure (DIWE),
- The neutral net present value (NPV) adjustment.

Three Criteria for Expenditure

The RAs noted in the Consultation Paper that the following three tests are reasonable tests for CapEx costs incurred by SEMO. The three criteria for efficiently incurred expenditure as stated in SEM-21-046 are:

1. Expenditure must be efficiently incurred;
2. Expenditure must be demonstrably necessary for progression of the I-SEM; and

3. Expenditure must be incremental to existing price controls and capable of being robustly validated by the RAs.

SEMO supports this proposal provided that the three criteria are adhered to in conjunction with the following elements, as agreed as part of the AAD.

Demonstrably Inefficient or Wasteful Expenditure
Demonstrably Inefficient and Wasteful Expenditure (DIWE) is defined as "expenditure which has been determined, by the regulator (giving the robust reasons for its decision) to be demonstrably inefficient and/or wasteful, given the information reasonably available to the licensee at the time that the relevant decision about that expenditure was made. For the avoidance of doubt, no expenditure is demonstrably inefficient or wasteful expenditure simply by virtue of a statistical or quantitative analysis that compares aggregated measures of the licensee's costs with the costs of other companies".[9]

SEMO is proposing in the current price control that the RAs should be responsible for all monies agreed to be recoverable subject to "*no finding of demonstrable inefficiency or wastefulness in their incurrence*".[10]

SEMO has concerns with the RAs' Consultation Paper since requiring SEMO to provide evidence of efficient expenditure increases the probability of disallowance and therefore is likely to encourage risk-averse behaviour. The business will be less willing to consider innovative projects subject to the condition of demonstrably efficient expenditure compared to the situation as agreed under the DIWE provision in the AAD. The resulting risk-averse behaviour will undoubtedly be damaging to the consumer. This is corroborated by the SEM-21-046 consultation:

> *An ex-post recovery subject to DIWE would ensure SEMO does not try to minimize costs, delay investment and adopt risk averse behaviours which are not in the consumer interest.* [11]

In the AAD, it was agreed ownership should lie with the RAs to demonstrate inefficiency of spending or the counter-factual of efficient spending. SEMO proposes this should be agreed alongside the other elements of the AAD noted in this section.

This was also agreed by the UR for the SONI price control 2020-25, where the UR agreed upon ex-post adjustment of expenditure available by virtue of the DIWE review carried out by the UR. Further guidance on the interpretation and application of the DIWE provision was provided by the UR in July 2017:

> *"The starting point is therefore that expenditure which is potentially subject to DIWE is presumed efficient; unless and until the UR establishes that it is not."*[12]

[9] See for example: SONI TSO Licence, Annex 1 - https://www.uregni.gov.uk/files/uregni/media-files/SONI%20TSO%20Consolidated%20Feb%202019.pdf
[10] SEM-15-004, *Design and Implementation of Integrated Single Electricity Market (I-SEM)*, Agreed Approach Document, 9 January 2015, page 25 - https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-004%20Published%20AAD%209%20Jan%202015.pdf
[11] Consultation Paper, page 30.
[12] Utility Regulator, *Guidance on the interpretation and application of the Demonstrably Inefficient or Wasteful Expenditure (DIWE) Provision*, 27 July 2017, page 4 - https://www.uregni.gov.uk/files/uregni/media-files/Guidance%20on%20the%20interpretation%20and%20application%20of%20Demonstrably%20Inefficient%20or%20Wasteful%20Expenditure.pdf

In the SONI 2020-25 price control, the UR also acknowledged the need to carry out an ex post review based on ex ante information and options rather than on hindsight as this would undermine the financeability of the package.

SEMO proposes the following set of agreed principles to underpin the RA's ex post DIWE guidance. Where the RAs choose to inquire into whether certain expenditure may be DIWE, it would take into account all the relevant circumstances. This would include the following:

a) The extent to which SEMO identified and utilised resources and delivered outputs agreed as part of the ex-ante determination.

b) The extent to which SEMO was, or ought to have been, able to control the relevant expenditure, including:

i. whether SEMO had in place appropriate processes to oversee and control its internal costs;

ii. whether SEMO had in place appropriate contract management processes to oversee and control third party costs;

iii. whether any of these processes were applied effectively.

c) The information that was reasonably available to SEMO and / or its third party contractors, at the time that it and / or they made any relevant decisions in relation to expenditure or the control of expenditure.

d) The extent to which any expenditure involved an unnecessary duplication of activity on the part of SEMO and/or its third party contractors.

e) The extent to which any expenditure was increased by any material error or mistake on the part of SEMO and/or its third party contractors.

f) The extent to which any expenditure was proportionate to the outputs which that expenditure was intended to, and/or did, deliver.

g) The extent to which those outputs were appropriate outputs to be delivered in the context of the project or other activity for which SEMO was given an allowance (or other form of approval to recover revenue) in accordance with its price control.

In accordance with the definition of DIWE (per above), the RAs could not determine any expenditure to be DIWE solely because of a comparative financial analysis of the costs of SEMO as against those of other companies.

Net Present Value (NPV) Adjustment

Capital has a cost both during investment and once this capital is invested. This cost of capital is caused by the existence of capital risk, which is likely to be larger during investment as variables such as estimated project costs scope remain uncertain in respect of the actual outturn of this period.

The Consultation Paper states that SEMO is not expected to bear the full project cost of all projects through to completion. However, in the absence of a net present value adjustment the current proposal implies that SEMO must bear this cost of capital before and during investment. An NPV adjustment would ensure SEMO is not at a loss and the business is able to deliver its expected returns, given the existence of this cost.

Making an NPV-neutral adjustment to the regulated WACC is an established and acceptable principle by both the UR and CRU in the face of these costs. SEMO suffers from the same costs which have been addressed in the past by the RAs using the NPV adjustment. The net present value adjustment is made in the EirGrid TSO price control.[13] However, the current Consultation Paper suggests that the NPV adjustment *"is not considered relevant to this SEMO price control"* [14], offering no justification of this approach to overtly ignore this cost of capital. Similarly in the report carried out by Yellow Wood Energy, the consultants acknowledged that systematic risks may exist during investment and were unable to make a definite recommendation to the Regulatory Authorities on this issue.[15]

In mitigation, the Consultation Paper suggested SEMO will continue to receive allowances to reflect depreciation in the k factor truing up process. This is conflating separate processes with the issue in question as these allowances do not alleviate the existence of the costs of capital that an NPV neutral adjustment covers.

SEMO is therefore proposing to reinstate the NPV adjustment since this was agreed previously in the AAD. In the AAD document it states that

> *"timing of recovery of monies under licensee revenue/price controls provision shall however be made on the basis that the recovery shall be on an NPV neutral basis by reference to the relevant regulated WACC pertaining"* [16]

This would be an appropriate means of addressing this cost of capital during investment. SEMO has offered other means of accounting for this cost. The alternative approach would be to add capital to the Regulatory Asset Base in the year of incurrence. SEMO has indicated it is equally comfortable with this approach, but this approach was not favoured by the RAs in earlier discussions.

2.4 Asymmetric Risk

SEMO faces a significant degree of asymmetry, in respect of cost recovery for predictable CapEx. Since it is impossible for SEMO to keep any upside benefit from greater efficiencies while only being exposed to downside risk, the expected shortfall for SEMO must be greater than zero. At best SEMO can recover its costs, at worst SEMO would make an uncapped loss.

As outlined in an expert report as part of the 2016 price control appeal with the CMA, from a funders perspective SONI bears the risk associated with efficiently incurred costs exceeding the cap, but retains none of the savings from efficiencies resulting in expenditure below the cap. This represents an asymmetric risk profile.

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[13] CRU20152, Commission for Regulated Utilities, *PR5 TSO and TAO Transmission Revenue for 2021-2025*, 22 July 2020, page 99 states *"…the NPV of the change in the TSO RAB and TAO RAB over the price review period (i.e. the opening value less the discounted value of the closing RAB, with the discount rate set at the cost of capital derived in section 6) is added to the total cash required to determine the net present value of the cash required by the TSO and TAO to finance the increase in the RAB over the regulatory period."* https://www.cru.ie/wp-content/uploads/2020/07/CRU20076-TSO-and-TAO-Transmission-Revenue-for-2021-2025.pdf

[14] Consultation Paper, page 30.

[15] *Assessment of SEMO Financeability*, Yellow Wood Energy, May 2021, p5.

[16] SEM-15-004, *Design and Implementation of Integrated Single Electricity Market (I-SEM)*, Agreed Approach Document , 9 January 2015, page 23 - https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-15-004%20Published%20AAD%209%20Jan%202015.pdf

Applying a premium based upon asymmetric risk would be in line with the CMA determination to remunerate SONI for the asymmetric risk that they face since the asymmetries are comparable. The CMA made their decision on asymmetric risk for SONI given

> *"in particular that the proportion of SONI's costs which are recoverable through the capped cost recovery mechanism is so high… The application of asymmetric risk to such a large proportion of SONI's costs without a corresponding return would be inconsistent with the expectations of investors that, on average, returns would be expected to be consistent with the cost of capital."* [17]

In the case of SEMO as explained in KPMG report on the financeability of SEMO in 2017[18], the CMA proposed a premium that was appropriate for asymmetric risk for *"SONI TSO as an asset light utility over and above RAB*WACC and an uplift to asset beta to reflect SONI TSO's high operational gearing"*.[19] In the current price review period, SEMO faces the same risk and therefore a premium is appropriate given SEMO's unique financeability model and size of its RAB. These asymmetric costs imply the Capital Asset Pricing Model (CAPM) principles do not hold and therefore the WACC itself is flawed.

In its report, Yellow Wood state that "*we would note that the incentive not to commit major crimes does not rely on there being a credible risk that law-abiding citizens will suffer severe punishment".*[20] However, the scope of the ex post review is not constrained by DIWE and across a portfolio of projects it may be difficult to evidence that projects are efficient, which creates additional risk.

Yellow Wood is mischaracterising the premium for asymmetric risk which is a premium for taking risk and for the expected losses given the truncated distribution of cost recovery and that the maximum cost recovery is a sunk cost.

The RAs acknowledge the asymmetric CapEx risk but do not provide for a margin against it. As stated in the RAs' Consultation Paper,

> *"While the RAs recognise that a small theoretical risk of disallowance of capital expenditure exists, SEMO has provided no convincing evidence of significant cost disallowances in its capital programme to warrant receipt of a guaranteed premium going forward."*[21]

However, no evidence of past disallowances cannot be sufficient to determine with certainty that significant cost disallowances will not occur in the future as a result of this risk. The acceptance of this risk implies this should be priced and therefore included in the current price control.

[17] The Competition and Markets Authority, *SONI Limited v Northern Ireland Authority for Utility Regulation,* Final determination, 10 November 2017, page 280 - https://assets.publishing.service.gov.uk/media/5a09a73ce5274a0ee5a1f189/soni-niaur-final-determination.pdf
[18] Provided to the SEMC as part of the SEMO Price Control supplementary submission, on 22 November 2017
[19] *Financeability of SEMO under the 2018-2021 price control*, KPMG, page 6.
[20] *Assessment of SEMO Financeability*, Yellow Wood Energy, May 2021, page 4.
[21] Consultation Paper, page 96.

The Yellow Wood report makes no recommendation to disallow an asymmetric risk premium in the current price control.

SEMO has several similar capital development characteristics to SONI TSO as highlighted in the table below. Table 1 questions why no asymmetry premium is provided despite comparable features of asymmetry being present in each case. This suggests that the approach applied by the RAs is in inconsistent and inappropriate in the case of asymmetric risk for the SEMO price control. This asymmetric risk is not being accounted for appropriately and therefore must be provided to not undermine the financeability of the regulatory framework.

Characteristic	SONI TSO	SEMO
Ex post cost recovery	Yes	Yes
Recovery up to a cap	Yes	Yes
WACC premised on CAPM	Yes	Yes
Uncertainty over up-front estimates	Yes	Yes
Asymmetric risk profile	Yes	Yes
Subject to DIWE assessment	Yes	To be included
Asymmetric risk premium	Yes	No

Table 1 Characteristics of SEMO TSO and SEMO Regulatory Framework

2.5 Collection Agent Margin

The collection agent revenues margin introduced for the 2018-21 price control is proposed to be set to zero; this will remove an amount of c.€2.4m over the next three-year period. It has been suggested that, *"Any residual risks associated with SEMO collection agent costs are entirely managed by the working capital facility"*.[22]

SEMO manages cashflows covering the Capacity Market, Capacity Socialisation Fund and Residual Error as the I-SEM market operator. SEMO therefore faces significant exposure to cash shortfalls due to revenue risks associated with variation in either income or cost as part of the tariff-based approach in I-SEM. The nature of these costs is inherently uncertain and outside of SEMO's control and there is no evidence to suggest these risks and costs have abated as I-SEM has become more established.

The collection agent risks for SEMO as evidenced in the independent report provided by KPMG "Independent report on the price control approach for SEMO's Collection Agent role" (included in Appendix 1) (the KPMG Report) are as follows;

- Liquidity risk due to risk in timing of revenue and costs
- Operational and reputational risk related to the quality of function
- Legal risks in complying with licence conditions
- Cyber risk due to attacks on the systems

[22] SEM-21-046, The SEM Committee, 2021, "SEMO 2021-2024 Price Control Consultation Paper", page 97.

- Cost risks relating to the OpEx and CapEx of running the system
- Cost (and opportunity cost) of maintaining a working capital facility

The failure to provide this margin would result in these direct risks and costs associated with the working capital facility not being priced. This would not be in line with the principles used in previous SEMO price controls which seek to replicate efficient market costs for the discharge of the activity and associated risks. The CMA acknowledged in the SONI case that no private firm would provide these services and incur risk without receiving the appropriate remuneration.

As highlighted by the KPMG Report into the collection agent margin,

> *"The risks associated with revenue collection are directly observable. In the past, there has been periods of cost volatility and consequent under-recovery in double digit millions. It is clear that this activity cannot be seen as being zero cost or zero risk."* [23]

Collection agent activities impact the overall financing of the business. The KPMG Report states,

> *"…there are risks and costs associated with SEMO's collection agent role, which are material in scale compared to SEMO's RAB. However, costs and risks associated with the collection agent role are not priced under the RA's proposals. This would prima facie mean SEMO is not financeable, as its material business activities and risks are not priced on a commercial basis."* [24]

The financeability of SEMO is impacted by these activities through costs such as the direct cost of handling collection agent shortfalls, the need for an equity buffer on unpredictable shortfalls and the impact on implied gearing of the business and the costs of financing the business as a whole. As suggested in the independent report, these costs should be remunerated.

The Yellow Wood report overlooks the overall impact on SEMO's financeability given the existence of non-zero risks related to SEMO's collection agent activities. In response, the KPMG Report states,

> *"As a necessary criterion for a regulatory determination to be deemed financeable, an efficient regulated company must be able to reasonably expect to earn its required return on a commercial basis, under the assumed financial structure. This test underpinned the CMA's 2017 approach to determine SONI's financeability, which priced all sources of capital and risk. However, this financeability test does not appear to be captured by the SEM Committee's June 2021 consultation approach or by the YWE report."* [25]

The non-zero risks and costs implied by removing the Collection Agent Margin are evidenced in greater detail by our consultants in the KPMG Report.

The KPMG Report concludes that a margin on revenues remains an appropriate remuneration approach with respect to the collection agent function as evidenced in their report.

The KPMG Report recommends that SEMO collection agent activities should continue to be remunerated by at least a 0.25% margin on collection agent revenues.

[23] *Independent report on the price control approach for SEMO's Collection Agent role*, KPMG, 2021, page 3.
[24] *Independent report on the price control approach for SEMO's Collection Agent role,* KPMG, 2021, page 25.
[25] *Independent report on the price control approach for SEMO's Collection Agent role*, KPMG, 2021, page 25.

3. Operational Expenditure

The proposed disallowances for OpEx will need to be revisited in advance of the Final Decision. The proposals conflict with the RAs' explicit assertion that further efforts need to be made to stabilise SEMO's "business as usual" activities; there is insufficient OpEx funding so as to facilitate this and the current "unstable" setup has inappropriately been taken as a cost benchmark.

SEMO's OpEx request had resulted in an annual impact of approximately €1.34 on the average domestic customer across Ireland and Northern Ireland. The RAs' proposed OpEx allowance, results in an annual impact of approximately €1.07 per average domestic customer. Although this may seem like a minor difference the RAs' proposed disallowance will extremely challenge SEMO's ability to improve service levels.

SEMO required [redacted] additional managed service resources (over the [redacted] provided for in the current PC) in place and on the ground to help support the market. The RAs' proposal to disallow these resources will have a significant impact on SEMO IT operations and the support of the market and poses a significant risk that market participants' critical needs and delivery on our mandated service levels will not be achievable. Provision for these services must be restored in the Final Decision.

The proposed provisions for IT Hardware and Software Support are of significant concern. This would result in a deficit of €1.3m to SEMO as the underlying IT Hardware and software support contracts are in place, meaning that this spend is not discretionary and there is no capacity to reduce costs and maintain the required services. These monies must be restored in the Final Decision.

SEMO requested an additional 15 FTEs on top of the current baseline of 59.5 FTEs. Of these 15 FTEs, the RAs' propose to disallow 10. While all 10 FTEs are required, it is critical that, at a minimum, SEMO are provided for the 5 Testing FTEs and 1 Legal FTE as part of the OpEx costs. Furthermore, the RAs supplement this reduction in FTE headcount with a proposed disallowace of known pension costs, directly inconsistent with the CRU's decision on same as part of PR5. It is essential that the RAs accommodate these pension arrangements which equate to an additional [redacted]

RAs have proposed to disallow SEMO's full ask of €1.03m for the delivery of Strategic Initatives. A failure to provide for these costs will impact SEMO's security and its ability to deliver and utilise projects due to be advanced under the Capital programme.

The RAs further proposed to disallow in full provision for High Level Analysis and Design fees. SEMO has sought this provision so as to ensure that technical specialism could be introduced to the planning and design phases of the projects detailed in the Capital Programme. SEMO requests that provision is made in the Final Decision to ensure that market participants and end consumers receive optimal value from SEMO's €28m Capital Programme.

3.1 IT and Managed Services

One of the desired outcomes of the SEMO price control, as articulated at the Participant Consultative Forum was "*A well-functioning market (including the necessary systems to support it)*".[26] This can only be achieved if SEMO is provided with sufficient funding to maintain the underlying hardware and software that runs the market.

SEMO has serious concerns regarding the proposed disallowances pertaining to IT and Managed Services. In its OpEx submission, SEMO's set out the requirement for €14.9m to support IT and Managed Services over the price control; the RAs have set out a proposed allowance of €9.9m (a 33% disallowance) in their Consultation Paper.

The IT and Managed Services spend is the second largest OpEx category, after labour costs. The IT infrastructure is critical to not only the smooth running of the ISEM on a daily basis, but also to ensuring the market and market participants are not at risk from potential IT security threats. SEMO is reliant on many third-party vendors and managed service providers to enable it to operate the market, the costs for which are at this time largely fixed. As a result the RAs' proposal to apply a 33% cut to SEMO's IT and managed services provisions would have a detrimental impact to the market system support. The revenues proposed are simply insufficient to enable SEMO to service fixed cost requirements without which the very operability and security of the systems would be at risk.

SEMO has set out in detail further justification for the IT and Managed Services costs required by SEMO in Appendix 2. However, SEMO highlights below a number of areas of specific concern.

3.1.1 IT Hardware and Software

The proposed allowance for IT Hardware and Software would result in a deficit of €1.3m as the underlying IT Hardware and software support contracts are in place thus this spend is not discretionary and there is no capacity to reduce costs and maintain the required services. It is simply not sufficient to maintain SEMO's IT infrastructure support and maintenance and will jeopardise the renewal of support contracts.

In effect the proposals would necessitate SEMO to reduce, or remove entirely, support for a number of critical hardware and software components, thus compromising our systems in the event of any issues arising. This leaves SEMO with the unacceptable choice of leaving our underlying infrastructure unsupported with potentially serious market consequences or to reallocate OpEx from other areas to meet SEMO's commitments under these contracts resulting in consequential impacts on system stability and/or the overall service provided by SEMO.

Globally, cyber security threats are escalating, and attacks are becoming more sophisticated. We know that public services can become a target for an attack, which cause widespread disruption by accessing sensitive system data and infecting thousands of computers. We have had sufficient warnings to suggest that our sector (e.g. US Fuel pipeline), markets and exchanges (e.g. New Zealand

[26] Consultation Paper, page 20.

stock exchange) are not immune from cyber-attacks, nor is Ireland any longer a benign target (e.g. HSE).

Operating a market with unsupported hardware and software in any situation, never mind in the context of our current threat landscape is an action which SEMO simply cannot condone. Simple preventative measures are better (and more cost-effective) than having to recover from a system attack. With this in mind, the €2.3m SEMO has requested is judicious, prudent – and ultimately – cost-effective.

The RAs in the Consultation Paper seek to support their proposals on the basis that EirGrid Group synergises could be utilised to realise efficiencies or on the misunderstanding that projects identified to be advanced under the IT CapEx programme, in particular the proposed [redacted], will lead to a reduction in costs.

- Where synergies could be extracted these are already in place from an IT perspective and built into SEMO's forecast costs.
- In terms of the impact of the Capital Programme the RAs assumptions as they apply to the specific SEMO projects are incorrect. The planned hardware refresh as part of the ISEM Infrastructure Refresh capital project, will not remove the driver of the increased costs as suggest by the RAs as this project is not delivered in a "big bang approach". Such an approach introduces significant risk across a wide range of platforms and systems and to the smooth operation of the market. As set out in the SEMO CapEx Submission (see ISEM Infrastructure Refresh) the replacement of hardware will be staged over FY21/22, FY22/23 and FY23/24 and the CapEx cost proposed to be provided for by the RAs is on this basis. SEMO has factored this staged replacement into its forecast revenue requirement which is reflective of the age profile of the equipment and the requirement for extended support for the existing infrastructure, which will range from 1-3 years of extended warranty in order to sustain the operation.

For the RAs to use an average of the 2018/19 and 2019/20 costs as proposed and not the 2020/21 forecast costs creates a false baseline, even if the 2020/21 forecast costs are included in the average it will still not be sufficient to meet SEMO's actual cost outlay. Thus, it is essential that the RAs review their proposals in this regard and restore in full the revenues sought by SEMO for this critical element.

3.1.2 IT Managed Services

Of the €2.52m (€0.839m per year) allowance requested by SEMO, €0.8m (€0.3m per year) is proposed to be allowed; a shortfall of €1.72m. The RAs have premised their proposal to disallow the revenues associated with the additional resources on the basis that '*As the market will enter its fourth year of operation, the RAs would expect the level of fixes to reduce so the need for Managed Services should re-stabilise/reduce*.'[27]

[27] Consultation Paper, page 57.

A significant number of I-SEM project personnel were available to support the market launch and post go-live operations in the first 18 months, helping to minimise the operational impact of incidents and defects. These resources were over and above that provided under the current Price Control and were funded through bespoke Capital Projects (PPS and Day 1+). These resources have since been de-mobilised and it became immediately evident that the effort assumed, and provided for in the underlying OpEx arrangements for the in the I-SEM was an underestimation of the need.

To address this issue SEMO required [redacted] additional managed service resources [redacted] in place and on the ground to help support the market. These resources comprise of [redacted] The removal of these resources, which would be the outworking of the RAs proposal if left unchanged, will have a significant impact on SEMO IT operations and the support of the market whereby we run the risk of inadequate application, database and infrastructure support capability which could result in service outage or impairment.

In the context of the current operating environment, the RAs' proposal poses a significant risk that SEMO will, at some point, fail to meet our customers' critical needs and deliver on our mandated service levels, if the level of support as seen to date is not maintained.

3.1.3 Apps Support and Maintenance

The RAs have proposed to disallow SEMO's requested 10% uplift in the [redacted] support contract. The market systems provided by [redacted] are proprietary in nature and in this context only [redacted] can provide support and development services with respect to these. As such it is not simply the case that SEMO can seek to contract for support of the market systems with another provider.

[redacted] has already indicated to SEMO that their support costs have increased due to the level of support required and attempted to increase prices two years ago. While SEMO successfully challenged that increase, in light of the contacts in place since 2015, it is reasonable to envisage that the prices will increase in 2022 (once the current contract has ended). While SEMO will always strive to get the best deal possible, the RAs fail to take into account recent developments in input prices ([redacted]).

As SEMO detail in Appendix 2, a 10% increase is likely a prudent estimate of the increase expected under this contract and should be provided for in the final decision. The alternative, noting that costs have and will rise, if SEMO is to keep the contract price neutral, SEMO would need to consider descoping some services e.g. reduce the support SLAs.

3.1.4 Strategic Initiatives

The RAs have proposed to disallow SEMO's full ask of €1.03m for the delivery of Strategic Initiatives. SEMO view this as unjustified. A failure to provide for these costs will impact SEMO's security and its ability to deliver and utilise projects due to be advanced under the Capital Programme.

Strategic initiatives have both CapEx and OpEx elements. The CapEx elements are associated with the creation of an asset (e.g. Project delivery costs, hardware costs etc.) and the OpEx costs consist of the ongoing support and maintenance costs of that asset (e.g. licences, subscriptions, FTEs to support new functionality etc.).

The costs proposed by SEMO for Strategic Initiatives within IT OpEx have not been provided for by the RAs in the Consultation Paper, notwithstanding the fact that the CapEx associated with these Strategic Initiatives has been allowed. Any increase in CapEx will have a corresponding increase in OpEx in order to support new initiatives and as such the associated OpEx costs needs to be provided for if these initiatives are to succeed. This approach is inherently unworkable.

For example

- In terms of *Cyber* the RAs proposed approach is directly at odds with the respective positions of the CRU and UR in regard to this initiative in the context of the TSO Controls. SEMO notes that the CRU and UR respectively approved in its entirety the allocation of the Cyber initiative costs (both OpEx and CapEx) in the SONI and EirGrid price controls but the OpEx related costs have not been approved for SEMO.

- In addition the proposed disallowances of OpEx associated with *Data & Analytics Services* will hinder the day to day running of the services and render the proposed data platform a "white elephant". In effect a data platform will be built but users will not be licenced to use the tools to help extract information and the underlying infrastructure will not be maintained (whether in cloud or on-premise).

These initiatives are undertaken at group level in order to capture cost efficiency via economies of scale where possible and SEMO has set out in Appendix 2.4 further details as to each of the Strategic Initiatives and their applicability to SEMO.

[redacted]

- **Cloud Adoption** – this initiative is a critical precursor to the advancement of the SEMO Finance System Capital Project. If the cloud foundations (OpEx related costs) are not in place, then the €1.9m cost to SEMO for the SEMO Finance System would need to increase.

- **Operating Model** - It is SEMO IT's vision to create a modern and agile service delivery organisation that works closer with the business. Current maturity assessments have established room for improvement. An IT transformation updating our operating model is required to achieve this vision. The IT operating model will be aligned to the new IT strategy and vision and will support best practice IT management.

- **Data & Analytics Services -** There is a need for an enterprise-wide data and analytics capability that provides for intelligence-led planning, prioritisation and decision-making. The initiative will provide benefits to market stakeholders and a return on investment by (i) enhancing operational efficiency by the use of data analytics techniques (ii) improving data security and (iii) providing more effective use of resources.

3.2 Labour Costs

There are two main areas of focus for SEMO regarding the proposed provision for Labour Costs:

- **Additional FTEs** – The RAs have proposed to disallow 10 of the FTEs sought – while SEMO believe all 10 are required to deliver the level of service sought by market participants, SEMO outlines in the section below the business critical requirement for 6 the FTEs currently proposed to be disallowed.
- **Average Payroll FTE Rate** – The proposed reduction of the average payroll FTE rate to [redacted] and the basis for same is without merit and is directly inconsistent with the recent analysis and ultimate provision of known and accepted cost drivers in the recent CRU PR5 decision.

3.2.1 Additional FTEs

SEMO acknowledges the RAs' allowance of the current baseline of 59.5 FTEs and the further allowance of five additional FTEs provided for under Future Markets (2 FTEs), Programme Delivery (2 FTEs), and Cyber Security Specialist (1 FTE). While this is encouraging, the disallowance of 10 further FTEs sought will impact on SEMO's availability to deliver the level of service sought by market participants and on the programme of works ultimately brought forward for delivery under the capital projects.

The RAs state that SEMO did not provide "*a clear activity based methodology*" [28]when addressing the required number of FTEs for both the 2018-21 price control and 2021-24 price control period. It should be noted that an activity based methodology is not an appropriate measure to determine the number of FTEs required in SEMO. The nature of the market operations, in particular since the introduction of ISEM, is very complex. As outlined in SEMO's OpEx submission, the volume of customer queries and market incidents increased significantly since October 2018 and can vary month on month. To determine FTEs on an activity basis would not accurately reflect the volume of work completed by the MO team on a daily basis.

SEMO did however clearly set out where the current and additional resources are required. This built on the detailed business cases provided as part of the current price control process against which the further requirements were built. The RAs however, appear to have premised the proposed disallowances of a number of the requested resources due to concerns regarding the potential duplication of roles. SEMO sets out in the following sections additional details as to the business critical requirement for 6 the FTEs currently proposed to be disallowed.

It is essential for the operation of the SEM that these resources are provided for in the final decision.

3.2.1.1 Testing Resources (5 FTEs)

The RAs propose to disallow 5 Testing FTEs sought by SEMO for the purposes of Market Operations Functional Testing.

[28] Consultation Paper, page 52.

SEMO's OpEx Submission detailed the process of Market Ops Functional Testing, highlighting its role as a critical driver of *The Impact of Change* (pgs.28-31). Within this, SEMO requested 5 FTEs; 3 relating to *Testing*, and 2 for broader *Business Requirements* implementation. SEMO wishes to emphasise that due to ever-increasing market and system complexity, this disallowance of essential FTEs is fundamentally unsupportable given the market challenges ahead.

As SEMO outlined in the OpEx submission, testing and change management activities are no longer limited and seasonal in nature; these are now a day-to-day activity which was never properly accounted for or resourced post ISEM market Go Live. In actuality, the absence of suitable Market Operations Subject Matter Experts (SME) test resources has significantly constrained SEMO's ability to deliver a stable market along with substantial biannual releases under the current Price Control and is not a workable operational model moving forward.

The operation and continued development of the ISEM since go-live in 2018 has seen the impact of the increased complexity of the underlying system architecture and associated market process and rules come to the fore. This has naturally created an increased need for Market Operations SMEs to be involved in Market Release Programmes in an end-to-end capacity.

Under the Legacy SEM SEMO had dedicated IT SMEs who would intrinsically understand the market system design dynamics, market rules and operational procedures. Due to the complexity of the ISEM market and supporting systems there is a need for both IT SMEs and Market Operations SMEs to work in tandem to maintain market stability while delivering the necessary changes. For example, a User Acceptance Test (UAT) in the legacy market may have taken two to three days but can now take two to three months. This change in operations is reflected in the revenue allowance being sought but provisionally disallowed.

It is evident that the RAs' concern is a potential duplication of testing resources. The RAs state in the Consultation Paper that they are *"concerned with duplication of resource requests"* and that *"testing and quality assurance of the systems is captured within the capex allowances together with the 'IT & Communications' opex submission".* [29]

SEMO can confirm that this is a misunderstanding on behalf of the RAs and the conflation of very different testing functions.

At its core there are two aspects to testing – *IT Testing* is looking at the software code and/or physical equipment, checking if code changes are running without errors, are the signals and data feeds being fed correctly into the system etc.; while business *Functional Testing* is looking to see if the change is giving the expected outcome, has the change fixed the problem it set out to fix for example; has it had any unintended consequences somewhere else, do the new results align with the requirements of the TSC etc. Only Market Operation FTEs can look at the outputs and confirm they are as intended, if they are not as intended carry out the analysis to find where the design and implementation has diverged and suggest a functional solution.

[29] Consultation Paper, page 46.

SEMO notes that the Participant Consultative Forum, as outlined in the RAs' Consultation Paper, supported the need to improve both SEMO's

i) Test and
ii) Change Management capabilities.

The RAs stated that "*There was also recognition that an improved testing and change management process is necessary, with sufficient resources to design, test and monitor post-deployment and with scope to involve participants*." [30]

SEMO has set out below in Appendix 3 detailed information as to the requirements for these 5 additional Testing FTEs including clearly setting out what elements of the testing have been provided for by the RAs in the proposed allowances and which elements of the testing processes the RAs have currently not included any provision for.

Should SEMO fail to adequately test this far more complex market, there is a serious risk of market instability. Relative to its predecessor, the current market has a far more complex functional and technical design. Bi-annual Market Release Programmes are wide-ranging in their scope, from correcting defects (hotfixes, bug fixes, patching), to operational enhancements, and TSC modifications, which drives the need for specialist Market Operations SME input throughout the process.

It is essential that the RAs consider this decision and make provision for the 5 Testing FTEs, not only from a functional business perspective, but also taking into account the market and strategic implications of a failure to do so.

3.2.1.2 Legal Resource (1 FTE)

SEMO has requested an incremental legal resource (1 additional FTE) to assist with, as the RAs state, an "*increasing number of disputes, formal queries and Brexit related issues*" [31]; this request has been excluded from the RAs' proposal allowances on the grounds that a sufficiently robust business case has not been made to demonstrate the need as requested by SEMO.[32] SEMO now takes this opportunity to provide additional detail to the SEM Committee in support of its request.

SEMO is of the view that the ongoing legal workload will not be "short-term" as suggested by the RAs. At the time of writing, future cross-border market arrangements (which will govern how the SEM-GB border should be operated in the wake of Brexit) have not yet been agreed and progress to date has been slow in agreeing any approach, given the differing views of the various impacted stakeholders. This means that negotiations on any contractual and regulatory framework supporting any future arrangements will most likely form a substantial part of the 2022 legal workload and certainly at least for the duration of the 2021-2022 tariff year and most likely into the 2022/2023 tariff year. This is a substantial piece of work which will form the legal basis of the ongoing relationship with service providers in the UK post-Brexit.

[30] Consultation Paper, page 22.
[31] Consultation Paper, page 48.
[32] Consultation Paper, page 48.

Following the agreement of any such regulatory framework, a substantial legal review of all ex-ante related contracts will be required, which may result in a renegotiation of terms with existing service providers. Technical procedures for future arrangements must also be developed as part of this process which will require legal review and sign-off.
All of this work is in addition to the existing workload of providing day-to-day legal advice across the markets space, concerning issues such as registration, accession, formal queries, settlement queries, providing an interpretation of provisions of various codes, pricing and general disputes across the balancing and capacity markets; advices on the drafting of modifications across all markets, which are envisaged to increase in the coming Price Control Period; as well as performing the Secretariat function for all governing committees.

In addition, as a matter of general course, all existing contracts relating to the intra-day and day-ahead market require ongoing monitoring and formal revision as parties accede or by mutual agreement of the parties.

Furthermore, the substantial work of ensuring compliance with network codes is ongoing and will continue for the duration of the Price Control Period as modifications are introduced to ensure compliance. In that context, it is neither prudent nor practical for one legal resource to manage all market related queries and address legal issues relating to compliance obligations. The outcome of this is a substantial risk of non-compliance and delay in progressing legal disputes.

The RAs have suggested that legal fees of €70,000 per year (already agreed to by the RAs for the duration of the Price Control period) be used to supplement any gap in capacity or availability. However, €70,000 per year would not in fact cover the accumulation of legal fees which would be required to cover any shortfall brought about by the increase in workload which has been proposed by SEMO. This is the case as substantial reviews of regulations, legislation and contracts are typically time-consuming work of higher fee earners and therefore costly.

3.2.2 Average FTE Payroll Costs

The RAs' Consultation Paper proposed a reduction in the average FTE Payroll rate [redacted]. This is based on an average of SEMO's Payroll FTE costs for the current PC period 2018 - 2021. SEMO strongly disagrees with the proposed average Payroll FTE rates and indeed the proposed basis for its assessment.

The proposed methodology by the RAs [redacted] is wholly inappropriate in setting that which is now required and inconsistent with any established regulatory framework. Such an approach effectively disallows known or forecast increases, or indeed potentially decreases, in staff costs be they driven by legal or corporate obligations in terms of staff remuneration and pensions; wider market wage evolution, evolving staff mix etc.

3.2.2.1 Pension Scheme

SEMO is not a corporate entity but a joint venture between EirGrid and SONI. Under the MOA EirGrid and SONI are required to provide the necessary staff to SEMO on a 75:25 basis and all SEMO staff hold either a SONI Ltd or EirGrid plc. contract. Specific corporate obligations, such as staff pension arrangements flow from the relevant parent company and must be taken into account.

[redacted].

The RAs' proposed approach ignores these cost requirements and is directly inconsistent with the recent analysis and ultimate provision for such costs by CRU related to EirGrid plc. staff under the TSO PR5 Control.

[redacted]

[redacted]

[redacted]

This leaves SEMO with substantial Pension Costs funding shortfall as follows:

[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

Table 2 - SEMO Pension - Impact of Disallowance

[redacted]

3.3 Corporate, HR and Facilities

Recruitment – The RAs propose a total recruitment allowance of €11k in their Consultation (approximately €4k per year). This is seen as a significant cut as SEMO's actual recruitment costs in 19/20 were €11k, aligning with the proposed €32k allowance SEMO are requesting (approximately €11k per year) for the 21-24 price control period.

In the Consultation Paper, the RAs have reduced SEMO's projected costs on a pro-rata basis by two thirds in line with the reduced proposals for the additional FTEs. While SEMO acknowledges that a lower headcount may lead to lower recruitment costs, this simplistic approach does not allow for turnover of FTEs.

The RAs' mention in their paper that *"It is important that SEMO assesses its HR strategy, job specifications, currently allocation of resources to core functions and targeted intake grade of staff to ensure efficient and effective operations going forward".* [33]For SEMO to implement these proposed changes, it will require the necessary recruitment funds to ensure the highest calibre of staff is recruited. To expect the highest standard of staff but reducing the recruitment costs significantly does not align with SEMO's view.

SEMO proposes €32k as a reasonable allowance to accommodate the necessary recruitment expected over the forthcoming price control period.

Training – SEMO acknowledges the RAs allowance on training and the importance of development of SEMO staff.

Travel - As per the PR5 submission SEMO believe the reduction in travel costs to be a temporary phenomenon and that travel costs will return to pre COVID levels of at least the actual costs incurred in 2018/19 of €150k. Therefore, SEMO propose an allowance of €450k to be more reasonable. The previous allowance by the RA's from 2018 - 2021 was €801k so at €450k, this is still a significant reduction.

General Admin - General Admin is mainly made up of corporate subscriptions. SEMO forecast spend on corporate subscriptions in 20/21 being approx. €75k and between €65k and €70k in future years. SEMO require its full proposal of €210k to cover these corporate subscriptions which SEMO feel are a necessary part of operating its business. The RAs in their Consultation Paper have assumed that these costs should reduce in line with other "people" related management costs. General Admin costs are not "people" related nor are they allocated on an FTE basis. As noted above they are mainly in relation to corporate subscriptions.

[33] Consultation Paper, pages 5-6.

3.4 Regulation and Finance

The RAs propose to make a number of disallowances to cost lines under the Regulation and Finance, of noted to High Level Analysis and Design, Disputes and Strategic Initiatives. SEMO has addressed the proposed disallowance of the Strategic Initiatives provision as part of Appendix 2 to aid review as there are a number of cross dependences between the Strategic Initiatives and the IT programme and requirements. SEMO addresses in the sections below the proposed disallowances to the High Level Analysis and Design fees and Dispute costs.

3.4.1 High Level Analysis and Design

SEMO sought a provision of €2.25m over the Price Control period for High Level Analysis and Design support, so as to ensure that technical specialism could be introduced to the planning and design phases of the projects detailed in the Capital Programme. The RAs have proposed to disallow this provision in its entirety. SEMO has notable concerns with the RAs approach, particularly as SEMO has within the current price control period had to seek such support, in this case to advance the accommodation of batteries into the marketplace.

We note that the proposal to disallow High Level Analysis and Design Fees appears in part to be premised on an assumption that there will be limited Market Development in the forthcoming period and there is limited appetite for change from Market Participants. This premise appears to misunderstand the intent and requirement of the High Level Analysis and Design support that SEMO has requested. Rather than simply facilitating changes that have been requested by the market participants, the High Level Analysis and Design initiative seeks to ensure that any significant market changes, such as those deriving from European legislation or domestic regulatory ambitions, are designed and planned in an optimal way.

Specifically, SEMO’s proposal to access and utilise subject matter expertise through the High Level Analysis and Design Fees is intended to meet the objectives set out in the Consultation Paper to collectively seek to

(1) lower cost ways of doing things (‘productive efficiency’);
(2) the best way to use resources (‘allocative efficiency’); and
(3) new and better ways of doing things (‘dynamic efficiency’)

This will be required as SEMO works to deliver a Capital Programme of circa €28m comprising a broad range of complex policy, system and market driven requirements.

Examples of projects whose implementation will be adversely impacted by the RAs proposal to disallow funding for High Level Analysis and Design activities include (but are not limited to):

- EBGL
- Priority Dispatch
- Future Arrangements
- Capacity Markets
- Reintegration to Europe

Building on the above, SEMO has set out in Appendix 4 some of the initiatives that SEMO believe require external High Level Analysis and Design input. This list gives an indicator of where and when the fees are required. The Appendix also illustrates the importance of High Level Analysis and Design funding with specific instance of SEM-21-027, so as to reinforce that its purpose is not limited to change initiatives requested by Market Participants.

3.4.2 Disputes

The RAs have proposed to disallow the full provision for Disputes of €0.075m per year on the basis that this appears to be duplication of additional legal support. This is a fundamental misunderstanding.

The Dispute costs set out pertain to the costs of running the dispute process and the hourly rates attributed to Dispute Resolution Board (DRB) members. Following previous disputes where an appointed DRB recommended and implemented a course of action not provided for in the SEM Trading and Settlement Code, it has been acknowledged by the Regulatory Authorities that ensuring a three person DRB is selected provides optimum protection for market rules. On this basis, a prudent provision must be made within this price control to cover the costs of the fees of at least three DRB members for any dispute raised and referred to the DRB or Capacity Market DRB.

SEMO has no control over the number of disputes which are raised and referred to the DRB or Capacity Market DRB and therefore this €0.075m is a prudent allocation of the estimated DRB costs per year over the course of the Price Control Period.

4 Capital Expenditure

While the predictable and unpredictable CapEx pots are considerable and SEMO welcomes the RAs' recognition of the scale of potential capital investment required, the necessary support mechanisms, in terms of a financeable framework and associated OpEx activities (Testing FTEs and High Level Analysis and Design Fees), required to enable SEMO to develop the necessary CapEx projects are not provided for under the current proposals. SEMO is concerned that the necessary support mechanisms are not in place to allow SEMO to develop the CapEx projects.

There is a considerable lack of certainty regarding the recovery of the CapEx spend. The RAs have dismissed the proposed DIWE mechanism in the assessment of outturn CapEx notwithstanding it is and has been an established framework employed by both CRU and UR respectively and jointly where an *ex post* review of costs has been required. The approach proposed by the RAs leaves SEMO open to arbitrary disallowances and asymmetric risk.

The RAs have also proposed disallowance of the NPV neutral adjustment for capital projects and have not provided for asymmetric risk, thus reducing the financial incentive for SEMO to develop any CapEx projects.

If these support mechanisms are left unchanged regardless of the proposed CapEx provision set out SEMO is unlikely to be in a position to deliver the scale and complexity of projects envisaged.

4.1 The proposed Arrangements do not support the Programme

While the predictable and unpredictable CapEx pots are considerable and SEMO welcomes the RAs' recognition of the scale of potential capital investment required, the necessary support mechanisms, in terms of a financeable framework and associated OpEx activities (Testing FTEs and High Level Analysis and Design Fees), required to enable SEMO to develop the necessary CapEx projects are not provided for under the current proposals.

If these support mechanisms are left unchanged regardless of the proposed CapEx provision set out SEMO is unlikely to be in a position to deliver the scale and complexity of projects envisaged.

1. **The regulatory framework regarding recovery of CapEx**

In the Consultation Paper, the RAs state that they "*do not want, through lack of funding, to prevent SEMO from meeting its obligations, supporting the energy transition, or delivering consumer value.*" [34] While SEMO is in full agreement with the principles inferred by this statement, the absence of a regulatory framework regarding the recovery of CapEx will make it very difficult for SEMO to invest in Capital Projects.

[34] Consultation Paper, page 31.

There has been no clear guidance or direction provided by the RAs regarding the recovery mechanism, other than the onus will lie with SEMO to demonstrate that expenditure has been incurred in line with the proposed criteria[35]. SEMO has always spent capital allowances in accordance with these criteria. The RAB report and annual Capital report is submitted to the RAs. In addition, SEMO will be providing updates to the Market Operator User Group (MOUG) on a bi-annual basis regarding our CapEx spend going forward. Therefore it is not clear how we can further portray these costs in a more detailed fashion. It must be the role of the RAs to determine whether the CapEx spend is deemed to be inefficient or not.

2. **Reduced financial incentive to develop CapEx projects**

No allowance has been provided for asymmetric risk, although the RAs confirm that the risk exists. With the ex-post recovery framework, SEMO only faces downside risk, and the proposed 3% premium to accommodate this downside risk was disallowed by the RAs. As such, SEMO has reduced financial incentive to develop CapEx projects.

CapEx projects are added to SEMO's Regulatory Asset Base (RAB) on project completion. Due to the complexity of ISEM, some projects are multi-year projects. This means SEMO carries the cost of the full project until project completion. SEMO was willing to bear this risk, provided the NPV neutral adjustment is accommodated. However, on top of the asymmetric risk, the RAs also propose to disallow the NPV neutral adjustment.

As a direct consequence of this, not only is SEMO carrying the full cost of capital projects for the full duration of the project, but the recovery of the full cost of the project is also at risk. This will significantly impact SEMO's approach when large capital investments are required. The principles of asymmetric risk, as well as the NPV adjustment, are addressed further in section 2.3 and 2.4**.**

3. **The OpEx allowances do not support the level of investment available for CapEx projects**

The approach regarding the OpEx and CapEx allowances taken by the RAs appear to be inconsistent. While the RAs' have provided significant predictable and unpredictable pots for CapEx projects which will allow for a significant CapEx programme (provided the necessary recovery frameworks are in place), it should be acknowledged that these projects will require the necessary support from OpEx, in terms of ongoing support and maintenance fees post implementation. The RAs' proposals to allow for the minimum amount of OpEx over the next three years, will result in very little, if any, space to accommodate additional recurring costs as a result of new CapEx projects.

4. **Assumptions made that a reduction in OpEx costs will be achieved through the CapEx programme**

The RAs have made an assumption that a reduction in OpEx costs will be achieved through the CapEx programme. As echoed above, a significant CapEx programme increases OpEx costs. Implementation

[35] The proposed criteria for the RAs' ex-post review will assess if:

1. Expenditure has been efficiently incurred;
2. Expenditure was demonstrably necessary ;
3. Expenditure was incremental to existing price controls and capable of being robustly validated by the RAs.

of new software and systems requires annual maintenance and system support. In addition, we see vendor costs are increasing despite the discounts achieved as being part of the EirGrid Group.

5. **The CapEx recovery is for assets that are delivered; no allowance provided for early design phases of projects (that may or may not go ahead)**

As mentioned in the RAs' Consultation Paper, *"Capital can be in the form of tangible (e.g. property, plant, equipment) or intangible assets (e.g. software, trademarks) so long as it is probable that there will be future economic benefits from the asset and the cost can be reliably measured".*[36] The RAs have not provided an allowance for the early design phases of projects in the OpEx side through its High Level Analysis and Design. This will restrict SEMO's project development and creative thinking, should it be considered recovery of potential capital project costs are at risk.

[36] Consultation Paper, page 70.

5 Key Performance Indicators

While SEMO supports the proposed KPI incentives for the 01 October 2021 – 30 September 2024 period, SEMO does not agree with the proposed contingencies to be applied to the KPI reward.

The resolution of known issues which are still outstanding from I-SEM go-live would incentivise SEMO to focus on issues that may be significant in cost but of little value to the market participants. These would be prioritised over the more urgent change requests required by the market participants.

In terms of the proposed improvements to the resettlement and re-pricing, there appears to be a misunderstanding by the RAs regarding the resettlement process and as a result their proposed contingency would not be the most effective KPI.

SEMO would welcome engagement with the RAs' feedback regarding other possible KPIs. SEMO is conscious that there is a balance to be struck between the number of KPIs within a fixed pot and setting KPIs that remain meaningful to drive the desired outcomes/performance.

The RAs' proposed annual KPIs 2021-24, while remain challenging are supported by SEMO.

RAs' Proposed Annual KPIs 2021-24				
Metric	**Weighting**	**Target**	**Upper Bound**	**KPI Reward per annum**
Invoicing	30%	97%	100%	€130,548
SEMO Re-settlement Queries	40%	<15 per Qtr	<5 per Qtr	€174,064
General Queries (resolved within 20 business days)	10%	95%	99%	€43,516
System Availability	20%	99%	99.90%	€87,032
Maximum Available Reward per Year based on 4% of OpEx Allowance for 2021/22	**100%**			**€435,160**

Table 3 - RAs' Proposed Annual KPIs' 2021-24

SEMO however does not agree with any KPI reward being based on the proposed contingencies outlined by the RAs, that being that the following are achieved before any reward would be available:

1. resolution of known issues which are still outstanding since I-SEM Go-Live in 2018 and;
2. Improvements in both repricing and resettlement.

5.1 Proposed Contingencies

For KPIs to operate effectively, they should encourage the investment of discretionary capital and should be designed such that they complement the incentive placed on input and cost management. If applied effectively, the regulated business should not have a greater incentive to reduce costs at the expense of service quality if the service quality is ultimately, and demonstrably, that which is valued by participants. Ultimately a balance must be struck between having KPI incentives which are meaningful, the overall costs paid by customers and ensuring that only reasonable returns are accorded to investors.

SEMO fundamentally does not agree with applying contingencies on KPI returns. SEMO believes it is important that SEMO is appropriately incentivised to deliver high quality service levels. However, those incentive returns should be based on operational performance, and should not be impacted by delivery of capital projects as would be required under that proposed by the RAs.

Resolution of Known Issues

It should be noted, that it is rarely the most efficient or effective use of limited resources to remedy all defects, in particular those that are of high cost to rectify and low value additions. ISEM went live with a large number of defects which SEMO has worked to rectify over this current price control period.

SEMO has and must continue to prioritise defect resolution based on that which are most beneficial or of the highest urgency to the market participants, thus retaining the flexibility to make the right decision at the right time.

To make the resolution of 'known issues' a pre-condition to any KPI reward would have a detrimental impact to the market, because, it would place a clear focus for SEMO on the resolution of issues that may be of high cost but low value or impact to the market participants rather than to high priority or urgent issue resolution.

If the resolution of known issues is of significant concern to the RAs and industry then we suggest making it a separate incentive. SEMO would be happy to engage with the RAs to further discuss the introduction of resolving known issues as a separate KPI, in a manner that did not detract SEMO from addressing high priority issues/defects, if deemed necessary, noting of course that it would be extremely difficult for SEMO to rectify an increased number of issues without having the necessary testing resources available to carry out the necessary work.

Improvements in both repricing and resettlement

In the Consultation Paper, the RAs advise that *"Ad-hoc resettlement timelines are a concern as SEMO is currently carrying out ad-hoc resettlement for December 2018 being approximately a 2.5 year lag…the RAs are proposing an improvement of 12 months on the current ah-hoc reschedule by the end of the 2021/22 as being necessary before any KPI reward can be provided".* [37]

There seems to be a significant misunderstanding in the RAs' thinking. Market participants can raise formal queries since the beginning of ISEM under the TSC. SEMO's current settlement process (as set out in Appendix 5) cannot accelerate ad-hocs significantly due to system time reasons.

Instead of the proposal for an *"improvement of 12 months on the current ad-hoc schedule by the end of year 2021/22"* [38], SEMO suggests that a more appropriate mechanism to be to incentivise the rate at which ad-hoc billing periods are processed through a separate KPI, rather than a contingent factor bases on an absolute time period.

[37] Consultation Paper, page 92.

[38] Ibid

5.2 Going forward

The RAs set out in the Consultation Paper that the KPI pot is proposed as a fixed pot of 4% of the total OpEx allowance. SEMO notes however that the RAs in their Consultation Paper seek feedback on the appropriateness of KPIs associated with the SEM systems fully incorporating existing technologies (e.g. battery storage and the ability to make energy payments directly to DSUs).

SEMO looks forward to engaging with the RAs on the feedback received regarding the proposed KPIs received from industry. However note that there is a balance to be struck between the number of KPIs within a fixed pot and setting KPIs that remain meaningful to drive the desired outcomes/performance and SEMO would welcome engagement with the RAs on the proposals prior to their finalisation.

Appendices

Appendix 1 – Financeability Report - Collection Agent Margin

Appendix 2 – IT and Managed services detailed breakdown

Appendix 3 – Business Case – Requirement for Testing FTEs

Appendix 4 – High Level Analysis and Design

Appendix 5 – Resettlement detailed overview

Appendix 1 – Financeability Report - Collection Agent Margin

[redacted]

Appendix 2 – IT and Managed services detailed breakdown

A2.1 Hardware and software support

One of the desired outcomes of the SEMO Price Control, as articulated at the Participant Consultative Forum, was "*A well-functioning market (including the necessary systems to support it)*". This can only be achieved if SEMO is provided with sufficient funding to support the underlying hardware and software that runs the market.

SEMO wishes to raise significant and serious concern with regard to the proposed provision for IT Hardware and Software Support (€1m of €2.3m requested). The proposal would result in provision of an average of €340k/year for these services against an actual cost of c. €683k in 2020/21, of which SEMO has already spent €478k to the end of June.

The proposed allowance would result in a deficit of €1.3m as the underlying IT hardware and software support contracts are in place; thus this spend is not discretionary and there is no capacity to reduce costs and maintain the required services. It is simply not sufficient to maintain SEMO's IT infrastructure support and maintenance and will jeopardise the renewal of support contracts.

In effect the proposals would necessitate SEMO to reduce, or remove entirely, support for a number of critical hardware and software components, thus compromising our systems in the event of any issues arising. This would leave our underlying infrastructure unsupported, with potentially serious market consequences, or SEMO would need to reallocate OpEx intended to support labour or other costs to meet SEMO's commitments under these contracts, resulting in consequential impacts on system stability and/or the overall service provided by SEMO.

Globally, cyber security threats are escalating, and attacks are becoming more sophisticated. We know that public services can become a target for an attack, for example the cyber-attacks on the NHS and Ukrainian power system in 2017 and 2015, respectively, which caused widespread disruption by accessing sensitive system data and infecting thousands of computers. We have had sufficient warnings to suggest that our sector (e.g. US Fuel pipeline), markets and exchanges (e.g. New Zealand stock exchange) are not immune from cyber-attacks, nor is Ireland any longer a benign target (e.g. HSE).

The HSE has stated that the immediate costs of the recent cyber-attack on the HSE is €100m ("That is just to get us through this", HSE Chief Executive Officer Paul Reid has warned), but that will rise when other factors are included (up to half a billion euro) and that it will take months before systems are fully restored. We can use practical, simple and cost effective 'hygiene' methods to reduce risks from cyber threats. Much like the caution associated with COVID-19, simple preventative measures are better (and far more cost effective) than having to recover from a major outbreak.

Operating a market with unsupported hardware and software in any situation, never mind in the context of our current threat landscape, is an action which SEMO simply cannot condone.

For the RAs to use an average of the 2018/19 and 2019/20 costs and not the 2020/21 forecast costs creates a false baseline. Even if the 2020/21 forecast costs are included in the average it will still not be sufficient to meet SEMO's actual cost outlay. Thus, it is essential that the RAs review their proposals in this regard and restore in full the revenues sought by SEMO for this critical element.

A2.1.1 Required Revenues

The RAs propose to allow an annual amount which represents the average cost incurred in 2018/19 and 2019/20. As part of SEMO's OpEx submission and associated BPQ and in subsequent follow up questions from the RAs, a detailed breakdown of the IT Hardware and Software Support costs including the additional costs for 2020/21 (summarised in Table 4 below) was provided. Additional details are set out in the sections below to further support the RAs in their considerations.

[redacted]

[redacted]

The RAs in the Consultation Paper seek to support their proposals on the basis that EirGrid Group synergies could be utilised to realise efficiencies or on the mispremis that projects identified to be advanced under the IT CapEx programme, in particular the proposed [redacted] project, will lead to a reduction in costs.

A2.1.1.1 Synergies

SEMO would like to highlight that where synergies could be extracted they are already in place from an IT perspective. SEMO has achieved better purchasing power operating as a Group covering both initial purchase, cost of installation and ongoing support requirements.

The Group model ensures that all staff have the business tools, processes and services they need to manage their business tasks and fulfil their roles and provide services to customers and stakeholders including:

- provision of all mission critical and corporate IT and employee services across the Group;
- provision of IT services to stakeholders, participants and the public;
- management of vendors who supply IT products and services to the Group;
- driving the delivery of IT strategies and roadmaps;
- assuring the security of our people and our information; and
- managing the cost of IT and employee services.

By having centralised, dedicated teams delivering the IT services that underpin the SEMO business, we are able to focus on continuous improvement in the efficiency and effectiveness of the business tools, processes and services deployed and have built these efficiencies into the figures provided to the RAs.

SEMO benefits from Procurement on a Group-wide basis where EirGrid Group has increased strength in the market and significant savings on hardware (e.g. Laptops, PCs), and software costs are achieved. The savings to SEMO are through lower initial costs in buying the product or service and also through lower on-going support and maintenance.

The initial consolidation of IT across the Group resulted in discounts against list price of an average of 30%; however, by managing all renewals and looking at a two year horizon rather than the traditional one year timeframe, discounts of 40% for servers and 53% for storage have been achieved.

SEMO has further benefited from Group contracts for [redacted]

A2.1.1.2 Hardware and Software

[redacted] During the sixth and subsequent years of the life of server and storage, hardware tends to become more expensive, for a number of reasons:

- the kit becomes less reliable and therefore the vendor expects more calls and costs;
- spares become more expensive as they are no longer produced and supply shrinks; and
- the vendors want to focus on supplying and maintaining new kit and therefore disincentives long term retention.

[redacted]

The RAs proposal appears to be premised on the expectation that the planned hardware refreshed as part of the ISEM Infrastructure Refresh capital project, will remove the driver of these increased costs as the new hardware will be within a new warranty period. While this may be the case if the project was delivered in a “big bang approach”, this is not the approach envisaged. As set out in the SEMO CapEx Submission that (see ISEM Infrastructure Refresh) the replacement of hardware will be staged over FY21/22, FY22/23 and FY23/24 and the CapEx cost proposed to be provided for by the RAs is on this basis.

SEMO has factored this staged replacement into its forecast revenue requirement which is reflective of the age profile of the equipment, and will range from 1-3 years of extended warranty in order to sustain the operation. Under this programme a significant amount of hardware will thus remain in extended warranty for a significant period of time.

A big bang approach introduces significant risk across a wide range of platforms and systems and to the smooth operation of the market. A phased approach allows us to be more targeted and minimises outages required for upgrades and any adverse impact on production services. In addition, this programme needs to line up with the bi-annual release cycle and not adversely impact on it. As such in parallel with our engagements with [redacted], we are currently in conversation with [redacted] to develop an upgrade plan in line with the enterprise software roadmap of which there are many variables.

If the required costs are not provided for SEMO cannot take the risk in not supporting its aging kit. If the servers are out of support, the ability to quickly respond and resolve issues is impaired which impacts on the services and the impact could be catastrophic in the event of a cyber-attack.

[redacted] If this contract is not renewed, SEMO would effectively be operating software without licences which would leave SEMO exposed and subject to legal proceedings and as such is not a realistic option.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]: Provision of server encryption and security event monitoring. Security costs have increased due to support costs related to [redacted] Security monitoring costs have increased by necessity given the threat landscape from malicious actors is changing at a scale and pace. We have had sufficient warnings to suggest that our sector (e.g. US Fuel pipeline) is not immune from cyber-attacks, nor is Ireland any longer a benign target (e.g. HSE). SEMO's own workforce is changing rapidly with new international skills, hybrid working and third-party providers, and this change requires a new employee security perspective that assumes everyone has the potential to be a hostile player. SEMO must also consider and address new compliance requirements including under the Network and Information Security Directive and SEMO will be delivering new and ambitious technology solutions that will require us to design our security expectations at an earlier stage.

A2.2 Managed Services

The average annual cost of managed services during the 2018-2021 period was €0.647m; this has increased to €0.839m for 2021-24 as SEMO has requested [redacted] additional outsourced FTEs. The RAs have premised their proposal to disallow the revenues associated with the additional resources on the basis that the market will enter its fourth year of operation and the RAs would expect the level of fixes to reduce so the need for Managed Services should re-stabilise/reduce.

A significant number of I-SEM project personnel were available to support the market launch and post go-live operations in the first 18 months, helping to minimise the operational impact of incidents and defects. These resources were over and above that provided under the current Price Control and were funded through bespoke Capital Projects (PPS and Day 1+). These resources have since been de-mobilised and it became immediately evident that the effort assumed, and provided for in the underlying OpEx arrangements for I-SEM was an underestimation of the need.

To address this issue, and since then, SEM required [redacted] additional managed service resources [redacted] in place and on the ground to help support the market. The removal of these resources, which would be the outcome of the RAs proposal if left unchanged, will have a significant impact on SEMO IT operations and the support of the market whereby we run the risk of inadequate application, database and infrastructure support capability which could result in service outage or impairment. In the context of the current operating environment the limited resources that would be available under the RAs' proposal poses a significant risk that SEMO will, at some point, fail to meet our market participants' critical needs and deliver on our mandated service levels, if the level of support as seen to date is not maintained. We currently have [redacted] managed services working across IT Application and IT Infrastructure; the removal of [redacted] of these resources [redacted] would have a significant impact on current SEMO IT operations.

SEMO has set out in the sections below further details as to the roles and functions of the Application Support FTEs and Infrastructure Support Specialist (DBA) FTEs and the impact to the support and operation of the SEM should the revenues for these essential resources not be restored in the final decision.

A2.2.1 IT Applications Managed Services [redacted]

Under the current allocation the Application Support team is not sufficiently resourced to maintain critical services, address ongoing critical and major incidents, eliminate the defect backlog and cater for the natural evolution (support roadmap) of the systems. The current team is smaller than that which would have supported the previous SEM, a solution far less complex with a much shorter operational window. The complexity of the systems, coupled with the 24x7 operational window, means the time to address operational incidents is far shorter and support capability must be adjusted to meet this requirement.

It is in this context that we seek to secure the two additional application support analysts which we believe will strengthen the application support team such that it can enable a higher quality service offering, appropriate to operational timelines. The additional resources will provide “reactive” support to address service impacting operational incidents while also having scope to progress “pro-active” activities to avoid potential future service disruption. These pro-active activities include, but are not limited to:

- Application of Problem Management techniques to operational issues – eliminating recurring issues;
- Comprehensive defect management and prioritisation;
- Active engagement with business teams to identify potential changes of operational benefit (e.g. removal of time-consuming, resource-heavy workarounds or those that may be prone to operator error);
- Pro-active engagement with our vendors to identify ways of avoiding operational incidents (e.g. additional data validations, review of screen functionality, processing automation etc.) and improving the operational performance of the systems;
- Pro-active system monitoring to prevent issues as opposed to reacting to events as they occur.

The above activities will remove costly workarounds, introduce mitigation measures to eliminate operator error and introduce efficiencies which will save time, money and improve the service to our customers.

While SEMO agrees with the RAs that the systems are indeed beginning to settle this is only as a result of the additional managed services resources which are in place but it fails to recognise that

SEMO IT is moving from a break-fix scenario to improvement and increased performance and has been adding new additional functionality that was not implemented on Day 1, all of which requires additional support and maintenance. Examples include:

- Reporting Database
- Data archiving
- Repricing & Settlement

For example, the Repricing & Settlement functionality recently implemented will result in a significant level of support required as an increased level of resettlement is performed by users.

A2.2.2 IT Infrastructure Managed services [redacted]

The underlying IT database platform is complex and involves a significant support effort to maintain stability, availability and alignment with vendor support roadmaps. Under the current Price Control the requirement for one Infrastructure Support Specialist FTE was envisaged and provided for. However, this proved to be a significant underestimation of the need.

Support requirements to date have been [redacted] Infrastructure Support Specialist (DBA) FTEs. These [redacted] additional resources are currently on the ground and in the Database Support team to meet the current operational requirements and to deliver pro-active capacity to maintain alignment with infrastructure vendor roadmaps and also to respond to changes at an application or functional level that impact on the underlying infrastructure. If these two infrastructure resources are removed [redacted] database support will be affected. Investment in storage and databases and additional management for security purposes has meant additional support requirements to maintain and ensure that they are working efficiently, being tuned, being backed up properly and replicated across sites for disaster recovery.

Duties include:

- On-Call 2nd and 3rd level support (24 * 7 Support)
- Outage Management (Out of hours outage support)
- Change Management: Emergency, Expedited and Normal Changes to our Production and Non-Production System
- Audit Management: Support to Audits
- Release Management: Support Bi-Annual Release and Support ISEM release framework
- 9-5 System Support: Supporting System Service Catalog, System refreshes, System uptime (KPIs), Capacity Management, System restarts, and Account Management

The operation of the SEM is dependent on 26 database servers and much of the application logic resides in database code. This requires database changes to be managed in sync with application level change, much of which has related to defect resolution and performance tuning and it is not possible with the current allocation of resources. Since ISEM go-live, the team have implemented ~600 database release updates and ~200 database refreshes.

These DBA roles support the following IT elements:

- [redacted]
- [redacted]

- [redacted]
- [redacted]

The roles involve the following activities:

- Systems management
- Incident management
- Problem management
- Request fulfilment
- Access management
- Application hosting
- Database hosting
- Database performance tuning
- Defect management (application level defects often require changes to underlying infrastructure)
- Vendor management
- Database disaster recovery management
- Security patching of [redacted] operating systems and database products
- Audit Support

The risks associated with inadequate DBA support capability include:

- Service outage or impairment
- Inefficient deployment of resources (both people and financial)
- Increased cyber threat exposure
- Inadequate vendor support
- Licensing non-compliance
- Inability to support occasional activities such as audits

The addition of [redacted] DBA FTEs (already on the ground) to EirGrid's IT Infrastructure team along with the existing approved [redacted] FTE would provide a support capability that is reflective of the complexity and size of the database platform that underpins the critical market IT services. It will facilitate the appropriate pro-active and reactive maintenance to maintain high availability and to respond to evolving vendor support arrangements and product life cycle management.

A2.3 Apps Support and maintenance

SEMO acknowledges the near full allowance provided by the RAs for Application Support and Maintenance with the exception of a projected 10% uplift in the [redacted] contract when the current support contract expires in October 2022.

The RAs do not propose to allow for the 10% uplift and rather have based the proposed annual allowance on the average of costs incurred during 2018-21. This approach fails to take into account the widely acknowledged market conditions that have seen the costs of IT services continue to increase.

If SEMO are to keep the contract price neutral, as would be required to work within that currently proposed by the RAs, and noting that costs have and will rise, then SEMO would need to consider descoping some services (e.g. reduce the support SLAs).

A2.3.1 Current vs Future Support Costs

The market systems provided by [redacted] are proprietary in nature and in this context only [redacted] can provide support and development services with respect to these. As such it is not simply the case that SEMO can seek to contract for support of the market systems with another provider. [redacted] support services will be required as long as the current market systems are operational.

Support costs for the [redacted] Systems were agreed as part of the original tender process in 2015 and have remained stable for the past 5 years. [redacted] has already indicated to SEMO that their support costs have increased due to the level of support required and attempted to increase prices two years ago. While SEMO successfully challenged this increase in light of the contacts in place it is reasonable to envisage that the prices will increase in 2022 (once the current contract has ended) and a 10% uplift was included as an estimate in SEMOs forecast. Indeed there is no guarantee that this 10% uplift will cover the increase and the figure could outturn higher.

[redacted]

A2.3.2 Expected Trends in IT Costs

The RAs approach in setting the proposed allowance would require IT costs to remain static or decline in the current period. While SEMO will always strive to get the best deal possible, the RAs fail to take into account the widely acknowledged market conditions that have seen the costs of IT services continue to increase. [redacted]

[redacted]

A2.4 Strategic Initiatives

Strategic initiatives have both CapEx and OpEx elements. The CapEx elements are associated with the creation of an asset (e.g. Project delivery costs, hardware costs etc.) and the OpEx costs consist of the ongoing support and maintenance costs of that asset (e.g. licences, subscriptions, FTEs to support new functionality etc). This is why there is a capex component and an OpEx component to the strategic initiatives. Where possible SEMO has outlined the specific OpEx and CapEx components of each item.

The costs proposed by SEMO for Strategic Initiatives within IT OpEx have not been provided for by the RAs in the Consultation Paper, notwithstanding the fact that the CapEx associated with these Strategic Initiatives has been allowed. Any increase in CapEx will have a corresponding increase in OpEx in order to support new initiatives and as such the associated OpEx costs needs to be provided for if these initiatives are to succeed.

For example, through our "Cyber" initiative, [redacted]

[redacted]

[redacted]

[redacted] will be used Group-wide, leveraged by SEMO and therefore SEMO must contribute to the [redacted]. Please see further detail regarding this and the additional initiatives below.

A2.4.1 Cyber

Cyber Security has been a vital component in our service delivery model for many years. However, continued investment is required to maintain a level appropriate to the current threat landscape.

The National Cyber Security Centre Ireland (NCSC-IE) provided guidance on what is expected from the operators of essential services (OES). This guidance emphasised both the increase in the nature and scale of cyber-attacks against OESs such as EirGrid Group. It also recognised the significant economic and social impact a cyber-attack could have on OESs. A cyber-attack of the market systems would have a catastrophic impact on SEMO's ability to run the market and in turn on market participants and consumers.

EirGrid Group commissioned an independent assessment of its current cyber security capabilities. As part of this assessment EirGrid Group was benchmarked against European Power & Utility companies and assessed against a Cyber Security Framework, which comprised 20 elements of cyber security, including architecture, software security, incidence responses, and threat intelligence, amongst others. [redacted]

The specific measures selected under this initiative are summarised below:

[redacted]

The majority of costs in this initiative are operating costs. [redacted] will be used Group-wide, leveraged by SEMO and therefore should be paid for through the Cyber Security Strategic Initiative.

Additional strategic investment is planned to introduce risk mitigation and performance improvement controls through the price control period;

[redacted]

[redacted]

There is a level of unpredictability in cyber threat forecasting and it is expected that EirGrid Group may be faced with additional risks in the future that cannot be foreseen at present. New risks may require additional investment in capabilities and tools that cannot be accounted for at this moment in time.

EirGrid Group proposes the introduction of additional capital (described in the Capex paper) and operating investments [redacted] to improve its effectiveness in managing cyber risk. SEMO notes that the UR and CRU respectively approved in its entirety the allocation for the initiatives costs (both OpEx and CapEx) in the SONI and EirGrid price controls respectively, but the OpEx related costs have not been approved for SEMO. SEMO urges the approval of these costs which will act as critical defences to SEMO from cyber-attacks from malicious actors.

A2.4.2 Cloud Adoption

The disallowance of Cloud operating costs may result in SEMO not benefitting as widely as anticipated from the adoption of cloud. For example the capital cost presented for the SEMO Finance System in the CapEx submission assumed that cloud foundations/capability described below would be in place. However, OpEx funding for the Cloud Adoption Strategic Initiative has been disallowed. If the cloud foundations (OpEx related costs) are not in place, then the €1.9m cost to SEMO for the SEMO Finance System would need to increase.

In addition Cloud adoption drives a fundamental shift from CapEx to OpEx in terms of how information technology solutions and services are acquired and as a result although the CapEx has been approved by the RAs, the RAs have disallowed OpEx costs which fund items such as Employee Collaboration Tools, Backup as a service subscription and usage, Disaster Recovery as a service subscription, Application Modernisation and moving Test and Development environments to the cloud.

The adoption of cloud services necessitates a clear vision and capability to manage the impacts to people, processes and organisation and to enable the strategic adoption of cloud services in the MO; we intended to focus our efforts in the following areas:

- The adoption of new skills and processes within our IT function to support the adoption of cloud technologies.
- Our service management processes will need to increase to support and underpin the adoption and operation of cloud services.
- Software license management to procure, distribute and manage the licenses needed – requires new skills and new processes to manage licensing needs.
- Engagement with key stakeholders across the business in completing a cloud computing strategy, where the core focus of the strategy is on a workload assessment to ensure that the adoption of cloud services is aligned to business needs and goals.
- Ensuring that the core technology foundation elements in the adoption of cloud services are operating to the highest standards. This includes identity and access management, application and data integration, security operations and connectivity.
- The formalisation of a 'Cloud Centre of Excellence team' within the IT function. This will ensure the correct skills and expertise exist to enable the adoption and operation of cloud services.
- Solution acquisition and supplier management – a range of competencies required along the solution and supplier selection journey

The outputs of the movement to deploy solutions to the cloud will be new services. With this we expect:

- Reduction in on-premises information technology infrastructure;
- Reduction in business continuity on-premises information technology infrastructure;

- Increased flexibility and reduced time to make solutions available to the business and to increase the volume of users and workload the solution can support.
- Greater solution availability.
- Access to solutions by employees no matter where they are and what time they need access to the solution.
- Access to a wider range of innovative solutions.

Notwithstanding the fact that the Cloud Capex costs have been approved by the RAs, the underlying support function to manage and support our transition to cloud needs to be in place in order to make our digitalisation journey a success.

A2.4.3 Operating Model

It is SEMO IT's vision to create a modern and agile service delivery organisation that works closer with the business. An IT transformation updating our operating model is required to achieve this vision and the operating costs associated with this initiative include vendor management capability costs, operating model professional fees (agile upskilling and operating Model transformation) and Telecommunications Line rental, Rack rental and data transfer.

The IT operating model will be aligned to the new IT strategy and vision and will support best practice IT management. This will allow our teams to focus on value-adding activities and provide the agile and responsive business support that we know to be required. Outsourced and co-located data centres will offer potential benefits to EirGrid Group such as improved security, availability, reliability, resilience, flexibility and security (both physical and cyber) as well as reduction in overhead costs, improved service and offer the ability to take advantage of new technology deployment and usage options. It will also support the anticipated increases in standing data volumes.

Current maturity assessments have established room for improvement in vendor management and an opportunity to secure improved return on investment by applying a standardised commercial management toolkit across major contracts. Adoption of Agile Principles will drive improvements in service delivery, including anticipating business needs and forecasting resource planning responsively on a monthly basis, testing and adapting projects 'in-flight' if needed and working in close contact with business customer stakeholders.

The delivery of the suite of operating model transformation changes will ensure resilience of the services to SEMO's customers and meet current and future needs of the business.

A2.4.4 Data & Analytics Services

Data & Analytics services OpEx related costs in this strategic initiative include data strategy and architecture definition, data governance, licence subscriptions and infrastructure maintenance. SEMO will develop and implement a strategy to support the realisation of benefits of data services.

The data strategy will:

- Enhance SEMO's approach to data capture, management and analysis by developing and embedding specific data analytics capabilities
- Identify issues and gaps with existing approaches and transform the output with improved data governance and the deployment of enterprise tools
- Review future data service requirements.
- Enhance our approach to data security, governance and quality.

There is a need for an enterprise-wide data and analytics capability that provides for intelligence-led planning, prioritisation and decision-making. The initiative will provide benefits to market stakeholders and a return on investment by (i) enhancing operational efficiency by the use of data analytics techniques (ii) improving data security and (iii) providing more effective use of resources.

There are a large number of data feeds entering and exiting the market. As SEMO moves towards increased digitalisation, data management needs to be developed and enhanced to deploy more complex analytics techniques. Data governance ensures accountability is defined for enterprise data assets. Data governance is the discipline of developing and implementing solutions for the control of processes for sourcing, transport, usage, storage, retention and disposal of enterprise information.

SEMO data has a strong focus on data quality; however there has been less effort invested in deploying strong analytics techniques. There has been a heavy reliance on end-user computing solutions for analysing data – [redacted] Some of these are legacy tools and the capability will be significantly enhanced by moving them to a modern, enterprise platform. One example of this will be the expansion in the use of [redacted] Currently the SEM data makes very limited usage of dashboards and business intelligence reporting the ongoing transition from manual data handling to an intuitive, visualisation platform will deliver value to all SEM participants. There is good recognition of the value and potential for analytics and the journey will enhance our current descriptive analytics (lookback or post mortem analysis) with the use of more effective tools and in time, will deliver predictive and prescriptive analytics (i.e. machine learning and decision support).

A data governance structure is required to ensure key activities such as driving the adherence to our Data Governance Policy and the enhanced use of a Business Glossary are implemented correctly. The implementation approach is to focus on prioritised data quality issues and use cases for improved business insights. This value-led approach will support the organisation developing in data maturity and will ensure that key data is being treated as an enterprise asset. The Data Governance Forum sets the strategic direction for data governance and is accountable for data governance and puts in place appropriate procedures, standards etc. to improve data quality and integrity and evaluates and directs the use of data and how it is managed.

A modern data platform (capex) is a centralised data repository that supports the storage of the most important market data at any scale. This will provide the platform for SEMO's data analysts and data scientists to produce dashboards and visualisations and to run big data processing, real-time analytics, and machine learning to guide better decisions. Data & Analytics services OpEx related costs associated with the data platform include licence subscriptions and infrastructure maintenance.

The modern data platform will provide a single source of truth but the maintenance of metadata for each element of data is an operational activity. SEMO will establish metadata to ensure that data is correctly described whether we publish data externally or access data internally and there is an OpEx overhead in this data management.

The provision of capex costs only by the RAs for the Data & Analytics Services initiatives will hinder the day to day running of the services and render the proposed data platform a "white elephant". In effect a data platform will be built but users will not be licenced to use the tools to help extract information and the underlying infrastructure will not be maintained (whether in cloud or on-premise).

A2.4.5 Telecoms

The total costs for Telecommunications across the 2021-24 period have increased by 87% compared to the 2018-21 period. The costs are forecasted to remain steady over the 2021-24 price control, with €0.150m requested for each year. As previously set out the increase in costs seen over the current period is due to increased connectivity driven by off premises data centres in the IT operating model initiative. The RAs propose to allow for Telecommunications costs in 2021-24 which align with an average of costs incurred in 2018/19 and 2019/20. €100k of €450k granted.

We have budgeted and project that €160k will be spent this year 2020/2021 and would request that the RAs include this figure in determining the average spend for the forthcoming period.

A2.5 CapEx

SEMO welcomes the overall provision provided for CapEx and notes the RAs proposed unpredictable CapEx allowance, which is capped but flexible and has the capability to flex/substitute priority projects as required and notes the framework on which this funding is allowed.

SEMO has however a number of concerns with the framework set out for these projects and our ability to fund the Capital Programme given the fundamental changes proposed to the financeability framework. This is addressed in Section [2] and as such is not covered here.

Rather, in the sections below SEMO has focused on a small number of inaccurate assumptions, inconsistencies and overlooked cross dependencies in the revenues proposed to be allowed by the RAs and which need to be corrected in the Final Decision.

A2.5.1 SEMO Finance System

In relation to the SEM Finance System migration to the cloud, the RAs state they are minded to allow €1.14m of €1.9m requested, this being the estimated market operator capital element associated with this project based on an adjustment applied by the RAs to acknowledge the allowance provided as part of the EirGrid and SONI TSO price control decision for EirGrid and SONI's [redacted] This represents a fundamental misunderstanding on behalf of the RAs.

The TSO [redacted] to the cloud is completely separate from the SEMO Finance system migration to the cloud.

EirGrid Group will be procuring two entirely different services in the cloud –

- A corporate Finance system for the TSOs (which has been provided for under the respective TSO controls); and
- An entirely separate operational Finance system for SEMO which is heavily integrated to the SEM settlement systems. The cost of €1.9m is entirely SEM related costs.

The migration of the [redacted] to cloud should not be seen as an upgrade but rather a reimplementation of an on-premise system in the cloud. All functionality will need to be completely reimplemented in the cloud and this will necessitate two entirely separate projects in order to implement two separate services.

The SEM finance system will need to be realigned in order to integrate into the cloud and this will include the redesign of [redacted] system interfaces into and out to the SEM settlement systems. In addition SEM finance processes may need to be redesigned and functionality implemented in the settlement system should the cloud instance, which is an out of the box solution, not provide the functionality required in order to deliver the SEM finance processes. It is as a result of this added complexity that the cost of the SEM implementation of [redacted] in the cloud is more expensive than that forecast for the TSOs implementation.

It is not possible to integrate the corporate and market platforms due to the

(i) complexity;
(ii) operational nature of the market functionality which would limit the ability to take outages, provide maintenance etc.; and
(iii) the heavily integrated nature of the SEM Finance system to the settlement systems.

Following engagement with our support partner [redacted] they have advised that the migration of the SEM Finance System to the cloud is a re-implementation and estimate the cost to be ~ €2m. We ask that the RAs remove the incorrectly applied adjustment proposed and provide the provision of €1.9m requested. As the current SEMO [redacted] reaches its mainstream end date for support in October 2021 and extended support in January 2023 the advancement of this project is critical. Without a migration to the cloud there is a serious risk of disruption to the smooth operation of the SEM.

In addition and as mentioned in the IT OpEx Section [3.1.4], the RAs have proposed to disallow any OpEx costs for the Cloud Adoption Strategic Initiative through which the precursor cloud foundations would be put in place in order for applications such as the SEM Finance System to be migrated to the cloud. These foundations will need to be put in place before any migration and therefore if the cloud foundation programme cannot be leveraged then the migration of [redacted] to the cloud may not be achieved. Examples of cloud foundations include:

- Develop the Cloud Operating Model to ensure that SEMO's structure, processes, people and technology are aligned to enable cloud delivery

- Establish a Cloud Management Platform to manage cloud computing management, provide full visibility into every cloud environment, automate orchestration tasks and optimise resource usage.
- Develop Cloud Financial Management Capability

A2.5.2 Provision of associated OpEx

Investment of €11m (excluding Market System Release Capital and Market System Release Support) has been allowed to introduce new functionality but the RAs proposal have made no provision in the draft determination for

- the critical Market Operations SME testing resources (further details are set out in Appendix 3)
- the necessary High Level Analysis and Design fees (further details are set out in Appendix 4); or
- the associated incremental OpEx cost in support and maintenance in running the additional functionality which poses a significant risk in being able to support the new functionality (further details are set out in Appendix 2)

Appendix 3 – Business Case – Requirement for Testing FTEs

A3.1 Introduction

Testing and change management activities, which under the Legacy SEM would have been limited and seasonal, are under I-SEM a daily occurrence. This was never accounted for or resourced post ISEM market Go Live. The full disallowance of the proposed five additional FTEs by the RAs will significantly restrict the market operation testing capability. If SEMO's ability to adequately manage functional testing and changes to the market systems does not improve, market participants will continue to experience, and potentially be subjected to increased levels of, market instability.

While the RAs have suggested that the "*business case for additional internal testing resources is at odds with SEMO's statement that, in terms of a testing function, 'Where there are larger changes to the Market Systems* [redacted] *this capability can be scaled up appropriately under the associated (CapEx) change programme",* [39]SEMO would point to the fact that extensive and deep market knowledge, along with a detailed functional understanding of the systems, is an absolute prerequisite for these roles. SEMO would welcome the opportunity to work through some detailed examples which illustrate the level of expertise required with the RAs.

It would therefore be neither practical nor efficient to resource these roles by recruiting external contractors for short periods of time. An outsourced model inevitably involves the changeover of contractors, with associated knowledge loss; SEMO considers this would represent an unacceptable risk to market stability as desired by participants.

At its core, there are two aspects to testing. IT Testing looks at the software code and/or physical equipment, checking, for example, if code changes are running without errors and whether the signals and data feeds being fed correctly into the system. Functional Testing is looking to see if the change is giving the expected outcome (i.e. has the change fixed the problem it set out to fix); for example has it had any unintended consequences somewhere else, do the new results align with the requirements of the TSC. Only Market Operation FTEs can assess the outputs and confirm whether they are as-intended; if they are not as-intended, only these FTEs can carry out the analysis to find where the design and implementation has diverged and suggest a functional solution.

As such, while an outsourced and scalable model may be appropriate for the more routine elements of IT testing, SEMO's view is that such arrangements are not appropriate for Functional Testing (i.e. the 5 FTE roles sought). This is based on experience since market go live which tells us that the time required to acquire the deep subject matter expertise to carry out function testing is measured in years rather than months.

Where required (such as on the transition from high level concept to detailed implementation stages), these internal functional testing FTEs could be supported by external subject specific SMEs

[39] Consultation Paper, page 46.

with internal best practice experience obtained through the proposed High Level Analysis and Design support.

As outlined in the Consultation Paper, the Participant Consultative Forum supported the need to improve both SEMOs Test and Change Management capabilities. It stated that –

> *There was also recognition that an improved testing and change management process is necessary, with sufficient resources to design, test and monitor post-deployment and with scope to involve participants.*[40]

The absence of suitable Functional Testing resources has significantly constrained SEMO's ability to deliver a stable market along with substantial biannual releases. ISEM's market complexity has driven a need for permanent operational funding to support business testing and change management.

SEMO split the *Functional Testing* resources into two parts:

- Market Testing (3 FTEs): These new test resources would carry out the testing activities on the continuous changes being made;
- Business requirements (2 FTEs): These resources are required to translate high level concepts (such as TSC Modifications) into detailed functional design and implementation documents for the software developers.

The ISEM market has a far more complex functional and technical design. The legacy SEM had dedicated SEMO IT Subject Matter Experts (SMEs) who would intrinsically understand the market system design dynamics, market rules and operational procedures. Due to the complexity of the market and supporting systems there is a need for both IT and Market Operations SMEs working in tandem to maintain market stability while delivering the necessary changes. Market Operations now needs to gather requirements for complex change and needs to continuously carry out test activities. Furthermore the effort required to undertake testing is far more significant in the ISEM given its complexity, for example a UAT test in the legacy SEM may have taken two to three days but for ISEM now takes up to two to three months. This change in requirements is reflected in the revenue allowance being sought but provisionally disallowed.

Participants support the need for SEMO to be adequately resourced. These resources, as participants observed, would help in the:

- delivery of additional system capability
- along with sufficiently resourced settlement function

In this section we demonstrate the effort that is required to carry out proper and thorough testing and change management activities that will ultimately deliver market stability.

The Regulatory Authorities state in the Consultation Paper that it us up to the SEMO to assign resources to where the priorities are highest which would introduce efficiencies.

[40] Consultation Paper, page 22.

It is at SEMO's discretion to allocate its quota of resources to roles as required to meet its core obligations, reviewing these to ensure efficiencies and allocation against priority/challenging work areas at a particular point in time during the price control.[41]

While SEMO agree with the principle, such an approach can only be implemented where there is capacity within the resources that are provided. This is certainly not the case, as SEMO has set out and as evidenced in our KPI performance under the current price control period, SEMO has does not have sufficient resources to carry out all of its obligations to the levels expected. To date SEMO has had to divert resources to the highest business priorities items to simply deliver on our core market obligations. As a result the following activities are currently not sufficiently resourced and are impacted as a result:

- Formal query resolution
- Defect management
- Test Management and
- Change management

The RAs in their Consultation Paper further assess that SEMO's submission is at odds with itself, by reference to the testing functions called out under the CapEx programme. This is a conflation of functions and scope by the RAs and is not the case. As noted above there is a distinction between the role and scope of the Market Operations test activities (Functional Testing) and the testing activities that are carried out by IT under CapEx, (IT Testing) as noted above.

It is evident that the RAs' concern is a potential duplication of testing resources. To address this matter SEMO has set out below further detail on the respective testing functions and roles. As part of this section, we will demonstrate where funding has been provided and where test activities have not been funded through the use of business process diagrams and supporting test documentation.

A3.2 Impact of ISEM

The complexity of the SEM Balancing & Capacity Markets and associated Market Systems has been learned and applied by the business SME teams over the last number of years through support of production issues, query management and testing. In particular, there has been an onus on the business to drive the system change design coming from the Trading and Settlement Code (TSC) modifications and operational improvements through the last seven [redacted]

The [redacted] uses highly complex logic to create balancing market volumes and associated balancing offer prices using mathematical functions to fully comply and replicate the rules set out in the TSC. This complex design of the Profiler and balancing market mathematical algebra set out in the TSC Part B - Section G, requires logical and analytical skills layered on a deep understanding of electricity markets that would not normally be a requirement of an IT testing service or the IT business analyst team.

[41] Consultation Paper, page 43.

More specifically, Bid Offer Acceptance Bands and Orders and what constitutes 'Biased' volumes and 'Undo' actions requires a deep balancing market knowledge and the ability to apply this to design change and test analysis. Manual graphing of balancing market offer volume profiles can only be completed by a small number of experienced business SMEs which is required to pass complex testing scenarios and fully understand proposed design changes. Understanding of the underlying data inputs from over 137 ISEM market system interfaces is also a key element of design and test. Commercial Offer Data (simple and Complex) and how this is selected based on Flags & Tags, including actions before and after gate closure are also key to understanding market outcomes. The amount of functionality needed to correctly calculate BOAs, such as Commercial Offer Data (COD), Technical Offer Data (TOD), Physical Notifications (PNs), Real Time Availability, Dispatch Instructions (DIs), therefore builds in layers of complexity into the overall calculation of the Imbalance Price.

The IT Testing resources would not have this deep understanding of the workings of the SEM Balancing or Capacity Markets, nor the interactions between System Operator and Trading outputs and their effects on settlements i.e. [redacted] Schedules, Tags and Flags etc.

A3.2.1 Market Systems Interactions (End-to-End)

The ISEM market and system landscape is far more integrated across TSO System Operations and the Market Operations than the Legacy market. Control Centre Dispatch, [redacted] Frequency data, Scheduling runs and Pricing have a direct impact on each other and downstream on Settlements. Any changes proposed to any of these areas, including Registrations, will have a direct and material impact on the other functions. This was clearly evidenced by the recent repricing resettlement change required (CR158), but also with the recent design and implementation of the interim Battery solution.

This cross functional work on the interim battery solution to allow Registration, Scheduling, Dispatch, Pricing and Settlement of Battery unit types clearly highlights the interdependency between the various functions from source systems [redacted] to final Settlement, Credit and Clearing. This is currently not possible so the units are registered as multi-fuel and data is not logged in the negative range other than metering and trades. It is clear that technology type whether it is Pump Storage, Wind, DSU, Batteries, Solar or hybrid solutions requires business expertise (supported by external SMEs) in design decision making. The internal SMEs are integral in guiding the nuanced design approach that best works for both the participant and the market as a whole. This may lead to a solution that involves both systems changes and processes workarounds within operations.

[redacted]

A3.3 The Role of Market Operations SMEs in Implementing System Change

In order to show the difference between the 5 Functional Testing FTEs requested in OpEx (the "Market Operations SMEs"), the IT Testing and quality assurance of the systems provided for as part of the CapEx programme and the "IT SMEs"[42] referenced in the IT & Communications' OpEx submission, it is necessary to address the change and implications that ISEM has in the Market Operations testing.

A3.3.1 Release Programme

The central market systems are constantly being updated to correct defects, introduce operational enhancements and give effect to agreed TSC modifications. A successful market release program is a prerequisite for achieving market stability, ensuring its continued operation and allowing the market to evolve in accordance with Participant requirements.

Given the complexity of the systems and the diverse range and scale of issues that drive change, good practice has been to batch such changes into a fixed biannual release program. This approach also provides a level of certainty and stability for market participants. Each biannual release is in itself a mini project with a duration of between 11 and 12 months and passes through phases of prioritisation, design, scoping, specification, testing, release and documentation.

As can be seen in Figure 2, in order to meet the target of a release every 6 months, three such projects are generally running in parallel. This means that the functional Market Operations SMEs can be simultaneously involved in the user acceptance testing or release of Release X, while working with vendors on the detailed specifications for Release Y while carrying out the high-level design for Release Z. Each stage within the release program will be described in more detail in the following sections. However what is evident is that the workload for these Market Operations SMEs is continuous, complex and enduring.

[42] IT SMEs is used as short hand in this document to encompass (1) the IT Business Analysts (BA) team and (2) the IT Testing Services

[redacted]

[redacted]

A3.3.2 Change Management and Implementation Process

There is a significant number of implementation steps required to take an agreed market design change to a successful market release. While this process requires substantial input and effort from IT SMEs there are key dependencies on Market Operations SMEs that also have a deep understanding of the functional operation of the market systems.

In Figure 3, SEMO has set out the various implementation steps. In their proposed allowances, the RAs have provided the revenues to carry out the steps shown in the green work streams which are carried out by IT SMEs under the Capital Programme. However, no provision is made the FTEs required to support the deliverables in the work stream in white. This work stream denotes the work and input required by Market Operations SMEs that would be carried out by the additional 5 Testing FTEs sought.

[redacted]

[redacted]

Change Model - Roles and Responsibilities

Looking at this from a design process perspective and roles & responsibilities, market change requests and defect descriptions are driven by Market Operator SMEs working with the IT SMEs to correctly document them. This is achieved through the following high level sequence of engagements and document reviews:

- Market Operations SME engagement in the modification process and understanding of market participant needs and the purpose of these market design changes. Also the business understanding of operational changes required for quality, accuracy and inefficiencies.

- Initial high level discussions with the modifications team to align thinking with the capability and current logic in the market systems. This ultimately informs the final modification proposal options for agreement by industry.

- Assisting the IT SMEs before detailed workshops can begin to understand specific scenarios and outcomes that are being addressed and how this might be achieved. Worked examples and detailed analysis are provided at this stage as a basis for wider business workshops.

- The most appropriate logic that needs to be implemented to satisfy T&SC modifications or operational changes is then provided to the IT SMEs to allow them to provide clarity to the vendor of exactly the scope of change required. This comes in the form of detailed and specific requirements gathering; that allows for a higher quality impact assessment and final costing.

- The Vendors' detailed design notes are reviewed from a technical perspective e.g. back-end table changes and other non-functional requirements by IT SMEs. However the confirmation that the proposed systems design is in line with the required market design in the T&SC and is operationally feasible and practical, lies with the Market Operations SME. This requires direct engagement with the vendor facilitated by the IT SMEs to talk through and understand the proposed implementation.

- Finally, Factory Acceptance testing (FAT), System Integration Testing (SIT) and User Acceptance Testing (UAT) documentation and release notes are reviewed by the Market Operations SME with calls facilitated by the IT_SME to agree and sign-off the approach. During the testing phases there is usually a requirement for further improvements or corrections to the design leading to additional code drops to be re-tested by the Market Operations SME and IT SME.

- On many complex changes, the Market Operations SME is required to engage in FAT witnessing to validate the design and vendor testing before the product is delivered for SIT and UAT.

    - As an example, CR-158 (Implementation of updated Repricing Tags and Flags in Settlement) required three Market Operations SMEs to witness parallel testing of separate elements of the change request, over a two week period.
    - For Imbalance Pricing; inclusive of repricing and CR 158, a total of 86 scenarios (81 UAT/Regression scenarios and 5 Model Office scenarios) were developed and tested. This involved the preparation, review and approval of 86 testing scripts, 48 of which were developed from scratch by Market Operations SMEs. Testing this CR required 1118 save-cases (datasets) to be prepared and uploaded into the test environment. The results of all test scenarios had then to be examined in detail and any analogies explained or corrected by the vendor.

- Prioritisation of the numerous changes and defects is best determined by the Market Operations SMEs. These priorities change after each release as participant feedback, material queries, market audits and operational reviews all impact on these decisions. Resource changes in the IT SMEs require additional training from the Market Operations SMEs which can be challenging due to its technical market background and time constraints. Early input into these discussions by the Market Operations SME(s), and prompt responses to vendor design queries is critical in ensuring that these changes can be delivered in the earliest available Bi-annual System Release.

This division of roles is also reflected in the User Acceptance Testing (UAT) work streams (Figure 4). As can be seen from there are three main UAT roles. The top row represents the activities carried out by Market Operations SMEs. These activities include

- Testing Biannual Releases

- Testing defects
- Reconstructing Formal Query conditions or
- Testing of Emergency patches.

The two other main parties involved in the UAT process are the:

- Prime Contractor [redacted] and
- IT SMEs

Again as above those work streams in green are proposed to be provided for by the RAs while no revenue provision has been made for the FTEs required to support the deliverables in the work stream in white. Activities such as Evidence Gathering, the compilation of Defect Descriptions, Test Scripts, Test Plans, execution of Runsheets, Shadow Settlement, Entry and Exit reporting Weekly and Team Lead reports etc. are not covered in the proposed decision.

[redacted]

[redacted]

To illustrate the complexity and extent of Market Operations SME involvement in the change management and testing process, SEMO has summarised sample Use Cases below. Due to both confidentiality constraints and the size of the files, SEMO is not in a position to include the supporting emails and documentation as part of this response, however, SEMO believe it would be beneficial to engage with the RAs to go through this detailed documentation to further demonstrate and carful the requirement for the 5 Testing FTEs requested.

A3.3.2.1 Use Case 1 – CR241 Undo Actions

This example is to highlight the level of detail required to implement a Change Request (CR). *CR241 Undo Actions* would be considered as a relatively small change from a market participant point of view, however, the actual work involved to implement this change was considerable.

SEMO has documented the corresponding emails and documentation reflecting this process to outline the various steps that the Market Operations SME, which included:

- Initial step – Market Operations SME explaining the issue to facilitate design change;
  - Three different scenarios were assessed, across 7 different examples.
  - Potential materiality impact ranged from €6.5k to €800k.
- Next step – Further provision of Pseudo Logic from Market Operations SME to IT SMEs to guide the vendor in their understanding via CR;
- For each scenario, detailed supporting analysis and documentation to feed into workshops and draft change requests were developed by the business.

A3.3.2.2 Use Case 2 – CR158 Repricing Resettlement

CR158 was a very important change request from a participant's point of view. Following implementation of this change request, repricing and resettlement can be completed. This is important for participants as they need to close their financial accounts for 2019 and 2020. This CR was very complex and required significant input across the relevant market operation and IT teams.

SEMO has over 30 pieces of corresponding emails and documentation (~70MB of relevant information) reflecting this process. Below is a summary of the steps that required input from the Market Operations SME in respect of *CR158 Repricing Resettlement*.

1. Initial High Level Analysis and Design and Workshops: Market Operations SME presents overview of change required to IT:

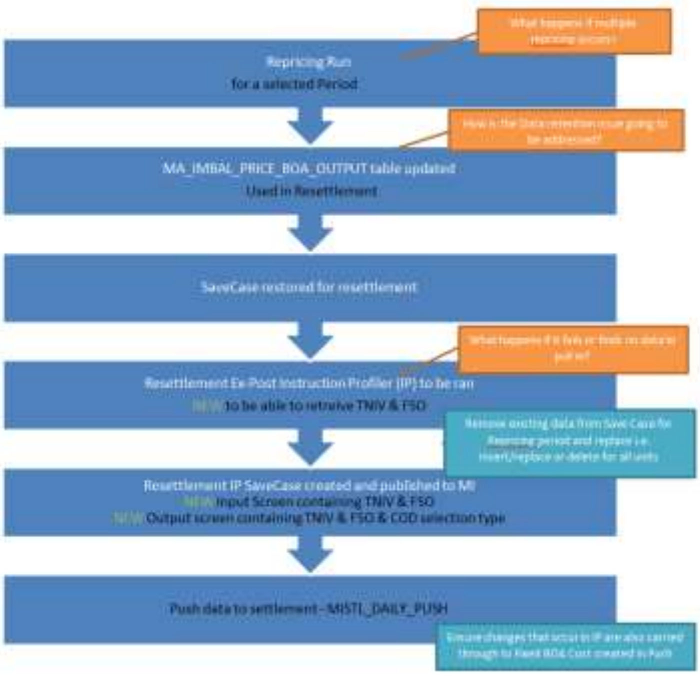


Figure 5 - Business Process Design Flow of CR158

2. Initial Draft of Change Request and Approval Form reviewed and detailed comments provided by the Market Operations SME.
3. Vendor and IT SMEs issue a final draft for comment and detailed review by the Market Operations SME.
4. Market Operations SME reviews CR and participates in ongoing detailed Vendor discussions facilitated by IT SMEs.
5. Business Design Note issued by vendor and IT SMEs for detailed review by Market Operations SME.
6. Business Testing documentation review carried out with input required by the Market Operation SME, including comments on update design note and FAT Test procedures.
7. Comprehensive UAT Test Planning led by Market Operations SME
8. Business led Test Result Analysis and Results including development of evidence pack
9. Engagement required regarding issues identified during testing by Market Operations SMEs
10. Financial Impact Analysis (Pre-Deployment) and Stakeholder Engagement carried out by Market Operations SME

UAT Detailed Evidence and analysis CR 158

- CR158 – Repricing Resettlement: One of only 4 changes and more than 20 defects in Release G
- Trading Test Evidence – 7 out of 86 scenarios tested covering UAT, regression, change requests, defects and model office testing
- UAT Exit Report – This will form the basis of an internal business lessons learned to be scheduled.

A3.4 Implications of Disallowance

A3.4.1 Poor Quality Releases

To date, there are been significant issues in relation to market releases. These issues have manifest themselves in numerous ways such as delays to releases, descoping of changes during implementation, introduction of new defects into the market systems, and discovery of defects post release (that were not captured in the test phase) leading to multiple hot fixes. These issues have had a direct and unwelcome impact on market participants and market operations as evidenced by of the correspondence / complaints received from participants. Examples of customer feedback are included below:

- *"SEMO assured participants that testing efforts and quality had been increased and there would not be a repeat of critical issues slipping through. We are now in a position of MO invoices being issued incorrectly with SEMO asking participants to change values on the invoice XMLs whilst stating this is merely a display issue… It now appears invoicing was not tested either. The anonymised sample files provided by SEMO fall short of what is required; no invoice file was provided, no resettlement statements were provided and the Initial Statement files contained no values."*

- *"How confident are SEMO that the vendor will be able to provide an enduring fix given how quickly the issue has reoccurred or has release E broken the original fix?"*

- *"In the run up to Release E going LIVE, SEMO experienced a number of significant system issues which they advised would all be resolved by the deployment of release E. However, post implementation settlement has ground to a halt more than once, there are more Instruction Profiler and price issues than what we have seen in recent times."*

Given the scale and impact of issues experienced during market releases an internal Lessons Learned report was completed post Release F. This report pointed strongly to the need for greater involvement of the Market Operations SMEs in all stages of change development and testing. For example, an action taken was to move business resources into the earlier stages of analysis and testing e.g. significant involvement in factory acceptance testing. This is referred to as 'moving to the left' in the classical change process as the complexity of the systems and associated business rules means that the IT SMEs cannot detect or respond to functional problems. This Lessons Learned report is included in Section A3.5

This requirement for significant, on-going and critical work for Market Operations SMEs in the release program was not recognised at the time of the 2018 -2021 SEMO price control, however experience since market go-live and lessons learned conducted by SEMO IT and Market Operations have pointed to the vital requirement for these additional Market Operations SMEs if market releases are to be completed to the necessary quality and in a timely manner.

A3.4.2 Limitations on achieving stability, removing defects and implementing mandated change

The current list of defect fixes, TSC Modifications waiting implementation and operational changes have been examined to illustrate which of the pending change requests require the highest level of Market Operations SME input if they are to proceed. Table 6 illustrates those that are most at risk of not being completed to the standard or time required if insufficient resources are available to drive the functional aspects of the change process.

CR Title	MOD ID	CR Ref	Area	SME Requirement (1-10)[43]
Instruction Profiling and QBOA Outcomes in a Subset of Undo Scenarios		CR-241	Trading	10
Battery Changes in [redacted] Scheduling, Registration and Settlement		CR-XXX	Cross Functional	10
Payment for Non-Energy Services Dispatch (System Services Flag)	[redacted]	CR-253 CR-260	Settlement	9
Removal of Difference Charges where operational constraints are binding	[redacted]	CR-XXX	Settlement	8
Inclusion of Wind-Based TCGs in Group Constraint Manager		CR-219	System Operations	8

TH showing in PUMP mode in merit order		CR-216	System Operations	8
SO Flagging of interconnector Trades		CR-244	Trading	8
Retain resource name (GU, SU, DSU, AU) while changing ownership to different Participant		CR-XXX	Market Interface	7
Imbalance prices to reflect the real-time value of energy	[redacted]	CR-XXX	Trading	7
ISEM OUI Global Parameters (IP PUSH changes)		CR-238	Settlement	7
Brexit VAT Arrangements - [redacted]		CR-207	Settlement	6
Settlement reports to be generated for Ad Hoc Settlement run		CR-237	Settlement	6
Incorrect Loss Factor on QAB for Interconnectors		CR-247	Settlement	5
Automatic export of RD merit orders etc after LTS, RTC, RTD runs		CR-096	System Operations	5
PMEA No Energy Action Same Direction as NIV	[redacted]	CR-203	Trading	5
Brexit VAT Arrangements - [redacted]		CR-207	Settlement	4
Correction of QUNDELOTOL calculations to convert TOLUG and TOLOG to MWh	[redacted]	CR-XXX	Trading	4

Table 4 - List of Defect Fixes

A3.5 Lessons Learned Report

Market System Release F Lessons Learned Report

Project	**Market Systems Release F**
Date of Lessons Learned:	24/11/2020
Lessons Learned Participants:	CPIO Analysis and IT Test teams, Business Leads.

Project Summary

Release F contained 5 CRs for the [redacted] and approximately 95 defects. It was released to production on the 2nd of November 2020.

Lessons Detail

The lessons learned log contains the individual details of identified lessons during the Project.

Lessons Summary

Positive results from previous Lessons:

- [redacted] Lock down for testing
- Use of shared Terminal servers for access to [redacted]
- Push left: [redacted]
- [redacted] Test documentation improvement

Additional Lessons to focus on:

- Earlier engagement & involvement with the operations business [Market Operations SMEs] in Defect and CR analysis.
- Deeper Test Analysis [IT Testing] on Defects and CRs to be reflected in Test Scripts and subsequent execution
- Cutover planning phase to include Business, Delivery and Support
- Earlier and inclusive Test planning;
- Tester access and tool set-ups
- Test Data set-up
- Technical set-up, backups etc.
- Test [Market Operations SMEs] resourcing [Functional Testing] vrs Operational work
- System Testing [IT SMEs] Settlements processes & defects
- Closer collaboration between Delivery & Support in relation to releases management
- Test Execution communication between Business [incl. Market Operations SMEs], Delivery & vendor [IT SMEs].
- A number of Test Process improvements

Actions Items

Detailed list of all action items generated to resolve the problem areas.

#	What	Who	When
1	Continuing with the Push left approach Operations Teams [Market Operation SMEs] to be involved early in defect analysis. Currently workshops are underway with the vendor, delivery and business teams to review the defects. This will ensure defects are assigned to the correct teams and the required knowledge is in place to allow test scripts to be defined in detail for it well in advance of testing starting and preparation complete. Specific detail can be requested on the implementation of the fix for the business from the vendor.	Business Leads [Market Operations SMEs] & CPIO [IT]	In Progress
2	Operations Teams to review the design notes for CRs. Currently underway.	Business Leads [Market Operation SMEs]	In Progress
3	Test scripting to start in line with Analysis on defects and CRs. All test scripts to have documented entry and exit criteria and data set up requirements. Any external impacts ([redacted]/Participant) and downstream testing requirements to be flagged as analysis completes. All test data required should be included in the test script including save cases. (A refresh will be performed in advance of SIT starting.) Test script drafting progress will be tracked and reported weekly to management.	Business Leads [Market Operations SMEs]	Per project milestone
4	Investigate Closer alignment of production data for IES1. Note: Automation POC work underway to include PN loading to IES1 and other feeds.	CPIO [IT]	In Progress
5	Include Cutover review and alignment workshop with Business teams [Market Operations SMEs], Delivery and App Support; 1. Both test release and prod release milestones to be included. 2. Will include all Test deployments and their contents. 3. Roles, responsibilities & tasks to be agreed for the cutover between the Business [Market Operations SMEs], Support and Delivery teams [IT SMEs]. 4. Log of all production deployments since previous batch release to be reviewed during cutover analysis for impact to this release and plans adjusted accordingly.	CPIO[IT] & Business leads [Market Operations SMEs]	Per project milestone

6	All business tester's [Market Operations SMEs] access to systems and tools to be requested 1 month in advance of UAT starting.	Business Leads [Market Operations SMEs]	Per project milestones
7	Ensure IES1 refresh process includes; 1. Not to refresh [redacted] from different dates backups. 2. Use suitable date for refresh where processing in finished. 3. Ensure finish to start dependencies are in place for steps in the refresh process such as [redacted] alignment before interfaces are turned on again 4. Check AO table space [redacted] before Model Office (and refreshes). Table space	CPIO [IT]	In advance of next refresh
8	Test evidence from [redacted] to be provided to assist test scripting for Defects and CRs. (FAT scripts to be continued to be provided).	CPIO [IT]	In Progress
9	Validated the running all processes in advance of UAT including settlements and repricing.	CPIO [IT]	Per project milestones
10	A phase of full Settlements processes to be run in System/UAT. This will involve training the test support team [IT SMEs] to run Settlements pushes, pre-calcs, bill cases, publishing etc. and may require assistance from the operational Settlements team.	CPIO [IT] & Settlements	Per project milestones
11	Ensure nominated UAT test resources are available continually throughout testing as planned.	Business Leads [Market Operations SMEs]	Per project milestones

Appendix 4 – High Level Analysis and Design

A4.1 Introduction

SEMO notes the RAs' emphasis on 'productive efficiency', 'allocative efficiency' and 'dynamic efficiency', as part of an expectation that SEMO strives to explore lower cost ways of doing things, the best way to use resources and new and better ways of doing things. SEMO views the High Level Analysis and Design fees as a key component to the further evolution and development of the market in a way that delivers these efficiencies.

Due to the vast array of changes required to cater for all new initiatives, SEMO believe it is essential that it a can bring in subject matter expertise to support and advise on how to deliver the broad (yet interlinked) range of complex policy, system and market driven requirement through thought leadership. The proposal is built on our experience and the lessons learnt from delivery of the I-SEM (a summary of the ISEM Lessons Learned in included in Section [A3.5])

The High Level Analysis and Design initiative covers the early phase of project scoping, and is essential in ensuring that there is clarity of scope and robust and clear decisions are made early and prior to any Capital Project being initiated; thus it is a key enabler for efficient delivery of projects. Indeed it as part of this work that relevant high level information as to the likely costs and timeframes for the delivery of projects are compiled allowing informed decisions to be reached on project progression or not and it is for this reason that they are not capitalised cost. As the RAs will be aware, initiating projects in the absence of robust high level design can lead to significant additional costs being incurred during a projects development and can also lead to significant delays.

The RAs set out in the Consultation Paper that they expect SEMO to strive to collectively seek

> *(1) lower cost ways of doing things ('productive efficiency');*
> *(2) the best way to use resources ('allocative efficiency'); and*
> *(3) new and better ways of doing things ('dynamic efficiency').*[44]

SEMO's proposal to access and utilise subject matter expertise through the High Level Analysis and Design Fees is intended to meet the RAs' aforementioned objectives of identifying lower cost ways of doing things, the best way to use resources and new and better ways of doing things.

The High Level Analysis and Design Fees support these objectives by

[44] Consultation Paper, page 16.

Lower cost ways of doing things	*The best way to use resources*	*New and better ways of doing things*
• Early engagement, advice and clarity on complex design issues delivers substantial savings on time and resources • Enable SEMO to learn from the mistakes of others and thus mitigate potential risks and costly mistakes and delays	• Design clarity allows the development of a clear plan which further helps identify the tasks and resources required for delivery • Enable SEMO FTEs to access and learn form subject matter experts (SME) on a range of technically complex topics. Expertise that SEMO could not reasonably be expected to hold in house across all areas	• External expertise is essential to understand how SEMO could do things better as they bring their invaluable external experience into the organisation

By way of illustration, SEMO lacks specific experience in delivering '*Battery storage facilitation'* while Australia, Germany and Japan are leading the way in utility-scale battery storage systems. Battery storage is currently deployed and providing ancillary services in Ireland and Northern Ireland, but there are no battery storage projects active in the energy market, despite their desire to participate. While SEMO will address this requirement over the forthcoming price control period, we do not know what challenges we will face. Early engagement with knowledgeable consultants who bring real experience of the complexities and issues experienced in other global markets is invaluable and will ultimately be to the benefit of the Market Participants and future operation of the SEM. As such, while not explicitly provided for under the current PC, SEMO has engaged the services of an external company with relevant experience to provide initial advice on how we should go about accommodating batteries into the marketplace. They have delivered an Opportunity Brief explaining the impacts to the SEM and have identified the Programme of work that is required.

A4.2 Why High Level Analysis and Design support is required in the PC period 2021-2024

We note that the proposal to disallow High Level Analysis and Design Fees appears in part to be premised on an assumption that there will be limited Market Development in the forthcoming period and there is limited appetite for change from Market Participants. Extracts from the Consultation Paper read:

> *In terms of approach to reviewing the price control proposals, the RAs reflected on the PCF feedback that there is no significant change expected to the balancing market during the 2021-24 period, and that implications of Celtic interconnector and microgeneration are beyond the timelines for this price control.*[45]

And

> *Given the relatively recent Go-Live of the revised SEM arrangements, there appears to be little appetite amongst participants for further major change at this juncture.*[46]

[45] Consultation Paper, page 15.
[46] Consultation Paper, page 16.

This premise demonstrates a possible misinterpretation of the intent and requirement for High Level Analysis and Design support. There is a large body of work in the pipeline and it will be necessary at a minimum to begin the initial design phases of these works in the forthcoming price control if SEMO is to be in a position to implement the requirements when required in a way that ensure the delivery is economic, efficient and, ultimately, delivered in a holistic manner so as to deliver value to market participants. By way of illustration:

- The initial design phases of I-SEM began in 2012, six years in advance of its go-live date.
- The thought processes and planning for the reconnection of the SEM with Pan-European Market has already started in the current revenue control (2018 to 21).
- The High Level Analysis and Design of the next iteration of SEM will be developed during this new revenue control period (2021-24) which will require significant intellectual capital to progress policies into proposals and eventually a range of possible market system design solutions.

Work to be progressed during the forthcoming price control period includes but is not limited to:

Immediate issues
- Brexit - Managing GB SEM interaction
- Evolution of technologies for the future e.g. batteries
- Support Services from new technology

EBGL
- Managing EBGL implementation in isolation of Europe
- Influencing future balancing market Regulations

Priority Dispatch
- Aligning operational practice with the energy market
- System services revenue issues
- Renewable support schemes

Future Arrangements
- Getting investment to solve the technical challenges of high SNSP
- New Interconnection

Capacity Markets
- Transition to new Capacity Credit
- Improve Market Participant compliance
- Solving the immediate scarcities

Reintegration to Europe
- Fundamental market design review
- Self /central dispatch
- Continuous Xbid

These areas are not only large-scale when considered as discreet projects, but are also intertwined with a number of other projects. It is in considering the totality of the projects, during the initiation stage, that SEMO can ensure that the end solution is optimal.

While we recognise that participants may have little appetite for Market Development, the volume of Governmental, Regulatory and European-driven change has ramped up significantly. Failure to manage the early stages of implementation projects could see the SEM fail to meet the aggressive targets that are set out in documentation from government, government departments, multiple regulatory authorities and the EU. As recognised by the RAs SEMO's operations are underpinned by a strict legislative and regulatory framework and as such where SEMO are obliged legislatively and from a regulatory perspective to deliver change this must be advanced. Figure 6 below summarises some of the targets and objectives that SEMO is set by a selection of its stakeholders:

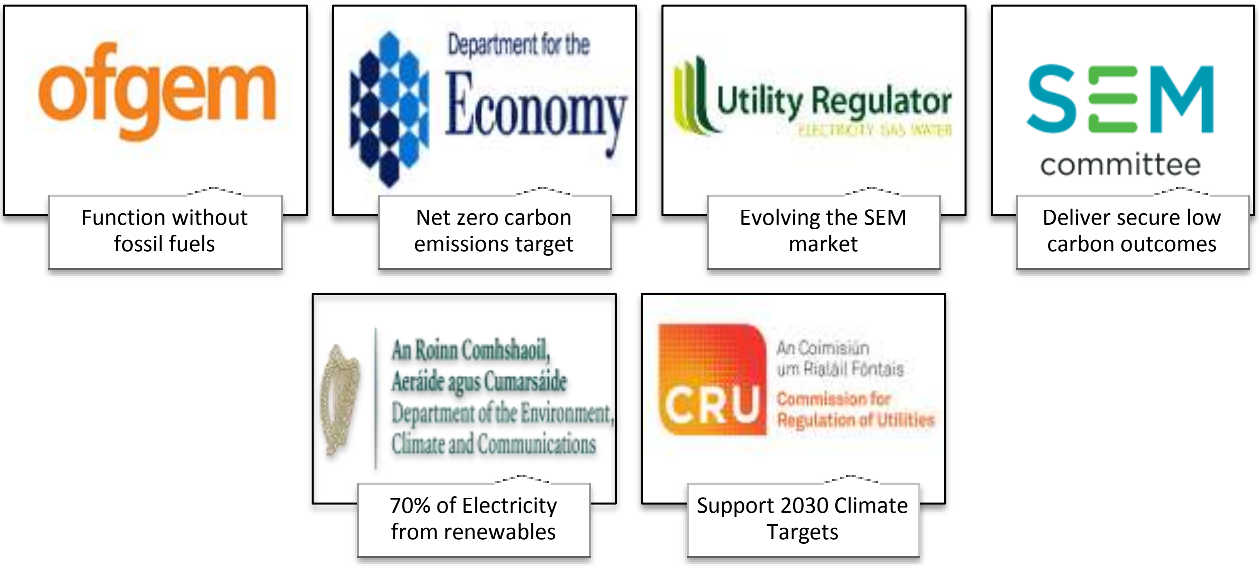


Figure 6 - Regulatory and Governmental objectives

Completing this work in isolation and without considering best practices and experiences could at best delay, or at worst prevent, SEMO's delivery of optimal market design possibilities and solutions. This would ultimately mean that costs may increase and solutions do not provide the intended benefits to the SEM.

As noted by the RAs in the Consultation Paper, Market Participants support the use of subject matter experts by SEMO to enhance SEMO's understanding of various technologies to enable SEMO to manage a diverse range of products including new technology and the need to facilitate the speed of change

A number of participants raised the need for SEMO to be able to manage a diverse range of product including new technology and the need to facilitate the speed of change. There was a view that prioritisation of issues and changes required was crucial. Part of this may include enhancing SEMO's understanding of the technology perhaps through use of a subject matter expert (SME) assigned to help remove the existing barriers to entry.[47]

It is through the proposed High Level Analysis and Design Fees provision that SEMO would seek to contract the required specialist capability across a range of subject specific areas. This is not expertise that SEMO could economically retain in-house; furthermore it would not be appropriate for SEMO to seek to retain all the necessary subject matter experts as full-time FTEs when they are only required for specific projects. Thus, we consider our proposed approach to the costs associated with High Level Analysis and Design to be efficient and justified.

[47] Consultation Paper, page 22.

A4.3 Cost Forecast

The proposed cost of circa €750k per year should be considered in the specific context of a significant Capital Programme of around €28m. This investment should ensure that SEMO does not have to implement interim or partial solutions and then have to invest further capital funding shortly after on an enduring solution at the expense of market participants and consumers. Good advice, based on relevant experience, and informed guidance early in a project or programme of work will point the work in the right direction and will help SEMO avoid the pitfalls or costly mistakes that have already been made in other countries. Learning from the lessons of others will enable SEMO to affect value for consumers through the delivery of well-considered, optimal arrangements for market participants.

Table 7 illustrates some of the initiatives that SEMO believe require external High Level Analysis and Design input. This table gives an indicator of where and when the fees are required. While SEMO have consistently discussed the High Level Market design fees for functionality, it should be noted that High Level Analysis and Design fees are also required to:

- Provide advice and support on how best to deliver the technical needs of the market which could deliver a more resilient market along with costs efficiencies.
- Provide essential Market Certification services

High Level Analysis and Design Need	2021-2022	2022-2023	2023-2024	Total Cost
Capacity Market - Cross border participation	€50,000	€50,000	€50,000	€150,000
Celtic integration	€20,000	€20,000	€10,000	€50,000
Priority dispatch / curtailment compensation (Clean Energy Package)	€100,000	€100,000	€100,000	€300,000
State aid for DSUs – enduring	€50,000	€50,000	€50,000	€150,000
Flextech – Storage	€50,000	€50,000	€50,000	€150,000
Commence changes to market based on earlier studies, Flextech, Self-dispatch, EBGL	€100,000	€100,000	€100,000	€300,000
Interconnector registration readiness		€10,000	€20,000	€30,000
Battery Storage Implementation	€120,000			€120,000
External Testing Resource	€60,000	€60,000	€60,000	€180,000
Markets – Ex-Ante Markets - New Product Changes			€100,000	€100,000
Markets - Market development to prepare for greater interconnection - Multi NEMO arrangements Project commences		€50,000	€50,000	€100,000
Market System Penetration Testing	€20,000	€100,000	€50,000	€170,000
Market System Certification	€50,000	€50,000	€50,000	€150,000
Business Process re-engineering expertise	€50,000	€50,000	€50,000	€150,000
Programme Software procurement support	€100,000	€50,000		€150,000
Total	**€770,000**	**€740,000**	**€740,000**	**€2,250,000**

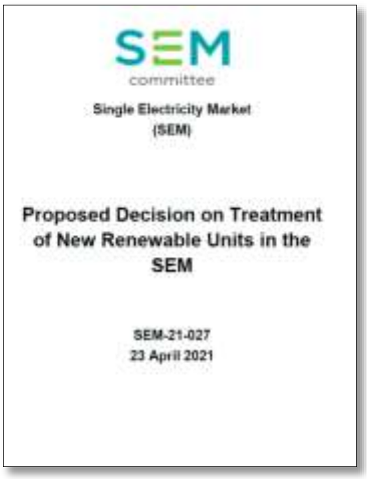
Table 5 – High Level Analysis and Design fees

SEMO believe this investment is modest in the context of the expansive programme that has to be delivered and that it would shorten overall delivery timelines, provide design certainty earlier in a project, provide clarity to market participants, and ultimately yield stable market systems. This brings substantial benefits to consumers. The corollary costs and impacts and the consequences of getting the design wrong are far more serious.

SEMO has detailed in Section A4.4 a case study that presents evidence to support the need for the High Level Analysis and Design fees along with a breakdown of where we need the High Level Analysis and Design fees. In conclusion SEMO believes that the requested High Level Analysis and Design fees will assist in the delivery of:

- ***A well-functioning market,***
- ***Enabling new generation types* into the SEM market**, by getting the best external advice on how to do this;
- ***Including reactivity/flexibility in the SEM market***

A4.4 Case Study: Proposed Decision on Treatment of New Renewable Units in the SEM (SEM-21-027 23 April 2021).


SEM
committee
Single Electricity Market
(SEM)

Proposed Decision on Treatment of New Renewable Units in the SEM

SEM-21-027
23 April 2021

This case study illustrates the difficulties that face both the SEM Committee and subsequently the workload of the Market Operator in implementing the Proposed Decision on Treatment of New Renewable Units in the SEM, (SEM-21-027, 23 April 2021).

The SEM Committee acknowledge that they will deliver minded to positions and principles for the facilitation of renewables without priority dispatch. SEMO will require High Level Analysis and Design fees in order to progress these principles into a high level design outputs as directed by the SEM Committee.

The Proposed Decision Paper focuses on the Regulatory Authorities' proposals concerning the treatment of new renewable units in the SEM, considering the feedback received to SEM-20-028. The paper includes a number of minded to positions and principles in order to facilitate new renewable units without priority dispatch to take part in the market like any other unit in line with the requirements of Regulation (EU) 2019/943.

The SEM committee in the paper proposes that the solution be progressed by SEMO and openly acknowledged the complexity of the work that needs to be carried out, stating

> *Once a final decision on these principles is made by the SEM Committee, a proposal for the design of a solution will be progressed by the TSOs and SEMO leading to design and implementation as soon as possible, **noting the complexity that will be involved in this process.***[48]

For such a very complex design it may be expected that SEMO would be given considerable time to come up with an enduring solution. However, this is not the case, it is proposed in this paper to only

[48] SEM-21-027 – page 2

allow three months for SEMO to come with design requirements, setting out in detail the interim and enduring implementation proposals and associated timelines.

SEM Committee Proposed Decision:
The RAs propose that following publication of this Proposed Decision; 1. *One or more workshops is held by the TSOs and SEMO to discuss detailed design requirements with interested stakeholders.* 2. *Within three months of the Decision, a paper is prepared by the TSOs and SEMO setting out the detail of interim and enduring implementation proposals and associated timelines.* 3. *A final proposal should then be submitted to the SEM Committee for approval.* [49]

The potential requirements arising from the development of a new category of generator unit will have significant impacts across a number of IT systems (including for the TSO and market participants, as well as SEMO). The changes required in some cases go beyond those considered within the I-SEM programme; the detailed design for the I-SEM took over two years to complete with implementation taking a further two years of system build and testing. Without investment in High Level Analysis and Design activities, developing an implementation proposal will not be possible in the ambitious three-month timeframe proposed by the RAs. In the event that the proposed deadline is met, the solution is unlikely to take into account the multiple additional relevant considerations. Building on the lessons learned from the ISEM Implementation project, which identified that not having clear design requirements had both time and cost implications, it is essential that SEMO has clear designs at a project outset to provide to our vendors or we risk system instability, poor solutions and higher costs.

More time was needed for the design phase	Detailed specifications for vendor
• More time was needed for the design phase in order to have clear requirements in place in advance of building and delivering the market systems.	• Vendors needed to have detailed specifications available during the procurement process to avoid high level responses which needed to be developed extensively later. This had implications for the amount of cost and time needed to design and build systems.

Figure 7 - Lessons Learned from the case study

By way of summary, this case study demonstrates

- The interlinked, complex nature of SEM market design decisions
- The RAs' aspiration to ensure projects are progressed in accordance with tight timelines
- The importance of having access to sufficient funding to bring in external expertise during the early stages of a project which will provide clarity, reduce costs and shorten delivery timelines.

[49] SEM-21-027, page 36

A4.5 Lessons Learned from the ISEM project

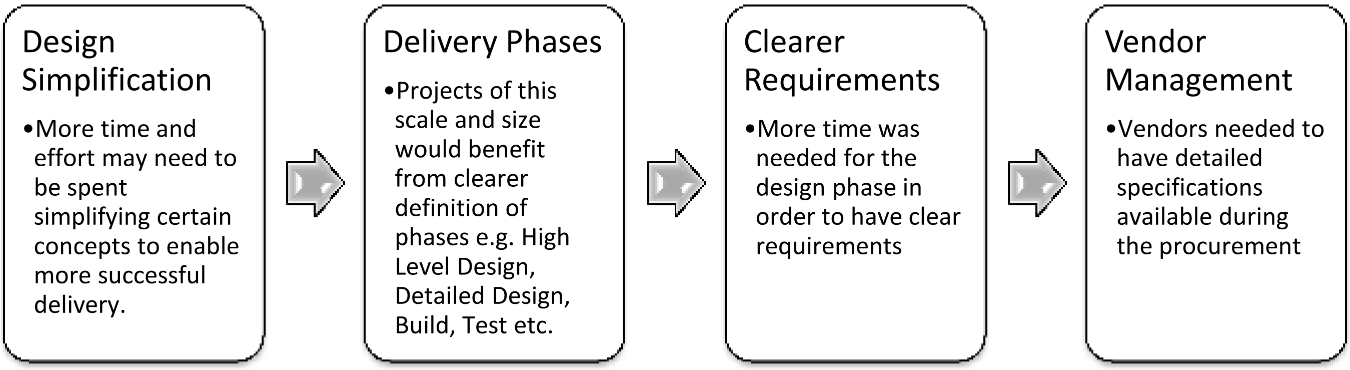


Figure 8 - Lessons Learned from ISEM

More time was needed for the design phase

The complexity of the underlying requirements meant that the original time estimates were overly ambitious. More time was needed for the design phase in order to have clear requirements in place in advance of building and delivering the market systems. The resulting solution performance showed the need for additional implementation time and the need to do more testing at an integrated and regression level.

Detailed specifications for vendor

Vendors needed to have detailed specifications available during the procurement process to avoid high level responses which needed to be developed extensively later. This had implications for the amount of time needed to design and build systems.

Design Simplification

Although the main elements of the Balancing Market, Imbalance Settlement and Ex-Ante have been delivered, there were complex design areas (e.g. QBOA) which proved to be a challenge for vendors. More time and effort may need to be spent simplifying certain concepts to enable more successful delivery.

Lack of Subject Matter Expertise

From time to time it became clear that there was a shortage of staff with detailed knowledge of certain systems. In certain cases key staff members left the organisation and it was very difficult to replace them. Ensuring that there is multiple knowledge owners across the market systems would help to mitigate this.

Development Phases

Finally, all future projects of this scale and size would benefit from clearer definition of phases e.g. High Level Design, Detailed Design, Build and Test etc. Sufficient time needs to be set aside for each phase with any delay in one phase having a consequential impact on subsequent phases.

Appendix 5 – Resettlement detailed overview

The RAs' propose for SEMO's KPIs to be contingent on two factors –

i. **SEMO closing out specific known issues;**

ii. **Making certain improvements to resettlement and repricing.**

This appendix focuses on the proposed improvements to resettlement and repricing. There seems to be a misunderstanding by the RAs regarding the resettlement process, which is set out below.

A5.1 Background to date

The earliest possible start date for ad hoc sequential resettlement of the SEM was Nov '2020 (after Release F was deployed) to run from Oct-2018 to May 2020 (~85 billing periods).

- The period of Oct '18 to Sep '19 is to capture settlement defects which have been corrected through releases up to Release F.
- The period of July '19 to May '20 is to capture re-pricing resettlement after Release G/CR-158 was deployed in June 2021.

To date, Oct-2018 to mid-Jan 2019 is completed (16 billing periods) with the settlements team currently processing one ad hoc billing period (7 days) per week. This is along with business as usual publications of 28 Settlement runs (4 billing periods) per week for indicative, initial, M4 and M13 publications.

Table 8 outlines the status of current M4, M13 and ad hoc sequential resettlement due to run to settlement month of May 2020, with M4 and M13 now aligning with TSC timelines.

Calendar Month	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
M+4 Month (s)	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22
M+13 Month	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21
Adhoc Month	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20 & May-20

Table 6 - M+4, M+13 and Adhoc Sequential Resettlement Timelines

A5.2 Ad hoc resettlement review – July 2021

As presented by SEMO at a meeting with the RAs on the 07 July 2021, SEMO Settlements carried out a full review of ad hoc resettlement in terms of systems processing time, processes and resourcing required to carry out ongoing ad hoc resettlement. The main significant finding is the system time required to run ad hoc resettlement whilst also ensuring TSC obligations are not compromised for daily settlements of indicative, initial, M4 and M13 processing, Credit Risk Management and most importantly Settlement Document timelines which can impact the weekly flow of money in the market.

The same level of data processing and quality checks are required for adhoc resettlement when compared to initial settlements processing – in terms of system access and effort required, with the full end to end process of one ad hoc billing period taking up to 2.5 days of processing and analysis. This significant processing time for ad-hoc, when added to the processing time required for daily settlements of indicative, initial, M4 and M13 limits SEMO's capacity to one ad-hoc billing period (7 days) per week.

The below table outlines the volume of ad hoc processing in progress, and ad hoc resettlement yet to take place;

Adhoc (AH) Run Type	Resettlement Period	Formal query count	Billing periods	Ad hoc status July 2021
AH Sequential (1st Iteration)	Oct-2018 to May-2020	Multiple: Settlements & pricing manifest errors	~ 85	In progress, 16 weeks completed out to Jan 2019
AH Targeted	Oct-2018 to May-2020	10	~ 15	M13 will resolve, potential AH solution & timing in review
AH Sequential (2nd Iteration)	Oct-2018 to Jan-2020	19	~ 27	AH solution & timing in review, **pending** defect fixes & testing
AH Targeted	June-2020 - today	4	~ 2	AH solution & timing in review, **pending** defect fixes & testing

Table 7 – Ad hoc processes

Key points to note on Table 9 above;

- Due to the timing of releases and fixes, a second iteration of ad hoc resettlement will be required to run from the start of the market to close out outstanding formal queries for the 19 billing periods identified
- Additional (unknown) formal queries may be raised on current ad hoc processing which might add to the existing backlog, which can extend back to the start of the market as per TSC formal query obligations
- Currently SEMO Settlements cannot accelerate ad-hocs significantly due to system time reasons, with SEMO proposing to include one additional ad hoc per month from September 2021 on the current ad hoc sequential schedule (5 weeks ad hoc completed in a 4 week period)

In the Consultation Paper *"the RAs are proposing an improvement of 12 months on the current ad-hoc schedule by the end of year 2021/21"*[50] as a pre-condition to any performance award under the KPIs, however, there are certain limitations that have been overlooked. The ad-hoc settlement is a one off settlement. An improvement of 12 months is not realistic as participants can raise an issue 3 – 4 years back under the terms of the TSC. As currently written the proposal would appear to conflict with the TSC and for SEMO to achieve it would require SEMO to act contrary to its obligations. This surely could not be the intent.

[50] Consultation Paper, page 92.

It is unfortunate that we have this backlog and SEMO recognise and understand Market Participants frustrations however SEMO are in the process of rectifying the current issue. By the end of 2021/22 it is expected that the current iteration of ad-hoc resettlement will be completed. The corrections that have been applied under this iteration of ad-hoc will then be resolved from June 2020 onwards by the standard M4 and M13 resettlement processes. Please refer to table above, billing periods subsequent to June 2020 where adjustments are required will be covered under M+13 resettlement. As such, the vast majority of adhoc resettlement up until June 2020 will take place until September 2022.

As a result the proposed contingency is not the correct format to address this matter and will not drive the intended outcomes.

A5.3 Recommendation

Therefore, the proposal for an 'improvement of 12 months on the current ad-hoc schedule by the end of year 2021/22' in the Consultation Paper would not be meaningful.

Given the volume of resettlement required in the future is unknown, and taking into account that future iterations of ad-hoc resettlement that may be required (to fix known or new defects) cannot be limited to a specific historical timeframe under the current TSC provisions, should the RAs and Market Participants believe that ad-hoc resettlement would benefit from being a KPI then it should be a separate standalone KPI and not pre-condition to the remaining KPIs.

SEMO would suggest that a more appropriate mechanism would be to incentivise the rate at which ad-hoc billing periods are processed, rather than on an absolute time period. That is that once the functionality is introduced via the bi-annual release programme, the KPI would be based on the rate of ad-hoc billing periods processed.

Appendix 6 – Acronyms

AAD	Agreed Approach Document
AH	Adhoc
BAU	Business as Usual
BOAs	Bid Offer Acceptances
BPQ	Business Plan Questionnaire
CapEx	Capital Expenditure
CAPM	Capital Asset Pricing Model
CBA	Cost-Benefit Analysis
CEP	Clean Energy Package
CMA	Competition and Markets Authority
COD	Commercial Offer Data
CPI	Consumer Price Index
CPIO	Chief People and Information Office
CR	Change Required
CRU	Commission for Regulation of Utilities
CSB	Clearing Settlement and Billing
DIs	Dispatch Instructions
DIWE	Demonstrably Inefficient or Wasteful Expenditure
[redacted]	[redacted]
DRB	Dispute Resolution Board
DSU	Demand Side Unit
EA	Enterprise Agreement
EBGL	Electricity Balancing Guideline
[redacted]	[redacted]
EDIL	Electronic Dispatch Instruction Logger
[redacted]	[redacted]
EU	European Union
FAT	Factory Acceptance Testing
FTE	Full Time Equivalent
HSE	Health Service Executive
I-SEM	Integrated Single Electricity Market
IT	Information Technology
KPI	Key Performance Indicator
[redacted]	[redacted]
MO	Market Operator
MOA	Market Operator Agreement
MOUG	Market Operator User Group
[redacted]	[redacted]
NCSC-IE	National Cyber Security Centre Ireland
NHS	National Health Service
NPV	Net Present Value
OES	Operators of Essential Services
OpEx	Operational Expenditure
PC	Price Control
PCF	Participant Consultative Forum

PN	Physical Notification
PPS	Post Production Support
PR5	Price Review 5
RAB	Regulatory Asset Base
RAs	Regulatory Authorities
RPI	Retail Price Index
SEM	Single Electricity Market
SEMC	Single Electricity Market Committee
SEMO	Single Electricity Market Operator
[redacted]	[redacted]
SIT	System Integration Testing
SLA	Service Level Agreement
SME	Subject Matter Expert
SOC	Security Operations Centre
TOD	Technical Offer Data
TSC	Trading and Settlement Code
TSO	Transmission System Operator
[redacted]	[redacted]
UAT	User Acceptance Testing
[redacted]	[redacted]
UK	United Kingdom
UR	Utility Regulator
[redacted]	[redacted]
WACC	Weighted Average Cost of Capital
YWE	Yellow Wood Energy

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