



SEM Capital Investment

Market System Development Plan 2022 –
February 2023

Abstract

This document outlines the proposed capital projects planned for SEMO for the period between 1 October 2022 and 30 September 2025 following SEMO's consultation.

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1. Introduction

SONI and EirGrid, in their capacity as licenced Market Operators, are required to produce a Market System Development Plan (MSDP) for approval by the Utility Regulator (UR) and the Commission for Regulation of Utilities (CRU) for the development of the Single Electricity Market (SEM) Trading and Settlement System. This three year plan is produced in accordance with Condition 16 of the [SONI SEM Operator Licence](#) and in accordance with Condition 4 of the [EirGrid Market Operator Licence](#).¹

This document is the MSDP developed by the Single Electricity Market Operator (SEMO) for the period from 1st October 2022 to 30th September 2025. It identifies changes that SEMO believes will facilitate the effective operation, administration and development of the SEM and proposes what capital investment projects are essential to support the needs of the market.

There are currently a number of factors that will influence where SEMO's capital expenditure is focused in the coming years in order to facilitate the efficient, economic and coordinated operation, administration and development of the Single Electricity Market in a financially secure manner. SEMO will need to accommodate and adhere to the direction received from the Regulatory Authorities (the CRU and the UR, hereafter the RAs), any direction received from the European Commission, and feedback SEMO receives from participants. This is in addition to ensuring the longer-term goal of ensuring SEMO can facilitate the challenges of high renewable energy share in electricity (RES-E) required to achieve the 2030 decarbonisation targets.

This is reflected in the approach taken by the RAs in the current SEMO Price Control Decision [SEM-21-073](#) with the increased allowance regarding unpredictable capital expenditure. As stipulated by the RAs in [SEM-21-073](#), *"It will be at SEMO's discretion to use the unpredictable capex allowance as appropriate, but legislative, regulatory and participant obligations or preferences should be taken into account in its considerations. This approach was to acknowledge uncertainty and allow SEMO flexibility to react to priorities in a timely manner without the need to seek additional regulatory approval."*

The recent decisions published by the SEM Committee regarding the Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943 ([SEM-22-009](#)), and System Services Future Arrangements High Level Design Decision Paper ([SEM-22-012](#)) alone will also have future impacts on SEMO. The level of change required over the coming years to ensure the 2030 targets are met is significant. In addition, the introduction of new technologies within the market, as well as the higher than usual prices that current energy market is currently experiencing, will impact the current and future environment.

In Section 2, this document outlines SEMO's CapEx allowance for background information regarding projects that are currently in the implementation phase, this includes the projects that SEMO is committed to the delivery of.

Section 3 then provides the framework for consultation responses with information regarding SEMO's CapEx allowance for future projects, the Known Issues that have not been committed to in a specific market release and the projects that

¹ The relevant licences require a plan for the following two calendar years, but the Regulatory Authorities are content with a three-year look-ahead applying to tariff years. The Regulatory Authorities are currently considering the timing and format of this document going forward.

are in the future pipeline. SEMO received four responses to this consultation from industry participants and appreciates the participants' feedback regarding the prioritisation of projects in this section. SEMO also received comments back from the RAs as part of their review in advance of approving the MSDP report which have also been incorporated as part of this updated report.

As noted in the MSDP Consultation Paper, there are a number of often competing challenges and limitations to the delivery of major projects which mean that not all potential projects can be simultaneously delivered during the period in question. These include the challenges faced by the industry, the regulatory environment, the capability of vendors and market systems, SEMO's priorities and capability to coordinate major changes and adapt processes, and participants' priorities and their capability to keep pace with the level of change required.

SEMO will continue to consider all these factors as appropriate in order to achieve its core objectives. As such, SEMO will take into consideration the feedback received when making key decisions regarding the prioritisation of projects during the period from 1st October 2022 to 30th September 2025.

2. Capital Expenditure Spend for FY2022

2.1 Summary of SEMO CapEx Spend – FY2022 (01 October 2021 – 31 March 2022)

As per [SEM-21-073](#), SEMO received the following allowances for Capital Expenditure (CapEx) for FY2021/22.

SEMC's CapEx Decision – SEM/21/073	2021/22 (€'m)	2021/22 (€'m)	2021/22 (€'m)
	Allowance	Actual Spend (Oct - Mar)	Assets under Construction (Oct – Mar)
Total System Release Capital	5.72	2.28	2.20
Market System Releases ²	4.62	2.18	1.58
Market System Release Support	1.10	0.10	0.62
Predictable Business CapEx	1.88		0.30
SEM Infrastructure Refresh	1.32		0.30
SEMO Finance System ³	0		
Automated Test Capability	0.33		
Website Development	0.23		
Unpredictable CapEx	1.44	0.23	0.17
Additional Market Environments		0.01	
MMS Performance Enhancements		0.12	
Other		0.10	0.17
Total SEMO CapEx	9.04	2.51	2.67

Table 1- Summary of SEMO CapEx Spend FY2021/22 YTD

As per [SEM-21-073](#), SEMO has a CapEx allowance for FY2021/22 of €9.04m.

Table 1 above outlines SEMO's CapEx spend between 01 October 2021 – 31 March 2022. An overview of the above projects is included in the sections below.

As outlined in [SEM-21-073](#), the SEMC has split SEMO's CapEx spend into four categories:

1. Market System Release Capital
2. Market System Release Support Capital
3. Predictable Capital Projects
4. Unpredictable Capital Projects

² The figures included reflect the total cost of the Market System Release spend and Release Support Capital spend for each Release. However, consistent with that set out in SEMO Price Control Decision [SEM-21-073](#), Section 4.4, "changes driven by system operator licensable activities, such as scheduling and dispatch processes, should be funded through the EirGrid and SONI system operator price controls and therefore an appropriate cost adjustment should be applied."

³ No allowance provided in respect of the SEMO Finance System in FY21/22.

In the SEMC's SEMO Price Control Decision for 01 October 2021 – 30 September 2024 ([SEM-21-073](#)), there were a number of projects where the market design, scope and implementation effort were unknown at the time of SEMO's price control submission, for example Loose Volume Coupling, the Clean Energy Package, and the Electricity Balancing Guidelines.

Historically SEMO's unpredictable capital allowance was for unforeseen capital spend during the Price Control period to cover replacement of servers and additional software licences etc. However, the unpredictable capital allowance provided under [SEM-21-073](#) is a bigger pot than previous years. As outlined in the SEMC decision paper, *"this provides SEMO with a level of certainty regarding a set allowance which can provide additional flexibility during the price control period that can be utilised on capital projects which are not specifically captured in the predictable capex allowances above, depending on the prioritisation of capital projects during the price control period."*

This unpredictable capital allowance provides SEMO with the opportunity to react to the needs of the market participants and any regulatory decisions received in respect of the 'known unknown' projects. However, to ensure transparency and visibility of SEMO's unpredictable capital spend, enhanced reporting measures have also been introduced. These include the following:

- SEMO will provide bi-annual updates to market participants via the Market Operator User Group (MOUG) including unpredictable CapEx.
- SEMO will report to the RAs annually detailing each unpredictable CapEx project, including the need for the project, the final cost, detail of the asset delivered and the expected future benefit to be obtained from the asset.
- SEMO will report to stakeholders / market participants annually on the use of the unpredictable allowance.
- Each project cost will be subject to RA approval (as part of the k-factor process) with the onus on SEMO to prove that the expenditure has been efficiently incurred, demonstrably necessary for the purposes of the market operator business and expenditure is incremental to existing price controls and capable of being robustly validated by the RAs.

2.2 Projects in the Implementation Phase

2.2.1 Market System Release and Release Support Capital

The central market systems are updated twice per year, typically with a spring and autumn release. A number of change request, Known Issues and defect fixes are included in each market release. Change requests can be a result of modifications to the Trading and Settlement Code, accommodating changes in other markets timeframes (such as ex-ante) or improvements to market functionality.

There continues to be a number of Change Requests (CR) which are taking some time to progress in relation to approved Modification Proposals due to the complex nature of those changes. The rate at which system changes can be assessed and implemented continues to be challenging in the context of the complexity of Change Requests, for example those affecting multiple market systems, and the large volume of Defects, Known Issues and Change Requests backlog which is being worked through. Therefore, prioritisation is required and in each release, there will be a certain capacity available for changes to each of the different parts of the market systems, so multiple Change Requests affecting the same part of the systems, e.g. settlement, have to be prioritised. In this context it is necessary that particularly important or high materiality system changes to implement rule changes are given the necessary priority to ensure that their delivery is appropriately expedited, within the confines of what is practically achievable. For example one change request, CR-253, for the implementation of Mod_13_19 'Payment for Energy Consumption in SEM for non-energy Services Dispatch' is currently still being worked through after being voted on in February 2021 because of the complexity of drafting the change request requiring coordinated and parallel changes in the TSOs' Energy Management System (EMS) (CR-260). A review of long outstanding items led to the drafting of a change request CR-241 to correct an error in the implementation at go-live of a subset of undo scenarios in the QBOA calculation (Mod_22_21), which is also proving challenging due to the complexity of the calculations for multiple scenarios. A high-level impact was received, and a detailed impact will be requested for the scenarios with the highest materiality.

Table 2 below provides an overview of the Modifications in each release with system changes and their associated level of complexity.

	Date	Modifications with system changes	Complexity
Release F	Oct-20	4	Major: Mod 17_19 (DSU State Aid (Interim)) and Mod_10_19 (excluding priority dispatch in Pricing – Capability deployed but not switched on) Minor: Mod_19_19 (setting operator flag to zero in Settlement) and Mod_21_19 (loss factor for interconnectors)
Release G	Jun-21	4	Medium: Mod_03_19 (amended application of Back Up Price) and Mod_20_19 (changing Day Ahead difference quantity in within day charge) Minor: Mod_08_19 (clarification to ID quantity and Payment) and Mod_22_19 (converting TOLUG and TOLOG to MWh)
Release H	Nov-21 & Jan-22	1	Major: Mod_02_21 (flag for interconnector actions)
Release I	May-22	1	Major: Mod_01_20 (changes to PMEA when Niv opposite)

Release J⁴	Dec-22	1	Major: Mod_13_19 (Payment for energy consumption in SEM for non energy Services Dispatch, which impacts on the TSOs' EMS as well as the SEM Settlement Systems on both EMS and CSB)
Release K³	Apr-23	To be confirmed.	A major change being assessed for inclusion: Mod 22_21 (Undo scenarios) ⁵

Table 2- Modifications in each Market System Release

In this section a description is provided of the Change Requests which are being implemented in the next two releases of the central market systems, the Known Issues that are resolved or planned for resolution in a specific market release and the volume of defect fixes included in each market release.

2.2.1.1 Change Requests

These Change Requests for Year 1 represent a committed schedule of changes which should go-live provided that implementation and testing is successful. More detail on these Change Requests below can be found in Appendix 1 and 2, where information is included in relation to the development effort required by the vendor for each change request.

Market Management System Release I - Delivered May 17th 2022

CR-065: Usage of Seasonal Circuit ratings from CIM Model in MMS

The MMS did not use the correct equipment rating when multiple ratings were included. The change request included additional logic to use the relevant ratings based on Operator selection, as ratings can differ significantly from summer to winter.

CR-068: Timespan of Reports 078, 079, 080

There was an issue with the timespan of the reports for the Contracted Quantities for Generation, Demand and Wind. This Change Request amended the content of the report so that it always contains Trading Period quantities from the start of the Imbalance Settlement Period in which the report is produced to the end of the current Trading Day.

CR-203: Marginal Energy Action Price

The Marginal Energy Action Price calculation was changed to ensure imbalance price information is reflective of the underlying system conditions and the associated price of balancing actions taken to resolve the Net Imbalance Volume (NIV).

CR-216: PUMP mode in Merit Order

Pumped Storage Units were not shown in the Online Merit Order for which they are incremental when they are in pumping mode. This change added them to the Online Merit Order and therefore improved operational effectiveness and satisfied the scheduling and dispatch process audit requirements set out in the SONI and EirGrid TSO Licences Conditions.

⁴ Future releases to be confirmed.

⁵ At the time of publication of this consultation, Mod_14_21 (Replacement Flag Reserve) was included as part of Release K. This has since been removed, hence the scope has been updated accordingly.

CR-217: Reserve Requirements to cater for System wide reserve

This change request facilitated an All Island (TOTL) Ramping Reserve submission and subsequently utilised the reserve requirements data within the Operational Scheduling.

CR-237: Settlement reports to be generated for ad hoc run

Implementation of this CR allows SEMO to publish the M+4 / M+13 / Ad-Hoc Billcase data. This CR will facilitate the implementation of a new process which will also publish M+4 / M+13 / Ad-Hoc Meter Data.

Further information on the Change Requests above can be found in Appendix 1.

Market Management System Release J – Delivery Targeted November 2022 (Delivered December 2022)**CR-219a: Penalty Costs**

This change request updates the penalty cost structure by introducing separate penalty costs for jurisdictional reserves for each reserve category.

CR-224: Participant user updates in the MPI

An issue arose when a participant submitted a change to a Trading Site without notifying SEMO at a similar time to SEMO making a registration data change. This caused the settlements systems to go down thus delaying settlement documents. In order to prevent this issue occurring again this change request will display updates by participants to registration data so that SEMO have visibility of the changes.

CR-226: Registration Screens

Incorrect data selection and entry in certain MPI fields has resulted in issues for the settlement system and across the market for Participants. This change request will implement new validation rules in order to avoid the reoccurrence of such issues in the future.

CR-259: Intermediary option for Supplier Units in the MPI

As per the decision paper [SEM-20-063](#), supplier units can register under an Intermediary in the market. The Regulatory Authorities have requested this information from SEMO to meet their quarterly reporting requirements. The Resource screen for GEN, DSU, EU has a checkbox to tick “Acting as Intermediary”. However, this is not available for other unit types currently.

CR-227: End Date Users in MPI

There is currently no option to end-date a user in the SEMO registration system. An end date field is displayed in the user tab of the user details screen, but this is non-editable. Currently if a user’s access is to be revoked, the Stakeholder team will have to log a support ticket to revoke the certificate of the user – this can take up to five days to be actioned.

CR-253: Payment for Energy Consumption in SEM for non-energy Services Dispatch – Balancing Market (BM) Mod_13_19

The mode of operation for a generator capable of providing synchronous compensation or reactive power at 0 MW is not currently accounted for in SEM. This mode should be profiled and accounted for as uninstructed imbalances. More information on the implementation of this change is included in the appendix.

CR-238: ISEM OUI Global Parameters (ADMIN) changes

Create an improved data push capability to automate the functionality of a manual data push beyond 40 days, along with other related changes.

CR-239: CSB Data Exchange Screen

Currently, Indicative and Initial Bill Case processes are run for one Settlement Day at a time. However, the M+4 and M+13 Bill Case processes are run for an entire Billing week. These processes can only be started for one day at a time. Implementation of the change request will make sure a number of critical pre-calculations can be run for a day range.

Further information on the Change Requests above can be found in Appendix 2.

2.2.1.2 Known Issues

A number of Known Issues have been resolved or planned for resolution in Market System Release I and J as per the latest [Known Issues Report](#) at the time of publication. These are included in Table 3 below for information purposes.

Balancing Market			
Name	Impact to Participants	Status	Confirmed Release
Incorrect application of COD in Imbalance Pricing	Incorrect PBOA values being applied, resulting in impact to Imbalance Price.	Resolved	I
SEMO settlement			
Name	Impact to Participants	Status	Confirmed Release
Currency Jurisdiction being set to NULL where jurisdiction is not ROI or NI.	Publication error where a unit's jurisdiction is registered other than ROI or NI.	Resolved	I
QABNF appears incorrect in the Settlement Calculations for a specific unit.	Incorrect QABNF in settlement calculation for a specific generator unit for a specific date.	Resolved	I
COD retrieval over day boundary	In certain scenarios units can be settled on incorrect simple COD for the 23:00 and 23:30 Imbalance Settlement Periods.	Resolved	I
Incorrect Heat State for CSU	May cause incorrect amounts being paid for CSU	Planned Resolution	J

Table 3- Known Issues which are Resolved or have a Planned Resolution in a specific market release

Section 3.2 below includes information on the Known Issues that have not yet been resolved or are not yet planned for resolution in a specific market release.

2.2.1.3 Defect Fixes

The warranty for the resolution of defects in the Central Market System expired 12 months after Go-Live and consequently defect resolution is now a chargeable activity.

As the market systems continue to mature, the baseline number of defects continues on a downward trajectory. However, the complexity of the residual defects and therefore the effort to resolve are higher and we expect this trend, both in terms of complexity and effort, to continue in the short-term. The trend in vendor effort in resolving defects is highlighted in Figure 1 below.

For Market release I, it is estimated that 2000 vendor hours will be spent on defect fixes.

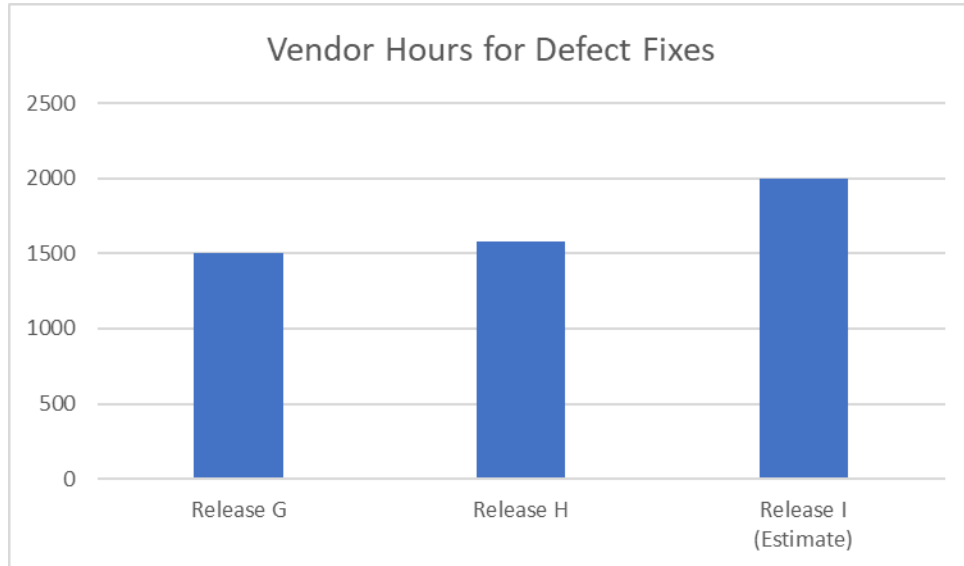


Figure 1- Vendor Hours for Defect Fixes

2.2.2 Predictable CapEx

The sections below give updates on the Capital Investment projects identified under Price Control 2021-2024. It should be noted however that many of the projects below are dependent on the timely delivery and commissioning of new hardware and global supply chain issues are impacting supplies worldwide. We are working closely with our hardware providers and system vendors to mitigate any risks in so far as possible.

2.2.2.1 SEM Infrastructure Refresh

SEMO will continue to invest in the infrastructure as required over the lifetime of the Price Control. This will ensure the systems do not fall into End-of-Life (EOL), remain under support from our hardware vendors and we can avail of upcoming performance and security updates as provided periodically from our vendors. This year we are planning to upgrade our Production database servers, upgrade to the latest version of ORACLE and re-configure the databases to improve flexibility and performance. This upgrade is currently planned to align with Release J (December 2022), subject to timely hardware delivery. There are however significant constraints in the global supply chain for the provision of hardware and we are working with our Infrastructure partners to mitigate these in so far as possible.

2.2.2.2 SEMO Finance System

Although there are no plans to upgrade the SEMO Finance system this year, we are currently investigating what is required to upgrade it to the latest version. Microsoft Dynamics is the platform on which our Finance system is deployed and is nearing End-of-Life. The platform is hosted in EirGrid Groups datacentres and to move to the next version it will involve upgrading it to the MS Dynamics 365 platform which is hosted in the Cloud.

2.2.2.3 Automated Test Capability

This project will initiate this year where a discreet number of test cases will be selected for automation. Following this a review of all test cases will be undertaken to identify and prioritise those which would be suitable for automation.

2.2.2.4 Website Development

Following internal review of the website functionality, SEMO has reached out to the Regulatory Authorities and engaged with Participants through a survey to understand needs and identify required changes to the SEMO website. Through the survey, SEMO received a response from 16 individuals, across 12 organisations.

Following on from this engagement and taking this feedback into consideration, a number of changes are being considered to the website, including:

- Improvements to the search functionality, including categorisation improvement
- Updates to various sections including *Links*, *Training* and *Joining the Balancing Market*.
- Enhancements to the Modifications section, including date stamping of publications
- Tidying and updating of material in the Training section of the website
- Update of the look and feel of the website and Operational Indicators.
- Introduction of new functionality including a new MPI helpdesk page and an 'About' tab
- Set up an API to allow users to manually pull the information generated on the table on the Market Results SEMOpx webpage.
- Possible changes to the display of live trading information.

The detailed requirements for these website changes are currently being developed. Once these have been completed, the scope and the timeline for delivery will be published in advance of delivery.

2.2.3 Unpredictable CapEx

2.2.3.1 Market Systems Data Archiving

Phase One (Proof of Concept) of this project is underway and we expect it to complete towards the end of this Financial Year. We are heavily reliant on the Central Market Systems vendor expertise to deliver this project. On completion of the Proof of Concept we will move to full implementation.

2.2.3.2 Additional Market Environments

There are no plans to commission any additional Market Environments.

2.2.3.3 MMS Performance Enhancements

In relation to the work this year regarding SEM Performance improvements, this will align with the work being planned in the SEM Infrastructure Refresh where a combination of hardware, database upgrade and vendor software changes to reconfigure the databases will deliver additional performance and operational flexibility. As previously advised this work is currently planned to align with Release J (December 2022), subject to timely hardware delivery. There are however significant constraints in the global supply chain for the provision of hardware and we are working with our Infrastructure partners to mitigate these in so far as possible.

2.2.3.4 Oracle Middleware Upgrade

This project is underway and we are planning to upgrade the ORACLE Middleware system in alignment with Release K (April 2023). As this project includes a hardware and software upgrade, we are working closely with our suppliers to mitigate any impact from global supply chain issues with respect to the hardware.

3. Capital Investment Requirements – Future Pipeline

3.1 Summary of SEMO CapEx Allowance – FY2023 and FY2024

As per [SEM-21-073](#), SEMO received the following allowances for CapEx for FY2022/23 and FY2023/24. These are shown in Table 4 below.

SEMC's CapEx Decision – SEM/21/073	2022/23 (€'m)	2023/24 (€'m)
	Allowance	Allowance
Total System Release Capital	5.72	5.72
Market System Releases	4.62	4.62
Market System Release Support	1.10	1.10
Predictable Business CapEx	3.79	1.49
SEM Infrastructure Refresh	1.52	1.22
SEMO Finance System	2.00	
Automated Test Capability	0.27	0.27
Website Development		
Unpredictable CapEx	1.74	1.47
Total SEMO CapEx	11.25	8.68

Table 4- SEMO CapEx Allowances as per [SEM-21-073](#)

The following sections outline the future projects. SEMO has taken on board participants' feedback on regarding how projects should be prioritised. This will help to inform the future projects that SEMO will focus the available funding on, as shown in Table 4, within this MSDP period.

3.2 SEMO Known Issues Reporting

This section includes information regarding the Known Issues that have not yet been resolved or planned for resolution in a specific market release and the impact to market participants of these issues.

Figure 2 below shows the amount of Open Known Issues up to April 2022, which highlights that while the number of Open Known Issues in the Balancing Market has been fairly consistent, this number has fallen over the last year for Settlement Open Known issues.

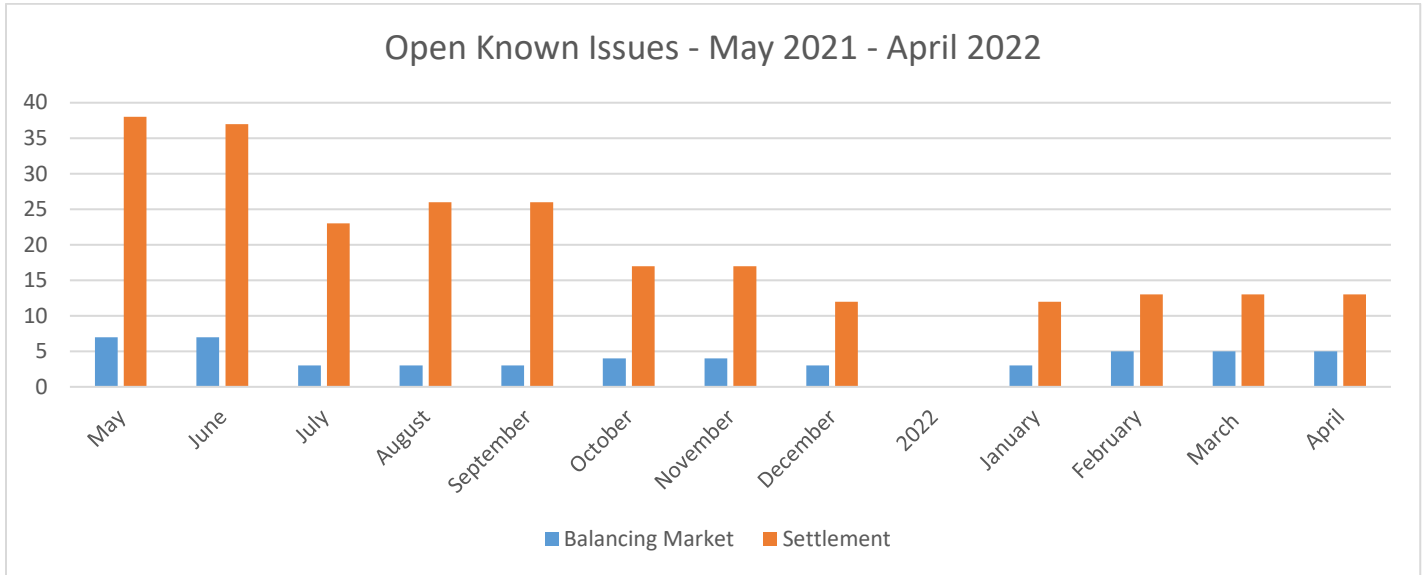


Figure 2 - Open Known Issues as of April 2022.

Table 5 below includes the Known Issues that have not yet been committed to in a specific market release at the time of publication. Known Issues that have been resolved or have been planned for resolution in a specific release at the time of publication are included for information above in Section 2.2.1.2. Further description of all of these Known Issues can be found in the Known Issues Reports under General Publications on the SEMO website at the following filtered [link](#).

SEMO welcomed any feedback on the below Known Issues on the necessity to provide a system-based resolution, and if required priority order, for items not already committed to in a specific market release. These Known Issues were to be considered for prioritisation holistically alongside the future pipeline projects listed in Section 3.2.3, bearing in mind the challenges and limitations for delivering all projects. SEMO will take the feedback received on board when making key decisions regarding the future market design and prioritisation of projects going forward.

Balancing Market		
Name	Impact to Participants	Status
REPT_082	May cause issues for Market Participants that are validating against PUB_DailyRegisteredUnits	Partially Resolved
VTOD Changes Taking Effect on Approval	VTOD changes will take effect in the market systems on the date of approval. Note – SEMO are implementing a workaround whilst this defect remains open.	Partially Resolved
NM Flagging of Interconnector Trades	May result in the Interconnector BOAs being flagged out the Imbalance Price calculation. Note: With the implementation of Mod_02_21 this issue no longer impacts on the Imbalance Price calculation. The resolution of this issue would therefore only provide participants with accurate information on when the interconnector is non-marginal.	Partially Resolved
SO Trade Volumes	The Net Imbalance Volume will be incorrect for Imbalance Pricing Periods where the SO Trade Volume has not fed into the calculation.	In Analysis
Incorrect QBOA Order Profile created for Wind Units	Incorrect calculation of QBOA in impacted periods, will result in an incorrect NIV ;and on occasion, changes in price.	In Analysis
User Key Contacts in MPI	Participants are unable to amend a User's Key Contact status in the MPI.	In Analysis
SEMO settlement		
Name	Impact to Participants	Status
CRM Unit Capacity values being knocked off following Reg import due to overlapping date ranges	Where the CRM unit capacity was replaced with a zero due to overlapping dates, Capacity payments will not have been calculated due to missing qCCOMMISS value	In Analysis
CFC CSU Not Processed Correctly	In the situation with a unit X for the half hour period ending 19:00 on 25.08.19:Both of the PPOP will have a warmth state set to C (cold). This does not matter for this specific scenario since the Hot/Warm/Cold Start Up costs are all the same, but that is not always the situation.	Partially Resolved
Incorrect Instruction Profile created	BOA volumes may be incorrect in a small specific number of scenarios affecting BALIMB Settlement amounts	In Analysis
Incorrect DQ calculation for Interconnectors, feeding to settlement	I/C BOA volumes may be incorrect in a small specific number of scenarios affecting BALIMB Settlement amounts	In Analysis
EUPECC (supplier units undefined exposure for capacity charges) FX rate	EUPECC is reduced by ~3% for all applicable PT's.	In Analysis
Instruction Profiler – Intersection point 'Error in Slope'	The IP throws a generic error and skips processing for that unit for that study horizon. The fix to address the majority is to improve the accuracy of the break point calculation.	In Analysis
CSU not paid when first ISP of the POPO is settled on simple	CSU not paid when first ISP of the POPO is settled on simple	Planned Resolution
Process does not allow TOD to change	No effect on BALIMB settlement amounts to date	In Analysis

Table 5 - [Known Issues Report](#) projects which have not yet been committed to in a specific market release

3.3 Unpredictable CapEx – Future Pipeline of Market Design Changes

3.3.1 Overview

There are two major policy areas that are likely to affect SEMO systems in some way during the period FY2022-2025. Firstly, the need to align markets with challenges associated with high RES-E and secondly the need to prepare for full trading arrangements between SEM and Great Britain (GB) or EU Markets. Major EU legislation (Clean Energy Package) and specific directions from Regulatory Authorities are yet to be applied to the current energy market arrangements. These obligations are primarily captured in the Clean Energy Package (CEP) including non-priority dispatch of renewables (Article 12) and compensation of dispatch down of renewable resources (Article 13). Following BREXIT, both SEM and GB markets were decoupled from the European day-ahead market. Under the Trade and Cooperation Agreement (TCA) between GB and EU new arrangements will be needed for the day-ahead markets in addition to the interim intraday markets which exist today.

In addition to changing trading arrangements with GB, it is expected that there will be additional cross border capacity to be allocated in 2024 with the commissioning of the Greenlink interconnector. While such capacity will be allocated in the ex-ante market, downstream changes will be required in the balancing market e.g. to accommodate new interconnector units, accept and process ex-ante market positions, calculate imbalance volumes and carry out the associated settlement and collateral functions. Unlike the addition of a generator or supply unit, significant system and contract changes are required in order to accommodate a new interconnector. Work also needs to commence to prepare for the commencement of operation of the Celtic Interconnector. This work will require key design areas to be addressed including the design of a suitable Capacity Calculation Region. Most of the work will be shared between SEMO and the System Operators (SOs) however some areas such as ex-ante pricing and settlement will significantly impact market systems.

To achieve the objectives of operating a power system with higher levels of RES-E (up to 80% as outlined in the [Climate Action Plan](#) and a target of 80% as agreed by the NI Assembly as an amendment to the [Climate Change \[No.2\] Bill](#)) by 2030, there is a wider context of evolutionary change needed to align markets and system services with operational challenges. Sizeable investment will be needed in order to replace the legacy conventional generation plant with alternative more renewable sources. In order to stimulate this investment, appropriate changes need to be made to the design of the markets which will have implications for all market systems. Careful consideration will be made to ensure that changes do not undermine investor confidence and reasonable certainty of return which could lead to an increase in costs in the long term. The policy changes will impact on all aspects of the markets including procedures, processes and market systems.

Any forward work plan covering the period 2022-2025 will have to consider the totality of these implications in addition to the other changes which are being driven by more business as usual processes including modifications, resolution of shorter-term design issues and resolution of critical defects. In the event that the necessary investments in market systems do not occur the increased divergence between the financial schedule arising from market trades and physical operational schedule could increase, leading to greater inefficiency. The implications for the end user of inefficient outcomes as a result of divergence is compounded as SEM energy prices are used as reference prices for other markets including capacity markets, RESS and system services markets. The major programme of work being done by the System Operators, in parallel, to ensure that System Non-Synchronous Penetration (SNSP) is raised to almost 100% supports non-constrained market schedules for the main ex-ante markets.

The complex and highly integrated nature of the current market systems means that facilitating high RES-E penetration and the integration of SEM into GB and EU Markets will be major tasks. Understanding the cross system and data implications which involve considerable analysis and programme management skills.

3.3.2 Key Policy Areas

This section describes how the two main policy areas are being addressed during the period of interest 2022-2025 and how the work will impact on SEMO market systems in the period. Programmes are being prepared to deliver the capability changes which will include people, process, systems and data. Due to the integrated nature of the market systems and the wider organisation means that it is likely that changes will be multi-disciplinary impacting on various groups across SEMO, the System Operators and wider industry stakeholders.

Scheduling and Dispatch Programme

The Scheduling and Dispatch Programme is currently commencing which will deliver changes to make the market systems comply with CEP Article 12 and certain elements of Article 13. There are specific elements which will affect SEMO (see table 7 below for reference) including:

- The treatment of non-priority dispatch renewable generation
- Energy Storage Power Station (ESPS) capability
- Synchronous Condenser Scheduling and Compensation
- Reserve from Wind and New Technologies

Other elements of the programme including changes to dispatch tools and systems services are out of scope for the Market System Development Plan. Initial impact analysis indicates that there is a strong likelihood of changes being made to the systems in the following areas:

- *Bid/Offer Management*: These changes will have an impact on processes and systems for bidding, including commercial and technical offer data gathered.
- *Settlement & Billing*: The changes to market arrangements to accommodate new units will need to be reflected in the settlement formulae for the market, and thus the processes and systems (including interfaces) that support them.

Key Benefits of Scheduling and Dispatch Programme: EU Regulations outlined in the [Clean Energy Package](#) mandate that both System and Market Operators make changes to support the wider policy objectives. The status quo is not compliant. The SEM Committee has included a numbers of projects in its 2021/22 [Forward Work Plan](#) that will be covered as part of the Scheduling and Dispatch Programme, including CEP – Decision on Treatment of new Renewable Units; CEP – Decision on Dispatch and Redispatch in SEM; and CEP – Decision on Priority Dispatch. Failure to deliver will negatively impact the industry’s commercial expectations resulting in an increase in the Cost of Capital for RES investments. At worst it could stop investment altogether.

Anticipated activities

SEMO conducted scoping activities and engagement with the RAs in advance of the publication of the Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943 ([SEM-22-009](#)) in March 2022. Detailed programme planning and business analysis began in February 2022 and as yet an overall cost of the programme is not available, but the wider programme is likely to be considerable and beyond the scale of the unpredictable capital element of the MSDP. The main focus is on:

- A transparent design process with key stakeholders by workshopping concepts and issues for changes with industry relating to Article 12 and other consulted and agreed changes;

- A programme plan and detailed design on dispatch and scheduling changes. The detailed design step will translate the results of the design interpretation work into a single solution outlining the proposal across all issues of scheduling and dispatch to be addressed. This document must be sufficiently detailed to enable its use as the roadmap for any changes to the Trading and Settlement Code as well as for defining technical requirements. The work will include key elements which impact on SEMO systems related to:
 - Treatment of new non-priority dispatch renewable generation; and
 - How Energy Storage Power Stations (ESPS) will be accommodated.

It is envisaged that an implementation phase will take place in 2023 and 2024 which will take the outputs of the regulatory authorities' decision-making regarding Article 12 and ESPS following the market design phase and deliver the following:

- A full impact assessment of how the market design developed in the first phase impacts all of SEMO's systems
- Once existing impacted systems and potential vendors have been identified, further consideration is given to options to modify or replace existing systems, including an assessment of what other vendors and tools can deliver on this capability
- A high-level solution architecture and detailed design would be developed from the market design and used in a procurement process to identify suitable vendors;
- A detailed solution(s) would be developed by the successful bidder following these activities:
 - Detailed business requirements taking all up to date decisions into account;
 - Detailed solutioning, architecture and specification of modifications to market systems and other changes
 - Design of the solution(s) by the successful vendor(s) taking all the various approved designs into account
 - Delivery of the solution(s) by the successful vendor(s) including all necessary test cycles
 - Implementation of suitable technical infrastructure to support new arrangements
 - Integration of all new systems and the completion of integrated test programmes
 - Data establishment and cutover to new arrangements
 - Trailing of the new arrangements in advance of operational readiness and cutover of new systems.

It is highly likely that there will also be scoping and planning work to complete on Article 13 from 2023 to 2025 including:

- Cooperative work with the RAs in advance of the SEM Committee deciding on a high-level design for compensation for dispatch down of renewables (Article 13) and other settlement impacts
- Developing a detailed design for compensation for dispatch down of renewables (Article 13) in dispatch and more importantly for SEMO settlement systems
- Commencing the solution architecture work on the detail design ahead of engagement with vendors

It is unlikely that work will advance past this stage during the period in question.

Full Trading Arrangements between SEM and GB, and EU Reintegration

Two integration projects will need to be delivered over the next few years, one for GB markets, and the other to support EU re-integration. Both integration projects will impact aspects of the TSO, MO and SEMOpx, only a sub-element of each programme would be potentially impact the balancing market, and therefore be relevant for the MSDP 22-25. Once the Celtic Interconnector becomes operational in 2026/27 SEM will have to re-integrate with EU markets. This will require compliance with electricity market network codes including pan EU Intraday processes. While pre-existing intraday arrangements continue to be used between SEM and GB markets there is still a need for cross border trading and capacity calculation measures to be put in place to support new ex-ante markets with GB. At this stage there is no scope of the activities completed for the work. The wider context involves the establishment of an appropriate Capacity Calculation Region (CCR). The MSDP will be concerned with any impact that this work could have on SEM systems.

The particular projects which will impact SEMO (see table 7 below for reference) regarding the full trading arrangements between SEM and GB, and the EU reintegration are:

1. Multi Regional Loose Volume Coupling; and
2. Greenlink

Key Benefits of Integration to GB and EU Markets: The full re-integration of SEM with GB and EU will bring new trading opportunities to Market Participants both in SEMO and in coupled markets and more efficient economic outcomes for consumers. It is difficult to envisage a system with the degree of renewable generation of the island of Ireland working efficiently without effective interconnection. This is as true for the market perspective as it is for the operational perspective. These benefits are in addition to other benefits that accrue with more interconnectors including security of supply improvements.

Anticipated activities

Work is the early stage of development for this initiative. The SOs and SEMO have commenced procurement to support the assessment of requirements and a subsequent milestone plan will be available at a later stage. In advance of this plan it is not possible to determine whether there will be any impact on SEMO market systems in 2023 or 2024, however, given the experience of other programmes it is unlikely that any developments beyond initial design will happen in this timeframe.

3.3.3 Future Market Projects

In this section a value matrix for future market projects (Table 7) is presented with a view to gathering participant feedback regarding these projects against a number of pertinent lenses. These lenses include EU or national legal and regulatory requirements, contribution to achieving up to 80% RES-E by 2030, contribution to security of supply, commercial impact and the IT ease of implementation. The list of projects in the future pipeline include complex projects requiring major change to market systems and processes. Limitations in their delivery for vendors, SEMO, and participants, mean that not all of these projects can be delivered simultaneously. Nor would it be necessarily ideal to introduce this level of change into an already complex market over a very compressed timeline. Participants' views on the appropriate quantum, timing and priorities for change were sought as part of the MSDP consultation. These projects must therefore be assessed against key regulatory, legislative and policy obligations and preferences in order to appropriately prioritise the delivery of these projects.

Indicative scoring was provided in order to stimulate comment from participants and the legend explaining the indicative scoring can be found in Table 6 below. The indicative scores refer to the indicative significance or importance of each project for the achieving of each of the respective lenses. The IT ease of implementation refers to the level of difficulty in implementing each project from the perspective of vendor capability and the number and stability of systems involved.

Legend	Indicative Score			
	Low	Medium	High	Not Optional
	IT ease of Implementation			
	Easy	Medium	Difficult	

Table 6- Legend for indicative scoring

With the lenses that are identified in mind, along with the challenges in the delivery of these complex projects for all stakeholders, SEMO welcomed any feedback from participants regarding their preferences for the prioritisation of future pipeline projects.

The below list of projects are those that have been currently identified as impacting directly on SEMO, however if any further projects are identified in the future, they will be included in MSDPs as we progress through the 2021 to 2024 price control period. Following the feedback as set out in the participants’ responses SEMO will work with the RAs to prioritise and progress the below list of projects accordingly⁶.

⁶ Changes made to Table 7 as a result of the feedback from the MSDP 2022 Consultation are denoted with an asterisk.

Change Driver	Description	EU or National legal/regulatory requirement	Up to 80% by 2030	Security of Supply (Secure Transition)	Commercial Impact	IT Ease of Implementation
Multi Regional Loose Volume Coupling	Post Brexit alternative method of coupling the SEM/EU and GB markets in the day ahead timeframe. Would impact the ex-ante market information to be used as input to the balancing market	Not Optional	Low	Low	Medium	Difficult
CEP Article 8 - 30 Minute MTU	The Clean Energy Package Article 8 requires that the Market Time Unit MTU (ex-ante auctions) is aligned with the Imbalance Settlement Period ISP. Changes will be necessary in the balancing market to accept 30 min MTU instead of the current 60 min MTU from the day ahead auction	Not Optional	Low	Low	Medium	Easy
SEMC decision 22-009 Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943 (Art.12 and part of 13)	The Clean Energy package requires that SOs have capability to dispatch new large-scale renewables (which no longer have priority dispatch designation) to be dispatch to their market position. Changes related to the payments to non-priority renewable generation and compensation for non-market redispatch will require changes to SEMO's central market systems. Given the outcomes of the RESS1 auction this ability will be required to be operational in the control centres by mid-2023.	Not Optional	High	Low	Medium	Difficult
Greenlink	Greenlink is a proposed DC interconnector linking the All Island power market (SEM) and Great Britain. It is an EU Project of Common Interest. When commissioned in 2024, the interconnector is expected to provide a 500MW link from the South East of Ireland (Co. Wexford) to Pembrokeshire in Wales. Greenlink will need to be integrated into the various SEM markets (ex-ante, balancing and capacity) and the SEM-GB cross border energy trading arrangements. As an interconnector linking two markets as a complex set of regulatory arrangements, legal agreements, commercial contracts and technical (IT) systems will need to be put in place to ensure the successful registration and ongoing operation of this new cross border capacity.	Not Optional*	High	High	High	Difficult
Demand Side Management enduring solution for energy payments	As per SEMC forward work program and SEM Committee Decision SEM-22-090, "Enduring Solution to Enable Energy Payments in the Balancing Market for DSUs".	Not Optional *	Low	Low	Low	Difficult
Energy Storage Power Station Integration	The objective of this initiative is to provide for the full operational and market participation of ESPS resources, in a manner consistent with the operation characteristics of these facilities. This includes Participation in the balancing market, and in the provision of system services (whether procured on a market or contracted basis), dispatch, control and monitoring of ESPS resources providing these services, participation in the I-SEM forward markets (day-ahead, intra-day) and capacity market.	High	High	High	High*	Difficult
Synchronous Condenser Scheduling and Compensation	Synchronous Condensers are an essential requirement in assisting the transition to 80% RES-E by 2030. They are a cost effective and a necessary source of critical system services and as a technology present and mitigate to some of the operational scarcities seen in the Shaping Our Electricity Future Consultation. Synchronous condensers are required to provide inertia and reactive power control. SEMO will need to integrate this new unit type into the market systems e.g. registration and settlement.	Medium	High	Low	Medium	Medium
Trading and Settlement Code Modification/Market participants change	A range of Mods will be proposed, assessed and approved over the time period.	Medium	Medium	Medium	Medium	Medium
Defect fix	Each release will have a number of defects which are prioritised for the scope inclusion and which are then targeted for resolution within that release. The warranty for the resolution of defects in the Central Market System expired 12 months after Go-Live and consequently defect resolution is now a chargeable activity	Medium	Low	Low	Medium	Medium
Reserve from Wind & New Technologies	Wind generation is currently paid to provide reserves which cannot be correctly utilised for balancing market. The balancing market must put in place the necessary operational markets tool for scheduling and compensation for reserves (non-energy actions) from a broader pool of new types of service provider e.g. storage, wind, solar and the integration of low MW output inertia solutions. The use of reserves from new types of service provider such as wind and solar generation must be facilitated in order to achieve the 80% RES-E target by 2030.	Low	Medium	Low	Medium	Medium

Table 7- Future Project Value Matrix

4. Consultation Feedback

SEMO received responses back from 4 respondents and the Regulatory Authorities on the MSDP 2022⁷ which has been taken on board by SEMO.

The consultation process did not identify any new projects, nor has it led to any wholesale changes to the assessment provided in the project matrix outlines in the original consultation (as set out in Table 7 above). SEMO will now work with the RAs to further the implementation of the relevant projects.

In the coming years the current market will undergo a number of significant changes due to regulatory requirements at both SEM and EU level, security of supply and RES-E integration. SEMO will continue to engage and provide updates to industry on any progression of the projects through the various industry fora, inclusion the Market Operator User Group, the SEMO Focus Group as well as any project specific workshops that take place.

⁷ A detailed summary of all four responses can be found here in the MSDP 2022 Consultation Report document.

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I. Appendix

Appendix 1 - Market Management System Release I Change Requests

Change Request Reference	Change Title	Summary of Change
CR-065	Usage of Seasonal Circuit Ratings from CIM Model in MMS	<p>The MMS did not utilise the correct equipment ratings when there were multiple ratings included in the relevant CIM file based on the current design. This resulted in the MMS using the incorrect equipment rating values at times. MMS uses equipment ratings in the Network Security Monitor (NSM) function, which is an integral part of producing a secure and economic dispatch schedule (and associated advisory dispatch instructions). This Change Request included additional logic to use the relevant equipment ratings based on Operator selection, enabling the correct transition from summer to winter ratings and vice versa, as ratings can differ significantly from Summer to Winter.</p>
CR-068	Timespan of Reports 078, 079, 080 (Contracted Quantities for Generation, Demand and Wind)	<p>Under existing functionality, the below Reports contained values for each Imbalance Settlement Period for which the gate in the corresponding Trading Day is still open:</p> <ul style="list-style-type: none"> • REPT_078 - Aggregated Contracted Quantities for Generation • REPT_079 - Aggregated Contracted Quantities for Demand • REPT_080 - Aggregated Contracted Quantities for Wind <p>These reports were published each hour at approx. 20 mins past the hour. This impacted reports that are published close to the Trading Day boundary of 23:00, in that there were no gates in the current Trading Day that were open, so by the time that the report was published in the subsequent Trading Day, gates were closed for the first Imbalance Settlement Period (and were therefore never included in any of the above reports). This Change Request proposed amending the content of the report so that it always contains Trading Period quantities from the start of the Imbalance Settlement Period in which the report is produced, to the end of the current Trading Day. For example, previously the Report produced at approx. 23:20 for a specific Trading Day will contain data from the Imbalance Settlement Period 00:30 to 01:00 until the end of the Trading Day. However, as the publication time of this report resides within the Imbalance Settlement Period 23:00 to 23:30, the first Imbalance Settlement Period within this Report should also be 23:00 to 23:30. This same logic is also be applied to the subsequent reports that are published for the remainder of the current Trading Day.</p>
CR-203	Marginal Energy Action Price (No Energy Action(s) same direction as NIV)	<p>Balancing Market Modification 01_20, changed the current Marginal Energy Action Price (PMEA) calculation which takes place in RTPIMB (PIMBCALC) within the Market Application section of the Operator User Interface. The change was to ensure imbalance price information is reflective of the underlying system conditions and the associated price of balancing actions taken to resolve the Net Imbalance Volume (NIV). This change altered the calculation of the Price of Marginal Energy Action taken to include a condition where there are ranked sets and where there are no energy actions in the same direction as the NIV.</p> <p>Note: in terms of mentioning the 'same direction as the NIV' this represents the following:</p> <ol style="list-style-type: none"> 1. A positive Quantity Accepted Bid/Offer /incremental volume where the Net Imbalance Volume (NIV) is a positive value. This indicates a generation shortfall 2. A negative Quantity Accepted Bid/Offer / decremental volume where the Net imbalance Volume (NIV) is a negative value. This indicates a generation surplus
CR-216	TH showing in PUMP mode in Merit Order	<p>The merit order display within the MMS provides price stack information based on incremental and decremental costs and availability MW for generating units or demand side units for the current time. Previously, Pumped Storage Units were not shown in the Online Merit Order for which they are Incremental when they are in pumping mode and this change added them to the Online Merit Order.</p> <p>This change request improved operational effectiveness and satisfied the scheduling and dispatch process audit requirements set out in the SONI and EirGrid TSO Licences Conditions.</p>

<p>CR-217</p>	<p>Reserve Requirements to cater for System wide reserve</p>	<p>Part of the 'Delivering a Secure Sustainable Electricity System (DS3)' programme requires the provision of Ramping Margin and an associated tool and optimization.</p> <p>Ramping Margin is a means by which a minimum level of ramping capability is available (from available online or offline generator units), to maintain system security. The implementation of Ramping Margin in I-SEM requires utilization in MMS of Ramping Margin Requirements for RM1, RM3 and RM8 ramping products which are defined for each jurisdiction (ROI, NI) and system-wide.</p> <p>Under the previous functionality, only Reserve data for the following jurisdictions were submitted to the MMS.</p> <ul style="list-style-type: none"> • NI (Northern Ireland) • ROI (Republic of Ireland) <p>This change request facilitated an All Island (TOTL) Ramping Reserve submission and subsequently utilised the reserve requirements data within the Operational Scheduling for LTS, RTC & RTD</p>
<p>CR-237</p>	<p>M+4 / M+13 / Adhoc - Report Publications – Settlement / Meter Data</p>	<p>The following Settlement runs / Bill Cases are generated for each Settlement Day in the Market:</p> <p>Indicative – usually run 1 day after Settlement Day</p> <p>Initial – usually run approx. 5 days after Settlement Day</p> <p>M+4 – run approx. 4 months after Settlement Day</p> <p>M+13 – run approx. 13 months after Settlement Day</p> <p>Adhoc Settlement – as and when required</p> <p>The outputs for these Billcase are published to the Market through a number of Reports. For certain reports it was only possible to publish the Indicative and Initial Billcase data.</p> <p>Previously only Indicative (TD-1) and Initial (TD-5) Meter Data was published to the Market.</p> <p>Implementation of this CR allows SEMO to publish the M+4 / M+13 / Ad-Hoc Billcase data.</p> <p>This CR will facilitate the implementation of a new process which will also publish M+4 / M+13 / Ad-Hoc Meter Data.</p>

Appendix 2 - Market Management System Release J Change requests

Change Request Reference	Change Title	Summary of Change
CR-239	CSB Data Exchange Screen	<p>CR-239 - CSB Resettlement Pre-Calc Report Publication Process Improvements.</p> <p>The Indicative and Initial Bill Case processes are run for one Settlement Day at a time. However, the M+4 and M+13 Bill Case processes are run for an entire Billing week – Sun to Sat.</p> <p>In the current implementation these processes can only be started for one day at a time.</p> <p>Implementation of the change request will make sure that a number of critical pre-calculations can be run for a day range (max 7 days to avoid accidentally starting for a long period).</p> <p>This change request will enable the following reports to be produced for a day range for operational effectiveness</p> <ul style="list-style-type: none"> ▪ ISEM Report: Capacity Market Financial Publication ▪ ISEM Report: Capacity Market Informational Publication ▪ ISEM Report: Capacity Payments By Market ▪ ISEM Report: Capacity Payments By Unit ▪ ISEM Report: Energy Market Financial Publication ▪ ISEM Report: Energy Market Information Publication ▪ ISEM Report: Metered Generation Information Publication ▪ ISEM Report: Over-Under Generation Parameters ▪ ISEM Report: Settlement Report – BALIMB / CRM / MO ▪ ISEM Report: Settlement Statement – BALIMB / CRM ▪ ISEM Report: Metered Volumes By Jurisdiction
CR-226	Registration validations	<p>Incorrect data selection/entry in certain MPI fields has resulted in issues for the settlement system and across the market for Participants e.g., variations in Meter Transmission Type caused major issues for the settlement system resulting in delays to settlement documents.</p> <p>This change request will implement new validation rules in order to avoid the reoccurrence of such issues in the future.</p>
CR-224	Participant user updates in the MPI	<p>When some information is changed a bell icon is currently displayed beside the Party/Participant/Resource/Trading Site name to indicate that it needs the Market Operator's approval.</p> <p>An issue arose when a participant submitted a change to a Trading Site without notifying SEMO at a similar time to SEMO making a registration data change. This caused the settlements systems to go down thus delaying settlement documents.</p> <p>In order to prevent this issue occurring again this change request will display updates by participants to registration data so that SEMO have visibility of the changes</p>
CR-227	End date users in MPI	<p>There is currently no option to end-date a user in the SEMO registration system. An end date field is displayed in the user tab of the user details screen, but this is non-editable. Currently if a user's access is to be revoked, the Stakeholder team will have to log a support ticket to revoke the certificate of the user – this can take up to five days to be actioned.</p> <p>This change request will allow a user to be end dated by the market operator for efficiency.</p>
CR-253	Payment for Energy Consumption in SEM for non-energy Services Dispatch – BM Mod_13_19	<p>Maintaining voltage on the transmission system is critical to ensuring the stability of power flows. Generators (or other devices) either generate or absorb "reactive power" to maintain system voltage.</p> <p>Particular requirements for voltage support are often locational.</p> <p>A generator with the capability of operating in synchronous compensation mode or a wind farm capable of providing reactive power at OMW will consume energy when operating in those modes. However such modes of operation are not currently accounted for in SEM.</p> <p>The TSOs propose that such modes of operation should be modelled in SEM, that non-energy dispatch instructions should be profiled and accounted for as uninstructed imbalances;</p> <p>Implementation of this system change is described below;</p> <p>A flag is sent to settlement to denote the period where a generator unit has been instructed to provide reactive power at OMW, during those periods the energy would be assigned to imperfections, whereas during the trading periods where the unit is not at zero, it would pay for its consumed energy as normal.</p> <p>The flag is in the interface from EMS to MI "INT_25* - DS3 System Services Provider Flag" submitted for Generator Units.</p>

		<p>The MI push to CSB will aggregate the flags for Generator Units within a Trading Site to one flag for the associated Trading Site Supplier Unit (TSSU).</p> <p>If there is a DSU/Autoproducer on the Trading Site, then the flag will be 0 for that TSSU.</p> <p>This will be enabled via the interface from EMS to MI "INT_25* - DS3 System Services Provider Flag".</p>
CR-238	ISEM OUI Global Parameters (ADMIN) changes	<p>There are a number of automated data pushes configured within the SEMO systems. One of the primary Settlement data pushes has been automated to run once a day at 14:30 although it can also be run manually at any stage throughout the day.</p> <p>There are two types of data push processes:</p> <ol style="list-style-type: none"> 1. Automated Standard Push: <ul style="list-style-type: none"> ◆ The system uses the current operation date as a starting point and look back 40 days ◆ All the data with a Trade Date that is within this 40-day window and has an update time between the event start time and time of the previous successful push will be sent to CSB 2. Manual Ad-hoc Push: <ul style="list-style-type: none"> ◆ To enable this data push, the user must specify a trade date ◆ The system uses the current operation date as a starting point and look back 15 days ◆ All the data with a trade date that matches the trade date and an update time within the 15-day window will be sent to CSB <p>Change Required;</p> <ul style="list-style-type: none"> • Create a data push capability (Automated manual Push) to automate the functionality of a manual data push beyond 40 days. • Get the list of trade dates beyond 40 days for the data that was changed in the last 24 hrs. This data needs to be pushed to CSB. • For multiple trade dates that need to be pushed in the same event, data for each trade date will be pushed one day at a time. If the event fails, then manual intervention is needed, and this activity should be completed before the next scheduled event. In this case, the failed event will pick up from the point where it failed/timed out. • A new table is created to capture trade dates, IP re-run dates, process end time, process flag etc. • A new display for the control table and corresponding audit table are created to show which all trade dates are processed.
CR-259	Intermediary option for supplier units in the MPI	<p>As per the decision paper SEM-20-063, supplier units can register under an Intermediary in the market. The Regulatory Authorities have requested this information from SEMO to meet their quarterly reporting requirements.</p> <p>The Resource screen for GEN, DSU, EU has a checkbox to tick "Acting as Intermediary".</p> <p>This is not available for other unit types currently. This change request is proposing to add the same option to the supplier unit resource screen as well.</p>
CR-219a	Penalty Costs in schedulers	<p>This change request updates the penalty cost structure by introducing separate penalty costs for jurisdictional reserves for each reserve category.</p> <p>In addition, a new feature will be added to allow system constraints to have separate tuneable penalty cost functions.</p> <p>These penalty costs are critical to the optimisation of scheduling. Functionality to allow configuration of these penalty costs will enable the TSO to more accurately model the complete set of constraints that exist in SEM.</p>