# Single Electricity Market Systems
# Readiness Assurance Report:
# Gemserv

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Dr. Brian Saunders, *Consultant*
Malcolm Rowley, *Consultant*

**Gemserv Limited**
7th Floor Centurion House
24 Monument Street
London
EC3R 8AJ

Company Reg. No: 4419 878

Tel:      +44 (0) 20 7090 1013
Fax:      +44 (0) 20 7090 1001
Mobile:   +44 (0) 77 4381 3003

Malcom.Rowley@gemserv.com
www.gemserv.com

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# 1. Executive Summary

Gemserv was appointed by the Regulatory Authorities (RAs) of Ireland and Northern Ireland to provide assurance on the readiness of the market for the implementation of the All Island Market for Electricity.

One element of this assignment covers a quality assurance activity focussed on Market Systems compliance with industry codes and procedures.

The nature of the quality assurance required was specified in Terms of Reference provided by the Regulatory Authorities in the Market Readiness Support Request for Proposals of 23 November 2006 and further described in the proposal for the work from Gemserv.

This report deals with the assurance opinion relating to the compliance with industry codes and procedures of Market Systems that are being delivered through the SEM Establishment Programme. This programme is being undertaken by the Transmission System Operators (TSOs) in Ireland and Northern Ireland.

At the outset of this element of the assignment an Approach Document was produced, and then discussed and agreed with the RAs and the TSOs. This report has been produced in accordance with that Approach Document.

The Programme comprised streams of works to specify, design, build, test and commission:
- central systems to implement the rules and processes of the new market;
- systems and processes so that the two System Operators could fulfil the requirements placed on them by the new market; and
- wholesale meter data provider services to meet to requirements of the new market.

There were other aspects of the Programme that were out of the scope and are therefore not covered in this report.

The Programme consisted of three main projects within the scope of the Gemserv assignment; the SEM Implementation project and two TSO Readiness projects. The latter incorporated the meter data provider work.

In summary, Gemserv's opinion is that based on the evidence provided and reviewed. Reasonable assurance can be given that each of the projects, within the Programme,

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will deliver systems and processes which will comply with the requirements of the Trading and Settlements Code and its subsidiary documents. Further evidence should be sought from the Market Trials to gain additional assurance that the new Market Systems will successfully operate together end-to-end.

Gemserv found that the teams in each project were professional and committed to successful delivery. Gemserv is grateful for the assistance provided by each team and particularly by Fergal Egan.

In general fit-for-purpose project and programme management methods were applied across the programme. The methods used were not the same across the projects, being adapted, modified or replaced as appropriate to the context.

In order for the all new systems to fully implement the new market it also necessary for the systems and processes to have been designed and developed at a detailed level in a mutually consistent way.

Although the projects were governed as a single Programme, there was no overall Design Authority or Programme-wide Configuration Management. It might have been expected that responsibility would have been taken at a single point for overall consistency, integrity and inter-operability of the programme deliverables. Instead it appears that reliance was placed on each project taking and interpreting its requirements from the TSC separately and defining the interface requirements between the central systems and the TSO systems. In general the project management processes within each project gives confidence that the requirements will have been correctly identified and delivered, but the lack of overall Design Authority creates a risk that the systems may not fully inter-operate correctly. This could be dealt with through testing of the ability of the systems to work together. The programme did undertake testing of the interfaces and demonstrated the ability to transfer files of data across the interfaces. However, this testing did not include all the systems in a fully end-to-end manner. A Design Authority and such end-to-end testing would have provided useful additional assurance.

Full end-to-end operation should be demonstrated, for the first time, in the Unscripted Phase of Market Trials. This would also include market participants outside the Programme,

This assignment did not include the Market Trials and does not therefore take account of any of the results and findings of the Market Trials. However, Gemserv notes that some issues have been identified in the early stages of Market Trials. Gemserv recommends that additional assurance be sought from the results of the unscripted phase of the Market Trial.

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These assurances should include:

- the end-to-end compatibility of the systems and processes developed by all the projects in the programme;
- that there are no critical or major severity defects that will have a major impact on market operation' or;
- where there are high severity defects in market systems their affects will be resolved by the date of market opening or ameliorated by competent work-arounds to enable an orderly market to operate.

The findings from the Market Participant Self Certification Process are also likely to provide further information.

If the additional assurance set out above can be satisfactorily obtained from Market Trials and Self Certification, than reasonable assurance can be given that the Single Market systems, the TSO systems and the wholesale MDP systems will comply with industry codes and procedures and will operate to deliver the requirements of the Single Electricity Market.

## 2. Introduction

### 2.1 Background

Gemserv was appointed by the Regulatory Authorities (RAs) of Ireland and Northern Ireland to provide assurance on the readiness of the market for the implementation of the All Island Market for Electricity.

That assignment covers the following aspects:
- Assurance of Market Systems compliance with industry codes and procedures
- Participant Readiness Coordination
- Provision of strategic advice in regard to market readiness

The nature of the quality assurance required was specified in Terms of Reference provided by the Regulatory Authorities in the Market Readiness Support Request for Proposals of 23 November 2006 and further described in the proposal for the work from Gemserv.

This report deals with the assurance opinion relating to the first element above. Many of the market systems that are the subject of this assurance assignment are to be delivered through the SEM Establishment Programme. This programme is being undertaken by the Transmission System Operators (TSOs) in Ireland and Northern Ireland.

At the outset of this element of the assignment an Approach Document was produced, and then discussed and agreed with the RAs and the TSOs. This document is provided as Appendix 1.

This report is based on information gathered and discussed up to and including 27 September 2007. Several meetings were held with members of the Programme team. Documentation was provided for review before most meetings, some was presented at the meetings and more was provided after the meetings. The documents provided to Gemserv for review are listed in Appendix 2.

In accordance with the assurance approach set out in Gemserv's proposal and the Approach Document, this report is based upon review of the project management processes established and operated within the projects and of documents relating to the development and implementation life cycle.

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The Assurance Opinion is provided as three main strands:

- An opinion on the management processes and methods used in the programme
- An opinion on the conformance of the market systems and processes to be delivered by the programme to the requirements set out in industry codes and procedures.
- An opinion on the way the standards and methods adopted by the programme have been applied.

Taken together these strands give an overall view (within the scope of the assignment) of the expectation that the requirements of the new market will be delivered completely, on time and will be fit-for-purpose.

As set out in the Approach Document, this assignment does not cover all aspects of the SEM Establishment Programme, but only those agreed with the Regulatory Authorities.

## 2.2  The Context and Nature of the SEM Establishment Programme

In assessing the programme management method and processes, it is important to understand the nature of the programme, its context and the particular challenges and risks it faces.

The SEM Establishment Programme has to deliver a range of new or modified systems and business processes from several different projects within the Programme. It has to do this in two countries, under two legal systems, with two currencies, two Regulators and two system operators. It has to ensure the harmonisation of operations and procedures to enable the effective working of an All Island Market. The systems and processes it delivers have to inter-operate with those delivered and operated by other participants. When the Programme was initiated, the requirements of the market that are defined outside the Programme and are under the control of the RAs, were not completely specified. They have been subject to development and change throughout the lifetime of the Programme. Thus it can be seen that the Programme faces a broad set of challenges some that are likely to apply to all programmes of this nature and some that are very specific. The assurance opinion provided in this report takes into account the nature and context of the Programme.

## 2.3  The Programme Structure

The Programme is the joint responsibility of the Transmission System Operators (TSOs) in Ireland and Northern Ireland. The structure of the Programme has changed for different phases. It is fully described in the documents provided to Gemserv and included in the set listed in Appendix 2. The elements of the Programme which are relevant to this report are:

- Programme Management. This applies as an "umbrella" to the whole programme.
- SEM Implementation Project.
- Eirgrid Readiness Project
- SONI Readiness Project
- Eirgrid Metering Project. This forms part of the Eirgrid Readiness Project but is considered separately in this report.
- SONI Metering Project. This forms part of the SONI Readiness Project but is considered separately in this report.

Amongst the elements not in the scope of this report are the TSO Harmonisation Project and the SMO Establishment Project. This report and the assignment do not cover the Market Trial activities of the Programme.

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# 3. Programme Management Approach

## 3.1 Methodology

Programmes and projects are often managed according to a defined methodology. There are proprietary standards used by consultancy firms and public domain standards. One of the latter is Prince2, initially developed as PRINCE by the British Government's Central Computer and Telecommunications Agency (CCTA) and now issued by the Office of Government Commerce. These methodologies specify the standards and processes to be used in running a programme or project. The degree to which each element of the standards needs to be applied will depend on the context and nature of the programme. Adopting a standardised approach assists in ensuring completeness and adequacy of the way in which the programme is set up and managed through it life cycle. An audit of the programme management approach will often review the methodology chosen for its appropriateness and then review how completely that methodology has been implemented.

The SEM Establishment Programme does not have a specification or description of an overall approach to programme management that has been chosen for use. A range of standards, methods and processes has been put in place that is based on the experience and knowledge of the team created to provide programme leadership and advice. Gemserv was informed that some of the programme management approach was based on Accenture methods and other elements were based on the experience of individual team members.

Each of the projects within the Programme has to a certain extent, had to apply different project management approaches. This was driven by existing relationships and service arrangements covering legacy systems that needed to be modified to suit the new arrangements. For example, where change management processes had been provided for in existing contracts, it would not have been possible or sensible to attempt to impose the Programme standard.

The absence of a methodology specification is not necessarily a critical omission. Without the guidelines that a standard methodology would provide, the completeness and appropriateness of the standards and processes created for the programme will depend upon the choices and preferences of the programme team and the adequacy of the experience and knowledge on which these are based.

The Programme provided Gemserv with a wide range of documents which demonstrated the existence of many of the elements of project management that would be expected. In the absence of a specified methodology, Gemserv has

compared the set of documents provided with its expectations for a programme of this nature.

Appendix 2 includes in the list of documents all those seen and reviewed by Gemserv in assessing the completeness and adequacy of the programme management approach.

## 3.2 Audit Approach

As stated in the Approach Document, in order to make the initial assessment of the project processes and controls, Gemserv would expect to review the following documents. This assumes that the methodology and nomenclature of Prince2 is applicable. Gemserv does hold the view that Prince2 should always be used, but believes that it does provide a valuable and relevant reference or yardstick. Where different titles and a different documentation structure applied to the Programme, Gemserv sought access to the equivalent material:

- Project Initiation Documents
- Quality plan
- User requirements
- Project plans,
- Test Strategy and all other test documentation as it becomes available
- Risk, Assumption and Issue logs and supporting procedures
- Project structure and support
- Management Processes such as Change Control, Configuration Management,
- Internal assurance techniques (e.g. TACs, UACs and BACs)
- Compliance matrices mapping the projects obligations to requirements specifications, design specifications testing stages to project sign off

In many cases the equivalent material has been seen, either under a different title or distributed in several documents.

Each of the elements listed above is considered below.

### 3.2.1 Project Initiation Document

A Project Initiation Document (PID) in Prince2 defines the project, forms the basis for its management and defines the assessment of overall success. It is intended to ensure that the project has a sound basis before a major commitment is made and to act as a base document against which the Project Board and Project Manager can assess, progress, change management issues and ongoing viability questions.

Whether or not a PID is used as the vehicle for achieving them, these are valid building blocks for any programme or project.

The SEM Establishment Programme has no single Initiation Document however there a suite of documents which together comprises most of the elements expected for a PID. For example, there are initial impact analyses and scope documents which together identify the scope of the programme. There are Project Charters which repeat the definition of scope and go on to identify the nature of the resources required, the governance structure that will apply and some elements of programme management. Some of the projects within the Programme produced a PID relating only to those projects. There is a programme plan which comprises plans for each of the separate projects. There is no list of project or programme deliverables at this level, although there is a Progress Tracking process and document which captures the programme deliverable and milestones. Importantly for a programme of this nature there are documents detailing how communications inside and outside the programme are to be managed, including with the RAs. The suite of documents has been used as part of a briefing pack for incoming programme members. This is one of the functions of a PID.

The Programme underwent a specific planning phase during which the set up and resourcing of the programme were established.

The set of documentation seen by Gemserv, subject to the observations below, is fit for the purpose of a PID and should allow the intentions of a PID to be achieved.

### 3.2.2 Quality Plan

A Quality Plan is expected to be part of a Prince2 PID. It identifies the techniques and standards to be used to ensure that the quality expectations of the programme are met.

There is no Quality Plan for the SEM Establishment Programme, in that there is no single document which sets outs the quality techniques to be used. There is a range of documents which cover quality management. For example there are 12 documents titled "Standards". These are included in the list in Appendix 2. One or two of these standards are very specific to this programme (for instance Standard 11 which requires the use of a disclaimer and copyright notice). Others are more general in scope (for example, Standards on Risk Tracking, Issue Tracking and Change Management). There are other documents which define elements of quality management. These and the set of Standards would normally have been specified in a Quality Plan. The production, at the initiation stage, of a definition of the approach to quality would have provided additional assurance of completeness and appropriateness for the context of the programme. However, with the exception of the

observation below relating to Configuration Management, no significant omission in the provisions for quality management in the programme has been identified.

### 3.2.3 User Requirements

The User Requirements are, within the scope of this assignment, the set of requirements defined in the market codes and procedures that have to be delivered by the Programme. The SEM Establishment Programme has a wider set of requirements than this. This assignment is concerned only with assurance on the set of requirements defined in the Approach Document.

Gemserv has seen evidence of a process for identifying the requirements for the Programme at the initial stage and, particularly importantly for this Programme, for tracking changes to those requirements through the lifecycle of the Programme. Each project within the Programme has dealt with the further analysis and tracking of requirements separately. This is considered further in later sections.

### 3.2.4 Project Plans

Gemserv was provided with extracts of the large portfolio of programme plans which covered all the projects. The plans appeared to be comprehensive and to be used actively within the projects. There is a Standard covering the maintenance of the programme plans.

### 3.2.5 Test Strategy

The approach to testing for the central systems taken by the Programme is described in a document entitled "Overview of Central Systems Testing". This describes the different stages and types of testing to be undertaken and describes the purpose of each stage. (The document also describes how the Programme would ensure consistency between the Trading and Settlement Code and the system specifications.) The document describes the elements of testing that would be undertaken within the SEM Implementation Project, more widely with the other projects in the SEM Establishment Programme and participants in general. The testing elements were, described as two groups; one named Standard, Deterministic Testing, comprising unit test, product test and integration test; the other named External Integration Testing comprising; Communication Channel Qualification Testing, Facilitation of Participant Interface Testing and External metering Interface Testing. Although described in a Programme document, the approach to testing dealt primarily with the testing to be undertaken and managed by the SEM Implementation Project. It does not cover the specific testing to be undertaken within the TSO Readiness Projects. The approach provided for the testing of the interfaces with the other projects, but did not define how or to what extent the systems developed in those projects would be incorporated in the integration tests.

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As is described later in the section on the SEM Implementation Project the specified approach was thorough and should result in sound testing with processes to assure full coverage of the TSC requirements.

### 3.2.6   Risks, Assumptions and Issues Logs

Each of these were provided to Gemserv at various stages of the Programme. There were standards for risk and issue tracking (Standards 2 and 3). The logs covered all the aspects that would be expected and were reviewed under the processes defined in the Standards on a regular basis. The major risks identified included those that Gemserv would anticipate would arise in a programme of this nature. Mitigating actions were identified and the key risks were monitored at appropriate levels within the Programme Governance.

### 3.2.7   Management Processes

**Status Reporting**

The provision of information on progress to all the stakeholders of a programme of this nature is a major challenge. Documentation was provided which set out how this was managed in the Programme. Examples of Status Reports were provided. The reports appeared to present the information relevant to the intended audience in a concise manner. Based on the reporting standards, samples of reports and conversations with the Programme team, Gemserv's opinion is that reporting "upwards" process was suitable for a programme such as this.

**Change Management**

The management of change to requirements or scope is a key element of any project and is particularly important for the SEM Establishment Programme. The requirements defined by the market codes and procedures are not under the control of the Programme and were not firm when the Programme started.

Standard 5 sets out the approach used in the Programme to Change Management. The Standard sets out a process which appears to be fit-for-purpose in its content. Gemserv's review found that although the Change Management Standard was produced as a Programme Document, it was only applied fully in the SEM Implementation Project. The other projects were, in many instances, working within existing contractual arrangements using established development processes. In those instances the existing processes were utilised instead of the Programme Standard. Gemserv believes that this was pragmatic, acceptable and probably unavoidable. The processes used within each of the Projects for product development and change control were fit-for- purpose.

**Configuration Management**

This element of project assurance will seek to confirm that the project has incorporated and implemented, fit-for-purpose processes to identify track and protect the project's products. It is particularly relevant to this Programme which is delivering a range of systems and process in a number of projects. At least some of the systems and processes will need to inter-operate with each other and with other systems and processes being developed by others outside the Programme. Even for a single sub-system or business process there will be a number of associated products on which a change could have an impact. For example a change to a requirement is likely to necessitate a change to the functional specification, design documentation, the system itself and to the related test scripts. Configuration Management is applied to ensure that all of the related products remain consistent.

The deliverables of the SEM Establishment Programme are, by their nature, absolutely key to the success of the new market. The external requirements have been subject to significant change. In this context, control of the complete suite of deliverables and an understanding at all times of the status of each and the relationships between them, is very important. This is usually provided for by establishing a single programme wide Configuration Management process.

A Configuration Management process will provide a mechanism for managing tracking and controlling all of the programme's products. The integrity of the suite of products would usually be the responsibility of a "Design Authority". There would generally be a process for establishing a Programme Baseline. This is a snapshot of all the products that have been defined as part of the baseline at the time it is declared. There would be expected to be a Configuration Management Plan which would normally form part of the Programme Quality Plan.

The SEM Establishment Programme did not have a programme wide Configuration Management plan, or any standards which specifically covered configuration management. Gemserv was informed that the essential elements of configuration management were embedded in the change managements processes. These were intended to ensure that all impacts of a proposed change were identified and then implemented if the change was accepted. Gemserv did not see any evidence that this incorporated any fully Programme wide process. It did cover the specification and testing of the interfaces between the central systems and the TSO systems. The Programme approach has been to rely on the change control processes within each of the projects separately and the control of the interfaces. This is a plausible approach which avoids some management overhead. Without the assurance to be gained from a programme wide design authority and configuration management, greater emphasis and reliance is placed upon the individual projects and end-to-end testing of the

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complete set of systems to provide confidence in end-to-end compatibility.
Programme end-to-end testing is considered in a later section.

## 4. Meeting the SEM Requirements

This section provides Gemserv's assurance opinion on the conformance of the market systems and processes to be delivered by the programme to the requirements set out in industry codes and procedures. As described in the Approach Document the opinion is based on a review of the procedures within the Programme which identified the scope of the requirements and then ensured complete implementation of those requirements in a fit-for-purpose manner. The review made use of documentation provided by the Programme team; and meetings and conversation with members of that team.

This section of the report addresses each of the five projects that is:
- SEM Implementation t
- Eirgrid Readiness
- SONI Readiness
- Eirgrid Metering
- SONI Metering

The scope of the subject matter considered within the Gemserv opinion is as set out in the Approach Document.

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## 4.1 SEM Implementation Project

As stated in the Approach Document, the SMO assurance activities are primarily focused on the SMO's market systems, excluding those for scheduling and dispatch. The "systems" are taken to include all systems and processes to enable market operations, from "bid to bank", with the exception of the scheduling and pricing systems. This scope includes the Participant Registration system. The SMO's corporate finance systems are outside of scope, as these have no role in market operations.

All other activities related to SMO establishment are outside of scope, including but not limited to: organisation design and staffing, facilities, licences and agreements, training, Market Trial, financing, banking arrangements.

The assurance assessment of this project was undertaken by considering the following elements:

### 4.1.1 Project Management

The Programme established project management processes and standards. Not all of these have been implemented in the TSO Readiness Projects (this is further discussed in the respective sections of this report). However, the Programme Standards have been applied in the SEM Implementation Project.

### 4.1.2 Business Solution Assessment

The objective of this step was to establish that the project had processes in place to identify the external and internal business requirements and had interpreted those into the project specification documentation (e.g. User Requirement and Functional Specifications).

Gemserv reviewed the processes by which the SEM Implementation Project identified the requirements set by the TSC and its procedures and then ensured that all the requirements (within the scope of the assurance assignment) were captured and carried forward into development, testing and implementation. Gemserv was provided with a range of documents which covered the development of the requirements from an initial assessment through to the functional specifications which formed the basis of the procurement of the new systems. No single document which captures the complete set of User Requirements has been created. Instead the project has moved more or less directly from the initial impact assessment and definitions of project scope, to the production of procurement documents and the set of functional specifications. Those functional specifications were further developed for a re-quotation by the vendors. In all, Gemserv saw three versions of the set of Functional

Specifications dated, November 2005, February 2006 and March 2007. These are identified in Appendix 2.

Understanding accurately the true progress of development being undertaken by vendors at their own site can be an issue for a project. The SEM systems were largely developed by ABB and Navita in the United States and Norway. The SEM Implementation Project put in place some observers at key stages on the vendor sites. Status reports were provided regularly. Factory and Site Testing were used to confirm delivery of systems conforming to the Functional Specification.

A particular challenge for this project was that the market rules were not completely defined at the project outset. They were subject to development and change outside of the control of the project, under the authority of the RAs. A process was established which ensured consistency with the market rules as they developed. A joint change control process was established with the RAs, which was intended to ensure that developments and modifications of the TSC were managed and controlled so that any potential impact on the SEM Establishment Programme and the SEM Implementation Project could be identified before the change was confirmed. In addition to this, a reconciliation process was used to review new releases of the TSC and procedures to ensure consistency with functional specifications and the systems that were being built. Gemserv's understands that at least some issues identified in the reconciliation process were resolved by modifying the rules to match what the systems had been built to do. At that stage of the overall All Island Programme such an approach was pragmatic and probably the only practical way forward, if the Go Live Date was to be maintained. This was even more likely to be true as the implementation approach taken had been to use "off-the-shelf" products and to limit the degree of bespoke development.

Gemserv was provided with a record of the output of a reconciliation exercise dated 24 February 2007 and an email, dated 3 April 2007, from the Regulatory Authorities, acknowledging the work of the Programme in that reconciliation process.

Changes arising from either the TSC Change Control process or the reconciliation process were subject to the Programme change control procedures. This was defined in Standard 5 - Change Management Approach.

It is Gemserv's opinion that the lack of a consolidated set of User Requirements is a minor weakness. It at least partly reflects the fact there was no "user" organisation in place during the early stages of the Project. It has the effect of making it more difficult to demonstrate that all the requirements necessary for the SEM have been identified. However, other processes have been applied, (particularly the reconciliation and internal change control processes) that provide assurance that all the requirements of

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the SEM have been incorporated in the project and furthermore, that the set of project requirements has been kept consistent with the SEM requirements as the TSC has been developed and modified.

### 4.1.3 Specific Data Feeds

Gemserv was requested by the Regulatory Authorities to confirm whether the development and testing of some specific data feeds were within SEM Project scope. These are data feeds between the two TSOs and the central systems. Therefore they need to be part of the projects "at each end". Each data requirement is listed below:

- Technical information regarding generators, including spot availability declarations to the SMO.
- Information related to Market Participant trades on the Moyle Interconnector by the Interconnector Administrator.
- Transmission Loss Adjustment Factors calculated by the System Operator
- Loss-of-load probabilities (LOLP), for capacity payments.
- Spot dispatch instructions for all Generator Units, to support instruction profiling.
- Load and wind forecasts.
- Generator Outage and Transmission Outage schedules, provided to the Market Operator for publication.
- Data related to plant with non-firm access. (The System Operator needs to put in place rules for initially notifying the MO whether a plant has firm or non-firm access, and then of any changes within the year.)
- Estimates of any demand reduction due to load shedding by the System Operators.
- Generator Unit-under-Test notices.

Evidence of the inclusion of the first seven data feeds and their processing can be identified at a number of points. For example, the Market Applications Test Conditions System Integration Test Functional; Version 2.0 dated 29 January 2007 and System Integration Test Functional Control Sheet; Version 3.0 dated 15 June 2007, identify Test Conditions and the associated Test Scripts for the processing of this information and identify the sources as the two TSO systems.

There is no automated interface to support the provision of the following ad hoc flows to the SMO. TSO's have indicated that the information will be provided manually to the SMO:

- Data related to plant with non-firm access. (The System Operator needs to put in place rules for initially notifying the MO whether a plant has firm or non-firm access, and then of any changes within the year.)

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- Estimates of any demand reduction due to load shedding by the System Operators.
- Generator Unit-under-Test notices.

### 4.1.4 Review of the Test Approach

The next element of the audit reviewed the testing documentation covering the test approach, test planning and associated test material to ensure they followed best practice, were robust and complete. In short, that the proposed testing is 'fit for purpose'.

An important element here is assurance that the scope of testing covers the scope of the requirements as they are developed and modified through the project life cycle.

The testing approach for the SEM Implementation Project was set out in the Central System Testing Overview; dated 11 April 2007. This identified what type of testing was to be undertaken. It set out a structure for testing "internal" to the project and for external interface testing. It particularly included verification of the specifications against the Trading and Settlement Code.

The Market Applications Test Conditions System Integration Test Functional; Version 2.0 dated 29 January 2007 and System Integration Test Functional Control Sheet; Version 3.0 dated 15 June 2007 demonstrated how the definition of the testing cascaded from test cycles, to test condition, test scripts and test data. It also demonstrated how the different elements of the functional requirements were mapped into testing.

### 4.1.5 Review of test results

This element of the assurance work concentrated on the results from the tests carried out in accordance with the project test documentation. Gemserv reviewed test and error logs together with the records of remedial actions. The number of outstanding errors and their severity ratings will provide information to inform an opinion into market readiness reports.

Gemserv was provided with the reports of the Factory Testing, Site Testing and System Integration Testing. The following extracts from the reports illustrate the purpose and outcome of those tests.

**Factory Tests**

The Factory Test (FT) Report summarizes both the testing process and the status at the completion of Factory Test for the All Ireland Single Electricity Market Programme. The Factory Test Procedures were developed by the Prime Contractor (PC) based on

the Specifications of their System Design. The Test Procedures were reviewed by the EirGrid/SONI functional and technical teams, as well as the PC Oversight Team.

The stated goals of FT included:

- Ensuring that the hardware provided for the system was operational and fully integrated
- Ensuring that AIP-SEM met the requirements defined in the Functional Specifications
- Establishing a foundation of testing and baseline functionality
- Preparing the system for Site Test and other future test phases

FT was the responsibility of the PC. EirGrid/SONI was responsible for observing/witnessing as well as providing feedback during the FT execution – they did not have sign-off or acceptance responsibility.

FT started on time (January 22, 2007) in Santa Clara, California and was completed[1] in Dublin, Ireland with a 2 day delay (February 28, 2007) due to 4 test cases which had not passed during the FT activities at ABB. Of these 4 test cases, 3 were related to Settlements and Invoicing – Eligible Availability (EA), Pre-EA and CPGPF – and 1 was related to CRM – Security. For Settlement and Invoicing cases, the fix was implemented and additional tests were executed by Navita in Pasadena, California.

**Site Tests**
The Site Test (ST) Report summarizes both the testing process and the status at the completion of Site Test for the All Ireland Single Electricity Market Programme. The scope and process of ST essentially replicated that of FT, verifying the functionality of the system and following the same general FT test procedures once the system was shipped and installed on site at EirGrid/SONI facilities. Following functional verification of Market Applications (MA), Market Interface (MI), Settlements, Invoicing, Metering, and Credit Risk Management and their respective components, ST concluded with a site update period to ensure a smooth transition to System Integration Test (SIT).

The stated goals of ST included:

- Ensuring that the delivered system was identical to the system tested during FT

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[1] EirGrid/SONI had not at this stage contractually recognized the completion of Factory Test. There is an outstanding issue with respect to the level of quality of the performance testing that was performed during the Factory Test – it did not adequately test all of the requirements that were stated in the General Performance Requirements document.

- Ensuring that the delivered system meets the requirements set forth in the Functional Specifications. Specifically, the ST was designed to place more emphasis on the areas that interfaced with other systems
- Building up the baseline of known behaviour of the system
- Preparing and facilitating the system for Integration and Market Trial.

Despite the original intention to completely mirror FT, the schedule of ST mandated testing only a selection of the test cases previously established for FT.

ST started on time (March 1, 2007) and completed with a 4 day delay (March 27, 2007) in Dublin, Ireland, with 1 failed test case (Settlement and Invoicing – STL_CALC_ENG), which EirGrid/SONI agreed to leave for retest during SIT, after receiving a written commitment from ABB that the fix would be released by April 16, 2007.

According to the ABB Defect List from March 27, 38 defects remained open or had been postponed prior to the start of SIT. None of the open defects were classified with a severity of Critical or Major.

The Site Test report identified a number of risks arising from the results of the testing. It was recommended in the report that the bulk of these would be dealt with by testing in the Integration Test phase.

### System Integration Testing

System Integration Testing (SIT) was described in the Exit Report as an end-to-end test of the SEM systems and interfaces (both internal and external) and was meant to reflect the way these systems and interfaces will run in the real market.

The key objectives of SIT were as follows:
- Demonstrate that the SEM systems and interfaces (both internal and external) are fully integrated and operating (functionally and technically) as intended for real market operations;
- Demonstrate the ability of EirGrid / SONI (SMO) business users to perform their tasks effectively; and
- Provide assurance to the SEM Implementation Project that EirGrid / SONI (SMO) can fulfil their operational obligations and are ready to participate in Market Trial.

The SIT incorporated three passes. Gemserv has been provided with summaries of the results of each pass and logs of the defects that were discovered. At the end of the last pass there were 72 outstanding defects including 12 "major" defects. (The SEMIT graded defects as; critical; major; serious and minor.) The twelve major

defects related to a problem with digital signatures that prevented the correct transfer of data between the central systems and the TSO systems.

A further stage of testing was undertaken, named "Regression Testing". At the end of this stage there remained 2 major defects and 50 other defects. The two major defects related to the digital signature problem. It also appears that the regression tests were performed using a contingency arrangement to avoid the digital signature defect which had not been resolved by the end of SIT. This was summarised in the Exit Report as follows:

"MDPs were still unable to submit meter data files with a valid digital signature successfully, due to incomplete documentation by Navita. Although a contingency approach was put in place (removal of digital signature by Navita Web Services) and tested successfully with both MDPs (SONI and EirGrid), this issue still needs to be addressed and tested successfully prior to Go-Live."

A recommendation was made in the Exit Report that a correction plan for the outstanding defects should be agreed with the software vendors prior to Go Live. Gemserv was informed that this was done and two additional releases of the software were planned for 19th of August and 14th of September). Gemserv was also informed that a fix had been identified for the Digital Signature issue and further tests were arranged.

At the time of finalising this report, NIE T&D had reported that files had been transferred using digital certification and digital signatures. However, ESB Networks was, on 26 September, still sending reports using the contingency e mail alternative or file transfers without digital signatures.

Gemserv,s view is that the planned testing, within the SEM Implementation Project, was thorough and fit for the purpose of testing the central systems and the interfaces with the TSO systems. At the completion of the planned testing there remained defects and issues in the central systems and interfaces which required resolution before Go Live. Further work was done to resolve these issues and the results of additional testing demonstrated that there remained no critical or major issues with the central systems and interfaces.

The Gemserv Approach Document states that the assurance opinion needs to cover the SEM systems "from bid-to-bank". As discussed later in this report it is Gemserv's view that the integration testing undertaken by the Programme and as described in the SIT Exit Report does not provide the required "end-to-end" or bid-to-bank" assurance. Notwithstanding the second and third objectives of SIT set out above, Gemserv's understanding is that the testing did not include the systems that will be operated by Eirgrid and SONI "behind" the interfaces.

### 4.1.6   End-to-End Testing

The scope of this assignment as set out in the Approach Document was to provide assurance on the systems and the business processes needed to meet the requirements of the TSC, "from bid-to-bank". Gemserv has seen evidence of comprehensive functional testing within each of the projects comprising the SEM Establishment Programme. We have also seen evidence of the testing of the interfaces between the systems and processes developed in the separate projects. Gemserv has not seen evidence that these latter tests incorporated all the systems "from bid-to-bank". Rather than use all of the systems and processes end-to-end in the business process integration testing, files of data were constructed to facilitate interface testing, rather than generating the test data within the systems. This is understandable as constructing input data to generate known data from systems to allow comparison with predicted results can be difficult. However, this limits the assurance that each of the separate projects has interpreted the functional requirements in exactly the same way and that the systems are "end-to-end" compatible.

This programme has faced a significant change control and configuration management challenge. As discussed above, Gemserv has not seen evidence of a programme wide approach to ensure programme wide conformance to the requirements of the TSC. There is no Programme Design Authority with the responsibility for overall consistency and interoperability. In this context, a programme wide, end-to-end demonstration of compatibility would have provided valuable additional assurance. In the absence of this being gained from the integration testing, reliance will have to be placed on the quality of the design, development and testing within each of the projects separately; and on the results of the Market Trials. Only in the unscripted phase of the Market Trial will data be generated "at source" and processed "end-to-end". The Market Trials are outside the scope of the Gemserv assignment and this report. It is recommended that specific assurance is sought from the Market Trials, paying particular attention to the degree to which "real" source data is utilised in the trials and processed "end-to-end" by all the new and modified systems.

The participant self assessment process, which is being carried out by the RAs, includes an opinion from each participant of their performance of their systems in the Market Trials. It is recommended that this aspect of the self assessment returns should be given particular attention.

The conclusions that can be drawn from the Market Trial will be somewhat limited because of the limited "width" of data and scenarios that will be covered. Nevertheless, given the good standards applied to development and testing in each of

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the projects in the SEM Establishment Programme, if the results from the unscripted phase of the Market Trial are good, then Gemserv's opinion is that reasonable assurance can be had that the systems and processes developed and implemented by the Programme will be compliant with the requirements of the TSC and its subsidiary documents, and will be fit-for-purpose.

### 4.1.7 Performance Testing

In addition to demonstrating that the systems and processes incorporate all the functionality required by the TSC, it is important to demonstrate that the performance of the systems will be adequate to deal with the data rates and volumes that will be encountered in live operation. This was tested by specific performance tests which were reported in the Report – SEM Performance Test Summary Report Version 1. This was received in a draft form. The tests were designed to demonstrate that the performance of the systems met the General Performance Requirements. A number of performance targets were set for defined levels of loading. The tests covered performance, stress testing and system stability.

The conclusion drawn in this report from the performance testing was that the testing of the individual components and concurrent operating conditions of the SEM project had ensured a level of confidence in the system prior to go live and mitigated the risk of any potential performance issues

### 4.1.8 Business Readiness

This element of the audit comprised confirmation that the project incorporated preparation for the transition to live operation. The scope of this report as set out in the Approach Document excludes many elements of the establishment of the SMO. The opinion given here covers only those aspects within scope, primarily the preparations undertaken in order to ensure that the new systems and processes and the control arrangements around them are migrated successfully from the project environment into operation and meet the requirements of the Trading and Settlement Code.

Gemserv received the SMO Transition Plan and other related documents, including a sample status report dated week beginning 16 July 2007. The Plan included within its scope, provision for the transition to live operation of Processes, Systems, and Data which included the central market systems and data, other T&SC processes, and SMO corporate systems. The plan was written at a high level but it allocated responsibility for all activities necessary to bring about the transition to live operation and provided reasonable assurance that the management of the transition and preparations for business readiness were catered for in the scope of the project. The Plan dealt with the transition of responsibility for the systems and processes from the

SEM Programme to the SMO. It identified key milestones for the preparations for transition.

By the nature of this work, many of the important achievements were planned to be reached very late in the programme, and particularly after the production of this assurance advice. One key date which will be after the Go Live decision is the date for complete cutover for central market systems. It is recommended that the project is asked to provide an update on progress with and preparations for this milestone at the time of the Go Live decision, in order to gain assurance as close to the milestone as possible. A "Readiness Calendar" was used by the Programme to track progress with obligations and dependencies on participants over the last three months. It is likely that this or a summary based on it, will provide valuable information to the Go Live decision and thereafter.

Many of the elements of Business readiness were tested in the SMO Non-functional testing. The objective of the Non-functional test was to verify that the correct infrastructure, operational, and other non-functional architecture components were configured in order support the operations of the SEM Market

The results of the testing were reported in the Report - SMO Non-functional Testing Version 1.0 dated 12 July. That report included the following Table. This shows that there were a number of failed tests and deferred tests.

| | FAILED | PASSED | DEFERRED | REJECTED |
|---|---|---|---|---|
| TOTAL | 78 | 351 | 56 | 2 |
| % | 16.0% | 72.1% | 11.5% | 0.4% |

The failure and deferred tests were spread across a number of areas.

Gemserv saw a progress report (Outstanding Technical Items with Resolution Status v01) which indicated that a number of the faults causing the failures had been fixed and were due to be retested, or that a date by which a fix was to be identified was defined.

## 4.2 Conclusion for the Assurance Opinion on the Readiness of the SEM Implementation Project

The Gemserv assurance activities in relation to the readiness of the SEM Implementation work have been primarily focused on the settlement systems and

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processes to enable market operations (with the exception of the scheduling and pricing systems) and the interfaces to the two TSO systems.

The assessment was also required to consider whether the development and testing of the following required interfaces were within project scope:

- Technical information regarding generators, including spot availability declarations to the SMO.
- Information related to Market Participant trades on the Moyle Interconnector by the Interconnector Administrator.
- Transmission Loss Adjustment Factors calculated by the System Operator
- Data related to plant with non-firm access. (The System Operator needs to put in place rules for initially notifying the MO whether a plant has firm or non-firm access, and then of any changes within the year.)
- Estimates of any demand reduction due to load shedding by the System Operators.
- Loss-of-load probabilities, for capacity payments.
- Spot dispatch instructions for all Generator Units, to support instruction profiling.
- Load and wind forecasts.
- Generator Outage and Transmission Outage schedules, provided to the Market Operator for publication.
- Generator Unit-under-Test notices.

The approach taken was to assess the processes and controls that have been used within the projects. Gemserv did not undertake a detailed assessment of the deliverables. The assurance opinion covers:

- Fit-for-purpose programme and project management processes and standards.
- Fit-for-purpose utilisation of the project and programme processes and standards
- Fit-for-purpose processes and application of those processes for identifying the full scope of requirements and ensuring the robust development, control and testing of those requirements.

If each of these is properly achieved in the Programme then reasonable assurance can be taken that the relevant aspects of the market systems and processes will be ready and fir-for-purpose for Go Live.

This assignment did not include the Market Trials and does not therefore take account of any of the results and findings of the Market Trials. Gemserv does however make a

recommendation that additional assurance on end-to-end compatibility be sought from the results of the unscripted phase of the Market Trial.

### 4.2.1 Programme and Project Management Process and Standards

The SEM Establishment Programme does not have a specification or description of an overall approach to programme management that has been chosen for use. In this circumstance greater reliance than otherwise needs to be placed on the planning process and the insight of the project team to ensure that all required processes and standards are identified and established. Gemserv's review found that, with the exception of a documented process and plan for Programme-wide Configuration Management, fit-for purpose programme and project management processes and standards were in place for the SEM Implementation Project.

### 4.2.2 Application of Programme and Project Management Process and Standards

Gemserv found that, in general, the programme and project management processes and standards established for this project had been applied within the project lifecycle products. The exceptions observed are not felt to compromise a successful outcome for the work. Change Management was found to have been implemented in such a way as to include some elements of Configuration Management.

### 4.2.3 Completeness of Delivery of Requirements

Gemserv found that there were fit-for-purpose processes within the separate projects for specifying and maintaining the project requirements (within the scope of this assignment). The requirements were traced through the project lifecycle documents. Review processes were used to confirm continuing compliance as the externally generated requirements were incrementally developed.

Gemserv saw evidence that each of the specified data feeds and the process for calculation of the price and volume of System Operator trade on the Moyle Interconnector were included in the scope of the project. Some of the specified data feeds will be handled with a manual process as they will be utilised only infrequently. Gemserv's view is that the use of manual processes in these cases is appropriate and reasonable, especially as they are designed to inform the market and are not an integral part of the settlement processes.

The lack of a comprehensively documented, programme wide configuration management process was felt by Gemserv to be a weakness in a programme which faced significant configuration challenges. The Change Management processes used within this part of the Programme incorporated some elements of a Configuration Management process. A fit-for-purpose configuration management process helps to

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mitigate the risk of inconsistencies between different project products and with external (that is, those developed in other projects in the programme and those external to the programme) systems with which the project deliverables need to interoperate. If such inconsistencies arise, the set of products working together may not fully implement the SEM requirements. Functional testing within each project might not reveal incompatibilities in interpretation or implementation of requirements at a detailed level.

Comprehensive integration testing across the whole programme would be expected to reveal any such inconsistencies. Gemserv did not find evidence that the programme wide integration tests that were undertaken fully demonstrated end-to-end operation (the Approach Document required "bid-to-bank" assurance). Given that there was no evidence of programme wide configuration management and the challenge of external change to the programme, assurance of end-to-end compatibility is likely to be important to the Regulatory Authorities. Gemserv recommends that assurance be sought from the reports of the Market Trials, particularly the unscripted phase. This may be the only point at which "as live" data is processed end-to-end (Bid to bank)

Gemserv';s assessment of the testing within the project found that a comprehensive strategy was put in place with appropriate stages of testing for a project of this nature. The scope of testing was mapped from the specification of requirements to include the TSC requirements including the specific data feeds that Gemserv was requested to consider.

### 4.2.4 Overall View

Gemserv's view is that the programme management processes and standards, their application and the completeness of the scope of the requirements in the SEM Implementation Project have been applied in a competent and professional manner. The use and application of these disciplines provide reasonable assurance that the project deliverables with the scope of the Gemserv Approach Document should be compliant with the Trading and Settlement Code and it's Agreed Procedures. Gemserv would recommend that further assurance should be sought from the Market Trials. These assurances should include:

- the end-to-end compatibility of the systems and processes developed by all the projects in the programme;
- that there are no critical or major severity defects that will have a major impact on market operation' or;
- where there are there are high severity defects in market systems their affects will be resolved by the date of market opening or ameliorated by competent work-arounds to enable an orderly market to operate.

## 4.3 Eirgrid Readiness Project

The Eirgrid readiness project scope covers the changes required by the Transmission System Operator for Ireland to support the All Island Project. This includes the changes required because of the introduction of a Single Electricity Market (SEM) under the auspices of the Trading and Settlements Code (TSC), which is the main focus of this report.

The elements of the project that are included in the scope of this section include:
- Changes to the Eirgrid Electronic Despatch Instruction Logging system (EDIL), which is used to despatch controllable generation plant,
- Changes to existing systems such as MASS that will support the wholesale Meter Data Provider (MDP) Functions, and
- Data feeds that will be required by the Market Operator (M0) from the Transmission System Operator.

All other parts of the Eirgrid Readiness project scope, such as TSO harmonisation, have not been directly addressed as part of this assurance work.

### 4.3.1 Project Initiation Documents (PID)

Gemserv understands there are two main work streams within the Eirgrid SEM Project that are supported by a separate Project Initiation Document (PID). These are:

**Loss of Load Probability (LOLP) calculations**
The PID for the LOLP systems covers Project definition, Project planning, Quality planning, Communication planning, Configuration management, Project monitoring and control
The LOLP systems are new and are being developed by an in house Eirgrid team. The project also incorporates the interfaces with SONI to enable the calculation to be carried out on an all Ireland basis.

**TSO readiness Project**
The PID for the TSO readiness project states the scope includes the SIMDRACS Metering requirements, Load/wind despatch, EDIL and many other areas of TSO responsibility such as Outage Planning for the Transmission System and Generators. The PID includes; high level scope, milestone plans, Project Structure, Project Governance, Governance and Configuration Management.

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### 4.3.2    AIP database and interface system

To support the SEM, Eirgrid have developed an AIP IS system that includes a new database and interfaces between the external market and the systems. The main internal systems are MASS, LOLP, EDIL and OPS.

**MASS**

LogicaCMG is carrying out the modifications to the existing MASS systems to enable them to comply with the SEM requirements. This system will provide all the aggregated metered data quantities, required by the SMO, to the AIM IS system and will fulfil the wholesale MDP functions.

**EDIL and other information flows to the SMO**

Gemserv has been informed that the EDIL system does not require any changes. The despatch of Wind Farms will be carried out by the existing EMS system and not by changes to the EDIL system. The actual despatch instructions will be aggregated to a Trading Day in the AIP database and sent to the SMO on Trading Day plus 1. The Indicative unconstrained schedule will be made available to Eirgrid but not integrated into the EDIL systems. The testing of these changes is included in the AIP IS Test Plan.

### 4.3.3    Overall Governance and Management processes

Although part of the SEM establishment programme, the project has its own charter and plan. The Eirgrid Project Board manages the project governance. The Eirgrid Project Board has executive power over the project but no governance over the wider SEM establishment Programme. However, the Eirgrid Programme Sponsors sit on this board together with the TSO Project Board and the SEM Executive Board.

The Charter states that Programme templates and standards will be established and used by the project in a number of areas, including:

- Status Reporting;
- Risk Management;
- Issue Management; and
- Change Management;
- Document Approval & Sign-off; and
- Testing Approach.

As the project has evolved these templates and standards have been changed or modified to accord with the established practices of Eirgrid and the different project teams who are updating existing Eirgrid systems and processes. The majority of the Eirgrid project would seem to have adopted the Accenture developed methodologies

used in some areas by the SMO. Where appropriate the different methodologies are discussed in other parts of this section.

### 4.3.4    Meter Data Provider (MDP) Functions

Eirgrid has the responsibility for the collection of North/South interconnectors, transmission connected generation plant and demand metered data in the arrangements preceding the new All Island Market and have utilised a system called the Meter Data Aggregation and Substitution System (MASS) developed by a consortium led by LogicaCMG. The MASS system utilises raw metered data uploaded by MV90 applications and has supplied validated and aggregated metered data to the existing Transmission Electricity Settlements System (TESS).
It was identified that changes would be required to the existing MASS functionality in the Eirgrid- SIMDRAC, Scope document version 1. Based on this document LogicaCMG produced a functional specification. The functional specification detailed the changes required to the existing system which was expressed as:

- Export Generation on an end of half hourly basis for price affecting generation units.
- Export Generation on an end of half hourly basis for non price affecting generation units.
- Inter-jurisdictional (Letterkenny, Louth & Corraclassy) on an end of half hourly basis summated and netted to one value, import or export for aggregate unit IJ01
- Site Demand on an end of half hourly basis.
- Site Demand on an end of quarter hourly basis.

In addition an interface is being developed with ESB Networks to enable grid connected demand metered data to be transferred. At the time the assurance work was carried out the specification of the interface had been agreed, development had taken place and testing was in progress. Since then Gemserv has been made aware that this interface is completed and no system interface issues are outstanding.

Gemserv has also been provided with an extract from a LogicaCMG document that provided a report on the System and User Acceptance Testing indicating the functionality has been tested and approved for use within the MASS application. Gemserv has also been provided with a User Acceptance Test summary sheet.

Gemserv has not reviewed any supporting evidence to confirm the scope and execution of these test phases is satisfactory. Gemserv has based its opinion on the evidence presented indicating the Project Manager's approval of the delivery of the specified requirements that seemed to supported by indirect evidence (e,g, SIT results).

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### 4.3.5 Metered Data Estimates

As part of the brief, Gemserv was requested to confirm that the MDP would carry out metered data estimations in accordance with the Metering Code. This has been discussed with Eirgrid and we are aware that a change request has been raised to change section 3.8 of the Metering Code. This section says:

> "3.8: Where a test indicates that an error exceeds the limits of error then these errors shall be recorded before promptly adjusting, repairing or renewing the Metering Equipment (or part thereof) or replacing any defective components. The Metering Equipment shall be restored to service and proved to be operating within the prescribed limits of accuracy as soon, as is reasonably practicable. In such cases, substitute data shall be provided for settlement purposes in accordance with the MRSO procedures."

Gemserv has been provided with the Eirgrid suggested substitution and estimation rules. It is not part of Gemserv's remit to comment on the Metering Code but, the Eirgrid substitution and estimating procedures would seem more appropriate where SCADA, Main, Check, and registrant metered data are available. Based on our brief review of the Substitution Rules for Active Energy Data provided by Eirgrid these would seem to be fit for purpose and preferable to rules produced for distribution metering systems where alternative data is more limited.

### 4.3.6 Other data flows

Gemserv has been requested by the Regulatory Authorities to assess whether the development and testing of the following required interfaces' are within the SEM project's scope. Each data requirement is listed below with commentary on any written and verbal evidence. The document AIS System Test Plan has been provided to Gemserv to support the assurance activities. The document includes the main functional requirements and has been used by Gemserv to confirm the TSO SMO interfaces are within the project scope. Where possible test scripts references are also provided to provide an audit trail of evidence

**Technical information regarding generators, including spot availability declarations to the SMO.**
Section 15.10 of the AIS System Test Plan specifies the interface to the SMO for the provision of spot availability data. This is mapped in section 14, the requirements trace-ability matrix, as:

Business Requirement          BR10
Functional Requirement        FR13
Test Case                     ST13 (Provided to Gemserv)

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**Transmission Loss Adjustment Factors calculated by the System Operator**

Section 15.2 of the functional requirements in the AIS System Test Plan detail the changes required to Eirgrid TESS system. There will be a revised business requirement to store the TLAF's in a new AIP database, rather than in TESS. This is mapped in section 14, the requirements trace-ability matrix, as:

Business Requirement            BR2
Functional Requirement          FR2 and 3
Test Case                       ST2 and 3 (Provided to Gemserv)

**Data related to plant with non-firm access.**

There is no automated interface to support the provision of this ad hoc flow to the SMO. Eirgrid have indicated (along with SONI) that the information will be provided by manual means to the SMO.

**Estimates of any demand reduction due to load shedding by the System Operators.**

There is no automated interface to support the provision of this ad hoc flow to the SMO. Eirgrid have indicated (along with SONI) that the information will be provided be by manual means to the SMO.

**Loss-of-load probabilities (LOLP), for capacity payments.**

See section on LOLP

**Spot dispatch instructions for all Generator Units, to support instruction profiling.**

Section 15.12 of the functional requirements in the AIS System Test Plan provides information about the interface to the SMO for the provision of despatch instructions. It states '*The SMO require that they receive the Indicative Dispatch Instructions on D +1 at 14:00 and the Validated Dispatch Instructions by D +3 at 17:00.*'
This is mapped in section 14, the requirements trace-ability matrix, as:

Business Requirement            BR12
Functional Requirement          FR15
Test Case                       ST15 (Provided to Gemserv)

**Load and wind forecasts.**

Section 15.06 and 15.07 of the functional requirements in the AIS System Test Plan provides information about the interface to the SMO for the provision of load and wind forecasts.

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The load forecast is mapped in section 14, the requirements trace-ability matrix, as:

Business Requirement          BR6
Functional Requirement        FR9
Test Case                     ST9, and the wind forecast is mapped as:

Business Requirement          BR7
Functional Requirement        FR10
Test Case                     ST10 (Provided to Gemserv)
Annual Load Forecast Change Request refers (no ref Number)
Daily Load Forecast validation process design documents

**Generator Outage and Transmission Outage schedules, provided to the Market Operator for publication.**
Section 15.8 of the functional requirements in the AIS System Test Plan provides information about the interface to the SMO for the provision of generator and transmission outages.
The load forecast is mapped in section 14, the requirements trace-ability matrix, as:

Business Requirement          BR8
Functional Requirement        FR11
Test Case                     ST11

**Generator Unit-under-Test notices.**
There is no automated interface to support the provision of the TSO information to the SMO. Eirgrid have indicated (along with SONI) that the information will be provided manually to the SMO.

### 4.3.7    Disaster Recovery/Business Continuity

Some of the project documents include provision for Disaster Recovery (DR) and Business Continuity (BC). Gemserv is not aware of any testing being proposed before Go Live to test the changes and any upgraded systems.

### 4.3.8    Loss of Load Probability (LOLP)

Eirgrid will provide the SMO with the all island LOLP calculations. These will be calculated using information provided by SONI and Eirgrid. As mentioned earlier, Eirgrid have a discrete workstream to develop the LOLP requirements for the SEM. Change Request Reference Number: CR3 specifies the changes required to the Eirgrid system to include the SONI forecast data in the reference table for use in the LOLP calculations.

The workstream has produced a suite of documentation that includes:

- A business requirements specification (not seen by Gemserv)
- LOLP Capacity Payment Functional Requirements Specification
- LOLP project Table Definitions for Interfaces with LI Project
- LOLP schema
- XML formats for the SONI interfaces
- XML formats for the SMO interfaces
- PSOP file formats
- LOLP Screen design
- 5 Change requests

**Testing the LOLP systems**

Gemserv has also seen evidence of:

- LOLP Test Plan
- LOLP System Test Cases
- LOLP User Acceptance Test Cases
- Test Reports
- LOLP calculation testing
- System Testing Defect Reports
- Defect report sheets

All these documents would seem to conform to the standards set out in the project documentation. Gemserv is not aware of any outstanding defects with high severity ratings and interface tests have been carried out with SONI.

The LOLP project reported internally on the 16 August 2007 that they had 'Deployed to production Cape Clear Server. Deployed to 10g Server. CRs complete and Hand over to Ent. Apps complete.'

### 4.3.9    Cape Clear and legacy systems Test results

**System testing**

For the LOLP Project Gemserv have received information about system testing that indicates during the third pass 23 test cases have been run and 22 have passed with 3 residual defects.

For the TSO Readiness Project Gemserv have received information about system testing that indicates during the second pass there were 31 test cases run, 25 passed and there were 6 residual defects. The third pass indicates 25 Test cases were run and 25 passed with 2 defects.

**Dry Run testing**

Gemserv has seen evidence of dry run testing that fulfils the requirements of a Business Process Integration end to end test to prepare for market trials.

### 4.3.10 Internal Quality Assurance Processes

The project deliverables indicate the use of review and approval techniques to ensure they are produced to minimum quality thresholds. The governance and project structures would seem to support these quality procedures. Gemserv is not aware of any dedicated internal Quality Assurance team. We presume a member of the project board takes on a Senior User Role although we have no information to support this.

### 4.3.11 Defects, Issues and risks

Gemserv has been provided with the defect log that relates to the Eirgrid Market Trials Dry Run, dated the 27 August 2007. It stated there were 6 open issues and three were shown on the spreadsheet as high severity and high impact. Gemserv's understanding of these issues would indicate that they are of the type you would expect to encounter and resolve in a dry run environment.

The Project Board report dated 15 August 2007 described 12 open risks. None of the risks were judged to pose a 'go live' threat.

The same report indicated that there were 12 changes/issues/defects outstanding. Again none of these were judged to pose a 'go live' threat unless the proposed change requests were accepted and introduced into the production environment just before go live.

### 4.3.12 Conclusions

Eirgrid have taken a formal approach to the SEM project that is largely compliant with the stated standards. The development of the scope and business requirements looks to have been carried out in a structured manner. The requirements have been mapped through to the functional requirements and the test cases. The management processes relating to the MASS changes deviated from the programme methodology because of the ongoing arrangements with LogicaCMG who have been responsible for subsequent changes and updates. Gemserv believes this deviation from the Programme standards is sensible and practical and does not pose additional risk to the delivery of the project.

Gemserv has seen evidence of project planning and Change Requests but no evidence of supporting exception reports and impact assessments.

The samples of test documentation presented to Gemserv follow good industry practise and look to be fit for purpose. Gemserv has information on test results, defect reports, remedial action and the production of test reports. The defects and issues seem to be in line with what could be expected at this stage of a project lifecycle. With timely actions none would appear to pose a major threat to the go live date.

Based on the Dry Run evidence up to the 20 August 2007 Eirgrid have perfored their own end to end tests. The results, as at the 20 August, looked encouraging with the registered issues being addressed in timely fashion.

Gemserv's view is that subject to a satisfactory performance in the unscripted market trials Eirgrid should be in a position to support the opening of the SEM on the 1 November 2007.

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## 4.4 SONI Readiness Project

The SONI readiness project scope covers the changes required by the Northern Ireland Transmission System Operator to support the All Island Project. This includes the changes required because of the introduction of a Single Electricity Market (SEM) under the auspices of the Trading and Settlements Code (TSC), which is the main focus of this report.

The elements of the project that are included in the scope of this section include:
- Changes to the SONI Electronic Despatch Instruction Logging system (EDIL), which is used to despatch controllable generation plant,
- Changes to existing systems that will support the wholesale Meter Data Provider (MDP) Functions,
- Changes to the Moyle Interconnector Trading System (MITS) that will be required to support the TSC obligations, and
- Data feeds that will be required by the Market Operator (M0) from the Transmission System Operator.

All other parts of the SONI Readiness project scope, such as TSO harmonisation, have not been directly addressed as part of this assurance work.

### 4.4.1 Governance and Management processes

As part of the SEM Establishment Programme the SONI Readiness project has its own charter and plan. The SONI Project Board manages the project governance. The SONI Project board have executive power over the project but no governance over the wider SEM Establishment Programme. However, the SONI Programme Sponsors sit on this board together with the TSO Project Board and the SEM Executive Board.

The Charter states that Programme templates and standards will be established and used by the project in a number of areas, including:
- Status Reporting;
- Risk Management;
- Issue Management; and
- Change Management;
- Document Approval & Sign-off; and
- Testing Approach.

As the project has evolved these templates and standards have been abandoned or modified to accord with the established practices of individual vendors who are updating existing SONI systems and processes. These changes are discussed later in this section.

### 4.4.2 Meter Data Provider (MDP) Functions

SONI has the responsibility for the collection of transmission connected generation plant metered data in the arrangements preceding the new All Island Market. SONI has recently updated the systems with the SEM implementation in mind. A requirements document was produced - 'The Generator Meter Systems technical Specification and schedules' -that was used in the selection of a vendor for the work. This included new and additional metering systems that would be required to support the TSC obligations. The chosen contractor was Landis and Gyr's Meter2Cash subsidiary. The revised system was delivered at the beginning of 2007 and is now operational. Gemserv have seen evidence of the Landis and Gyr's Meter2Cash Factory Acceptance Testing and Site Acceptance Testing documents. The system does not include the interfaces to the SEM. These were specified separately as part of the MA/MI Interface workstream, for the development of the SONI Data Exchange, that would deliver all the required TSO external interfaces to the SEM, MITS and Eirgrid referred to later in this section of the report.

The MDP related functionality includes the requirement to insert metered data estimates where actual meter reading are unavailable for specified Settlement Periods. These will be inserted into the system manually and therefore SONI's internal procedures will need to ensure that any metered data estimates are compliant with the TSC and the Metering Code. These internal manual processes have not been reviewed as part of Gemserv's assurance activities. The system was delivered and tested in January and February 2007 and entered live operation during June 2007.

The Generator Metering System (GMS) installation includes full redundancy with duplicate functionality at both of SONI's key sites. These sites will support disaster recovery and business continuity requirements.

### 4.4.3 TSO Despatch (EDIL) systems

SONI commenced a project to redevelop its TSO dispatch systems during 2006. The systems were commissioned on 23 January 2007. It was mainly aimed at alignment with the EDIL systems already deployed by Eirgrid and included enhancements for the interfaces to the MITS. These TSO alignment changes were not primarily aimed at the TSC obligations although the EDIL system will in effect become one of the legacy systems supporting the SEM. Gemserv has carried out no assurance work on this element of the work although its operation since being commissioned would indicate the project has been successful.

The TSO despatch instructions are captured by the system and, similar to the MDP functions, the changes required to accommodate the SEM interfaces are dealt with by the SONI Data Exchange system.

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### 4.4.4 Moyle Interconnector Trading system (MITS)

The MITS was originally developed during the construction of the Interconnector to support electricity trading between Scotland and Northern Ireland. It was modified to support the BETTA trading arrangements introduced in GB during 2005. The IT developer, Real Time Engineering (RTE), successfully applied their own methodology in the original development and the subsequent changes required for BETTA. They have continued the use this methodology to implement the modifications to the MITS that support the SEM requirements. These methods are different to the standards established by the SEM establishment programme. Having reviewed the evidence supplied, Gemserv's opinion is that the principles of their methodology, if applied correctly, are appropriate for this type of development and this deviation from the Programme and Project methodologies is acceptable in these circumstances.

The changes to the existing MITS were specified and designed within a series of iterative workshops and this process continues where changes are required to the original specification. Each system change is captured in a 'Use Case'. The set of Use Cases make up the user and functional requirements for the software changes. For each workshop, minutes are produced that capture design decisions, actions, system rules and, in some cases, screen design. The Acceptance Test Specification maps the Use Cases to Use Scenarios that are each made up from a series of Test Cases.

The main interfaces with the SMO are specified in the requirements and include:
- Available Transfer Capacity (IA to SMO)
- Interconnector Active Capacity Holdings (IA to SMO)
- Interconnector User Nominations, and
- Modified Interconnector User Nominations (IA to SMO).

Gemserv reviewed the following logs maintained by RTE dated the 2 July 2007:
- Change management
- Risk Management
- Issue Management

These documents indicated a disciplined approach to change and issue management that is appropriate to the MITS project.

### 4.4.5 System Operator to System Operator Trades

Gemserv have been requested to provide assurance about the process for calculating the price and volume of System Operator to System Operator Trades over the Moyle Interconnector. Based on discussions and review of the based lined business requirements specification, Gemserv's understanding is as follows.

The volume of any System Operator trades will be limited in any Settlement Period by the active capacity of the Interconnector less the total of the Interconnector User Nominations in any one direction. Within these parameters the energy volume that can be traded by System Operators (National Grid (NG) and SONI) is unrestricted.

The prices for System Operator Trades will be agreed ex-ante and inserted into the MITS. The System Operators' written agreements and how the prices are derived, from that agreement, are outside the scope of this assurance work. For each . Settlement Period the MITS system will capture ex-ante the following information:

SONI initiated trades:
- Import   NG Offer price
- Export   NG Bid price

NG initiated trades:
- Import   SONI Offer price
- Export   SONI Bid price

There is also an "emergency assist" price only available to the Interconnector Administrator.

The System Operator trades are provided to the SMO in 2 files; the Indicative System Operator trades (SD plus 1) and the Final System Operator trades (SD plus 4).

### 4.4.6    Market Interfaces and Applications Interfaces workstream: SONI Data eXchange

SONI decided to produce a new development that would internally interface with their legacy system such as LOLP, Load, Anemos, GMS, EDIL to exchange data with the SMO and other external systems, such as the MITS and Eirgrid.

The system is an in-house development and they have used the Software Design specification for the MA/MI EMS interfaces as the base requirement. This document specifies all the new interface requirements to meet the TSC obligations. It also specifies an event scheduler to collate and exchange market information to support time critical flows.

Gemserv's understanding is the new system will access the required data from host, or legacy, systems and send compliant files to external organisations, such as the SMO. It will also receive files from the MITS, SMO and other SEM systems. For instance the TSO despatch instruction data is provided to the SMO via the new MI/MA system. The actual despatch data for a Trading Day, which is derived from the EDIL

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system, is selected and formatted for onward transmission to the SMO by the SONI Data eXchange system.

Gemserv has received a draft copy of the SONI Data eXchange Development Guide that incorporates the requirements definition. It includes the SEM XML Schema requirements, task manager and handler functionality and internal interface requirements. The SONI Data eXchange will collect and format data from the legacy systems into TSC compliant entities before transmission.

Gemserv has received the results of the SIT testing with the SMO. The results indicate that 17 of the 20 Integration tests were successful while 3 failed because of the MDP function digital signature validation issue. SMO was to identify a solution to the problem. SONI have since indicated that the Digital Certificate and Signature issues have been resolved and they are now using the enduring, rather than contingency, processes to transmit files to the SMO. Collectively this provides assurance that SONI is able to use the data eXchange system for sending files to the SMO. These tests are useful and necessary but Gemserv has some reservations about the overall level of assurance gained. It would appear that the data specified by the SMO could not be always be generated from the relevant SONI business system and the tests could not be described as full Business Process Integration Testing (BPIT). Gemserv would like to see more evidence regarding the end to end integration of all the market systems (see further comments in the sub section 'Market Trials').

Gemserv have received, from SONI, the spreadsheets of results from System and Unit tests. They reference test cases and their status. Gemserv have seen no evidence of the supporting test cases but SONI have indicated that collectively, the test cases provide tests of each data thread that the SONI ata eXchange supports.

### 4.4.7   Other data flows

Gemserv have been requested by the Regulatory Authorities to assess whether the development and testing of the following interfaces are within the SEM project's scope. Each data requirement is listed below with commentary together with any written and verbal evidence:

**Technical information regarding generators, including spot availability declarations to the SMO**
The table in Section 3.1.3 of the Software Design Specification for the MA/MI EMS interfaces and Section 2.2 of the SONI Data eXchange Development Guide specifies the interface to the SMO for the provision of spot availability data.

**Information related to Market Participant trades on the Moyle Interconnector by the Interconnector Administrator**

The table in Section 3.1.1 of the Software Design Specification for the MA/MI EMS interfaces specifies the interface to the SMO for the provision of Market Participant trades on the Moyle Interconnector. The changes to the MITS by RTE incorporate this requirement.

**Transmission Loss Adjustment Factors calculated by the System Operator**

The table in Section 3.1.1 of the Software Design Specification for the MA/MI EMS interfaces and Section 2.6 of the SONI Data eXchange Development Guide specifies the interface to the SMO for the provision of Transmission Loss Adjustment Factors.

**Data related to plant with non-firm access**

There is no automated interface to support the provision of this ad hoc flow to the SMO. SONI (along with Eirgrid) have indicated that the information will be provided manually to the SMO.

**Estimates of any demand reduction due to load shedding by the System Operators**

There is no automated interface to support the provision of this ad hoc flow to the SMO. SONI (along with Eirgrid) have indicated that the information will be provided manually to the SMO.

**Loss-of-load probabilities (LOLP), for capacity payments**

The table in Section 3.1.10 of the Software Design Specification for the MA/MI EMS interfaces and Section 2.5 of the SONI Data eXchange Development Guide specifies the interface to Eirgrid for the provision of SONI forecast data for inclusion in the calculation of whole system, rather than the jurisdiction, LOLP. The Eirgrid LOLP feed to the SMO is discussed in another section of this report.

**Spot dispatch instructions for all Generator Units, to support instruction profiling**

The table in Section 3.1.5 of the Software Design Specification for the MA/MI EMS interfaces and Section 2.2 of the SONI Data eXchange Development Guide specifies the interface to the SMO for the provision of despatch instructions at day plus 1.

**Load and wind forecasts**

The table in Section 3.1.6 of the Software Design Specification for the MA/MI EMS interfaces and Sections 2.1 and 2.4 of the SONI Data eXchange Development Guide specifies the interface to the SMO for the provision of daily, monthly and annual load forecasts at a jurisdiction level. The table in Section 3.1.7 specifies the interface to the SMO for the provision of Settlement Period Wind forecasts at a jurisdiction level.

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**Generator Outage and Transmission Outage schedules, provided to the Market Operator for publication**

The table in Section 3.1.8 of the Software Design Specification for the MA/MI EMS interfaces and Section 2.2 of the SONI Data eXchange Development Guide specifies the interface to the SMO for the provision of daily and monthly outage schedules

**Generator Unit-under-Test notices**

There is no automated interface to support the provision of the TSO information to the SMO. SONI (along with Eirgrid) have indicated that the information will be provided manually to the SMO.

### 4.4.8 Change and Risk Management

For the MITS workstream Gemserv has seen evidence of change, issue and risk management from the RTE reports. SONI also report on dependencies, issues and risks via their regular Status Reports – TSO Transition (SONI Operations) to the SEM Establishment Programme Board.

### 4.4.9 Testing and Trialling

Gemserv has seen no formal written information from SONI on the market trials but received a written update on Thursday 20 September 2007 and verbal update on Monday 24th September 2007.

It was reported on 20 September in writing that 'that all required market trial data have now been sent to the SMO via the SDX interface and we (SONI) are able to do this both using the scheduler and manually'.

The verbal update on 24 September included:
- The scripted trials had been completed successfully;
- Some minor issues were encountered during the first week of unscripted market trials but these had now been satisfactorily resolved;
- The digital certification and signature issue, with the SMO, had been resolved ( these will need to be changed to live signatures during cutover);
- TSO flows were being transmitted successfully using a production type environment;
- SONI had no significant known defects; and
- 2 issues perceived to be with the SMO systems had been reported.

### 4.4.10 Conclusions

SONI has the benefit of long term relationships with suppliers and IT support organisations. Each of these has evolved into a bespoke relationship that services the

ongoing needs of their commercial and functional requirements. The established development and maintenance methods used within this type of relationship are not the same as, and do not comply with, the methods and standards set up for the wider programme.

Based on Gemserv's observations, the different requirements of the Programme's methodology and the need to maintain existing relationships have been managed reasonably well. SONI support the Programme central governance structure by attending meetings and providing reports while managing their subcontractors using the pre-established protocols demanded by the longer term relationship.

Gemserv believe that this hybrid application of different methodologies in itself is not high risk as long as the management principles are applied in a disciplined and structured fashion. Some of the management techniques employed would seem to be informal and rely on the experience and skills of individual members of the team. This type of management can work well, in small to medium project environments, where there is a long term commitment by the key staff. However, the project is always vulnerable to the loss of those key staff.

With the exception of the MITS workstream Gemserv has some concerns about the lack of evidence relating to specification and testing materials. Gemserv did receive a summary of the results of Unit and System testing. Gemserv was informed that testing continued during the scripted Market Trials.

Gemserv would have liked to have seen more proof of successful end to end testing prior to the start of Market Trials and believe this places even more importance on the successful outcome of the unscripted phase of Market Trials.

More generally, as mentioned elsewhere in the report, we can see no real evidence of bid-to–bank, end-to-end integration testing. The successful delivery of the TSC requirements must be at risk until the unscripted phase of Market Trials has fully proven the integration of bid-to-bank and meter-to-bank processes.

Gemserv would recommend that the Regulatory Authorities obtain detailed feedback from SONI on the results of the unscripted phase of Market Trials just before the Go Live decision is made.

Gemserv has seen no evidence of how any metered data estimates will be derived and cannot confirm compliance with the Code of Practice although the need for estimation is is unlikely to arise and should not pose a significant risk to the integrity of settlements.

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# 5. Appendices

## 5.1 Appendix 1: Quality assurance approach for the SEM market systems

The Regulatory Authorities (RAs) are responsible for monitoring the efforts of all participants of the Single Electricity Market (SEM) to ensure that all necessary aspects of the market are ready for Go Active and subsequently Go Live. To assist in the execution of these responsibilities the RAs have appointed Gemserv to carry out some market readiness support activities. One of these activities is to provide independent external assurance about the readiness of the market systems that must conform to the industry codes and procedures.

**Purpose**

The purpose of this document is to provide the Single Market Operator (SMO) and the Transmission System Operators (TSOs) with preliminary information about the assurance processes that will be used by Gemserv in completing its assignment.
Scope of the Assurance Activities

The SMO assurance activities will be primarily focused on the SMO's market systems, excluding those for scheduling and dispatch (Gemserv has been made aware that the SMO has scheduled certification tests of the market scheduling and pricing systems and these are excluded from Gemserv's approach). The "systems" are taken to include all systems and processes to enable market operations, from "bid to bank", with the exception of the scheduling and pricing systems. This scope includes the Participant Registration system. The SMO's corporate finance systems are outside of scope, as these have no role in market operations.

All other activities related to SMO establishment are outside of scope, including but not limited to: organisation design and staffing, facilities, licences and agreements, training, Market Trial, financing, banking arrangements.

TSO assurance activities will be primarily focused on the dispatch systems and the data feeds from the TSO to the SMO systems. This assessment will cover whether the development and testing of the following required interfaces are within SEM Project scope including:

- Technical information regarding generators, including spot availability declarations to the SMO.
- Information related to Market Participant trades on the Moyle Interconnector by the Interconnector Administrator.
- Transmission Loss Adjustment Factors calculated by the System Operator

- Data related to plant with non-firm access. (The System Operator needs to put in place rules for initially notifying the MO whether a plant has firm or non-firm access, and then of any changes within the year.)
- Estimates of any demand reduction due to load shedding by the System Operators.
- Loss-of-load probabilities, for capacity payments.
- Spot dispatch instructions for all Generator Units, to support instruction profiling.
- Load and wind forecasts.
- Generator Outage and Transmission Outage schedules, provided to the Market Operator for publication.
- Generator Unit-under-Test notices.

TSO Assurance will also examine the process for calculation of the price and volume of System Operator trade on the Moyle Interconnector.

The scope of the assignment in relation to dispatch will be to confirm that an impact assessment on the dispatch processes of the introduction of the SEM has been completed, that the dispatch processes are documented and that any modifications necessitated have been incorporated in the scope of the projects.

The scope for the wholesale Meter Data Providers is the requirements defined by the T&SC, the Metering Code and by SIMDRACs. It includes Metered Data provided by the System Operators under AP16 as detailed in RA333 (subject to confirmation that this is agreed). The data should be estimated/substituted in accordance with the principles in the Metering Code

Finally, the scope of the audit will also include an audit of the project management processes followed by the TSOs' SEM Establishment Programme.

**The Approach**
Our approach will be to assess the processes and controls that have been used within the projects. We will not undertake a detailed assessment of the deliverables.

A prime requirement of this approach will be access to the relevant documentation produced as part of the project development methodology in standard formats such as word, excel, adobe, etc. If all the required information is readily available from the market systems projects, it is envisaged that only 2 or 3 meetings will be required with each organization to complete the work.

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Any follow up work will be similarly evidence based and is likely to be carried out remotely through telephone or e mail contact.

This approach is intended to be cost effective and to minimise intrusion. It will require a good level of cooperation at the working interfaces. At a high level, the approach can be broken down into four main elements. These are:
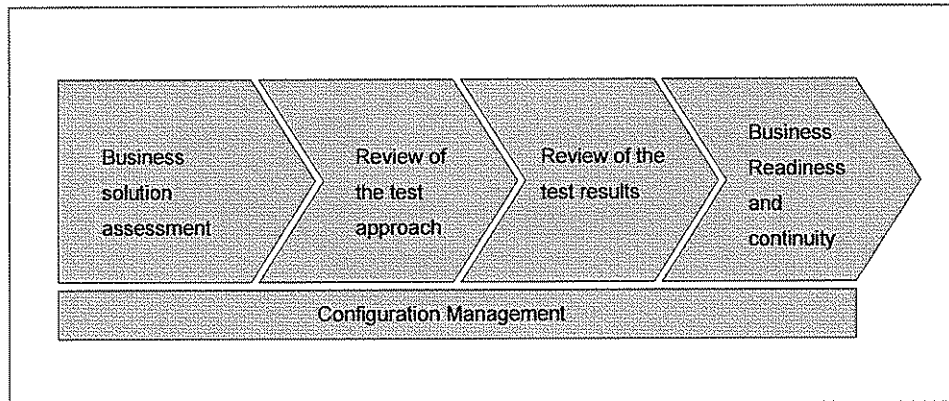


### Business Solution Assessment

The first element will concentrate on how the project, or programme, had identified the external and internal business requirements and had interpreted them into the project specification documentation (e.g. User Requirement and Functional Specifications). This stage is intended to ensure that the scope is correct and requirements have been clearly stated in the project documentation.

### Review of the test approach

The next element of the audit would review the proposed testing documentation such as the test strategy, test plan and associated scripts to ensure they follow best practice, are robust and complete. In short, that the proposed testing is 'fit for purpose'.

### Review of test results

This element would concentrate on the results from the tests carried out in accordance with the base lined test documentation.
The audit would concentrate on test and error logs, exception reports and records of remedial actions. The number of outstanding errors and their severity ratings will provide information to provide an opinion into market readiness reports.

### Business Readiness

This element will comprise confirmation that the project has incorporated preparation for the transition to live operation.

## Configuration Management

This element of the assurance will seek to confirm that the project has incorporated and implemented fit-for-purpose processes to identify track and protect the project's products.
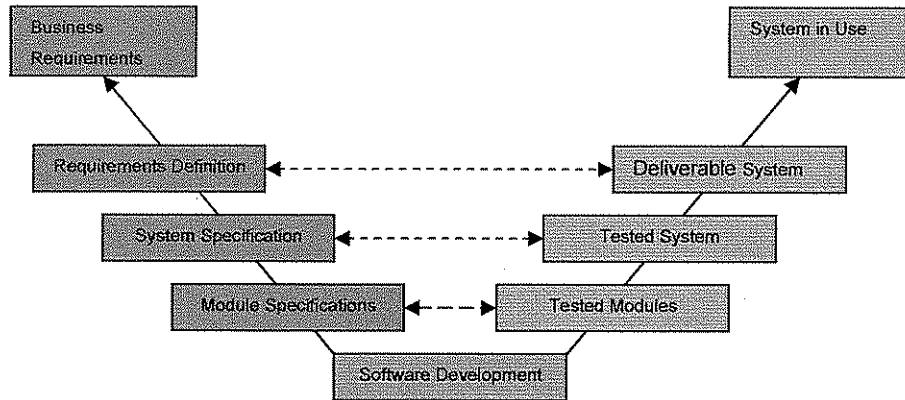


Throughout the process Gemserv will apply the classic "V" approach in which the requirements of the T&SC, other codes and procedures are taken as the starting point.

## Review of Management Processes

The intention of this aspect of the assignment is to provide assurance that the necessary scope is being delivered within a well managed project. The rationale is that if the scope is correct and the project management is good then there can be reasonable confidence that delivery will be fit-for-purpose. The approach will be to review the documentation that defines the project management processes that have been adopted by the projects. Evidence will be reviewed on a sample basis to demonstrate that the processes, as defined in the project documentation, have been followed. The project management approaches will be compared with those recognised as good practice. Gemserv will use Prince2 as a yardstick, but recognises that Prince2 itself can be applied in varying ways to suit the context and that other methodologies also represent good practice.

This approach minimises duplication of effort and allows an evidence based opinion to be developed. Specific queries and observations will be followed up with the respective project management.

## Timing of System Assurance Activities

The report(s) from this assignment will be used by the Regulatory Authorities as an input to the Go Live decision. Therefore it will be necessary to undertake to work in order to be able to submit a finalised report in mid September. The programme of interaction with the projects needs to be consistent with this. It will also be desirable

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to time the work to align with the achievement of key milestones and to be sympathetic to the workload on project staff.

**Initial Document list**

Gemserv will sign the necessary "Non-Disclosure Agreements" in advance of receiving any documents from EirGrid and SONI.

In order to make the initial assessment of the project processes and controls Gemserv would expect to review the following documents. This assumes the methodology and nomenclature of Prince2 is applicable. It may be that different titles and a different documentation structure apply to the projects, in which case Gemserv would seek access to the equivalent material:

- Project Initiation Documents
- Quality plan
- User requirements
- Project plan,
- Test Strategy and all other test documentation as it becomes available
- Risk, Assumption and Issue logs and supporting procedures
- Project structure and support
- The Management Processes such as Change Control, Configuration Management, Risk Management, Issue/Problem Resolution
- Internal assurance techniques (e.g. TACs, UACs and BACs)
- Compliance matrices mapping the projects obligations to requirements specifications, design specifications testing stages to project sign off

Based on the initial assurance work, further information may be requested via an iterative process.

**Communication of Findings**

Gemserv will communicate any findings arising from this review with EirGrid and SONI representatives in a timely manner and raise any concerns before inclusion in the report.

## 5.2 Appendix 2: Summary of Documentation Received

**Section 1 Programme and project Management**

SEM Impact Analysis

ESBNG Preliminary IT Inventory Assessment Report 20th May 2005 Fergal Egan

SEM High-Level Impact Analysis – ESBNG and SONI30th v2.0 September 2005
Todd Bessemer, Ray Porter


**Project scope**

ESBNG Readiness – Project Scope 11th October, 2005 Todd Bessemer, Michael Walsh

SONI Readiness – Project Scope ver 1.0 11th October, 2005 Todd Bessemer

SEM Implementation – Project Scope 1.0 5th September, 2005 Todd Bessemer

SMO Establishment – Project Scope 29th July 2005 Todd Bessemer, Ray Porter


**Project plans**

SEM implementation plan,

SEM Implementation Plan – Assumptions ver 0.2 25/08/05


**Project Governance**

Business Liaison Group Terms of Reference 25/08/05 ver 1.1 Ray Porter

Business Requirements Panel (BRP) Terms of Reference ver1.0 15/08/07 Fergal and Todd

Governance Structure for ESBNG Readiness Project 6/09/05 Todd Ray and Dave W

Governance Structure for SEM Implementation & SMO Establishment 6th September, 2005 ver 1 Todd Bessemer and Ray Porter

Governance Structure for SONI Readiness Project 06/09/05 Todd Ray and Dave Warner

Technical Liaison Group Terms of Reference ver 1.1 25 August 2007 Ray Porter

TSO Project Board Terms of Reference 25 August 2007 Ray Porter


**Project organisation**

SEM Establishment Programme, Organisation Structure ver 2 April 2007-06-04

ESBNG Readiness – Organisation Structure August 2005

SEM Implementation - Organisation Structure August 2005

SMO Establishment Project - Organisation Structure September 2005

SONI Readiness - Organisation Structure October 2005


**Project Charters**

Project Charter – ESBNG Readiness Project - October 2005

Project Charter - SEM Implementation & SMO Establishment - September 2005

Project Charter – SONI Readiness Project - October 2005

**Management Standards and tools**

Management Methods and Tools – ver1.3 16/01/06

Risk Management Approach – ver 2.0 Sept 2005

Issue Tracking & Resolution Approach – ver 2.0 6th September, 2005

Document Approval and Sign-Off Process – 1.0 29th August 2005

Change Management Approach – ver 1.0 26th September 2005

Document Standards and Network Share Management - 1.1 15th September, 2006

Deliverables and Milestones Management Ver 0.1 13th February 2006

Specification QA Checklist - ver 0.02 27th February 2006

SEM Establishment Programme Plan Maintenance Approach – Ver. 1.0 -20 Dec 2005

SEM Establishment Programme Plan Maintenance Approach – Ver. 0.1 15/06/06

External Communications – Note - 15th September 2006

Participant Deliverables Log approach – ver 1.0 - 1st March, 2007

SEM Establishment Programme Organisation Structure


**Procurement and miscellaneous strategies**

ESBNG Readiness – Procurement Strategy - Ver. 1.0 12th October 2005

SEM Delivery Strategy – recommended option – Ver. 1.0 10 June 2005

SEM Systems Procurement Overview and scope – Ver 1.0 11/08/05

SONI Readiness – Procurement Strategy – Ver 1.0 -12th October 2005

Knowledge Transfer Strategy - Ver 1.0 - 24th October 2005

SMO Transition Strategy – Ver 0.9 -10th November 2005

Stakeholder Communications Strategy – Ver 1.0 - 26th October 2005


**Templates**

Application Area Functional Specification

Change Request Form

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SEM Deliverable Formal Acceptance Form

Issue Log - Functional

Meeting Agenda

Meeting Notes

Memorandum

Issues log programme management

Report Template

Presentation Template

Status Report

Risk assessment Matrix

Status Reporting (Samples)

Status Report – Certification Testing (WP4)

TSO Project Board Action List

**Programme Resource report**

Status Report – Certification Testing (WP4) - 22 May 2007

Status Report – SEM Implementation Project - 23 May 2007

**Logs**

Change Request log

Deliverables Tracker

Participant's log (issues)

Programme Management Risk Log

SEM Programme Dependencies

SEM Risk assessment Matrix

Tracking Information sheet

**Key memoranda – Readiness**

Required Participant Readiness Activities – memo – 13/06/06

Comments on RAs' Participant Readiness Strategy – memo – 06/10/06

Participant Readiness, Schedule and Other Issues – memo – 11/10/06

TSO/SMO Involvement in Participant Readiness Activities and Resource

Requirements to Support Readiness 'Strawman' - memo –26/10/06

TSO Facilitation of Participant Readiness Activities - memo – 16/11/06

**Key memoranda – Rules**

Memo to define the 'ground rules' for the T&SC/Market Systems reconciliation
exercise – 02/02/07

Memo - Resolve process for finalisation of T&SC v1.3 and alignment with TSOs' SEM
delivery - 13th February 2007

Briefing note for DB about TSC changes

Product Description of 'Spec-Ready' Rules – mem0 –25/07/05

Key memoranda – Scope and change

Change Control and 'Design Freeze' – memo 13/06/06

Market Monitoring – memo - 14th August 2006

Finalisation of Agreed Procedure Work – memo – 09/10/06

Change Control, Programme Schedule and Release Management – memo – 13/10/06

Resolve outstanding issues concerning Change Management, Participant Readiness,

Agreed Procedures and Participant Communication – memo – 24/10/06

Reconciliation of T&SC and Market Systems – memo - 31st January 2007

SEM Establishment Programme Organisation Structure 01/07/07

**Section 2 - Systems**

CSA RPP

Client Side Adviser – Referral for price

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**Functional specs**

2.1 SEM End-to-End Summary (v1-0)

2.2 SEM – Market Overview

2.3 Functional specs for RFP

2.4 Functional specs for Vendor requite

2.5 Functional specs for baseline 3 2007-04


**MPUD**

Market participant Update document memo dated 27/04/07

Market participant user guide Revision H

Market participant Update document – clean - ver 3.0 dated 27/04/07

Market participant Update document – tracked - ver 3.0 dated 27/04/07

Market participant Report examples; settlement, statements, invoices, etc.

Schema MPUD ver 3.0


**Prime Contractor**

Request for re-quote from short-list of potential vendors for Prime Contractor for SEM

Central Market Systems ref. ENQNG179

Prime contractor – Referral for Proposal

Statement of work

Defect process

Contractor staffing plan

Change management process

Document inventory ver 1.1

ABB AIP SEM Documentation Standard Attachment

Hardware Deliverables for Production Site 1

AIP Issue tracking tool

AIP milestones ver 1.1

SEM Organisational chart ver 1.1

SEM out of scope items

Purchaser Data provision

Purchaser dependencies

Purchaser Staff at Contractor Site

AIP SEM Quality Management Process Attachment - *To be reviewed*

Review and Sign-Off Process - *To be reviewed*

SEM AIP risk tracking Tool Ver. 1.0

Contractor Statement of Work

Status Report template – ABB

AIPSEM Training Course Inventory Attachment *ABB doc*

Transmittal letter template Ver 1.1

**Systems Approach**

SEM Implementation – Specification Approach and Principles ver .2 dated 27 August 2005

Process and Specification Work – Purpose and Principles dated 26 August 2005

Specification verses the TSC 0_10Xv0.11

Change request to 3.8 of CER Metering Code

Outstanding technical items

SEM Non-Functional Test Summary

EirGrid Performance Test Summary Report

External Metering Interface Test Summary

SMO Transition Plan 2 January 2007

TRANSITION STATUS: SUMMARY WEEK BEGINNING 16TH JULY

TSO Obligations Review 0.3 25/07/06

SMO TRANSITION PLAN APPENDIX A 02/01/07

Specs V TSC 0_10 X Ref v0.11.xls

EndofSITClearQuestdefectReport(1).xls

SEMNonFunctionalTestScripts-v2.0(1).xls

**Technical architecture**

Tech Arch & Reqts Issued with RFP ver 1.02

Tech Arch & Reqts for Vendor Requote ver 1.09

Tech Arch & Reqts (latest) Ver 1.2.3

**Section 3 - Testing materials SMO**

**CCQT-FPIT –E MIT Approach**

Facilitation of Participant Interface Testing – Scope 21/03/07

Communication Channel Qualification Test Approach 28/02/07

External Metering Interface Test Approach 30/04/07 *Review this*

Facilitation of Participant Interface Test Approach

**Testing overview**

2.1Summary Position on Market Simulation using UUC 03/02/07

2.2 Overview of Central Systems Testing

2.3 Overview of Central Market Systems Testing

2.4 Accenture testing fundamental

2.5 SEM Testing Responsibility

2.6 Testing extract from PC Sow

2.7 SITF - Upload Actual Availability data for a normal day from SON

2.8 SITF2.2.2 - Upload Daily Load Forecast data for a short day from EirGrid

2.9SEM Non-Functional Test Summary

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2.10OutstandingTechnical Items with Resolution Statusv01(1).xls

2.11TransitionStatus2007-07-16v0-2(1).xls

2.12 End of SIT Defect Management Log (nonABB-Navita)(1).xls

**TSO data LOLP**

Table Definitions for Interfaces with LI Project: The LOLP Application will provide the

following data to the Legacy Interfaces Project for forwarding on to the SMO Annual

Load Forecast, Monthly Load Forecast and Monthly Outage Schedule

LOLP Screen design

LOLP Project Change Request Form, LOLP Data Publication Requirements CR

LOLP Project Change Request Form, Scenario Management Requirements

LOLP Project Change Request Form, Receiving SONI attachment in DIME format

LOLP Project Change Request Form, New PSOP Feed – Unit Forced Outage Rate

LOLP Project Change Request Form, SMO Trade Date Format Change

LOLP Capacity Payment Functional Requirements Specification

LOLP schema

PSOP File Formats for LOLP project

XML Formats for SMO Interfaces

XML Formats for SONI Interfaces

LOLP defect Log

LOLP defect reports ( 8)

LOLP test plan

LOLP test cases (58)

**Change requests**

Project Change Request Form, Annual Load Forecast Change Request

Project Change Request Form, DLF input data format change

Project Change Request Form, Meter Data XML field Reading Status to be set based

on value in corresponding SRC field.

Project Change Request Form, MINOUT value required for units in Actual Availability

data feed to the SMO

Project Change Request Form The current TSO-SMO interfaces design does not

include the interface for the re-declared Energy Limit. Change Request

SEM_PC_CR3 (approved) deals with the changes required in the SEM system but

does not cover the interface to be built by the TSO.

Project Change Request Form, Date and Timestamp Format Change Request

Project Change Request Form, New MA/MI EMS Interface Specification version

Project Change Request Form, The current design of the SEM systems does not

reflect the need to store and use resubmitted energy limits within day, which are

required in ex-post for UUC and for calculating Eligible Availability for Capacity

Payments.

Project Change Request Form, Transmission Loss Adjustment Factors (TLAF) should be sent from the TSO to SMO as 365 separate Daily Feeds before the end of August each year.

Project Change Request Form, Descope requirement for IS TSO Readiness project to take the 3 IJ's and aggregate/net the values to one IJ01. As per SEMIT requirements

AIP IS Design Document

Change request to 3.8 of CER Metering Code

**Miscellaneous**

Daily Load Forecast -Validation Process -Design Document

Capacity Payments Dependencies Meeting Minutes

System Integration Test Plan v1.0 12th February 2007

Eirgrid Test cases

Send Wind Forecast to the SMO

Send Daily Outage Schedule to the SMO

Send TLAF's to the SMO

Send Actual Availability to the SMO

Send Dispatch Instructions to the SMO

MITS progress report June 2007-08-09 SONI issues

SONI actions and issues log 27 June 2007

SONI Change request log 25 June 2007

SONI risk log 25 June 2007

SONI transition report 20070806

SONI progress report 26 05/07/07

SONI –SMO SITTests

SONI 0 - TSO Readiness report 06/08/07

SONI UnitTests(1).xls

SONI SystemTests(1).xls

SONI Data eXchange Development Guide

SONI SIT Test results(1).xls

SONI Transition report 20070806[1].doc

Eirgrid Set of system test reports (latest dated 07/02/07)

Eirgrid Defect report sheets (32)

Eirgrid AIP test plan

Eirgrid defect spreadsheet for legacy systems

Eirgrid set of test cases (33 scenarios 99 sets)

Eirgrid TSOR_001_SR All Island Project Information Systems Design Document

EirGrid Performance Test Summary Report

EirGrid  Dry run UAT_Testsheet_ver0.1(1).xls

EirGrid  Dry run Defect Log MT Dry Run 27082007.xls

EirGrid  Dry run MT_DR_20AUG2007.xls

EirGrid  Dry run MTDryRunStatusReport20August2007.doc

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EirGrid Dry run Defect Log MT Dry Run 27Aug2007.xls

EirGrid Dry run MT_DR_23AUG2007.xls

*Table 2 – Title*