



SEMO Price Control Submission

Paper 5

Capital Expenditure

1st April 2010

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CAPITAL EXPENDITURE

Capital Expenditure (Capex) is designed to allow SEMO to invest in new and improved systems in order to fulfil its operational and market management requirements. The following four types of Capex have been identified as part of the Price Control:

- Biannual IT Market Release Capex;
- Predictable Business Capex;
- Unpredictable Business Capex;
- Unknown Future Major Market Change Capex.

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CAPITAL ALLOWANCES

SEMO is seeking three capital allowances for:

- Biannual IT Market Release Capex;
- Predictable Business Capex and;
- Unpredictable Business Capex.

The Biannual IT Market Release Capex will be used to facilitate the rollout of Central Market System software releases, the content of which will be approved by the Regulatory Authorities.

A Predictable Business Capex allowance enables SEMO to plan for hardware and software upgrades and the implementation of additional operational support systems (which will increase efficiencies, thereby benefiting Market Participants) as and when the need arises. This business allowance also reduces the administrative burden that has been placed on both SEMO and Regulatory resources for the approval of relatively minor but essential Capex amounts.

Unpredictable Business Capex is required for IT related issues that occur on a daily basis, which cannot be accurately budgeted for but require immediate attention when they arise e.g. hardware failures, additional data storage devices, Digital Certificates etc. It is prudent that SEMO has such a Capex allowance in order to be able to react quickly to system requirements thus reducing the any risk to the operation of the Central Market Systems. This availability will also further reduce the approval resource burden on both SEMO and Regulatory Authorities.

Proposal 1 – Predictable Capital Expenditure

It is proposed that SEMO receive three separate allowances for the following Capex categories:

- 1. Biannual IT Market Release Capex;**
- 2. Predictable Business Capex.**
- 3. Unpredictable Business (IT) Capex**

UNKNOWN FUTURE MAJOR MARKET CHANGE CAPITAL

Future Major Market Changes that cannot be accounted for at this time do not form any part of the Revenue Submission. The Market System Development Plan (MSDP) and the Forward Work Programmes of the respective Regulatory Authorities, however, provide some indication of major projects facing SEMO in the near future. SEMO have outlined its views in Paper 3 entitled Forward Work Programme 2010-13.

It is proposed that SEMO will seek further Capital and Operational allowances as part of the annual adjustment process as and when the Regulatory Authorities make new policy decisions which significantly impact the SEM.

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Proposal 2 – Unknown Future Major Market Change Capital Expenditure

Unknown Future Major Market Change capital expenditure is exclusive of this price control and will be addressed on a project by project basis over the duration of the price control through the annual adjustment process.

BIANNUAL IT MARKET RELEASE CAPEX

SEMO recognises that there are internal and external pressures to implement change in a timely and accurate manner and that an ad-hoc or overly frequent IT release approach is not appropriate. SEMO and Market Participants are of the opinion that a biannual strategy represents a balanced and prudent approach to IT releases. This approach is the standard in similar electricity markets elsewhere. Scheduled IT releases better allow SEMO IT to co-ordinate its resources and retain vendor expertise and support for the CMS. This biannual release strategy has reduced development costs and allowed SEMO to focus on the implementation of key market rules that benefit the SEM and participants alike.

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IT RELEASE CAPEX

SEMO has negotiated six biannual releases over a period of three years, commencing with the April 2010 release until October 2012. Each release guarantees 6,125 hours of billable work for the software vendors as specified in a formal contractual agreement (the April 2013 release payments are assumed to be consistent with the previously negotiated releases). The total minimum commitment for the three year period will be 36,750 hours. The dates for the biannual delivery of the releases to SEMO will fall in April and October of each year. The schedule may be readjusted by mutual agreement of SEMO and ABB based on project developments during the year. Each release will cost €1,133,125. There is a three year rate lock for the entire contract, translating to a total contract value of €6,798,750, which is dependent on the minimum commitment of hours stated above. Any additional hours will be subject to adjustment based on currency fluctuation. The table below outlines the schedule of payments.

Release Date	Payment €
Oct-2010	1,133,125
Apr-2011	1,133,125
Oct-2011	1,133,125
Apr-2012	1,133,125
Oct-2012	1,133,125
Apr-2013 ¹	1,133,125
Total Release amount	6,798,750

Table illustrating the IT Release Schedule

Proposal 3 – Biannual IT Market Release Capex

**The proposed Biannual IT Market Release capital expenditure for the duration of the price control is
€6,798,750**

¹ For the purpose of Capital Allowance SEMO have assumed the same price going forward

IT RELEASE SUPPORT CAPEX

IT Release support Capex is required on an annual basis. The following support/release categories are necessary for all scheduled IT Releases

Travel and Subsistence Costs for SEMO staff to witness Factory Acceptance Testing (FAT) of the new software applications at the vendor site. Factory Acceptance Testing is a test phase where the vendor demonstrates that they have met SEMO requirements before SEMO deploys the applications on our own installation and commit significant resources to a full System Integration Test Phase. The necessity of a FAT test phase is "scope dependent" and would apply to significant software releases.

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Subcontractor Costs - costs of modifications to the SEMO Market and Corporate Finance application (Axapta) which has been implemented in conjunction with Bearing Point. The costs associated with the three year vendor agreement apply to software changes to the suite of applications delivered by our Prime Contractor (ABB) and ABB's sub-contractor (Navita) - these include MA, MI, UUC, RCUC, Settlements and TRM. The Finance System is not subject to regular change and any changes implemented in the recent past have been minor in nature.

ABB US on Site Support relates to support provided by our vendors leading up to, and during, deployments. Vendor support of this nature is required particularly where a release incorporates upgrade to third-party software components on which the applications are deployed. In addition, SEMO requires vendor support from the US to support these deployments in an effort to mitigate risks to the Central Market Systems arising from unexpected issues for which vendor expertise is required.

Testing System Support relates to the costs associated with the procurement of additional test resources for releases of a significant nature. The nature of the biannual release strategy means that the test phase of one release and the requirements gathering of the next release are activities that are being executed in parallel. This will result in peaks of workload for which SEMO requires the ability to address from a temporary resource perspective. In addition certain releases will require specialised testing (e.g. performance testing) for which SEMO cannot justify retaining a full time staff member - these costs also seek to address this requirement.

ABB Upgrades - Our vendors are constantly seeking to improve their standard application suite and, as part of a natural systems evolution cycle, upgrade their applications to provide more functionality which in turn will deliver more efficiencies in how the applications are operated and managed. SEMO sees the benefit of following our vendors upgrade path as there is potential for significant improvements in the operability and maintainability of the Central Market Systems.

Release Related Capex	2010-11	2011-12	2012-13	Amount €
FAT Testing travel and subsistence	€70,000	€70,000	€70,000	€210,000
Bearing Point System Release	€40,000	€40,000	€40,000	€120,000
ABB US on site support	€50,000	€50,000	€50,000	€150,000
Testing System Support	€90,000	€90,000	€90,000	€270,000
ABB Upgrades	€200,000	€300,000	€300,000	€800,000
Total IT Release Support amount	€450,000	€550,000	€550,000	€1,550,000

Bi-annual IT Release Support Capex

Proposal 4 – IT Release Support Capex

The proposed IT Release Related Support Capex for the duration of the price control is €1,550,000

The table below gives a breakdown by year of the total IT Release related Capital Expenditure for the next 3 years. This total figure excludes any major market changes which may require further expenditure.

Description	2010-11	2011-12	2012-13	Amount €
Bi-annual IT Market Release	2,266,250	2,266,250	2,266,250	6,798,750
Bi-annual IT Market Release Support	450,000	550,000	550,000	1,550,000
Total Release amount	2,716,250	2,816,250	2,816,250	8,348,750

Total Bi-annual IT Market Release Capital Requirements

PREDICTABLE BUSINESS CAPEX

A Predictable Business Capex allowance enables SEMO to plan for hardware and software upgrades and the implementation of additional operational support systems as and when the need arises.

PREDICTABLE BUSINESS CAPEX BUSINESS CASES

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The sections below give a brief synopsis of the individual Predictable Business Capex business cases. There are a total of 17 business cases which address the likes of IT infrastructure requirements, the need for additional operational support systems, reporting requirements, data storage, system monitoring tools etc. The detail of each business case can be viewed in Appendix 1.

1 HARDWARE UPGRADE

The SEM systems are built on multiple heterogeneous physical hardware components and are essential to the running of the All Island Electricity Market. These hardware components are based in two server rooms across two sites (Dublin and Belfast) and consist of over 120 servers, 4 Storage Area Networks (SANS), Tape Libraries and Network Devices.

Hardware replacement/upgrades are required for the following reasons:

- Downtime is expensive and affects industry confidence in SEMO;
- Maintaining an aged hardware infrastructure is generally more expensive;
- New/upgraded applications require greater hardware resources;
- Equipment wears out.

If SEMO does not go ahead with the market refresh participants are exposed to:

- Reduced Central Market System performance (downtime and outages);
- Increased support costs due to aged hardware;
- Reduced IT staff productivity in supporting legacy architecture;
- Reduced industry confidence in SEMO's ability to run the market;
- Inflexible architecture that will lead to difficulties in software upgrades.

2 SYSTEM MONITORING - REPORTING

SEMO does not currently have in place any monitoring process for its market systems or corporate infrastructure. It is operating on a reactive basis when issues arise and on daily manual checks on availability and performance. This is not an optimal use of SEMO resources which could be better focussed on database enhancements/development thus improving performance. Given the importance of the market systems being available and the sensitivity of the information the systems contain, it is critical that SEMO implements a

system monitoring and reporting tool that supports improving availability and performance across IT systems. A System Monitoring Tool will help:

- Increase the availability and improve the performance of the market systems;
- Maximise the output of IT resources allowing them to focus on development rather than maintenance;
- Provide a more secure infrastructure by detecting unauthorised access;
- Ensure the optimal configuration and usage of Central Market Systems.

3 SYSTEMS MANAGEMENT

SEMO does not currently have in place a structured/formalised approach to its systems management. The industry standard approach is to implement a systems management tool for provisioning, configuration management, monitoring, automating, patch management, release management and server administration. Without tools in place to facilitate these activities, systems management is performed on an adhoc and reactive basis and in a manner that does not utilise the SEMO resources in the most effective manner. SEMO notes that a number of systems management software packages are already available on the market, allowing all of these key activities to be automated, which can facilitate a proactive systems management strategy for the SEM systems. SEMO needs to implement an Enterprise Wide Infrastructure Management tool to enable overall cost reduction, improve governance and compliance, and provide greater agility for the market systems going forward.

Without an effective and robust systems management process in place, SEMO's IT operations will not be functioning to its full potential. All tasks will continue to be manual and will be continue to allow discrepancies and inaccuracies between environments. A system management tool will streamline the current environment management process.

4 VIRTUALISATION

The possibility exists for SEMO's corporate infrastructure to be hosted on virtual machines. A virtual infrastructure allows for physical resources of multiple machines to be pooled and shared across SEMO's entire infrastructure. These resources can be configured to serve high priority applications depending on business needs as and when these evolve and change. Resource optimization allows greater flexibility in the distribution of data and could result in reduced capital and operational costs. An infrastructure that can scale up and down against business demand reduces the number of physical servers needed and enables fast and flexible provisioning of new servers. SEMO is focused on investigating new ways to reduce its overall IT costs and believes savings can be made by adopting a virtualization strategy.

5 ORACLE LOGGING

Since the creation of SEMO, auditors have consistently identified that SEMO's inability to perform logging is a compromise/issue that needs to be addressed. They have stated that there needs to be the following types of logs kept by the SEM:

- Security
 - Authentication – confirming the validity of the user and that they are accessing the network from no more than one site;
 - Authorisation – confirming whether the user has the appropriate level of access;
- Tracking/audit trail for historical market events so that ad-hoc queries can be addressed more effectively.

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Implementing a logging tool will give SEMO the ability to react to security breaches in real time.

6 SHAREPOINT DEVELOPMENT (CHANGE MANAGEMENT)

To improve the operation of the market and to implement policy decisions, a large number of changes to the Market Rules and/or Central Market Systems have been and continue to be raised. Proposed change requests must be logged, impact assessed, priced and prioritised in a coherent manner. Market changes may be classified as:

- (a) Market Rules changes with or without Central Market Systems impacts; or
- (b) Change Requests which have no impact on the Market Rules, but impact the Central Market Systems or internal business processes.

Currently various SEMO departments each maintain their own sets of information relating to changes. It is important that a single set of information pertaining to changes is centrally maintained and kept up to date. The proposed Change Management System would store all Change Requests, impact assessments, presentations, minutes, emails and any other related documentation pertaining to market changes. It would provide a single interface through which all end users could view and edit tasks and track any issues associated with a Change Request. The proposed Change Management System could also provide a mechanism for prioritising and costing of changes, improve inter-departmental communications and provide a full audit trail for a particular Change Request. This would provide evidence of the transparency of SEMO's business dealings and thereby enhance visibility and understanding of the change process for external stakeholders.

7 DATA STORAGE – FILE MANAGEMENT

Currently there is no centralised location for all SEMO related documentation. Files can be stored in any number of places: employee email, employee hard drive, file share etc, resulting in duplication of documentation and difficulties in locating files. The lack of a central data storage facility makes it difficult for employees to find, share, and collaborate effectively on content and valuable business information.

SEMO requires a centralised document management system that will facilitate the storage and organisation of documents and the sharing of these documents within the organisation. Microsoft Office Sharepoint Server 2007 will provide this core functionality that would enable SEMO to:

- Store, organize, and locate documents;
- Manage consistency and version control of documents;
- Help protect documents from unauthorized access or use;
- Enables collaboration between SEMO departments.

8 DATA WAREHOUSE

Data warehouses are a way for business users, typically managers and decision makers, to extract information quickly and easily in order to answer questions about their business. Data warehouses are designed to answer comparative and "what if" questions. Unlike operational databases that are set up to handle transactional data, data warehouses are analytical, subject-oriented and are structured to aggregate transactions as a snapshot in time.

Data warehouse tools look for hidden patterns that can be used to predict future behaviour. Data mining helps discover previously unknown relationships using discovery-based approaches in which pattern-matching and other algorithms are employed to unveil key relationships in the data. Data mining algorithms can look at numerous multidimensional data relationships concurrently, highlighting those that are dominant or exceptional. The acquisition of a data warehouse is important because it will enable:

- Business analysts to perform a greater level of detail of analysis of the data without concerns about corrupting the data or having a limited window to operate in;
- Constant availability –not dependant on market systems being online;
- Key re-usable reports to be made readily available;
- Reduced maintenance requirements;
- Dashboards to be configured for senior management review as per their requirements;
- As the SEMO website develops further, the data warehouse could legitimately provide data/metrics to the site.

SEMO currently does not have a data warehouse. This is an issue for the operational groups (Market Operations, Business Analysts, Functional team) in relation to their ability to analyse data.

9 REPORTING DATABASE UPGRADE

SEMO IT has built its own reporting database enabling business users to have real time access to production data without the danger of corrupting data directly in production. Each of the users has read only access. The main users of the database are, Business Analysts, Functional Analysts, Market Operators and Ancillary Services in EirGrid.

The reporting database was originally made available by SEMO IT on the premise that there were to be no critical services/business operations to be built off the database. This requirement has since been changed and there are day-to-day operations depending on the availability of the database in order for them to fulfil their roles. Currently, the reporting database is run on a single instance. There are no backups available and therefore in the event of an emergency, if the database was to be made unavailable, there would be no alternative source of information for the various business users. Whenever this event does occur, it causes a major problem for both the IT and Operations groups who work to bring the database back online in a timely manner.

The reporting database is used for the following:

1. Management reports on a fortnightly, monthly, quarterly and annual basis;
2. Verification processing of settlement data for completeness;
3. Performing market studies throughout the year;
4. Bi-Annual Market Audit by Deloitte – requirement to provide blocks of data.

There is a requirement to upgrade the reporting database as well as the Oracle licence to give enhanced CPU and memory availability. The resultant performance improvements would greatly benefit the business users.

10 ORACLE DB SERVER VERSION 2

As data demands increase there is a need for greater availability and performance of the market systems to support the ongoing needs of Market Participants. It is therefore imperative that the database is upgraded to facilitate these needs. Under the current design it is not possible to meet the future requirements of participants.

The existing SEMO database server will no longer be supported by DELL as it's lifecycle is due to expire in the next year. The current model in use is a DELL 2950 and the level of support currently being provided by DELL is less than satisfactory. Continued growth in data has meant the current database is struggling to maintain acceptable performance and requires significant maintenance from SEMO IT DBAs.

11 NEW COMMUNICATION LINKS

The Market Operator IT sites (Belfast and Dublin) are connected via two 34 MBps links. Internal SEMO users connect to the active systems (in Belfast or Dublin) using the links as an internal LAN. These links are also used for IT systems communications, database and data replication, and systems monitoring and support requirements. SEMO is responsible for supplying the links to support the specification as described above.

The use of the 34 MBps links has been steadily increasing over the past 18 months and this is now affecting the operations of the Central Market Systems. The Oracle database is the heaviest user of the links and as the database continues to grow so will its need for bandwidth on the links. The loss of one link, which has occurred on a number of occasions, results in the considerable reduction in performance of all systems. Examples of the problems experienced include:

- TSO and Market Participants unable to submit bids;
- SEMO users unable to carry out day to day tasks through Citrix (i.e. email, write documents settlements runs etc.);
- Applications become unusable due to slow performance;
- Database grinds to a halt affecting the operation of Central Market Systems.

Increased use of the links by other existing applications (CMS Database) and new systems (enduring SEMO website) will further exasperate this problem and severely affect SEMO's ability to provide fully available and reliable Central Market Systems.

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Whilst the upgrade of the links is proposed to take place in summer 2010 further investment is expected in 2012-13.

12 CMS PRE PRODUCTION ENVIRONMENT

During the biannual deployment windows (April and October) the functional team requires three different environments to perform their testing and defect management. This puts a massive strain on the environmental resources available to the group. SEMO cannot compromise its test effort due to environmental constraints as the implications for the market are far too significant, and similarly the market analysis team need to continue their operational research.

Currently demand for pre-production environments is greater than availability. Within SEMO there are a number of different groups requiring access to a copy of the production environment in order for them to complete their day-to-day work. Currently only the IPT environment meets this requirement. However, at this time no performance testing is possible as the only environment that mimics the production platform is constantly in use by various groups for critical work. Not being able to carry out performance or stress testing is a major risk for the Central Market Systems.

As the Market Participants become more demanding and SEMO looks to increase the quality of its customer interaction, it is imperative that the necessary support structures exist to adequately test, diagnose, and investigate issues and proactively manage releases.

13 AXAPTA UPGRADE

The Axapta system is a core part of the Central Market Systems and is used to Manage Market Finances. The Axapta system is used to reconcile bank accounts and process cash receipts, maintain market ledgers, manage collateral and bad debt, manage market currency exposure, keep accounting records for Market Finance, the preparation of financial reports and the processing of payments to market participants.

The current Axapta system is based on version 3.0 of this Microsoft technology and requires an upgrade as Microsoft no longer provides support for this version. If the Axapta system were to develop a defect that is platform related (and therefore cannot be resolved until the system is upgraded) SEMO would not be in a position to operate the market.

14 ON-LINE HELP SYSTEM

Currently, parties wishing to raise an issue or a query with SEMO must telephone or email the SEMO Market Helpdesk. Stakeholders making follow-up inquiries on existing calls must progress their queries in the same fashion. Approximately 20 calls are created daily in the SEMO Helpdesk tracking tool, however, on any given day numerous additional calls are made by stakeholders inquiring about the status of open queries. SEMO wishes to reduce the number of contacts made by stakeholders to the Market Helpdesk, and believes this would be best achieved through the implementation of an on-line help system. The system would allow external stakeholders to submit a new query view the status of any existing queries through the SEMO website and in their own time, without having to make direct contact with SEMO.

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In order to achieve this, an area on the SEMO website is required to integrate SEMO's internal query tracking tool and to provide an on-line resource for stakeholders to submit, view and track queries that have already been raised. The implementation of an on-line help system would reduce the number of direct inquiries handled by the Market Helpdesk and would enhance SEMO's profile with stakeholders with regard to the progressing of queries.

15 ELECTRONIC FAX SOLUTION

Fax communication is defined in the Trading and Settlement Code as one of the three valid communication channels, and is a vital form of communication in the SEM. As part of market communications SEMO sends and receives a large number of different fax communications. All outgoing fax communications are currently prepared, printed and faxed manually. All incoming communications are received, scanned, and filed manually. The current manual processes for fax communications has the potential for error or omission, may not be timely enough in certain circumstances, is difficult to co-ordinate across dual site operations, is open to security (of confidential information) breaches, and does not provide auditable permanent records of incoming or outgoing communications.

While missing fax confirmations have been highlighted in previous audit reports, SEMO resources could be better utilised in ensuring core market functions are completed on time rather than manually managing fax transmittals. Therefore a need exists for an integrated electronic fax solution. The integrated electronic fax solution can receive and send faxes electronically, has the capacity to deal with business-critical time-dependent events such as Limited Communications Failure (LCF) and General Communication Failure (GCF) faxes, can send faxes to a single recipient or distribution list, can be viewed in electronic format by users in either the Dublin or Belfast, provides an audit trail of communications, can confirm successful transmission of all faxes sent, and can provide a secure environment for the receipt and storage of faxes thus reducing the risk of commercially sensitive data being lost.

16 ON-LINE REGISTRATION SYSTEM

The existing SEM registration process was devised ahead of market go-live in 2007. Since then SEMO has received feedback on the registration process from a number of stakeholders including new and existing participants registering Parties and Units, as well as the TSOs, MDPs and SEMO internally. This feedback has identified the following difficulties with the current process:

- Confusion on the part of Applicants when completing the pack due to the complex nature of the data required;
- Poor validation of the registration pack prior to submission;
- Poor version control and file management;
- Significant administrative overhead for SEMO;
- Inefficient dissemination of relevant information from the pack to TSOs and MDPs;
- Difficulty in converting applications into Market and TSO/MDP system setup.

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A business need has been identified for an online registration system and associated document management functionality to replace the existing inefficient and error prone manual registration process. This would simplify the process both for Market Participants and Other Parties involved (SEMO, TSOs, MDPs), and significantly improve the process as a whole. The online registration system should decrease the workload for new participants entering the SEM and make the registration process less daunting and more transparent to participants.

17 TRAINING ENVIRONMENT (INTERNAL)

Currently there are no training environments available in SEMO to train new hires or rotating staff in functions such as Pricings and Scheduling, Settlement, Funds Transfer and Credit Management etc. It is essential that additional Market Application environments are made available to allow SEMO to optimally train staff and thus reduce the potential of operational issues in the live systems. Without this environment there will always be the risk that issues could arise in the production environment due to a lack of experience on behalf of the trainee. Because staff rotation is key to ensuring that all functions of the market can be carried out in a contingency situation, there will always be a significant amount of training occurring, and for this reason a new environment along with better training will always be relevant and in the long run will reduce the cost to the market.

SUMMARY OF PREDICTABLE CAPEX

No	Predictable Capex Item	2010-11	2011-12	2012-13	Total €
1	Hardware Upgrade	1,190,000	530,000	530,000	2,250,000
2	System Monitoring Reporting	100,000			100,000
3	Systems Management	100,000			100,000
4	Virtualisation	30,000	30,000	10,000	70,000
5	Oracle Logging	120,000			120,000
6	Sharepoint and Document Management	100,000	60,000	40,000	200,000
7	Data Storage	70,000	30,000		100,000
8	Data Warehouse		200,000	100,000	300,000
9	Reporting Database Upgrade	150,000			150,000
10	Oracle Database Server Version 2		1,500,000		1,500,000
11	New Communications Links			2,000,000	2,000,000
12	CMS Pre Production Environment (IPT)	700,000			700,000
13	Axapta Upgrade	120,000		120,000	240,000
14	On-Line Help System		300,000		300,000
15	Electronic FAX Solution	100,000			100,000
16	On-Line Registration System	400,000			400,000
17	Training Environment (Internal)	250,000			250,000
	Total	3,430,000	2,650,000	2,800,000	8,880,000

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Summary of costs and timelines for the Predictable Business Capex

Proposal 5 – Predictable Business Capex

The proposed Predictable Business Capital allowance for the duration of the price control is €8,880,000

UNPREDICTABLE BUSINESS CAPEX

There is a requirement to have a level of unplanned spending in a given time period. This spending can arise out of failing or obsolete software components; new business requirements that demand a different set of components; the availability of new products on the market that would address longstanding issues; or the fact that a software upgrade on one side of the business may mean that existing software on another side may be incompatible. An IT department needs to have the flexibility/agility to react to any of these changes in a timely fashion so that normal service can be provided to its stakeholders (see Business 18 Appendix 2).

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The capital allowance for 2009-10 has proved insufficient to meet the day to day needs of SEMO. SEMO foresees that Unpredictable Business Capex will continue to be required into the future and is proposing an annual allowance of €250k be added to SEMO's overall Capex allowance.

Proposal 6 – Unpredictable Business Capex

It is proposed that SEMO be provided with an Unpredictable Business Capital allowance of €250,000 per annum for the duration of the price control.

CAPITAL EXPENDITURE SUMMARY

A summary of the Capital Expenditure proposed by SEMO Business and IT Release Capex for the new tariff period covering Oct 2010–Sept 2013 is as outlines in the table below.

Capex Category	2010-11	2011-12	2012-13	Total
Biannual IT Release Capex	€2,716,250	€2,816,250	€2,816,250	€8,348,750
Predictable Business Capex	€3,430,000	€2,650,000	€2,800,000	€8,880,000
Unpredictable Business Capex	€250,000	€250,000	€250,000	€750,000
Total proposed Capex Allowance	€6,396,250	€5,716,250	€5,866,250	€17,978,750

Summary Capital Expenditure

REGULATORY ASSET BASE

The value of the Regulatory Asset Base (RAB) now includes the last two biannual releases (October 2009 and April 2010) and the website project. Additional Capex items for Biannual Market Releases and Predictable Business Capex are to be added to the RAB as and when they are realised but have been provided for on an assumption of the timing of their incurrence. These two capital amounts have been included in the Revenue Submission and are reflected in the Total Revenue Requirement.

SEMO assets are subject to a straight-line depreciation over a five year period. The valuation of the RAB has been calculated by taking the historic (acquisition cost) value of the assets, revaluing them to nominal values using inflation, and applying straight-line depreciation.

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COST OF CAPITAL

The cost of capital determines the allowed return on the RAB. SEMO proposes that it continues with the existing Weighted Average Cost of Capital (WACC) mechanism which blends the two System Operator WACC values in a 75:25 ratio when determining the cost of capital and a separate paper has been prepared and submitted on same. The value of the WACC will therefore be determined by the Commission and NIAUR in the respective SO Price Controls.

ASSESSMENT OF THE ASSET BASE

The value of the SEMO RAB as at the end of September 2009 was €26,226,287 (based on SEM Establishment €19,827,992 and Day 1+ €6,398,295). The SEM Establishment figure is the Net Book Value based on the Asset Value determined in the 2009-10 Price Control Decision Paper (SEM-09-089)). The Day 1+ figure is the Net Book Value based on the Final Regulatory approved amount including IDC and inflation.

In 2009/10 additional assets were added to the SEMO RAB at an estimated value of €2,859,493 (the final value has yet to be agreed with the RA's). As a result SEMO has used this value in calculations for the Price Control Submission.

Assets going Live in 2009/10	Amount €	Go Live Date	Depreciation to Sep 10	NBV at 01.10.2010
SEMO IT CAGS - Novosco	8,494	Sep-09	1,557	6,937
October Release	135,077	Oct-09	27,015	108,062
Folding Machine	13,700	Apr-10	1,370	12,330
Website	702,044	Jun-10	46,803	655,241
April Release	1,133,125	Apr-10	113,313	1,019,813
Additional Costs April Release (recertification)	13,000	Apr-10	1,300	11,700
SAN	376,431	May-10	31,369	345,062
Sharepoint Infrastructure Upgrade	57,610	May-10	4,801	52,809
Hardware Replacement	13,712	Apr-10	1,371	12,341
Links Upgrade - estimate ²	400,000	Aug-10	13,333	386,667
Disks for IBM Servers RCUC	6,300	Apr-10	630	5,670
Total Assets going Live in 2009/10	2,859,493		242,863	2,616,630

Additional Assets added to the RAB in 2009-10

The value of the Regulatory Asset Base in October 2010 is outlined in the table below.

Summary	RAB Value at 01 October 2010
SEM Establishment	€19,827,992
Day 1+	€6,398,295
Capital Expenditure 2009-10	€2,616,630
Opening RAB Value October 2010	€28,842,917

Value of SEMO RAB in October 2010

DEPRECIATION

TREATMENT OF NEW CAPITAL INVESTMENT

Figures for Major Market Capital Projects are to be submitted for approval separately. Interest during construction (IDC) will apply where EirGrid and SONI carry the cost of financing capital expenditure. The rates of IDC should be based upon the opportunity cost of capital for the business.

VALUE OF DEPRECIATION FOR NEW TARIFF PERIOD

² The upgrade to the communications link is anticipated to be operational in the summer of 2010. Capital approval to be sought from Regulatory Authorities.

The two key areas of capital spend are related to the SEM Establishment Costs and the Day 1+ Project. The calculations of depreciation are detailed in Appendix 3. Depreciation in year 3 drops dramatically as SEM Establishment project will have been fully depreciated by 2011-12.

Summary	2010-11	2011-12	2012-13
Depreciation Charge	€12,835,000	€13,927,000	€6,627,000

INTEREST PROVISIONS

In the Decision Paper for the initial SEMO Revenue and Tariffs Period (Section 6.1.10); the Regulatory Authorities decided that working capital provided by the parent companies should be consistent with that currently provided by the parent companies while carrying out their TSO functions.

Working capital provided by the parent companies to cover fluctuations during the tariff period, and allowed under-recovery of revenue during the tariff period, will be paid back in the subsequent tariff period(s) with the appropriate amount of interest.

In the current tariff period working capital has been provided by the parent companies on a 3:1 basis. This means that the “Euribor rate” will be applied to three quarters, and the “Northern Bank Limited” rate will be applied to one quarter, of the working capital provided. We would continue to have concerns that this does not necessarily provide a true reflection of the opportunity cost of capital to the company for any such over/under recoveries.

WEIGHTED AVERAGE COST OF CAPITAL

See paper submitted by EirGrid

APPENDICES

APPENDIX 1 PREDICTABLE BUSINESS CAPEX BUSINESS CASES

This appendix consists of 17 business cases for the predictable business capital expenditure for the three years of the price control. Each business case outlines the issues SEMO are encountering, the risks of not addressing these issues and the benefits of implementing the Capital projects. These business cases outline the nature of the capital investment, the cost and the year of implementation.

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1 HARDWARE UPGRADE

Resource Title (Vacancy Title/ System Name)			
Hardware Upgrade			
2010-11	2011-12	2012-13	Total €
1,190,000	530,000	530,000	2,250,000
Problem Statement			
<p>The Single Electricity Market systems are built on multiple heterogeneous physical hardware components and are essential to the running of the All Island Electricity Market. These hardware components are based in two server rooms (Dublin and Belfast) and consist of the following major components:</p> <ul style="list-style-type: none"> • Over 120 servers <ul style="list-style-type: none"> ○ Dublin 80 ○ Belfast 40 • 4 Storage Area Networks (SAN) <ul style="list-style-type: none"> ○ Combined Storage of 50TB • 4 PowerVault ML6000 Tape Libraries <ul style="list-style-type: none"> ○ Combined Storage 128TB • 40 Network Devices <ul style="list-style-type: none"> ○ Cisco and Nokia Firewalls ○ Cisco Routers & Switches • Other devices <ul style="list-style-type: none"> ○ Coyote load Balancers, Ironport spam filters, Time Servers etc. <p>A full Hardware refresh programme is required for the following key reasons:</p> <ol style="list-style-type: none"> 1. Equipment wears out - Power supplies, hard disks, motherboards, displays, and other components will fail over time. Due to a combination of Electrical surges, mechanical failures and planned obsolescence, PCs, servers, network components, and other business-critical items performance will 			

dramatically decrease over time and so this equipment must be replaced.

2. Downtime is expensive - Older equipment fails more often. Outages and downtime will affect industry confidence in SEMO. It takes time to diagnose failures, identify appropriate fixes, obtain replacement parts, replace the failed component, and then test the repair. Outdated hubs and routers are decommissioned for a reason as they are either too slow, failed to operate properly, or no longer meet the organisation's needs.
3. Maintaining an aged hardware infrastructure will end up costing more – During the final years of its lifecycle, while there is no capital expenditure, the support costs will exceed the capital cost benefits of not replacing the hardware. Additionally, in the long run older systems will cause increased costs due to lost efficiencies, compatibility issues, service and maintenance, and downtime.

Dell has a policy of providing support for hardware up to 5 years after purchase. After this time SEMO would be forced to find another vendor to continue supporting these systems. This would be both costly and difficult to manage. The majority of SEMO systems were purchased in 2006 and will therefore reach end of life from 2011 onwards (i.e. within the 3 year price control).

4. New/Upgraded applications require greater resources – As the market systems are upgraded and added to (i.e. newer versions of Axapta, Oracle and new server platforms), these technologies have greater hardware requirements than the older platforms they replace. Failure to invest appropriately in hardware will result in failure to benefit from the efficiencies that many of the new software applications will deliver.

Business Need Statement / Objective

The SEM systems hardware are core infrastructure components of the Central Market Systems and are essential to the secure, reliable and efficient running of the All Island Market for Electricity. In the coming years, if the SEMO infrastructure is to have capacity to efficiently handle the increasing demands placed on it, then this refresh is an essential input into this strategy/approach. The following components will need to be upgraded:

- Servers
- RACs
- Hardware
- SANs
- Firewalls
- Routers & Switches

Strategic Benefits

- Continued availability of the Central Market Systems to participants in a robust and reliable infrastructure that will deliver performance efficiencies upon implementation of the upgraded hardware
- Operational Cost reductions will be realised due to time-saving on maintenance and support of many new software applications.
- Support Costs Reduction - Over the medium to long term, less maintenance of the infrastructure will be required
- Capacity efficiencies/Scalability – more up-to-date hardware will allow more complex/structured software to be housed
- New hardware will enable software improvements and upgrades more easily

- Upgraded infrastructure will enable business growth/expansion in coming years
- More up-to-date servers should experience less outages/downtime due to alerts that report hardware malfunction or abnormality as well as improved redundancy.

2 SYSTEM MONITORING REPORTING

Resource Title (Vacancy Title/ System Name)			
System Monitoring Reporting			
2010-11	2011-12	2012-13	Total €
100,000			100,000
Problem Statement			
<p>With any complex IT infrastructure, it is essential that an organisation has the ability to monitor activity and performance easily and to highlight potential issues before they cause wider problems. This is of particular importance to any organisation that has external facing systems that customers are reliant on to interact with. Currently, SEMO has a basic monitoring process in place for its market systems and corporate infrastructure that entails executing several manual steps by the DBAs. In the existing set up, the monitoring and reporting are performed on a reactive basis when issues arise and need investigation. Additionally, there are several processes that are subject to execution daily when the DBAs are reviewing various logs to check on availability and performance.</p> <p>These manual checks are not an optimal use of the SEMO IT resources time. As per the industry standard, this process should be completely automated, and the SEMO IT resources should only be required to intervene when an issue is highlighted. SEMO IT resources should be focused on Database issue resolution as well as the essential bi-annual deployments.</p>			
Business Need Statement / Objective			
<p>SEMO need to implement/ purchase a system monitoring and reporting tool such as Microsoft's System Center Operations Manager (SCOM). SCOM is an end-to-end service management solution that supports improving availability and performance across IT systems. With this in place, SEMO will realise the benefits of automated monitoring, alerting and reporting and will adopt a proactive approach to identifying and resolving issues that will help to maintain the market systems availability to the market participants.</p>			
Strategic Benefits			
<p>With the implementation of an Application monitoring and reporting tool the following benefits could be realised:</p> <ul style="list-style-type: none"> • Fault - This type of monitoring is primarily to detect major errors related to one or more components. Faults can consist of errors such as the loss of network connectivity, a database server 			

going off line, or the application suffers a Java out-of-memory situation. Faults are important events to detect in the lifetime of an application because they negatively affect the user experience for the market participants.

- Performance - Performance monitoring is specifically concerned with detecting less than desirable application performance, such as degraded servlet, database or other back end resource response times. Generally, performance issues arise in an application as the user load increases. Performance problems are important events to detect in the lifetime of an application since they, like Fault events, negatively affect the user experience for the market participants.
- Configuration - Configuration monitoring is a safeguard designed to ensure that configuration variables affecting the application and the back end resources remain at some predetermined configuration settings. Large environments with several machines, or environments where administration is manually performed, as is the case for the market systems, are candidates for mistakes and inconsistent configurations. Understanding the configuration of the applications and resources is critical for maintaining stability.
- Security - Security monitoring detects intrusion attempts by unauthorized system users.
- Non-application specific - Application monitoring tools are generally “out-of-the-box” solutions and so are not developed for anything more specific than the Java language and WebSphere Application Server environments. This means that they can be simply “plugged-in” to any infrastructure
- Reusability - Application monitoring tools are written to generically capture data from any application so can capture data for a variety of applications as they come online.
- Reliability - application monitoring tools from major vendors are generally subject to extensive testing and quality assurance for high volume environments.
- Understandable results - Consolidation of data will occur at a central console, and the results can be readily understood by a systems administrator.
- Cost – Obviously, there is the initial expenditure of procuring such a tool, but there is also the very real possibility of eventual cost savings - particularly in terms of time and resources.

Risk Analysis

Given the criticality of the market systems being available, it is essential that SEMO IT adopt a proactive approach to their systems monitoring. In the current set-up, which is reactive and manual, resource constraints ensure that it is not possible to review every facet of the infrastructure on a daily basis. With the implementation of a monitoring and reporting tool, the systems analyst would be able to work through the issues as they arise and before they become major issues that could affect the availability of the market systems for the participants. Additionally, with the current ageing SEMO infrastructure and the increasing demands that are put on it, it is of utmost importance that the performance is being constantly monitored. Automated reporting will also allow the IT team to set KPI's on key infrastructure components and analyse trends in performance and reliability.

What Data / Information Supports your risk assessment

The manual monitoring process that is currently in use requires deep specialist knowledge of the whole IT infrastructure. With the implementation of an application monitoring tool, it will enable reports to be reviewed rather than the code that sits behind it. Also, SEMO personnel are spending significant amounts of time digging through the logs to find the cause of issues. With a monitoring tool these steps would be automated and would reduce the amount of rework required.

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Business Benefit / Justification

- Increased availability of the market systems as issues will have been investigated earlier than before and prior to them becoming critical. This will also result in improved confidence of market participants
- Improved performance of the market systems will be possible as adjustments can be made to the IT infrastructure based on a deep understanding of performance metrics and what drives these.
- Better utilisation of IT personnel to focus on deployments and issue resolution rather than maintenance
- System monitoring will result in a more secure infrastructure as erroneous users will be identified proactively
- If SEMO infrastructure is being upgraded in the coming years, then it is essential to implement a monitoring tool to ensure the optimum use of these systems
- Metrics/Dashboards will be available for management review on a daily basis – facts can be published to the market if required to prove performance.

Anticipated Outcome

A software package such as Microsoft's System Center Operations Manager or similar to be implemented. In order to achieve the daily info publishing metrics of 99%, as set out by the regulator, the implementation a monitoring tool will contribute significantly to this.

3 SYSTEMS MANAGEMENT

Resource Title (Vacancy Title/ System Name)			
Systems Management			
2010-11	2011-12	2012-13	Total €
100,000			100,000
Problem Statement			
<p>SEMO does not currently have in place a structured/formalised approach to its systems management. The market/industry standard approach is to implement a systems management tool for provisioning, configuration management, monitoring, automating, patch management, release management and server administration.</p> <p>Without tools in place to facilitate these activities, systems management is performed on an ad hoc/reactive basis and in a manner that does not utilise the SEMO resources in the most effective manner. With so many different systems management software packages on the market, all of these key activities can be automated and can facilitate proactive systems management.</p>			
Business Need Statement / Objective			
<p>SEMO need to implement an Enterprise Wide Infrastructure Management tool to reduce resource costs, improve governance and compliance and provide more agility going forward for the market systems. Given the high profile nature and sensitivity of these systems, it is key that the management of the infrastructure is performed in as formalised manner as possible with a structured approach to each activity to enable tracking of system and IT processes effectiveness.</p>			
Strategic Benefits			
<ul style="list-style-type: none"> • Time savings in the provisioning all of servers/environments – this does not just apply to production but also to the pre-production and development environments. • Configuration management – inventory of servers and applications • A systems management tool will facilitate/enable an automated patch management process • Enterprise calendar and maintenance windows – configurable portal pages for current updates – ease of use and clear to senior management • Centralised event management – increased visibility across multiple sites 			

- Automation of routine IT operations – low value add activities in particular
- Can be integrated with email approvals and other business systems e.g. change/project management. This audit trail is of significant benefit.
- In order to benefit from the proposed hardware refresh (subject to approval), the implementation of a systems management tool will allow SEMO to fully realise all of the efficiencies associated with this.

4 VIRTUALISATION

Resource Title (Vacancy Title/ System Name)			
Virtualisation			
2010-11	2011-12	2012-13	Total €
30,000	30,000	10,000	70,000
Problem Statement			
<p>The current infrastructure is duplicated between Dublin and Belfast. There are circa 80 servers in Dublin and circa 40 in Belfast. There are inefficiencies in maintaining such a dual site model:</p> <ul style="list-style-type: none"> • the maintenance of multiple boxes • the rebuilding of components across both sites • disaster recovery • lack of redundancy – there is not an optimum utilisation of resources across both sites <p>This dual site approach contributes to the ongoing IT costs for SEMO. SEMO IT could make cost savings with a more efficient infrastructure set-up that could be facilitated through virtualisation. The scale of servers could be reduced for the service that is being provided. There are hardware and software management savings that could also be realised. Activities such as release management and the rebuilding of environments can take significant amounts of time and could be greatly reduced with the implementation of a virtualisation strategy. For instance, through a simple “drag and drop icon” activity an environment can be reworked or rebuilt.</p>			
Business Need Statement / Objective			
<p>The SEMO IT infrastructure could be hosted on Virtual Machines, the implications of which are as follows:</p> <ul style="list-style-type: none"> • A Virtual infrastructure allows for physical resources of multiple machines to be pooled and shared across your entire infrastructure; • A Virtual infrastructure allows multiple Virtual Machines (VMs) to be created on a single physical computer/host, maximising the use of the physical host; • Resources are shared across multiple virtual machines and applications; • Physical resources of your infrastructure can be dynamically mapped to serve high priority applications depending on business needs — even as those needs evolve and change; • Server infrastructure can be aggregated along with network and storage into a unified pool of IT resources; • Unified pool of resources can be utilized by applications when and where they’re needed; 			

- Resource optimization allows greater flexibility in the organization and results in lower capital and operational costs.

Strategic Benefits

- Greater redundancy and utilisation across both sites – the virtualization package can be configured to ensure this
- An infrastructure that can scale up and down against business demand – moving to a flexible and agile environment
- Reduces the number of physical servers – this will save real estate space costs
- Decrease AirCon and Power Costs due to a reduction in the number of servers to maintain
- Fast and flexible provisioning of new servers in minutes
- Secure – a virtualized infrastructure will have robust security requirements
- Ensuring that the organisation is meeting its Green IT responsibilities
- Greater responsiveness and value from current technologies

Risk Analysis

- Without a virtualization approach, capital expenditure levels will continue to increase at current levels. SEMO should be looking at ways to reduce IT costs in the current environment
- Not meeting Green IT agenda – it is envisaged that eventually there will be a statutory requirement to meet certain Green criteria. There is also the possibility of a grant being available to those organizations who implement a green initiative.
- Inflexibility of infrastructure – SEMO may have space constraints currently that could be overcome with a virtualization strategy.

Business Benefit / Justification

- Server Consolidation and Infrastructure Optimization - Virtualization makes it possible to achieve significantly higher resource utilization by pooling common infrastructure resources and breaking the legacy “one application to one server” model.
- Physical Infrastructure Cost Reduction - With virtualization, we could reduce the number of servers and related IT hardware. This leads to reductions in real estate, power and cooling requirements, resulting in lower IT costs.
- Improved Operational Flexibility & Responsiveness - Virtualization offers a new way of managing IT infrastructure and can help IT administrators spend less time on repetitive tasks such as provisioning, configuration, monitoring and maintenance.
- Increased Application Availability & Improved Business Continuity - Eliminate planned downtime and recover quickly from unplanned outages with the ability to securely backup and migrate entire virtual environments with no interruption in service.
- Virtualisation can help achieve significant License cost savings in the long term. As well as the

obvious savings through server consolidation, there would no longer be a requirement to have a license per Operating System and Application but rather just at the server level.

Anticipated Outcome

A strategic review to be conducted to identify the most appropriate areas of the SEMO infrastructure to be virtualised. Savings that have been seen when a virtualisation approach has been adopted (depends on scale of implementation).

- Server Hardware - up to 83%
- Storage Area Network - up to 28%
- Networking - up to 84%
- Power and Cooling - up to 88%
- Data Center Real Estate - up to 89%
- Disaster Recovery - up to 75%
- Provisioning - up to 93%
- Downtime - up to 75%

5 ORACLE LOGGING

Resource Title (Vacancy Title/ System Name)			
Oracle Logging			
2010-11	2011-12	2012-13	Total €
120,000			120,000
Problem Statement			
<p>Since the creation of SEMO, auditors have consistently identified the fact that SEMO's inability to perform logging is an issue that needs to be addressed. They have stated that there needs to be the following types of logging:</p> <ul style="list-style-type: none"> • Security <ul style="list-style-type: none"> ○ Authentication – checks whether the user is valid and that they are accessing the network from no more than one site ○ Authorisation – does the user have the appropriate level of access • Tracking historical events from the market so that ad-hoc queries can be addressed – these issues can be as a result of user events or application server events. This point is closely linked to the one above as there is a need to be able to justify all of the data within the database when issues arise. <p>SEMO IT currently utilise a basic software package, Oracle Enterprise Manager (OEM), to log and monitor historical performance in relation to resource usage e.g. CPU, memory etc. So that the performance of the production market systems is not affected, the logging activity is performed offline on a separate database. The OEM Repository is updated at 5 minutes intervals with alerts and any other specific performance information including top activity on the database. Additionally, it performs checks on the hard disk in order for capacity to be monitored.</p> <p>The integrity of the production database has been questioned in recent times with queries coming from the market through the Business Analysis or Market Helpdesk teams. SEMO IT needs to have the ability to easily reference/justify an event so that the market will have more confidence in it. However, this has proved to be difficult as the logging data that is compiled is neither comprehensive nor pulled directly from production.</p> <p>SEMO currently utilise Log Miner but it is deployed to a non-production database. This is because if it was to be deployed to the production database there would be significant performance issues and the market systems would not operate to the level that is required. Oracle Enterprise Manager could facilitate the</p>			

Security and events tracking in the database but this would compromise the performance of the database and hence the confidence of the market. SEMO needs to ensure that the current availability and performance is maintained.

Market Operations team/ Analyst team/ Functional teams have raised issues relating to the Capacity Count. With an accurate logging tool, the DBA's would be able to refer to the logs immediately to highlight the cause of any discrepancy.

Business Need Statement / Objective

A robust logging facility needs to be made available through the "Audit Vault" software. This will allow the logs to be continually sent offline. By integrating Audit Vault with the existing Log Miner software, SEMO IT would have a robust and secure logging infrastructure that should satisfy the auditor requirements.

Oracle Audit Vault automates the audit collection, monitoring and reporting process, turning audit data into a key security resource for detecting unauthorized activity.

Strategic Benefits

- The most significant benefit of implementing a Logging tool is that SEMO would be satisfying a long-standing audit requirement
- Additionally, Oracle Audit Vault is a powerful solution providing
 - a secure repository for the data
 - built-in reporting
 - event alerting
 - helps identify separation-of-duty responsibilities

Risk Analysis

- Failure to implement this software will lead the current DBAs to continue to manually search the databases for minute pieces of data – focussing on the wrong things
- Data integrity could be continued to be questioned internally and externally
- Data security needs to be ensured – without this software in place, this security cannot be ensured – security breaches will only be highlighted after the fact on a reactive basis rather than an alert being sent to the responsible parties in real time.

What Data / Information Supports your risk assessment

As the financial data travelling across the market systems continues to grow on a daily basis, it is essential that logging is implemented as a priority. This will enable a proactive approach to security and performance monitoring of the market systems and ultimately satisfy the long standing audit requirement.

Business Benefit / Justification

- Market systems performance improvements should be enjoyed by participants as analysis is possible on the causes of previous down time
- Full confidence that only appropriate users have access to the market systems
- Satisfying a consistently highlighted audit requirement

Anticipated Outcome

Once the database server has been refreshed, it is essential that logging software is deployed so that performance and audit benefits can be fully realised. Oracle logging will facilitate the publication of daily market data by SEMO by ensuring that as issues/discrepancies arise, they can be fully investigated and resolved.

Assumptions

While Oracle Audit Vault has been identified as the preferred solution, there is also the option to develop a customised solution – the Oracle software however has been identified as a market leader in this regard.

Additionally, with the proposed database and hardware upgrades coming down the line, it is anticipated that the performance issues of the production environment may be eradicated. If so, SEMO may be able to deploy Log Miner directly on to production.

6 SHAREPOINT AND DOCUMENT MANAGEMENT

Resource Title (Vacancy Title/ System Name)			
SharePoint and Document Management			
2010-11	2011-12	2012-13	Total €
100,000	60,000	40,000	200,000
Problem Statement			
<p>In the short to medium term, SEMO needs to develop further its use of SharePoint, as it is currently not utilising the full scope of the available functionality. Given the scale of the SEMO operation, an enterprise wide adoption of SharePoint, while fully integrating the application in to the day-to-day operations would see significant efficiencies experienced by the organisation.</p> <p>With no existing collaboration tools in SEMO, the organisation is behind the latest technological advances in helping to make employees more effective in their roles. In addition, the current document management solution is one that relies on email and file shares. Not only does this method take up a large amount of storage space but it is also ineffective in establishing any controls around change management or document workflow approvals.</p> <p>The broader implementation of SharePoint would also allow for a more coordinated approach to the management of changes to both the Central Market Systems and the Trading and Settlement Code, information on which is currently maintained by various business units within SEMO.</p>			
Business Need Statement / Objective			
<p>In order to facilitate SEMO to be as effective as possible in the day-to-day running of the market it is recommended that further work is completed on the existing SharePoint capabilities. This would align SEMO with its parents', EirGrid, current use of SharePoint.</p> <p>With the current SEMO infrastructure, SharePoint usage is low because there is a business perception that the application has a lack of performance. The current project to upgrade the SharePoint infrastructure will address these concerns and lead to a greater use of SharePoint in the long term. It may also be a requirement for SharePoint to interact with the SEMO website to streamline the communications process with the market.</p>			
Strategic Benefits			
<ul style="list-style-type: none"> Operational efficiencies due to greater SEMO in-house collaboration. Single instance of truth for data/documents. Improved processing of documents through 			

implementation of structured workflows. There will also be significant space savings as only a single version of documents will be worked on and made available on the portal.

- Enterprise search, file shares, web sites can all be facilitated with a full-scale implementation of SharePoint. These tools can be used across the various SEMO communities.
- Scalability – if SEMO was to expand further, the SharePoint solution will continue to meet requirements.
- Availability of workflows that are not currently present will ensure a secure and auditable document sign off process to support SEMO business processes.
- KPIs relating to workflows will help identify any bottlenecks in the various approval processes.
- Improved formal project management capability which is currently not present.

Risk Analysis

- Without proper investment in the SharePoint application it may not be possible to fully integrate with the external facing website.
- Without a significant effort to integrate SharePoint into the day-to-day operations of all SEMO units, there is limited benefit to an organisation if only a selection of units adopt the technology.
- Given the amount of data and documents that are prevalent within SEMO, there will continue to be a periodic requirement to purchase more space – this would be lessened with the full implementation of SharePoint.
- Without full scale adoption of SharePoint, there will continue to exist a danger of losing data/documents that are difficult to recover.

What Data / Information Supports your risk assessment

Insofar as change management is concerned, there is a need to centrally track and share information on Change Requests and Modifications of which, on average there are over 70 Modification Proposals received per annum, 50 defects, 51 Market Operations Change Requests, 10 TSO changes, 3 SEMO Finance change requirements.

As an authoritative voice within the industry, at home and abroad, a truly collaborative workspace would allow better communication between business units and the parent companies when responding to consultations, attending working groups, or seeking information on the operations and undertakings of other areas within the EirGrid Group. This would lead to a more cooperative and informed environment throughout the Group as a whole.

Business Benefit / Justification

- Facilitates collaboration between business units and IT.
- Facilitates a centralised and organised document management system providing version control and audit trails.

- SharePoint reporting mechanisms may be of benefit particularly in tracking of documentation, list items and workflows.
- Streamlining of communication between SEMO business units and the parent companies.
- Facilitates an increased quality and consistency of documentation.
- Facilitates a better security of data as one centralised source.
- Streamlining of communication to the market participants - Operational efficiencies will be achieved once the new website is online – SharePoint can be used to issue documentation through the site.

Anticipated Outcome

Once the SharePoint infrastructure is upgraded in the coming months, the potential for increased use across the enterprise should be realised. Once this happens, it should be more straightforward for the various businesses to agree on what processes that feel they would benefit from on SharePoint e.g. collaboration, document workflows, Change Control Board's (CCB) change management process etc.

Assumptions

In order for further SharePoint development to be beneficial, it would be recommended that the application is adopted enterprise-wide, replacing existing aged processes.

7 DATA STORAGE

Resource Title (Vacancy Title/ System Name)			
Data Storage			
2010-11	2011-12	2012-13	Total €
70,000	30,000		100,000
Problem Statement			
<p>Currently, SEMO does not have any data archiving in place. All data is stored online and available at all times despite the regulatory requirement to only have 2 yrs of online data and 7 yrs of offline data available at any time. As a direct result of this, SEMO is experiencing storage space problems as the data builds on a daily basis. This is putting a significant amount of pressure on the current disk architecture as there is no partitioning or tiering of the data in any form.</p> <p>Archiving within the current infrastructure would prove to be difficult, as the time to retrieve the data would be extensive while there is no data management in place. Given the scale of the data that is retained on a daily basis, there needs to be order placed on the data in terms of layering or segmenting it. By doing this, it will be easier to pull data upon request.</p>			
Business Need Statement / Objective			
<p>SEMO requires a data storage solution that will help reduce their disk space requirements. There are several software options that will provide management with a comprehensive approach to managing the lifecycle of a systems data from creation to the time when it becomes obsolete and deleted. These software options are generally GUI based tools for managing the various environments under its remit, and so facilitate ease of use. They also help to set rules for when data should be moved, archived or deleted. The software will also illustrate the storage requirements and costs savings associated with moving any sets of data.</p>			
Strategic Benefits			
<p>A data storage solution would benefit SEMO as follows:</p> <ul style="list-style-type: none"> • Less disk space required – significant cost savings • Tiering/Partitioning of data will also help performance as only the critical data will be housed on the primary layer • Costs savings - as less critical data will be housed on inexpensive servers • Regulatory compliance – will ensure that SEMO are storing the correct level of data as required • Efficient use of resources – replicating all data regardless of usefulness does not make sense 			

8 DATA WAREHOUSE

Resource Title (Vacancy Title/ System Name)			
Data Warehouse			
2010-11	2011-12	2012-13	Total €
	200,000	100,000	300,000
Problem Statement			
<p>SEMO currently does not have a data warehouse. This causes an issue for the operational groups (Market Operations, Business Analysts, Functional team) in relation to their ability to analyse the data around</p> <ul style="list-style-type: none"> • Capacity • Credit Risk Management • Metering • Settlement etc. <p>While all of these groups are able to pull the required info out of the database, it is done in an inefficient and manual manner. The reporting database that is in use at the moment was not built for this purpose and as such requires significant amounts of support from the IT team.</p>			
Business Need Statement / Objective			
<p>A Data Warehouse is an integrated and centralized data store organized specifically for end-user reporting and analytical access. A data warehouse is a copy of transaction data specifically structured for querying and reporting. Data warehouses optimize database query and reporting tools because of their ability to analyze data, often from disparate databases.</p> <p>Data warehouses are a way for business users, typically managers and decision makers, to extract information quickly and easily in order to answer questions about their business. Data warehouses are read-only, integrated databases designed to answer comparative and "what if" questions. Unlike operational databases that are set up to handle transactions and that are kept up to date as of the last transaction, data warehouses are analytical, subject-oriented and are structured to aggregate transactions as a snapshot in time.</p> <p>Data mining is a class of BI tools that look for hidden patterns in a group of data that can be used to predict future</p>			

behavior. Additionally,

- It helps discover previously unknown relationships among the data.
- It uses discovery-based approaches in which pattern-matching and other algorithms are employed to unveil key relationships in the data.
- Data mining algorithms can look at numerous multidimensional data relationships concurrently, highlighting those that are dominant or exceptional.

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Strategic Benefits

- No requirement to have production available so that queries are run – queries will be run offline in the data warehouse
- Reporting can be scheduled to run on a regular basis – no manual input required
- Dashboards can be configured for senior managements review as per their requirements
- Business Analysis can be performed without the need to run manual SQL queries
- Key/re-usable reports can be made readily available
- Less maintenance required for a data warehouse - updated with production data on a regular/agreed basis.
- Business analysts can perform a greater level of detail of analysis of the data without worrying about corrupting the data or having a limited window to operate in.

Risk Analysis

- Inefficient use of resources manually running SQL
- Continued strain on environmental resources – not enough for current SEMO demand – business analysis, testing, development
- Continue to use Excel and SQL – no verification/confirmation in place to confirm correct procedures currently being used.

Business Benefit / Justification

- Custom built GUI that will provide appropriate/pre-defined detail for business use
- Re-usable/consistent reporting
- No SQL to be run – no need for business analysts to make changes to their sequel if changes are made to the database
- Constant availability – will be separate from the market systems – not dependant on market systems being online
- Increased control and understanding over the data for IT
- As the SEMO website develops further, the data warehouse could legitimately provide data/metrics to the site
- Scalability – as the data requirements continue to grow in the coming years, a data warehouse will be able to adapt to this and continue to report in an effective manner

- Data confidence – it is advised that data should be cleansed before a warehouse is established – if this is the case, then the business can be confident of its content

Anticipated Outcome

A full requirements gathering exercise will be performed to establish the functions/features as required by SEMO.

Assumptions

- This is not a replacement for the reporting database as data warehousing is generally not real time.
- Many options to implement – Business Objects, Oracle Data Warehouse Builder, Teradata

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9 REPORTING DATABASE UPGRADE

Resource Title (Vacancy Title/ System Name)			
Reporting Database Upgrade			
2010-11	2011-12	2012-13	Total €
150,000			150,000
Problem Statement			
<p>SEMO IT built a reporting database so that business users could have real time access to production data without any danger of corrupting the data directly in production. Each of the users has read only access and the main users of the database are:</p> <ul style="list-style-type: none"> • Business Analysts • Functional Analysts • Market Operators • Auxiliary Services in Eirgrid. <p>This reporting database was originally made available by SEMO IT on the premise that there were to be no critical services/business operations to be built off the database. This requirement has since been changed and there are day-to-day operations depending on the availability of the database in order for them to fulfil their roles. Currently, the reporting database is run on a single instance and no backups are available in the event of an emergency. Therefore, if the database was to be made unavailable, there would be no alternative for the various business users. Whenever this event does occur, it causes a major problem for both the IT and operations groups to make the database available in a timely manner.</p> <p>Without a database that offers redundancy, SEMO IT cannot guarantee the availability of the database for reporting purposes. Given the increased focus on metrics and market analysis as the market matures, it is essential that the reporting database has maximum availability.</p>			
Business Need Statement / Objective			
<p>The reporting database is used for the following functions</p> <ol style="list-style-type: none"> 5. Management reports on a fortnightly, monthly, quarterly and annual basis. This is for both internal and externally to market participants as per the SEMO obligation to publish market data on a daily basis. Additionally, as the data is not maintained on the SEMO website, the market participants are 			

entitled to request data from SEMO on an ad hoc basis.

6. Verification processing of settlement data for completeness – ABB systems vs. Navita
7. Perform market studies throughout the year
8. Bi-Annual Market Audit by Deloitte – requirement to provide blocks of data to the auditors.

Strategic Benefits

- Improved performance with greater CPU and memory availability – this will also benefit the business users from a productivity perspective
- More resilience and availability of the reporting database will result in a reduced requirement for IT support
- Environment redundancy will facilitate disaster recovery/business continuity planning
- Business users will be able to run their reports consistently

Risk Analysis

There is an operational dependency on the reporting database. If it were to be unavailable, many of the critical day-to-day operations would not be able to perform. SEMO would be failing to meet its obligations to publish data to the market – without this; confidence in the market would be depleted in SEMO's ability to run the market effectively.

What Data / Information Supports your risk assessment

SEMO does not have a business continuity plan in place for its reporting database. This critical gap needs to be addressed by upgrading the database itself so that redundancy can be established/provided.

Business Benefit / Justification

- Continued availability of critical resource to perform essential roles on a daily basis.
- EirGrid depend on the output of the reporting database to perform their energy settlement reconciliation

Anticipated Outcome

All reporting requirements to be fully documented as well as any ancillary processes being run off the database.

Assumptions

This requirement will continue to exist despite any data warehouse solution being implemented. The reporting database will continue be a real time asset whereas the warehouse will be an offline resource.

10 ORACLE DATABASE SERVER VERSION 2

Resource Title (Vacancy Title/ System Name)			
Oracle Database Server Version 2			
2010-11	2011-12	2012-13	Total €
	1,500,000		1,500,000
Problem Statement			
<p>Currently, SEMO have a requirement to upgrade the existing database server (DELL 2950) in the short term as the current infrastructure will no longer be supported by Dell – this requirement is covered under a general hardware refresh business case. This planned upgrade will be sufficient to adequately cover the existing requirements but may not be enough in the medium or long term.</p> <p>SEMO requires the flexibility to further upgrade the database server in order to meet any increased demands placed on its infrastructure in the next 2-3 years. Given the ever changing technological advances, it is currently unclear what specific technologies will be available to SEMO in the medium/long term, but it is expected that there will be products available that will allow SEMO's market systems too enjoy greater</p> <ul style="list-style-type: none"> • Efficiency • Performance • Reliability <p>As the demands for data on the market systems grow and the market matures, the database server will need to be availing of the most up-to-date technologies to ensure that the required customer service is delivered. As the market expands and the customer base becomes more demanding, it is essential that the market systems infrastructure can handle these demands. Without constantly investing/upgrading in the market systems core infrastructure, SEMO IT will be reacting to changes needed rather than being proactive in their systems management approach and ensuring a seamless level of customer service.</p>			
Business Need Statement / Objective			
<p>SEMO are looking to have the potential to upgrade their DB Server in the medium term to the most up-to-date technology available at the time. This will help to ensure that the market systems are operating on the most robust, reliable and secure infrastructure available at the time. This proactive approach to database management will ensure that SEMO maintains its SLAs with market participants prior to any degradation of service levels.</p>			
Strategic Benefits			

- Can eliminate the cost of third-party specialty hardware, security and management solutions if a comprehensive database server were to be selected. Rather than selecting a basic package and adding on other software, it would be more efficient to select an end-to-end solution
- The upgraded database will enable scalability of the associated software – the performance and capacity of each component should improve significantly
- Greater data security and compliance through easy access logging
- Will assist in maximising availability during planned and unplanned downtime. Issue resolution will be quicker and the environment will be brought back up more quickly and therefore continuing to provide superb customer service.
- An upgrading of the database server will result in greater performance of the associated data warehouse (if implemented). It will do this by offloading intensive query processing and data mining scoring from database servers and bringing it closer to the data
- Data storage requirements are 2yrs online and 7yrs offline. If this is to be achieved, then a suitable database needs to be selected.

Risk Analysis

With the market maturing, it is anticipated that there will be an increased demand for data on the market systems as well as a need for consistent availability and performance improvements for the market participants. It is imperative that the database will be further upgraded to facilitate this as it may not be able to meet these significant requirements under the current infrastructure.

Without a significant database upgrade in the medium term to the most up-to-date technologies available, there is a risk that the market systems will not be operating at their optimum levels. Market participants may not enjoy the benefits of other hardware upgrades as a result of a mediocre database server.

What Data / Information Supports your risk assessment

The demands on the market systems will continue in the coming years but it is not yet understood as to the scale of this growth. A strategy to review the demands on the database server in the medium term will ensure that the market systems will continue to deliver on its SLAs.

Business Benefit / Justification

- Greater availability, reliability and performance of the market systems – this will maintain the confidence of the market participants in the market
- Faster response times of applications will enable operational efficiencies to be achieved both internally and externally
- A more structured approach to data management will be facilitated with the implementation of the most up-to-date technologies. As well as application performance improvements, storage costs will

also be reduced as the least active data will be stored in a more appropriate storage tier

Anticipated Outcome

A review to take place in the medium term to ensure that the market systems are operating at an acceptable level and determine whether an upgraded database server would result in significant benefits.

Assumptions

A database server upgrade will further enhance the performance benefits that SEMO will experience upon the proposed hardware infrastructure upgrade. Additionally, the new database server would provide the redundancy required if the business was to grow further.

11 NEW COMMUNICATIONS LINKS

Resource Title (Vacancy Title/ System Name)			
New Communications Links			
2010-11	2011-12	2012-13	Total €
		2,000,000	2,000,000
Problem Statement			
<p>The Market Operator IT sites (Belfast and Dublin) are connected via two 34 Mbps links which are due to be upgraded in the coming months to 100Mbps. Each of these links is connected to different Cisco 3845 Routers for redundancy. Internal SEMO users connect to the active systems (in Belfast or Dublin) using the links as an internal LAN. These links are also used for IT systems communications, database and data replication, and systems monitoring and support requirements. During normal operations, both links are used to transfer the data between Dublin and Belfast. If one of the links goes down, the other will assume full responsibility and all the IT systems communications, database and data replication, and systems monitoring and support requirements will continue to operate as normal on this one link.</p> <p>The use of the links has been steadily increasing over the past 18 months and this is now affecting the operations of the Central Market Systems. Presently, because of bandwidth constraints the database must be active on the same site as other market applications for the Central Market Systems to function. Failover of market applications to a separate site from the database leads to performance issues resulting in errors and potentially failure of the application.</p> <p>Examples of the problems experienced include:</p> <ul style="list-style-type: none"> • SEMO users unable to carry out day to day tasks through Citrix (i.e. email, write documents settlements runs etc.). • Applications become unusable due to slow performance. • Database grinds to a halt affecting operations of Central Market Systems • TSO and Market Participants unable to submit bids <p>An upgrade of the existing dual links is planned for this year and will deliver two 100MB protected links to address the issues detailed above. However, in the coming years, as the market continues to grow and mature along with the scale of the data that is being demanded, there may be a requirement to upgrade the links further so that the market systems performance is maintained. Any future software or hardware changes</p>			

for SEMO could also require increased bandwidth to ensure that the necessary performance is maintained. It is difficult to forecast exactly what the impact of any upgrades/changes in the medium term will have on the effectiveness of the links between Dublin and Belfast but, there may well be a requirement to upgrade the links further. Also, increased use of the links by existing applications (CMS Database) and new systems (Enduring SEMO website) may well further this problem and severely affect SEMO's ability to provide fully redundant and highly available Central Market Systems.

SEMO must also consider that, in the medium term, there may be significant advances in the communication links products available in the market that would give SEMO significant efficiencies that could not be ignored. This business case is put together to highlight the need for a checkpoint to be taken in 2 to 3 years to evaluate the effectiveness of the links and that the outcome of this assessment may be to upgrade the links further.

In the coming years, there may be changes to the overall SEMO strategy and the services that they are to provide to the market. As a result of these changes a detailed assessment of the impact on the market systems will need to be conducted to ensure that SEMO's commitment to the market has not been compromised in terms of performance or reliability.

Business Need Statement / Objective

These links are a key infrastructure component of the Central Market Systems and essential to provide fully redundant, consistently available, and high performing systems across two locations and will be a key factor in the future ability of SEMO to cope with increasing data demands and ensure that all of the benefits from any future software upgrades are realised.

Strategic Benefits

- Ensures that the Market Systems perform at the levels expected by the market participants. By upgrading the links further, the Market Systems should enjoy quicker performance and faster response times.
- Maintaining fully redundant systems across two locations
- Maintaining highly available Central Market Systems
- Flexibility to adapt to increased demands on the systems

Risk Analysis

- Reduced capability to operate Central Market Systems from either Dublin or Belfast
- Reduction in dual site capability will lead to lower system availability
- Reduced system availability of Central Market Systems will feed into lower KPI's for SEMO
- Loss of industry confidence in SEMO to run the market

What Data / Information Supports your risk assessment

These communication links are the key component to ensuring the effectiveness of the market systems.

Business Benefit / Justification

- Continued customer service level improvements due to constant availability of Central Market Systems even during disaster recovery times
- As data demands increase in the future across the market it is imperative that the infrastructure is robust and can accommodate the increased traffic.

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Anticipated Outcome

Following a detailed evaluation in 2 to 3 years time and constant monitoring until then, an assessment of the Communications Links will determine whether a further upgrade is required. The new Communications Links will contribute to:

- 95% availability of central market & corporate systems during extended business hours
- Publication of market daily info would be facilitated upon implementation of an upgraded communication links channel

Assumptions

A full analysis and monitoring exercise would be required before the further upgrading of the communications links could be approved.

12 CMS PRE PRODUCTION ENVIRONMENT (IPT)

Resource Title (Vacancy Title/ System Name)			
CMS Pre-Production Environment (IPT)			
2010-11	2011-12	2012-13	Total €
700,000			700,000
Problem Statement			
<p>One of the key activities that any IT group should be performing on a regular basis, is performance testing. Currently it is not possible for SEMO IT to do this due to the lack of availability of the IPT environment. There is no other suitable environment that could be used for testing. This is a crucial gap in SEMO's IT management and a major concern as SEMO is trying to provide a robust service to the market but is not able to undertake performance or stress tests of the systems.</p> <p>Beyond this, due to the scale of the production environment set up, there is no opportunity for SEMO to provide participants with training in the market systems. Were an additional environment fully replicating the production environment available SEMO may, in the longer term, be in a position to provide participants with this type of training, thereby providing participants with a greater understanding and appreciation for the CMS. This training would also be useful for new staff ahead of their progression to operations within the 'live' system. Significant additional resources would be required to progress this undertaking.</p> <p>Currently, demand for pre-production environments is greater than what is available. In particular the IPT environment is fully utilised, as it is the only full reproduction of the production market systems. This demand for IPT comes from the Functional and Technical Teams within SEMO IT and puts a significant strain on scheduling appropriate time for each group. While the Functional Team has more predictive timelines, the Technical Team need to have constant access as ad hoc issues arise for which speedy resolutions are required. Without these resolutions, there is a danger that the market systems are operating with errors, or not at all. Similarly, if the Functional Team does not have access to the environment there could be delays in planned testing and as a result, the bi-annual deployments.</p> <p>During these bi-annual deployment windows (April and October) the Functional Team require three different environments to perform their testing and defect management. This puts a massive strain on the environmental resources available to the group. SEMO cannot compromise its test effort due to environmental constraints as the implications for the market are far too significant. Further, there is no scope</p>			

to change the release schedule as this is what SEMO has committed to providing to the market.

Often, issues raised by market participants are caused by the dual site design of the production infrastructure (between sites in Belfast and Dublin). In order for these issues to be properly investigated a similar dual site environment is required to simulate and resolve the error. The implementation of an additional dual site environment would greatly assist in timely and economic issues management by SEMO.

Business Need Statement / Objective

There is significant need for the provision of a new dedicated pre-production environment for use by the technical team of SEMO IT. This environment will be used to facilitate technical upgrade testing, component testing and issue investigation. With the technical team having full time access, it will ensure that all of these activities are performed comprehensively and accurately as they will not be limited by having to hand the environment over to anyone.

Being able to undertake testing on an environment other than the production environment mitigates against any mishaps occurring in the critical market infrastructure, with testing able to be queried in parallel. Further, there may be an opportunity to provide market participants with training in the functions of the CMS, thus increasing the transparency of the market as well as encouraging greater understanding of market operations.

Strategic Benefits

- A full reproduction of production will ensure that end-to-end testing can be completed by the technical team during upgrades or deployments.
- The technical team will have the ability to fully troubleshoot issues as they arise.
- Turnaround time for issue resolution should improve as the technical team will have constant access to the new environment.
- Performance and stress testing can be completed more regularly – this is particularly important as the data demands increase.
- There may be an opportunity to provide both new staff and market participants with practical training in the market system operations.

Risk Analysis

The existence of an additional duplicate 'systems' environment mitigates against the occurrence of issues in the live system, in that it would sufficiently allow for testing to be taken out both prior to a release and as issues occur in real time. This would in turn allow SEMO to provide a better level of service to its stakeholders both internal and external.

Were the environment, within which testing currently occurs, to be rendered unavailable due to corruption of data it would mean that any further issues could not be investigated until such time as it can be brought back on-line. This could pose significant issues for the operation of the live market systems as well as for impending

releases.

It is imperative that SEMO be in a position to investigate, test and diagnose issues in a timely and efficient manner, particularly where those issues impact on the operations of market participants. Were this not to occur additional risk may be posed to the reputation of SEMO as the market operator.

What Data / Information Supports your risk assessment

The current production mirror environment is being over utilised and there is always one of the IT groups who do not have access at a critical time.

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Business Benefit / Justification

- Potential to offer training to market participants in the long term
- Improved customer service to the market participants during new code release periods as issues will have been comprehensively tested and resolutions identified.
- Improved customer service and perception from market participants as SEMO is able to diagnose and solve system issues in a timely and efficient manner.
- Improved understanding of the CMS through the provision of training, where resources permit.

Anticipated Outcome

It is anticipated that the additional pre-production environment would allow for the more efficient identification, investigation and resolution of issues within the systems. It would also provide SEMO IT with a dedicated resource for ongoing or ad-hoc testing, particularly in line with the bi-annual systems releases.

As a dedicated tool for the use of the IT technical team, the new environment would permit the freeing up of other resources allowing for a more efficient distribution of existing resources amongst those staff that require it.

Further, in freeing up existing resources there may be capacity to undertake new endeavors such as working towards a program of training for new staff or interested market participants. This would encourage a better understanding of the CMS across the market.

It is a requirement that SEMO ensures that the market systems are on-line at least 95% of the time. This can be better facilitated by the availability of the new environment to investigate issues, test new releases and complete market analyses, ensuring the market remains robust in operation.

Assumptions

- There is a robust configuration management process in place to facilitate the maintenance of the new environment to be in-line with that in production. A single code line will need to be applied across all environments and could be facilitated with the adoption of SCOM (separate business case).

13 AXAPTA UPGRADE

Resource Title (Vacancy Title/ System Name)**Axapta Upgrade**

2010-11	2011-12	2012-13	Total €
120,000		120,000	240,000

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Problem Statement

The Axapta system is a core part of the Central Market Systems and is used to Manage Market Finances. The Axapta system supports the following Market Finance activities:

- Maintain participants' master data
- Reconcile bank accounts & process cash receipts
- Maintain market ledgers
- Manage Collateral & bad debt
- Manage market currency exposure
- Keep accounting records for Market Finances
- Prepare Financial Reporting
- Process Payments to market participants

The Axapta system also supports SEMO Corporate Finances and is used to support the following activities:

- AR, AP
- GL
- Asset Register
- Cash Management
- Tax
- Transfer Costs
- Reporting

The current Axapta system is based on version 3.0 of this Microsoft technology and requires an upgrade as Microsoft will no longer support this version.

Business Need Statement / Objective

The Axapta system is a core part of the Central Market Systems and is used to Manage Market Finances and SEMO Corporate Finances. If SEMO experienced an Axapta application related fault we would fail to receive support from Microsoft to resolve the issue. This would have major implications for SEMO's reputation in the market.

Strategic Benefits

With the current version of the Axapta software no longer supported by Microsoft, it is essential that SEMO reduce the risk to the market by upgrading to the latest version of software.

Risk Analysis

The Axapta system develops a defect that is platform related and therefore cannot be resolved until the system is upgraded – SEMO would not be able to operate without an operational version of Axapta.

What Data / Information Supports your risk assessment

An upgrade is required as Axapta v3 will no longer be supported by Microsoft.

Business Benefit / Justification

- Axapta system platform support from Microsoft.
- Increased Axapta functionality to SEMO users.

Anticipated Outcome

The Axapta software will need to be upgraded, which will contribute to:

- 95% availability of central market & corporate systems during extended business hours.
- The delivery of a modern and responsive service to our customers using industry best practice - 95% response and resolution times for Service Calls and Support Calls.

14 ON-LINE HELP SYSTEM

Resource Title (Vacancy Title/ System Name)			
On-Line Help System			
2010-11	2011-12	2012-13	Total €
	300,000		300,000
Problem Statement			
<p>Describe the problem the resource would address, including any problems related to technology, processes and/or services, without presupposing a solution.</p> <ul style="list-style-type: none"> • Currently, parties wishing to raise an issue or a query with SEMO must phone or email the SEMO Market Helpdesk to do this. • Stakeholders making follow-up inquiries on existing calls or previously raised queries must also phone or email the SEMO Market Helpdesk to do this. • There are no metrics available on-line providing statistics on SEMO's performance around query resolution. 			
Business Need Statement / Objective			
<p>An area on SEMO's website is required which integrates to SEMO's internal query tracking tool and which would provide an on-line resource for stakeholders to submit, view and track queries raised with the Market helpdesk.</p>			
Strategic Benefits			
<p>The implementation of an on-line help system would bring the following strategic benefits:</p> <ul style="list-style-type: none"> • Would reduce the number of direct inquiries handled by the Market Helpdesk. • Would enhance SEMO's profile with stakeholders with regard to query handling. 			
Risk Analysis			
<p>If SEMO do not implement this on-line help resource, the following risks have a high probability of occurring:</p> <ul style="list-style-type: none"> • No reduction in high volume of calls to the SEMO Market Helpdesk causing Helpdesk service team to use their time on the follow-up queries rather than on proactive stakeholder management. • No improvement in terms of transparency on SEMO's handling of market queries. 			
What Data / Information Supports your risk assessment			
<p>Approximately 20 calls are created daily in the SEMO Helpdesk tracking tool, however many additional contacts are made by stakeholders inquiring about the status of open queries. SEMO wish to reduce the number of</p>			

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contacts made by stakeholders to the Market helpdesk.

Business Benefit / Justification

The implementation of an on-line help system would bring the following operational benefits:

- Would provide a means to allow external stakeholders to submit a new query without having to make direct contact with SEMO.
- Would provide a means to allow external stakeholders to view the status of an existing query without having to make direct contact with SEMO.
- Would provide a means for stakeholders to view a history of queries raised for his/her organisation.
- Would enable customers to monitor SEMO's performance in handling queries.
- Could proactively provide information around topics that are the cause of multiple similar Formal Queries.

Anticipated Outcome

- SEMO's stakeholders are empowered with a self-service solution for tracking of queries.
- Enhanced profile for SEMO with regard to transparency on query handling.
- Number of emails and phone calls to the helpdesk requesting status or follow-up on existing calls will reduce.

15 ELECTRONIC FAX SOLUTION

Resource Title (Vacancy Title/ System Name)			
Electronic FAX Solution			
2010-11	2011-12	2012-13	Total €
100,000			100,000
Problem Statement			
<p>Fax communication is defined in the Trading and Settlement Code as one of the three valid communication channels, and is a vital form of communication in the SEM.</p> <p>As part of market communications SEMO sends and receives a large number of different fax communications. All outgoing fax communications are currently prepared, printed and faxed manually. All incoming communications are received, scanned, and filed manually.</p> <p>The current manual processes for fax communications is time consuming, prone to error or omission, may not be timely enough for certain communications, is difficult to co-ordinate across dual site operations, open to security of confidential information concerns, and does not provide auditable permanent records of incoming or outgoing faxes.</p> <p>Missing fax confirmations have been highlighted in previous audit reports as an issue.</p> <p>Resources could be better utilised in ensuring core market functions are completed on time rather than managing fax transmittals manually.</p>			
Business Need Statement / Objective			
<p>A need for an integrated electronic fax solution has been identified to aid SEMO in remedying the problems with the current manual fax transmittal process described above.</p> <p>The integrated electronic fax solution will assist in meeting the following Business Needs:</p> <p>Ability to receive and send faxes electronically. Removing the overhead to manually process incoming and outgoing faxes.</p> <p>Providing the capacity to deal with business-critical time-dependent events such as Limited Communications Failure (LCF) and General Communication Failure (GCF) faxes, without the need to divert excessive resources away from the core market functions and to complete these communication activities within the timeframes specified in the Code.</p>			

Ability to send faxes to a single recipient or distribution list removing the need to print and manually fax each individual separately.

Ability for received faxes to be viewable in electronic format by users in either the Dublin or Belfast SEMO offices. Removing the need for scanning and emailing of faxes between locations.

Audit trail of faxes received to the published emergency number at SEMO in the case of operational emergencies, for example Limited Communications Failure, General Communication Failure etc.

Ability to confirm successful transmission of all faxes sent, whether sent to an individual or to a distribution list. In the case of sending to a bulk distribution, it is required to be able to track success/fail status on an individual basis.

Ability to view historical information of actual fax transmittals and their content for the purposes of audit or query.

Providing a secure environment for the receipt and storage of faxes and reducing the risk of commercially sensitive data being lost.

The following provides examples of the fax communications SEMO currently undertake. Each has been assessed against the criteria of frequency, Trading and Settlement Code compliance, impact of not being able to transmit, and volumes.

Fax Communication	Frequency	T&SC Compliance	Impact	Volumes
Issue Credit Increase Notices	Daily	Code Breach	High	Individual Market Participant
Limited Communication Failure	Low	Code Breach	High	All Market Participants
General Communication Failure	Low	Code Breach	High	All Market Participants
General System Failure	Low	Code Breach	High	All Market Participants
Issue Suspension Notices	Low	Code Breach	High	Individual/All Market Participants
Issue Beneficiary Statement to Bank	Low	Code Breach	High	Individual Market Participant
Issue Default Notice	Weekly	Code Breach	High	Individual Market Participant
Notice of Dispute	Monthly	Code Breach	High	Impacted Parties
Issue of Manual Invoices	Half Yearly	Code Breach	High	All Market Participants
Issue SRA Cancellations	Daily	Code Breach	Medium	Individual Market Participant
Party Receipts	Monthly	Code Breach	Medium	All New Market Participants
Unit Applications	Weekly	Code Breach	Medium	All New Market Participants
Authorised Persons Confirmation	Half Yearly	N/A	Medium	All Market Participants
Issue Confirmation of Drawdown	Low	Code Breach	Medium	Individual Market Participant and SEM Bank
Commencement Notice	Weekly	Code Breach	Medium	All New Market Participants
Market Participant Audit Request	Yearly	N/A	Low	Half of Market Participants
Initial Credit Cover Requirement (Registration)	Weekly	Code Breach	Low	All new Market Participants

Strategic Benefits

The strategic benefits will be to:

- Operate the Single Electricity Market consistent with the Trading and Settlement Code

- Improve the efficiency of Market Operations
- Ensure efficient, accurate and timely communication with the Market Participants
- Increase transparency of market operation through the availability of complete and accurate historical fax communication transactions.
- Improved security of commercially sensitive information

Risk Analysis

There are a number of risks if an integrated electronic fax solution is not implemented.

High Risk

- The issues identified by the auditors of SEMO about being able to prove fax transmittal will continue due to the manual nature of the process
- The inability of SEMO to respond to the obligations under a LCF, GCF event
- Important market activities, such as query resolution or market publications will be impaired with time needing to be spent on administering faxes and fax records.
- The reputation of SEMO is impaired due to errors in fax transmittals.
- Further breaches of the Code by SEMO for obligations that could be met with the appropriate fax communication system in place.

Medium Risk

- Additional disputes being raised due to fax communications being misplaced, or receipt not being auditable.

Low Risk

- Commercially sensitive data being misappropriated

What Data / Information Supports your risk assessment

- SEMO currently issue approximately 150 faxes per month and receive a similar number. This excludes faxes in relation to LCF, GCF or System Failures.
- Missing fax confirmations have been highlighted in previous audit reports as an issue.
- SEMO resources such as Credit Risk controllers are using manual fax issuance on a daily basis.
- Customer Service has to manually deal with all incoming faxes and deal with faxes received in both jurisdiction offices.

16 ON-LINE REGISTRATION SYSTEM

Resource Title (Vacancy Title/ System Name)			
On-Line Registration System			
2010-11	2011-12	2012-13	Total €
400,000			400,000
Problem Statement			
<p>The existing SEM registration process was devised ahead of the SEM go-live in 2007. Since then SEMO have received feedback on the registration process from the point of view of New and Existing Participants registering Parties and Units, as well as TSOs, MDPs and SEMO internally. This feedback has identified a number of deficiencies in the current registration process. Some of the shortfalls of the current process include:</p> <ul style="list-style-type: none"> • <i>Confusion on the part of Applicants when completing the pack due to the complex nature of the data required and content of the application forms.</i> For example a wind generator will still be asked about reservoir maximum fill capacity. • <i>Poor validation of the registration pack prior to submission.</i> No validation occurs as data is entered prior to submission to SEMO. This frequently leads to the Participants having to resubmit applications with corrected data. This in turn leads to delays in the starting the registration process for the Participant and additional work for SEMO. In some cases SEMO, the TSO, and MDP have deemed the application complete but later realise that not all the information to register the unit is present. • <i>Poor version control and file management.</i> Especially where the application may need to be revised and updated. This has led to issues with different versions of documents being used by Parties involved in the registration. • <i>Significant administrative overhead to manage by SEMO.</i> Due to the email and hardcopy nature of the current process to accept, respond, distribute to the Parties involved in validating and realising the registration. • <i>Inefficient dissemination of relevant information from the pack to TSOs and MDPs.</i> The TSOs and MDPs are required to validate and approve specific registrations information. In addition they need to load information into their systems to provide the required inputs to SEMO. • <i>Difficulty in converting applications into Market and TSO/MDP System setup.</i> There have been cases since Market start where the setup of new registrations has meant settlement of the market has been delayed. 			

The number of Unit registrations has continued to increase over 2009. Indications are that 2010 will see further increased levels of new registrations.

Business Need Statement / Objective

A business need has been identified for an online registrations system and associated document management system to replace the existing inefficient and error prone manual registration process. The objective is to:

- Simplify the process both for Market Participants and Other Parties involved (SEMO, TSOs, MDPs)
- Improve the efficiency of the registration process
- Provide better document management

The new online registration system and associated document management system will assist in meeting the following business needs:

- Tailoring of registration applications in order to only present the required information to the new Participant based on the type of generation/supply they are registering.
- Validation of applications as the user inputs information and before submission to ensure consistency and completeness
- Version management to: allow Participants to update applications where required and resubmit, and allow updates to applications to be controlled and disseminated correctly to impacted Parties
- Online approvals by TSOs, MDPs, Participants and internal SEMO market functions to remove the need for paper or email based approvals.
- XML output of registration information to allow TSOs, MDPs and SEMO to load registration information to their systems. Reducing errors and omissions, as well as improving the efficiency of setup.

Strategic Benefits

The strategic benefits will be in meeting the Trading and Settlement Code Objectives. Particularly:

- to facilitate the efficient discharge by the Market Operator of the obligations imposed upon it by its Market Operator Licenses
- to facilitate the efficient, economic and coordinated operation of the SEM
- to facilitate the participation of electricity undertakings engaged in the generation, supply or sale of electricity
- to promote competition in the single electricity whole market on the island of Ireland.

Risk Analysis

The risk associated with not implementing an online registration and document management system are:

High Risk

- Additional resources will be requested by SEMO, MDP, TSOs in order to manage the increasing number of registrations in the market.
- Errors which may delay registration of new Units or disrupt settlement of the SEM will continue to occur.
- The reputation and image of the SEM will be tarnished by poor first interactions with the market by New Participants.
- Breaches of the Trading and Settlement Code by all Parties involved may increase.

Medium Risk

- Possibility of disputes being raised due to registration issues.
- Delays in registration of Units in the SEM.
- Issues identified in audit reports will continue to occur due to difficulties in document control with the existing process.
- The quality and timeliness of market functions will be reduced due to resources being drawn into administering the registration process.

Many of these risks may be seen as a barrier to entry into the Market.

What Data / Information Supports your risk assessment

Since Market Go Live Market Participants have found it complicated to Register in the SEM that the application process and Form makes it difficult to get it correct the 1st time. This was highlighted and discussed at a 2009 Modifications Working Group which was looking at amendments to AP1 “Participant and Unit Registration and Deregistration”. The suggestion put forward by Market Participants was for SEMO to progress an online Registration Tool.

There have been occasions since market start where registration errors and omission have lead to issues with the setup of registrations in both the Market System and MDP/TSO systems having a detrimental effect on the operation of the market. This includes delays in settlement of the market.

There has been a number of Market Participants who have raised concerns with the Regulatory Authorities about the Registration process and this is one of the areas that cause difficulties for the Market Participants, especially given it is often the first contact they have with the SEM.

Business Benefit / Justification

The business benefits of an online registration system and associated document management system are:

Simplifying the Process for both Market Participants and Other Parties involved in Registrations (TSOs, MDPs, SEMO).

- Decreased workload for Market Participants in entering the SEM.
- Easier completion of application forms.
- More transparency in the registration process on Market Participant requirements.
- Improved image of SEM through more transparent and straight-forward registration process.

Improved Efficiency of Registration Process

- Reduction in workload with validation of application prior to submission meaningless work in correcting incomplete or inaccurate applications.
- Improved communication between applicants and SEM.
- Ability to monitor the process or issues with registrations more easily.
- Reduce to minimum, delays in processing applications due to administrative issues.
- Less administration in disseminating information to Parties (TSO, MDP, SEMO internal).
- More efficient approvals process (TSO, MDP, SEMO, Market Participant).
- Few errors in setting up new registrations in SEMO, TSO and MDP systems.

Better Document Management

- Reduced errors due to different versions of documents being used by Parties.
- Single repository for registration documents.
- Reduction in disagreements over timelines for application processing.
- More easily audited registrations.

Anticipated Outcome

A simplified, more efficient registration process for all Parties involved. With fewer issue related to registrations in the SEM.

- Positive feedback from new Participants regarding registering in the SEM.
- Reduced number requests to resubmit applications due to incorrect or missing data
- Reduced timelines deemed complete applications.
- Fewer errors in the registration setup in SEMO, TSO and MDP systems.
- Reduced workload for SEMO, TSO and MDPs in completing registrations.

Assumptions

SEMO Controller resources will be approved to work on this project

17 TRAINING ENVIRONMENT (INTERNAL)

Resource Title (Vacancy Title/ System Name)			
Training Environment (Internal)			
2010-11	2011-12	2012-13	Total €
250,000			250,000
Problem Statement			
<p>Currently there are no training environments available in SEMO to train new hires or rotating staff in any of the functional areas:</p> <ul style="list-style-type: none"> • Pricings & Scheduling • Settlement • Funds Transfer • Credit Management. <p>Without a dedicated environment for staff training, it has resulted in the Production environments being used. This is by no means an ideal scenario as there is a major risk that operational issues occur during training that could ultimately impact the market.</p> <p>In addition, there are no environments available for SEMO staff to run studies for reports that are an important part of SEMO's function. Staff has to request access to other IT test environments and/or run studies in production. This puts a constraint on the number of studies that staff can perform and hinders SEMO's capability to undertake studies.</p>			
Business Need Statement / Objective			
<p>It is essential that additional Market Application environments are made available to allow SEMO to:</p> <ul style="list-style-type: none"> (i) train staff and thus reduce operational issues in the short and enduring time frame and (ii) to allow SEMO to perform more studies to satisfy the demand for greater market analysis. 			
Strategic Benefits			
<ul style="list-style-type: none"> • Fewer operational issues occurring in production as a result of training, resulting in: <ul style="list-style-type: none"> ○ Lower costs of operational issues in the market can be great depending on the amount of rework required to correct the issue as well as having to communicate and manage the corrections. ○ The SEMO reputation is maintained 			

- Improved performance of individuals that follows from a completed training programme that only the provision of additional environments can provide.
- More comprehensive analysis can be provided to the Market if a dedicated environment were to be available without restrictive time constraints.

Risk Analysis

Without the provision of an additional environment, there will always be the risk that issues are caused to the production environment because of a lack of experience on behalf of the trainee. Because staff rotation is key to ensuring that all functions of the market can be carried out in a contingency situation, there will always be a significant amount of training occurring.

There is also the risk that SEMO cannot provide the analysis that the Market requires due to unavailability of environments to run studies; in particular the Pricing and Settlement environments.

What Data / Information Supports your risk assessment

Based on data for 2010 the forecast is that there will be at least four different staff trained in different functional areas every quarter for 2010; so for the whole year there will be least 16 training sessions going on during the year at different times. For 2009 there were 96 Operational issues that lead to breaches in the Trading & Settlement Code. The majority of these issues can be attributed to training in one form or another. There is plenty of scope for improvement in the number of operational issues.

In terms of running studies the fact that there are no dedicated environments means that the amount of analysis conducted is restricted to the availability of the environments. This should not be the case for the market operator. It should be possible to conduct studies for the benefit of the market on an ad hoc basis.

Business Benefit / Justification

- Less resources investigating and remedying operational issues – operational efficiencies
- Reduction in costs to the market due to the reduction in operational issues that cause resettlement.
- Greater ability to do more analysis as a dedicated study environment is always readily available

Anticipated Outcome

It is anticipated that there would be a measurable improvement in operational performance if a training environment was made available. In addition to the Operational Breaches mentioned above the operational KPIs would also show improvement.

It is anticipated that if a study environment is made available that SEMO's capability for providing analysis to the market as a whole would increase.

The number of Operational Breaches is a verifiable measure of operational improvement. In addition the KPIs

already in place for SEMO can also be used to measure the success of additional environments: Ex-Ante Pricing, Ex-Post Initial Pricing, Invoicing, Credit Cover Increase Notices.

Assumptions

It is assumed that the following environments be made available:

ABB Market Systems: MA, MOI, MPI X 2 environments (1 for training and 1 for Studies)

Navita Systems: Settlement, Meter Data, Credit Management x 2 environments (1 for training and 1 for Studies)

Axapta Systems: Axapta Finance System x 1 environment (for training, no need for Studies environment)

APPENDIX 2 UNPREDICTABLE BUSINESS CAPEX

Resource Title (Vacancy Title/ System Name)			
Unpredictable Budget			
2010-11	2011-12	2012-13	Total €
250,000	250,000	250,000	750,000
Problem Statement			
<p>From time to time, at short notice, there may be a requirement for supplementary capital expenditure. In recent times, there have been several cases of SEMO requesting amounts for capital expenditure such as additional storage tapes, additional software licences and other hardware sundries (i.e. RAID controllers, power supplies etc.). These requirements arose out of obsolescence or failure of some components and other unforeseen issues that required addressing.</p> <p>In any organisation's IT Department, there is a requirement to have a level of unplanned spending in a given time period. This spending can arise out of failing or obsolete software components; new business requirements that demand a different set of components; the availability of new products on the market that would address longstanding issues; or the fact that a software upgrade on one side of the business may mean that existing software on another side may be incompatible. An IT department needs to have the flexibility/agility to react to any of these changes in a timely fashion so that normal service can be provided to its stakeholders.</p> <p>The approval process for securing this funding from the Regulatory Authorities, is an unnecessary administrative step considering that the items required to be procured are essential. There is no value added to the process by building a formal business case and presenting to the regulator as this ultimately only serves to delay the inevitable purchase.</p>			
Business Need Statement / Objective			
<p>A contingency budgetary amount should be made available to the SEMO IT Manager to spend on business capital items without requesting specific approvals from the regulator. It is not possible to predict the exact level of spending that will be required, but it is essential to maintain a reliable, robust and secure set of market systems and so capital expenditure may be required at short notice to ensure this.</p>			
Strategic Benefits			
<ul style="list-style-type: none"> • More efficient use of resource time in SEMO and Regulatory Authorities. • Quicker turnaround of critical purchases to enable maintenance of market system availability and performance. 			

- Direct in-house ownership of “sundries” budget – SEMO to manage spending closely – senior management to challenge requesting manager on each piece of spending.

Risk Analysis

Without this amount, the SEMO management will have to continue requesting individual amounts from the Regulator. This may delay the resolution of a critical issue that could be remedied with the installation/upgrading of some piece of hardware/software.

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What Data / Information Supports your risk assessment

Over the past number of years, when a capital expenditure requirement has been identified, the regulator has been approached to approve the amount. These types of spending are limited to essential items and have been consistently approved by the regulator. There is no value added by approaching the regulator and therefore SEMO feel this role should be the remit of the SEMO IT Manager.

Business Benefit / Justification

- Issues should be resolved more quickly as administration will not be holding SEMO up to make the required purchases.

Anticipated Outcome

A discretionary budget to be allocated to SEMO on the proviso that at the end of each year a detailed account of spending will be provided to the regulator.

Assumptions

That any spending of the discretionary budget to be agreed between the SEMO IT manager and the SEMO General Manager.

APPENDIX 3 DEPRECIATION CALCULATIONS

The Depreciation Calculations for SEM Establishment, Day 1+ and Other Assets for 2009-10 are illustrated in the 3 tables below.

SEM ESTABLISHMENT

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SEM Project Asset	Amount €
	47,802,291
Per RA Response based on inflated amount as opening balance in Nov 07	-0.45%
Asset Value in March 2010 Prices	47,587,181
Monthly Depreciation	793,120
Annual Depreciation	9,517,436
Depreciation To Date at /End Sept 10	27,759,189
Asset Value at 01/10/2010	19,827,992

SEM DAY 1+

Day 1+ Asset	Amount €
Est Asset Value at Feb 09	9,363,359
Monthly Depreciation	156,056
Annual Depreciation	1,872,672
Depreciation To Date at /End Sept 10	2,965,064
Asset Value at 01/10/2010	6,398,295

OTHER ASSETS 2009-10

Other Assets go live in 2009/10	Amount €
Approved Spend	2859493
Monthly Depreciation	47658.22
Depreciation to Sept 10	242862.7
NBV at 01/10/10	2616630

DEPRECIATION SCHEDULE

	Opening Asset Values				Depreciation			Additions	Depreciation Charge	NBV	5.80%	WACC Charge
	SEM	Day 1+	Other Assets	Additions in Revenue Period	SEM Asset	Day 1 +	Other Assets live in 2009/10				Average WACC	
Oct-10	19,827,992	6,398,295	2,616,630	1,378,125	793,120	156,056	47,658	22,969		29,201,240	141,078	
Nov-10	19,034,872	6,242,239	2,568,972	1,355,156	793,120	156,056	47,658	22,969		28,181,437	136,152	
Dec-10	18,241,753	6,086,183	2,521,314	1,332,188	793,120	156,056	47,658	22,969		27,161,635	131,225	
Jan-11	17,448,633	5,930,127	2,473,656	3,654,219	793,120	156,056	47,658	62,052		28,447,749	137,438	
Feb-11	16,655,513	5,774,071	2,425,997	3,592,167	793,120	156,056	47,658	62,052		27,388,863	132,322	
Mar-11	15,862,394	5,618,015	2,378,339	3,530,115	793,120	156,056	47,658	62,052		26,329,977	127,207	
Apr-11	15,069,274	5,461,959	2,330,681	5,711,188	793,120	156,056	47,658	99,438		27,476,830	132,747	
May-11	14,276,154	5,305,903	2,283,023	5,611,750	793,120	156,056	47,658	99,438		26,380,559	127,451	
Jun-11	13,483,035	5,149,847	2,235,365	5,512,313	793,120	156,056	47,658	99,438		25,284,288	122,155	
Jul-11	12,689,915	4,993,791	2,187,706	5,842,875	793,120	156,056	47,658	106,604		24,610,850	118,901	
Aug-11	11,896,795	4,837,735	2,140,048	5,736,271	793,120	156,056	47,658	106,604		23,507,412	113,570	
Sep-11	11,103,675	4,681,680	2,092,390	5,629,667	793,120	156,056	47,658	106,604	12,835,194	22,403,974	108,239	1,528,486
Oct-11	10,310,556	4,525,624	2,044,732	7,131,188	793,120	156,056	47,658	133,406		22,881,858	110,548	
Nov-11	9,517,436	4,369,568	1,997,074	6,997,781	793,120	156,056	47,658	133,406		21,751,618	105,088	
Dec-11	8,724,316	4,213,512	1,949,415	6,864,375	793,120	156,056	47,658	133,406		20,621,378	99,627	
Jan-12	7,931,197	4,057,456	1,901,757	7,300,969	793,120	156,056	47,658	142,906		20,051,638	96,874	
Feb-12	7,138,077	3,901,400	1,854,099	7,158,063	793,120	156,056	47,658	142,906		18,911,898	91,368	
Mar-12	6,344,957	3,745,344	1,806,441	7,015,156	793,120	156,056	47,658	142,906		17,772,158	85,862	
Apr-12	5,551,838	3,589,288	1,758,782	8,910,375	793,120	156,056	47,658	176,875		18,636,574	90,038	
May-12	4,758,718	3,433,232	1,711,124	8,733,500	793,120	156,056	47,658	176,875		17,462,865	84,367	
Jun-12	3,965,598	3,277,176	1,663,466	8,556,625	793,120	156,056	47,658	176,875		16,289,156	78,697	
Jul-12	3,172,479	3,121,120	1,615,808	9,879,750	793,120	156,056	47,658	201,875		16,590,447	80,153	
Aug-12	2,379,359	2,965,064	1,568,150	9,677,875	793,120	156,056	47,658	201,875		15,391,738	74,361	
Sep-12	1,586,239	2,809,008	1,520,491	9,476,000	793,120	156,056	47,658	201,875	13,927,194	14,193,030	68,570	1,065,553

Oct-12	793,120	2,652,952	1,472,833	12,667,250	793,120	156,056	47,658	258,427		16,330,894	78,899	
Nov-12	0	2,496,896	1,425,175	12,408,823		156,056	47,658	258,427		15,868,752	76,666	
Dec-12		2,340,840	1,377,517	12,150,396		156,056	47,658	258,427		15,406,611	74,433	
Jan-13		2,184,784	1,329,858	12,741,969		156,056	47,658	272,594		15,780,303	76,239	
Feb-13		2,028,728	1,282,200	12,469,375		156,056	47,658	272,594		15,303,995	73,937	
Mar-13		1,872,672	1,234,542	12,196,781		156,056	47,658	272,594		14,827,687	71,636	
Apr-13		1,716,616	1,186,884	13,517,313		156,056	47,658	299,146		15,917,952	76,904	
May-13		1,560,560	1,139,226	13,218,167		156,056	47,658	299,146	Page	15,415,092	74,474	
Jun-13		1,404,504	1,091,567	12,919,021		156,056	47,658	299,146	73	14,912,232	72,045	
Jul-13		1,248,448	1,043,909	12,649,875		156,056	47,658	299,646		14,438,872	69,758	
Aug-13		1,092,392	996,251	12,350,229		156,056	47,658	299,646		13,935,512	67,326	
Sep-13		936,336	948,593	12,050,583		156,056	47,658	299,646	6,627,128	13,432,152	64,894	877,210