

Assurance Report:
SONI IT Strategy Review and Related Costs

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Commercial in Confidence



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1. Introduction

The Utility Regulator (UR) has engaged Gemserv to review SONI's IT Strategy and provide advice and recommendations. The UR's requirements were described as:

- Detailed input into the level of system integration with EirGrid given SONI's licence obligation to remain fully operationally independent;
- Following the above detailed input an assessment is required of each capital project including the proposed need and estimated cost for a five year period 2015 – 2020.
- Assessment of the operational expenditure of maintaining our preferred IT and telecommunications structure.
- Review and if necessary assist with drafting the UR decision relating to proposed integration of SONI's IT systems and telecommunications.
- Direct engagement with SONI and EirGrid and possibly their consultants.
- Weekly progress meeting with the UR (during periods of activity as set out above).
- Any other aspects which may arise throughout this SONI review process.

This report is intended to reflect the work carried out to date and inform the UR's considerations about the required level of independence required from the Eirgrid Group.

Our supporting cost recommendations are based around the UR's declared intention to apply a symmetrical gain share incentive scheme for IT OPEX and CAPEX.

Gemserv understands that the UR wishes that this report can be shared with SONI. We confirm that this is acceptable on the basis that SONI treats it as 'Commercial in Confidence'.

1.1 Gemserv's Approach

Following the contract award Gemserv met with the UR on the 7th and 8th January to discuss the assignment scope and timescales. It was agreed that Gemserv would read into the assignment and provide initial views about what, in reality, operation independence would mean from an IT system perspective. This would enable the forecast IT OPEX and CAPEX amounts, submitted by SONI, to be considered in that context.

Since then, Gemserv has attended many meetings (two with SONI) and held telephone conference calls to develop an understanding of what the UR would consider a compliant ICT infrastructure.

The written information provided by SONI does not provide a cogent description of their strategies and policies with documents referring to an Eirgrid strategy that does not appear to exist. Therefore Gemserv has also relied on the face to face meetings to further understand what the proposed budgets cover and if these proposals meet the UR's requirements for independence.

Gemserv has also followed up meeting with additional written clarification questions. These questions along with the SONI responses are reproduced in Appendix 2.

Where Gemserv have used verbally provided information it is clarified in the appropriate section of this report.

1.2 Documents Reviewed

- SONI Revenue Review 2015-2020; Paper 10 – Information System Drivers
- Eirgrid IS Strategy 2015-17
- SONI TSO Price control (2015-20) Business plan Information requirement: OPEX Telecommunications, Support and Maintenance
- Cost Allocation & Recharge Policy' document
- SONI TSO Licence Condition 12
- UR Price Control Tables

Previous Price Control Documents such as:

- SONI Ltd Price Control Submission 2010-15 Capital Expenditure
- Agreed Opex allowance for 2010-15

2. SONI Licence Condition 12

As part of this assignment Gemserv have reviewed the present SONI Licence Condition 12 wording and discussed its implications with the UR. Gemserv understands that the UR's intention of an 'Associated Business' in Condition 12 was any business that has an ownership association with SONI; in this case all associated companies that form the Eirgrid Group. Eirgrid Group's interpretation is different and they assert the UR's intention was an 'Associated Business' in electricity supply and generation: as was the case when SONI was part of the Viridian Group. Furthermore Eirgrid assert that Condition 12 does not apply to an associated TSO business and presumably an associated Transmission Network Owner.

Gemserv understands that any perceived ambiguity of the present Condition 12 wording will be clarified in the new Licence changes. For the purpose of this report we have assumed the intention of Licence Condition 12 applies to all the EirGrid Group.

This report mainly focuses on the impact of operational and functional independence as it relates to SONI's IT systems. In an attempt to interpret the future licence changes we have assumed that the UR requires SONI to have enough independence from Eirgrid so that it could be demerged and sold off to a third party in a relatively short period of time. Our interpretation will need to be tested against the draft licence changes as it can't be fully defined for the following reasons:

- The Eirgrid Group should be able to generate economies of scale not achievable by SONI, as an independent company, as it is the interests of all customers for these to be realised;
- Corporate functions (non-control room critical systems) could be separated reasonably quickly, or SLA's could be put in place before complete separation (e.g. HR systems, third line support functions, software licences, etc.);
- There is a growing need, backed up by European legalisation and supporting Codes, for Transmission System Operators to operate on a more regional basis to facilitate cross border trading. Therefore the harmonisation of systems and processes will assist in the optimisation of system interconnections;
- With the proposed penetration of non-synchronous renewable energy, there is a need for collaboration by both Eirgrid and SONI to meet the progressive challenge of maintaining a reliable and stable transmission system; and
- The Single Electricity Market (SEM) is an all island wholesale market with a single merit order scheduling system (Reserve Constrained Unit Commitment (RCUC)).

3. Eirgrid Strategic Policies

As mentioned previously Gemserv is aware of the UR's concerns about the independence of SONI as the TSO for NI and was asked to provide a view about the SONI IT CAPEX and OPEX proposals in relation to these concerns.

To meet this requirement Gemserv discussed at length the Eirgrid policies, with SONI, as they relate to providing NI with independent IT system operator systems that include adequate resilience and disaster recovery for both Castlereagh and Oval control centres. From these discussions Gemserv understands the following information.

The new EMS system, presently being commissioned, has high levels of redundancy and resilience with operational instances in both control centres and adjacent disaster recovery locations. SONI believes this configuration, together with the highest level of resilience for communications¹ between Belfast and Dublin, provides a very secure and flexible arrangement for what is the heart of the TSO's control functions.

SONI also state that the EMS system in each control centre will, under normal conditions, operate as a jurisdictional system with each operational centre having the ability to operate on an all island basis when the need arises. Furthermore this EMS configuration will act as a template for all other control room systems as they are updated, or replaced, during the next price control period. SONI believes this template will provide the level of independence required by the UR.

Although Gemserv is not aware of any comprehensive written statement from the Eirgrid Group the following statements were made at the meetings attended by Gemserv:

- It is Eirgrid's policy to establish two equal control centres, one in each jurisdiction.
- Each control centre will be able to operate the transmission system independently in their respective jurisdiction.
- Where there is functional impairment in one jurisdiction the other jurisdictional control centre will have the capability to operate on an all island basis (this ability includes staff being trained to operate on an all island basis).

Gemserv comments: Although the EMS is the central system for control room operations many other related IT systems are required to provide autonomous control of the NI transmission system from Castlereagh House. These, inter alia, include:

- Electronic Dispatch Instruction Logger (EDIL)
- Event recorders
- Generation metering
- Reserve Constrained Unit Commitment (RCUC)
- Auction Management Platform (AMP) for the Moyle Interconnector
- Ancillary services and TUoS settlement systems

It will also be necessary to develop new functions to deal with the high penetration of nonsynchronous generation (mainly wind) and also new European obligations on

¹ Multiple service providers who each do not have any single point of failure within their contracted private networks.

transmission system operators. These new, or enhanced, functions will also need to be operated from Castlereagh House if it is to retain the capability of independent operation. Eirgrid's verbal depiction of their control room strategy seems to provide benefits for customers in both jurisdictions. Having the ability to seamlessly transfer operational responsibilities to the other control centre, in times of distress, provides a higher level of resilience than transferring resources to an (unmanned) disaster recovery centre. Gemserv understands that the two disaster recovery centres will be maintained to provide some additional redundancy and resilience; especially for the communication links. This type of configuration has similarities to those operated by other transmission system operators as it provides robust levels of operational service provision.

Gemserv has assumed in its recommendations about appropriate allowances that this high level of resilience and redundancy, detailed above, will be incorporated in control room IT systems over the next 5 years. We note that the documentation provided by the Eirgrid Group is not totally consistent and some of the aforementioned information has been provided verbally at the two joint meetings attended by Gemserv. It is strongly recommended that the Gemserv understanding is confirmed in writing by the Eirgrid Group as it has a far larger impact than the IT budgets.

4. Challenges for SONI, over the next Five Years

4.1 Renewable energy production

Northern Ireland and the ROI have world leading and demanding targets for the production of renewable energy. Managing the stability of the system with large amounts of non-synchronous electricity production brings with it new challenges and issues. These challenges are compounded by the lack of support from other jurisdictions as both interconnectors to Scotland and Wales are Direct Current (DC) and provide little real primary response capability.

The aforementioned points make controlling the island's electricity transmission system more complex than other jurisdictions that have good synchronous connections with adjacent transmission grids. SONI have proposed many new items of investment that are intended to directly, or indirectly, support addressing this challenge.

These budgets propose higher levels of IT spend to develop technics that can control this changing generation mix alongside the optimum level of ancillary services.

Gemserv comments:

As the costs of any unnecessary ancillary services are likely to be many times higher than any related IT spends Gemserv have attempted to consider the efficacy of the IT budget in that context.

4.2 IT Refresh Cycles

Most companies operating critical IT systems enjoy the assurance of premier support contracts for their software and hardware. These contracts normally include guaranteed service levels that provide comfort when software faults are encountered, or the hardware malfunctions. As systems or versions of software age, premier support contracts cease although extended support contracts can be negotiated for a limited period of time (e.g. two years) normally at an increase in cost.

Therefore, it is normal for companies that require high availability and/or critical systems to negotiate premier support contracts and refresh the systems before premier, or extended, support contracts run out. This situation normally results in refresh cycles of about 5 years. Eirgrid indicated that their refresh cycles are between 3 and 7 years with most important systems refreshed at about the 5 year point.

It can be concluded from this that over a five year period most of the IT systems will be replaced or upgraded. The CAPEX proposals by SONI would indicate that these expected refresh cycles have been built into the budgets.

Gemserv comments: Based on this expected IT refresh lifecycle we would recommend that all IT CAPEX is written off over a five period and not the present eight years. Also as some communications equipment has to be replaced every three years a separate telecommunications RAB with a three year depreciation period should be considered².

4.3 Cost Apportionment principles

Eirgrid provided the UR with the '*Cost Allocation & Recharge Policy*' document that provides information about how Eirgrid Group costs should be apportioned to, and between, business units. The two main apportionment principles used for joint projects between the TSOs are:

² This is probably less important as SONI already treat NIE's recharge telecommunications costs as OPEX.

Volume related

Where the joint project costs are deemed to be related to energy volumes the costs are apportioned 75:25 between Eirgrid and SONI respectively.

Unit related

Where the project costs are deemed to be related to units (the number of instances) the joint costs are shared on that basis. For instance the new EMS system has been apportioned on a 50:50 basis between Eirgrid and SONI respectively.

While the full list of apportionment ratios can be found in the Eirgrid plc. 'Cost Allocation & Recharge Policy' document the apportionment percentages applied to items included in this report are listed in appendix 1.

Gemserv's views on cost apportionment: The cost of all shared projects should result in an overall reduction for SONI when compared with an equivalent standalone project. These synergies should defray any higher costs resulting from ROI procurement costs compared with those in NI. At the meetings, attended by Gemserv, Eirgrid stated that all none critical system joint CAPEX costs are calculated on the basis of the 75:25 split whereas most of the critical control room systems (e.g. EMS) that are duplicated in both locations are split 50:50. The latter is consistent with SONI having a complete and separate instance of the critical IT systems located at the Castlereagh House and the local Disaster Recovery Centre.

Gemserv has no vires to review the Eirgrid's ROI costs and have attempted to look at what the SONI CAPEX costs would have been if a similar standalone project was initiated. This review has to be a somewhat subjective assessment but our views in Section 5 are conditioned by this principle.

Contrary to the above it could be argued that as SONI would normally require a smaller system, for NI in isolation, and paying 50% of a larger system for both locations could be construed as inequitable. However to provide control room support for the ROI (along with the counterfactual) is in the interests of both ROI and NI customers³ to have systems with equal capabilities. On the basis that the savings would not be substantial, and to support the principle of full operational independence, Gemserv has not recommended any disallowance although it may be appropriate for the UR to take a different stance. In this case a 5% disallowance from the 50:50 expenditure items would be reasonable.

³ See Section 3.

The 75:25 apportionments for joint projects, that are deemed energy volume related, seems to be fair. Gemserv makes no recommendations to alter this ratio as it closely resembles the proportion of energy consumed in each jurisdiction. The table and recommendations in Section 5 assume the apportionment values stated in Appendix 1 have already been applied.

5. Capital expenditure

SONI provided the UR with a paper 'SONI Revenue Review 2015-2020; Paper 10 – Information System Drivers' dated 15 October 2014. This is the main document Gemserv has used to provide commentary on the IT CAPEX proposals.

Summary Table from Paper 10

Item	Capital Expenditure Summary	SONI Submission					Total
		£'000					
		2015-16	2016-17	2017-18	2018-19	2019-20	
1	IS Infrastructure	83	396	219	458	146	1,302
2	Corporate Systems	358	149	266	97	149	1,019
3	Energy Management Systems- All Island Operations	366	125	125	646	1,292	2,554
4	EDIL/RCUC/AMP	299	269	238	217	217	1,240
5	TUoS/Settlement/Metering	219	94	260	104	104	781
6	Big Data/Data Mining	240	208	42	0	0	490
7	DS3/Smart Grids	167	260	469	312	125	1,333
8	Operation Changes - Network Codes	0	208	0	0	0	208
	Total	1,732	1,709	1,619	1,834	2,033	8,927

The following subsections include a short review of each CAPEX cost category:

5.1 IT Infrastructure (including Desktop infrastructure)

This cost category has a budget provision of £1,302k and includes the following items:

- Common IT Infrastructure (clarified as mainly Storage Area Networks (SAN) (£417K)
- Hardware replacement (£146k)
- Firewalls (£250k)
- Memory and storage expansion (£146k); and
- Desktop infrastructure (£344k)

Without looking at detailed technical inventories it is not possible to provide a facsimile comparison of costs. However, Gemserv did challenge SONI on many of the cost items in this category and, in the main, received satisfactory answers. For instance a typical desk top infrastructure replacement could be expected to be £1-1.2k for each workstation whereas the total cost for SONI (£344k) works out at about £2.45k per workstation. SONI have indicated that their budget includes additional screens, additional lap tops, Microsoft Project

(retail £850 less discounts), 3 year support and remote access. This allowance still looks somewhat generous even when factoring in the enhanced requirements of control room staff. However, desktop systems act as a critical link between operators and TSO operational control systems so some additional costs can be expected compared to a normal office environment.

Another instance is the provision of £250k for SONI's firewalls that indicates at the group level the total cost would be around £500k. The latter would seem a high cost provision for the two TSO's firewalls, although they are essential to the integrity of the IT and communications infrastructure. Gemserv concludes that this cost line includes provision for other security enhancements as these do not seem to be listed separately elsewhere, unless covered by other general headings. As security is a continual challenge, and without further supporting evidence, Gemserv does not take issue with this provision only that it looks well provided for.

As storage requirements are predicted to increase substantially over the next five years and SAN infrastructures require regular updating we feel the Common IT infrastructure is within expected parameters.

In response to a written question SONI clarified what was included in the 'Hardware Replacement' cost line, the detail of which can be found in appendix 2.

Gemserv Comments: Based on the information provided by SONI Gemserv does not take issue with any of the cost lines but comment that the budget looks well provided for.

5.2 Corporate Systems

This cost category has a budget provision of £1,019k and includes the following items:

- Dynamics (Enterprise Resource Planning system for office efficiency) (£225k)
- Customer Relationship Management System (CRM) (£208k)
- Human Resources Management system (HRMS) (£169k)
- SharePoint Migration and Enhancements (£156k)
- Productivity Tools (provisional sum) (£260k)

Gemserv's comments: From the SONI feedback at meetings, Gemserv assumes that the presented budgets are 25% of the group costs for all items in this cost category. As all these items are not business critical systems a proportion of the proposed budget could be described as discretionary, or subject to a positive Cost Benefit Analysis (CBA). The

HRMS is being brought in-house (presumably to reduce costs) and SharePoint is an existing system that periodically needs to be refreshed and on that basis they are both required. However, there would seem some degree of discretionary spend around the Dynamics ERP, CRM and productivity tools systems (the latter of which is a provisional sum and would indicate a £1m Eirgrid Group spend).

The CRM system was discussed with SONI and they indicated that the group requires a CRM system to service external interfaces. It is not clear if the group has a positive business case for such a system as no discrete cost savings have been identified in the documentation supplied.

Gemserv views: Like other company assets corporate systems need refreshing and updating and SONI should make a contribution. This cost category includes new, potentially discretionary, items that should, if cost effective, reduce other associated costs. There is no supporting evidence in the information reviewed to support such a business case.

5.3 Energy Management Systems (EMS)

This cost category has a budget provision of £2,554k and includes the following items:

- EMS Platforms (£1,763k)
- EMS Enhancements (£208k)
- Wind Dispatch (£583k)

The EMS system forms the heart of the control centre and is an important business critical system.

The first cost line would seem to include the residual costs of the present EMS upgrade being commissioned (£96k in year 2015/16) and the five year refresh in 2018/19 (£417k) and 2019/20 (£1,250k). The second cost line makes provisions for system enhancements in 2015/16 (£104k) and again in 2018/19 (£104k). The third cost line makes provisions for wind dispatch in all five years starting from 2015/16 (£167k) until 2019/20 (£42k) with a total spend of £583k.

Gemserv's comments: The EMS system must be classified as the most business critical system for SONI and requires the highest level of integrity and resilience. On that basis Gemserv does not take issue with the magnitude of the costs. However they seem to be well provided for, especially for a 50% share of a two site footprint planned for the refresh as from 2018. There also seems to be some asymmetry between the treatment of

enhancements planned for post implementation of the new EMS system in 2015/16 and just before its replacement in 2018/19.

The Wind dispatch costs for 2015/16 look relatively high especially as it would be expected that the most update features would be built into the newly commissioned EMS system. However this concern has been clarified in a SONI response⁴ to a written question as apparently the budget includes new features and enhancements identified since the new EMS specification was finalised. SONI have indicated a high level of confidence in their forecast cost.

There is also some ambiguity as to whether some of the wind dispatch costs should be in the DS3 cost category as it is not clear to Gemserv how DS3 costs are separately categorised.

In general and without a much closer understanding our initial view is that all the cost lines include adequate contingency provisions and may be bettered in reality.

5.4 Generator and Trading Systems (EDIL, RCUC and AMP)

This cost category has a budget provision of £1,240k and includes the following items:

- Reserve Constrained Unit Commitment (RCUC) (£417k)
- Auction Market Platform (AMP) (£563k)
- Electronic Dispatch Instruction Logger (EDIL) (£260k)

The items in this cost category are all business critical systems.

Gemserv's comments; There is an annual provision of £83k for updates and changes to the RCUC. This cost profile may reduce later in the five year period when the I-SEM requirements are fully understood and further developments of the existing RCUC system cease.

Gemserv understands that the AMP costs are allocated 50:50 between SONI and Egrid. This seems a reasonable allocation as the AMP covers both the Moyle and ROI East/West interconnectors.

⁴ Appendix 2 page 26 question 'EMS Wind Despach'; answer provided on page 27 second paragraph of SONI response.

5.5 TUoS/Settlement and Metering

This cost category has a budget provision of £781k and includes the following items:

- CSB (Counterparty Settlements & Billing) (HAS for NI) (£125k)
- CSB upgrade (£156k)
- MV90/Converge (£104k)
- App enhancements/consolidations (£396k)

This cost category refers to systems for meeting the demands of the SEM Transmission Data Provider functions (MV90/Converge) and systems for settlement of TUOS and Ancillary Services payments (CSB).

A provision has been made for £125k in 2015/6 for *'the integration of SONI Ancillary Services (AS) and Other System Charges (OSC) Settlement into the CSB System'*.

SONI indicates the CSB system was developed for Eirgrid in 2012 and requires an upgrade in 2017/8. There is a further budget provision of £156k to cover SONI's share of that upgrade.

App enhancements/consolidations: In a response to a written question SONI state that *'a base cost of £42k per annum has been set against the settlement and metering applications in this respect'*. In addition the group is consolidating its metering applications into a single application that will take place in 2016/17 and the step change in the *App enhancements/consolidations* category is to accommodate the consequential work.

Gemserv's comments: Obviously SONI need IT systems to facilitate the financial settlements required by the NI TSO obligations. The cost lines and supporting text indicate the integration of SONI's own settlements system into an Eirgrid Group CSB system. In answer to a written question SONI have indicated that an instance of the group system will be resident in Belfast but it may not be run autonomously although it would be possible to split the systems⁵.

The largest cost line relates to *'application enhancements and consolidation'* that has an increase in cost of 285% as from 2017/18. Gemserv did ask for additional clarity around this budget line and the full response can be found in Appendix two.

⁵ Subject to higher licence and support costs

The budget provision seems adequate for an instance of all the systems covered in this cost category to be resident in Belfast and having the capability to be run autonomously within a short period.

5.6 Big Data and Data Mining

This cost category has a budget provision of £490k and includes the following items:

- Data Management (£52k)
- Big data/Data Analytics (£146k)
- Website (£83k)
- Middleware (£208k)

SONI have a need to store and interrogate more complex data over the next five years as more standing (e.g. genset characteristics) and dynamic data (e.g. transmission system behaviour) are required to maintain system stability. SONI estimate their data storage requirements will increase by 13% per year over the price control period and requires a different approach to sharing and storing the more comprehensive datasets.

Gemserv's comments: Transmission system operation is becoming more complex and will demand better quality intelligence to operate efficiently. We conclude that an allowance is required to support enhanced data collection, storage and interrogation.

Gemserv assumes the £83k provision for the group website is the SONI share (25%) of the remaining work due to be completed in Quarter 3 of 2015 and is therefore well understood. From Gemserv's discussions with SONI their budget projections will cover their present aspirations but it is not clear how this expenditure will interface with DS3 budgets.

5.7 DS3 and Smart Grids

This cost category has a budget provision of £1,333k and includes the following items:

- DS3 (£417k)
- DS3 Tools (£625k)
- Smartgrids (£292k)

This seems to be an area where the actual requirements over the next five years are not yet definable.

For instance the DS3 - Performance Monitoring Data IT system requirements are acknowledged by SONI as unknown⁶ and excluded. It is therefore unclear to Gemserv what the provision of £417k for IT equipment is actually for?

DS3 related tools are definitely required but the extent to which a separate budget is required is debateable as provisions in other budget lines⁷ could include such innovations. Smart Grids bring potentially new requirements for security and storage; however it is not clear if other budget lines support these unspecified, and probably unknown, requirements.

Gemserv's comments: We are in no doubt that provisions are required for these items but feel that the proposed budgets are not defined enough to provide an opinion. If, as implied in the SONI submission, that they will need to make a separate IT submission for this work, (presumably under a D¹ term) it is suggested that no allowance is made at this junction, only to recognise it is not a disallowance but a deferred cost approval awaiting further clarification.

5.8 European Network Codes

This cost category has a budget provision of £208k and includes the following items:

- Network Codes (£208k)

Gemserv is informed that new European Network Codes require more information to flow between Transmission Systems Operators (TSOs) and will require updates to the NI Grid Code. The £208k would seem to be a provisional sum for new communication lines to other TSOs and central functions in Europe. SONI also state that the allowance is also to cover changes to databases and interfaces.

Gemserv's comments: The need for additional (shared) communications lines to other TSOs and central functions in Europe seems highly probable. The need for additional changes to databases and interfaces should not be great and may be implicitly covered by more general allowances elsewhere in the budget. Gemserv concludes that the proposal, as a provisional sum, is adequate.

⁶ Paper 10 – Information System Drivers states in the last paragraph of page 27 ‘Given the range of potential solutions and the wide variation in IS costs associated each no system (hardware or software) costs for implementing the final decision have not been included in the submission’.

⁷ E.g. EMS Wind Dispatch budget of £583k.

5.9 CAPEX Conclusions

The SONI budget submissions seem to be well provided for. Many of the costs lines seem to be based on empirical information while others are provisional sums based on assumptions. The latter is not surprising as many of the requirements are presently not adequately defined for an accurate estimate to be determined. For an ex ante allowance it is not unreasonable to include contingency provisions based on worst case scenarios to ameliorate the risk of getting it wrong. In this case SONI seems to have, not unreasonably, taken that risk adverse approach.

IT requirements are changing and system operators will require more sophisticated systems to control more demanding grids. This is fully reflected in the SONI submission that at £8,927k is about £5,500k more than similar allowances in the last price control period. This large increase in forecast IT costs may not be a reasonable baseline for a 50:50 +/- gain share arrangement the UR is proposing implement. On the basis that the overall allowance will form the reference point for a gain share arrangement Gemserv would recommend the following changes to the SONI submission:

5.9.1 DS3 Smart Grids

The UR should recognise that SONI will require some CAPEX expenditure for DS3, DS3 tools and smart grids. However, as the costs are not presently definable⁸ no provision should be included in the price control. When the costs are fully understood SONI should apply for the net increase in costs⁹ under a D_t term. It should be noted that other budget lines could support DS3 requirements such as wind despatch (£583k) in the EMS cost category.

5.9.2 All other cost categories

As mentioned above the remaining cost categories all seem well provided with contingency provisions. Although all cost lines will not be the same it can be expected that overall savings can be accrued from the forecast total expenditure provided in Paper 10. Also some of the corporate systems proposals should only be implemented if there are positive business cases. As noted in subsection 4.3 the 50:50 cost apportionment for operational IT systems installed in both jurisdictional operational centres, may slightly disadvantage NI customers¹⁰.

⁸ Gemserv understands the all island final requirements are not yet agreed by the SEM Committee.

⁹ See previous sub sections where potential overlaps are mentioned.

¹⁰ Although no disallowance has been recommended.

With these points in mind, and the timely need to agree a fair allowance for IT systems that can be classified as meeting the independence criteria,¹¹ it is recommended that the allowances are scaled down by 10% from the SONI submission to form the baseline of the gain share mechanism.

Based on the aforementioned adjustments the following table provides the recommended baseline gain share allowance:

Item	Capital Expenditure Summary	SONI Submission £'000						URs Proposals £'000					
		2015-16	2016-17	2017-18	2018-19	2019-20	Total	2015-16	2016-17	2017-18	2018-19	2019-20	Total
1	IS Infrastructure	83	396	219	458	146	1,302	75	356	197	412	131	1,172
2	Corporate Systems	358	149	266	97	149	1,019	322	134	239	87	134	917
3	Energy Management Systems - All Island Operations	366	125	125	646	1,292	2,554	329	113	113	581	1,163	2,299
4	EDIL/RCUC/AMP	299	269	238	217	217	1,240	269	242	214	195	195	1,116
5	TUoS/Settlement/Metering	219	94	260	104	104	781	197	85	234	94	94	703
6	Big Data/Data Mining	240	208	42	0	0	490	216	187	38	0	0	441
7	DS3/Smart Grids	167	260	469	312	125	1,333	Subject to separate submission when scope agreed					
8	Operation Changes - Network Codes	0	208	0	0	0	208	0	187	0	0	0	187
	Total	1,732	1,709	1,619	1,834	2,033	8,927	1,409	1,304	1,035	1,370	1,717	6,835

¹¹ Likely to meet the UR's proposed independence test.

6. IT and Communications OPEX costs

Gemserv have reviewed the OPEX Telecommunications, Support and Maintenance spread sheet, held meetings with SONI and requested responses to many written questions about SONI projected OPEX costs. A summary of our findings and conclusions are detailed below:

6.1 Telecommunications

The three cost lines that make up the telecommunications costs are:

Operational Telephony Network (£4,623k)

SONI have stated that they share the NIE¹² Operational Telephony Network (OTN) and pay a contribution to the operational and capital costs. These costs are allocated between SONI and NIE based on the proportion of the OTN resources used by each party. This apportionment is based on the total count of basic circuits in use. Gemserv understands the allocation has been approximately 30:70 to SONI and NIE respectively. SONI are forecasting a real increase in costs of 2.75% between 2015/16 and 2019/20. If the year 2013/14¹³ is ignored the aforementioned rate of increase is lower than those encountered over the last 4 years.

All OTN related costs, recharged from NIE, are all classified as OPEX.

Calls, Rentals, support, Internet (£375k)

The projected costs for the next 5 year period are similar to those expended over the last three years.

Equipment (£113k)

Gemserv understands this cost line covers telecommunications equipment that is not part of the NIE shared network.

6.2 Hardware Warranties and Support

The two costs lines that make up the Hardware Warranties and Support are:

Hardware (£120k)

¹² As the Transmission Network Owner

¹³ When NIE did not invest in the network because of the RP5 Competition Commission referral.

Hardware will normally have support contracts in place to ensure the equipment will continue to meet the business needs and normally include SLAs for breakdown support and repairs. The present costs of £20k per year are forecast to be the same for the 5 year period. This is not surprising with server virtualisation enabling fewer, but larger, servers to meet the organisational needs.

Maintenance and support (£377k)

The hosting of IT infrastructures is an important support function essential to system wellbeing. The projected costs for the control period are £65k per annum, the same as the last three years with the exception of years 2017/8 and 2018/9 where the forecast spend is £96k. SONI has indicated this cost is due to the required extension of the (capitalised) three year warranty that expires in 2017/8 for equipment purchased in 2014 and 2015.

6.3 Software licences and support

Software vendors normally offer support contracts to deal with technical issues and software updates that are needed for efficient, and bug free, operation. The normal cost for this support is 18% of the licence fee adjusted for inflation. The two cost lines that make up the Software licences and support are:

Energy Management System (£618k)

This is the only application with its own cost line (£118k per annum) and represents the largest operational system in the SONI portfolio. As the system is presently being commissioned, these OPEX costs can be expected to be well established. The forecast spend for 2019/20 is increased to £146k to represent additional maintenance costs paid to Alstom¹⁴. It is not clear to Gemserv how SONI differentiate general support costs (OPEX) and enhancement costs (CAPEX).

Other applications (£3,285k)

In previous price control submissions, SONI has previously broken this cost line down by each software licence. They have indicated that this is no longer possible because they cannot be sure what software will be introduced over the next five year period. Gemserv agrees that some for the software presently in use may be subject to change but the CAPEX budgets indicate otherwise. However, licence costs, and some maintenance costs, cannot be accurately predicted 2-3 years out.

¹⁴ See the SONI answer in Appendix 2.

This cost line profile is projected to increase by 28% over next five years and the last year cost is £736k. The SONI response to a written question provided underlying reasons for this increase and is detailed in Appendix 2.

6.4 OPEX Conclusions

Nearly half of the total OPEX budget is accounted by the Operational Telephony Networks shared with NIE. With the exception of the deviations mentioned above most of the other cost lines follow a pattern established in the present price control period. With reference to the CAPEX IT spending proposals, it is not surprising that software support costs are increasing although the increases should be tempered by the Eirgrid Group's abilities to leverage better discount structures.

Gemserv considers that there may be areas of the proposed allowance where cost savings can be achieved but these will not be large. Therefore the SONI proposed allowance for OPEX seems suitable for the reference point for a gain share incentive arrangement.

The proposals submitted by SONI are shown below:

Description	UR's Proposals					Totals
	2015/16	2016/17	2017/18	2018/19	2019/20	
	£'000	£'000	£'000	£'000	£'000	
Telecommunications						
OTN (Operational Telephony Network)	£907	£919	£932	£932	£932	£4,623
Calls, Rental, Support, internet	£75	£75	£75	£75	£75	£375
Equipment	£23	£23	£23	£23	£23	£113
Hardware Warranty and Support						
Maintenance & Support	£65	£65	£96	£96	£65	£388
Hardware	£20	£20	£20	£20	£20	£100
Software Licences and Support						
Energy Management System	£118	£118	£118	£118	£146	£618
Other Applications	£575	£630	£660	£684	£736	£3,285
Totals	£1,783	£1,850	£1,924	£1,948	£1,997	£9,501

7. Appendix 1: IT Apportionment Percentages

Eirgrid 75% SONI 25%

1. Common IT Infrastructure
2. Hardware replacement
3. Memory and storage expansion
4. Desktops/VDI
5. MS Trueup
6. MS licencing (Project/Visio)
7. CSB Upgrade
8. CSB (HAS for NI)
9. MV90/Converge/MASS
10. App enhancements / consolidations
11. Data Management
12. Big Data / Data Analytics
13. Website
14. Middleware
15. Wind Dispatch
16. CRM
17. SharePoint Migration and enhancements
18. Productivity Tools
19. EDIL
20. Network Codes
21. SmartGrids
22. DS3
23. DS3 tools - ramping, voltage management, frequency management

Eirgrid = 73% SONI =27%

24. Dynamics
25. HRM

Eirgrid = 50% SONI =50%

26. EMS Platform
27. Firewalls
28. RCUC
29. EMS enhancements

Eirgrid = 0% SONI =100%

30. AMP
31. Telecoms SONI

8. Appendix 2: Questions and Answers

Question: TUOS/Settlement/Metering: What product is SONI presently using for Ancillary Services (AS) and Other System Charges (OSC) Settlement? Is it presently separate or integrated with the present Eirgrid group product? If it is, or will be integrated, will it have the ability to operate autonomously from the SONI premises in NI?

Harmonised Ancillary Services (HAS) and Other System (OSC) payments and charges are currently settled in Belfast by members of the all-island Commercial and Settlement team using the Gentix Integrated Settlement System. The EirGrid TSO product used is Counterparty Settlement Billing (CSB) from ABB/Ventyx. It is intended to integrate the NI settlement processes using the CSB product as described in section 3.5.1 of our paper 10 submission during the year 1 of the new price control period.

Please also find additional information below re the advantages to CSB integration:

- Support of existing AS and OSC settlement processes across the EirGrid Group [ROI and NI] in a single settlement system.
- Support of data transfers from both jurisdictions into the single settlement system. Centralised view of all island and jurisdictional AS data.
- Accessible centralised secure database.
- Accurate and efficient group wide and jurisdictional reporting capabilities.
- Reduced costs in terms of system support and on-going development.
- Removal of risk associated with a small scale vendor such as Gentix [SONI HAS System].
- Minimal impact on TSO developed software which supplies or utilises AS data feeds.

Alignment of settlement will also simplify the implementation of settlement changes required for DS3 as one settlement system would be upgraded rather than two.

In integrating the NI settlement processes to CSB, separate instances of the HAS system would be maintained with access restricted between NI and ROI instances (as is currently the case with the NI and ROI instances of TUoS in the CSB system).

When the Ancillary Services system has been harmonised, the CSB system will be a single platform which can run from both Belfast and Dublin. The full hardware and software installation will also be in both Belfast and Dublin. It would be possible to split the systems so that they could be run independently however this would be subject to increased licence and support costs as discussed at our meeting on 12th February.

SONI can act autonomously in the operation of the power system. However other corporate systems including billing may or may not be run autonomously depending on the most efficient and cost effective solution.

TUOS/Settlement/Metering: The cost line ‘app enhancements/consolidations’ has projected spend over 5 years of £396k. There is no supporting text to justify this amount or the reason for the increase from £42k to £104k as from 2017/8. Please provide further information to explain the need and change in annual spend from 2017/8?

It is prudent for us to anticipate a base level of change and enhancements against all applications to meet these requirements. A base cost of £42k per annum has been set against the settlement and metering applications in this respect.

The HAS project in NI is a major change to the CSB application which is planned for 2016 (as described above). In addition the intention is to review our metering applications and to consolidate on a single product across the group. This major piece of work will also include the upgrading of operating system, database and supporting applications to ensure that the metering platform is fit for purpose for the subsequent 5 years. This consolidation and upgrade project will be run over 2016/2017.

Part of the consequence of a major system upgrade is a program of outstanding changes and enhancements which are required to ensure that we will get the most from the product and resolve any issues that arise as a consequence of the changes. The step change in the “application enhancements/consolidations” is to cater for this consequential work.

In addition a program of major change will take place against these applications as costed in the ‘CSB Upgrade’, ‘CSB (HAS for NI)’ and ‘MV90/Converge/MASS’ lines. The Settlement System is due for a major system upgrade in 2018. This is a defined part of the lifecycle of the CSB product and will ensure that our software is fully supported and that the underlying operating system and supporting applications are also at a supported point in their roadmap.

EMS wind dispatch: Please explain if this cost line refers to enhancements/replacement to EMS or a sister system (e.g. WSAT). Please provide the assumptions used in the preparation of the budget and the confidence SONI has in the estimated year on year costs. Also explain the overlap between costs lines EMS wind dispatch and EMS enhancements (annex 1 explanation) cost lines. Also why it was not possible to build in the enhancements planned for 2015/16 (£104k) into

the initial release (knowing the difficulties of enhancing an operational system)? Also why enhancements are planned in the operational EMS system in 2018/9, just before replacement, and not introduced as part of the refresh 2019/20?

The provision for Wind Dispatch refers to a tool within the EMS that is used to monitor and control wind plant e.g. to curtail wind turbines in the event of excessive wind power in a particular part of the network. It is not directly related to WSAT (Wind Stability Assessment Tool) which is external to the EMS.

Significant investment in the wind dispatch tool was required in 2014 to meet the new regulatory requirements specified in SEM 11-062, 11-105 and 13-010 decision papers. The tool has been initially implemented on a jurisdictional basis, reflecting the two existing EMS platforms on the island. A second phase of investment in 2016 will be required to harmonise the functionality in order to facilitate the monitoring and control of wind plant on an all-island basis. This investment is awaiting the delivery of the new all-island EMS in late 2015. The 2016 provision also covers certain enhancements have been identified since the existing tool was designed, e.g. handling requests by the DSO for the constraint of embedded wind power. SONI has a strong level of confidence in the figures indicated, based on the scope and cost of the 2014 investment and wider experience of wind dispatch functionality in the EirGrid group.

The provision in 2019 is due to a number of reasons including a requirement to cater for the expected increase in the number of wind-farms in NI, new power system operational techniques, developments in wind farm control or communications technologies.

The EMS itself requires a major upgrade approximately every five years, coupled with minor upgrades to specific software modules or hardware elements on an annual basis. This does not include the additional wind dispatch tool which is provided for separately. The EMS enhancements provision it is to cater for its on-going software improvements and hardware expansion to meet the needs of new connections to the grid and the on-going increase in processing and storage capabilities to cater for the expected data growth demonstrated in the following graph:

The 2016 annual upgrade project will include a larger number of software change requests that could not be delivered in parallel with the current 2015 project. In general the on-going investment in EMS hardware and software is retained into the future e.g. the enhancements indicated in 2019 will be carried forward into the upgraded 2020 system.

IS infrastructure cost category: This cost category includes £146k for hardware replacement, please detail what systems this allowance is intended for and if it includes operating systems software or support costs. Please clarify where hardware is also covered by other costs lines (e.g EMS platform, etc. etc.).

This provision here is for non-standard installations e.g. for modelling applications where a specific high spec configuration is required. Also included is the external facing server environment which is on a physically separate platform to the “Common IT Infrastructure” for security reasons.

Other server and storage hardware is provided for under “Common IT Infrastructure” and the “EMS Platform” line items. In addition, hardware is included in the “Memory and Storage Expansion” line item (see below).

This line item does not include any operating system software.

IS infrastructure cost category: The ‘common IT infrastructure’ already includes SAN (as explained at the last meeting), please clarify the difference between this and the cost line ‘memory and storage expansion’ together with what systems they each relate to?

As discussed at our meeting the line for ‘Common IT Infrastructure’ includes the purchase of the SANs and the main VMWare platform for all internal systems. This does not include any hardware (SAN or servers) for the EMS or Market systems. The SANs were purchased in 2013 which would lead to an end of life date in 2018. The purchase of the SANs included a number of disk arrays with capacity for our storage requirements for a number of years.

The ‘Memory and Storage expansion’ line item was identified to cater for the purchase of additional disk arrays for the SANs midway through the lifecycle of the SAN. This time period also coincides with an expected large increase in the data requirements. It is not viewed as financially expedient to fully populate the SAN at the time of purchase as over time it is possible to buy faster disks and often at a lower price when most required later. In addition, memory expansion is for the purchase of additional memory for servers which no longer deliver the response required by the users.

OPEX clarification questions. Spreadsheet: SONI TSO Price control (2015-20)

Business plan Information requirement: OPEX Telecommunications Support and Maintenance refers:

Hardware warranty and support, Maintenance and support; the cost line has a proposed allowance of £65k per year for the 1st, 2nd and 5th year. For the 3rd and 4th years the amounts jumps to £96k. Is this a mistake or is there an explanation?

There was a major hardware replacement programme during 2014 and 2015 and a provision of £31k has been put in place in each of 2018 and 2019 to cover an extension to the warranty on this equipment. The replacement cost in 2014 and 2015 included the hardware cost plus 3 years of warranty – all of which was allocated to the capex budget. Additional warranty will be purchased in 2018 and 2019 to ensure that this hardware is fully supported to its anticipated end of life. There will be no further provision for warranty extensions outside of this, on our hardware platform for the period of this price control.

Note that all hardware procured from our main datacentre vendor (including PCs, servers, SAN storage) follows this policy of including 3 years warranty with the initial capital outlay. Typically network hardware and software implementations include one year's warranty/licence maintenance as part of the capital outlay – all subsequent years are included in the opex budget.

Telecommunications, OTN: The year on year allowance increases (in real terms) in years 2 and 3. Please explain the underlying reasons.

NIE own the Operational Telecoms Network (OTN) however SONI have an enduring right of use. The OTN is continuously maintained and a programme of changes agreed between the parties. This will include planned replacement of aging equipment, elimination of single points of failure and provision of new circuits as may be required e.g. for the connection and control additional wind farms. Since the asset sits in NIE's RAB, SONI contribute to the investment and maintenance programme through Opex.

The reason for the increase over the price control period is to cover the anticipated growth (3%) in telecommunications circuits' requirement to facilitate the monitoring and control of additional renewable generation. The network investment is anticipated to remain at the same level as it has been to date.

Telecoms equipment Opex: The present price control has only a small allowance (£3k in years 2011/12 and 2012/3) up until the last year where it is forecast to be £23K. The SONI proposals for the new price control include this new amount for each of the five years. Would you please let me know what this new cost is for?

The increase in the cost is due to the necessity to replenish the spares holdings which have been depleted. This provision will ensure that an appropriate level of spares is maintained. In addition the SONI building is now substantially larger necessitating a larger range and quantity of electrical consumables.

□ Station UPS equipment £9k □ RTU spares £4k □ Electrical spares and consumables £10k

Software licences, other applications:

In year 2019/20 the projected cost is £736k. Assuming vendor support costs are 18% of the purchase cost this would equate to a software purchase cost of about £4million. Is this correct or are there other support costs included in this amount?

Software licences and support, other applications: The year on year allowance increases (in real terms) in every year and equates to a 28% real increase over the 5 year period. Please explain the underlying reasons.

The figure of £736k for 2019/2020 is based on current 2014/15 costs of £571k for the existing suite of applications with expected additional maintenance charges incorporated year on year thereafter directly related to the proposed capital programme. A small provision has been made for potential downstream TSO system changes which may be required in order to accommodate changes to TSO interfaces to the market etc.

The capital programme of £8.9m (of which £2.5m relates to EMS) results in the additional maintenance of £165k (or 2.6% of the overall programme cost).

It is important to note that the impact of an increase in IT maintenance relating to a particular project is dependent on the year in which it was implemented. The earlier within the price control period a project is implemented, the greater the impact will be e.g. a £5,000 increase in 2016 will have an impact of £20,000 over the life of the price control but only a £10,000 impact if implemented in 2018.

Software licences, EMS: In year 2019/20 the projected cost is £146k against previous years of £118k. This seems a large increase for a new release or does it reflect the cost of the new and old licences over the transition period?

This is not a licence fee – it is the annual maintenance cost paid to Alstom for the EMS platforms. The increase is due to the expected additional functionality which would be included during the system upgrade planned and delivered during 2019-2020. In addition contracted inflation expectations have been included.