SONI Forward Work Plan 2024-25

Appendix 1
System Operation and Adequacy

Northern Ireland
September 2024

SONI Deliverables 2024-25 Role 1 System Operation and Adequacy

The SONI Forward Work Plan for 2024-25 outlines the various projects and work streams scheduled to be undertaken from October 2024 to September 2025. This appendix provides further details on the deliverables associated with Role 1 System Operation and Adequacy. It is important that this appendix be reviewed in conjunction with the main Forward Work Plan document.

Please note , while the Forward Work Plan includes IT-related projects under Role 1 System Operations and Adequacy, SONI have intentionally excluded any programmes of work related to cyber security. SONI consider this is a confidential area and, as such do not intend to include any narrative or metrics related to cyber security within the Forward Work Plan.

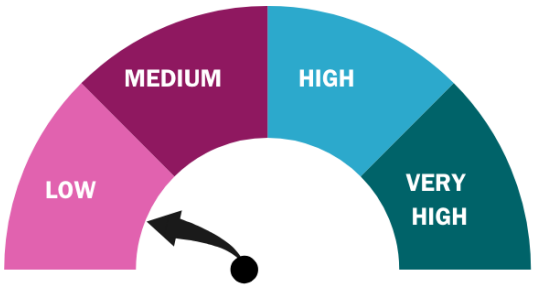
Cost Scale

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 in the table below, the gauge icon will be used in the detailed project information for each deliverable.

LOW	£0-£500K
MEDIUM	£500K-£1M
HIGH	£1M-£5M
VERY HIGH	£5M+

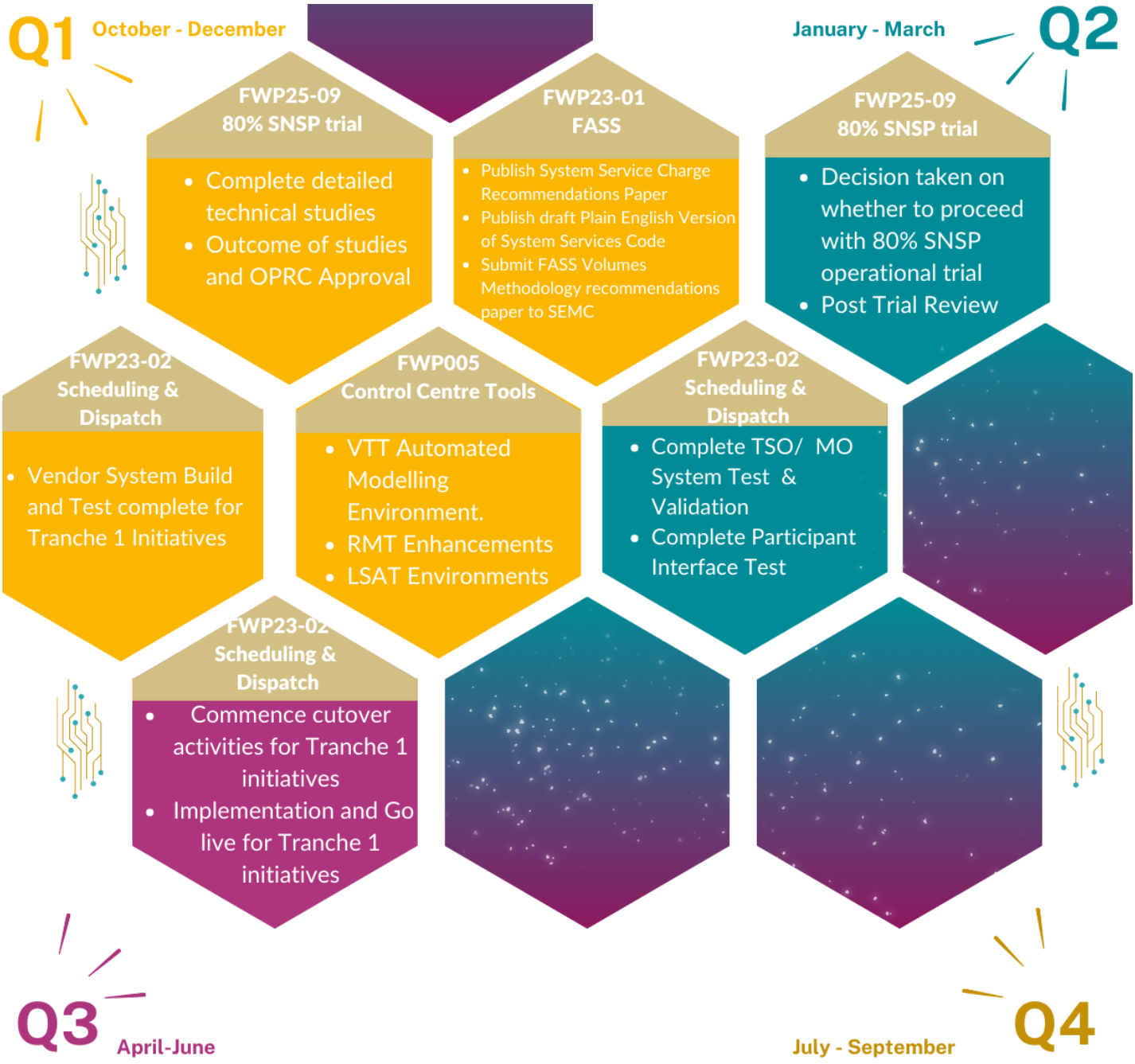
Cost Scale Table



Cost Scale Gauge

Project Overview

A complete view of all projects to be delivered across Role 1 System Operation and Adequacy are detailed in the below table. More detail on each project is provided within this document.



Role 1 Projects

Project	Milestone	Timescale	Performance Measure	Project Carried forward
FWP23-01: Future Arrangements System Services (FASS)	1. Publish System Service Charge Recommendations Paper 2. Publish draft Plain English Version of System Services Code 3. Submit FASS Volumes Methodology recommendations paper to SEMC	November 2024 December 2024 December 2024	Performance for the period will be measured against the successful progression of deliverables above. *All dates will be confirmed in the Phased Implementation Roadmap (PIR V2.0 to be published end of September)	Yes
FWP23-02: Scheduling and Dispatch	1. Vendor System Build and Test Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives 2. TSO/MO System Test and Validation Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives 3. Participant Interface Test (PIT) Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives 4. Cutover activities commences for Scheduling and Dispatch Programme Tranche 1 Initiatives 5. Implementation and Go Live for Scheduling and Dispatch Programme Tranche 1 Initiatives	December 2024 March 2025 March 2025 March 2025 April 2025	Successful achievement of the Phased activities	Yes

FWP25-09: 80% SNSP operational trial (FO)	1. Detailed technical studies to be completed 2. Studies outcome and results approved by OPRC 3. Decision taken on whether to proceed with 80% SNSP operational trial 4. Post Trial Review	December 2024 December 2024 December 2024 June 2025		No
FWP005: Control Centre Tools	1. VTT Multi-Timepoint Solution Live and Operational 2. VTT Automated Modelling Environment - 3. RMT Enhancements 4. LSAT Environments	October 2024 November 2024 December 2024 December 2024	Delivery of the Voltage Trajectory Tool enhancements. *Timescales are dependent on funding approvals	Yes

Detailed Programme of Deliverables

Role 1

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. In April 2022, the SEM Committee (SEMC) published its High-Level Design (HLD) for the Future Arrangements for System Services (FASS) Programme as set out in (SEM-22-012). However, the final programme scope was not confirmed until 8th December 2023 in SEMC Decision Phased Implementation Roadmap for the System Services High Level Design (SEM-23-103).

SONI, in conjunction with EirGrid, has engaged with the Regulatory Authorities (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. Furthermore, the Qualification Trial Process 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 but 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 and delivering consumer value. One of the FASS programme's key objectives is to achieve compliance with the relevant legislation including the Clean Energy Package (CEP) and enable industry to achieve the all-island climate change ambition, including targets of 80% RES-E per annum by 2030.

Following the publication of SEM-23-103, SONI worked with the RAs on refining the scope of the full programme of work, including programme phases of Establishment, Procurement, Design, Build and Operate. The Phased implementation Roadmap details key timelines and activities with planned go-live date of December 2026.

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 FASS programme's new system services market design will need several years to mature to deliver the necessary Investment in the required services.

As outlined in the Phased Implementation Roadmap, the TSOs have an overall low-medium level of confidence in timelines. This is typical at this early stage in programmes of this scale and complexity. More detailed timelines cannot be provided until, funding from UR and CRU for Phases 3 -4 of the FASS programme is approved and IT vendors are mobilised for implementation. To mitigate programme risks, there is a 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.

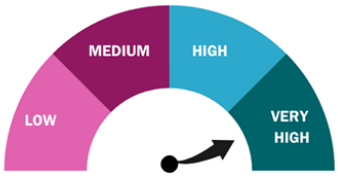
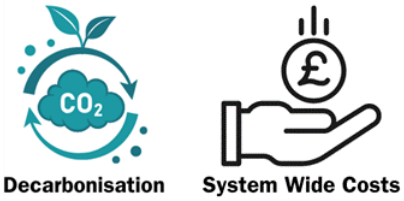
From January 2024 we have achieved the following:

- ❑ Published Phased Implementation Roadmap 1
- ❑ Published FASS Daily Auction/Procurement Design Consultation Paper
- ❑ Established System Service Code Development Working Group, Terms of Reference
- ❑ Published FASS Daily Auction Product Review and Locational Methodology Consultation Paper
- ❑ Published FASS Charge Consultation Paper
- ❑ Published FASS Daily Auction/Procurement Design Recommendation Paper

These will be discussed further in the SONI 2023/24 Annual Performance Report.

A summary of the associated milestones for the project during 2024-22025 is provided below

FWP23-01 Future Arrangement System Services (FASS)	
Description of Activities	Please note, all dates and activities from September 2024 to June 2025 to be confirmed via the publication of the next iteration of the Phased Implementation Roadmap (PIR V2.0) at end of September. 1. Publish System Service Charge Recommendations Paper (due November 2024, final date to be confirmed in PIR V2.0) 2. Publish SS Code (Plain English) First Draft (due December 2024, final date to be confirmed in PIR V2.0) 3. Submit Volumes Forecasting Methodology Recommendation Paper Including Volumes Requirements Reporting (due December 2024, final date to be confirmed in PIR V2.0)
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. 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. ❑ Avoiding over-procurement of reserve services to deliver value to consumers. These benefits are key to SONIs outcomes especially in terms of Decarbonisation and system wide costs thus enabling stakeholder satisfaction.
UR Strategic/ 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** FASS is a complex programme, SONI is continuing to collaborate closely with stakeholders, including the Regulatory Authorities, to ensure alignment with high-level design requirements and external dependencies.

	Consistent engagement will ensure that stakeholder input is integral to the programmes development and implementation. The challenging nature of the FASS programme encourages innovation within SONI. As we address the complex issues involved in this programme, we are incorporating learnings from across the business and externally to develop creative solutions, driving both project success and fostering a culture of continuous improvement. SONI is maintaining ongoing engagement with the Utility Regulator to ensure that adequate funding is secured and to ensure that each phase of the programmes objectives is met.
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. Current engagement channels are: ❑ System Services Future Arrangements (SSFA) Project Panel ❑ System Services Code Working Group ❑ Shaping Our Electricity Future (SOEF) Advisory Council ❑ Future Power Markets Industry Forum ❑ Regulatory Authorities & TSOs Workstream Meetings
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 2024-25 period; however, this will be subject to timely decisions and funding approvals by the UR.
Cost Scale	
SONI Outcome	

Scheduling and Dispatch Programme (SDP)

Renewable Energy Sources (RES) in Northern Ireland 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 net-work)

Following decisions in the Clean Energy Package, 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

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

Phases 3 to 4 will continue, and Phase 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. changes:

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

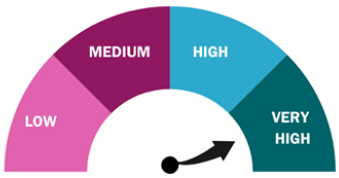
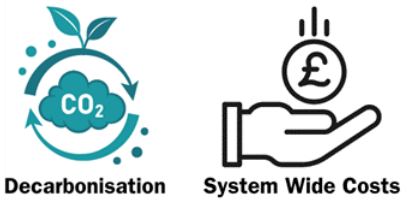
Support: This phase will support the Implementation in the period immediately following go live and also formally close out the programme in a controlled manner. The activities of phase 4 will follow the proven market and system change processes used in previous major projects relating to SEM changes:

- ❑ 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.

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. ❑ Implementation and Go Live for Scheduling and Dispatch Programme Tranche 1 Initiatives ❑ Approval for Trading and Settlement Code, Capacity Market Code & Grid Code Mods for Scheduling and Dispatch Programme Tranche 2 Initiatives ❑ Implement the people, process, and technology changes for the Scheduling & Dispatch Tranche 2 initiatives based on the agreed detailed design of the Scheduling & Dispatch solution. Deliver Business and Industry Readiness for the Scheduling & Dispatch Tranche 2 initiatives.
Key Benefits	The key benefits of the Scheduling and Dispatch Programme are detailed below: ❑ **Alignment with the NI Energy Strategy**: The Scheduling and dispatch programme is closely aligned with the NI Energy Strategy, aiding in the overall transition towards net-zero emissions.

	❑ **Compliance with EU Legislation on Clean Energy Package**: The Scheduling and Dispatch programme ensures that SONI adhere to EU Regulations. ❑ **Transition to Higher SNSP**: A significant benefit of the Scheduling and Dispatch programme is enabling the increase from 75% to 95% SNSP by 2030, allowing for more renewable energy sources to be integrated into the grid, enhancing sustainability and energy efficiency. ❑ **Support for Government Targets:** The Scheduling and Dispatch programme allows for a forward-thinking approach, by implementing key market design works, SONI are actively supporting the achievement of governmental energy and climate goals.
UR Strategic/ 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.** This is an ambitious project as acknowledged by the SEM Committee given the complexity of issues. SONI are fostering open dialogue and collaborative problem-solving by conducting workshops and engaging with EirGrid TSO and industry stakeholders. This approach ensures that all risks are identified and addressed, and innovative solutions are developed. This project encourages SONI to challenge existing processes and learn from practical engagements, ensuring that solutions are well-planned, and risks are managed effectively. Through this collaborative and learning-focused approached, SONI is demonstrating its ability to adapt quickly to policy changes and regulatory requirements, such as those outlined in the EU Clean Energy Package. This project also underscores SONI's commitment to achieving a low-carbon future, operational excellence and meeting broader policy goals by aiming to increase SNSP from 75% to 95% by 2030.
Engagement	The Scheduling and Dispatch programme will involve active engagement with industry through a series of initiatives. This includes obtaining Regulatory Authority approval for modifications to the Trading and Settlement Code, Capacity Market Code and Grid Code as part of Tranche 1 and Tranche 2 of the programme. To ensure broad industry participation and input, monthly workshops will be conducted to engage stakeholders and provide updates on the progress of the programme.

Performance Measure	Performance will be measured over the period by the successful achievement of the Phases 3-5 activities as detailed above.
Timescale	1. Vendor System Build and Test Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives - **December 2024** 2. TSO/MO System Test and Validation Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives - **March 2025** 3. Participant Interface Test (PIT) Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives - **March 2025** 4. Cutover activities commences for Tranche 1 Initiative.—**March 2025** 5. Implementation and Go Live for Scheduling and Dispatch Programme Tranche 1 Initiatives - **April 2025**
Cost Scale	
SONI Outcome	

Recommendation to start 80% SNSP operational trial

FWP25-09: Recommendation to start 80% SNSP operational trial (FO)	
Description of Activities	The power system will undergo radical transformation to meet 2030 targets. This will include: ❑ The connection of two new HVDC interconnectors (to Great Britain and France ❑ Large offshore wind farms and solar generation connections ❑ Hydrogen energy production ❑ Demand response and energy storage innovations, ❑ Coupling to European markets and anticipated market evolvement ❑ Major growth in demand driven by electrification of society and large electricity users. The aim of the Operational Roadmap is to plan a pathway for the evolution of operational policy to facilitate these radical transformations while maintaining and enhancing security of supply, reliability and resiliency for customers on the island of Ireland. SNSP is a measure of the non-synchronous generation on the system at an instant in time. It is the ratio of the real-time MW contribution from non-synchronous generation and net HVDC imports to demand plus net HVDC exports. In early 2022, the TSO successfully completed a trial of 75% SNSP on the system with over 350 hours of operation above 70% SNSP. 75% SNSP then became enduring operating policy. The TSO continues to monitor system parameters with detailed analysis of events and disturbances including market outcomes. During 2024, the TSO has been conducting studies for operating the all-island system at 80% SNSP with an operational trial and implementation of enduring operational policy following post-trial analysis.80% SNSP operational policy will facilitate the transition to 2030 renewable targets while maintaining system security as outlined in the TSO roadmaps to 2030. Significant operational policy changes represent the culmination of work we are doing across the business.

	The outcome of the commencing the trial will be a significant step towards 95% SNSP enduring operational policy change that will reduce dispatch down of renewables thereby facilitating more RES-E generation on the power system. Key deliverables during this period are listed below: 1. Perform detailed technical studies on changing operational policy to 80% SNSP. 2. Present studies outcomes to Operational Policy Review Committee (OPRC) governance panel for approval. 3. Subject to decisions proceed with operational trial of 80% SNSP. 4. Conduct a post-trial review
Key Benefits	The key benefits associated with the 80% SNSP operational trial are detailed below: ❑ **Increased Integration of Renewable Energy**: The progression towards 80% and eventually 85% SNSP will significantly increases the amount of renewable energy on the power system. ❑ **System Security and Reliability**: The TSO's trials and studies ensure that system security is maintained even as higher levels of non-synchronous generation are integrated. ❑ **Supporting Long-term Energy Transition Goals**: The move to 80% and ultimately 95% is a critical milestone in the roadmap to meet the 2030 renewable energy targets. This transition plays a key role in reducing greenhouse gas emission, combating climate change and positioning the energy system for a sustainable future. ❑ **Reduction in Curtailment of Renewable Generation**: Achieving higher SNSP levels reduces the need to dispatch down renewable energy sources. This will ensure that more energy from wind, solar and other sources can be utilised, maximising the contribution of clean energy to the grid.
UR Strategic/ 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.** The 80% Operational System trial allows SONI to gather valuable insights and learnings that will contribute to the development of enduring operational policies. By learning from real-time system performance and renewable integration during the trial, SONI strengthens its capability to manage higher levels of RES generation in the future.

	This trial directly supports policy objectives by reducing the dispatch down of renewables, thus facilitating more RES on the system. This demonstrates SONI's agility and responsiveness in adapting to evolving market needs and regulatory frameworks that prioritise decarbonisation and sustainable energy practices. The trial is a key step towards the long-term goal of achieving 95% SNSP, and this structured approach ensures we are on track to meet future policy and regulatory targets. The outcomes of this trial will inform long-term operational policy changes aimed at achieving 95% SNSP. By openly sharing the results and lessons learned, SONI supports continuous improvement in system operations, benefiting all stakeholders involved in renewable energy integration.
Engagement	Over the period SONI will have ongoing engagement with the Department for Economy, Regulatory Authorities and industry.
Performance Measure	Operational Capability trialled to 80% SNSP
Timescale	1. Detailed technical studies to be completed – **December 2024** 2. Studies outcome and results approved by OPRC – **December 2024** 3. Decision taken on whether to proceed with 80% SNSP operational trial - **December 2024** 4. Post Trial Review - June 2025
Cost Scale	
SONI Outcome	

Control Centre Tools

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 (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 2024/2025 will be to refine and improve the tools to meet business enhancements and Regulatory requirements.

Details of items included in this project are included in the table below

Activity	Description
VTT Tuning	Operational Tuning of the Multi 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.
LSAT Environ-ments	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

Key Benefits

The key benefits associated with the Control Centre Tools project are detailed below:

- **Improved Voltage Control and Stability**: The Voltage Trajectory Tool (VTT) allows Grid Controllers to assess and manage reactive power sources more effectively, ensuring local voltage management issues are addressed. This is critical as more renewable energy sources are integrated into the system, which can impact voltage stability.
- **Enhanced Management of Renewable Integration:** As more wind and solar generations replace conventional units, managing the power systems becomes more complex. The VTT helps facilitate this transition by optimising voltage control in a system increasing dominated by non-synchronous renewable generation, therefore supporting higher levels of SNSP.
- **Facilitation of Net Zero Carbon Targets**: By enabling more efficient control and management of the grid under conditions of high renewable generation, these tools are pivotal in helping SONI achieve its renewable energy targets and contribute to the broader goal of a net-zero carbon future.

	❑ **Real-time Decision Support for Grid Controllers**: The introduction of advanced tools like the Ramping Margin Tool (RMT), Voltage Trajectory Tool (VTT) and Look-Ahead Security Assessment Tool (LSAT) provides Grid controllers with real-time information, allowing them to make informed decision to maintain system security and reliability under variable conditions. ❑ **Improved System Stability:** The LSAT enhances stability analysis by assessing the system's stability both now and in the near future. It helps identify potential stability issues and propose corrective actions in advance, based on forecasted system conditions and contingencies. ❑ **Future proofing the Power System**: These tools will not only address the current challenges that SONI face, but also prepare the grid for future needs, providing multi-time horizon assessments (such as intra-day and day-ahead) that ensure long-term system reliability and adaptability as renewable energy use continues to grow. ❑ **Relaxing Conventional Grid Constraints:** The VTT contributes to reducing the reliance on large synchronous machines by determining optimal reactive power targets for various devices. This helps accommodate increasing non-synchronous renewable generation, easing the need for conventional power plants to maintain grid stability.
UR Strategic/ 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.** 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 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 will contribute towards SONI's Decarbonisation and Grid Security Outcome.
Engagement	SONI will engage internally to ensure cross departmental collaboration and a coordinated approach in delivering the Voltage Trajectory Tool, as it serves as a key enabler for programmes. Regular updates will be provided to the Utility Regulator to keep them informed of progress. Since this is a specialised technical tool for the control room, no external engagement is required.

Performance Measure	Delivery of the various tools described above
Timescale	1. VTT Multi-Timepoint Solution Live and Operational - October 2024 2. VTT Automated Modelling Environment. – November 2024 3. RMT Enhancements – December 2024 4. LSAT Environments – December 2024 The VTT Enhancements, Phase 2 is scheduled for delivery in October 2025, however this has not been included as a milestone as it is not in scope for this Forward Work Plan period.
Cost Scale	
SONI Outcome