SONI Forward Work Plan

2023 – 24

Appendix 1 SONI Deliverables 2023-2024

Role 1 System Operation and Adequacy

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SONI Deliverables 2023-2024 - Role 1 System Operation and Adequacy

The SONI Forward Work Plan provides details on the various projects and programmes of work that will be undertaken over the period from October 2023 to September 2024. This appendix document provides further detail on those deliverables associated with Role 1 *System Operation and Adequacy* and should be read in conjunction with the main document.

Please note, that although there are IT related projects included under Role 1 System Operation and Adequacy as deliverables, SONI has not detailed any programmes of work associated with cyber security. SONI considers cyber security as a confidential area and therefore does not intend to include a narrative or metrics in the Forward Work Plans.

Cost Scale

SONI have created a Cost Scale in order to assist the audience in understanding the scale and/or importance of a project, and detailed where on this scale each project lies. The costs indicated are SONI related costs and do not cover any costs accrued by any stakeholder SONI may be collaborating with on said project.

This scale applied is detailed below:

Table 1 Cost Scale

Low	Medium	High	Very High
£0 - £500k	£500k - £1M	£1M - £5M	£5M +

Overview of the projects

The table below provides a complete view of the projects being undertaken across Role 1 System Operation and Adequacy. These projects are expanded upon throughout this document.

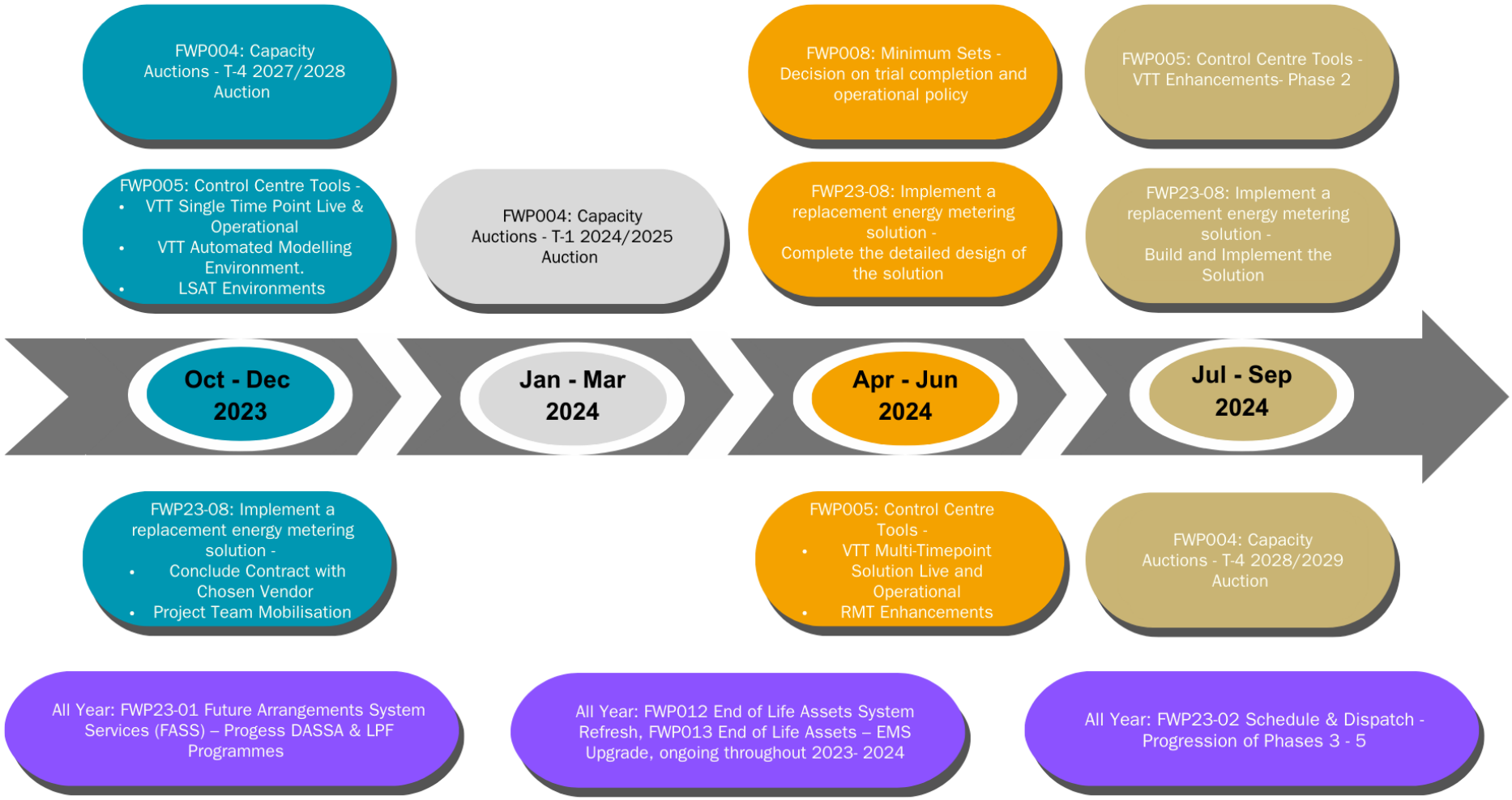

Figure 1 Role 1 Timeline

Project	Milestone	Performance Measure	Timescale
FWP23-01: Future Arrangements System Services (FASS)	1. Publish FASS enduring daily auction/procurement design consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 2. Publish FASS enduring daily auction/procurement design recommendations paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 3. Publish FASS Layered Procurement Framework design consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 4. Publish FASS Layered Procurement Framework design recommendations Paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 5. Publish FASS enduring daily auction product review consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 6. Publish FASS enduring daily auction product review recommendations paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023	Performance for the period will be measured against the successful progression of deliverables above. Updates on progress made provided via Shaping Advisory Council meetings and Stakeholder feedback recorded and actioned.	December 2023 March 2024 March 2024 June 2024 June 2024 September 2024
FWP23-02: Scheduling and Dispatch	A series of industry workshops are to be held monthly during Phase 3 & 4. Approval for Trading and Settlement Code, Capacity Market Code & Grid Code Mods for Scheduling and Dispatch	Successful achievement of the Phased activities	Timescales are dependent on funding approvals

Project	Milestone	Performance Measure	Timescale
	Programme Tranche 1 Initiatives. Implement the people, process, and technology changes for the Scheduling & Dispatch Tranche 1 initiatives based on the agreed detailed design of the Scheduling & Dispatch solution. Deliver Business and Industry Readiness for the Scheduling & Dispatch Tranche 1 initiatives.		
FWP004: Capacity Auctions Schedule	T-1 2024/2025 Capacity Auction T-4 2027/2028 Capacity Auction T-4 2028/2029 Capacity Auction	Annual Audit	March 2024 October 2023 September 2024* *Timetable to be finalised. Proposed month is an estimate.
FWP005: Control Centre Tools	VTT Single Time Point live and operational - Complete. VTT Multi-Timepoint Solution Live and Operational - Complete. VTT Enhancements - Phase 2 – Complete. VTT Automated Modelling Environment. RMT Enhancements - Complete. LSAT Environments - Complete.	Delivery of the Voltage Trajectory Tool enhancements.	November 2023 May 2024 September 2024 December 2023 May 2024 December 2023
FWP008: Minimum Sets	Decision on trial completion and operational policy	Completion of trial and associated analysis, along with updating Operational	May 2024

Project	Milestone	Performance Measure	Timescale
		Policy where appropriate.	
FWP012: End of Life Assets	System Refresh	Delivery of all activities	Ongoing throughout 2023 – 2024
FWP013: EMS Upgrade	Energy Management System Midlife Upgrade Programme Phase 2	Delivery of all activities	Ongoing throughout 2023 – 2024
FWP23-08: Implement a replacement energy metering solution	Conclude Contract with Chosen Vendor Project Team Mobilisation Complete the detailed design of the solution Build and Implement the Solution	Successful completion of activities.	November 2023 December 2023 May 2024 September 2024
FWP24-01: Introduction of NRAA	Publish the first Northern Ireland National Resource Adequacy Assessment (NRAA).	Delivery of Publication	September 2024

Role 1: Detailed Programme of Deliverables

Future Arrangements for System Services (FASS)

The Future Arrangements for System Services (FASS) project was formally launched by the SEM Committee (SEMC) in July 2020. This project is aligned under our Markets pillar of work within our Shaping Our Electricity Future Roadmap.

The SEMC consulted on the System Services Future Arrangements High Level Design (SEM-21-69) from August to October 2021. A decision on the High-Level Design was published in April 2022 (SEM-22-012 FASS High Level Design Decision Paper).

SONI, in conjunction with EirGrid, has engaged with the Regulatory Authorities[1] (RAs) to provide all information requested to aid in the SEMC HLD decision making process. The Utility Regulator's service priority regarding the facilitation of new technologies plays a key part in this programme. In the future, it is expected that the TSOs will increasingly contract for the provision of System Services from new technology types. These will likely include, amongst others, solar PV units and residential demand aggregators. It is anticipated that units aggregating residential demand will provide certain operating reserve services in the coming years. The Qualification Trial Process[2] provides a mechanism for trialling new technologies for the provision of system services.

The existing system services arrangements (DS3) were designed to meet the 2020 renewable targets of 40% RES-E and will not be sufficient to deliver the needed capability to achieve the Northern Ireland target of 80% renewable generation by 2030. Attracting investment and procuring sufficient volumes of system services capability from both existing service providers and new prospective providers, will be critical to meeting this target. It is important that the design for the future arrangements is agreed as soon as possible to ensure that appropriate arrangements can be implemented to further ensure that there is no break in the investment that is needed to meet 2030 targets.

Over the past number of months, SONI has worked and will continue to work with the RAs on refining the scope of the full programme of work, including programme phases of Establishment, Procurement, Design, Build and Operate.

There is a growing need to drive new investment in system services to meet the technical challenges of managing real time operations of up to 95% SNSP by 2030. The suggested introduction of a new system services market design will need a number of years to mature to deliver the necessary investment in the required services.

The plan we have proposed has significant project implementation risks. These potential risks include the need for timely and appropriate regulatory decisions, both market design and programme resourcing, as well as a complimentary application of resources by EirGrid and SONI in delivering to these challenging timelines. This can only be achieved with a coordinated and focused industry working together to successfully achieve the Renewable Ambition. It will also require timely approval of funding for each phase of the programme.

During the initial phase of development of the project, the funding we received to date on the project will be used to deliver:

[1] The Regulatory Authorities (RAs) consist of the Utility Regulator for the Northern Ireland and the Commission for the Regulation of Utilities (CRU) for the Republic of Ireland.

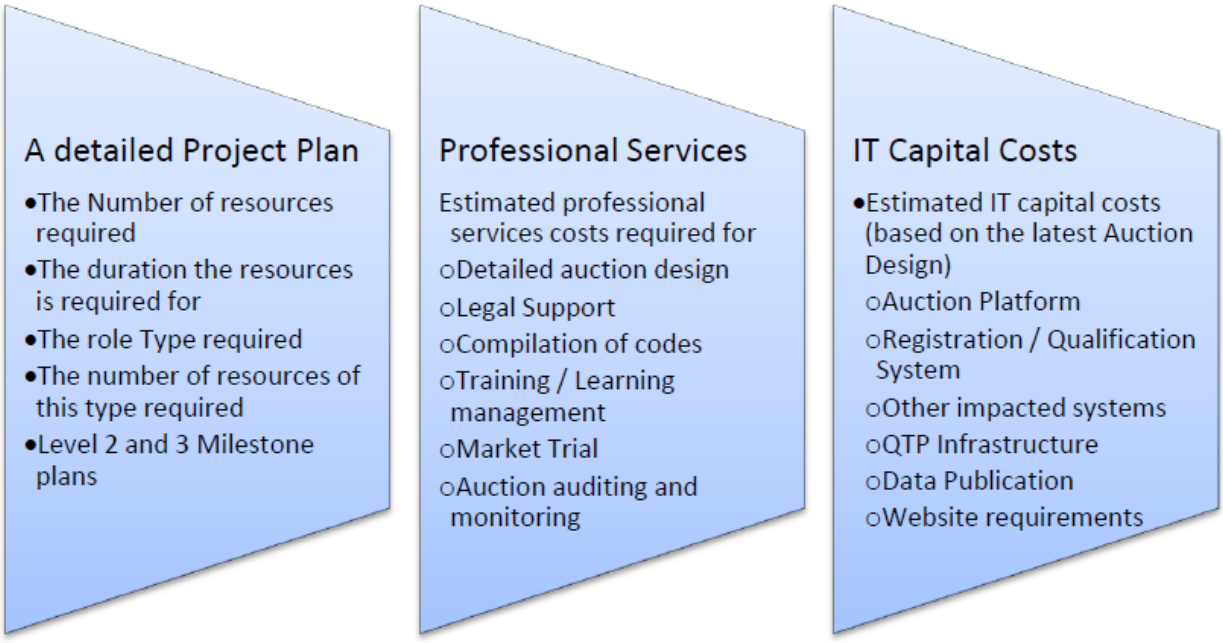

Figure 2 FASS Funded Deliverables

During 2022/2023 we have achieved the following:

- Progressed design of Day Ahead System Services Auction (DASSA) per SEMC HLD (SEM-22-012)
- Options analysis and planning for the transition to SEMC HLD
- A Detailed implementation roadmap for Future Arrangements together with resourcing and funding requirements have been developed and presented to the Regulatory Authorities
- Scoping of regulatory and legal considerations.
- Mobilisation of priority workstreams
- Published Dotecon/AFRY recommendation on daily auction design

These will be discussed further in the SONI 2023/23 Annual Performance Report.

A summary of the associated milestones for the project during 2023-2024 is provided below.

Deliverable	FWP23-01: Future Arrangements System Services
Description of Activities	Our Shaping Our Electricity Future Roadmap identified the project deliverables below: 1. Publish FASS enduring daily auction/procurement design consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 - **December 2023** 2. Publish FASS enduring daily auction/procurement design recommendations paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 – **March 2024**

	3. Publish FASS Layered Procurement Framework design consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 – **March 2024** 4. Publish FASS Layered Procurement Framework design recommendations Paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 – **June 2024** 5. Publish FASS enduring daily auction product review consultation paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 – **June 2024** 6. Publish FASS enduring daily auction product review recommendations paper. Subject to SEMC Decision on Phased Implementation Roadmap being published in September 2023 – **September 2024**
Key Benefits	The SEM Committee has assessed the benefits of this transition to the future arrangements for system services when making its decision around the High-Level Design. For completeness in this submission, SONI would highlight that the benefits of the FASS project include: • A significant reduction in Carbon and GHG pollution • A greening of the energy sector which is in line with the UK and NI Executive aspirations. • Improving our security of supply by reducing our dependence on fossil fuels • Improved efficiency in the cost of procuring system services. • Providing certainty for investors in the technologies required to support our energy transition. These benefits are key to SONIs outcomes especially in terms of Decarbonisation and system wide costs thus enabling stakeholder satisfaction.
UR Service Priorities	**A culture of open and collaborative innovation** **A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market development.** **Developing markets through competition and stakeholder engagement and collaboration** System Services Future Arrangements is a very complex and challenging programme, as there are a number of high-level external dependencies and requirements for collaboration with the Regulatory Authorities. SONI will be working together with stakeholders on the implementation of the FASS programme, with the high-level design indicated by the RAs and consistent engagement throughout the project. SONI will also be engaged with the Utility Regulator as the programme progresses through each Phase in order to ensure that the level of funding required is achieved. The activities associated with the programme will also encourage a culture of organisational learning and innovation, as this is a complex programme of work there will be instances where solutions will be required to solve challenging issues and for learnings from elsewhere in the organisation to be brought forward to meet these challenges.

Engagement	Over the period SONI will attend multiple workshops and consultations led by the Regulatory Authorities. These will facilitate opportunities for collaboration with the Regulatory Authorities, with SONI either providing support or taking a leading role dependent on the topic.			
Performance Measure	Performance for the period will be measured against the successful progression of deliverables above. Updates on progress made provided via Shaping Advisory Council meetings and Stakeholder feedback recorded and actioned.			
Timescale	Progress activities detailed above in the 2023-24 period; however, this will be subject to timely decisions and funding approvals by the UR.			
Cost Scale	Very High			
SONI Outcome	**Decarbonisation**	Grid Security	**System Wide Costs**	**Stakeholder Satisfaction**

Scheduling and Dispatch Programme (SDP)

Renewable Energy Sources (RES) in Northern Ireland[3] have priority dispatch which effectively means their output is maximised in dispatch – e.g., whatever they are producing (based on the weather conditions) is used by the TSOs in dispatch, displacing other generation (fossil fuel), subject to security of supply and other statutory requirements.

RES is dispatched down (turned down or off) only as a last resort for two reasons:

- curtailment (too much wind overall) or
- constraint (too much in a part of the network)

Following decisions in the Clean Energy Package[4], changes to how wind is to be treated in dispatch and redispatch (Article 12 & Article 13) have been under consideration by the SEM Committee. The Clean Energy Package (CEP) has a number of implications for SONI's operations. In particular, CEP requires that TSOs provide for the dispatch of 'non-priority dispatch' renewables (until this point, renewables in the SEM have been subject to priority dispatch, functioning as 'price-takers' in the market to ensure this).

The SEM Committee decision paper on Dispatch, Redispatch and Compensation pursuant to Regulation (EU) 2019/43 (SEM-22-009) was published following on from previous consultations relating to Articles 12 and 13 of the Clean Energy Package. Decisions included (but were not limited to) the following:

- Treatment on non-priority dispatch RES (and other previously eligible units) in dispatch.
- Compensation for non-market based redispatch down of generation.
- Timeline for pay-out of compensation.

The decision also acknowledges the complexity of issues, which will require workshops and engagement between SONI TSO and EirGrid TSO (due to the all-island nature of the system) and industry to discuss future solutions.

The functional scope of the SDP is:

Tranche 1

Treatment of Non-Priority Dispatch Renewable of renewables in scheduling and dispatch

Energy Storage Power Station (ESPS) integration

Wind dispatchability improvements

Tranche 2

Fast Frequency Response (FFR)

Reserve services scheduling and dispatch

Synchronous condenser scheduling and dispatch

[3] SONI Licence Condition 9A

[4] Applies in Northern Ireland under the terms of the Withdrawal Agreement between the UK Government and the EU

The Programme Phases are currently defined as:

- Phase 1 – Analysis – Completed ✓
- Phase 2 – Detailed Design: detailed market design; process definition; detailed definition of solution requirements; selection of solution/service providers; rule/code change definition, etc. – Commenced
- Phase 3 – Implementation: implementation of system and service provider solutions; testing; data; procedure definition; operational capability changes, etc.
- Phase 4 – Readiness & Rollout (may overlap other phases): training; market and operational readiness; trialling/commissioning; rollout and cutover.
- Phase 5 – Support: enhanced support through operational stability; planning for deferred items.

Phases *3 to 5* will commence during the period and the approach to these phases is delivery via:

Phase 3

Implementation: This phase will implement the people, process, and technology changes for the Scheduling & Dispatch initiatives. It will carry out the main activities of system build, formal arrangement approval, business process definition and external engagement including participant testing. The activities of phase 3 will follow the proven market and system change processes used in previous major projects relating to SEM changes:

- Formal arrangements proposed to relevant committees
- System build
- Test approach and associated artefacts
- Conduct solution testing
- Business Process Definition (L2) & Procedures Definition (L3)
- Training Approach & Plan

Phase 4

Readiness & Rollout: This phase will conduct internal and external readiness for the introduction and incorporation of Scheduling & Dispatch changes to the people, processes, and technology. It will focus on preparing the business and industry for the introduction of the Scheduling & Dispatch initiatives as well as preparing and delivering on the system deployment and cutover. The activities of phase 4 will follow the proven market and system change processes used in previous major projects relating to SEM changes:

- Stakeholder Engagement
- Business Training
- Business Readiness Assessment
- Market Participant Training
- Market Participant Readiness Assessment
    - Deployment/cutover plans
    - Go/No-Go approvals

Phase 5

Support: This phase will support the implementation in the period immediately following go live and also formally close out the programme in a controlled manner. The activities of phase 4 will follow the proven market and system change processes used in previous major projects relating to SEM changes:

- System and Business Post Go Live Support
- Transition support to operational teams
- Programmed Close Out

A programme of our associated project activities is provided below.

Deliverable	FWP23-02: Scheduling & Dispatch
Description of Activities	Alignment of the energy market with high penetration of renewable generators - leading to scheduling and dispatch changes to ensure all market technologies and participants have equal access and opportunities. Over the period the following activities will be progressed: • A series of industry workshops are to be held monthly during Phase 3 & 4. • Approval for Trading and Settlement Code, Capacity Market Code & Grid Code Mods for Scheduling and Dispatch Programme Tranche 1 Initiatives. • Implement the people, process, and technology changes for the Scheduling & Dispatch Tranche 1 initiatives based on the agreed detailed design of the Scheduling & Dispatch solution. • Deliver Business and Industry Readiness for the Scheduling & Dispatch Tranche 1 initiatives.
Key Benefits	The key benefits of this programme of work will be ensuring that SONI is compliant with the EU Legislation regarding the Clean Energy Package. By carrying out the key market design works it also means that SONI are being proactive in our approach to ensuring we support the delivery of key government targets, and we are aligned with the approach of the energy strategy in the Path to Net Zero. An important aspect of this project is that it is a key enabler to be able to transition from 75% SNSP which is currently operational to 95% SNSP by 2030.
Strategic Theme	**A culture of open and collaborative innovation:** **A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market development.** This is an ambitious project as acknowledged by the SEM Committee given the complexity of issues, which will require workshops and engagement between SONI TSO and EirGrid TSO (due to the all-island nature of the system) and industry to discuss future solutions. This will also promote a culture of open and collaborative innovation – to discuss

	through workshops solutions and challenge the thought process to ensure all risks are identified and mitigated against. It is also important against collaborating towards achieving our decarbonisation targets and achieving operational excellence – we are enabling the delivery of a low carbon future through this project and this will lead the way towards increasing our level of SNSP from 75% to 95% by 2030. This activity will represent the UR's service priority of a culture of organisational learning, we will challenge each other within SONI in order to ensure the most appropriate solution and risks are identified which will support our accountability, and planning demonstrating SONI's agility and responsiveness in meeting policy, in this instance the EU Clean Energy Package.			
Engagement	SONI will require SEM Committee approval in order to progress to the next Phases of the project. Monthly industry workshops will be held to engage with the wider industry on the programme of work.			
Performance Measure	Performance will be measured over the period by the successful achievement of the Phases 3-5 activities as detailed above.			
Timescale	Details on programme delivery timelines will be confirmed pending regulatory funding approval.			
Cost Scale	High			
SONI Outcome	**Decarbonisation**	Grid Security	**System Wide Costs**	Stakeholder Satisfaction

Capacity Market Auctions

The Capacity Auction process aims to secure the volume of capacity required at competitive rates. It includes:

- Capacity Market Code secretariat and modifications process
- Determination of the parameters and auction information pack
- Capacity Market qualification activities
- Assessing the system impact of plant closures as a result of exit signals from the capacity auctions

The Capacity Market centres around annual Capacity Auctions that take place approximately four years in advance of delivery (T-4 auction) and approximately one year in advance of delivery (T-1 auction). These auctions match offers from Participants in respect of their Capacity Market Units against a Demand Curve set by the Regulatory Authorities. The auction is combinatorial in nature as it seeks to maximise Net Social Welfare subject to satisfying various constraints including inflexibility constraints (where offers can be all or nothing) and Locational Capacity Constraints (where a certain predetermined quantity of capacity must clear in particular areas of Ireland and Northern Ireland).

The capacity market auction process which will be carried out over the period is detailed below.

Deliverable	FWP004: Capacity Auctions to be Completed
Description of Activities	**Capacity Auction process to be completed for T-1 2024/2025 capacity auction T-4 2027/2028 capacity auction, and T-4 2028/2029 Capacity Auction** The timetables for completion of both capacity auctions are detailed below. **Capacity Auction Timetable 2024/2025 T-1 Capacity Auction**

Category	Appendix C ref	Event	Date & Time
Info	A.1	Initial Auction Information Pack Date	07/09/23
Qualification	A.2	Opt-out Notification Date	21/09/23
Qualification	A.3	Exception Application Date	05/10/23
Qualification	A.4	Qualification Application Date	05/10/23
Qualification	A.5	Provisional Qualification Results Date	07/12/23
Review	B.19	Application for Review Date	11/12/23
Review	B.20	Non-complying Application for Review rejection Date	13/12/23
Review	B.22	System Operators request for further information Date	15/12/23
Review	B.21	Participant provision of further information Date	04/01/24
Review	B.22	System Operators notification of outcome Date	11/01/24
Disputes	B.24	Qualification Dispute Notice Date	16/01/24
Disputes	B.25	Qualification Dispute Decision Date	13/02/24
Qualification	A.6	Final Qualification Submission Date	15/02/24
Info	A.9	Final Locational Capacity Constraint Limits Date	07/03/24
Qualification	A.7	Final Qualification Results Date	07/03/24
Qualification	A.8	Qualification Results Publication Date	07/03/24
Info	A.10	Final Auction Information Pack Date	07/03/24
Auction	A.11	Capacity Auction Submission Commencement	21/03/24
Auction	A.12	Capacity Auction Submission End	28/03/24 10:00
Auction	A.13	Capacity Auction Run Start	28/03/24 12:00
Auction	A.14	Capacity Auction Completion Date	05/04/24
Auction	A.15	Capacity Auction Provisional Results Date	05/04/24
Auction	A.15A	Capacity Auction Provisional Results Publication Date	09/04/24
Post Auction	A.16	Capacity Auction Approval Date	02/05/24
Post Auction	A.17	Capacity Auction Results Date	02/05/24
Post Auction	A.18	Performance Security Date	13/06/24

Note: Appendix C of the Capacity Market Code is referenced above.

Capacity Auction Timetable 2027/2028 T-4 Capacity Auction

Category	Appendix C ref	Event	Date & Time
Info	A.1	Initial Auction Information Pack Date	02/03/23
Qualification	A.2	Opt-out Notification Date	30/03/23
Qualification	A.3	Exception Application Date	14/04/23
Qualification	A.4	Qualification Application Date	14/04/23
Qualification	A.5	Provisional Qualification Results Date	22/06/23
Review	B.19	Application for Review Date	26/06/23
Review	B.20	Non-complying Application for Review rejection Date	28/06/23
Review	B.22	System Operators request for further information Date	03/07/23
Review	B.21	Participant provision of further information Date	05/07/23
Review	B.22	System Operators notification of outcome Date	13/07/23
Disputes	B.24	Qualification Dispute Notice Date	18/07/23
Disputes	B.25	Qualification Dispute Decision Date	14/08/23
Qualification	A.6	Final Qualification Submission Date	14/09/23
Info	A.9	Final Locational Capacity Constraint Limits Date	05/10/23
Qualification	A.7	Final Qualification Results Date	05/10/23
Qualification	A.8	Qualification Results Publication Date	05/10/23
Info	A.10	Final Auction Information Pack Date	05/10/23
Auction	A.11	Capacity Auction Submission Commencement	19/10/23
Auction	A.12	Capacity Auction Submission End	26/10/23 10:00
Auction	A.13	Capacity Auction Run Start	26/10/23 12:00
Auction	A.14	Capacity Auction Completion Date	01/11/23
Auction	A.15	Capacity Auction Provisional Results Date	01/11/23
Auction	A.15A	Capacity Auction Provisional Results Publication Date	08/11/23
Post Auction	A.16	Capacity Auction Approval Date	05/12/23
Post Auction	A.17	Capacity Auction Results Date	05/12/23
Post Auction	A.18	Performance Security Date	16/01/24

A Capacity Auction will be run for the 2028/2029 Capacity Year, though a timetable has not been finalised at this point.

Key Benefits	Completion of the Capacity Market Auction Process is driven by grid security; therefore, we anticipate the completion of these 2 auctions to bring benefits to this SONI outcome. Given the all-island nature of the capacity market and the associated engagement activities, we expect this will also bring about enhancements to the SONI service quality outcome.
Strategic Theme	**In terms of capacity market delivery, SONI should co-ordinate with EirGrid in delivering the CRM and the Capacity Auctions, to ensure that all milestones and associated processes are met on time in keeping with published and approved timetables.**

	SONI considers this the most pertinent strategic theme – the capacity auction process is a vital part of SONI's obligations to provide a safe, secure and reliable Transmission System. The capacity market delivery involves SONI coordinating with EirGrid in delivering the CRM and the Capacity Auctions. This is to ensure that all milestones and processes associated with the Capacity Market Auction are met on time in keeping with published and approved timetables.			
Engagement	Engagement is an important process in the delivery of the Capacity Market Auctions. SONI engages with market participants during the process, providing the timetable for the auctions in advance, providing auction packs and associated information and dealing with participant queries. SONI is also actively engaged with the Utility Regulator as part of the process. The Utility Regulator attends a weekly call with SONI and EirGrid to discuss Capacity Auction timelines, potential modifications to the Capacity Market Code, as well as general improvements to the Capacity Remuneration Mechanism in order to ensure it is still fit for purpose in an ever-changing energy market.			
Performance Measure	SONI will measure our success across these auctions by monitoring the target timelines for completion of the above activities.			
Timescale	T-1 2024/2025 Capacity Auction – March 2024 T-4 2027/2028 Capacity Auction – October 2023 T-4 2028/2029 Capacity Auction – September 2024* *Timetable to be finalised. Proposed month is an estimate.			
Cost Scale	Very High			
SONI Outcome	Decarbonisation	**Grid Security**	System Wide Costs	**Stakeholder Satisfaction**

Control Centre Tools

This DS3 Control Centre Tools project will deliver a suite of Control Centre Tools (CCT) to enhance the stability analysis, voltage control and frequency management capability of the control centre. This capability enhancement is necessary to increase the levels of instantaneous renewable generation on the system (SNSP). A core objective of the TSO and the DS3 Programme is facilitating levels of SNSP up to 75% to meet public policy.

Deliverable	FWP005: Control Centre Tools
Description of Activities	**Completion of Phase 1 and delivery of Phase 2.** SONI uses a range of Control Centre Tools, namely Look-ahead Security Assessment Tool (LSAT), Ramping Margin Tool (RMT), and Voltage Trajectory Tool (VTT), to assist in monitoring and managing the power system of Northern Ireland. These tools are needed to operate the power system safely and securely as the system becomes fundamentally more complex and levels of uncertainty increase with increased renewables. The objective of these tools is to provide the Control Centre operators with more accurate real-time information, flexibility and greater control and monitoring facilities. This enhanced capability in real-time is essential to increasing the level of System Non-Synchronous Penetration[5] (SNSP) on the system to enable the maximum amount of renewable generation at any one time, whilst ensuring the safe, secure, reliable operation of the power system. Increasing SNSP is also essential to ensure that levels of renewable generation curtailment are minimised, which ensures that the largest possible volume of price-taking generation is available to the market and hence, to the end consumers in Northern Ireland and Ireland. These ground-breaking decision support tools will be required for power system operation with reduced number of conventional plan on-line and, thus, will facilitate increased levels of SNSP in the All-Island system. The Control Centre Tools have been scoped and developed throughout 2019 through 2023 using Agile development, testing and validation completed in cooperation with vendors and external consultants. SONI (and EirGrid) will be the first TSOs in the world to include these within their scheduling and dispatch processes. These tools have been delivered and the main objective for 2023/2024 will be to refine and improve the tools to meet business enhancements and Regulatory requirements. The details of items included in this are below. **Activity** — **Description** VTT Tuning — Operational Tuning of the Single Time Point Solution for initial roll out into the Control Room. Vendor Support and Maintenance contract will commence providing full support from IT and vendor throughout tuning. VTT Master Problem — User Acceptance Testing and Tuning of the Master Problem Optimisation solution in VTT and close out of the Delivery Project for full operational go live in the Control Room. VTT Modelling — Automatic transition of updated Model configurations from Modelling environment to Production and remove requirement for manual configuration in Production. RMT Change Requests — 1) Consolidate Reserve Scheduling Data (RSD) functionality into the Ramping Margin software. 2) Retire the Reserve Scheduling Data application and move it to enterprise solutions in line with IT Strategy 3) Integrate Reserve Scheduling Data feeds from RMT to MMS.

5 System Non-Synchronous Penetration (SNSP) is a real-time measure of the percentage of generation that comes from non-synchronous sources, such as wind & interconnector imports, relative to the system demand.

	LSAT Environments	1) Close out testing of LSAT Modelling environment. 2) Implement additional environment for the Operations Support team to safely triage issues and test solutions.
	VTT Phase 2	Implementation of functionality deferred from the minimum viable product delivery phase of Voltage Trajectory Tool. Project Kick off Q2 FY 2024.
Key Benefits	The Voltage Trajectory Tool is a decision-support tool that allows Grid Controllers[6] to assess the impact of varying sources of reactive power across the power system, including of voltage control devices including dynamic and static reactive power devices. As we facilitate more variable renewable generation (e.g., wind, solar) on the system and reduce the number of conventional units, the management of the system will become more complex. The need for a Control Centre Tools has been identified (through extensive analysis) to provide SONI with more accurate real time information and monitoring facilities. **Ramping Margin Tool (RMT)** enables Grid Controllers to identify periods where the uncertainty in the renewable forecast might jeopardise the secure and reliable operation of the power system and enables Grid Controllers to schedule Ramping Reserve services which enables effective management of changing demand and generation profiles with increased wind and solar integration. **Look-Ahead Security Assessment Tool (LSAT)** provides enhanced Stability Analysis Capability by assessing the stability of system now and into the near future for changing wind/demand and propose corrective actions to maintain stability where required. It assesses the system stability for key contingencies and provides forward looking analysis based on forecasted system conditions across multiple time horizons (24 hours). **Voltage Trajectory Tool (VTT**) enables Grid Controllers to assess the impact of varying sources of reactive power across the power system to ensure that local voltage management issues are managed. Enhanced voltage control management capability in the control centre is critical to facilitate increased levels of SNSP. Voltage management in Northern Ireland is becoming more challenging due to the reduction of available reactive power resources (through displacement of conventional plant) and the disperse location of wind farms (with different capability characteristics), combined with increasing installation of HV underground cables. Currently, an active transmission constraint dictates that there must be a minimum of 8 large synchronous machines on-load at all times in the all-island system. To accommodate increasing amounts of non-synchronous renewable generation, this constraint must be relaxed. VTT will determine optimal reactive targets for different types of devices, developing voltage trajectory plans secure against contingency events for a near time horizon (typically intra-day and day-ahead). This project is therefore pivotal in SONI achieving our RES-E targets and progressing towards a net zero carbon future.	
Strategic Theme	**A culture of open and collaborative innovation** **A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market development.** These milestones are key enablers in achieving our target of 80% RES-E by 2030, therefore leading the electricity sector on decarbonisation. The Voltage Trajectory Tool will also assist in	

[6] Grid Controllers operate the grid from Castlereagh House Control Centre (CHCC) Belfast. The grid controllers carry out the intricate task of matching electricity production to customer demand.

	the management of voltage as we achieve our goals on the path to net zero, therefore maintaining Grid Security as the transmission system evolves and presents complex system needs, demonstrating SONI's proactive approach to ensuring these tools are in place for a decarbonised system. This contributes to SONI's Decarbonisation and Grid Security Outcome.			
Engagement	SONI will be engaged internally to ensure collaboration across departments and a coordinated approach to ensure the delivery of the voltage trajectory tool as this tool is a key enabler for other programmes of work and as such the UR will continue to receive regular updates from SONI. As this is a specific technical tool for the control room, no external engagement is required.			
Performance Measure	Delivery of the various tools described above.			
Timescale	Note - timescales and delivery are dependent on availability of funding required to deliver the work. • VTT Single Time Point live and operational - Complete November 2023 • VTT Multi-Timepoint Solution Live and Operational - Complete May 2024 • VTT Enhancements - Phase 2 - Complete September 2024 (subject to funding) • VTT Automated Modelling Environment - Complete December 2023 (subject to funding) • RMT Enhancements - Complete May 2024 (subject to funding) • LSAT Environments - Complete December 2023 (subject to funding)			
Cost Scale	Medium			
SONI Outcome	**Decarbonisation**	**Grid Security**	**System Wide Costs**	**Stakeholder Satisfaction**

Minimum Number of Sets

The successful completion of the 75% SNSP and RoCoF trials has enabled us to move on to further operational trials, for example reducing the minimum number of large synchronous units online, which is required to further facilitate even higher levels of renewable generation.

Reducing the minimum number of large synchronous units online on the all-island system from 8 units to 7 units is a challenge for an island system that is already at the forefront, worldwide, with regard to levels of non-synchronous penetration. Therefore, it requires a mixture of new technologies (some of which have only recently connected) and some ingenuity, as well as operational experience and real time performance monitoring, to enable the reduction of minimum number of large synchronous units online from 8 to 7, without reducing the transmission system security and stability.

This has required SONI to be prudent and to implement this change on a phased basis, starting with studies during 2022 and early 2023, and then progressing to an operational trial. The target of a minimum of 7 sets will be progressed once the trial is deemed a success.

The planned work under this programme is detailed below.

Deliverable	FWP008: Minimum Sets
Description of Activities	Reduction of the operational constraints related to the minimum number of large synchronous units online. We will complete the ongoing operational trial for a minimum of 7 large synchronous units online, which is part of the transition to system operation with 3 large conventional units or less (the interim steps have been laid out in the Operational Policy Roadmap to 2030[7]). The steps commenced in 2022 and will continue up to 2030. Specifically, the operational trial for a minimum of 7 large synchronous units online which started in May 2023 is expected to continue until at least March 2024. Trial analysis has already commenced and will continue until it can be proven that the system is secure, and mitigations are available for any issues that may arise.
Key Benefits	The reduction of large synchronous units online on the all-island system from 8 to 7 will have a significant positive impact on RES-E and Imperfections and Constraints. This will therefore contribute to the Decarbonisation and System-Wide Costs Outcomes.
Strategic Theme	**A culture of open and collaborative innovation** **A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market development.** SONI is progressing key activities which will contribute towards achieving government RES-E targets and reducing transmission constraint groups on the transmission system, therefore affecting costs. Reducing the minimum number of online units on a small island system presents additional challenges. SONI is adopting a prudent approach to ensure we retain a safe, secure and reliable Transmission System. However, we remain proactive in

[7] https://www.soni.ltd.uk/media/documents/Operational-Policy-Roadmap-2023-to-2030.pdf

	implementing these projects as we push the boundaries of our Operational Policies. We consider that this demonstrates SONI's consideration around ways to minimise constraint groups for system security and safety, with the additional benefit of impacting on costs.			
Engagement	SONI will conduct external engagements whilst progressing the programme of activities, in particular via the SOEF Advisory Council.			
Performance Measure	Completion of trial and associated analysis, along with updating Operational Policy where appropriate.			
Timescale	Decision on trial completion and operational policy – May 2024 This is dependent sufficient hours with the necessary system conditions (mix of demand and available renewables)			
Cost Scale	Low			
SONI Outcome	Decarbonisation	Grid Security	System Wide Costs	Stakeholder Satisfaction

End of Life Assets – System Refresh

Deliverable	FWP012: End of Life Assets
Description of Activities	**System Refresh** **ERP Upgrade to Dynamics 365 Finance** The Enterprise Resource Planning (ERP) system used by SONI is Microsoft Dynamics. The current version of the system – Microsoft Dynamics 2012 R3 is at end of life and is under extended support until January 2025. The recommended upgrade path is to Microsoft Dynamics 365. SONI has implemented two instances of Microsoft Dynamics – one for the SONI business and a second for the SEMO business. SONI intends to run an upgrade project to complete the SONI Instance upgrade of Dynamics 365 in **July 2024** **Telecommunications and Information Technology Refresh 2023-2024** SONI is dependent on telecommunications equipment and systems for the delivery of real time data to support control centre operation. It is also dependent on Information Technology Infrastructure for the delivery of business systems. The following elements of these have been identified as needing replacement over the next year: • Operating Systems decommissioning: Windows Server 2012 decommissioned – **May 2024** • Oracle 12c decommissioned - **Dec 2023** • IT Network upgrade complete – **Sep 2024** NOTE: SONI is experiencing supply chain issues which could impact any of the above projects. Work is ongoing scoping out the work associated with a Telecoms Asset Transfer to NIE Networks. Further engagement is needed with NIE Networks and the UR in relation to this project.
Key Benefits	The ultimate benefit of this ongoing investment is the safe and reliable operation of our network on an ongoing basis, in accordance with our duty to achieve continuous system operation and adequacy. As such, we expect this programme of work to bring enhancements to our grid security outcome.
Strategic Theme	**Collaborating and coordinating to promote a holistic, customer-based service approach to digitalisation.** Having up to date internal systems is aligned under the above theme so that we can provide a reliable service to our customers and stakeholders. More up to date software is required especially in consideration of the potential for cyber threats, it is essential that we have resilient software to be able to continue to provide a safe, secure and reliable Transmission System.
Engagement	SONI will conduct a range of internal engagement activities in order to ensure a coordinated and collaborative approach across the business in ensuring the delivery of the above programme of works.
Performance Measure	We will measure our success in this area by monitoring the timeframes to complete these activities.

Timescale	Ongoing throughout 2023 – 2024			
Cost Scale	High			
SONI Outcome	Decarbonisation	**Grid Security**	System Wide Costs	**Stakeholder Satisfaction**

End of Life Assets – EMS Upgrade

SONI has reviewed the optimum useful life of its IT assets and will refresh them on this basis. This programme includes mission critical systems, such as our energy management system that we use to operate the transmission system.

Deliverable	FWP013: End of Life Assets
Description of Activities	**Energy Management System Midlife Upgrade Programme** The EMS is a mission-critical platform utilised in our control centres to enable the monitoring and control of the power system of Northern Ireland and Ireland. The current platform is reaching end of life and the hardware, software and telecoms components must now be upgraded so that the resilience and availability of the critical process related to managing the power system can be maintained. This upgrade will ensure that the critical supporting systems are robust, resilient, secure, performant, and maintain appropriate support arrangements with vendors, ensuring access to new functionality, bug fixes, security patches etc. The primary objective of the current upgrade project is to address upcoming obsolescence of our EMS platform. To achieve this objective, all components of the EMS architecture are being replaced including new production and pre-production infrastructure, upgraded operating systems, middleware and databases versions as well as the upgraded GE eterra platform. The project commenced in FY21/22. In FY 23/24 some of the key programme delivery activities/outputs are as follows: 1. Completion of application build sprints 2. FAT testing completion 3. Infrastructure delivery 4. SAT testing 5. Live Service Cutover NOTE: The previously communicated risk around hardware procurement lead times and delays is now closed. All hardware required for the upgrade for the data centres has been delivered.
Key Benefits	The ultimate benefit of this ongoing investment is the safe, consistent and reliable operation of our network on an ongoing basis, in accordance with our duty to achieve continuous system operation and adequacy. As such, we expect this programme of work to bring enhancements to our grid security outcome.
Strategic Theme	**Collaborating and coordinating to promote a holistic, customer-based service approach to digitalisation.** Upgrading the EMS system is aligned under the above theme. It is essential that we have resilient software to be able to continue to provide a safe, secure and reliable Transmission System.
Engagement	SONI will also be in regular contact with suppliers and liaising internally throughout this project. Appropriate programme governance has been agreed and has been operation since programme initiation. As this is a specific

	technical system and this upgrade was included in the SONI price control, no external engagement is required.			
Performance Measure	We will measure our success in this area by monitoring the timeframes to complete these activities.			
Timescale	Ongoing throughout 2023 – 2024			
Cost Scale	High			
SONI Outcome	Decarbonisation	**Grid Security**	System Wide Costs	**Stakeholder Satisfaction**

Implement a Replacement Energy Metering Solution

Reliable and timely energy meter data is a fundamental requirement for the operation of all wholesale electricity market and retail markets. Under the various industry codes[8] in Northern Ireland, SONI is obliged to collect Meter Data from:

- transmission connected generators.
- the Moyle Interconnector.
- the North-South Tie Line; and
- all distribution connected generation that participates in the wholesale market or is subject to central dispatch (this covers all distribution generation with an MEC greater than 5MW).

This data is then used for settlement of:

1. The wholesale electricity market (SEM)
2. TUoS
3. System Support Services.

SONI's current energy metering system has been in operation for over 15 years. It has undergone many changes and component upgrades during that time. Some of the components are now required to be replaced or upgraded.

The SONI energy metering system currently consists of two parts:

1. A meter data collection facility; and
2. A collection of bespoke tools that are used to process the collected meter data.

The proposed scope of the replacement project is to acquire a product or products to replace both of these parts.

Deliverable	FWP23-08: Implement a Replacement Energy Metering Solution
Description of Activities	The various phases associated with this project are detailed as follows: Having completed the first two stages detailed in 2022/2023: 1. Analysis and Solution Specification, Solution Tender Development and 2. Procurement and Supplier Selection Over the 2023/2024 period, SONI will be progressing the following stages: 1. **Conclude Contract with Chosen Vendor – November 2023** This will involve detailed contract negotiation with the successful tenderer for the delivery of the Energy Metering Solution. The culmination of this stage will result in a signed contract for delivery of the project. 2. **Project Team Mobilisation – December 2023** Following contract execution a project team will be established consisting of both vendor and SONI resources. 3. **Complete the detailed design of the solution– May 2024** During this phase the project team will conduct a detailed analysis of the business requirements for the Energy Metering Solution and map these requirements to the functional implementation of the vendor solution.

[8] These include the Metering Code section of the Grid Code and also the SEM Trading and Settlement Code.

	4. **Build and Implement the Solution – September 2024** This phase will involve the development, configuration, testing and final acceptance of the solution.			
Key Benefits	There are three key benefits identified as a result of implementing this programme of work. 1. **Ongoing Compliance** The current SONI metering systems are constrained. The systems have evolved with the requirements over several years resulting in a collection of applications and manual processes. 2. **Essential New Functionality** This investment is designed to be fit for purpose for the known requirements out to 2030 and beyond. It should also be able to process the data signals that will be essential for monitoring new technologies that require more frequent data readings, such as the fast response from batteries. This will ensure that customers only pay for services that are delivered.			
Strategic Theme	**Collaborating and coordinating to promote a holistic, customer-based service approach to digitalisation** This replacement for the metering system will deliver essential new automated functionality which will allow the business to more away from the current, more labour-intensive processes associated with the existing system.			
Engagement	SONI is engaged with various stakeholders in these deliverables, with NIE Networks as Meter Operator, SEMO and EirGrid TSO who are also upgrading its own energy metering system.			
Performance Measure	Completion of the milestone set out above.			
Timescale	September 2024			
Cost Scale	High			
SONI Outcome	Decarbonisation	**Grid Security**	**System Wide Costs**	**Stakeholder Satisfaction**

Introduction of National Resource Adequacy Assessment (NRAA)

Deliverable	FWP24-01: Introduction of NRAA
Description of Activities	For Northern Ireland, the United Kingdom's Committee on Climate Change recently advised that it is necessary, feasible and cost-effective for the UK to set a target of net-zero Green House Gas (GHG) emissions by 2050. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 came into effect on the 27 June 2019. The revised legally binding target towards net zero emissions covers all sectors of the economy. This update to the Order demonstrates the UK's and Northern Ireland's commitment to targeting a challenging ambition in line with the requirements of the Paris Agreement. The Generation Capacity Statement Methodology Statement, which SONI and Eirgrid worked collaboratively to publish in 2023, outline the expected electricity demand and the level of generation capacity that will be required on the island over the next ten years. This project has been initiated to improve the GCS methodology in order to meet the needs of the Island of Ireland while aligning with the National Resource Adequacy Assessment (NRAA) process (legal requirement[9]) Over the period SONI will be reviewing our modelling systems to transition to Plexos and ensure that our methodology is aligned with the NRAA process. Moving to a new adequacy assessment methodology will enable us to enhance our modelling of a power system with at least 80% renewables. We are moving to a system where the greatest risk is no longer the loss of a thermal power plant, but uncertainties of disruption to gas supply and weather, particularly during extended periods of low renewable output. Having already developed a high-level plan on what is required to deliver a new resource adequacy and a high-level design for the modelling framework and a project migration implementation plan, SONI, in collaboration with Eirgrid, will publish the first Northern Ireland NRAA in 2024.
Key Benefits	SONI will be fully compliant with the NRAA process. This will ensure a more robust and reliable assessment of adequacy of a decarbonised power system.
Strategic Theme	**A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market development.** **Collaborating and coordinating to promote a holistic, customer-based service approach to Digitalisation** These themes are significant in the context of the improvements being adopted to the system modelling in order to enable the transition to an updated methodology aligned with the NRAA process. SONI will embrace a culture of organisational learning whilst undertaking this process, using our learnings from other programmes which may help adapt to challenges which can arise during this process.

[9] Regulation (EU) 2019/943 Article 24

Engagement	SONI will be engaged with the various internal departments and external vendors to ensure a seamless transition to the new methodology. This will entail a number of regular meetings, public consultations and engagement with stakeholders and discussions on the approach and programme to deliver the methodology.			
Performance Measure	Successful delivery of the NRAA publication.			
Timescale	Publish first Northern Ireland NRAA - September 2024			
Cost Scale	Low			
SONI Outcome	**Decarbonisation**	**Grid Security**	System Wide Costs	**Stakeholder Satisfaction**