



# **Utility Regulator**

## Review of SONI IT Expenditure

June 2020



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# 1. Introduction

This report presents GHD's review and analysis of the forecast IT capital expenditure submission made by SONI as Transmission System Operator (TSO) for the years 2021 – 2025.

The GHD review has examined the business case submitted by the TSO along with any supporting information gathered via questions raised during the review period.

## 1.1 Background

The Utility Regulator (UR) provide Northern Ireland Transmission System Operator (TSO) – SONI with an allowance to carry out its functions as part of the TSO price control. UR received a business plan from SONI on 31 October 2019 following publication of the regulatory approach, published in March 2019.

UR are seeking support to assess and scrutinise IT Expenditure to provide an initial position across a number of potential areas:

- SONI requested IT Solutions
- Digitalisation & Data Services
- Control Centre Tools
- Investment assurance model

## 1.2 Scope and limitations

UR provided the SONI submission for IT and telecoms expenditure along with the initial clarification questions sent to SONI and their responses. Following the initial review, UR requested that GHD undertake a high level review of the investment assurance model set out in appendix S of the SONI business plan.

GHD scope was to review the documentation and identify any additional clarifications needed within the question window. Once all responses were received, GHD provided opinion in the robustness of the need case provided by SONI on the IT expenditure.

We form opinion on the costs through assessment of the sources that SONI have used in producing the cost estimates.

## 2. Expenditure review

This section reviews the IT expenditure in detail based on the evidence in the business plan.

### 2.1 Forecast IT capital expenditure

The IT expenditure is distributed across multiple sections – and multiple appendices of the business plan – dependent on the nature of the expenditure, Table 2-1 summarises the areas that have been reviewed as part of this IT expenditure review.

**Table 2-1: Business case areas**

Appendix D (IT BaU) <sup>1</sup>	Appendix E – telecoms BaU	Appendix F – sustainability & decarbonisation	Appendix G – Operate, develop & enhance the grid & market
D.9 Initiative D.2 – Transition to Cloud	E.4 telecoms opex 2020 – 2025	F.2 Initiative F1: Renewable strategy and implementation programme	G2 Initiative G1: alternate for disaster recovery
D.10 Initiative D.3 – IT operating model	E.5 Telecoms capex	F.3 Initiative F2: Control Centre Tools	G3 Initiative G2: Control centre training
D10.2.1 Data centre optimisation		F.4 Initiative F3: Smarter outage management	G4 Initiative G3: Physical security tech replacement & enhancement
		F5 Initiative F4: migration to IP to support SCADA	G5 Initiative G4: Cyber security
		F6 Initiative F5: Data services	G6 Initiative G5: European Network Codes
		F7 Initiative F6: System Planning	G.7 Initiative G6: Capacity Market Secondary Trading
			G.8 Initiative G7: DSU Compliance with State Aid
			G.9 Initiative G8: Implementing a mixed integer programming solver
			G.10 Initiative G9: State aid cross border capacity
			G.11 Initiative G10: Market related TSO governance, risk management and compliance
			G.12 Initiative G11: Metering system

<sup>1</sup> BaU = Business as usual. Considered the normal execution of roles and activities within the business and not influenced by innovative or testing of unusual technologies

Appendix D (IT BaU) <sup>1</sup>	Appendix E – telecoms BaU	Appendix F – sustainability & decarbonisation	Appendix G – Operate, develop & enhance the grid & market
			G.13 Initiative G12: Operational support for IT projects

The capital expenditure requested by SONI for these areas is summarised in Table 2-2.

Two capex figures are shown. Taken from the business plan chapters and appendix U – data table excel spreadsheet. We note four issues:

- 1) Not all business case entries have an associated expenditure line in the data table
- 2) In most cases the business plan entries are close in value to the data table, but do not match exactly.
- 3) One exception is Migration to IP where the capex cost is significantly different.
- 4) In five cases, we were not able to identify a capex allowance in the data table.

Table 2-2 is a comparison of the data table and the submission; however, the analysis in this report is based on the information in the business plan.

**Table 2-2: Forecast total IT capital expenditure**

	2021 – 2025 business plan		GHD Recommendation	
	CAPEX	OPEX	CAPEX	OPEX
<b>Appendix D – IT business as usual</b>				
D2 Transition to Cloud	747	922	747	922
D3 IT operating model	222	702	222	702
<b>Appendix E – SONI telecoms business</b>				
E4 telecoms opex	-	7,270	-	7,270
E5 telecoms capex	1,373	-	1,298	-
<b>Appendix F – sustainability and decarbonisation</b>				
F1 renewable strategy and implementation programme	3,580	3,500	890	875
F2 control centre tools	3,970	590	0	500
F3 smarter outage management	480	60	480	60
F4 migration to IP to support SCADA	270	800	0	0
F5 data services	100	-	0	-
F6 system planning	-	500	-	500
<b>Appendix G – Operate the grid</b>				
G1 Alternate for disaster recovery	1,750	750	0	0
G2 control centre training	830	400	0	0
G3 physical security tech replacement and enhancement	1,220	970	1,220	970
G4 Cyber security	160	1,120	160	1,120
G5 European network codes	-	800	-	0
G6 Capacity market secondary trading	440	580	220	290
G7 DSU compliance with state aid	820	-	0	-
G8 implementing a mixed integer programming solver	260	180	260	180
G9 state aid cross border capacity	230	400	0	0
G10 market related TSO governance, risk mgmt. & compliance	-	200	-	0
G11 metering system	880	90	0	0
G12 Operational support for IT projects	-	200	-	0
<b>Total</b>	<b>17,332</b>	<b>20,034</b>	<b>5,497</b>	<b>13,389</b>



## 2.2 Detailed review of the IT initiatives

The following section reviews each of the initiatives in detail.

### 2.2.1 D.9 Initiative D.2 – Transition to Cloud

SONI, as an IT intensive business and are investigating ways to build long-term resilience into their existing systems and processes. One of these mechanisms is moving away from the business owning and maintaining their own servers and purchasing cloud-hosting software systems. This initiative is already underway in that certain number of services have been migrated to cloud services so the business can gain knowledge and experience in areas such as security and authentication, and identify the skills and resources needed to support the organisation in its future state.

This initiative continues to build on current knowledge of cloud-based services and migrate additional services to cloud based servers. SONI provides a 5-year plan including details on the type of the corporate services to be transitioned.

GHD is of the view that the use of cloud services is becoming a standard industry practice and SONI approach of staged entry is appropriate as the potential risk for governance and security management need to be addressed (SONI acknowledge the need for security management).

There is commonality with this initiative in that Initiative D1: Assets Reaching End of Life (server replacement) and Initiative D10.2.1: Data centre optimisation that will continue in house services for the next price control period. We are of the view that the services offered by SONI, i.e. market services, is classified as critical infrastructure services and as such a priority on maintaining data integrity.

GHD is of the view that there is a justified need to investigate the use of cloud-based services SONI adopting a cautionary approach of staged implementation to gain knowledge of the services presents a reasonable approach for a utility business.

**Table 2-3: Transition to cloud cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Transition to Cloud	Capex	747	747
	Opex	922	922

### 2.2.2 D.10 Initiative D.3 – IT Operating Model

The current SONI IT operating model is a business owned centralised IT service with duplication at a second location. This initiative focuses on providing upgrades and replacements at the in-house data centres to ensure that they are fit for purpose in the future.

With respect to the scope of the IT operating model, the largest focus is Data Centre Optimisation and is discussed in the next section.

This option is cognisant with Initiative D1: Assets Reaching End of Life (server replacement) and Initiative D2: Transition to Cloud. In that the services offered by SONI, i.e. market services, is classified as critical infrastructure services and as such a priority on maintaining data integrity. This means that there may be cheaper ways to move towards Cloud based computing; however, they are not without additional risk to security and resilience.

SONI did provide costs relating to server installation and ownership, their costs are in line with expectations for servers including the cost of ongoing maintenance.

We are of the view that SONI are adopting a low risk approach, which in our view is correct and ensures that there is increased resilience.

### **D10.2.1 Data centre optimisation**

This initiative focuses on the physical location of the IT servers. The current location of the data centre does not allow for the necessary physical space needed to accommodate the growth in assets to manage the data management tools and decision support tools. Especially in relation to the resilience and security and flexibility. An upgrade is needed.

In short, three options have been examined from relocation of physical assets to an alternative site through to cloud infrastructure (in different guises) and an intermediary of partial outsourced services with co-location.

The preferred option is the intermediary option of partial outsource of some services whilst maintaining some services in house at an alternative location. GHD is of the view that for the next price control there is a justified need to invest in location space and the hybrid approach is a low risk option.

**Table 1-4: IT operating model cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
IT Operating Model	Capex	222	222
	Opex	702	702

### **2.2.3 E.4 telecoms opex 2020 – 2025**

The following information is provided on telecoms opex in the business plan. In general, the proposed Opex of £7.27m is in line with the previous year's accounting for inflation and ongoing initiatives.

**Table 1-5: Operational telecoms network cost**

Opex	£Million – April 2019 Prices						GHD Recommendation
	2020/21	2021/22	2022/23	2023/24	2024/25	Total	
Operational Telecoms Network	0.892	0.910	0.928	0.946	0.965	4.641	4.641
Operational Telecoms Network Investment (Pass-through to NIE)	0.325	0.275	0.275	0.275	0.200	1.350	1.350
Disturbance Monitoring &	0.047	0.049	0.050	0.051	0.052	0.249	0.249

Opex	£Million – April 2019 Prices						GHD Recommendation
	2020/21	2021/22	2022/23	2023/24	2024/25	Total	
Metering Services							
Operational Telephony & Emergency Voice	0.196	0.201	0.206	0.211	0.216	1.030	1.030
Total Telecoms Forecast	1.460	1.435	1.459	1.483	1.433	7.270	7.270

## 2.2.4 E.5 Telecoms capex

The proposed telecommunication Capex expenditure is summarised in Table 1-4 below.

**Table 1-6 - Telecommunications Capex**

Capex	£'000					
	2020/21	2021/22	2022/23	2023/24	2024/25	Total
RTU Replacement Project	122	102	150	150	150	674
UPS Replacement Project	82	82	20	20	20	224
Moyle HVDC Project	250	-	-	-	-	250
Ballylumford 275kV upgrade	25	-	-	-	-	25
IP Telephony Upgrade	-	-	-	-	200	200
Total Telecoms Forecast	479	184	170	170	370	1,373

### RTU Replacement

SONI are proposing to replace 11 RTUs reaching their 20-year life during the period 2010 – 2025 with modern units that are IP compatible to allow for the migration from Serial Communications to IP Communications. It is noted the SONI has based the unit cost for replacing 11 RTUs (£20.4k each) on the smallest RTU size that they are installing giving a total investment £225k. In addition, SONI are also proposing to install a further 9 new RTUs at a cost of £50k based this unit cost on the largest RTU size they are installing giving a total investment £450k.

The basis on which the need for 9 new RTU has been derived has not been provided. It is assumed this is based on new transmission connected generation with some network reinforcement. The total investment requested over the period is £675k.

We note there is significant potential for the replacement RTU cost to be considerably higher depending on substation size resulting in an overspend of £325k. However, given the uncertainty of the number and size of new RTUs required this may result in an underspend of a similar magnitude.

In our experience the upper and lower costs for a replacement RTU appear reasonable, however the actual RTU sizes and quantities are not known therefore the reasonability of the investments cannot be assessed.

### ***UPS replacement***

SONI have stated manufactures recommendation for the replacement of UPS batteries is every 5 years. However, based on SONI fault data and asset monitoring SONI state they have taken the decision to extend the life span of the equipment to 7 years. SONI have not provided the age profile of the assets but state that for the 2020-2025 period it is planned to replace 55 UPS units during the 2020 – 2025 period.

SONI's unit cost are £4k per site resulting in a total investment of £225k over the 5-year period.

### ***Moyle HVDC Project***

The only details provided regarding the proposed £250k expenditure identifies the upgrade of the telecommunications interface to the HVDC interconnector to support IP technology, IEC 104 protocol and additional data exchange with the EMS. We understand the current communications is based on aging analogue technology and there is a need to upgrade the telecommunications interface.

The scope of work is not detailed to allow a full assessment of the costs of the project, but we would expect the cost to be in the region of £200k. Recognising the work is required, it is agreed with the Regulator that a £200k allowance is reasonable.

### ***Ballylumford 275 kV upgrade***

The scope of work is for a new RTU to be installed as part of the NIE upgrade of the substation. The £50k expenditure quoted in paragraph E.77 as the unit cost for a large RTU does not match the £25k expenditure in Table E.3.

Following discussions with the Regulator, we understand that the assets will be transferred to NIE and therefore SONI will not incur this expenditure. Therefore, this cost is set to zero.

### ***IP Telephony***

We note the new IPT system is being installed in the 2019/2020 period and SONI are expecting to capitalise this cost in the current price control review. In addition, due to CISCO policy of ceasing support after five years, the system will need be updated in 2024/2025. The forecast cost for the 2019/2020 system is £300k, while, SONI is forecasting £200k as the cost of the refresh in 2024/2025. SONI have not provided a scope of work, however a five year refresh period is appropriate and £200k is reasonable.

The results for E.5 are summarised in Table 1-5 below.

**Table 1-7: Summary of Telecoms Capex**

Capex	GHD Findings	SONI Cost	GHD Recommendation
RTU Replacement Project	Reasonable	674	674
UPS Replacement Project	Reasonable	224	224
Moyle HVDC Project	Lack of scope	250	200
Ballylumford 275kV upgrade	Transfer to NIEN	25	0
IP Telephony Upgrade	Reasonable	200	200
<b>Total</b>		<b>1,373</b>	<b>1,298</b>

### 2.2.5 F.2 Initiative F1: Renewable strategy and implementation programme

Ireland has developed a Climate Action Plan with a target of 70% of electricity to be generated from renewable sources by 2030. This would entail the phasing out of coal and peat electricity generation and an increase in homeowners generating their own electricity and selling back to the grid as micro-generation. The current target for renewable generation is 40% by 2020 from 20% in 2015.

This programme is one of the elements of Northern Ireland's response to the challenging 40% RES target. The DS3 programme facilitated Northern Ireland's renewable target and one of the benefits of this programme is that by increasing the level of non-synchronous generation that can be accommodated.

#### *Development of tools and systems*

SONI has proposed to develop tools and systems for scheduling and monitoring of renewable generators. SONI has identified six packages to encompass the renewable strategy.

- Scheduling of reserves from new technologies;
- New digital performance monitoring system;
- New digital communications infrastructure;
- System Services at residential level
- New TSO-DSO interface.
- A new System Services settlement system

Each is discussed in more detail below.

#### **Scheduling of system services from new technologies**

The business case identifies a need to augment the existing systems to allow for additional dispatch services. This infers that the current scheduling and dispatch system is at capacity or has insufficient ability to be scaled up to include additional dispatch.

The responses are vague on how the augmentation has been assessed other than previous experience. If there were a need for augmentation for system services, we would expect the new system services would be identified. As such, we cannot make an allowance at this stage based on the justifications provided.

## **Digital performance monitoring**

This initiative is automated performance monitoring and remuneration of the service providers of the existing 14 System Services and any future System Services. The DPMS will compare the declared availability of each individual site vs actual response was to a system event and determine a pass/fail rating. This may require a new bespoke system if it is not possible for augmentation our existing systems.

As the new services are stated as being residential in nature, we would expect that to be developed by the DSO, not the TSO. Therefore, we are of the view that this is not a TSO function. As such, we do not propose to make an allowance to the TSO for this expenditure.

## **RES telecommunications lab**

The RES telecommunications lab is an extension of the digital performance monitoring system that enhances the processing of data by developing communications infrastructure to interact with Phasor Measurement Units (PMU). As mentioned above, the DPMS relates to residential services and as such we would expect the DSO to develop those services. As such, we do not proposed to make an allowance for the TSO for this expenditure.

## **DSM at residential level – pilot / DSM at residential level – roll out**

This is a pilot project to explore the potential approaches, mechanisms and systems to facilitate the rollout of DSM and System Services at a residential scale.

Both the business case and the Climate Action Plan identifies that the future will include significant input of intermittent renewable generation contribution will be from residential services.

We are of the view that these new generators will be residential services, and this falls under the remit of the DSO. We further understand that the DSO is also establishing IT tools for performance monitoring, telecommunication for residential generation.

A second technology development within the renewable energy initiative is Demand Side Management (DSM) at the residential level. As mentioned above, our current understanding is that the management of residential services would fall under the jurisdiction of the DSO, and the DSO has allocated project costs towards this service offering.

Based on the information in the business case, there are significant synergies to be captured if the systems are to be accessed by both parties and we would not expect the TSO to be funding DSO activities. As such, we cannot make an allowance for this as a TSO expenditure.

## **TSO-DSO interface**

There is a need for data information flow between the DSO and TSO, and this is captured under this TSO-DSO interface platform being developed under this initiative. We see this TSO-DSO allocation as the formal interface between the two bodies and we understand that current SCADA technology has the ability to provide some of these services – but not all. As distributed generation becomes a more significant factor and the roles of the TSO and DSO will change, the data interface will become an important factor. The cost of developing this interface is reasonable.

## **Settlement system**

The TSO has identified a need for a new settlement system to manage the increased complexities of for new system service project and incentive structures and is an extension of the DS3 settlement system. There is no further information on the nature of the new system services or the new incentive structures. There is mention of new system services being part of

the research and development through technical studies to identify and enhance system services.

We surmise that the new system services are currently in the research and development stage and are not sufficiently developed. There is an allowance for research and development including policy review and appraisal.

We are of the view that the need for a new settlement system for new services has not been sufficiently developed. As such, we cannot make an allowance at this stage based on the justifications provided

A summary of the Capex allocations is given below.

**Table 1-8: Renewable strategy capex cost**

Capex Initiative	Cost over Price Control (£'000)	
	SONI proposal	GHD recommendation
Scheduling of system services from new technologies	450	0
Digital performance monitoring	450	0
RES telecommunications lab	220	0
DSM at residential level – pilot	450	0
DSM at residential level – roll out	670	0
TSO-DSO interface	890	890
Settlement system	450	0
Total	3,580	890

The business case identifies four categories for opex of Payroll, Professional fees, IT development cost and research, shown below. There is no further breakdown of the opex costs therefore, we propose to apportion the opex based on the capex allowance – 25%.

**Table 1-9: Renewable strategy Opex cost**

Opex Initiative	Cost over Price Control (£'000)	
	SONI proposal	GHD recommendation
Payroll	1,800	
Professional fees	220	
IT development costs	1,200	
Research	280	
Total	3,500	875

A summary of the totals is given below:

**Table 1-10: Renewable strategy cost**

		SONI proposal	GHD recommendation
Renewables strategy and implementation programme (DS3+)	Capex	3,580	890
	Opex	3,500	875

**2.2.6 F.3 Initiative F2: Control Centre Tools**

The table below identifies the Capex proposed for the control centre tools.

**Table 1-11: Control centre tools capex cost**

Description	Capex (£'000)
Overall Programme Design. High Level Solution Design and Component Identification	200
Common Dispatch Mechanism and Communications Design and Implementation	600
Control Centre Data Store	250
RES (Renewable Energy Sources) Dispatch	330
SSG (Small Scale Generation) Aggregation/ Dispatch	330
DSU (Demand Side Unit) Dispatch	330
Storage Control Management	330
System Services Scheduling for RES (Renewable Energy Sources)	330
Enhanced RES Forecasting	520
Enhanced Demand Forecasting	580
Additional Forecasting Data Sources	170
<b>Total</b>	<b>3,970</b>

SONI are proposing to upgrade the EMS. However, at this time it is not clear which, if any of these proposed tools, are to be included in the EMS solution. This uncertainty presents a risk to delay the development and deployment of the tools.

The solution architecture proposed allows development of some or all of the tools to be undertaken separately where the EMS option is not available or unsuitable. However, these third-party developed tools may also be required to interface with to EMS to ensure a co-ordinated dispatch of all network resources. This strategy also has risk of delay and additional costs due to the interfacing and co-ordination of the works.

Furthermore, there are complexities in the development of tools for the scheduling and dispatch of distributed energy resources embedded within the distribution network. These include knowledge of operational, thermal, voltage and fault level restrictions within the distribution network to ensure safe operation of the network and compliance with licence regulatory conditions. It is not apparent how these constraints in the network are considered in the dispatch tools.

As highlighted that these are complex software packages requiring detailed specification and testing to ensure they operate satisfactorily. The proposal has not presented anything more than a conceptual design and a list of potential developments with the first task being the



preparation of solution roadmap and programme for the development. We would agree the adoption of new technologies and the increase in distributed energy resources embedded in the distribution network requires the development of new tools to assist the network operation. However, SONI have not provided a clear justification of the costs, or demonstrated they will be able to meet the programme to complete the work during the next price control period. However we do recognise that there is a need for development. We have allowed £500k for additional staff as discussed and agreed with the UR.

**Table 1-12: Control centre tools cost**

Initiative	Cost type	Cost over price control (£'000)	
		SONI proposal	GHD recommendation
Control Centre Tools	Capex	3,970	0.0
	Opex	590	500

### 2.2.7 F.4 Initiative F3: Smarter outage management

SONI has identified that the current scheduling and management of the transmission system. As part of the energy market, generators are compensated where revenue is lost through the imperfections charge of which an element is related to outage management.

The solution is identified as implementing a solution that will allow more accurate prediction of the impact on outages and on the DBC budgets prior to outage requests being approved. The solution is an enterprise solution that will initially manage outages and then further expand to work with future developments, and optimisation.

The business case identifies two major Users, EirGrid and SONI (both will have portals and use the 'common all-island outage management solution). The cost associated with each user is not stated.

SONI has determined the costs through solutions from a least 20 potential suppliers and have stated they have used these F3 costs to validate their own (we have not seen a breakdown of the cost).

On the assumption that the cost allocation between EirGrid and SONI is correctly addressed, we believe the need, solution and cost is reasonable.

**Table 1-13: Smarter outage management cost**

Initiative	Cost type	Cost over price control (£'000)	
		SONI proposal	GHD recommendation
Smarter outage management	Capex	480	480
	Opex	60	60

### 2.2.8 F5 Initiative F4: migration to IP to support SCADA

This initiative looks to develop safe, secure and economic real time monitoring and control over IP technology. This is closely linked to Initiative E.4 Telecoms opex 2020 – 2025 and Initiative E.5 telecoms capex.

The principle of the technology is already readily available, and is being adopted as a SCADA communication protocol. The need relates predominantly to the need to manage distributed

generation, and this assumes that the TSO will be managing and instructing distribution connected generation. We are of the view that distribution connected generation will fall under the remit of the DSO, as discussed in section 2.2.5. As such, the TSO will have a passive interface with the DSO – also captured in section 2.2.5.

We are of the view that this technology for controlling transmission assets is appropriate, but distributed generation is not within the remit of the TSO and therefore we have applied zero for migration to IP for distribution connected generation.

**Table 1-14: Migration to IP technology cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Migration to IP Technology	Capex	270	0
	Opex	800	0

### 2.2.9 F6 Initiative F5: Data services

The driving need for this initiative is not fully defined and the driver is based on the statement that the volume and complexity of data is increasing. Increase in data is driven by new trading arrangements, multiple new connection and growth in renewables, again targeted at the distribution network connected level.

The solution is improved data analytics, to help manage increase level of uncertainty. The solution is not clearly defined and there are apparent duplication in solution with Initiative F2: Control Centre Tools, Initiative F3: smarter outage management; Initiative F6: system planning (tools).

The initiative is summarized as a data strategy that will:

- Define our approach to data capture, management and analysis.
- Identify issues and gaps with existing approaches.
- Review future data service requirements.
- Define an approach to data security, governance and quality.

This is an investigative initiative with the aim to enable a full analysis of the tools available to ensure the most suitable ones are selected. It will include an element of trialling and piloting of the available tools.

We are of the view that this particular investigative initiative is covered under other initiatives, for example Initiative F3: smarter outage management is aimed a procuring an analytics and solution for predictive power flows modelling, which by design will have data analytics. Therefore, we are making no allowance for these additional costs.

**Table 1-15: Data services cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Data services	Capex	100	0
	Opex	0	0

### 2.2.10 F7 Initiative F6: System planning

SONI has stated that the need for additional system planning resource is due to expected future complexity of power system analysis. The business case states the intent is to bring current outsourced services in house and increase the current knowledge in-house. We agree that where outsourced services are consistently being used, it is reasonable to bring those services in house. We have not been presented with data identifying the current levels of outsourcing.

The need for additional staff is based on a risk adverse approach being available to deal with estimated additional analytical burden.

In summary, the exchange of external resources for in-house resource is a prudent step, as long as it is supported with historical resourcing. As such, we have allowed the requested allowance.

**Table 1-16: System planning cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
System planning	Capex	0.0	0.0
	Opex	500	500

### 2.2.11 G2 Initiative G1: alternate for disaster recovery

As the controller of the Northern Ireland Transmission System, the Control Centre is duplicated so that in the case of a need to evacuate the main control centre, control can be passed seamlessly to an alternate location and the network integrity can be maintained. This is common practice for TSO businesses worldwide.

SONI has identified that the current Disaster Recovery Business Continuity (DRBC) facility provides very basic control centre capability and that the resources needed for future hosting is limited.

SONI has examined a variety of options, including sharing facilities with EirGrid, and the preferred option is to host their own, dedicated facility.

The location and the scope of the alternate facility have been forecast on a recent fit-out of EirGrid's DRBC site. The scope of the requirements has not been established.

We are of the view that the need for a DRBC facility for SONI is established. As an independent TSO, they are obligated to maintain their network and should not be beholden to a third party. The current facilities are rented from NIE and are also aged.

In relation to the cost, we believe that SONI need to establish a bottom up cost for their disaster recovery facility and that the use of EirGrid DRBC site fit-out is a guide. We understand that there is a need, but not substantiated, therefore we recommend that the allowance is set to zero until SONI provide a full detailed cost.

**Table 1-17: Alternative for disaster recovery cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Alternate for disaster recovery	Capex	1,750	0

	Opex	750	0
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We are of the view that the need is justified, however the allowance should be provisioned until SONI has built up a cost in detail.

### 2.2.12 G3 Initiative G2: Control centre training

The operation of the power system requires Control Centre staff to be competent in both operations and control centre system including the SCADA/EMS and other decision tools. The preferred option is to utilise in-house training facilities rather than an external third party. This is quite common for TSOs where SCADA/EMS systems are specifically tailored to their network operational requirements. Furthermore, it allows different operating scenarios to be simulated on their actual network.

A cost breakdown has not been included in the submission. The costs have been ‘...internally validated...’ but the basis of the estimate unclear. In the case of the SCADA/EMS, training this is normally provided as part of the system supply contract. It is not clear from the details provided if SCADA/EMS training and system are also included as part of the EMS refresh. As such, based on the information provided we cannot make an allowance at this time.

**Table 1-18: Control centre training cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Control Centre Training	Capex	830	0.0
	Opex	400	0.0

### 2.2.13 G4 Initiative G3: Physical security tech replacement & enhancement

This proposed initiative is stated as being informed by the Network & information Systems (NIS) Regulations that were enacted in May 2018. To support this initiative SONI engaged an external security expert to review the physical security. The report has not been provided.

We assume that the physical security review audited SONI against the NIS Regulations. Based on the assumption gaps were identified that this initiative is aimed at addressing those gaps. As we have not seen the report, we assume that the proposed solution meets the requirements of the NIS Regulations. On this assumption, we believe that there is a need to address security issues.

SONI proposed three options (Do nothing, maintain like-for-like, enhanced). We further assume that maintaining the systems like-for-like with modern equivalent assets would still make SONI non-compliant with the NIS Regulations and so the remaining option is ‘enhanced’. The business case does not explicitly state this.

The cost estimate is based on market pricing (although a breakdown of the cost has not been provided). Based on the assumptions above, we accept the need for SONI to be compliant with the NIS Regulations and as such accept the requested allowance as reasonable. We recommend that allowance is released once additional information is released from SONI on the scope of works.

**Table 1-19: Physical security cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Physical security technology replacement and enhancement	Capex	1,220	1,220
	Opex	970	970

**2.2.14 G5 Initiative G4: Cyber security**

Cyber security is seen as an important element with cyber-attacks increasing on utilities around the world. The National Cyber Security Centre Ireland provided guidance on the expected levels of cyber security for essential services in Ireland.

SONI commissioned an independent assessment of its current cyber security capabilities and provided recommendations to achieve leading industry target state by 2021. (The report has not been made available for this review).

As a needs case, we would not expect SONI to achieve leading industry status in cyber security, rather we would expect they meet industry best practice. The needs case should address any weaknesses and align with either National Cyber Security Centre guidance or align with Energy Networks Association guidance on cyber security. We would seek to confirm that the needs case for cyber security is focussed on attaining current legislation and / or industry best practice.

Costs were derived from a review of published material and advice from strategic partners. We assume that the proposed initiative will make SONI compliant with the National Cyber Security Centre guidance (although it does not explicitly state this).

We recognise the need for a utility to meet the guidelines for cyber security. As a business managing critical infrastructure, it is important that they have the necessary protection in place from cyber attacks. Our assessment is made on the assumption that the work SONI plans will be compliant with the National Cyber Security guidance.

We recommend that the allowance is held for detailed analysis against the scope of works to confirm that it will meet the National Cyber Security guidance in its entirety.

**Table 1-20: Cyber security cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Cyber security	Capex	160	160
	Opex	1,120	1,120

**2.2.15 G.6 Initiative G5: European Network Codes**

SONI has stated that the current European Network Codes and the All Ireland Network Codes are being harmonised to promote efficient use of cross-border interconnection. The harmonisation of the Codes started in 2016 and this is a continuation of that work. The Electricity Balancing Guidelines are not included in this proposal due to uncertainty. SONI are of the view that the current resources are not able to meet the task due to the increased workload.

This is a proposal to increase the number of full time employees by two people. It is mentioned that that staff are shared between SONI and EirGrid. We assume that the proposed cost is the proportion of the total cost chargeable to SONI and EirGrid cost is captured within their price control.

SONI has identified that the review of the European Network Code development has been underway for ‘...several years...’ and the role is for enduring services. This leads us to assume that SONI currently does not have the necessary resources, to date to meet their current obligations. The proposal does not explicitly state that they are under-resourced.

GHD is of the view that the additional need has not been fully justified. On the assumption that there is currently insufficient resources, we would expect to see evidence of that under resourcing. As the development of European Network Codes has been underway for several years, the needs case should identify a step change in workload that would require additional resources. Currently it does not as such we cannot make an allowance based on the justification provided.

**Table 1-21: European network codes cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
European Network Codes	Capex	0.0	0.0
	Opex	800	0.0

### 2.2.16 G.7 Initiative G6: Capacity Market Secondary Trading

Operating the Capacity Market is a new role that SONI has been allocated as a TSO. This initiative includes the development of an online platform for a Secondary Trading Market. We agree that development of a capacity market secondary trading platform is a requirement of the TSO role and there is a need to develop some form of platform.

The exact model to be used for the trading platform has not been agreed at this stage, we question the ability to establish a cost for the project. It is not stated whether the product will be an ‘off the shelf’ platform or bespoke build.

The costs have been ‘...internally validated...’ from recently completed projects. A breakdown of the costs has not been provided. The use of internal costs from recently completed projects does not provide sufficient information to confirm that the completed projects were delivered efficiently.

Without a timeline for delivery, no detail on the type of platform, the resourcing profile of four permanent staff from the start does not appear reasonable.

**Table 1-22: Capacity market secondary trading cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Capacity Market Secondary Trading	Capex	440	220
	Opex	580	290

### 2.2.17 G.8 Initiative G7: DSU compliance with state aid

SONI are proposing to implement the three steps set out by the regulators removal of DSUs from exemption of difference charges.

A breakdown of the costs has not been included with the implementation costs being calculated based on internal SONI costs. This cost estimate has been '*...internally validated...*' against the recent Enhanced Performance Management System Phase 1 project.

The scope of supply of equipment, hardware, software development, communications etc required to deliver the project has not been supplied. We understand that this is an obligation that SONI must fulfil, therefore we recommend the allowance set to zero until SONI can provide a scope of works for delivery.

**Table 1-23: DSU compliance cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
DSU compliance	Capex	820	0
	Opex	0.0	0.0

### 2.2.18 G.9 Initiative G8: Implementing a mixed integer programming solver

SONI state that during the detailed design of the Capacity Market, the Regulatory Authorities considered a number of auction algorithm approaches to be applied in the Capacity Auctions. SONI have stated it is the intent of the Regulatory Authorities to move to the new Auction Format D on an enduring basis.

SONI are proposing to implement the algorithm using Multiple Integer Programming to derive the optimum solution. An external supplier will carry out the algorithm development and the cost estimate has been based on experience from the I-SEM project and other recently completed Capacity Market activities.

We recognise that SONI is obligated to implement efficient balancing systems. Based on the assumption that the external supply costs are scoped to deliver this initiative the project is reasonable.

**Table 1-24: Capacity market algorithms cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Capacity Market Algorithms	Capex	260	260
	Opex	180	180

### 2.2.19 G.10 Initiative G9: State Aid cross Border Capacity

We note that it is a State Aid requirement that SONI is prepared for integration into this cross-border Capacity Market by 2024. The estimated costs are based on the recent I- SEM project as a benchmark.

The scope is not sufficiently developed and we are of the view that the justification for the cost estimate is not sufficiently robust to recommend an allowance.

**Table 1-25: State aid cross border capacity cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Capacity Market Cross Border	Capex	230	0.0
	Opex	400	0.0

### 2.2.20 G.11 Initiative G10: Market related TSO governance, risk management and compliance

SONI have stated a need for additional governance, risk and compliance management because of I-SEM being established. I-SEM replaced SEM in 2018, bringing in new energy markets aimed at increasing competition and ultimately lowering prices.

Governance is shared between SONI and EirGrid where EirGrid fund 75% of the cost. The cost below is stated is the 25% value. To meet the governance, risk and compliance requirements, EirGrid intend to add two resources with an allocation to SONI summing to £200k over the PR5 period.

The business case states that without the additional resource. SONI would not be able to oversee their market related obligations. There is insufficient information to support the need for extra staff, therefore the recommendation is set to zero.

**Table 1-26: Market related TSO governance cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Market related TSO governance, risk management and compliance	Capex	0.0	0.0
	Opex	200	0.0

### 2.2.21 G.12 Initiative G11: Metering System

SONI is obliged under the Trading and Settlement Code to collect and validate meter data for a defined set of metering points. As the Transmission Meter Data Provider, SONI is also responsible for the collection, validation and aggregation of meter data for the provision of Revenue Meter Data for the Settlement and Billing Systems for the single market. The metering data is currently provided via three major applications and a number of support tools. SONI have advised these systems are reaching end of life.

The transition from a small number of large centrally dispatched generators, to a larger number of small, renewable energy sources and hybrid generation sites, increases the number and complexity of the connections and the metering systems. We agree that the current systems require a refresh to meet the new demands being imposed on them by the change in the market.

SONI's preferred solution is a single all island system, however, details of the final design have not been provided.

The implementation costs have been '*...internally validated...*' from discussion with vendors and recent contract for other utilities. A breakdown of the costs has not been included and the



information supplied does not provide sufficient detail to confirm the costs are justified. As such, we cannot make an allowance based on the information provided at this time.

**Table 1-27: Metering system cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Metering System	Capex	880	0.0
	Opex	90	0.0

### 2.2.22 G.13 Initiative G12: Operational Support for IT projects

This initiative is to ensure that there is sufficient resources during the price control period within the operational teams to deliver the sponsored projects.

SONI has identified 7 sponsored projects that require operational support. The additional support is not related to the IT product outlined in the initiative identified in the submission, but to capture the impact on teams already occupied with full time roles and who need to provide staff to support the integration of the new product into the organisation.

We are of the view that any additional operational support required to deliver sponsored projects should be captured in the sponsored project. GHD is of the view that this is not justified.

**Table 1-28: Operational support for IT cost**

Initiative	Cost type	Cost over Price Control (£'000)	
		SONI proposal	GHD recommendation
Operational support for IT	Capex	0.0	0.0
	Opex	200	0.0

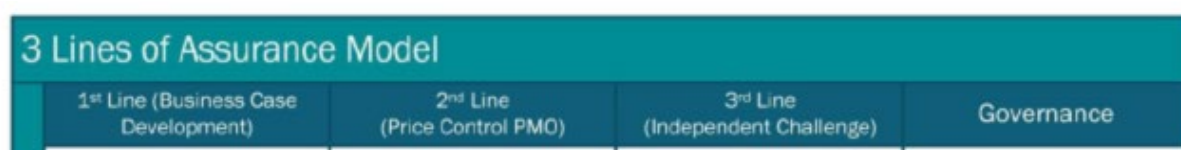
### 3. Review of SONI investment assurance model

This section reviews SONI investment assurance approach.

#### 3.1 Assurance framework

SONI has provided an overview of their Assurance framework in Appendix S of the business plan. The Assurance framework has been developed to provide confidence that any proposed investment has been through a thorough and rigorous review. SONI state that at their assurance framework operates on three lines of assurance (Appendix S page 4 – heading snapshot below).

**Table 3-1: Assurance model used by SONI**



The three lines are Business Case Development; Price Control PMO and Independent Challenge. Following these three lines of assurance, there is a final Governance approval.

##### 3.1.1 Business case development

In the first stage, there are quality checks and management and executive oversight. Although not explicitly stated we expect that every investment can be supported with the sign off of Management and Executive oversight.

##### 3.1.2 Price control PMO

Stage 2 increases the level of assurance in relation to ‘...*quality of data and robustness of assumptions...*’ This stage places ownership of data in certain business units ‘...*directorates...*’ who ‘...*maintain integrity of the work or data*’. As above, this should lead to a signed off document identifying who has approved it. The section does not mention how integrity is maintained, but we would expect that there is some form of challenge at this stage.

##### 3.1.3 Independent challenge

Stage 3 has ‘*robust technical challenge on business case data and assumptions*’. This role is conducted by KPMG and all challenges should be recorded and monitored.

As above, independent challenge for this Price Control was provided by KPMG. According to the information, KPMG undertook the review and developed a Cost Tool. KPMG then provided validation guidelines to strengthen the underlying cost base.

KPMG also undertook a Business Case Review – both in the initials stages and in the final stages of development. Producing ‘...*feasible solutions within the time available*’.

The section does say that a RAG Report was produced for each business case. We have not seen the RAG Report.

### ***Materiality threshold***

KPMG applied a materiality threshold (actual value not given) where if the investment was below a % of TOTEX, a lower level of supporting evidence was allowed. There is no information on this threshold, therefore its impact is difficult to assess.

### **3.1.4 Governance**

The final stage utilises a Regulatory Governance Board (RGB) approval. Their role appears to more monitor changes through the process rather than a detailed re-evaluation of the proposed investment.

This stage is reliant on the 3 prior Assurance Model stages to provide detailed robust challenge in that this level of challenge would not be carried out at this final RGB stage. This seems reasonable as RGB will be monitoring a large number of investments and it would be unreasonable for them to review every one in detail. I would expect that RGB have the right to challenge if they see fit, but their role is to ensure that the assurance model has been followed correctly (that is in spirit, not just by the letter of the challenge).



## **4. Summary and recommendations**

This section provides a summary of our conclusions and our recommendations.

### **4.1 Summary of IT expenditure**

A summary of the IT expenditure review is given in Table 4-1 below.

**Table 4-1: Summary of the proposed costs and GHD recommendations**

	2021 – 2025 business plan		GHD Recommendation	
	CAPEX	OPEX	CAPEX	OPEX
<b>Appendix D – IT business as usual</b>				
D2 Transition to Cloud	747	922	747	922
D3 IT operating model	222	702	222	702
<b>Appendix E – SONI telecoms business</b>				
E4 telecoms opex	-	7,270	-	7,270
E5 telecoms capex	1,373	-	1,298	-
<b>Appendix F – sustainability and decarbonisation</b>				
F1 renewable strategy and implementation programme	3,580	3,500	890	875
F2 control centre tools	3,970	590	0	500
F3 smarter outage management	480	60	480	60
F4 migration to IP to support SCADA	270	800	0	0
F5 data services	100	-	0	-
F6 system planning	-	500	-	500
<b>Appendix G – Operate the grid</b>				
G1 Alternate for disaster recovery	1,750	750	0	0
G2 control centre training	830	400	0	0
G3 physical security tech replacement and enhancement	1,220	970	1,220	970
G4 Cyber security	160	1,120	160	1,120
G5 European network codes	-	800	-	0
G6 Capacity market secondary trading	440	580	220	290
G7 DSU compliance with state aid	820	-	0	-
G8 implementing a mixed integer programming solver	260	180	260	180
G9 state aid cross border capacity	230	400	0	0
G10 market related TSO governance, risk mgmt. & compliance	-	200	-	0
G11 metering system	880	90	0	0
G12 Operational support for IT projects	-	200	-	0
<b>Total</b>	<b>17,332</b>	<b>20,034</b>	<b>5,497</b>	<b>13,389</b>

## 4.2 Summary of assurance framework

The assurance framework, as presented in appendix S shows a thorough and robust approach. The descriptions show three stages of challenge and review, all within a defined scope. We assume that each stage has a formal submission and approval before commencing to the next stage. These approvals should be available for review by the Regulator.

KPMG state that some projects were removed, others needed strengthening evidence. This does indicate that there is a weakness in the Assurance Model in that if investments are making to the 3<sup>rd</sup> line – independent challenge - and are then being removed or re-scoped, the first two lines of assurance are not working correctly. We do not know how many changes were made or how many were dropped, which would also be an interesting benchmark to see how well the Assurance Model is performing.

## 4.3 Recommendations for IT expenditure

The following section summaries the recommendations for each IT expenditure category.

**D2 Transition to cloud:** Cloud services are becoming a standard industry practice and SONI approach of staged entry is appropriate as the potential risk for governance and security management need to be addressed (SONI acknowledge the need for security management). There is commonality with this initiative in that Initiative D1: Assets Reaching End of Life (server replacement) and Initiative D10.2.1: Data centre optimisation that will continue in house services for the next price control period.

**Recommendation:** GHD is of the view that there is a justified need to investigate the use of cloud-based services SONI adopting a cautionary approach of staged implementation to gain knowledge of the services presents a reasonable approach for a utility business.

### D3 IT operating model:

The current SONI IT operating model is a business owned centralised IT service with duplication at a second location. This option is cognisant with Initiative D1: Assets Reaching End of Life (server replacement) and Initiative D2: Transition to Cloud. In that the services offered by SONI are classified as critical infrastructure services and as such a priority on maintaining data integrity. This means that there may be cheaper ways to move towards a Cloud based computing system, however they are not without additional risk to security and resilience.

**Recommendation:** We are of the view that SONI are adopting a low risk approach, which in our view is correct and ensures that there is increased resilience.

**E4 Telecoms capex:** The telecoms capex is in line with previous regulatory period expenditure and ongoing initiatives.

**Recommendation:** We are of the view that telecoms capex is reasonable.

**E5 telecoms opex:** SONI are proposing to replace RTUs and UPS' for modern equivalent units. The cost for replacement of RTUs appears to be reasonable and the life extension of the UPS also reasonable.

There are three project specific telecoms upgrades – Moyle HVDC; Ballylumford; IP telephony. In all three cases, there is a lack of scope and information to allow a detailed assessment of the reasonability of the costs. We understand the Ballylumford allowance will be transferred to NIE, therefore no allowance is needed for SONI.

In the case of Moyle HVDC and IP telephony, a cost allocation has been provided as recommended by the Regulator.

**Recommendation:** The Ballylumford assets are to be transferred to NIE, therefore no cost is required by SONI. For Moyle and IP telephony there is limited scope and detail with the projects upgrades, we can see that there is a need to upgrade. We recommend that the expenditure is allowed with the proviso of additional scope details being provided.

**F1 Renewable strategy and implementation programme:** This initiative covers seven programmes of work, four of the schemes relate to generation connecting to the distribution network. We are of the view that distribution network connected generation falls under the remit the DSO and not the TSO. Two of the schemes are in the developmental / research stage and their scope and need is not defined sufficiently to warrant investment.

SONI has identified costs associated with the DSO – TSO interface. We believe that this is appropriate

**Recommendation:** we recommend that the expenditure associated with the DSO – TSO interface is allowed, the remaining six schemes are not justified.

**F2 Control centre tools:** SONI are proposing a suite of additional tools to support control centre operations. We are also aware that SONI are looking to upgrade their EMS, which many of the tools would be included in the EMS solution. In addition, the software packages are presented as a concept design for potential development as the first task is to prepare a roadmap programme for development.

**Recommendation:** The expenditure has not been fully justified for any of the tools, we understand that there is a need for development and therefore an allocation of £500k has been provided.

**F3 Smarter outage management:** The proposed initiative is identified as implementing a solution that will allow more accurate prediction of the impact on outages prior to outage requests being approved. The solution is an enterprise solution shared between SONI and EirGrid. It will initially manage outages and then further expand to work with future developments.

**Recommendation:** On the assumption that the cost allocation between EirGrid and SONI is correct, we believe the need, solution and cost is reasonable.

**F4 Migration to IP to support SCADA:** This initiative looks to develop safe, secure and economic real time monitoring and control over IP technology. This is closely linked to Initiative E.4 Telecoms opex 2020 – 2025 and Initiative E.5 telecoms capex.

**Recommendation:** We are of the view that this technology for these assets reside with the DSO. The inclusion of the control of distributed generation is not within the remit of the TSO and is therefore not required.

**F5 Data services:** The driving need for this initiative is not fully defined and the driver is based on the statement that the volume and complexity of data is increasing. The solution is new data analytic tools.

**Recommendation:** we are of the view that this is covered under existing initiatives, for example, F3 smarter outage management and the requested expenditure is not justified.

**F6 system planning:** SONI is expecting the system planning function to increase in complexity and therefore need additional resource. The business case states the intent to bring in house, currently outsourced services.

**Recommendation:** if SONI can demonstrate the consistent use of external resources, their approach to bring these services in house is reasonable.

**G1 Alternate for disaster recovery:** the current disaster recovery facility is dated and requires replacement. SONI has undertaken an assessment of the current location and has shown that it



will not provide the necessary resources for future operations. Therefore proposes new facilities. The costs are estimated based on EirGrid costs, not scope has been developed.

**Recommendation:** We agree that there is a need for new facilities and therefore expenditure is needed. However, the costs are speculative and we recommend the cost is held until SONI provide a detailed breakdown of the necessary works.

**G2 Control centre training:** The operation of the power system requires Control Centre staff to be competent in both operations and control centre system including the SCADA/EMS and other decision tools. The preferred option is to utilise in-house training facilities rather than an external third party. A cost breakdown has not been included and furthermore, in the case of the SCADA/EMS training this is normally provided as part of the system supply contract.

**Recommendation:** we are of the view that these costs will be included as part of the EMS refresh and not justified as an initiative.

**G3 physical security tech replacement and enhancement:** This initiative is stated as being informed by the Network & information Systems (NIS) Regulations that were enacted in May 2018. To support this initiative SONI engaged an external security expert to review the physical security.

**Recommendation:** The cost estimate is based on market pricing and based on the assumptions above, we accept the need for SONI to be compliant with the NIS Regulations.

**G4 Cyber security:** SONI commissioned an independent assessment of its current cyber security capabilities and provided recommendations to achieve leading industry target state by 2021.

**Recommendation:** Costs are derived from a review of published material and advice from strategic partners. We assume that the proposed initiative will make SONI compliant with the National Cyber Security Centre guidance and is therefore reasonable.

**G5 European network codes:** This is a proposal to increase the number of full time employees by two people. On the assumption that there is currently insufficient resources, we would expect to see evidence of that under resourcing. As the development of European Network Codes has been underway for several years, the needs case should identify a step change in workload that would require additional resources.

**Recommendation:** GHD is of the view that the additional need has not been fully justified.

**G6 Capacity market secondary trading:** This initiative includes the development of an online platform for a Secondary Trading Market. We agree that development of a capacity market secondary trading platform is a requirement of the TSO role and there is a need to develop some form of platform. The exact model has not been agreed at this stage, we question the ability to establish a cost for the project.

**Recommendation:** We recognise a need for SONI to develop this platform and due to lack of scope, an arbitrary 50% has been allocated for the platform.

**G7 DSU compliance with state aid:** SONI are proposing to implement the three steps set out by the regulators removal of DSUs from exemption of difference charges. However, there is no detail on the scope or the requirements.

**Recommendation:** there was no clear scope for this project however, we recognise that DSU compliance is a requirement for SONI to fulfil, therefore we recommend that the allowance is set to zero until SONI provide a clear scope of works.

**G8 Implementing a missed integer-programming solver:** During the detailed design of the Capacity Market, the Regulatory Authorities considered a number of auction algorithm

approaches to be applied in the Capacity Auctions. SONI have stated it is the intent of the Regulatory Authorities to move to the new Auction Format D on an enduring basis.

SONI are proposing to develop an algorithm using an external supplier and the cost estimate has been based on experience from the I-SEM project and other recently completed Capacity Market activities.

**Recommendation:** We do recognise that SONI is obligated to implement efficient balancing systems. Based on the assumption the external supply costs are scoped to deliver this initiative the project is reasonable.

**G9 State aid cross border capacity:** We note that it is a State Aid requirement that SONI is prepared for integration into this cross-border Capacity Market by 2024. There is little detail on the scope and the cost is estimated from previous I-SEM projects.

**Recommendation:** The scope is not sufficiently developed and we are of the view that the justification for the cost estimate is not justified.

**G10: Market related TSO governance, risk management and compliance:** The business case states that without the additional resource. SONI would not be able to oversee their market related obligations. However, there is no further justification for the need for additional resources.

**Recommendation:** There is insufficient information to support that costs are reasonable, therefore the recommendation is set to zero.

**G11 Metering system:** The transition from a small number of large centrally dispatched generators, to a larger number of small, renewable energy sources and hybrid generation sites, increases the number and complexity of the connections and the metering system. SONI's preferred solution is a single all island system, however, details of the final design have not been provided.

**Recommendation:** A breakdown of the costs has not been included and the information supplied does not provide sufficient detail to confirm the costs are justified.

**G12 Operational support for IT projects:** SONI has identified seven sponsored projects that require operational support. The additional support is not related to the IT product outlined in the initiative identified in the submission, but to capture the impact on teams already occupied with full time roles and who need to provide staff to support the integration of the new product into the organisation.

**Recommendation:** We are of the view that any additional operational support required to deliver sponsored projects should be captured in the sponsored project. GHD is of the view that this is not justified.

#### **4.4 Recommendations for assurance framework**

The independent assessment of the assurance framework does identify that some projects (quantity not stated) were sent back for re-scoping at the latter stages. We would recommend that the volume and cost of these projects is assessed to see if it indicates that the assurance framework, in its early stages, is delivering the correct level of oversight.

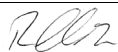
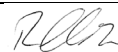



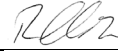
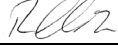
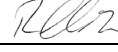
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#### Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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