SONI Forward Work Plan

1 October 2021 to 30 September 2022

Published – 22 March 2022

Foreword

This SONI Forward Work Plan has been prepared by SONI in line with the UR's Guidance on the Evaluative Performance Framework[1] that came into effect on 17 January 2022.

This Forward Work Plan has been prepared as part of the 'transitional year' activities as set out by the UR. This means that SONI is publishing this paper half-way through the year it applies to.

SONI's 'transitional year' Forward Work Plan provides an outline of the key services SONI performs across a set of four TSO roles, being 'System Operations', 'Independent Expert', 'System Planning' and 'Commercial Interface'. It also provides an overview of the key programmes of work which are planned over the period October 2021 to September 2022.

The publication of this 'transitional year' Forward Work Plan by SONI is the first step in the implementation of the UR's Evaluative Performance Framework. It will not only set the tone for SONI's accountability of our service areas and programmes of work, but also demonstrates the pathway to achieving our energy objectives.

The Forward Work Plan draws on the work undertaken in developing the 'Shaping Our Electricity Future' Roadmap, which provides an outline of the key developments to support this transition and implementation of the Northern Ireland Energy Strategy. The Forward Work Plan will identify some of the key programmes which will be developed over the next year, in order to support the Path to Net Zero Energy as set out in the Energy Strategy.

Upon publication, as per the UR's Guidance on the Evaluative Performance Framework, the UR will welcome submissions from stakeholders to provide feedback on SONI's Forward Work Plan. SONI would also welcome any feedback to this paper. We would like to take the opportunity to thank stakeholders for their feedback ahead of this process, as this will help to inform future plans.

Alan Campbell
SONI
Managing Director

[1] epf-guidance.pdf (uregni.gov.uk)

Executive Summary

SONI's primary role is to plan and operate the electricity transmission system in Northern Ireland. We send power from where it is generated to where it is needed, at the most economic price possible.

The SONI strategy is shaped by climate change and the need for a secure transition of the electricity sector to low carbon, renewable energy. This 'transitional year' Forward Work Plan identifies the key programmes and studies required to reach at least 70% renewable electricity by 2030. This Forward Work Plan covers the period from 1 October 2021 through to 30 September 2022. This is in order for SONI to facilitate a transition into the full implementation of the UR's Evaluative Performance Framework over the period.

The main objective of this Forward Work Plan is to outline our key activities within each of the four SONI TSO roles, and the associated programmes of work which are to assist in the achievement of a secure transition to our Renewable Ambition as well as ensuring the enhancement we bring to the four SONI outcomes.

SONI Four TSO Roles

Role 1 System operations and Adequacy	Role 2 Independent Expert
Role 3 System Planning	Role 4 Commercial Interface

The Four SONI Outcomes relate to Decarbonisation, Grid Security, System Wide Costs and SONI service quality.

Our Forward Work Plan provides a pathway through each of the four SONI TSO roles and gives an overview of each 'service area' within each role. It details how SONI is bringing enhancements to these areas and our key programmes of work which will act to enable our achievement of the Northern Ireland renewable targets. In some of these areas SONI has already achieved ground breaking records, such as our work to increase System Non-Synchronous Penetration (SNSP) where we are world leading, and we continue this drive towards establishing 75% SNSP as normal operating practice, with this being on the pathway to increasing ambitions towards 2030.

Other key priorities will be commencing a whole system approach across each of the four SONI TSO roles. SONI believes that our Renewable Ambition can be delivered while

maintaining the stability of the power grid. The scale of the transition is challenging and the current approaches to network planning, public and industry engagement, electricity system operation and electricity markets need to be transformed if these targets are to be achieved. Closer collaboration between TSOs, Transmission Owner and Distribution Network Operator will be a key factor in achieving these ambitions and making them a reality as we approach the short horizon to 2030, and some of these collaborative programmes are emphasised in our plan.

SONI conducted its largest engagement exercise during 2021, with our Shaping Our Electricity Future Consultation. We seek to continue these engagements over the period October 2021 through to September 2022, as detailed in our Shaping Our Electricity Future Roadmap, as we will need to make an evolutionary shift in how we engage with the public in order to plan and develop the grid for the 2030 revolutionary targets. In order to make this evolutionary shift, we need to evolve our public engagement strategy. SONI now have their own strategy to transform public engagement that builds upon extensive work over the past decade. This will remain a process of continuous improvement.

Our public engagement will provide a comprehensive, thoughtful, transparent and inclusive approach. We must listen to those who live near future grid infrastructure. Only with their support will we be able to achieve the scale of change required in the next few short years. These activities will be detailed within our Role 3 System Planning activities and service areas.

As we take each SONI TSO role in turn, we identify the key stakeholder engagement activities over the period. We have been responsive, where possible, to stakeholder feedback submitted during the UR's consultation to the Guidance on the Evaluative Performance Framework, with respect to the key performance indicators which stakeholders wished to be informed of, and how we expect these to be influenced by our activities over the period.

The key activities to be progressed during the period October 2021 to September 2022 are summarised below.

Role	Project
Role 1	**Low Carbon Inertia Services (LCIS)** - Share a plan for the identification of requirements and procurement of Low Carbon Inertia Services with stakeholders
	Low Carbon Inertia Services (LCIS) - Undertake studies to identify the technical and locational requirements considering inertia, reactive power and short circuit level
	Close Out DS3 Programme - Complete the ongoing 75% SNSP trial and its transition to enduring operational policy

	Close out DS3 Programme - Complete the ongoing 1 Hz/s RoCoF trial and its transition to enduring operational policy
	Close Out DS3 Programme – Facilitate NIE Networks completion of the ongoing Nodal Controller Trial in Northern Ireland and determine next steps
	Implementation of Capacity Market Qualification Platform - Develop an online Qualification hub to be used by market participants to complete their Application for Qualification for Capacity Auctions.
	T-1, T-3 and T-4 Capacity Auctions - Capacity Auction Process to be completed for T-1, T-3 and T-4
	Control Centre Tools - Go-Live of enduring Ramping Margin Tool
	Control Centre Tools - Go-Live of Voltage Trajectory Tool (VTT)
	Control Centre Tools - Develop a delivery plan for the tools and capability we need to operate the power system to 2030.
	Capability to operate at 75% SNSP - The 75% SNSP trial is nearing completion and a trial analysis has begun. This will assist in decision making on whether and when to change the operational policy and relax the corresponding operational system constraints.
	DS3 Protocol review and consultation - Consultation on DS3 System Services Protocol Document
	Minimum Generation Requirements Study - The focus of this study is on minimum number of conventional units on that is currently set to eight. The TSOs are aiming to relax this particular constraint in order to operate the all island power system with minimum number of seven conventional units by 2022 and beyond.
	Qualification Trial Process (QTP) - Review the QTP process and develop a plan for the transition to the System Services Future Arrangements. Note: This is dependent on a SEMC decision on the high-level market design and governance.
	Moyle Controller Project: Phase 1 – Impact Assessment and High Level Design – March 2021 Phase 2 – Testing and Implementation – September 2022 (Estimated)
	Simplify and Standardise IT Solutions
	End of Life Assets – Scheduled replacement of assets nearing end of life
	Commence EMS Upgrade – Preparation of high-level design

	Telecommunications – Commence Asset Transfer - Agree a programme of work with NIE Networks
	Moyle HVDC Project - SONI requires IT hardware, software and resilient telecommunications circuits to replace current assets now at 18 years old.
Role 2	**Shaping Our Electricity Future Engagement –** Engage Better Outcomes for All, Council Rollout and SONI Knowledge Hub
	Publish Shaping Our Electricity Future Roadmap - publication
	Annual Innovation Report - Publication
	Electricity Balancing Guidelines - Plan/implementation of the local (interim) design and approach through to implementation
	Balancing Market Principles Statement – annual update and consultation
	Publish SONI's 2021/22 Forward Work Plan - publication
	Consult on the 2021 Transmission Development Plan for Northern Ireland
	SEM/GB Post Brexit Trading Arrangements - Develop a plan for implementation of Post Brexit SEM-GB Trading Design
	Publish SONI's 22/23 Forward Work Plan - publication
Role 3	**North-South Interconnector** - Work to continue for Land Access
	Part 1 Belfast Metropolitan Redevelopment Project - Phase 2 Work to Commence
	Part 2 Belfast Metropolitan Redevelopment Project - TNPP Submission
	Mid Antrim Upgrade - Part 2 Activities to Commence from April 2022
	Drumnakelly and Armagh Reinforcement - Submission of TNPP early 2022
	East Tyrone Reinforcement - Options Assessment Workstream with NIE Networks and TNPP submission
	Mid Tyrone Upgrade - Extensive constraint mapping to complete by Q3 2022
	Moyle 275kV Reinforcement - TNPP Submission
	Northwest 110kV Reinforcement - Options assessment to begin end 2022

	Coolkeeragh 110kV Extension - Options Report and TNPP submission
	Airport Road - Work ongoing with regard to the substation site and progressing on securing legal agreements for site acquisition.
	Shunt Reactors - Additional Shunt Reactors
	CVT Upgrade - NIE Networks D5 Approval to be progressed during the period and construction commenced
	Omagh-Dromore Restring - Progression of Part 3 of the SONI grid development process (Project handover)
	110kV Switchgear Replacements - Progression of Part 3 of the SONI grid development process (Project handover)
	275kV substation Fault Level solutions - Risk assessment, options assessment scope, obtain client engineer and engage environmental consultant. Three substations to be commenced in 2022 are; Castlereagh, Coolkeeragh and Kells.
Role 4	**Agivey Cluster** - Energisation of the Agivey Cluster
	Energisation of two battery storage projects - Energisation of the customer sites, Execution of associated Connection Agreements and Execution of associated GTUoS Agreements

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Purpose of the Paper

The purpose of the 'transitional year' SONI Forward Work Plan is to provide the scope, timeline and estimated enhancements across SONIs Roles that will inform governments, regulators, industry stakeholders and consumers on a pathway to maintaining an affordable, secure, and reliable power system while meeting our ultimate ambition for a renewables-based power system.

This Forward Work Plan details our roles and services and, in particular, the work we do on a day to day basis, key strategic initiatives and their associated milestones, and how these operate in synergy with the Northern Ireland Energy Strategy and associated Action Plans in order to achieve our shared renewable ambitions.

SONI would like to highlight that although this Forward Work Plan has been published in March 2022, as part of the transition year to implement the Evaluative Performance Framework, this plan covers the period 1 October 2021 through to 30 September 2022 and as such, some of the activities are written in the context that these programmes are expected to be achieved at the start of the period, which has since transpired.

This plan takes each of the four SONI TSO roles in turn, and sets out:

- An overview of each service area within the TSO role, and what we do and how we will do this;
- The key performance indicators for each role, the baseline performance using the historic SONI performance per the UR's Guidance on the Evaluative Performance Framework, and our target metrics for the period, having assessed the impact our activities will have on these metrics;
- The planned deliverables for each role, the programme of work to be achieved, key milestones to be implemented over the period, the benefits we expect these to bring (especially in relation to the four SONI outcomes) and the key measure of success for these milestones;
- Stakeholder engagement activities for each role; and
- SONI's performance as measured against the regulatory criteria as set out in the UR's Guidance on the Evaluative Performance Framework.

In November 2021, SONI published our Shaping Our Electricity Future Roadmap which provides an outline of the key developments from a networks, engagement, operations and market perspective needed to support a secure transition to at least 70% renewables on the electricity grid by 2030. This Forward Work Plan sets out the projects over the period which SONI is progressing in order to achieve the initial stages of activities within our Shaping Our Electricity Future Roadmap and therefore the associated requisite activities as part of the Northern Ireland Energy Strategy, in order to facilitate the achievement of our Renewable Ambition.

SONI has provided the layout in this way in order to facilitate our accountability for the assessment of SONI across each of the four SONI TSO roles. SONI has committed to fulfilling the programmes of work and engagement opportunities as identified throughout each of the four SONI TSO roles.

SONI notes that the UR are currently consulting on SONI Governance and associated proposed licence modifications. For the avoidance of doubt, the activities and deliverables

described in this paper are based on the current arrangements and the current licence obligations. SONI will be responding to the UR consultation on SONI Governance.

Upon publication of this Forward Work Plan, the UR will welcome stakeholder submissions to comment on certain aspects of SONI's Forward Work Plan and we look forward to the opportunity to be responsive to stakeholder opinions provided to the UR. With this in mind, SONI welcomes any comments from stakeholders on this Forward Work Plan. Stakeholders can provide comments using the email address: info@soni.ltd.uk quoting "*Feedback on SONI Forward Work Plan"* in the subject heading.

About SONI

As the Transmission System Operator (TSO) for Northern Ireland, SONI (System Operator for Northern Ireland) is at the centre of Northern Ireland's electricity system.

SONI plans and operates the electricity transmission system, the wholesale market, and manages flows on interconnectors with our neighbours. We do so to meet the needs of all electricity users.

SONI is an independent entity, with no vested interest in the generation or selling of electricity. We don't own the grid infrastructure, and so have no self-interest in adding to it. We ensure that electricity is always available when and where it's needed, every second of every day, and for decades to come. We do this in the most cost-effective way possible, and in the interests of all electricity users.

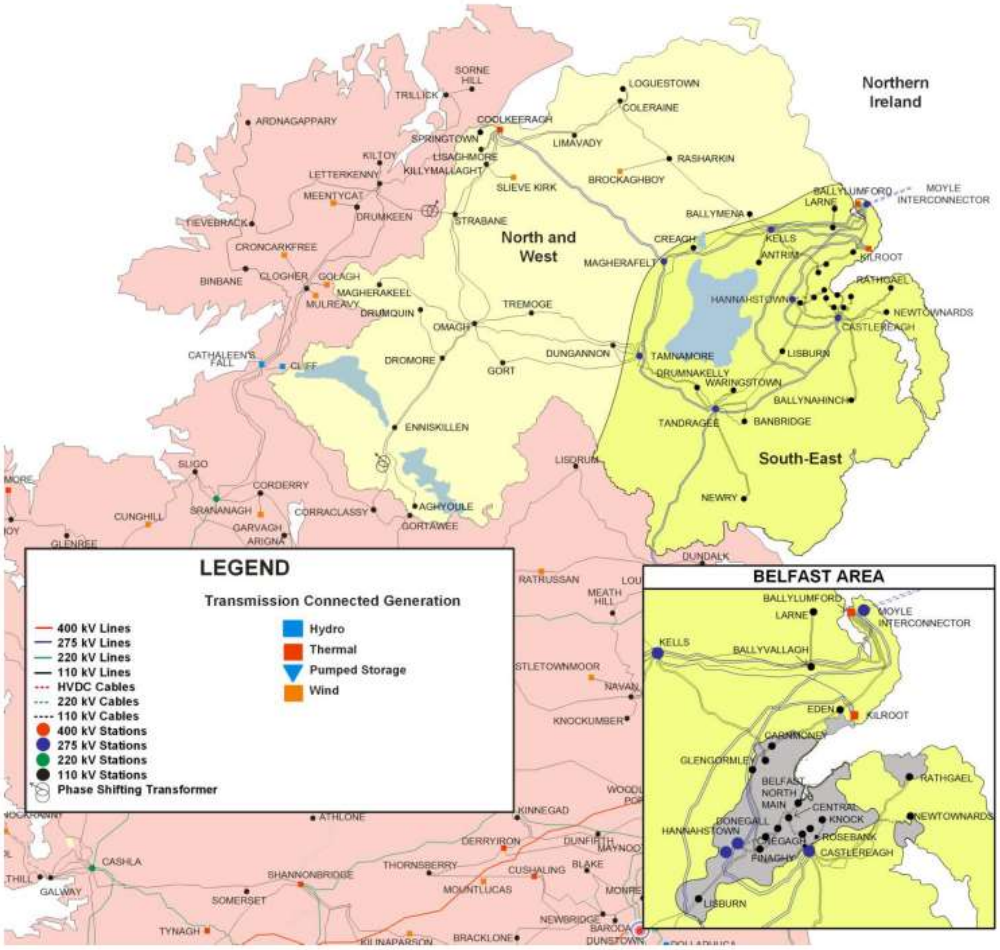
SONI is responsible for a safe, secure and reliable supply of electricity for now and in the future. It provides homes and businesses with the power they need, whenever it is required. This requires SONI to ensure that electricity demand and supply are balanced at all times, which is a complex job.

Maintaining security of supply in the power system means ensuring that there is enough generation to meet both the demand and the operational requirements to run the electricity system securely for each and every hour across the year.

SONI continues to work to identify the most appropriate network reinforcements required to maintain appropriate levels of network performance and reliability as the power system transitions whilst engaging with customers and stakeholders as projects progress through the respective grid development processes.

The electricity system is made up of transmission and distribution networks, and the most common analogy is to think of it like a road network. The transmission network is like the motorways and A roads, and is used to transport high voltage electricity quickly until it gets to the B roads. From there, the voltage of the electricity is reduced and taken to businesses and homes by the Distribution Network Operator (DNO). The Northern Ireland transmission system is a network of 275 kV and 110 kV (and in future 400 kV) high voltage lines and cables. It is the backbone of the power system; efficiently delivering large amounts of power from where it is generated to where it is needed, safely and reliably. The regions and planning areas that best reflect the conditions and power flows on the transmission network are illustrated in Figure 1 below. Northern Ireland Electricity (NIE) Networks is the DNO for Northern Ireland and it also owns all of the electricity network assets, e.g. the electricity grid.

Figure 1



The SONI five year corporate strategy[2] is shaped by climate change and the need for a secure transition of the electricity sector to low-carbon, renewable energy.

During this significant electricity system transition we will need to deliver against the Renewable Ambition (at least 70% of electricity from renewables by 2030 – an important step on the journey to net zero by 2050) while retaining the essential reliability, resilience, and affordability of the Northern Ireland electricity system. We also need to consider the impacts of ageing infrastructure, the retirement and displacement of fossil fuel generators, an increase in renewable energy supply and storage, a rise in demand from large energy users and distribution connected customers, the social impacts of electricity infrastructure and a change in consumer preferences, behaviours, and expectations of their electricity supply.

SONI has given significant attention to the roles and services that the company provides across the electricity system, which will help develop understanding of how SONI can influence the system for the benefit of everyone.

[2] https://www.soni.ltd.uk/media/documents/SONI-Strategy-2020-25-(DOWNLOAD).pdf

It is critical that SONI identify opportunities to deliver greater value for customers as they arise, and that it is able to make critical decisions at the right time. Within this forward work plan SONI presents a framework which it believes will deliver for all customers

As TSO for Northern Ireland, SONI will play an important leadership role in Northern Ireland together with other organisations. SONI is committing to be an enabler for the changes that are needed to allow Northern Ireland to move away from carbon emitting generation.

The electricity system needs to evolve and strengthen in order for this transition to happen. Making these changes now has the potential to secure the future for current and future generations

5 Year Strategy

SONI believes that a company with a strong vision will deliver better outcomes for society, the environment and the economy for the long-term. The SONI Strategy 2020-25 was formally launched in October 2019[3]. It clearly sets out the company's purpose and goals for five years, from 2020 through 2025. These have been captured and fully reflected in this business plan submission for the 2020 - 2025 Price Control period.

The fundamental requirements of those who use electricity are universal. All electricity users across the island expect a reliable and competitively priced supply of power.

Equally, the UK Government and the UR are both addressing the need for low carbon electricity as part of efforts to tackle climate change. They are seeking ambitious and cost-effective responses from electricity system operators. This requires a commitment to innovation without disrupting stability. SONI meets this commitment through the publication of our Annual Innovation Report and consultation, which is detailed further in Role 2, Independent Expert, of this Forward Work Plan.

SONI has a proven track record of innovating to respond to Northern Ireland's needs. The initiatives put in place over recent years have allowed for up to 65% instantaneous use of renewable energy on the Northern Ireland grid. This figure will need to increase in order to deliver Northern Ireland's share of the UK's commitment to net zero. SONI is world leading in this area and has continued this drive by trialling SNSP at 75%. This is expanded on further within Role 1, System Operation and Adequacy, of this Forward Work Plan.

[3] http://www.soni.ltd.uk/about/strategy-2025/SONI-Strategy-2020-25.pdf

SONI's purpose is to "Transform the Power System for Future Generations".

Figure 2: SONI Strategy 2020-2025

Our strategy is shaped by climate change and the impending transformation of the energy sector. The transition to low-carbon and renewable energy will have widespread consequences. There will be major changes in how electricity is generated, and in how it is bought and sold. There will also be major changes in how electricity is used, such as for transport and heat. The electricity system will carry more power than ever before and most of that power will be from renewable sources. Coal, peat and oil-based generation will be phased out in the next decade.

Our central role is to plan and operate the electricity system in Northern Ireland. In addition, we are part of a group that operates the Single Electricity Market throughout Northern Ireland and Ireland. We also manage power flows on interconnectors with our neighbours.

This gives SONI the deep expertise needed to deliver a low-carbon, cost-effective power system. That is why we are making a commitment to take real responsibility for many elements of this energy transition. We will offer our expertise to provide real leadership for this fundamental change. SONI will be a beacon towards an ultimate future for electricity that is sustainable and free from carbon. We are committed to be visible in leading the change towards a carbon-free electricity system. Visible and trusted leadership is essential. This is because we cannot achieve this goal without public, political and regulatory support.

We already have a real and recognised expertise in accommodating renewable energy on the grid. We will work to continue our role as a trusted source for information and advice

for those who set the energy agenda. We will build on and leverage our expertise, both at local and UK level, to influence policy and support for our work.

Evaluative Performance Framework Process

The UR has devised the evaluative performance framework as part of the SONI 2020 to 2025 price control. The UR has provided guidance on the evaluative performance framework which can be found on the UR website[4].

The primary purpose of the evaluative performance framework is for SONI to demonstrate its engagement, through actions and behaviours, which contribute to four high level outcomes ("SONI outcomes").

The four SONI outcomes are:

- **Decarbonisation** - the Northern Ireland electricity system supports government decarbonisation policy and targets;
- **Grid security** – Norther Ireland electricity customers receive secure and reliable electricity supplies;
- **System-wide costs** - Northern Ireland electricity consumers get good value for money which reflects efficiency within, and across, different parts of the Northern Ireland electricity system, over the short term and the longer term; and
- **SONI service quality** - SONI provides an appropriate range and quality of services to participants in the Northern Ireland electricity system and other stakeholders.

The obligations that define SONI's roles and services in greater detail are set out across a number of documents, including: its TSO Licence; the Northern Ireland Grid Code; the Trading and Settlement Code; the Transmission Interface Arrangements; other Licence agreements; the EU Network Codes; and the methodologies approved in accordance with the EU Network Codes, European and Northern Ireland legislation, and SEMC decisions.

SONI has equated the roles and services into four TSO Roles, which detail how these obligations translate into the services provided by SONI.

The four SONI TSO roles are:

- **Role 1 – System Operation and Adequacy**
- **Role 2 – Independent Expert**
- **Role 3 – System Planning**
- **Role 4 – Commercial Interface**

The Evaluative Performance Framework Process can be summarised as follows. SONI will publish a Forward Work Plan annually. The UR will then welcome submissions from stakeholders to provide feedback on SONI's Forward Work Plan. An independent Panel formed by the UR will then assess the feedback received, alongside the SONI Forward Work Plan and an associated score will be provided to the UR. The UR will then decide

[4] epf-guidance.pdf (uregni.gov.uk)

whether they are in agreement with this score, or whether this should be revised, and the final score is then provided to SONI.

This will be followed by a mid-year review and a subsequent Annual Performance Report. The timeline for this process is detailed below in Figure 3.

This Forward Work Plan is in relation to the transition year, and the associated timelines are therefore different to Figure 3 and as such are demonstrated in Figure 4. This Forward Work Plan is the only exception to the timeline, in order to facilitate an introduction to the evaluative performance framework in a transition year.

Figure 3: Annual requirements as part of evaluative performance framework

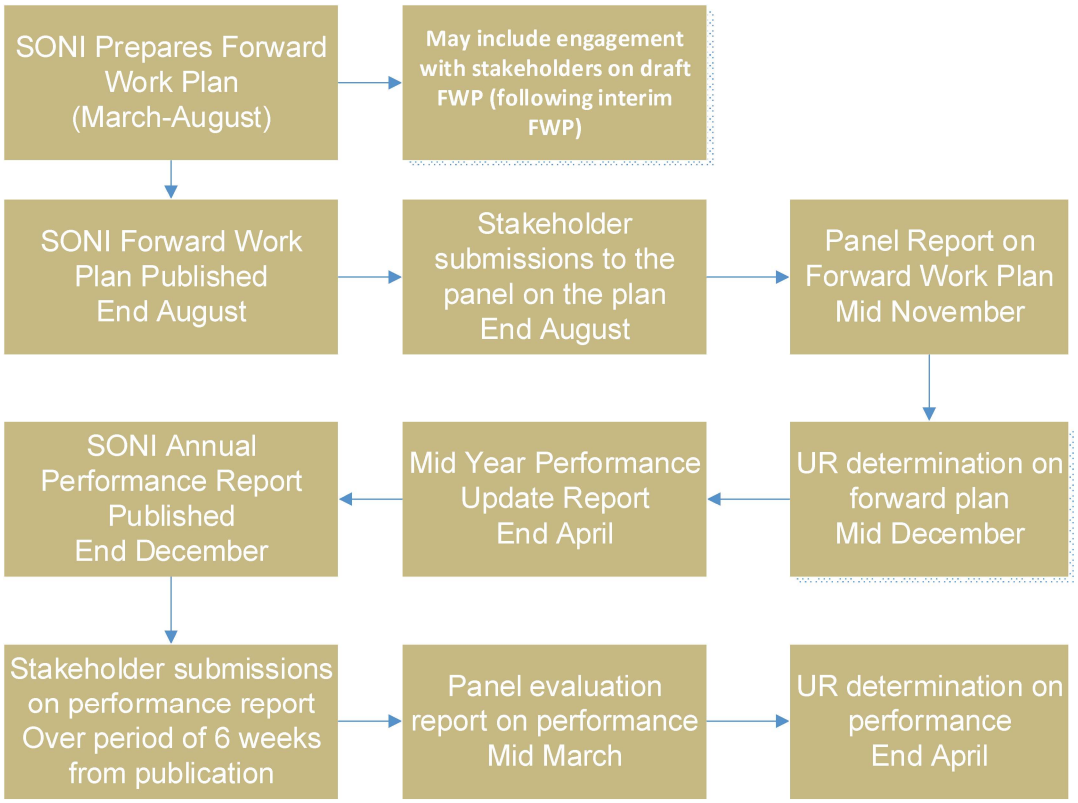
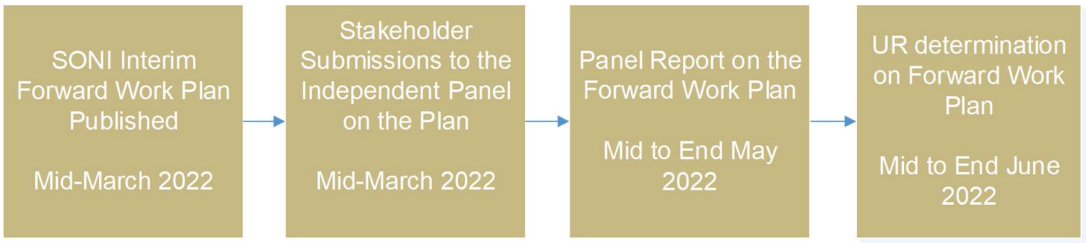


Figure 4: Transitional year requirements



Role 1: System Operation and Adequacy

1. Overview

SONI's most critical role is to ensure that the supply and demand on the electricity system in Northern Ireland remains in balance at all times, and that the ability to maintain this balance continues into the future. While this underpins all of the services that SONI provides, we have divided the principal activities associated with maintaining this balance of System Operation and Adequacy into two services:

- Scheduling and Dispatch; and
- Ensuring System Adequacy.

1.1 Layout of Role 1

The SONI TSO Forward Work Plan is comprised of a number of chapters and appendices. To aid with the review of our plan, we have provided an overview of the chapter below, with the relevant section headings

1.2 Section Overview

Role 1: System Operation and Adequacy

- **Scheduling and Dispatch Overview**
  - Least Cost Deviation
  - Priority Dispatch
  - System Security and Safety
  - Forecasting Demand and Intermittent Generation
  - Common Grid Model
  - Provision of IT and Telecoms for Forecasting and System Scheduling and Dispatch
- **Ensuring System Adequacy Overview**
  - Capacity & Capacity Market Delivery
  - System Services, System Services Market, Procurement and Performance Monitoring
  - Facilitation of Renewable Generation
  - Outage Planning
  - Emergency Preparedness and Blackstart
  - Protection Policy and Operations
- **SONI Key Performance Indicators for Role 1**
- **SONI Deliverables for Role 1**
- **SONI Stakeholder Engagement for Role 1**
- **SONI Performance against Regulatory Criteria**
  - **Outcomes**
  - **Ambition**
  - **Accountability**
  - **Alignment to the UR Priorities**

System Operation and Adequacy

Our TSO role in System Operation and Adequacy is comprised of two areas: Scheduling and Dispatch and Ensuring System Adequacy. We have highlighted below the key activities that we will be undertaking during the period and expand on these further within the section and also in the section on SONI Deliverables.

Within each section, we have identified the work we do in this area, how we carry out these activities, also identify the key activities over the period and the key performance indicators which will be used to measure our success in each service area.

Scheduling and Dispatch

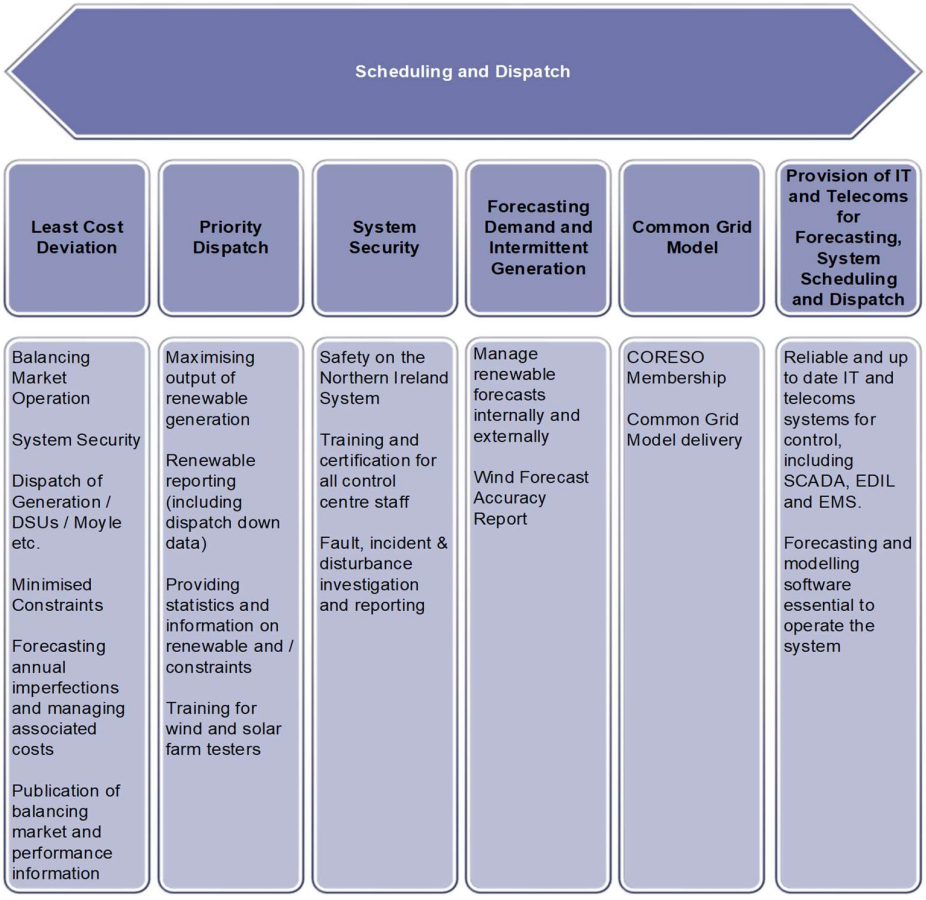
1. Overview

SONI controls the balance of generation and demand for electricity in Northern Ireland. This requires SONI to predict demand and to ensure that generation meets that demand (or demand reduction services are used) to ensure a safe and stable supply of electricity.

SONI considers a number of factors within this process. These include:

- The ability of the available generation to increase to match changes in demand or intermittent generation;
- The need to maximise the use of priority dispatch generation;
- The cost of changing the generation output away from those determined by the day ahead and intra-day markets for wholesale electricity across the island;
- Maintaining voltages within the statutory limits;
- The need to facilitate outages on the transmission network and for generator maintenance;
- Ensuring the dynamic and transient stability of the system; and
- The overall security of the network.

The key service areas and activities associated with this role are summarised in the table below. We have provided more detailed information on each of these areas below.



2. Least Cost Deviation

What SONI does
Under the least cost deviation service area SONI conducts work across six operational areas. These are:

- Balancing Market Operation
- System Security
- Dispatch of Generation / DSU's / Moyle
- Minimised Constraints;
- Forecasting Annual Imperfections and Managing Associated Costs; and
- Publication of Balancing Market and Performance Information

The scheduling and dispatch processes are built around the Balancing Market. This is the sole mechanism by which we schedule and dispatch units to manage operational security constraints (including the provision of System Services), maximise priority dispatch generation and efficiently operate the balancing market.

We have an obligation under our Licence to establish and operate a merit order system for the Balancing Market which will take account of the objectives set out in our Licence. SONI's TSO Licence requires us to take into account the following objectives:

- minimising the cost of diverging from physical notifications;
- as far as practical, enabling the Ex-Ante Market to resolve energy imbalances; and
- as far as practical, minimising the cost of non-energy actions.

The Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing includes the establishment of common principles for the procurement and settlement of frequency containment reserves, frequency restoration reserves and replacement reserves and a common methodology for the activation of frequency restoration reserves and replacement reserves.

SONI ultimately has an obligation to ensure we provide a reliable and safe transmission system. SONI, in conjunction with EirGrid, publish the Balancing Market Principles Statement [5] which describes how we discharge our obligations with regards to the Balancing Market, Merit Order decisions and system security.

We are responsible for ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity, operating, maintaining and developing under economic conditions secure, reliable and efficient transmission systems with due regard to the environment, contributing to security of supply through adequate transmission capacity and system reliability, and ensuring a secure, reliable and efficient electricity system.

Our obligations in respect of ensuring operational security are further defined in our Licence, the TSC and the Grid Code, and therefore form a key part of the scheduling and dispatch process.

[5] https://www.soni.ltd.uk/media/documents/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf

Through analysis of forecast conditions and scenarios we define system security constraints that set limits within the scheduling process. Each constraint type is assigned a constraint violation cost which is incurred if the constraint is breached within the scheduling optimisation. This cost deters the optimisation from breaching a constraint as to do so would result in a higher apparent cost within the optimisation. These constraint violation costs are parameters within the optimisation that we tune to give effect to each constraint. In principle all constraints are absolute requirements which must be respected.

This process captures the majority of power system security issues and ensures our schedules are secure. However, to account for real-time system conditions we also continuously monitor the status of the system to determine other potential security issues (e.g. that might arise following the trip of a unit or transmission circuit). Our real-time dispatch takes into account this real-time security assessment to ensure that operational security is maintained

How SONI does this

SONI is audited by an independent external auditor, whose audit report is published on the SONI website[6] to validate that system security is maintained at all times. We have set a target for 2021/22 that the System Minutes Lost will remain below the threshold[7]. SONI will implement the changes highlighted from the Scheduling and Dispatch Audit Recommendations in order to enhance our activities in this area.

These also include performance measures as detailed in the Balancing Market Principles Statement[8] ("BMPS") which is consulted on annually. A consultation is scheduled during Spring 2022 for the next revision of the BMPS, where SONI will take into consideration feedback from stakeholders prior to a final version being provided to the UR for final approval.

Alongside the BMPS, SONI also publish a variety of reports in order to ensure stakeholders are fully informed within this area. These include:

- All Island Transmission System Performance Report[9];
- All Island Generation Capacity Statement[10]; and
- All Island Winter outlook[11].

The All Island Transmission System Performance Report includes transmission system data and performance statistics which are key to ensuring that stakeholders are informed and measure our success in achieving our decarbonisation targets. We will have a strong focus towards our 75% SNSP trials which are ongoing, Low Carbon Inertia Services, and Minimum Number of Conventional Generation Units, which are key to ensuring we achieve our decarbonisation outcome.

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[6] https://www.soni.ltd.uk/media/documents/Independent-Assurance-Report-on-compliance-with-specified-elements-of-the-Scheduling-and-Dispatch-process-for-the-period-ended-31-December-2020.pdf

[7] See Section on Key Performance Indicators

[8] https://www.soni.ltd.uk/media/documents/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf

[9] https://www.soni.ltd.uk/media/documents/All-Island-Transmission-System-Performance-Report-2020.pdf

[10] 208281-All-Island-Generation-Capacity-Statement-LR13A.pdf (soni.ltd.uk)

[11] https://www.soni.ltd.uk/media/documents/Winter-Outlook-2021-2022.pdf

The All Island Transmission System Performance Report will be published in the summer 2022.

The annual All-Island Generation Capacity Statement published by SONI presents information on generation adequacy studies that assess the balance between supply and demand over the next ten years. SONI is aiming to publish the next GCS 2022-2031 during early Summer 2022, subject to regulatory approval.

The Winter Outlook presents a more detailed view focusing on the upcoming winter in Northern Ireland. This document is published annually in October and helps inform the electricity industry and supports preparation for the coming months. We study the expected generation capacity and the forecast demand to determine if there is adequate generation capacity margin.

SONI also jointly (with EirGrid) produces a number of publications which are made available on the TSO section of the SEMO website, alongside the SONI website. These are detailed in Section 6 of the Balancing Market Principles Statement[12]. SONI will continue to provide accurate and timely information for the weekly publication of the Operational Constraints Updates.

SONI TSO licence requires that constraints are appropriately scheduled and dispatched. To alleviate any congested parts of the network, we may constrain generators to vary their output and optimize the flow of electricity in that area of the grid. Generators are compensated for being constrained through the Balancing Market. SONI regularly reviews the Transmission constraint groups to ensure they are relevant as required and update accordingly. This is an ongoing activity that will continue throughout the period.

SONI (and EirGrid) provide the Regulatory Authorities[13] (RAs) with forecast constraint costs element of the total Imperfections revenue requirement for each tariff year, including the results of the forecast costs from the PLEXOS model, in addition to the supplementary modelling. We also collaborate with EirGrid in the provision of quarterly reports to the RAs so they can have summary visibility of the actual imperfections costs versus the forecasts.

Dispatch Balancing Costs (DBC) refers to a number of payments related to how generators are instructed. They include Constraint Payments, Uninstructed Imbalance Payments and Generator Testing Charges. The Transmission System Operators (TSOs) are responsible for forecasting and managing Dispatch Balancing Costs.

The costs are recovered through the Imperfections Charge, which is levied on suppliers in the Single Electricity Market (SEM) by SEMO. The Imperfections Charge also recovers the net cost of energy imbalances and Make Whole Payments.

Imperfection costs[14] are an inherent feature of the SEM design and arise due to the difference between ex-ante market schedule and real-time dispatch. This is an all island design and as such these costs are in Euro. EirGrid and SONI, as Transmission System Operators (TSOs), are responsible for managing imperfection costs, through efficient dispatch of generation, whilst maintaining a secure electricity system.

[12] EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf
[13] The Utility Regulator and Commission for Regulation of Utilities
[14] Appendix 2 - Imperfections Reforecast Report.pdf (semcommittee.com)

Provisional Imperfections Charge for 2021/22 Tariff Year: The RAs proposed allowed revenue for the 2021/22 Tariff year is €341.01m. Allowing for the K factor adjustment, provides a total forecast Imperfections Charge of €330.83 million, which when divided by the forecast demand, of 36,000 GWh[15]. Any under or over recovery of Imperfections Costs in the 2021/22 tariff year will feed into the K factor of subsequent tariff years.

SONI will continue to adhere to our obligations with regard to imperfections costs, engagement with the Regulatory Authorities, the publication of the associated information as per our TSO Licence obligations. A key activity which SONI expects to impact on the DBC is our Minimum Generation Requirements Study. More information on this is provided in the section, SONI Deliverables.

As detailed above, SONI will continue to ensure all relevant publications are made on time in an efficient and accurate manner in order to provide stakeholders with up to date information. A full list of the publications can be found in the Balancing Market Principles Statement and are repeated here for information.

[15] The TSOs forecast demand for the 2021/22 tariff year is 36,000 GWh, which represents a 7.1% increase from the 2020/21 forecast demand of 33,600 GWh

DEMAND DATA
Demand Forecast (ENTSO-E)
Demand Actual (ENTSO-E)
Demand Forecast (Market Data Static Report – SEMO website)
Demand Forecast (Market Data Dynamic Report – SEMO website)
Demand Actual (Smart Grid Dashboard)
Demand Forecast (BMI)

WIND DATA
Wind Forecast (ENTSO-E)
Wind Actual (ENTSO-E)
Wind Forecast (Smart Grid Dashboard)
Wind Actual (Smart Grid Dashboard)
Aggregated Wind Forecast (Market Data Static Report – SEMO website)
Aggregated Wind Forecast (Market Data Dynamic Report – SEMO Website)
Aggregated Wind Forecast (BMI)
Wind Forecast (BMI)
Wind Actual (BMI)

INDICATIVE OPERATIONS SCHEDULES
LTS Indicative Operations Schedules (Market Data Static Report – SEMO Website)
RTC Indicative Operations Schedules (Market Data Static Report – SEMO Website)
LTS Indicative Operations Schedules (BMI)
RTC Indicative Operations Schedules (BMI)
RTD Indicative Operations Schedules (BMI)
Information Note on the Indicative Operations Schedule and Dispatch (SEMO Website)

DISPATCH INSTRUCTIONS
Hourly Dispatch Instructions (Market Data Static Report – SEMO Website)
Daily Dispatch Instructions D+1 (Market Data Static Report – SEMO Website)
Daily Dispatch Instructions D+4 (Market Data Static Report – SEMO Website)
Hourly Dispatch Instructions (BMI)
Daily Dispatch Instructions D+1 (BMI)
Daily Dispatch Instructions D+4 (BMI)

OUTAGES
All Island Generation Outage Plan (TSO Responsibilities - SEM-O website)
Daily Generator and DSU Outage Schedules Report (BMI)
All Island Transmission Outage Programme (TSO Responsibilities - SEM-O website)
SONI Transmission Outage (Outage Information – SONI website)
Daily Transmission Outage Schedule Report (Market Data Static Report – SEMO Website)
Daily Transmission Outage Schedule Report (BMI)

CONSTRAINT REPORTS
Operational Constraints Update – monthly (SEMO website)
Operational Constraints Update – weekly (SEMO website)
Operational Constraints Update – ad hoc (SEMO website)
Information Note on Inter-Area Flow Constraints (TSO Responsibilities – SEMO website)
Information Note on Wind Dispatch Tool Constraint Groups (TSO Responsibilities – SEMO website)

OTHERS
Scheduling and Dispatch Policy Parameters (SEMO Website)
Daily System Shortfall Imbalance Index and Flattening Factor (SEMO Website)
Unit Under Test (Market Data Static and Dynamic Report – SEMO Website)
Unit Under Test (BMI)
North-South Tie Line and Moyle Interconnector Data (SONI Website)

One key programme of work we will undertake in this area involves the Moyle Controller Upgrade. This is expanded on further in the document within the Section on SONI Deliverables. SONI anticipates that the implementation of this programme will bring a variety of enhancements to our grid security outcome.

Key Activity: The key activities associated with the Least Cost Deviation service area are the Moyle Controller Upgrade as well as the implementation of the actions identified as a result of the Scheduling and Dispatch Annual Audit. These activities are expanded on further in the section SONI Deliverables.

Key Performance Indicator: In order to measure our success in this area we need to monitor certain metrics which we consider will be impacted by our activities and programmes of work within this service area. SONI has been responsive to the feedback provided by stakeholders to the UR on their Consultation for the Guidance on the Evaluative Performance Framework. Stakeholders indicated their preference towards certain metrics which they considered relevant to the role SONI plays. SONI has considered these metrics and believes that System Minutes Lost (SML) is the most appropriate metric to monitor our success in this area, alongside the associated timelines being achieved for the associated strategic initiative. This metric is expanded on in the section, SONI Key Performance Indicators within this role.

3. Priority Dispatch

What SONI does
Priority dispatch is the SONI Licence obligation to schedule and dispatch energy from renewable generators ahead of other generators as far as secure operation of the electricity system permits. The purpose of priority dispatch is to further the objective of the integration of renewable energy into the electricity system in order to promote sustainability and security of supply.

Priority dispatch generation is comprised of dispatchable units (e.g. hydro, CHP) and non-dispatchable (but generally controllable) units (wind and solar). Dispatchable units must submit their physical notification (PNs) and their priority dispatch status will apply to their physical notification quantities as far as the secure operation of the power system allows. Any availability above the PN'd quantity will not be treated as priority dispatch but in normal economic order. Non-dispatchable units may submit PNs however they will run to their actual availability subject only to operational security constraints. In the event of curtailment or constraint of non-dispatchable units being required, SONI issues control set-points to these units on a pro-rata basis – to all units for global system curtailment events or to a subset of units within a constraint group.

This area covering priority dispatch is considered to have four outputs:

- Maximising output of renewable generation;
- Renewable reporting;
- Providing statistics and information on renewables and constraint
- Training for wind and solar farm testers.

How SONI does this
We assign priority dispatch status in the scheduling and dispatch process by allocating a range of pre-determined negative decremental prices to the units defined as priority dispatch. These prices reflect their relative position in the priority dispatch hierarchy – the higher the priority the more negative the decremental price. Any submitted decremental price is substituted by this predefined priority dispatch price for the purpose of the optimisation however this replacement price does not feed into pricing or settlement. These negative decremental prices are tuned to account for potential conflicts with other constraints or the prices of other units.

We develop the schedule to ensure that sufficient 'room' is made available to accommodate priority dispatch generation (i.e. non priority dispatch units will have their output reduced or they may even be de-committed) and that sufficient System Services are scheduled to support system operation (such as the scheduling of sufficient inertia on the system to support the operation of the system during high wind conditions). Our dispatch objective is then to minimise any operational security related constraint or curtailment of priority dispatch sources.

With the ongoing energy transition, it is important that SONI carries out the key role of ensuring the transmission system can remain secure with an increased electricity from renewable sources. Our world leading 75% SNSP trial will play a vital role in assisting with maximising the output of renewable generation, ensuring that the transmission system can remain secure with an increased number of renewable generators on board and preparing for newer technology types connecting to the transmission system. This is a key element of supporting the delivery of the objectives and targets set out in the NI Energy Strategy.

In order to ensure stakeholders are fully informed and able to play their role within the energy transition, it is important that SONI continues to fulfil our obligations with regards renewable reporting and providing key information on renewables and constraint to all of our stakeholders as well as the UR.

As part of our Shaping Our Electricity Future consultation[16], a number of consultation responses highlighted the importance of renewable generation forecasts. Improved renewable generation forecasts can reduce the level of reserve services which need to be maintained by conventional units and can increase the level of renewable penetration on the all-island power system. SONI has been responsive to this feedback and publishes a variety of updates on our website, the Balancing Market Interface ("BMI") and the SEMO website in order to ensure stakeholders are fully informed. A full list of these publications, dashboard updates and reports can be found in the Balancing Market Principles Statement[17].

SONI also publishes an Annual Renewable Energy Constraint and Curtailment Report[18] on our website each year. It is prepared in collaboration with EirGrid, as TSO for Ireland, in order to cover the Northern Ireland, Ireland and the All-Island aspects of the electricity system.

The Annual Renewable Energy Constraint and Curtailment Report details the level of dispatch down energy for the year, as required under European[19] and Member State Legislation[20].

For the Priority Dispatch Service area, the most relevant strategic initiative is our programme which relates to the Clean Energy Package. We expect this programme to support our work to facilitate the decarbonisation of the electricity sector in Northern Ireland. However, this programme is at an early stage. Because the precise requirements are still to be finalised, we have not been in a position to develop a robust programme of activity at this stage. As such our main focus in this area will be engagement with the Regulatory Authorities and SEM Committee as they finalise their decisions and to subsequently develop a suitable programme of work

Key Activities: The key activities relevant to this service area are the work in SONI's 75% SNSP Trial, which will form part of our Operational Pillar of work detailed within the

[16] https://www.soni.ltd.uk/media/documents/Shaping-Our-Electricity-Future-SONI-Plain-English-Consultation-Report.pdf
[17] EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf
[18] The 2020 report can be found on the SONI website Annual Renewable Constraint and Curtailment Report 2017 (soni.ltd.uk)
[19] Article 16C of the 2009 Renewable Energy Directive (2009/28/EC) states: "If significant measures are taken to curtail the renewable energy sources in order to guarantee the security of the national electricity system and security of energy supply, Members States shall ensure that the responsible system operators report to the competent regulatory authority on those measures and indicate which corrective measures they intend to take in order to prevent inappropriate curtailments."
[20] Article 4.4 of Statutory Instrument 147 of 2011 states: "If significant measures are taken to curtail the renewable energy sources in order to guarantee the security of the electricity system and security of energy supply, the transmission system operator shall report to CRU on those measures and indicate which corrective measures it is intended to take in order to prevent inappropriate curtailments."

SONI Shaping Our Electricity Future Roadmap. These are expanded on further in the section, SONI Deliverables.

Key Performance Indicator: In order to measure our success, SONI has been responsive to stakeholder feedback and applied metrics which stakeholders viewed as relevant. SONI consider these to be Dispatch Down, System Non-Synchronous Penetration ("SNSP") and RES-E. These are expanded on further in the section, SONI Key Performance Indicators. Alongside these metrics as a measure of our success, SONI will also monitor our target timescales for implementation of these associated activities.

4. System Security and Safety

What SONI does
System security considers how SONI ensures we can operate the system within security limits. A critical and sometimes misunderstood aspect of electricity is that it is a basic need. It is a necessity to maintain our quality of life and the success of every aspect of our economy.

SONI has an obligation to ensure we provide a reliable and safe transmission system. SONI, in conjunction with EirGrid, published the Balancing Market Principles Statement[21] which describes how we discharge our obligations with regards to the Balancing Market, Merit Order decisions and system security.

It is evident that the power system technology mix is changing, and new challenges are emerging that must be tackled to ensure that we maintain power system reliability. In the past we have relied on fossil fuel-based power plants that offer dispatchable power to meet the needs of the power user. The reliability of the system was maintained by ensuring that there were enough dispatchable power plants to meet the peak demand of the system while considering the risk of failure of multiple plants for a given set of scenarios.

Looking forward, it is becoming apparent that electricity supply onto the grid is becoming more unpredictable (increasing difficulty to forecast when wind and solar resources will come on and how they will perform on the power system) and more variable (forecasting how much supply will be received from wind and solar resources at any point in time). We need to transform how we view power system security of supply and dimension the problem accordingly so that future risks and challenges are catered for.

Through analysis of forecast conditions and scenarios we define system security constraints that set limits within the scheduling process. Each constraint type is assigned a constraint violation cost which is incurred if the constraint is breached within the scheduling optimisation. This cost deters the optimisation from breaching a constraint as to do so would result in a higher apparent cost within the optimisation. These constraint violation costs are parameters within the optimisation that we tune to give effect to each constraint. In principle all constraints are absolute requirements which must be respected. This process captures the majority of power system security issues and ensures our schedules are secure. However, to account for real-time system conditions we also continuously monitor the status of the system to determine other potential security issues (e.g. that might arise following the trip of a unit or transmission circuit). Our real-time dispatch therefore takes into account this real-time security assessment to ensure that operational security is maintained.

The Transmission Operators work to ensure supply of power and system security to customers across the system in real time. That means they may have to dispatch or call in some power generators differently from the schedule in the wholesale power market. This is because of the technical realities of operating a dynamic and fast-changing power system, such as preventing overloads or maintaining enough generation reserve. It may also arise because of generator testing.

[21] EirGrid-and-SONI-Balancing-Market-Principles-Statement-V2.0.pdf (sem-o.com)

Where power stations are run differently from the market schedule, it is termed "constraint". Subject to the Trading and Settlement Code and Firm Access, Constraint payments keep generators financially neutral for the difference between the market schedule and what actually happened when generating units were dispatched.

Generators can be constrained 'on' or 'up', if the market schedule indicated they were to be run at lower levels than actually happened. Or they could be constrained 'down' or 'off' in they were to be run at a higher level than happened in reality. There is always an overall net cost to the system associated with constraints.

We also consider three other aspects to our role in System Security:

- Safety on the NI system;
- Training and certification for all control room staff; and
- Fault, incident and disturbance investigation and reporting.

Safety refers to a number of scenarios such as the transmission plant outages which are necessary to allow for the safe operation of work to be carried out, managing outages that are forced due to storms or faults and so forth. Ultimately, we are responsible for ensuring a safe and reliable transmission system. When we manage and develop the grid, we always follow health and safety standards. We operate under NIE Networks Safety Rules to ensure effective collaboration and working to the same high standards to ensure the protection of our workers and those who live or work near our lines.

SONI continuously reviews the training and certification of our staff as part of our processes and, as part of our control centre tools programme we will progress additional training of our staff in the operation of these new systems. Our control centre tools programme is planned to help us to manage the system and therefore bring enhancements to our system security.

Another aspect of system security is fault, incident and disturbance investigation and reporting. An incident is a system event that results in loss of supply. The criterion for reporting of incidents is specified in part 8, paragraph 33 of "The Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012[22]". SONI ensure we are compliant with these regulations by reporting on this in our annual All-Island Transmission System Performance Report[23] which is published on our website.

On the power grid, recording the events before, during and after a disturbance is often the only way to find out what has happened, and to reliably investigate a disturbance or event afterwards. Storing complete and reliable information about these disturbances on the Transmission Network system is accomplished by the disturbance recorder being installed on site, and, connected back to the control system via telecommunications circuits. SONI uses a combination of Operational Telecommunications Network (OTN) and 3rd Party telecommunication circuits to provide the telecoms connectivity back to the control room in Castlereagh to ensure the data is captured and stored, ensuring compliance with the Grid Code.

[22] https://www.legislation.gov.uk/nisr/2012/381/made
[23] https://www.soni.ltd.uk/media/documents/All-Island-Transmission-System-Performance-Report-2020.pdf

Data capture is also important for the Generator Performance Incentives, which are used to encourage good behaviour and therefore better service and lower costs for customers. We envision under System Security that our Control Centre Tools programme will bring enhancements to our system security.

How SONI does this
The DS3 Control Centre Tools project will deliver Enhanced Stability Analysis, Enhanced Voltage Control and Enhanced Frequency Management to the Control Centres. The functionality will be delivered by two independent decision-support tools - Look-Ahead Stability Assessment Tool (LSAT) and Voltage Trajectory Tool (VTT), the programme of activity is expanded on in this section in SONI Deliverables. This programme will be detailed as part of our Shaping Our Electricity Future Roadmap published in November 2021, and feature as a key area within our Operations Pillar of work.

We consider the key metric in system security is System Minutes Lost ("SML"). This metric represents the cumulative total of system minutes lost due to system quality. Another key measure of our success and our compliance in this area is system frequency. Our baseline performance and target performance expected as a result of implementing these programmes, is detailed further in the Section on SONI Key Performance Indicators.
Given the planned activities within System Security, SONI considers these will bring enhancements to our four SONI outcomes, in particular grid security.

Key Activity: The key activities which pertain to this role of System Security and Safety are the finalising and commissioning of the Control Centre Tools Programme which is key to ensuring we have the tools to manage the system, as well as SONI's 75% SNSP Trial which is important to ensure that we can manage the system with increased levels of RES integration. These are detailed further in the section, SONI Deliverables.

Key Performance Indicator: In order to measure our success within the service area of System Security and Safety we have been responsive to the metrics which stakeholders identified as relevant in the URs consultation on the EPF. These include System Minutes Lost and System Frequency which SONI considers most relevant to this area. Alongside these metrics we will also monitor our timescales for our associated programmes of work as a measure of our success. These are detailed further in the section SONI Key Performance Indicators.

5. Forecasting Demand and Intermittent Generation

What SONI does
Forecasting demand and intermittent generation is a key function that SONI performs which ensures that we are open and transparent with our stakeholders, ensuring we provide the relevant information to inform stakeholders across both short term and long term horizons.

Alongside forecasting and modelling in order to operate the system, SONI is also involved in the preparation and publication of the Generation Capacity Statement ("GCS"), and the Transmission Investment Programme ("TIP"). Forecasting and modelling play a critical function in SONI's day to day business activities and it is essential that we maintain these specialisms to a high standard for the benefit of our stakeholders, to ensure they remain fully informed.

SONI is required by Licence to produce an annual Generation Capacity Statement ("GCS"). In the GCS, a range of scenarios are detailed to forecast electricity demand over the time horizon of the report. We conduct adequacy assessment studies in order to model the generation portfolio against the demand forecast, using an accepted standard of risk. These studies are carried out separately for Ireland and Northern Ireland, and jointly on an All-Island basis with EirGrid, as TSO for Ireland. The findings, in terms of the overall demand and supply balance, are considered to be useful to market participants, regulatory authorities and policy makers.

How SONI does this
As part of our Shaping Our Electricity Future consultation[24], a number of consultation responses highlighted the importance of renewable generation forecasts. Improved renewable generation forecasts can reduce the level of reserve services which need to be maintained by conventional units and can increase the level of renewable penetration on the all-island power system.

SONI has provided the following publications for a number of years:

- Short-Term Demand Forecasting Methodology;
- Wind and Solar Forecasting Methodology;
- Demand Forecast (ENTSO-E);
- Demand Forecast (Smart Grid Dashboard);
- Demand Forecast (BMI);
- Wind Forecast (ENTSO-E);
- Wind Forecast (Smart Grid Dashboard);
- Wind Forecast (BMI);

Since 2019, SONI has made improvements in our Energy Management System (EMS) which we continue to implement and as such now also offer additional detail as follows:

- Demand Forecast (Market Data Static Report on SEM-O website);
- Demand Forecast (Market Data Dynamic Report on SEM-O website);
- Aggregated Wind Forecast (Market Data Static Report on SEM-O website);
- Aggregated Wind Forecast (Market Data Dynamic Report on SEM-O website);

[24] https://www.soni.ltd.uk/media/documents/Shaping-Our-Electricity-Future-SONI-Plain-English-Consultation-Report.pdf

- Aggregated Wind Forecast (BMI); and
- Wind Unit Forecast (BMI).

SONI also publishes a wind forecast accuracy report on our website where the system data is based on 30-minute average SCADA MW data.

In considering how we measure our success in this service area, SONI has been responsive to the feedback received by stakeholders in relation to the UR's consultation on the Guidance on the Evaluative Performance Framework. In their responses, stakeholders indicated the key performance indicators they considered relevant for inclusion in SONI's Forward Work Plan. One of these metrics is system minutes lost. SONI has therefore applied this metric, being the most relevant metric to the forecasting function, in order to measure our success within this service area.

Key Activity: A key activity within this service area will be the implementation of the Control Centre Tools Programme. This is expanded on further within the section, SONI Deliverables.

Key Performance Indicator: SONI has been responsive to the stakeholder feedback provided to the UR as part of their consultation to the Guidance on the Evaluative Performance Framework and the metrics which stakeholders considered relevant. After consideration, we believe the most relevant affected by this service area pertain to System Minutes Lost and the Imperfections Charge, and so these can each be used to measure our success in this area, alongside monitoring the delivery of our control centre tools programme to ensure this achieves the timescales advised (see SONI Deliverables).

6. Common Grid Model

What SONI does

The Common Grid Model ("CGM") is defined as a European Union-wide data set agreed between various Transmission System Operators ("TSOs") describing the main characteristic of the power system (generation, loads and grid topology) and rules for changing these characteristics during the capacity calculation process.
Activity associated with CGM is comprised of two areas:

- CORESO Membership; and
- Common Grid Model Delivery.

CGM is a prerequisite for any joint regional security evaluation and capacity calculation among the Transmission System Operators (TSOs) in the relevant system operation region.

The CGM is not only used for operational tasks but also for market and asset management/grid planning activities such as operational security calculations, capacity calculations and outage coordination.

Under this service area we also include SONI' CORESO Membership alongside the CGM Delivery.

The UR had progressed work on establishing the guideline on electricity transmission system operation (SOGL), in accordance with Article 67(1) and 70(1) of Commission Regulation (EU) 2017/1485 and received all the TSOs' proposals for a Common Grid Model Methodology (CGMM-v3) including SONI's. The UR approved SONI's proposals in September 2018.

How SONI does this

In order to meet European Network Code requirements, SONI must develop an Individual Grid Model (IGM) file which, in turn, will be leveraged to produce SONI's input to the pan-European Common Grid Model (CGM). The CGM files will contain operational power system data spanning time horizons from one year ahead to a day ahead represented in hourly intervals commencing and ending on the half hour. This will enable a range of long- and short-term capacity allocation analyses, operational security analyses, outage planning and grid maintenance planning at a pan-European level. During this price control period, we will deliver an upgrade to the Individual Grid Model Generator (IGMG) within the Energy Management System (EMS) to enable the automatic production of the IGM. In addition, we will work with our IT partners to design and deliver the new requirements to meet CGM requirements (i.e. to move the HVDC elements into a separate file, as per the recent CGM programme decision).

CGM is the system prerequisite to enable one-way communication and provision of IGMs to Regional Coordination Centres (RCCs). A separate, wide ranging, internal programme of work will be required to enable the implementation of the legally mandated RCC services; Coordinated Capacity Calculation (CCC), Coordinated Security Analysis (CSA), Outage Planning Coordination (OPC) and Short-Term Adequacy assessment (STA).

European regulations require SONI as TSO to provide a significant volume of transmission and market system data to ENTSO-E and ACER platforms. SONI provides substantial sets of information on the electricity grid and on the operation of the market to ENTSO-E

and ACER on an ongoing basis ranging in frequency from real time and hourly to annually. For example, ENTSO-E is expanding the set of information they require as part of their OPDE (Operational Planning Data Environment) tool. This includes IGM (Individual Grid Model) and CGM (Common Grid Model) data taken from the SONI EMS and includes details on Interconnector Flows, Generation Schedule, Forecast Demand, Constraints, Network Topology, Outages and Voltage and Regulation. As ENTSO-E and ACER requirements evolve, SONI should be in a position to respond in a timely manner. The work will involve enhancing the data interfaces and implementing new interfaces as prioritised by the business.

SONI's membership of CORESO is also a core activity within this service area and, within the context of Brexit, this has presented some challenges in understanding our future position and obligations within this area. However, as we operate an all-island market in collaboration with EirGrid, we expect to maintain our membership within this group.

In considering the above service area activities, the relevant programme of work is the Common Grid Model Programme, which is currently being developed. We anticipate this will evolve over 2022/2023.

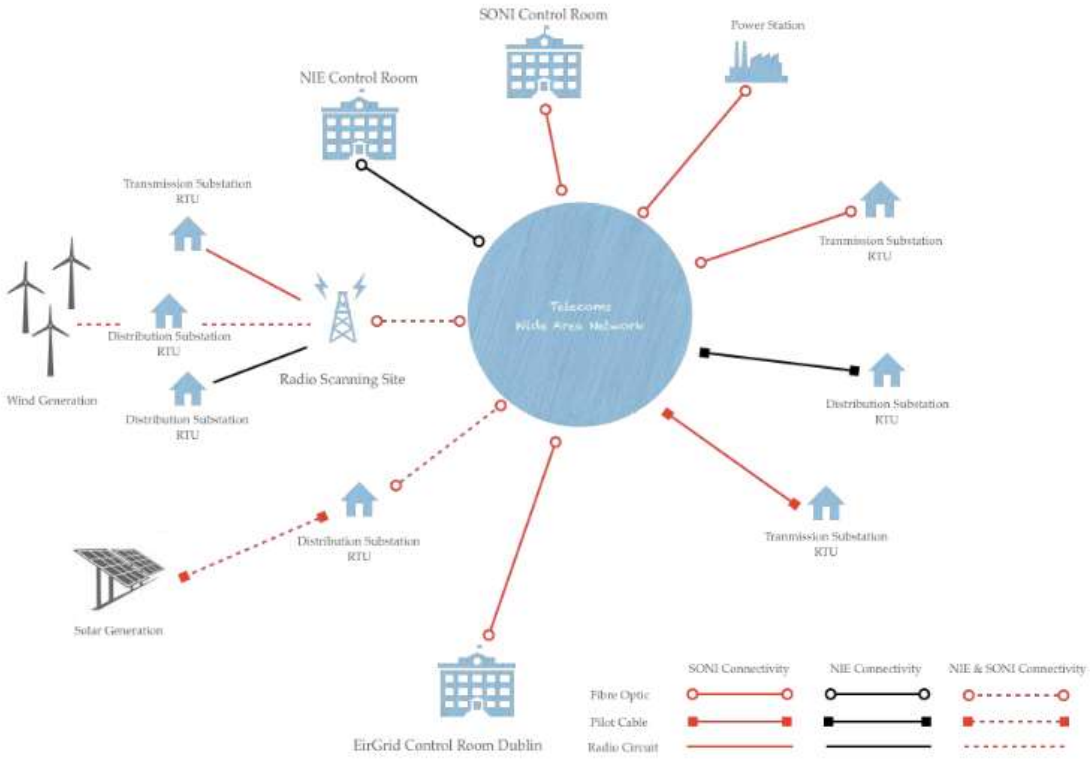
SONI have also given consideration around how we measure our success within this area. We consider this to be our implementation of the Common Grid Model Programme and ensuring we achieve, and endeavour to exceed, our timeframes for the delivery of this workstream.

Given the alignment the CGM service will bring to collaborating with other TSOs across Europe, we consider that the activities within this area will bring enhancements to our outcomes, in particular our SONI service quality and security of supply as we implement the same standard of operating across industry.

7. Provision of IT and Telecoms for Forecasting and System Scheduling and Dispatch

The Telecoms Network is made up assets owned by either NIE Networks or SONI that are installed in substations, control rooms, remote telecoms sites comprising of fibre optic cables, copper cables, radio links and telecoms equipment. The scope of the network is shown in Figure 5:

Figure 5: Network Illustration



The IT and telecoms provision include services provided to market participants and support on a 24/7 basis. The utilisation of our telecoms assets is based on industry best practice. While most of the telecoms services we use are shared with NIE Networks, some are also unique to SONI. These are procured separately in line with our corporate procurement approach.

This service area is comprised of two sub activities:

- Reliable & up to date IT & Telecoms systems for control, including SCADA, EDIL & EMS; and
- Forecasting & modelling software essential to operate the system

The integrated Energy Management System ("EMS") provides the SONI control room with visibility of the power system in Ireland and supports power system optimisation on an all-island basis through monitoring, control, dispatch, security/optimisation, forecasting, data logging and data reporting facilities. It also provides additional capability to manage the

transmission system from a single control room and dispatch of the generation and transmission systems to be conducted from one location.

Given the Telecoms Network is made up assets owned by either NIE Networks or SONI, ongoing engagement and collaboration with NIE Networks is essential in order to ensure a safe and resilient Transmission System. In addition, SONI is supporting the UR on its plans for the Telecoms assets to be moved from SONI to NIE Networks.

The inputs to the scheduling and dispatch process range from relatively static parameters, forecasts that extend over several days to continuously changing power system conditions. We publish a monthly Operational Constraints Update[25] to present the key system and generator constraints which are included in the scheduling process.

Prior to the start of each week we prepare a weekly forecast of expected constraints on the transmission system including requirements for System Services. These constraints and requirements, along with any updates arising from changes to forecast conditions and our continuous monitoring of the real-time status of the power system will form an input to each schedule.

Demand Forecast[26]: By 09:30 each day we prepare a four-day demand forecast at half hour resolution. This forecast is used in the LTS (Long-Term Scheduling). On a continuous basis we interpolate and blend this forecast with real-time demand conditions to form an input to the shorter term Real Time Commitment ("RTC") and Real Time Dispatch ("RTD") schedules.

Renewables Forecast[27]: Every six hours we prepare four-day renewables forecast, at fifteen-minute resolution. This forecast is then be interpolated and blended with real-time renewables conditions on a continuous basis to form an input to each scheduling run.

SONI's planned activities under its provision of IT and telecoms for forecasting, system scheduling and dispatch are expected to bring about a number of efficiencies and improve upon the accuracy which will be demonstrated through the various reports and updates that we provide in relation to forecasting on the Balancing Market Interface, SEM-O website and SONI website.

Given the increasing challenges presented with the number of units from renewable sources on the system, it is important that we implement these upgrades and replacements as they are now reaching the end of their life. To not progress with these planned activities would present a risk to the system security and operation of the Transmission System.

As the power system continues to decentralise, with increased amounts of small generation connecting to the distribution system, and recent Network Code determinations, SONI will need to ensure operational capability, including its modelling systems.

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[25] https://www.soni.ltd.uk/media/documents/Operational_Constraints_Update_May_2021.pdf
[26] Short-term Demand Forecasting Methodology for Scheduling and Dispatch' and the BP_SO_4.2_Demand Forecasting for Scheduling and Dispatch business process.
[27] Wind and Solar Forecasting Methodology for Scheduling and Dispatch' and BP_SO_4.3_Wind Balancing Market Principles Statement V4.0 14 October 2020 Page 70 Forecasting business process.

The EMS is a key enabler of all-island power system operation, providing the control centres with a single view of the power system and the ability to optimise capacity and flows accordingly in the best interests of customers. The current EMS is geared towards modelling and managing a relatively small number of large generation connections. The EMS modelling philosophy and capability of distributed generation needs to be developed taking account of EMS, MMS and other dependent systems.

EMS interfaces with wind are greater than for other generation types (dispatch instructions are included) and this could extend to other larger generators having dispatches modelled and managed in EMS also. A bespoke interface for dispatching wind has been developed but not for other generation types, nor for embedded (in distribution network) generation.

EMS is expected to be renewed to support the existing service level for EMS (99.95%) availability on annual basis and will ensure the continued delivery of 3 critical services:

- Real-Time SCADA & Communications
- Real-Time Situational Awareness
- Dispatch of Windfarms

SONI's planned activities under its provision of IT and telecoms for forecasting, system scheduling and dispatch are expected to bring about efficiencies in a number of areas, such as modelling, dispatch, demand forecasting, DSO interface, and the impact on End user prices. As such we consider our work in this area will bring about enhancements to each of the four SONI outcomes.

Key Activity: SONI considers the key activities taking place over the period for this service area to be our Telecommunications Programme and our workstream for End of Life Assets - EMS Upgrade. This are detailed further in the section, SONI Deliverables.

Key Performance Indicator: SONI has considered the metrics which stakeholders considered relevant for inclusion in the Evaluative Performance Framework alongside the work carried out within this service area and believe the key performance indicator for this area to be System Minutes Lost. This is detailed further in the section, SONI Key Performance Indicators. Alongside these KPIs, SONI will also monitor the timescales for the associated programmes of work as another measure of our success within this area.

Ensuring System Adequacy and Market Development

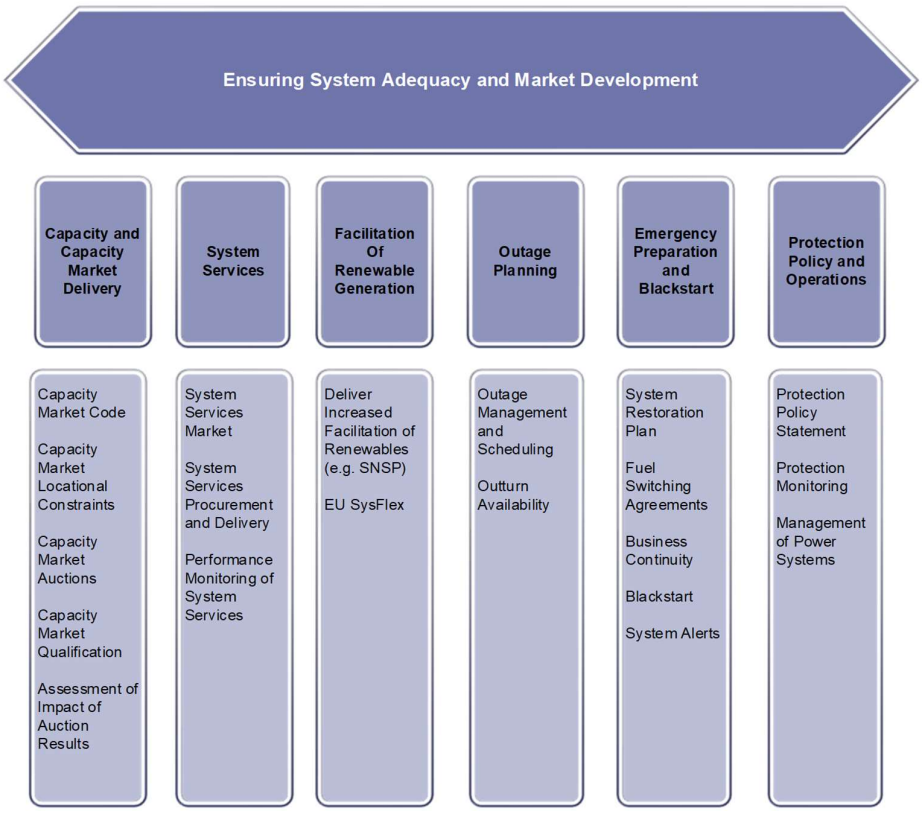
1. Overview

The objectives that SONI is meeting when it delivers this service are set out in its licence, in particular conditions 20, 21, 23A and 29. Obligations under the Grid Code, Northern Ireland Fuel Security Code and European Network Codes are also delivered through this service.

This service includes the delivery of the Capacity Market, procurement of System Services, emergency preparedness, outage planning, generation performance monitoring and maintenance of the transmission planning and security standards and operating security standards.

It is through this service that we address some of the core issues triggered by the energy policy objectives in renewable energy and the European internal energy market. These are resulting in a fundamental change to the generation portfolio and the operational characteristics of the power system.

Figure 6: Ensuring System Adequacy associated activities and outputs



2. Capacity and Capacity Market Delivery

What SONI does
The work that SONI has undertaken under the DS3 programme, and continues to deliver though its other innovation initiatives, aims to take innovative steps in a prudent manner, ensuring security of supply in maintained.

Within this service area, there is a key activity regarding the Capacity Market Code.

Capacity Auction work secures the volume of capacity required at competitive rates and 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;
- Entering into any Local Reserve Services Agreements (LRSA) that may be required should the auctions outcomes not provide enough System Services such as reserve or cannot accommodate outage situations that exceed those catered for through the planning and security standards.

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 are 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 assessment of Locational Capacity Constraints ("LCC") is against the latest version of the Ten Year Transmission Forecast System ("TYTFS") and Generation Capacity Statement ("GCS") and checks are completed beforehand to ensure their data inputs to the capacity related computations remain valid and correct.

The locational capacity assessment involves a number of steps that may be summarised as follows:

- High-Level Assessment of Transmission System Topography;
- Detailed Transmission Network Capacity Assessment:
- Identification of Constraint Areas; and
- Calculation of Minimum MW per Constraint Area.

Where the detailed network analysis is used to assess constraints on the meshed transmission network and identify their corresponding Capacity Constraint Areas, the minimum MW is determined by testing the required levels of generation necessary to mitigate those constraints. This is quantified though additional power flow simulations, where the simulations take the non-compliant cases and increase the generation within the identified area until the constraints are alleviated. Different constraints are more

onerous for different test cases and that the analysis will seek to ensure that the TSSPS is met for each of those test cases. The process is iterative and utilises the models and simulation tools made use of in the detailed network studies referred to above. The level at which the capacity constraints can be eliminated defines the minimum MW.

The capacity market auction associated activities are undertaken as obligated within the Capacity Market Code[28] and the associated CMC Agreed Procedure 3 Qualification and Auction process[29].

In the lead up to the Capacity Auction, there are a number of documents made available, including:

- Initial Auction Information Pack;
- Final Auction Information Pack;
- Notifications to advise stakeholders of the submission and completion dates for the capacity auction;
- Notifications of Capacity Auction Results and associated performance security terms requirements.

How SONI does this

SONI will continue to work with and support the RAs, Government Departments and TSOs to ensure that an adequate amount of capacity is maintained on the system for future years to cover periods of high system demand. As such, the delivery of the capacity market is key to ensuring this need is fulfilled at lowest cost to customers. The outputs of the capacity mechanisms have consequences for the system and market at large. SONI is therefore now required to undertake range of new activities as a result. These new tasks include: capacity market code secretariat; registration and qualification of participants; determining capacity requirements; identifying constrained areas; and assessing the impact of the auction outcomes.

The Capacity Market Code[30] forms part of the legal and regulatory framework that governs the Single Electricity Market ("SEM"). As TSO, we are responsible for maintaining the Capacity Market Code and for delivering a number of functions set out in the Trading and Settlement Code. It is essential that we provide additional governance and assurance to ensure that we are delivering the requirements of these codes in a reliable and transparent manner. The objectives of the Capacity Market Code are detailed further in paragraph A.1.2.1 of the Capacity Market Code.

A key activity that is underway is to prepare an updated version of the Capacity Market Code in order to take into account the recent modifications that have been proposed during the year. It is anticipated that the next version, version 6 of the CMC will be published within Q2 2022.

The Qualification Process under the Capacity Market Code consists of a number of stages as set out below:

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[28] https://www.sem-o.com/rules-and-modifications/capacity-market-modifications/market-rules/Capacity-Market-Code.docx

[29] https://www.sem-o.com/rules-and-modifications/capacity-market-modifications/market-rules/CMC-Agreed-Procedure-3-Qualification-and-Auction-Process.docx

[30] Capacity Market Rules (sem-o.com)

Throughout the Capacity Market Qualifications process, SONI is engaged with both participants and the Regulatory Authorities to ensure open and transparent communication throughout the process.

The Capacity Market Team engages with participants / RAs in the qualification process as follows:

- to notify the relevant Participant of their Provisional SO Qualification Decisions in respect of the Capacity Market Unit;
- to notify the Participant of the requirements under section E.7 of the Code that the Application for Qualification failed to satisfy should it be rejected;
- to submit to the Regulatory Authorities all the Provisional System Operator Qualification Decisions in relation to the Qualification Process in respect of the Capacity Auction;
- after the provisional qualifications result date, the results are published so they can be viewed by participants; and
- to review a rejection or provisional qualification decision as requested by a participant.

The Capacity Market team regularly engages with participants and the RAs throughout the year, mainly through the Capacity Market Board which meets on a weekly basis. This provides a forum to highlight any potential complexities and obtain feedback from the RAs on any key points of discussion. It allows SONI to interact with the RAs in an open and transparent manner whilst ensuring they are kept informed of the obligations that SONI is meeting and ensuring a safe and secure transmission system with security of supply.

Key to this area is our work in assessing and ensuring adequate security of supply in place for Northern Ireland. We work with EirGrid to produce a technical overview assessment of the all-island system requirements to the RAs, including:

- Whether the generation adequacy needs for each constraint area have been met;
- Whether the auction results give rise to any unexpected or localised technical issue on the island (e.g. an issue that did not meet the definition of "clear and significant" before the auction);
- Whether the auction results give rise to any concerns in relation to satisfying either local or all island System Services requirements; and
- Whether the auction results give rise to any other concern.

Over the period, our key activities will include the completion of the T-1 (22/23), T-3 (24/25) and T-4 (25/25) capacity auctions in Q1 2022 and Q2 2022, alongside the implementation of the capacity market qualification platform in Q1 2022.

Given our work in this area, SONI considers this should bring enhancements to our four SONI outcomes, in particular grid security.

Key Activity: To summarise, the key activities over the period will be our work and assessments continuing for Security of Supply Work. We also have a number of Capacity Auctions (T-1, T-3 & T-4) to occur over the period which are expected to be completed by Q2 2022 and we also will conduct a revision of the Capacity Market Code to version 6 to be published Q2 2022 to take into consideration recent modification proposals. These are expanded on further in the section, SONI Deliverables.

Key Performance Indicator: Our key measures of success within this area and associated programmes of work will be the completion of capacity auctions on time in line with the criteria identified above alongside meeting the associated timelines for publication of version 6.0 of CMC.

3. System Services, Market Design, Procurement and Associated Performance Monitoring

What SONI does

In response to binding national and European targets, SONI, as part of EirGrid Group, began a multi-year programme, “Delivering a Secure, Sustainable Electricity System” (“DS3”), in 2011 with the aim of meeting the challenges of operating the electricity system in a secure manner while achieving the 40% 2020 RES-E target. The DS3 Programme was designed to ensure that we could securely operate the power system with increasing amounts of variable non-synchronous renewables.

The DS3 Programme has been based around three pillars, each vital to the success of the programme: System Performance, System Policies and System Tools.

DS3 is not only about making the necessary operational changes to manage more renewables, it is also about the evolution of the wider electricity industry and implementing changes that benefit the end consumer, in terms of decarbonisation. From the onset, the integration of wind generation presented a range of challenges previously unseen in the power sector. Through collaboration with the Regulatory Authorities, the Distribution System Operators and the wider electricity industry, DS3 has developed several innovative and progressive solutions.

One of the key areas in the DS3 Programme is System Services, new arrangements for which were introduced in 2016. We want to make sure that the system operates securely and efficiently, while facilitating higher levels of renewable energy. To achieve this aim, we are working to obtain a range of services from as wide a pool of generators and market participants as possible. This includes the development of financial incentives for better plant performance. This should mean savings for the consumer and an increase in the levels of renewable energy we can accommodate at any given time

The SEM Committee recently consulted on the high-level design of new System Services arrangements for which go-live is planned for 1 May 2024. The aim of these new arrangements is to provide market-based procurement of System Services where appropriate but also to give the right investment signals to obtain the required capabilities to operate at higher levels of SNSP in the future to support delivery of the 2030 renewable electricity ambitions in Northern Ireland and Ireland. This will play an important part within our System Services Market Design.

Market Design

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

SONI has previously demonstrated the fundamental need to enhance the System Services arrangements to drive investment to solve a range of technical challenges arising out of the need to regularly operate the power system at higher levels of RES-E in real time. Our analysis of the challenges to operate up to 95% RES-E in real time shows that additional investment is required, and the operational challenges are more advanced than today where there is a real time operational limit of three quarters of the generation within the SEM coming from RES-E.

The existing System Services arrangements are designed to meet the 2020 renewable targets of 40% RES-E and will not be sufficient to deliver the needed capability to achieve the renewable targets of 70% of electricity from renewable sources set for 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 the Renewable Ambition. In addition, the procurement of System Services will need to be compatible with EU regulations.

Procurement and Delivery

In order to achieve the 2030 renewable generation policy ambitions, we have developed a programme of work which will enable us to enhance our system operations capability out to 2030. This Shaping Our Electricity Future Operations programme of work builds upon the programme of activity that was carried out as part of our DS3 Programme. By 2030, we are planning to be able to operate at System Non-Synchronous Penetration (SNSP) levels up to 95%. Achieving this level of renewable integration on a synchronous system is unprecedented and presents significant challenges for the real-time operation of the power system.

Through the DS3 Programme SONI, in conjunction with EirGrid, implemented a range of System Services, which are essential in helping both Northern Ireland and Ireland achieve high levels of SNSP. SONI has licence and statutory obligations to procure sufficient services to enable efficient, reliable and secure power system operation. The DS3 System Services arrangements define the standards to which service providers offer these on a commercial basis.

The TSOs have contracted for the provision of DS3 System Services from those technologies listed in Table 1 below.

Table 1: DS3 System Services providing Technologies

Type of Providing Unit	Technology Sub-Type
Conventional / Synchronous Generators	Thermal Hydro Pumped Storage Synchronous Compensator
Wind Farms	Wind
Interconnectors	Interconnector
Aggregators	Industrial Demand Side Unit (DSU) Aggregated Generation Unit (AGU)
Storage Units	Battery

4. Performance Monitoring

What SONI does
Performance reliability is a key aspect of the DS3 System Services arrangements. A unit that performs consistently when called upon to provide a service gives a greater degree of certainty to the TSOs than a unit that performs sporadically. The SEM Committee decision paper on DS3 System Services Procurement Design and Emerging Thinking[31] proposed that a performance scalar be introduced that rewards and incentivises high levels of performance as well as ensuring lower payments for lower levels of performance.

The performance monitoring of DS3 System Services consists of two processes:

- Performance assessment: the evaluation of a unit's actual achieved response to frequency events, voltage disturbances or dispatch instructions against its expected response to those triggers; in the future, performance assessment will also include an evaluation of a unit's availability to provide the services;
- Performance scalar: the calculation of a scaling factor, based on the outcomes of the performance assessments, between zero and one that is applied to a unit's monthly payment; where the value of the performance scalar is less than one, the unit will receive a reduced payment for that settlement month.

There are other related areas that include:
- Other System Charges;
- Generator Performance Incentives; and
- Testing and Commissioning, including of System Services Providers.

How SONI does this
SONI is planning to enact some enhancements to our business activities, which include programmes of work related to the Qualification Trial Process and Low Carbon Inertia Services. These activities will ensure that as the deployment of new technologies progresses with more renewable sources of electricity generation coming on to the transmission system, that the system remains safe, secure and reliable and that these technology types can be facilitated onto the transmission system. These activities are expanded on within this role in the section SONI Deliverables and will also be highlighted under our Operations pillar of work within out Shaping Our Electricity Future Roadmap.

The design and implementation of a new market is complex, and it takes time for the rules to be developed, agreed, and approved. Investors need time to understand how to operate and manage risk in the new construct. In our experience this process can take four years from inception to delivery of new investment. It will therefore be imperative to have an agreed design for future procurement arrangements delivered by SONI in conjunction with EirGrid and the RAs as soon as possible to meet the target of at least 70% of electricity from renewable sources by 2030. Such a design will need to specify the core functional requirements for future System Services procurement and be flexible to allow the

[31] SEM Committee Decision Paper on DS3 System Services Procurement Design and Emerging Thinking
https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14-108%20DS3%20System%20Services%20Decision%20Paper.pdf

integration of services when required. SONI is actively engaged with the RAs to understand the High Level Design (HLD) requirements.

Therefore, our main focus in this area is the Future Arrangements programme for System Services, which aims to deliver on the RAs programme of work as it evolves. This programme of work is expanded on in this role in the section SONI Deliverables.

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 due in December 2021 but has not yet been published. The next phase of the development of Future Arrangements (Detailed Design) is contingent on the publication of this decision. SONI has engaged with the RAs to provide all information requested to aid in the SEMC HLD decision making process.

In the future, it is expected that the TSOs will 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.

Performance monitoring of System Services is evolving as SONI gains operational experience. This evolution is documented and consulted on with customers via the DS3 Protocol. It is expected that there will be regular updates and consultations to this protocol. SONI is planning to launch a consultation in March 2022 regarding the DS3 Protocol. This will provide an opportunity for stakeholders to provide feedback on the proposed changes to the Protocol document. SONI will endeavour to be responsive to stakeholder feedback and will publish all non-confidential responses to the consultation as per our normal practice.

It is important that SONI measures success in these areas, to ensure we monitor the role we play within the energy transition to ensure we show progress in achieving our government targets. It is also important that we listen to our stakeholders with regards to the appropriate metrics. SONI has been responsive to the stakeholder feedback provided to the UR as part of their consultation on the Guidance on the Evaluative Performance Framework. SONI has considered the appropriateness of these suggested metrics against this service area and concluded that the most appropriate performance indicator for System Services, in delivering a secure and sustainable electricity system is RES-E, which goes hand in hand with SNSP. Our baseline performance for these metrics, alongside our target performance which considers improvements brought from these programmes of work, are detailed further within this role in the section, SONI Key Performance Indicators.

SONI considers work in this area will bring about enhancements to our four SONI outcomes, in particular SONI service quality in ensuring that we can procure contracts from more renewable generators as technology continues to advance in this area.

Key Activity: The key activities for System Services includes Future Arrangements as detailed above (and within the Markets pillar of our Shaping Our Electricity Future Roadmap), the close out of our DS3 Programme of works, our Qualification Trial Process and our activities regarding Low Carbon Inertia Services (as detailed within our Operational pillar of our Shaping Our Electricity Future Roadmap). In terms of Performance Monitoring of System Services, the key activity within this area, as

highlighted above, is our work on the DS3 Protocol Review & Consultation. These are expanded on further within the section, SONI Deliverables.

Key Performance Indicator: In order to measure our success in this service area, as advised above we have considered the metrics which stakeholders suggested as relevant and in the context of System Services we believe RES-E and SNSP to be appropriate measures of our success. These are expanded on further in the section, SONI Key Performance Indicators. We will also measure our success in this area, by monitoring our programme timelines to implement the key activity above, as well as consider the volume of responses to the consultation and the sentiment behind the responses in order to determine the quality of the consultation which will be put forward in Q2 2022.

5. Facilitation of Renewable Generation

What SONI does
Tackling climate change means changing the way electricity is produced and used and, as the Electricity System Operator for Northern Ireland, SONI has a key role in this transformation.

This service area covers:

- Delivering increased facilitation of renewables and the associated change in policies, operating standards and tools (e.g. SNSP);
-

In April 2018, SONI announced that we had successfully developed the capability to operate the power system with up to 65% of variable renewable energy at any time. This was predominantly made up of wind power, and the all-island power system was the first in the world to reach this level of renewable power, making this a ground-breaking achievement.

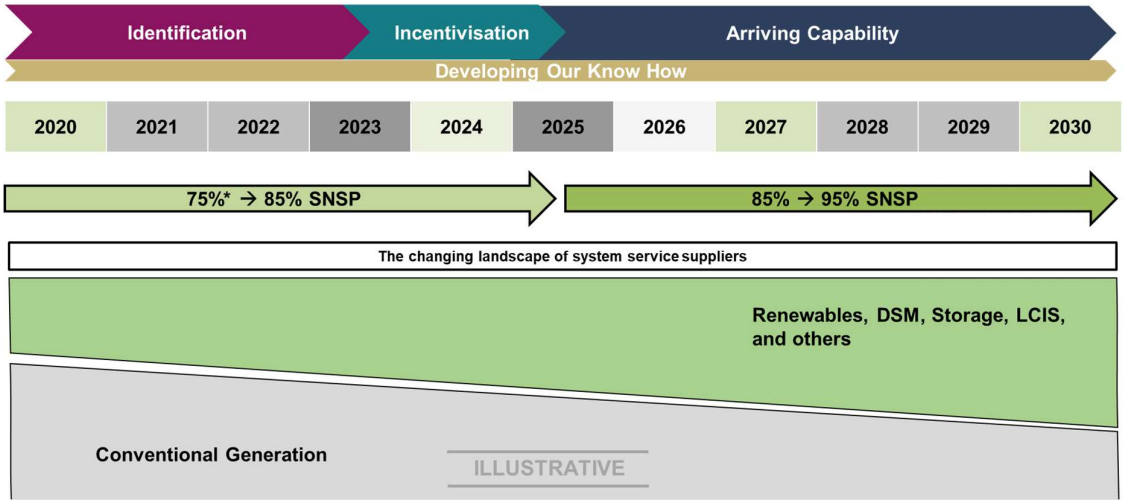
This represented a significant milestone and demonstrates SONI's continued drive to integrate more renewable generation onto the power system.

This drive did not cease at achieving 65% System Non-Synchronous Penetration (SNSP). SONI managed to increase this operational limit from 65% SNSP to 70% SNSP following an operational trial in 2021 and we are currently undertaking a further trial of operation at 75% SNSP which we expect to successfully conclude in March 2022.

How does this
SONI is committed to transforming the power system for future generations, and as such, we continue to maintain our commitment to continue our success with regards to SNSP. As already stated, we are currently conducting a 75% SNSP operational trial with a plan to increase this further to 85% by 2025 with an overall plan to achieve 95% SNSP by 2030.

To achieve at least 70% renewables, we must evolve our proven practices of system operation even further to allow operation at 95% System Non-Synchronous Penetration (SNSP) by 2030. Enhancements to current operational policies, electricity market rules, together with support from regulators and government bodies will be needed to allow us to bring online and operate the appropriate resources on the system in a timely and efficient manner.

Figure 7: Operational Transition to 2030



Ultimately, continued secure operation of the power system is critical. We are currently trialling operation of the power system with System Non-Synchronous Penetration (SNSP) levels of up to 75% and Rate of Change of Frequency (RoCoF) up to 1.0 Hz/s. Satisfactory completion of these trials (expected in Q1 2022) to demonstrate our capability to operate the power system securely at these levels will form the basis of further changes to our operational practices to achieve our 2030 targets. This is captured under our workstream to close out the DS3 programme of work, expanded on further within this role in the section SONI Deliverables.

The current maximum SNSP level facilitated by existing system operations capability is 75%[32]. By 2030, we are planning to be able to operate at SNSP levels up to 95%, to have a reduced Inertia Floor (reduction from the current floor of 23,000 MWs), to have implemented a secure RoCoF limit of 1 Hz/s (an operational trial is currently underway and expected to run until Q1 2022) and to have a significantly reduced Minimum Number of Large Synchronous Units requirement (the current requirement is to keep 8 large conventional synchronous units synchronised across the island, 3 of which are required to be in Northern Ireland). The purpose of evolving these, and other, operational metrics is to facilitate a reduction in the minimum level of conventional synchronous generation (in MW terms) required on the system.

In 2017 SONI joined a consortium of TSOs, led by EirGrid, in launching EU-SysFlex, a new EU Horizon 2020 project. This project is considering the integration of renewables, subsequent to DS3 timescales (out to 2030), the technical scarcities which will be encountered, and the solutions to these challenges. SONI is leading a significant work package within the project, looking at future controls for operation of the system with very high levels of renewables.

Under the EU-SysFlex Project, SONI, in conjunction with EirGrid, is responsible for identifying key barriers and solutions to renewable integration. In delivering this task, co-operation and engagement with NIE Networks is essential – hence the development of

32 A 75% SNSP trial commenced on 22 April and is expected to run until Q1 2022

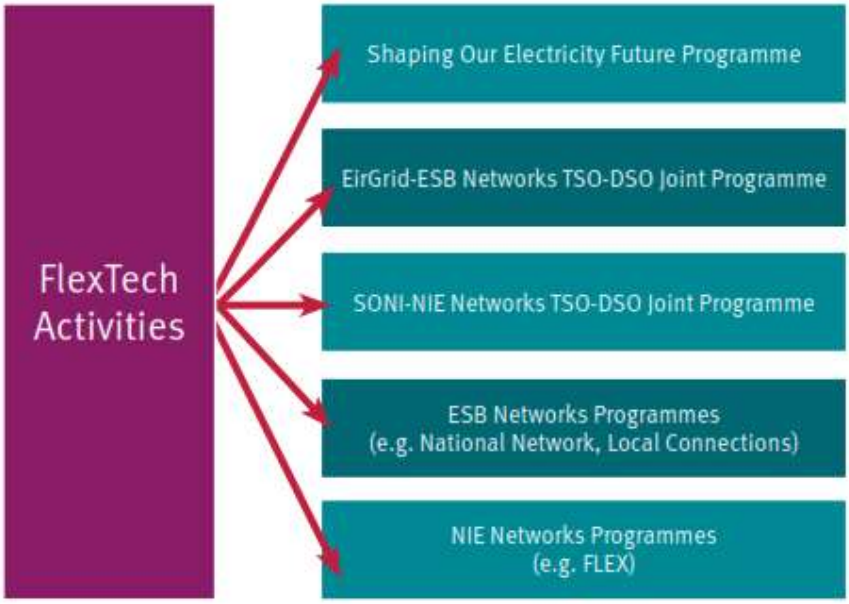
the FlexTech Initiative. This initiative was our answer to addressing this need by providing a structured platform of engagement with our stakeholders.

One of the key outputs of the FlexTech initiative is to inform future Qualification Trial Processes (QTP), which determines what technologies should be trialled and which prove capable of providing the required flexibility. While the QTP process is operated and governed under the DS3 programme[33], its learning and outcomes provide key insights to the EU-SysFlex Project

Through the Shaping Our Electricity Future initiative, EirGrid and SONI is integrating our broader 2030 networks, markets, engagement and system operations plans into a single overarching programme of work with associated governance arrangements. In addition, we have developed and are continuing to refine a separate committed TSO-DSO programme of work with NIE Networks in Northern Ireland.

In that context, we consider that delivery of the strategic priorities identified in the 2020 FlexTech Response to Consultation would be better achieved by integrating the various FlexTech activities into this and other established programmes as set out in Figure 8. For clarity, while we will no longer manage activities under the FlexTech governance arrangements nor use the FlexTech brand, we remain firmly committed to delivering on FlexTech's objective of removing barriers to the integration of new technologies at scale.

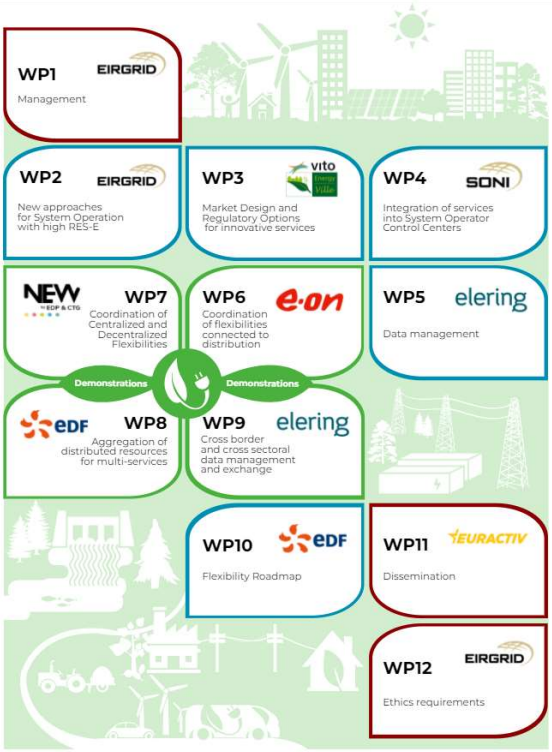
Figure 8: Integration of FlexTech activities into established programmes of work



The EU-SysFlex project is structured into eleven work packages, covering different aspects of the innovation process, from the development of new approaches for integration of large-scale renewable energy, to testing pilot installations, to analysis of regulatory requirements, development of viable business models, and policy recommendations, see Figure 9 below.

[33] Governance of the QTP is expected to transfer in the future from the DS3 Programme (which is expected to close out in 2022) to the Shaping Our Electricity Future Operational programme.

Figure 9 Overview of EU SysFlex Workstream (From EU Sysflex Website[34])



As shown in Figure 9, SONI is responsible for the work plan 4, "Integration of services into System Operator Control Centres[35]".

Work Package 4 will develop tools and procedures to equip System Operators with the new operating practices as required by the introduction of new System Services. For that, it will develop:

- New operator scheduling and decision support tools for innovative System Services
- A Dispatch Trainer Simulator (DTS) of a significant part of the Continental Europe network with high RES-E and extensive use of new technologies providing System Services
- A Qualification Trial Process (QTP) to demonstrate the ability of a range of technologies to provide System Services (see Section SONI Deliverables)
- Operator protocols to meet specific system and market conditions, which is a key input into the Flexibility Roadmap in Work Package 10

The DTS will run high RES-E scenarios developed in Work Package 2 and model the System Services functionality of the demonstration projects in Work Packages 6-8 and the QTP. SONI will work in collaboration with TSO operators from across Europe to explore the challenges in training the operators of the future, including cross border and TSO-DSO coordination.

[34] Structure of the project – EU-SysFlex
[35] WP4: Simulation of the integration of new system services into System Operator control centres – EU-SysFlex

SONI considers that our activities within this service area will bring about enhancements to our four SONI outcomes, such as decarbonisation. We have also given consideration as to how we will measure our success in this area, apart from monitoring the timescales involved in the associated programmes of work with the close out of the DS3 workstream, mentioned above, and ensuring they are completed on time, or exceed the timescales by making efficiencies without any additional significant costs. SONI has been responsive to stakeholder feedback in considering this additional measure of success, as detailed throughout out forward work plan, and determined that RES-E and SNSP are appropriate measures of success within the facilitation of renewable generation workstream. Within this role we have detailed a section, SONI Key Performance Indicators, which expands further on our baseline performance and the associated target performance which has been targeted based on the enhancements we consider our work within this role will bring.

Key Activity: The key activity within this service area is considered to be the DS3 Programme Close Out activities which forms part of our Operational pillar of our Shaping Our Electricity Future Roadmap. This is expanded on further within the section, SONI Deliverables.

Key Performance Indicator: As detailed above, we consider the relevant measures of our success to be the RES-E and SNSP metrics. We will monitor the impact our activities have on these metrics, alongside the timeframes to complete any associated programme of works as detailed within this service area, as a measure of our success.

6. Outage Planning

What SONI does
Transmission outage planning is a key enabler for the delivery of electricity infrastructure and ensuring that generation units can be maintained and optimised with maintenance of the grid and generation units. The availability of sufficient outages is a fundamental part of the programme of works for delivering network reinforcements across Northern Ireland. This is a key constraint that has to be managed both before and during project delivery.

Stakeholder feedback from our Shaping Our Electricity Future consultation indicated that some industry respondents questioned the operational impacts of outages needed to implement transmission system reinforcements. SONI recognise that the scale and quantity of network reinforcements needed to achieve the energy transition will increase challenges related to management of planned outages and gaining access to the transmission network to perform works. The increased demand for reinforcement outages must be managed along with demands for maintenance driven outages.

How SONI does this
In Northern Ireland, to manage the uprate programme of works that are required, there will be a need to carefully schedule the transmission outage programmes of work in the North West region over the years out to 2030. SONI and NIE Networks will continue to work closely to deliver the outage programme and in turn the grid delivery programme as effectively and efficiently as possible.

- The Outage Planning area also looks at:
- Outage management and scheduling looking 3 years ahead and produced each year;
- Outturn availability tracking and reporting

It is important that the control room have up to date and efficient systems in order to manage outages accordingly and our continued collaboration with NIE Networks as Distribution System Operator and Transmission Owner that we are aware of any planned work to take place to ensure we manage outages safely and efficiently to protect the lives of those working on the system.

It is important that we can measure our success in this area so we can track our progress in achieving our target performance. We consider that System Minutes Lost is the most relevant performance indicator for this service area, and we advise on it in more detail around the baseline performance and target we are aiming for in considering our activities in this role in the section SONI Key Performance Indicators.

Key Activity: SONI considers our relevant programme of work to be Control Centre Tools workstream, which is aligned to our Operational Tools workstream in the Operations Pillar of our Shaping Our Electricity Future Roadmap. This is expanded on further in the section, SONI Deliverables.

Key Performance Indicator: In order to measure success in this area, we will monitor our metrics for System Minutes Lost and System Availability, which are considered most relevant to outage planning. We will also monitor our timelines for any associated programmes as detailed in the key activity area above, in order to ensure we meet our planned timelines and endeavour to make efficiencies where possible.

7. Emergency Preparedness and Black Start

What SONI does

SONI as the system operator is committed to keeping key parties informed of key incidents and events on the system. This includes but is not limited to those times when there is a serious risk to security of supply. SONI has implemented a Power System Emergency Communication Plan which details the actions required to manage the sharing of information with key stakeholders during a power system emergency. This area covers a number of aspects including:

- System Restoration Plan;
- Fuel Switching Agreements;
- Business Continuity;
- Black Start and Emergency Communications Exercises; and
- System Alerts.

The European Commission Regulation (EU) 2017/2196 establishing a network code on emergency and restoration (NCER) sets out rules relating to the management of the electricity transmission system in the alert, emergency, blackout and restoration states with the main objective of a reliable, efficient and fast restoration of the transmission system back to its normal state. The responsibility to ensure operational security is also provided for in national legislation, namely Article 12 of the Electricity (Northern Ireland) Order 1992.

The System Restoration Plan[36] is a document covering the steps taken to produce a Power System Restoration Plan (PSRP), which details the actions the Grid Control Engineers must take to restore the power system following a total or partial black out.

SONI has had a Restoration Plan in place for many years. In the wake of the new Network Code requirements on Emergency and Restoration (NCER), the Power System Restoration Plan (PSRP) was revised in 2020.

How SONI does this

SONI continuously reviews our system restoration plan. This ensures a properly resourced response, organised in relation to any incident and led by a manager of appropriate seniority.

A Power System Restoration Plan ("PSRP") is traditionally developed by system operators for laying out relevant guidelines and procedures for system restoration in the unlikely event of a blackout. The underlying principle of the PSRP is to use generation stations that can be started without an external power supply in order to energise other parts of the transmission system, including larger 'target' generators.

A variety of changes that are expected to occur in the all-island power system over the current decade can affect the respective PSRPs. In order to successfully accommodate and manage these changes, significant efforts will need to be put in place in several areas pertaining to system restoration, including: black start contracting, black start capability and islanding testing, voltage and reactive power management during re-energisation, performing appropriate Electromagnetic Transients ("EMT") and (Root Mean Square)

[36] SONI_System_Restoration_Plan_NorthernIreland.pdf

RMS re-energisation studies, as well as updating/approving the PSRP along with its implementation in the control room.

SONI is planning to conduct a technical assessment of the 2030 study outcomes, in order to identify potential solutions for mitigating technical challenges which may arise from high RES-E penetration. SONI intends to publish this report on our website towards the end of 2021.

In addition, we have implemented a Power System Emergency Communications Plan which details the actions required to manage the sharing of information with key stakeholders during a power system emergency. The primary focus of the plan is to alleviate concerns and maintain confidence to external parties that the system is currently being restored to its pre-incident state in accordance with agreed and well-practiced guidelines.

SONI, in conjunction with EirGrid, is required to monitor and communicate the state of the Northern Ireland and Ireland transmission systems respectively. The System Operation Guideline (SO GL)[37] defines five system states and provides a set of criteria for each system state. Prior to the Network Codes coming into force, EirGrid and SONI had an established Alert system in place. In order to achieve compliance with the SO GL, the Ireland and Northern Ireland System Alerts were updated to align with the SO GL requirements.

The diagram below provides a simple overview of how we have aligned the System Alerts with the new SO GL system states.

Figure 10: Overview of System Alerts

The system states range from the normal state to increasing levels of system stress; Alert state (Amber alert); Emergency state (Red Alert); Blackout state (Blue Alert); and finally to a Restoration state which aims to bring the power system back to the Normal state. The SO GL criteria are largely related to operational security limits, such as frequency and voltage limits.

[37] COMMISSION REGULATION (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

When the system state deviates from “Normal” SONI must alert key stakeholders by issuing local and wide area alerts. Local alerts are issued using the energy management system, texts, or emails and are transmitted to centrally dispatched generators, demand side units and key stakeholders. Wide-area alerts are issued via the ENTSO-E Awareness System. In any alert situation Market Operations, CRU and UR are to be informed. Upon receipt of an alert the different parties implement their own procedures.

SONI is obligated, under Condition 29 of our TSO Licence, to facilitate any request from the relevant generator, to enter into a Fuel Switching Agreement[38]. Fuel switching agreements, set out the rights and obligations relating to all aspects of fuel switching that generators can avail of. They are relevant to those service providers that have the capability of switching from one fuel type to another to provide for the recovery of costs that are not recoverable through other mechanisms. The main benefit of the fuel switching modifications is enhanced security of supply for Northern Ireland in the event of primary fuel disruptions.

SONI as the system operator is committed to keeping key parties informed of key incidents and events on the system. This includes but is not limited to those times when there is a serious risk to security of supply.

In summary, SONI aims to deliver a quality, highly resilient service to the customers and stakeholders that we serve. Our Customer Relations Team aims to provide professional, reliable and efficient assistance and support to business and industry customers.

In considering what we are aiming to achieve within Emergency Preparedness and Blackstart as a service area, we believe the appropriate metric includes System Minutes Lost as a measure of our success, alongside system availability. This is expanded on further in this role in the section SONI Key Performance Indicators.

Key Activity: SONI considers the key activities over the period for this area to include Power System Restoration Plan Improvements, performing of the Annual Communications Exercise and the Analysis and Publication of our Technical Assessment of the 2030 study outcomes by Q1 2022.

Key Performance Indicator: For emergency preparedness we consider that System Minutes Lost and System Availability are the most appropriate measures of our success and ensuring these remain within the target range. More information on these measures can be found in the section SONI Key Performance Indicators within Role 1.

[38] Fuel-Switching-Agreement_template.pdf (soni.ltd.uk)

8. Protection Policy and Operations

The increasing mix of technology types and the increasing level of renewable energy on the system increase the importance of correct protection philosophy. This vital activity must be undertaken to secure the stability of the system and maintain safety.

Work in this area includes the Protection Policy and Philosophy, and fault monitoring and reporting. This involves close collaboration with NIE Networks in order to monitor the system performance which allows SONI to demonstrate our whole system approach, working cohesively with NIE Networks as protection policy and operations evolve.

An important activity over the coming period will be the engagement with NIE Networks in this area. SONI and NIE Networks will work to establish a sub-group of the TIA Planning Panel in order to analyse the impact of increased levels of renewable energy on the performance of protection systems. SONI will also support NIE Networks in its preparation for its RP7 price control because this is dependent on the recommendations that will arise from this workstream.

Key Activity: Establishment a sub-group of the TIA Planning Panel in cooperation with NIE Networks to analyse the impact of increased levels of renewable energy on the performance of protection systems and to develop recommendations on the most appropriate way forward. Engagement with NIE Networks on the development of protection policy changes required for further renewables integration excepted up to 2030. These activities form part of end to end TSO/TO approach to delivery which is under our Networks pillar within our Shaping Our Electricity Future Roadmap.

Key Performance Indicator: Ongoing availability of a fit for purpose Protection Philosophy and Policy.

SONI Key Performance Indicators for Role 1

It is important to SONI that we are able to monitor our success as detailed by the UR in their associated Guidance on the Evaluative Performance Framework. As such, and in line with the guidance, SONI has conducted a review of our baseline performance, using historic data available from the tariff year 2019/20 and compared these to our target performance for 2021/22 and detailed this in the table below.

These are key in terms of measuring our success and demonstrating our growth towards our shared renewable ambitions and government targets and set the path to achieving these.

Pertaining to Role 1 System Operation and Adequacy, these are detailed in the table below, alongside our 2021-2022 target metric. We expect to achieve these targets by implementing our planned activities as discussed in this paper, and these will contribute to a relevant performance indicator as detailed at the bottom of each section. As such, these activities will be critical to ensure that we achieve the targets as set out in this table.

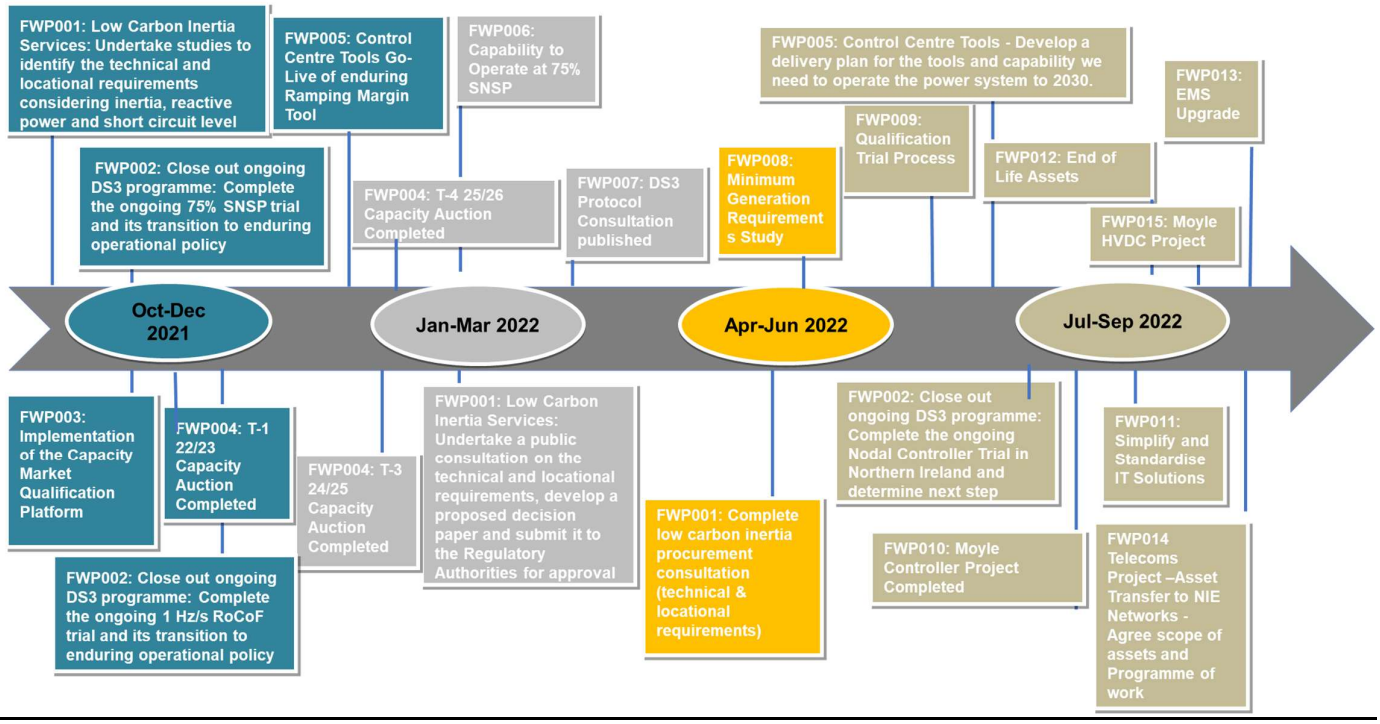
Table 2: Baseline Performance Versus Target for each Performance Indicator

Performance Indicator	Description	2019 Baseline	2021/22 Target
RES-E (%)	To increase the percentage of electricity from renewable sources in Northern Ireland.	39%	41%
SNSP (%)	To increase the maximum level of Synchronous Non-Synchronous Penetration (SNSP) that SONI will allow on the system at any one point in time	65%	75%
Renewable Dispatch Down (%)	To keep the average level of curtailment and constraint in Northern Ireland below a certain level.	10.7%	10%
System Minutes Lost (SML)	To keep this below a certain threshold each year.	Mean of 2012-18 2.231 SML	0.75 – 2.5 SML
System Frequency (%)	To ensure that SONI manages the system frequency within Grid Code requirements which states that target frequency is that Frequency determined by the TSO, in its reasonable opinion, as the desired operating Frequency of the Total System. This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by the TSO, in its reasonable opinion when this may be 49.90 or 50.10Hz.	99.66%	98%

SONI Deliverables for Role 1

Throughout this section, which covers System Operation and Adequacy, we have provided an overview of each area within the business which contributes to this role. At the end of each of these corresponding business areas, we have indicated the key strategic initiative or business improvement to be undertaken which we expect to result in improving the metrics provided in the previous section or enhance the four SONI outcomes. We have detailed below the associated programme of activities for each of these areas, alongside the benefits we anticipate it will bring and any corresponding performance indicator that we will use to measure our success.

SONI has reviewed our 2019 performance in relation to the System Operation and Adequacy role and considers that we have demonstrated significant improvement in comparison to the activities, engagement and publications we will provide over the coming period.



Low Carbon Inertia Services

<table>
<tr><td>Project ID</td><td>FWP001</td></tr>
<tr><td>Project Name</td><td>Low Carbon Inertia Services (LCIS)</td></tr>
<tr><td>Project Milestone to be Achieved</td><td>Identify needs for LCIS and their placement to provide sufficient kinetic energy (inertia), reactive power support, additional system strength (short circuit contribution) and synchronizing and damping torque to ensure secure and stable operation of the all-island power system with an 85% SNSP in 2026.</td></tr>
<tr><td>Project Description</td><td>The basis of this programme of work is to identify needs for LCIS and their placement to provide sufficient kinetic energy (inertia), reactive power support, additional system strength (short circuit contribution) and synchronizing and damping torque to ensure secure and stable operation of the all-island power system with an 85% SNSP in 2026. These studies form the backbone of the procurement of LCIS which paves the path towards the 2030 goal of 95% SNSP.

Table 3: Low Carbon Inertia Services Overview
<table><tr><th>Description</th><th>Start Date</th><th>Target Date</th></tr><tr><td>Share a plan for the identification of requirements and procurement of Low Carbon Inertia Services with stakeholders</td><td>Q4 2021</td><td>Q4 2021</td></tr><tr><td>Undertake studies to identify the technical and locational requirements considering inertia, reactive power and short circuit level</td><td>Q3 2021</td><td>Q1 2022</td></tr><tr><td>Undertake a public consultation on the technical and locational requirements, develop a proposed decision paper and submit it to the Regulatory Authorities for approval</td><td>Q1 2022</td><td>Q2 2022</td></tr><tr><td>Undertake a public consultation on the fixed term contracts, develop a proposed decision paper and submit it to the Regulatory Authorities for approval</td><td>Q3 2022</td><td>Q4 2022</td></tr></table>
These studies continue into 2022 and the final results will facilitate the delivery of the first LCIS consultation, providing signals for procurement of LCIS. Workshops to stakeholders will be delivered to support the LCIS consultation. Tools and methodologies that have been developed can be used for future projects. This programme of work forms part of our Operational pillar within our Shaping Our Electricity Future Roadmap.</td></tr>
<tr><td>Target Completion Date</td><td>As detailed above</td></tr>
<tr><td>Project Benefits</td><td>This programme is expected to bring enhancements in the future to our decarbonisation and grid security outcome.</td></tr>
</table>

Key Performance Indicator	This workstream plays an important role in ensuring that we can maintain a secure and stable transmission system with 85% SNSP in 2026, and as such our SNSP metric will be used to measure our success in this area, alongside monitoring the timeframes to complete this programme of work.

Close Out Ongoing DS3 Programme Operational Trials

<table>
<tr><td>Project ID</td><td>FWP002</td></tr>
<tr><td>Project Name</td><td>Close out of ongoing DS3 Programme Operational Trials</td></tr>
<tr><td>Project Milestone to be Achieved</td><td>Close out remaining operational trials per individual deliverables below.</td></tr>
<tr><td>Project Description</td><td>Our DS3 programme was a key enabler in achieving our 2020 RES-E target of at least 40%. The activities detailed below are the remaining phases of this programme before it is fully completed.

Table 4: Close Out DS3 Programme Trials
<table>
<tr><th>Description</th><th>Start Date</th><th>Target Date</th></tr>
<tr><td>Complete the ongoing 75% SNSP trial and its transition to enduring operational policy</td><td>Q2 2021</td><td>Q1 2022</td></tr>
<tr><td>Complete the ongoing 1 Hz/s RoCoF trial and its transition to enduring operational policy</td><td>Q2 2021</td><td>Q1 2022</td></tr>
<tr><td>Complete the ongoing Nodal Controller Trial in Northern Ireland and determine next step</td><td>ongoing</td><td>Q4 2022</td></tr>
</table>
This programme of work will form part of the implementation of our Operational pillar within our Shaping Our Electricity Future Roadmap.</td></tr>
<tr><td>Target Completion Date</td><td>As detailed above</td></tr>
<tr><td>Project Benefits</td><td>SONI considers that the activities within this area will contribute to enhancing our decarbonisation outcome.</td></tr>
<tr><td>Key Performance Indicator</td><td>We anticipate that, given the success the programme provided in achieving our RES-E targets, that this will continue throughout the conclusion of the programme. Therefore, our RES-E metric continues to play an important role in measuring our success in this programme of work, alongside monitoring our target dates to ensure these are met or if possible exceeded.</td></tr>
</table>

Implementation of the Capacity Market Qualification Platform

Project ID	FWP003
Project Name	Implementation of the Capacity Market Qualification Platform
Project Milestone to be Achieved	Develop an online Qualification hub to be used by market participants to complete their Application for Qualification for Capacity Auctions.
Project Description	The Capacity Market Enduring Solution requires an online-based solution that allows the Capacity Market Qualification process to be conducted in a fully auditable environment, and to make the results of the qualification and auctions available at key stages. The enduring solution will be based on the functionality and learnings from our current Capacity Market current Qualification process. It will be used by both external and internal SONI users to enter, submit, view and update applications – as well as run auctions based on the data of the "qualified" participants. The steps involved in the qualification process for Capacity Market auctions are outlined in Section E of the Capacity Market Code. Qualification for Capacity Market auctions is mandatory for existing Generation Units (unless they submit an "opt out" notification which is approved by the Regulatory Authority). For new Generation Units, or existing and new Demand Side Units, qualification is not mandatory.
Target Completion Date	Q1 2022
Project Benefits	This project is expected to bring enhancements to the qualification process as well as to our SONI outcomes, especially grid security.
Key Performance Indicator	Timely delivery of the capacity market qualification platform implementation

Capacity Auctions to be completed – T-1, T-3 and T-4

Project ID	FWP004
Project Name	Capacity Auction Process
Project Milestone to be Achieved	Capacity Auction Process to be completed for: T-1 2022/23 Capacity Auction T-3 2024/25 Capacity Auction T-4 2025/26 Capacity Auction
Project Description	T-1 2022/23 Capacity Auction- predicted activities include: **Qualification** Final Qualification Results Date **Qualification** Qualification Results Publication Date **Info** Final Auction Information Pack Date **Auction** Capacity Auction Submission Commencement **Auction** Capacity Auction Submission End **Auction** Capacity Auction Run Start **Auction** Capacity Auction Completion Date **Auction** Capacity Auction Provisional Results Date **Auction** Capacity Auction Provisional Results Publication Date **Post Auction** Capacity Auction Approval Date **Post Auction** Capacity Auction Results Date **Post Auction** Performance Security Date SONI is targeting October 2021 and November 2021 for the activities above from Qualification through to Auction, with the Post Auction activities expected to take place between December 2021 and January 2022. T-3 2024/25 Capacity Auction: **Qualification** Provisional Qualification Results Date **Review** Application for Review Date **Review** Non-complying Application for Review rejection Date **Review** System Operators request for further information Date **Review** Participant provision of further information Date **Review** System Operators notification of outcome Date **Disputes** Qualification Dispute Notice Date **Disputes** Qualification Dispute Decision Date **Qualification** Final Qualification Submission Date **Info** Final Locational Capacity Constraint Limits Date **Qualification** Final Qualification Results Date **Qualification** Qualification Results Publication Date **Info** Final Auction Information Pack Date **Auction** Capacity Auction Submission Commencement **Auction** Capacity Auction Submission End **Auction** Capacity Auction Run Start **Auction** Capacity Auction Completion Date **Auction** Capacity Auction Provisional Results Date **Auction** Capacity Auction Provisional Results Publication Date **Post Auction** Capacity Auction Approval Date **Post Auction** Capacity Auction Results Date **Post Auction** Performance Security Date

SONI is aiming to complete the above activities by end of December for the activities from Provisional Qualification through to the Qualification Dispute Decision Date, and between December 2021 and mid-April 2022 for the Final Qualification Submission Date to Performance Security Date.

T-4 2025/25 Capacity Auction Programme activities:

Info	Initial Auction Information Pack Date
Qualification	Opt-out Notification Date
Qualification	Exception Application Date
Qualification	Qualification Application Date
Qualification	Provisional Qualification Results Date
Review	Application for Review Date
Review	Non-complying Application for Review rejection Date
Review	System Operators request for further information Date
Review	Participant provision of further information Date
Review	System Operators notification of outcome Date
Disputes	Qualification Dispute Notice Date
Disputes	Qualification Dispute Decision Date
Qualification	Final Qualification Submission Date
Info	Final Locational Capacity Constraint Limits Date
Qualification	Final Qualification Results Date
Qualification	Qualification Results Publication Date
Info	Final Auction Information Pack Date
Auction	Capacity Auction Submission Commencement
Auction	Capacity Auction Submission End
Auction	Capacity Auction Run Start
Auction	Capacity Auction Completion Date
Auction	Capacity Auction Provisional Results Date
Auction	Capacity Auction Provisional Results Publication Date
Post Auction	Capacity Auction Approval Date
Post Auction	Capacity Auction Results Date
Post Auction	Performance Security Date

SONI is aiming to complete the above activities by end of February 2022 for the activities from Initial Auction Information Pack through to the Qualification Dispute Decision Date, and between February 2022 and June 2022 for the Final Qualification Submission Date to Performance Security Date.

Target Completion Date	As indicated above
Project Benefits	Completion of the Capacity Market Auction Process is driven by grid security; therefore, we anticipate the completion of these 3 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.
Key Performance Indicator	SONI will measure our success across these auctions by monitoring the target timelines for completion of the above activities.

Control Centre Tools

<table>
<tr><td>Project ID</td><td>FWP005</td></tr>
<tr><td>Project Name</td><td>Control Centre Tools</td></tr>
<tr><td>Project Milestone to be Achieved</td><td>Go-Live of Enduring Ramping Margin – Q4 2021
Develop delivery plan to 2030 – Q4 2022</td></tr>
<tr><td>Project Description</td><td>
<table>
<tr><th>Project Name</th><th>Description</th><th>Start Date</th><th>Target Date</th></tr>
<tr><td rowspan="2">Implementation / Enhancement of already planned / existing control centre tools</td><td>Go-Live of enduring Ramping Margin Tool (RMT)</td><td>-</td><td>Q4 2021</td></tr>
<tr><td>Go-Live of Voltage Trajectory Tool (VTT)</td><td>-</td><td>Q4 2021</td></tr>
<tr><td>Control Centre of the Future - Operational Tool Development Plan</td><td>Develop a delivery plan for the tools and capability we need to operate the power system to 2030. This will include, but is not limited to, tools to:
• Interface with the DSOs on visibility, management and forecasting of DER
• manage congestion
• control new network devices
• improve models
• enable probabilistic operations
This plan will also cover the development of associated IT, data management and physical infrastructure to support the tools.</td><td>Q1 2022</td><td>Q4 2022</td></tr>
</table>

Decision Making Tools shortly expected to be live in the Control Centre include:
• Look-Ahead Security Assessment Tool (LSAT): enables Grid Controllers[39] to analyse the stability of the power system in the near-future, facilitating optimal system operation with higher levels of wind and solar integration.
• 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[40]. Following identification of some issues and gaps in functionality in Factory Acceptance Testing of the Voltage Trajectory Tool, a period of re-design work is currently taking place. This will be followed by a re-planning exercise that will revise the timeline if required.
</td></tr>
</table>

[39] **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.

[40] **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.

	• Ramping Margin Tool (RMT): Enables Grid Controllers to accurately schedule and dispatch the Ramping Margin services[41], and manage changing demand and generation profiles, with increased wind and solar integration. The Look-Ahead Security Assessment Tool went live in the Belfast control room in December 2020. The tool is a world first which enables operation of the All Island power system with world leading levels of variable renewable generation in a safe and secure manner while minimising the level of constraint and curtailment of wind and solar. Thus, LSAT is a key contributor in the path towards decarbonisation of the electricity sector. Enhancements to Look Ahead functionality have been developed and tested during 2021 and will be deployed to the control rooms in early 2022. 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 device, developing voltage trajectory plans secure against contingency events for a near time horizon (typically intra-day and day-ahead). This ground breaking decision support tool will enable operation with reduced number of conventional plan on-line and, thus, will facilitate increased levels of SNSP in the All Island system. The Voltage Trajectory Tool has been scoped and developed throughout 2021. Agile development, testing and validation are underway in cooperation with vendors and external consultants. Deployment to control rooms is expected within this reporting year. SONI and EirGrid will be the first TSOs in the world to include this within their scheduling and dispatch processes. An enduring Ramping Margin Tool is expected to go live in the control centre in SONI in October 2021. This tool enables grid controllers to accurately schedule and monitor the ramping margin reserve services, thereby enabling more effective management of changing demand and generation profiles with increased wind and solar integration. These activities form part of the implementation of our Operational Tools workstream within our Shaping Our Electricity Future Roadmap.
Target Completion Date	Identified individually per the programme above.
Project Benefits	The DS3 Control Centre Tools project will deliver Enhanced Stability Analysis, Enhanced Voltage Control and Enhanced Frequency Management to the Control Centres. The functionality will be delivered by two independent decision-support tools -

[41] **A Ramping Margin service** is the increased MW output that can be delivered with a good degree of certainty for a given time horizon.

	Look-Ahead Stability Assessment Tool (LSAT) and development of the Voltage Trajectory Tool (VTT). SONI anticipates this will bring enhancements to our four outcomes, in particular decarbonisation and grid security.
Key Performance Indicator	Given the activities contained within the programme of work, and being responsive to stakeholder feedback, SONI considers SNSP and system frequency to be important to measuring our success within this workstream, as well as monitoring our timeframes for implementation and ensuring these are achieved, or efficiencies made to exceed this timescales with no additional costs.

Capability to Operate at 75% System Non-Synchronous Penetration

Project ID	FWP006
Project Name	Capability to operate at 75% SNSP
Project Milestone to be Achieved	The 75% SNSP trial is nearing completion and a trial analysis has begun. This will assist in decision making on whether and when to change the operational policy and relax the corresponding operational system constraints.
Project Description	There is currently an operational system constraint within our operational policy that limits the operation of the All-Island power system with up to 70% SNSP. One of the DS3 Programme targets is to relax this operational system constraint to 75% SNSP in order to enable more renewable energy to be transferred through the power system. During 2021 extensive studies were carried out to ensure that the All-Island power system can be operated in a secure and reliable manner when increasing SNSP to 75%. Extensive studies were carried out to investigate different aspects of power system security and stability by performing various steady-state and dynamics power system studies and modelling of a number of different power system phenomena. Whilst moving to 75% SNSP is an innovation in its own right, there are two particularly innovative aspects of this modelling related to: 1. Data mining used to identify a valid set of study snapshots to cover the entire space of different operating conditions based on the power system attributes such as SNSP, imports/exports, demand, the minimum number of large units on, ROCOF and many others. 2. Automation related innovations used to perform bulk studies in parallel, efficient data processing of the study results and modelling tasks/challenges especially with respect to the modelling of Voltage Dip Induced Frequency Delay (VDIFD) phenomenon. The timely outputs of the studies ensured that SONI were able to commence the 75% SNSP trial in April 2021. This trial is expected to close in Spring 2022. The benefits start to accrue from the start date of the trial and there have been a significant number of hours where the SNSP has been greater than the previous limit of 70%, thus enabling more renewable generation and reducing curtailment. For a small island network, such high levels of SNSP are rare. Further studies during 2021 benefitted from the data mining and automations developed as part of this study. The 75% SNSP trial is nearing completion and a trial analysis has begun. This will assist in decision making on whether and when to change the operational policy and relax the corresponding operational system constraints.

	The developed data mining techniques and automation are further used for similar studies targeting relaxation of our operational system constraints in order to enable more renewable energy on to the All-Island power system. These activities also form part of our Operational pillar within our Shaping Our Electricity Future Roadmap.
Target Completion Date	Q2 2022
Project Benefits	The successful completion of the 75% SNSP trial will enable us to move on to further operational trials, for example reducing the minimum number of units and the inertia floor, all of which are required to further facilitate even higher levels of renewable generation.
Key Performance Indicator	Our measure of success in this area will be the achieving of the 2022 timescale set against this activity, and our key performance indicator of system non-synchronous penetration, as detailed in the previous section SONI Key Performance Indicators. We also expect this activity to enhance our decarbonisation outcome, which will also be demonstrated in achieving this key performance indicator.

DS3 Protocol Review and Consultation

Project ID	FWP007
Project Name	DS3 Protocol Review and Consultation
Project Milestone to be Achieved	Consultation on DS3 System Services Protocol Document
Project Description	The Protocol document specifies the Compliance Requirements which a service provider must satisfy before qualifying for remuneration for DS3 System Services in respect of its Providing Unit(s), as well as the Performance Monitoring procedures to be applied and the unit(s)' Operational Requirements. SONI is planning to consult on updates to the paper to provide an opportunity for stakeholders to provide feedback on the proposals to amend the DS3 System Services Protocol document – Regulated Arrangements, Version 3.0, published 1st October 2020, with the consultation proposed to open by Q2 2022.
Target Completion Date	Q2 2022
Project Benefits	Enhanced SONI service quality outcome
Key Performance Indicator	The number of responses received will provide some beneficial insight alongside the quality of the responses, whether the sentiment is in agreement or not with the proposed questions forming the consultation – this will allow SONI to monitor the engagement level of stakeholders and present an opportunity to be responsive to stakeholder feedback.

Minimum Generation Requirements Study

Project ID	FWP008
Project Name	Minimum Number of 7 conventional generation units on for the all island power system.
Project Milestone to be Achieved during period	The focus of this study is on minimum number of conventional units on that is currently set to eight. The TSOs are aiming to relax this particular constraint in order to operate the all island power system with minimum number of seven conventional units by 2022 and beyond.
Project Description	This project evaluates security and stability of the future snapshots (2022 and beyond) where operational system constraints related to the minimum number of units are relaxed to enable more renewable energy being transferred through our All-Island power system. The main focus is on relaxing the minimum number of large units on constraints both jurisdictional (five in Ireland and three in Northern Ireland currently) and regional constraints. In the studies these minimum number of units are relaxed to allow for having the minimum of all-island units set to seven, with SNSP up to up to 85%, a RoCoF (Rate of Change of Frequency) constraint of 1 Hz/s and inertia constraint of 20 GWs. The study focuses on voltage stability and dynamic studies to identify potential insecurities and instabilities when operating with less than 8 large units on. A formal study outcome is expected in Spring 2022. When complete, the study outcomes will inform whether it is prudent to start an operational trial with a reduced number of minimum units. This will enable higher levels of renewables to be facilitated onto the all-island system, contributing towards the 2030 RES-E targets.
Target Completion Date	Spring 2022
Project Benefits	Enhanced RES Integration and lower DBC
Key Performance Indicator	A key performance indicator for this activity will be the timelines set to complete the study. As this is in the study phase, we do not expect this to bring any enhancements at this time to RES-E. However, the study itself is key to informing SONI on the impact this will have on our RES-E and whether it is prudent to commence a trial phase.

Qualification Trial Process

<table>
<tr><td>Project ID</td><td>FWP009</td></tr>
<tr><td>Project Name</td><td>Qualification Trial Process</td></tr>
<tr><td>Project Milestone to be Achieved</td><td>Review the QTP process and develop a plan for the transition to the System Services Future Arrangements.

Note: This is dependent on a SEMC decision on the high-level market design and governance</td></tr>
<tr><td>Project Description</td><td>The Qualification Trial Process (QTP) is important to demonstrate the ability of a range of technologies to provide System Services.

Facilitating new technologies to provide System Services on the system to increase competitive pressures on the long-term costs of System Service provision to the consumer by expanding the range of Service Providers. This will improve the technical capability of the generation fleet and the system more generally by facilitating capability valuable to the system at high levels of renewable penetration therefore delivering value to consumers and a secure, sustainable power system.

Table 5: Qualification Trial Process
<table>
<tr><th>Description</th><th>Start Date</th><th>Target Date</th></tr>
<tr><td>Conduct annual QTP process to facilitate the integration of new technologies, for example:
• Hydrogen-based technology; and
• Grid forming technology
Note: Current regulatory funding mechanism is in place until Q2 2024.</td><td>-</td><td>Annual</td></tr>
<tr><td>Review the QTP process and develop a plan for the transition to the System Services Future Arrangements.
Note: This is dependent on a SEMC decision on the high-level market design and governance by Q4 2021</td><td>Q4 2021</td><td>Q4 2022</td></tr>
</table>
The above activities will form a part of our Operational pillar of work within our Shaping Our Electricity Future Roadmap.</td></tr>
<tr><td>Target Completion Date</td><td>Q4 2022</td></tr>
<tr><td>Project Benefits</td><td>Facilitating the integration of new technologies is vital in order to ensure we achieve our renewable target of 70% of electricity consumption from renewable sources by 2030.</td></tr>
</table>

Key Performance Indicator	Overall, this workstream is anticipated to promote enhancements to our RES-E performance metric, which will also be our measure of success in this area, alongside monitoring the timeframes for completing these activities.

Moyle Controller Project

Project ID	FWP010
Project Name	Moyle Controller Project
Project Milestone to be Achieved during period	Phase 1 – Impact Assessment and High Level Design – March 2021 Phase 2 – Testing and Implementation – September 2022 (Estimated)
Project Description	Mutual Energy has initiated a modernisation project to install new hardware and software systems. SONI has been liaising with Mutual Energy to understand the scope, timing and scale of integration required to ensure that SONI can continue to fulfil our role. It is vital that the new control system is integrated and fully tested against the SONI system. We have two phases of work planned, an "Impact Assessment and High-Level Design" phase and secondly the "Implementation and Testing". This project is expected to take place over the period 2021 to 2022. Testing is scheduled for Q4 2021, with an instance of the upgraded control system installed by Q1 2022. On site testing will commence in Q2 2022 with a go-live date of September 2022. Note: *Phase 2 of the project implementation is dependent on decisions with Mutual Energy*
Target Completion Date	Phase 1 – March 2022 Phase 2 - September 2022 (Estimated).
Project Benefits	The following benefits have been identified for the project. • Continued ability for SONI to operate the Moyle Interconnector, maintaining the connection to the GB transmission system and the security of supply that this provides. • Integration of the DC signals into the EMS, rather than the current legacy stand-alone system, will increase system security due to better alarm visibility. • SONI's EMS system has a very high level of security and high-availability, which the current legacy stand-alone system does not have. • All interconnectors into the SEM will be aligned from a systems and management point of view, due to EMS integration.
Key Performance Indicator	The measure of success for this area will be against the timescales involved in the project delivery as indicated above. This will also enhance our system security, therefore another measure of success will be monitoring our system minutes lost metric, as detailed within the SONI Key Performance Indicators section above and ensuring these achieve our target metrics. Given the information provided, SONI would highlight that this is expected to bring enhancements over the year to our grid security outcome.

Simplify and Standardise IT Solutions

Project ID	FWP011
Project Name	Simplify and Standardise IT Solutions
Project Milestone to be Achieved	As below
Project Description	**Application Rationalisation** This relates to a general and ongoing activity to reduce the number of individual business solutions that are part of the application landscape. In FY21/22 SONI will move a number of applications to centralised server-based licencing e.g. PowerFactory and Plexos which provides many additional user benefits and will improve productivity and efficiency. In addition, the existing Plexos infrastructure is aging and as models become more complex, the run-times are increasing which is limiting productivity and effectiveness. SONI is planning to trial a move of Plexos to the cloud to investigate options around optimisation of performance and productivity for the team. In FY21/22 SONI will commence a Database Rationalisation project to create a new central database repository which will be used to replace many of the corporate database estate. A single repository will negate the current practice of duplicating data in multiple databases, create a single source of truth and facilitate accurate reporting. The project will reduce the overall footprint of the corporate databases and reduce the manual maintenance and backup effort required to manage the databases. Having a single corporate database will provide a single source of truth for corporate data resulting in better data management, reduce data movement, reduce backup runtime and size. The new technologies being used (ODI) will replace outdated technology which has been in use for 20+ years. **Capacity Market Platform (CMP)** The Capacity management Platform (CMP) went live in October 2018. There is an ongoing requirement to make small to medium changes to the platform to accommodate changing industry requirements and business and technical platform improvements. In FY21/22 SONI will commence planning of an online qualification hub to capture and validate market participant applications, which can be audited for qualification for capacity auctions.
Target Completion Date	2022
Project Benefits	Enhanced SONI service quality outcome
Key Performance Indicator	The number of responses received will provide some beneficial insight alongside the quality of the responses, whether the sentiment is in agreement or not with the proposed questions forming the consultation – this will allow SONI to monitor the engagement level of stakeholders and present an opportunity to be responsive to stakeholder feedback.

End of Life Assets

Project ID	FWP012
Project Name	End of Life Assets
Project Milestone to be Achieved	System Refresh
Project Description	**Desktop Equipment Refresh** In FY21/22 SONI will complete the refresh of corporate and control room devices including laptops and mobile devices to enable remote working. In line with industry best practice, SONI's corporate desktop environment is refreshed every five years. In FY21/22 a project will commence with the aim of upgrading all desktops in the SONI and emergency control centres and their current operating system, to keep up with the technology and security upgrades supported by Microsoft. **VMware/Citrix Upgrades** VMWare is a virtual platform that hosts the majority of SONI Enterprise applications, which reduces the need for physical hardware. The underlining hardware is approaching end of life and all virtual machines will be migrated to newer hardware. In addition, an upgrade of the software will be completed in FY21/22. This continued investment in virtualisation reduces SONI's carbon footprint of its data centres. **Server OS Upgrades** <u>Email Server Upgrade</u> SONI will upgrade email servers, migrating email capability to the cloud which will provide greater resilience and to facilitate collaboration. <u>Backup Upgrade</u> SONI will undertake a project to upgrade the backup hardware as the existing backup hardware is approaching end of life and needs to be replaced. A number of cyber security hardening enhancements will also be delivered. **Data Centre Switching Upgrade** The ongoing replacement of the data centre switches every five years is required to maintain support, ensure security and to cater for growing data volumes. <u>Network Switch Life Cycle Management</u> The network switch hardware equipment is approaching end of life and will no longer be capable of accepting new firmware updates, and the hardware is no longer supported by the vendor. This exposes a risk to the SONI network infrastructure in terms of security and supportability. In FY21/22 SONI will complete the refurbishment of network equipment in three data centre cabinets in the SONI Control Centre. **Floor Access Switching Upgrade** In FY21/22 there will be ongoing replacement of network equipment required to maintain support, ensure security and to cater for growing data volumes. **Wireless IS Upgrade** The Wireless LAN Upgrade Project will commence in FY21/22 with the following goals:

	• phase 1 - replace the existing wireless LAN infrastructure due to end-of-life elements; • phase 2 - redesign the wireless LAN services to provide new functional and security features; and • phase 3 - add additional wireless LAN access points to increase service coverage throughout the SONI Control Centre building. **Oracle Database Refresh ODS/ODH/CB upgrades** In FY21/22 SONI will commence the high-level hardware designs for the dispatch systems and finance systems and a number of downstream support systems (compute, storage and network costs). The current hardware is approaching end of life and will provide SONI with the opportunity to upgrade the underlying software stack. **Dynamic AX Upgrade** In FY21/22 SONI will deliver a plan for the migration of Dynamics to a cloud platform. A modern ERP system in the cloud will ensure that there is continued support for the Microsoft's Dynamics AX solution and alignment with the Dynamics AX 'out of the box' capability. *NOTE: SONI is experiencing supply chain issues which could impact any of the above projects.*
Target Completion Date	2022
Project 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.
Key Performance Indicator	We will measure our success in this area by monitoring the timeframes to complete these activities, while endeavouring to make efficiencies in timeframes where possible and without additional cost.

EMS Upgrade

Project ID	FWP013
Project Name	End of Life Assets
Project Milestone to be Achieved	Commence EMS Upgrade – HLD preparation
Project Description	The EMS is a mission-critical platform deployed in both NCC and CHCC to enable the monitoring and control of the power system of Ireland and Northern 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 and modern. In FY21/22 the EMS High-Level Design (HLD), which includes the scope of the upgrade, evaluation of the design options, selection of a preferred architecture and the estimation of overall implementation costs will be delivered. The HLD outlines the impacts of the upgrade on interfacing systems and devices, the IT infrastructure required, the testing and migration approach and will identify any additional process or modifications to existing ones. The primary objective of the project is to address upcoming obsolescence of the EMS platform by upgrading its hardware and software. Following the delivery of the HLD the next phase of the project will commence and will take the outputs from this HLD phase, and working with 3rd party partners commence work on a Statement of Work (SOW) for both the upgrade hardware and software. In addition, Low-level Designs (LLDs) will be commenced for all aspects of the upgrade – including Infrastructure, Database, Windows, Security, Networking, Telecoms, etc. *NOTE: SONI is experiencing supply chain issues which could impact this project.*
Target Completion Date	2022
Project 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.
Key Performance Indicator	We will measure our success in this area by monitoring the timeframes to complete these activities, while endeavouring to make efficiencies in timeframes where possible and without additional cost.

Telecommunications Programme – Asset Replacement and Transfer to NIE Networks

Project ID	FWP014
Project Name	Telecommunications – asset replacement and transfer to NIE Networks
Project Milestone to be Achieved	Agree a programme of work with NIE Networks
Project Description	As provided in Annex 4 of the UR's Final Determination[42] for the SONI Price Control submission, NIE Networks is the Transmission Asset Owner (TAO) and SONI is the Transmission System Operator (TSO). As a principle, UR considers that the assets used in the field for the operation of a regulated licenced function should be in the ownership of the asset owner and remunerated via the TAO price control mechanisms. SONI has engaged with the UR to understand the scope and timings for the transfer of the assets and the associated activities (e.g. contractual and operational arrangements). Over the period 2021/22, SONI will engage with both NIE Networks and UR in order to agree a programme of work and associated timeframes to facilitate the transfer of assets to NIE Networks. *NOTE: SONI is experiencing supply chain issues which could impact this project.*
Target Completion Date	2022
Project Benefits	Enhanced SONI service quality outcome given the additional collaboration with NIE Networks and the UR.
Key Performance Indicator	Achieving the target date for agreement of the scope of assets involved and an associated programme of works.

[42] Final Determination for SONI Price Control 2020-2025 | Utility Regulator (uregni.gov.uk)

Moyle HVDC Project - Telecoms

Project ID	FWP015
Project Name	Moyle HVDC Project
Project Milestone to be Achieved during period	SONI requires IT hardware, software & resilient telecommunications circuits to replace current assets now at 18years old.
Project Description	The HVDC Moyle Interconnector is the 500 MW HVDC link between Auchencrosh, South Ayrshire in Scotland and Ballycronan More, County Antrim in Northern Ireland, which went into service in 2001 and is owned and operated by Mutual Energy. The control systems installed at the Moyle site are now end of life and Mutual Energy have contacted SONI to initiate a project to integrate the new control system into the SONI EMS. This includes the SCADA connectivity back to the SONI control rooms. This is currently operating on an analogue system utilising IEC 101, and will need to be replaced with an IP Solution utilising IEC 104. In addition, there a new set of requirements for the data to be dispatched, displayed and captured in the SONI EMS. To support Mutual Energy, SONI will require IT hardware, software and resilient telecommunications circuits to replace the current aging assets.
Target Completion Date	September 2022 (estimated)
Project Benefits	SONI anticipates that this work will bring enhancements to grid security.
Key Performance Indicator	The measure of success for this area will be against the timescales involved in the project delivery as indicated above. This will also enhance our system security, therefore another measure of success will be monitoring our system minutes lost metric, as detailed within the SONI Key Performance Indicators section above and ensuring these achieve our target metrics. Given the information provided, SONI would highlight that this is expected to bring enhancements over the year to our grid security outcome.

SONI Stakeholder Engagement for Role 1

Stakeholder engagement is a core activity that SONI regularly undertakes. Collaboration is one of our core values, in that we drive the most benefit from these engagements by listening to our stakeholders, being responsive to feedback that we receive and learn from our successes and our failures by engaging with stakeholders.

In November 2021, SONI is intending to publish the Shaping Our Electricity Future Roadmap. This will detail a multi-year plan for stakeholder engagement covering a number of critical areas. In relation to TSO Role 1 System Operation and Adequacy, they include:

- Engage for better outcomes for all: the establishment of our Shaping Our Electricity Future Advisory Council, industry briefing webinars and coordinating a regular Shaping Our Electricity Future industry forum.

As part of our Shaping Our Electricity Future Roadmap engagement activities, we are currently reviewing the existing DS3 Advisory Council membership with the view to establishing the Shaping Our Electricity Future Advisory Council which will meet in Summer 2022. The terms of reference for the new council is under development.

SONI has detailed below the routine engagement that we undertake in order to deliver outputs on a regular basis.

- Publication of Balancing Market and Performance Information;
- Publication of Balancing Market Principals Statement

SONI undertakes a number of routine engagements within the Balancing Market Operation. We publish a number of quarterly and annual reports that provide Participants with information on the outcome of the scheduling and dispatch process, which include:

- Quarterly Renewable Dispatch Down (Constraint & Curtailment);
- Annual Renewable Dispatch Down (Constraint & Curtailment);
- Quarterly Constraint Cost Outturn;
- Annual All-Island Transmission System Performance Report

These also form part of our baseline performance. A full list of the operational publications can be found in Section 6.2 of the Balancing Market Principles Statement V.2[43].

[43] EirGrid-and-SONI-Balancing-Market-Principles-Statement-V2.0.pdf (sem-o.com)

- SONI publish a wide range of reports and updates in relation to the security of the system. These include but are not limited to the following:
- All Island Generation Outage Plan (TSO Responsibilities) on SEM-O website
- Daily Generator and DSU Outage Schedules Report on the Balancing Market Interface
- SONI Transmission Outage* (Outage Information) on the SONI website
- Daily Transmission Outage Schedule Report* (Market Data Static Report) on the SEM-O website
- Daily Transmission Outage Schedule Report on the Balancing Market Interface

Note: These items are available since 2019 and an improvement to our baseline performance as additional information is now widely available to stakeholders.

SONI publishes a number of different operational data resources for stakeholders on the SEM-O website, SONI website, ENTSO-E website and the Balancing Market Interface (BMI), these are identified on the following page.

DEMAND DATA
Demand Forecast (ENTSO-E)
Demand Actual (ENTSO-E)
Demand Forecast (Market Data Static Report – SEMO website)
Demand Forecast (Market Data Dynamic Report – SEMO website)
Demand Actual (Smart Grid Dashboard)
Demand Forecast (BMI)

WIND DATA
Wind Forecast (ENTSO-E)
Wind Actual (ENTSO-E)
Wind Forecast (Smart Grid Dashboard)
Wind Actual (Smart Grid Dashboard)
Aggregated Wind Forecast (Market Data Static Report – SEMO website)
Aggregated Wind Forecast (Market Data Dynamic Report – SEMO Website)
Aggregated Wind Forecast (BMI)
Wind Forecast (BMI)
Wind Actual (BMI)

INDICATIVE OPERATIONS SCHEDULES
LTS Indicative Operations Schedules (Market Data Static Report – SEMO Website)
RTC Indicative Operations Schedules (Market Data Static Report – SEMO Website)
LTS Indicative Operations Schedules (BMI)
RTC Indicative Operations Schedules (BMI)
RTD Indicative Operations Schedules (BMI)
Information Note on the Indicative Operations Schedule and Dispatch (SEMO Website)

DISPATCH INSTRUCTIONS
Hourly Dispatch Instructions (Market Data Static Report – SEMO Website)
Daily Dispatch Instructions D+1 (Market Data Static Report – SEMO Website)
Daily Dispatch Instructions D+4 (Market Data Static Report – SEMO Website)
Hourly Dispatch Instructions (BMI)
Daily Dispatch Instructions D+1 (BMI)
Daily Dispatch Instructions D+4 (BMI)

OUTAGES
All Island Generation Outage Plan (TSO Responsibilities - SEM-O website)
Daily Generator and DSU Outage Schedules Report (BMI)
All Island Transmission Outage Programme (TSO Responsibilities - SEM-O website)
SONI Transmission Outage (Outage Information – SONI website)
Daily Transmission Outage Schedule Report (Market Data Static Report – SEMO Website)
Daily Transmission Outage Schedule Report (BMI)

CONSTRAINT REPORTS
Operational Constraints Update – monthly (SEMO website)
Operational Constraints Update – weekly (SEMO website)
Operational Constraints Update – ad hoc (SEMO website)
Information Note on Inter-Area Flow Constraints (TSO Responsibilities – SEMO website)
Information Note on Wind Dispatch Tool Constraint Groups (TSO Responsibilities – SEMO website)

OTHERS
Scheduling and Dispatch Policy Parameters (SEMO Website)
Daily System Shortfall Imbalance Index and Flattening Factor (SEMO Website)
Unit Under Test (Market Data Static and Dynamic Report – SEMO Website)
Unit Under Test (BMI)
North-South Tie Line and Moyle Interconnector Data (SONI Website)

In order to ensure that stakeholders are informed, we also publish a number of reports which include:

- All Island Generation Capacity Statement;
- All Island Winter Outlook;
- All Island Transmission System Performance Report

The All Island Transmission System Performance Report include transmission system data and performance statistics which are key to ensuring that stakeholders are informed and measure our success in achieving our decarbonisation targets. We will have a strong focus towards our 75% SNSP trials which are ongoing, Low Carbon Inertia Services, and Minimum Number of Conventional Generation Units, which are key to ensuring we achieve our decarbonisation outcome. The annual All-Island Generation Capacity Statement published by SONI presents information on generation adequacy studies that assess the balance between supply and demand over the next ten years. The Winter Outlook presents a more detailed view focusing on the upcoming winter in Northern Ireland. This document is published annually in October and helps inform the electricity industry and supports preparation for the coming months. We study the expected generation capacity and the forecast demand to determine if there is adequate generation capacity margin.

SONI considers that this will demonstrate growth in the area of stakeholder engagement and feedback provided through these engagements will be key in allowing SONI to measure our success through the eyes of the consumer and other industry experts. All work that we undertake in relation to stakeholder engagement will only bring about enhancements to our SONI service quality outcome over the period.

In 2022 we will continue to engage through a broad spectrum of methods, including one-to-one engagements with specific customers and industry representative bodies, formal engagement processes and panels, industry fora, publications and workshops on a range of topics including:

- Generator and transmission outages, including outturn availability reporting and fora;
- Scheduling and dispatch, including forecasting, Balancing Market Principles Statement,
- operational data, reporting;
- Dispatch down analysis, reporting, updates and industry engagement;
- Generator commissioning and testing, including Grid Code compliance;
- System Services, performance monitoring and tariffs;
- Interconnection;
- Business continuity, emergency communications and emergency and restoration planning;
- Dispatch Balancing Cost forecasting, management and reporting;
- System integrity, including protection, revenue metering and system performance;
- Grid Code, including the Grid Code Review Panel and derogations process;
- EU Network Codes Implementation;
- Capacity Market qualification and auctions;

Success will be measured as:

- Satisfactory outcomes to quantitative assessment through the key performance indicators and incentives put in place as part of our regulatory price review to measure operational performance.
- Customer feedback gathered through individual formal and informal engagements will provide qualitative assessment.

Outcomes

In SONI's Forward Work Plan, we have highlighted below what success will look like, alongside any relevant KPIs against the four SONI outcomes.

Decarbonisation

RES-E: SONI aims to facilitate the increase the percentage of electricity from renewable sources in Northern Ireland as detailed using the RES-E ("Renewable Energy Sources for Electricity") metric. SONI is aiming to achieve 70% RES-E by 2030. In order to do this, we need to gradually increase the number of renewable sources on the electricity system. SONI have therefore set a target of 41% in 2021/22 for the percentage of electricity from renewable sources during this coming year. This will increase over the next few years in a prudent manner in order to maintain a reliable transmission system. SONI has successfully increased this metric from 39% in 2019.

SNSP: SONI has been pushing the boundaries of the possible to integrate world leading amounts of electricity from renewable sources onto the power system, while carefully managing security of supply. At times in 2019, the electricity powering homes and businesses was made up of up to 65% wind and solar, but we need to increase this and have successfully trialled 70% of variable electricity from renewable sources at any one time. SONI is trialling a maximum level of SNSP of 75% and aims to convert this to operational policy in 2021/22. SONI has been successful to date in increasing this metric from 65% SNSP in 2019.

Grid Security

System Minutes Lost: This metric represents the cumulative total of system minutes lost due to system quality. SONI aims to maintain low levels of SML throughout 2021/22 despite this becoming increasingly complex. Our threshold is between 0.75-2.5 SML. SONI considers this is an ambitious target, as there are instances that are outside of SONI's control which can affect this metric, such as Red Level Weather events, capacity shortfall, ice accretion on transmission system, gas emergencies / fuel shortages etc.

System Frequency: SONI ensures that we manage the system frequency within Grid Code requirements. This measures the performance of the system frequency against the nominal frequency of 50 Hz. A target frequency range of 50 ±0.1 Hz is applied (Grid Code notes a range of 50 ±0.2 Hz for SONI to operate within). SONI have reviewed our system frequency metric from 2019, as also detailed in our All-Island Transmission System Performance Report 2019, which identify that in 2019 the system frequency was operated within 49.9Hz and 50.1Hz for 99.66% of the time in that year. SONI has set an annual target of 98%.

System Wide Costs

An important aspect of being the transmission system operator is to ensure consumers and the benefits we can bring as one of our main priorities. In our planned initiatives, we consider the efficiencies that we can make at all times and how we can pass any additional savings to the consumer, and ultimately keep costs at a minimum. This is especially important given the upcoming Northern Ireland Energy Strategy and the role the consumer can take to be a part of the energy transition.

Imperfection costs are an inherent feature of the SEM design and arise due to the difference between ex-ante market schedule and real-time dispatch. These costs are levied on suppliers through the imperfections charge. EirGrid and SONI, as Transmission System Operators (TSOs), are responsible for managing imperfection costs, through efficient dispatch of generation, whilst maintaining a secure electricity system.

SONI Service Quality

SONI aims to build on our stakeholder engagement over the 2021/22 period. As part of the Shaping Our Electricity Future Consultation, we received positive feedback from stakeholders that engagement has improved.

In particular, our Renewables Strategy Initiative includes the development of a TSO-DSO Interface. We envisage that, as these TSO-DSO plans are delivered, there will be opportunities for stakeholder engagement with SONI and NIE Networks on the various initiatives being planned. These will be published within our Shaping Our Electricity Future Roadmap in November 2021.

Ambition

Ambition is one of our core SONI values. We stretch ourselves to accomplish our goals. We drive transformation, take appropriate risk and recognise achievements throughout industry.

In order to play our role in the energy strategy, as well as maintaining a safe and reliable transmission system at a time when we seek to facilitate an increased amount of renewable generation, SONI will be required to implement plans which may be considered ambitious.

As our strategic ambition has evolved to respond to the climate crisis, we have provided a number of high level initiatives and business improvement activities to deliver key changes to how we operate the transmission system and collaborate with other TSO's and NIE Networks as TO and DNO in delivering joint projects.

Our planned activities will allow for a more resilient system, improved control centre tools and building on the expertise of our people to ensure they are enabled for their critical role of matching electricity generation to customer demand, as our control centre evolves to facilitate more renewable generation on the transmission system.

Given the publication of the Northern Ireland Energy Strategy and our role in the energy transition, it is expected to be more challenging to minimise dispatch down over the coming years given the scale of renewable generation, and the deployment of new technologies, on the transmission system.

However, SONI considers the benefits that this would bring to consumers and is aiming for a target of 10% dispatch down. SONI considers this particularly challenging given the evolving situation with renewable technology.

In order to deliver on renewable energy policies that will be expected in 2022, it will be necessary to accommodate unprecedented penetrations of variable non-synchronous RES such as onshore wind and solar whilst keeping curtailment to a minimum. We have planned a number of activities in this area, as we focus on ensuring that we have the System Services that are required to support managing the resilience of the power system.

One of our key projects, is the increasing value of SNSP to 75% in 2021/22. One of the reliability measures used to maintain synchronous inertia is the establishment of a maximum limit of system non-synchronous penetration which does not pose a risk to the electricity system. SONI is considered world leading in this area and are aiming to continue to break this limit by 2024/25. Our previous target of 65% which was achieved in 2019 was world leading and we have continued to persevere to achieve more in this area. The target of 95% SNSP set out in our Shaping Our Electricity Future consultation will see the all-island power system operating at higher SNSP levels than any other synchronous power system in the world. This 95% SNSP limit will be a key enabler for the electricity sector to achieve 70% RES-E by 2030 as per current government targets. Our target of 75% SNSP in 2021/22 is a key milestone in achieving this.

"A SNSP limit is system specific and has to be established based on thorough analysis and testing. Ireland and Northern Ireland managed to raise the SNSP limit from 50% in

2015 to 65% with a target of 75% by 2020"[44]. SONI is world leaders in renewable integration but it is important that we continue this drive over the period and beyond.

In line with SNSP, we also consider our RES-E metric to be of great importance. Our baseline figure from 2019 for the percentage of electricity from renewable sources in Northern Ireland was 39%. We expect this to grow over the next few years, with a target of 41% for 2021/22.

SONI's planned workstreams are designed at a high level and will bring about much needed improvements and efficiencies in how we manage the grid, and the timelines to achieve these key milestones are derived to ensure that we maintain pace with the energy transition.

[44] Market and system operation – Introduction to System Integration of Renewables – Analysis - IEA

Accountability

SONI considers Role 1 System Operation and Adequacy has provided clarity around our planned activities and initiatives and how the success of their performance will be measured.

For each of our service areas within this role, we have detailed the key day to day activities and the outputs or benefits they bring to the consumer. In addition, we have set out the key strategic initiatives, relevant business improvements necessary and details of performance monitoring processes required to ensure our 2030 renewable targets are met.

We have detailed our planned deliverables in the section SONI Deliverables, providing the key activities for each stage and the associated timeline. SONI considers that we have highlighted the business strategy and alignment to the Northern Ireland Energy Strategy for each planned initiative and deliverable, by aligning which of the four SONI outcomes are going to be enhanced by our activities.

Our performance commitments are specific. We have been responsive to stakeholder feedback to the UR's consultation on the Guidance on the Evaluative Performance Framework and ensured we aligned our activities to the key performance measures that stakeholders have asked to be informed on, to highlight how our activities impact on these metrics.

It is important that we deliver our planned initiatives to a high standard and within the timescales as advised in the section for Role 1, SONI Deliverables.

SONI conducts stakeholder engagement at various levels throughout our day to day business activities. This is provided in the section, SONI Stakeholder Engagement pertaining to Role 1. Throughout the implementation of some of our strategic initiatives and business improvements, there will be opportunities for stakeholder engagement in the delivery of our initiatives, through consultations and/or working groups. SONI is planning enhancements in our stakeholder engagement and have identified our plans for these over the period. We have demonstrated how these deliverables will impact on our performance metrics and these are reported on through the various publications and reports detailed within this Forward Work Plan.

Across each service area (Least Cost Deviation, Priority Dispatch etc.) we have aligned the appropriate performance indicator relevant to the outputs of the service. We have conducted a historic review of our 2019 performance, as indicated by the UR's Guidance on the Evaluative Performance Framework, in order to present a baseline performance for these key areas. Where possible, we have also aligned these performance indicators to our deliverables, where achieving successful delivery is anticipated to bring enhancements to the appropriate metric, and therefore these bring additional benefits to our four SONI outcomes.

Alignment to the UR Priorities

In the UR's Guidance on the Evaluative Performance Framework, the UR advised on the service and strategic priorities which they would like SONI to demonstrate an alignment against. We have taken each of these priorities in turn below and expanded on how we will demonstrate our alignment to these over the period October 2021 to September 2022 and beyond.

UR Strategic Priorities

A culture of effective engagement and collaboration

One of SONI's core values is that we are collaborative. We work with our colleagues and our external partners to deliver for our stakeholders. We listen and are responsive to the needs of our stakeholders and external colleagues. We have, and will continue to, demonstrate this through our various working groups which are engaged throughout SONI with partners such as NIE Networks as we progress our TSO-DSO Interface and continue to develop and enhance the Transmission Interface Arrangement. As the NI Energy Strategy evolves over the period, we will continue to liaise with our counterparts at NIE Networks and with industry to ensure we play our important role in collaborating to achieve our government renewable targets. Our work in areas such as the Generation Capacity Statement, relies on collaboration with EirGrid, as TSO for Ireland, in producing an all island approach in order to ensure that our stakeholders are fully informed. Our Shaping Our Electricity Future Roadmap will be published in November 2021 and will set the pathway for our planned activities and has been adopted as a result of the feedback that we received from industry on how we move forward to ensure we achieve our shared goals within the energy transition. SONI recognises that we further embrace this culture and this is why it is one of our core values.

A culture of open and collaborative innovation

One of SONI's core values is that we are transparent. We are open, honest and proactive in our communications. We have honest conversations and embrace diverse perspectives.

We publish a large number of reports and updates throughout our own website as well as theSEMO and ENTSO-E platforms. This also includes our Annual Innovation Roadmap Consultation. Our role within the EU Sysflex project and our Qualification Trial Process is a key programme which fully demonstrates our alignment to this service priority and this is enshrined in our core values as it is something that we believe our staff show in their day to day activities. Through these projects, we are engaged in innovative collaboration with ENTSO-E and TSO's across Europe in order to work towards our common goal given the climate crisis. We consider that only by living this culture, that this is the only way forward in engaging with other TSO's and sharing information, so that we can learn from each other and share our ambitions in order to drive change forward. This is a key part of SONI's culture, as we continue our work in these areas and fulfil our values, to bring enhancements to our decarbonisation outcome as well as system-wide costs.

A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market developments

SONI recognises the importance of this service priority, as it is only through being accountable and planning mitigations towards any uncertainty that we can look back and learn from the process. SONI lives this value in each service area. We work closely with

the UR when we are planning an update to our publications, such as the Generation Capacity Statement. We plan out the key activities, timeframes and consider any potential impacts from external factors. After the completion of any major project, we reflect back on the "lessons learnt" which informs future programmes of work in order to be responsive to any potential future issues. SONI has demonstrated our accountability throughout this document for the year ahead. We have demonstrated how we will measure our success in each area and we have been responsive to the stakeholder feedback provided to ensure we meet the needs of our stakeholders. We will apply this approach across the business, as we have done in the past. The work we perform within the System Operations and Adequacy role can be fast changing at times, for instance in times where we may experience a security of supply concern, and we have demonstrated that we are agile in responding to the needs of a continuously evolving situation, maintaining regular contact with appropriate parties.

An example of this organisational learning, planning and accountability would be our work regarding System Services as detailed throughout the role. The design and implementation of a new market is complex, and it takes time for the rules to developed, agreed, and approved. It will therefore be imperative plan and prepare for future procurement arrangements delivered by SONI in conjunction with EirGrid and Regulatory Authorities as soon as possible to meet the target of at least 70% of electricity from renewable sources by 2030. SONI is actively engaged with the RAs to understand the HLD requirements for future System Services.

UR Energy Transition Service Priorities

Collaborating and coordinating to promote a holistic, customer-based service approach to digitisation

SONI demonstrates this service priority regularly and will continue to do so. Our strategic initiatives have been designed by giving full consideration to the benefits each programme can bring to a variety of service areas. We have adopted this holistic approach as it has demonstrated that this brings the maximum benefits available across each role, whilst maintaining a minimum cost to the consumer, rather than taking a simpler approach and having an increased number of work programmes which would be considerably more expensive to implement. We will be implementing a programme of activity involved in transforming engagement which will have a customer centred approach to our website, consultation portal and provide easy access to our stakeholders for the information that they require.

Developing markets through competition and stakeholder engagement and collaboration

In March 2021, EirGrid and SONI launched the Shaping Our Electricity Future consultation. This detailed a summary of our initial thinking on how the electricity grid, market and system operation could evolve to achieve the Renewable Ambition. The Shaping Our Electricity Future consultation processes proved successful in delivering against its key objectives:

- Offer a broad set of perspectives and views from across society and industry
- Provide clarity on a way forward that will ultimately deliver on our renewable obligations.
- Identify clear milestones and timelines that consider power system operations and market dependencies

- Provide input to a coordinated plan to inform the development of electricity infrastructure, and enhancement of system operations and electricity markets.

The consultation process, supported by the Shaping Our Electricity Future Consultation Paper, sought opinions and insights in the following areas:

We undertook extensive stakeholder engagement throughout this consultation process with various stakeholder workshops and events to inform and receive feedback. We will continue to develop these through the publication of our associated Roadmap in November 2021.

Whole system collaboration and coordination with 3rd parties, and NIE Networks across its various roles as TO, DNO and DSO

SONI will be implementing a programme of work which includes activities regarding a TSO-DSO Interface. Unique challenges with embedded renewables and capability are set to increase significantly as the system becomes more geographically diverse with a wider array of technologies creating not only local but also system challenges. This places a greater emphasis on how the TSOs and DSOs work together, a key part of the TSO-DSO partnership is the exchange of information. An updated TSO-DSO interface is therefore to be implemented. SONI already collaborate with the DSO as part of our system security area as detailed within this role. This is to ensure we communicate effectively with our counterparts in NIE Networks, in order to look after the safety of our workers which is our highest priority.

SONI TSO Role 2: Independent Expert

1. Overview

The services that SONI needs in order to be able to balance the system often take many years to deliver. It is therefore important that potential providers have access to information that indicates the expected requirements, prepared on a technology neutral basis. SONI produces a number of forward-looking documents (in accordance with its licence) that provide these long-term market signals to potential and current providers.

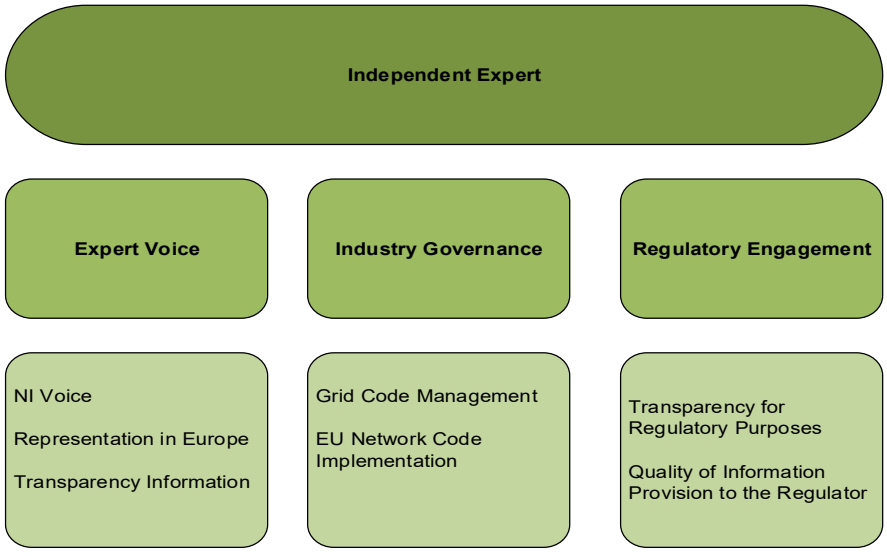
It is also important that the technical framework, under which the required services of providers are delivered, is stable and managed by a party that is independent of any commercial interest in the generation or supply of electricity. SONI has been certified as independent of generation and supply by the European Commission. This independence ensures that all parties in the market compete on a level playing field.

SONI is required to have a Compliance and Assurance Officer in place. This office undertakes an annual audit of SONI's compliance with its duty to not unduly discriminate against any party or class of parties when discharging its duties under its TSO licence.

Over recent years, developments in the industry have resulted in SONI increasingly being asked to provide independent expertise and evidence to decision makers, including Westminster committees and local government departments.

For the purposes of this Forward Work Plan, SONI has divided this role into three services as demonstrated in Figure 11 below:

Figure 11: Overview of SONI Role 2 Independent Expert



1.1 Layout of Role 2

The SONI TSO Forward Work Plan is comprised of a number of chapters and appendices. To aid with the review of our plan, we have provided an overview of the chapter below, with the relevant section headings

1.2 Section Overview

Role 2: Independent Expert

- **Expert Voice**
  - NI Voice
  - Representation in Europe
  - Transparency Information
- **Industry Governance**
  - Grid Code Management
  - EU Network Code Implementation
- **Regulatory Engagement**
  - Transparency for Regulatory Purposes
  - Quality of Information Provision to Regulator

SONI Key Performance Indicators for Role 2

SONI Deliverables for Role 2

SONI Stakeholder Engagement for Role 2

SONI Performance against Regulatory Criteria

- **Outcomes**
- **Ambition**
- **Accountability**
- **Alignment to the UR Priorities**

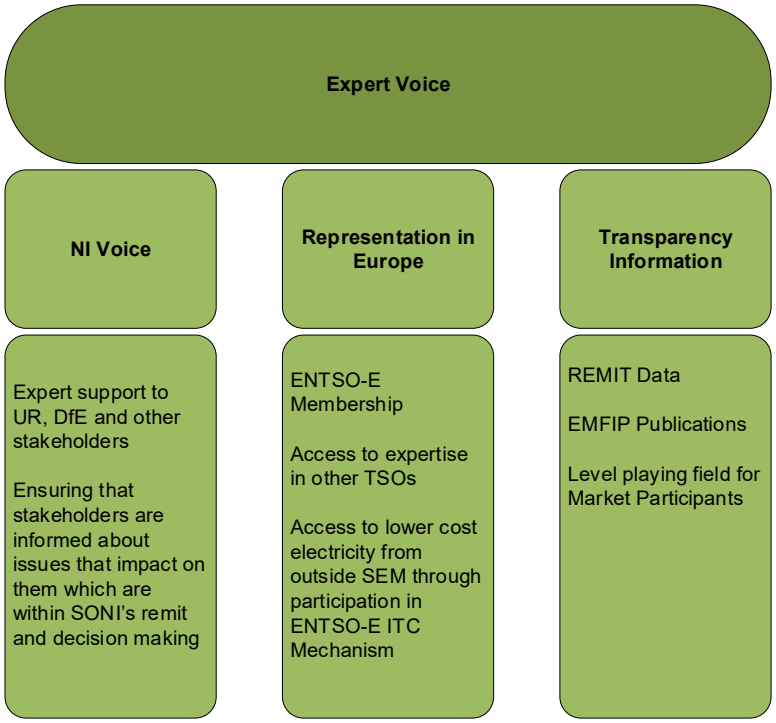
Expert Voice

SONI's independence and expertise places it in a unique position to provide information about industry issues to elected representatives and other key decision makers. We have been invited to present to committees at Westminster and Stormont. Topics covered have included security of supply and the impact of Brexit. We are currently working with the Department for the Economy (DfE), to support its development and delivery of the Energy Strategy for Northern Ireland.

SONI also represents the needs of the electricity industry in Northern Ireland at a European level. While membership of ENTSO-E[45] is mandatory, SONI uses this to ensure that the EU Network Codes and other legislation is fit-for-purpose for a small peripheral system, as well as the highly interconnected systems in Europe.

Transparency is vital for a functioning competitive market. SONI provides data to the European Transparency Platform; we have included this activity within the expert voice service because our independence is essential for ensuring trust in these data.

SONI has highlighted the service activities and associated outputs throughout this service area below, and further expanded on the key performance indicators and deliverables in the sections towards the end of this section.



[45] European Network of Transmission System Operators for Electricity. The 43 member TSOs representing 36 countries are responsible for the secure and coordinated operation of Europe's electricity system, the largest interconnected electrical grid in the world.

1. NI Voice

What SONI does

When considering our role under the NI Voice service area, we include activities such as providing expert support to the UR or the Department for the Economy. It also includes the activities that we undertake to ensure that stakeholders are informed, through the consultations, workshops, working groups and publications that we provide.

SONI's suite of obligations means that it has access to considerable information and insight into the electricity industry in Northern Ireland and Ireland. Statutory decision makers such as Stormont committees; government departments in Northern Ireland and the UK; the SEM Committee and the UR all rely on factual independent evidence provided by SONI when they are considering issues and policy.

SONI has responded to these requests through regular meetings with government departments and facilitating industry events, such as the NI Chamber of Commerce Energy Forums and responding with detailed submissions to the DfE Northern Ireland Energy Strategy Consultations and collaborating with industry on areas such as the energy transition.

Historically, SONI has provided evidence to many government committees including the Northern Ireland Affairs Committees of the House of Commons and House of Lords. We have supported government departments with the assessment of the implications of Brexit and we regularly provide expert speakers for industry conferences. SONI has given consideration to the significance of this role and our key learning has been the importance of ensuring that this wider influencing service is given sufficient priority due to its ability to deliver substantial benefits.

SONI also has an obligation to ensure a level playing field. One of the ways we ensure this is to make certain information available to the public and our stakeholders in order to keep them informed. We have highlighted some of the key publications in the diagram below.

Tomorrow's Energy Scenarios Northern Ireland (TESNI)
A wide ranging analysis of NI's electricity future over the next 20 years, and is carried out every 2 years.

Consultation is carried out on the TES to ask the energy industry, members of the public and interested groups to provide feedback on the scenarios. Feedback received on the TES Consultation is used when developing the final TES publication and the associated dispatch modelling.

Transmission Development Plan Northern Ireland (TDPNI)
An outline of how SONI propose to improve and develop the transmission grid over the next 10 years.

Consultation is carried out on the TDPNI to provide customers, stakeholders and the public the opportunity to comment on and influence the TDPNI and associated environmental reports.

SONI then test the plan alongside the feedback received and then use this to finalise the final report.

SONI Website
Our SONI wesbite has a dedicated General Customer Information page which also highlights areas of information for interested parties as detailed below:

- Transmission Use of System Charges
- Outage Information
- Transmission Loss Adjustment Factors
- Transmission Interface Agreements
- Transmission Connection Policy
- FAQs and ATRs
- DS3 System Services and Other System Charges
- SEMO
- The Grid Code
- Connections and Applications Register
- Business Continuity

Generation Capacity Statement (GCS)
In this statement we outline the expected electricity demand and the level of generation capacity that will be required on the island over the next ten years.

The GCS covers Northern Ireland, Ireland and All Island. It uses a range of scenarios to forecast electricity demand over the time horizon of the report in order to provide the findings, in terms of the overall demand and supply balance, which should be useful to market participants, regulatory agencies and policy makers.

Ten-Year Transmission Forecast Statement (TYTFS)
The All-Island Ten Year Transmission Forecast Statement (TYTFS) provides the following information:
• Network models and data for the all-island transmission system;
• Forecast generation capacity and demand growth;
• Maximum and minimum fault levels at transmission system stations;
• Predicted transmission system power flows at different points in time;
• Demand and generation opportunities on the transmission system

How SONI does this

We recognise that customers must be at the heart of decisions. They will need to support network, operations and market developments and customers will have to be empowered in how they use and pay for electricity. We are committed to working with UR, DfE and the Consumer Council and other representative bodies to find new and effective ways to bring customers and their representatives into what are challenging and technical conversations.

Over the period 2021 to 2022, we envision our activities in this area expanding as a result of the publication of the Northern Ireland Energy Strategy and the action plans therein. SONI will seek opportunities for collaboration with the UR and DfE to further engage in those areas and ensure we provide key information to assist with the energy transition throughout 2021/22 and beyond.

This year we have raised the bar in terms of the dissemination of our trusted expert voice; through the Shaping Our Energy Future Consultation and through the development of our Roadmap.

The development of the Shaping Our Electricity Future has taken us two years; tens of millions of technical simulations and we have been cognisant of the need to ensure the outputs align to the forth coming Northern Ireland Energy Strategy. We have worked closed with DfE in relation to the strategy, supporting our colleagues with data and expertise. We have engaged with Economy Ministers and have taken on board their strong signposting of a target of at least 70% of electricity from renewables by 2030.

We have participated in DfE's thematic working groups, engaged with the electricity and energy industry and proffered solutions in collaboration with the DSO, NIE Networks and the Utility Regulator.

We ensure our engagement with all stakeholders facilitates two-way information flows and as a result, all our key partners mentioned above have had the opportunity to input into the Shaping Our Electricity future proposition. We have collaborated with and involved DfE from the outset of this project, ensuring our roadmap is aligned as far as possible with the Executive's policy ambition. In addition, we will evolve the roadmap as required, in response to policy changes.

At the outset of Shaping Our Electricity Future, due to its significance and what it could mean to Northern Ireland's clean energy ambition, we had the objective of engaging with the various groups as the heart of the process. This included the government, Utility Regulator, industry representatives, councils, consumers, communities and landowners.

In March 2021, following engagement with DfE, UR, NIE Networks, CCNI and Renewables NI, we launched our most extensive public consultation to date.

We know that the development of the transmission grid can be emotive and involves change and new developments. Ultimately it is the elected representatives who will make the planning decisions on our projects,and so we ensured that our network propositions are the most visible, accessible and the focus of our public consultation.

We set ourselves a goal of trying to engage with representatives of almost all parts of NI society, to involve those sections of the community that traditionally have not been engaged in conversations about Northern Ireland's energy future.

It was important that this consultation was promoted in a cost-effective manner, which meant relying on our existing partnerships, good relationships and existing networks.

Over a 14 week period SONI drove a series of briefings, events and communication outputs, including winning earned news coverage across print, broadcast and online and utilising all channels and platforms and partner amplification available to us.

Some highlights included briefings with the Economy Minister, the Agriculture and Environment Minister, the UK's climate change committee, BEIS, the UR's consumer vulnerability working group, and direct engagement with NI Chamber, IOD NI, CBI, UFU,

local councils, Environmental NGOs and additional membership organisations. We also held an industry forum and our first ever civil society forum.

In parallel, briefings and engagements with DfE, UR and NIE networks continued –as we brought them on the journey with us.

Figure 12 outlines the breadth of our Engagement outputs during this 14-week period.

Figure 12: Overview of SONI Consultation and Engagement Activities

We are now in the process of analysing the feedback available to us, as a result of the consultation submissions and through our extensive events and briefings programme.

These views will be fed into the Shaping Our Electricity Future Roadmap which will be published and briefed on through another series of events later in the year.

Shaping Our Electricity Future has transparency, clarity and accessibility at its core and this is more important than ever due to the rapid changes in the way society consumes and generates electricity.

The number of customers connected to the transmission system in Northern Ireland is increasing with renewable and conventional generation customers and potential data centres.

In the past, most customers planning a new connection would have industry experience, but with new technologies and interest in renewables investment, the customers are less informed about our specific industry and its processes (e.g. potential customers from outside the energy industry considering the connection of battery installations in Northern Ireland). Consequently, we need to create world class stakeholder relationships to ensure that we can continue to meet the needs of new and existing customers.

Consultation with our stakeholders on their evolving needs will form a key part of our work in the next year. We intend to undertake a stakeholder needs assessment. This will inform the development of our Enhanced Customer and Stakeholder Strategy and resulting annual implementation plans.

Through the Shaping Our Electricity Future engagement we know that there is an appetite for increased engagement on electricity from all sectors. We also know that due to our role, we are uniquely placed to impart independent, data based thought leadership, with the success of Shaping Our Electricity Future engagement programme, giving us the expertise and confidence to do so.

SONI has reviewed our historic performance in each TSO role, as per the UR's Guidance on the Evaluative Performance Framework[46], based on our 2019 performance. SONI acknowledges feedback from stakeholders that our engagement has improved since 2019, however we consider there will be further improvements that can be made as a result of our planned stakeholder approach for Shaping our Electricity Future programme. SONI also considers that this will enhance our four SONI outcomes, in particular SONI service quality.

Public acceptance must be at the heart of our approach to grid delivery in Northern Ireland and critical to the success of the energy transformation. We also recognise that engagement should not be limited to those directly affected by grid development plans, and that every energy citizen should have opportunities to give their views on how SONI is contributing to delivery of the energy transition and the ultimate net zero ambition.

In order to represent the NI Voice over the period 2021 to 2022, as advised above, SONI will:

- Establish a Shaping Our Electricity Future Advisory Council
- Hold Civil Society Forum, Industry Forum and additional briefings and workshops to support the Shaping Our Electricity Future Roadmap
- Coordinate regular Shaping Our Electricity Future Industry Forum – every 6 months
- Ensure that the Shaping Our Electricity Future Roadmap is transparent, accessible and promoted in a cost-effective manner through organic/earned media
- Engage elected representatives and council officials in relation to the Shaping Our Electricity Future, Transmission Network Development Plan and key projects (relevant to council areas)
- Continue the utilisation of our Consultation Portal for key SONI consultations on both industry and network investments and seek new and innovative means for project specific engagement via a blend of digital and traditional methods.

[46] epf-guidance.pdf (uregni.gov.uk)

Some key publications are also developed and approved by the UR ahead of publication to ensure that we represent all the information available to stakeholders and reflect any updates as they appear. This includes delivering on the Generation Capacity Statement ("GCS") by Q3 2022 and launching a consultation on the Transmission Development Plan for Northern Ireland ("TDPNI") by Q2 2022.

SONI also provides regular updates on system alerts, publications and upcoming events through our info@soni.ltd.uk point of contact. We provide regular updates through this communication channel, as well as our twitter feed and website.

SONI considers that the activities in this area, intertwined throughout the four roles, will enhance our service quality.

Key Activities: The key activities linked to this service include GB/SEM Post BREXIT Trading, the delivery of GCS, TYTFS, TDPNI. It also includes providing support to DfE on Northern Ireland Energy Strategy and our Shaping Our Electricity Future Engagement work.

Key Performance Indicator: In order to measure our success in this area we will monitor our activities, in particular ensuring the timely delivery of our publications alongside the programme delivery for our activities identified throughout this section.

2. Representation In Europe

What SONI does

SONI considers that our Representation in Europe service is a key area in order to ensure that we are fully informed of the developments of any European Legislation, such as the Electricity Balancing Guidelines and the Clean Energy Package, in order to ensure that we are proactive in our duties with these obligations and also to ensure that we represent the NI voice throughout these engagements as TSO for Northern Ireland.

This service area includes activities such as:

- ENTSO-E Membership
- Access to Expertise in other TSOs
- Access to lower cost electricity from outside SEM through participation in ENTSO-E ITC Mechanism

ENTSO-E[47] is the European Network for Transmission System Operators for Electricity, which represents 43 electricity transmission system operators from 36 countries across Europe.

As an engaged member of ENTSO-E, we will continue to use our influence to ensure that the rules established for our synchronous system remain appropriate for our circumstances. SONI will continue to represent the interests of Northern Ireland in Europe through its work at ENTSO-E.

Brexit has decoupled the SEM and GB markets from the European day-ahead market and capacity calculation process and as a result, there is no longer any day-ahead trading on the SEM-GB border. The pre-existing (interim) intraday arrangements between SEM-GB are still active, which enables trading across the two interconnectors in this time frame. Under the Trade and Cooperation Agreement ("TCA") between the GB and EU, new arrangements will be required for day-ahead capacity allocation and capacity calculation. The proposed capacity allocation process that is being examined at present is based on multi region loose volume coupling ("MRLVC") for the day-ahead time frame with an associated capacity calculation process. This work is being progressed in a co-ordinated approach between the UK TSOs, EU TSOs and ENTSO-E.

SONI would consider that alongside the post-Brexit trading arrangements, the most relevant work in this area is our ongoing input to the in development of new and updated Network Codes.

SONI's engagement in this area is reflected in our participation of ENTSO-E consultation exercises, such as the Ten-Year Network Development Plan ("TYNDP"). SONI is also

[47] SONI is obliged to be a member of this organisation in line with the Electricity Regulation and the terms of the Withdrawal Agreement between The UK Government and the EU.

engaged with ENTSO-E and other TSOs through the work planned to implement the Common Grid Model (see Role 1 System Operation and Adequacy).

Access to expertise in other TSOs is particularly important. SONI is actively engaged with TSOs from across Europe, primarily through its role in the EU SysFlex service area (see Role 1, Ensuring System Adequacy, Facilitation of Renewable Generation). As the energy transition unfolds it is particularly important to work together in collaboration with other TSOs such as EirGrid and National Grid ESO as well as other European TSOs through our participation in ENTSO-E and EU SysFlex.

How SONI does this

SONI also actively represents Northern Ireland interests in Europe. We use our membership of ENTSO-E to ensure that developments at that level are suitable for a small electricity system like that in Northern Ireland. Legally binding regulations made at European level have the potential to provide great benefits for our system and can reduce costs for customers here through standardisation and competition. However, these regulations could also have the opposite effect if they are not constructed in a way that accommodates our needs as the operator of a relatively small synchronous system.

Therefore, this is a vital part of our delivery and our high-level duty to ensure that there is an economic and efficient system for the transmission of electricity in Northern Ireland. This service delivers substantial value for Northern Ireland, through support for projects that reduce the cost of electricity and appropriate definition of obligations set at European level.

Access to lower cost electricity from outside SEM through participation in ENTSO-E ITC Mechanism is another output provided within this service area and coincides with our interactions in Europe**.** Despite the UK leaving the EU on 31 January 2020, SONI continues to be required to comply with EU legislation relating to the electricity wholesale market[48] .

The ITC mechanism allows transmission system operators to receive compensation for the costs of hosting cross-border flows on their networks. This compensation shall be paid by the operators of national transmission systems from which cross-border flows originate and the systems where those flows end. The details of the ITC mechanism were developed by ENTSO-E. These were approved by the European Commission.

ACER (Agency for the Cooperation of Energy Regulators) monitors[49] the implementation of the ITC mechanism as well as the management of the ITC fund and reports to the European Commission.

[48] https://www.legislation.gov.uk/nisr/2020/307/regulation/8/made
[49] http://acer.europa.eu/en/Electricity/Infrastructure_and_network%20development/Pages/Inter-TSO-compensation-mechanism-and-transmission-charging.aspx

The ACER monitoring report[50] advises:
"*TSOs or groups of TSOs being treated as a single unit participating in the ITC mechanism ('ITC Parties') receive compensation from the ITC Fund based on the transits they carry and contribute to the ITC Fund based on their net import and export flows. Non-participating countries connected to the ITC Parties' networks ('Perimeter countries'3) pay a transmission system use fee for their scheduled imports from and scheduled exports to the ITC Parties' networks. As such the ITC Fund is mainly a redistribution of yearly payments among the ITC Parties"*

Northern Ireland benefits from the transfer of electricity across the European Network because it is a net importer of electricity. Losses are incurred on these transfers of electricity across Europe and the purpose of the ITC mechanism is to ensure that the losses are paid for by the countries that benefit from the flows.

Given our proposed activities in this area, alongside our day to day engagements for the Representation in Europe service, we anticipate that this will bring benefits to SONI and therefore the Northern Ireland consumer.

Key Activity: As detailed above, our key activities within this area include our ongoing activities in the development of new and updated Network Codes and participation in the ITC scheme. These are expanded on in the section, SONI Deliverables.

[50] Microsoft Word - 2021-10-18_ITC monitoring report 2020-draft-for-BoR (europa.eu)

3. Transparency Information

What SONI does

SONI recognises that transparency in the decisions we make and the risks we manage is an important part of our resilience and accountability as a company.

When the SEM Committee was developing the new trading rules, a concern emerged around the transparency of the new more complex market. Transparency is also a foundation that the current European market is built on. SONI has an important role as the provider of Northern Ireland's transparency data to the European platforms. We also publish increasing amounts of information about our own scheduling and dispatch processes[51].

The main outputs in the transparency information provision area pertain to REMIT data, European transparency publications and ensuring that we provide a level playing field for market participants.

The goal of REMIT is to increase integrity and transparency of wholesale energy markets in order to foster open and fair competition in wholesale energy markets for the benefit of final consumers of energy.

REMIT specifically comes from the Regulation (EU) No 1227/2011[52] of the European Parliament and of the Council on Wholesale Energy Market Integrity and Transparency ("REMIT").

The requirement to provide transparency is an overarching obligation. We support the transparency objective through the design of our process and tools to feed a wide range of publications as described in section 6 of the Balancing Market Principles Statement[53] (BMPS). More information can be found on our regulatory obligations in the BMPS.

European regulations require SONI as TSO to provide a significant volume of transmission and market system data to ENTSO-E and ACER platforms. SONI provides substantial sets of information on the electricity grid and on the operation of the market to ENTSO-E and ACER on an ongoing basis ranging in frequency from real time and hourly to annually.

How SONI does this

The REMIT & Transparency Platforms European Agency Reporting includes the market data which will be made available for sending to the European Agencies. This information

[51] https://www.soni.ltd.uk/media/documents/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf - please see Section 4 for The Scheduling and Dispatch Process
[52] As listed in the Withdrawal Agreement between the UK Government and the EU.
[53] https://www.soni.ltd.uk/media/documents/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf – please see Section 2.2 Provision of Transparency and Appendix 1.5 Transparency Obligations Framework

is made available for ACER and ENTSO-E (European Network of Transmission System Operators for Electricity) as part of regulatory requirements.

The European Internal Electricity Market is built on the principle of a level playing field, which is facilitated by TSOs who have been certified as independent of any interests in generation and supply. This role includes publishing analysis on the expected need for generation and identifying opportunities that arise from future transmission network investments. The changes introduced by the Utility Regulator following SONI's certification in 2013 expanded SONI's obligations in this area.

It is important that all stakeholders, new applicants and experienced participants, all have access to the same publicly available information to allow them to make informed decision on a balanced scale with the same level of detail, in order to promote competition within the market.

A key business improvement that we will be undertaking over the period will be the preparation and publication of our 2021 Annual Innovation Report. This is included in our transparency information area as part of this annual innovation reporting process, we will seek to consult on our multi-year innovation programmes. The proposed strategic innovation programmes are SONI's view of the crucial areas of innovation that need to be investigated to ensure we can respond effectively to the challenges ahead.

Transparency is one of the four core values of SONI and we build this into not just our strategic initiatives but into our daily activities and communications internally and externally.

SONI considers these activities within the transparency area will enhance our four SONI outcomes, in particular decarbonisation and SONI service quality.

Key Activity: As indicated throughout this area, the key activities over the period will be the publication of the Annual Innovation Report and IT related work to support the submission of data to Europe. We also detail the Annual Updating and Consultation Process of the BMPS in the section, SONI Deliverables.

Key Performance Indicator: In order to measure our success in this area we will monitor our timescales for delivering on our key activities to ensure they are achieved in a timely manner.

Industry Governance

SONI is responsible for maintaining the Grid Code. This sets out the technical rules and procedures that SONI and all users of the system must comply with. It covers a wide range of topics including:

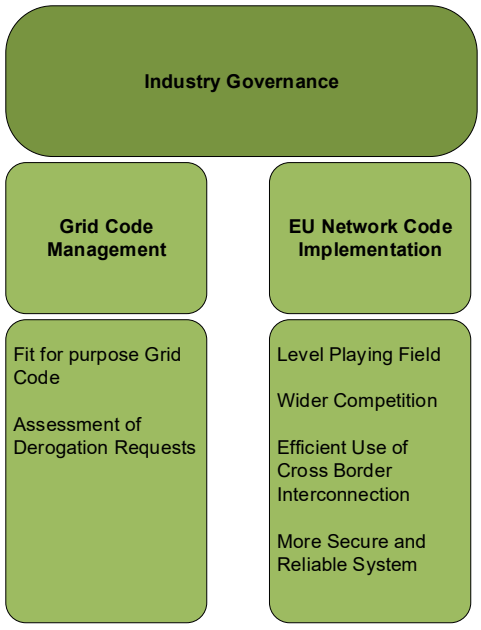
- The connection of generation;
- Technical requirements that generators and demand side units must comply with;
- Outage planning;
- How SONI schedules and dispatches service providers; and
- Metering requirements.

The I-SEM project integrated the wholesale market on the island of Ireland with the wider European market. To ensure a level playing field for all parties competing in this pan-European market, ENTSO-E has developed a series of Network Codes. These sit above the Grid Code in the legal hierarchy. SONI has helped to shape these Network Code requirements to ensure they are appropriate for our system. We are also implementing them, in conjunction with EirGrid, the UR and the CRU. This initiative facilitates competition across Europe, driving down prices for consumers, while improving security and reliability.

SONI also has a representative on the Trading and Settlement Code Modification Panel and the SEMOpx Rule Modification Panel.

SONI has highlighted the service activities and associated outputs in figure 13 below and will focus on the three service areas in the next section.

Figure 13: Industry Governance Service Areas



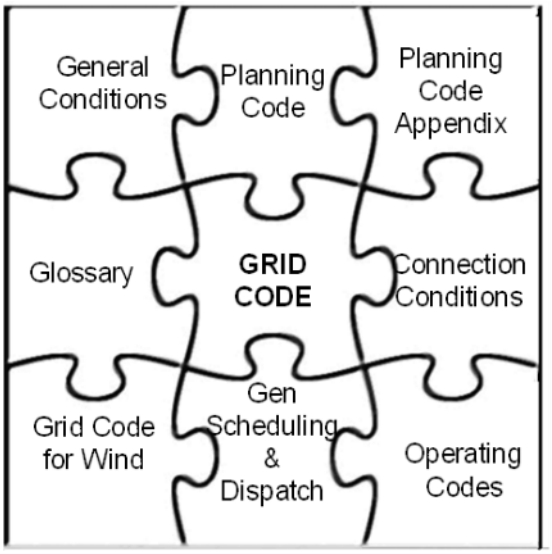
1. Grid Code Management

What SONI does

The main technical requirements to be met by users of the transmission system are outlined in the SONI Grid Code[54]. This Code sets out the principles governing SONI's relationship with users and technical standards to be complied with. The Code specifies procedures for planning, connecting to and operating the transmission system. Figure 14 highlights the interactions within the SONI Grid Code.

SONI is responsible for keeping the Grid Code up to date and meets with users on a regular basis to discuss any necessary modifications. Modifications to the Code must be approved by the Utility Regulator ("UR").

Figure 14: Overview of Grid Code Interactions



Other activities which are captured under the Grid Code Management service area include grid code management, ensuring a fit for purpose grid code and the assessment of derogation requests.

The SONI Grid Code Review Panel (GCRP) is a standing body mandated to review and discuss the SONI Grid Code, its workings and offer suggestions for amendments. Each member of the GCRP represents the interests of their respective industry and has the responsibility of engaging with their constituents and discussing their views. Membership of the SONI GCRP can be found on our website[55].

The SONI Grid Code Review Panel meet regularly to discuss topics such as ongoing work on the Network Codes, proposed modifications or derogations to the SONI Grid Code and

[54] SONI-Grid-Code-8th-October-2020.pdf
[55] https://www.soni.ltd.uk/media/documents/NI-Grid-Code-Membership_2021.xlsx

actions taken away from previous meetings. Part of the SONI Grid Code Review Panel's discussions surround (but are not limited to):

- Review & discuss Grid Code & its workings;
- Review & discuss proposed modifications to Grid Code
- Interpret provisions of Grid Code

Given the representation from industry and regulation, it provides a forum for welcome engagement and an opportunity for stakeholders to present their views for SONI and the UR to consider and act upon.

The SONI Grid Code specifies procedures for planning, connecting to and operating the transmission system. SONI is responsible for keeping the Grid Code up to date and meets with users on a regular basis to discuss any necessary modifications. Modifications to the Code must be approved by the Utility Regulator. Ensuring a fit for purpose Grid Code is essential to the safe and resilient operation of the Transmission System.

SONI, in its role under Grid Code Management, has a duty to be compliant in the assessment of derogation requests from participants.

It is important to highlight:

- A *modification* is a change in the text of the SONI Grid Code. It can change the meaning of a clause for all applicable users.
- A *derogation* from a clause exempts the Applicant of that derogation from complying with the provisions of that clause.

How SONI does this

In order to support the efficient running of the Single Electricity Market, certain sections of the Grid Code come under common governance. Modifications and derogations to these sections require agreement and direction from the UR, CRU and the TSOs affected.

SONI is currently progressing improvements to this area, which includes a planned initiative, the Minimum Generation Requirements Study, as well as our 'business as usual' improvements to be made through a Modifications Governance review.

SONI has been responsive to the stakeholder feedback provided to the UR as part of their consultation on the Guidance on the Evaluative Performance Framework. Stakeholders indicated their preference towards a list of suggested performance indicators that they considered relevant to the SONI Forward Work Plan. SONI has considered this list against the planned activities within this area and aligned our SNSP metric towards measuring our success in this area. This is expanded on further in the section, SONI Key Performance Indicators. We will also measure our success using a compliance register to objectively validate our consistent and timely compliance with the European Network Codes.

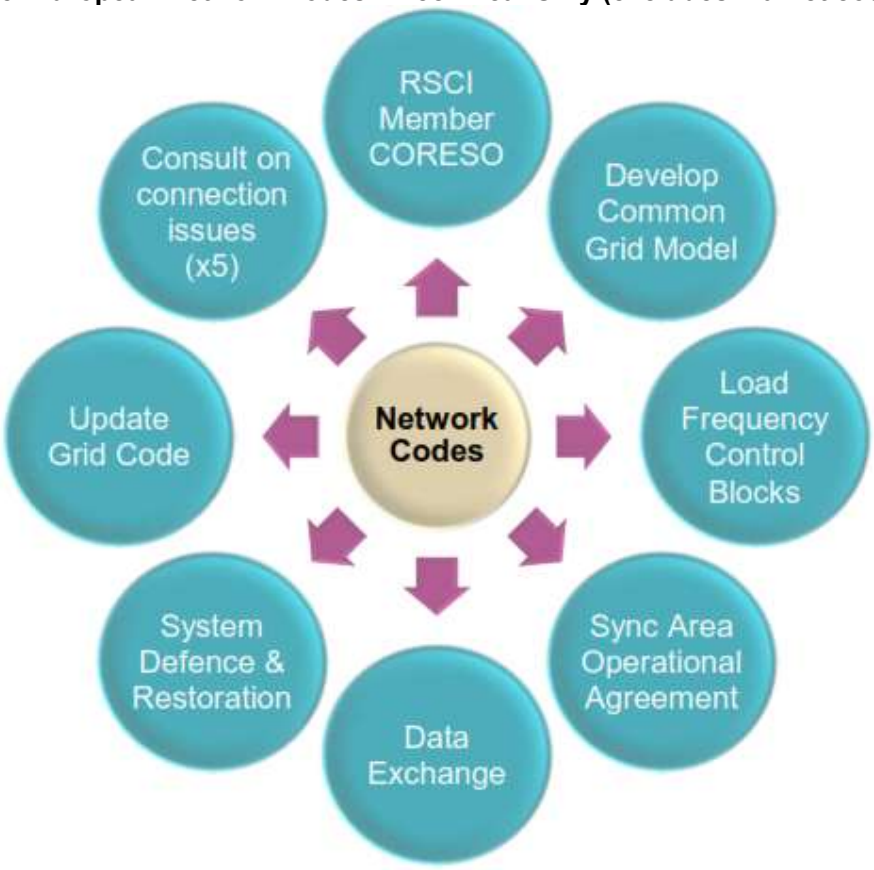
Key Activities: As indicated above, our key activities over the period within this area pertain to both the Minimum Generation Requirements Study and Modifications Governance. These are detailed further within the section SONI Deliverables for Role 2.

Key Performance Indicator: In order to measure our success in this area, we will monitor the timescales for delivering our key activities to ensure these are achieved in a timely manner. We will also consider the impact that these activities may have on system non-synchronous penetration and as such consider monitoring this performance indicator as a suitable measure also.

2. EU Network Code Implementation

What SONI does
SONI is currently implementing the EU Network Codes (Figure 15).

Figure 15: European Network Codes – Technical Only (excludes market codes)



The EU Network Code Implementation also includes ensuring a level playing field, promoting wider competition, the efficient use of cross border interconnection and ensuring a more secure and reliable electricity system.

How SONI does this
Over the past several years, SONI has engaged with other members of ENTSO-E to work in collaboration in the development of the European Network Codes. Our focus now is to identify what necessary changes are required in Northern Ireland to ensure that we are compliant with these new rules.

Under the Withdrawal Agreement between the UK Government and the EU, SONI is required to implement and comply with European Network Codes,

It is important that potential providers have access to information that indicates the expected requirements, prepared on a technology neutral basis. SONI produces a number

of forward-looking documents, in accordance with its licence, that provide these long-term market signals to potential and current providers.

It is also important that the technical framework, under which the required services of providers are delivered, is stable and managed by a party that is independent of any commercial interest in the generation or supply of electricity. SONI has been certified as independent of generation and supply by the European Commission. This independence ensures that all parties in the market compete on a level playing field.

SONI's TSO certification was part of the wider programme of liberalisation by the European Commission designed to promote competition in the energy market across Europe. Increased competition in the market will increase efficiency and offer increased customer choice.

By harmonising how grids operate across Europe and by developing tools for closer grid coordination, Network Codes contribute to making the best use of our power network. This not only increases security of supply[56].

The increased efficiency within the market, resulting from the codes, will therefore boost our competitiveness. By setting rules for connecting large renewable sources of electricity to the transmission system, the codes will also help develop the green economy.

SONI would highlight the key activity in relation to EU Network Code Implementation is the development of additional European Network Codes to cover technologies / issues not addressed at present. This is a significant activity in this service area, given the importance of the energy transition in achieving our renewable and net zero carbon targets. Furthermore, there will be an emergence of new technologies over the next number of years and it is imperative that SONI is proactive in its approach, rather than reactive. This approach will ensure SONI is not an obstacle to progress, and will help us to achieve these targets whilst enabling stakeholders to play their role in the energy transition.

SONI expects the activities within this area will bring about enhancements to our four SONI outcomes, such as SONI service quality.

In order to monitor our success in this area, we will regularly review our achievements in comparison to our target delivery dates, making efficiencies where possible. We will also, through the use of a compliance register, objectively validate our consistent and timely compliance with the European Network Codes.

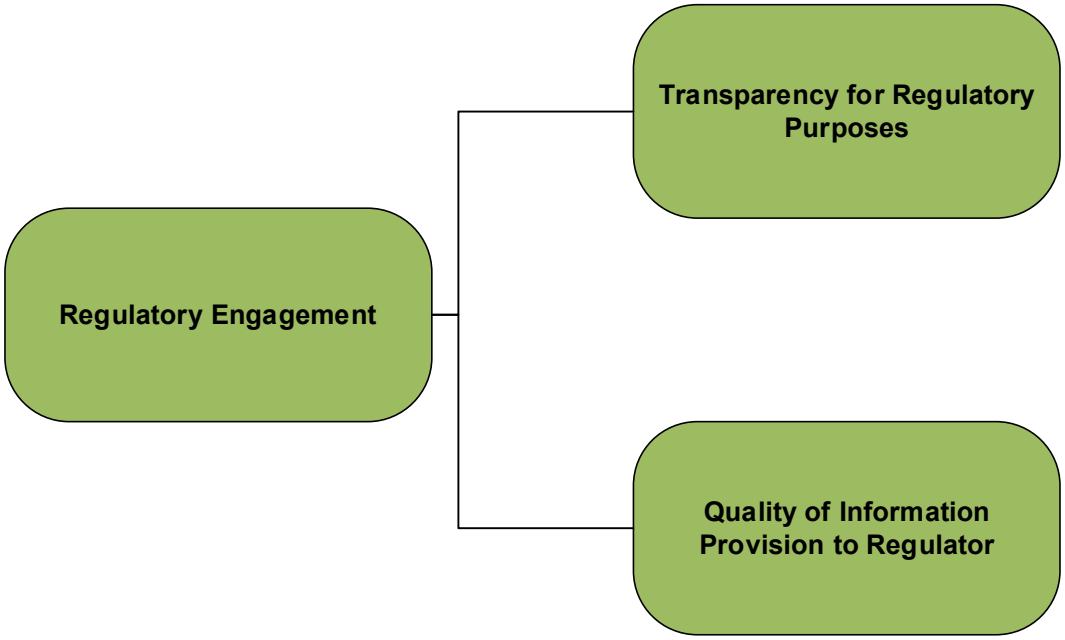
Key Activity: The key activities within this service area pertain to our work in the Future Arrangements – Electricity Balancing Guidelines ("EBGL"), our Common Grid Model programme and the development of SONI Grid Code Updates

Key Performance Indicator: None Identified

[56] Brexit has temporarily impacted on this.

Regulatory Engagement

SONI will continue to invest its time and resources in a strategic and transparent approach to regulatory engagement.



We expand further on these two areas within the sections below.

1. Transparency for Regulatory Purposes

What SONI does

SONI considers Transparency for Regulatory Purposes a vital role in ensuring that we can operate the Transmission System in a safe and resilient way, even in an indirect fashion.

SONI is obliged under our TSO licence, and other legislation to provide specific and detailed reports to the UR for funding purposes and also for the publication of certain reports that are then made available to customers.

In these situations, it is vital that we provide clear and accurate information for the UR, to ensure they may make a balanced decision based on the information provided. Providing the right level of information is also important, as it helps prevent potential delays in workstreams, resulting from inadequate information and ensures efficient deployment of necessary resources only.

How SONI does this

This is achieved by ensuring the correct amount of information is provided to the UR, therefore reducing the need for additional follow up queries. In some circumstances, where projects or publications require a longer period of time, this is done through planned and regular engagements and working groups, with a clear structure and timeline in order to manage the UR's expectations and provide the appropriate level of time in advance for any approval processes that the UR is required to undertake.

SONI engages with the UR at different levels across various different business service areas, including monthly working level meetings across the whole SONI business and Grid Code Review Panel engagements, as detailed in the previous Grid Code Management Section. There are also monthly Director level meetings. In our Markets related functions, we engage directly with UR teams on project related developments regularly.

It is important that SONI is actively engaged with the UR as this allows for knowledge sharing when complexities arise, which is likely as we progress further with the energy transition and the deployment of new technologies. It also promotes the culture of effective engagement and collaboration, and allows for transparency, as demonstrated on numerous working groups as these provide a suitable forum to raise potential issues and propose potential solutions rather than interacting on an individual basis ad hoc.

We work with the UR in a transparent manner and are seeking to enhance the information that we provide as part of the uncertainty mechanism processes, reporting processes and in general to any requests for information that we receive on an ad hoc basis. We actively engage and set out a clear structure to our engagement in advance of any publication, in order to effectively manage the publication processes and ensure that the UR is fully informed of what is being advised to our stakeholders within these publications.

Key Activity: monthly engagement activities with the UR where we are transparent and openly engaged in providing updates on our programmes of work and respond to any questions put to us by the UR.

Key Performance Indicator: None identified

2. Quality of Information Provision to Regulator

What SONI does
As detailed in the previous section, Transparency for Regulatory Purposes and providing the right quality of information to the Utility Regulator is of vital importance for two reasons. Firstly because this ensures the efficient deployment of the necessary resources only, for both SONI and the UR. Secondly, the provision of high-quality information will only improve relationships and build trust between all parties that the information is accurate and to a high standard.

How SONI does this
SONI would emphasise that this is an area that will demonstrate significant growth over the coming years.

The Evaluative Performance Framework requires three key outputs during a normal year – please note that this is a transitional period for 2021-22 and as such the introduction of an annual Forward Work Plan is the first step in implementing this new process. The three key outputs are:

- The Forward Work Plan;
- The Mid-Year Review;
- The Annual Performance Report

For this period, SONI will be assessed on this Forward Work Plan. The UR will invite submissions for stakeholders to provide feedback on this plan and this will be taken into consideration for the assessment. This will provide SONI with key feedback on the content of our Forward Work Plan, alongside the planned work. This stakeholder insight will provide SONI with additional valuable information which we can consider and be responsive to for the year ahead.

SONI engages with the Utility Regulator at different levels across various different business service areas, through monthly working group meetings. This is particularly beneficial within the Quality of Information Provision to Regulator, as it provides a suitable forum in order to constructively engage and provide information efficiently as well as resolve any potential issues, such as unexpected complexities in project delivery, as they arise.

Key Activity: A key activity during this first assessment period will be for SONI to consider the stakeholder responses to the UR's consultation on our Forward Work Plan. We will be reviewing these responses to determine the changes we need to make to our next revision and also ascertain how we can improve communications with stakeholders.

Key Performance Indicator: In order to measure our success in this area we will monitor our timelines for the associated activities to ensure that each of the milestones are met.

SONI Key Performance Indicators for Role 2

SONI has reviewed its activities within this role and we will have a focus throughout the period on the development of associated key performance indicators in order to measure our success across each relevant service area.

The UR held a consultation on their Guidance on the Evaluative Performance Framework. Stakeholders provided submissions to the UR on their guidance and the metrics which they considered relevant to SONI's assessment. Throughout each role, SONI has been responsive to stakeholders feedback, applying the most appropriate metric suggested by stakeholders to each role, should the metric be impacted by the work conducted in each service area.

Role 2 represents a number of activities which have more qualitative than quantitative aspects and as such it is difficult to determine the levels of success these areas. These include engagement activities, collaborative discussions and representing the NI Voice.

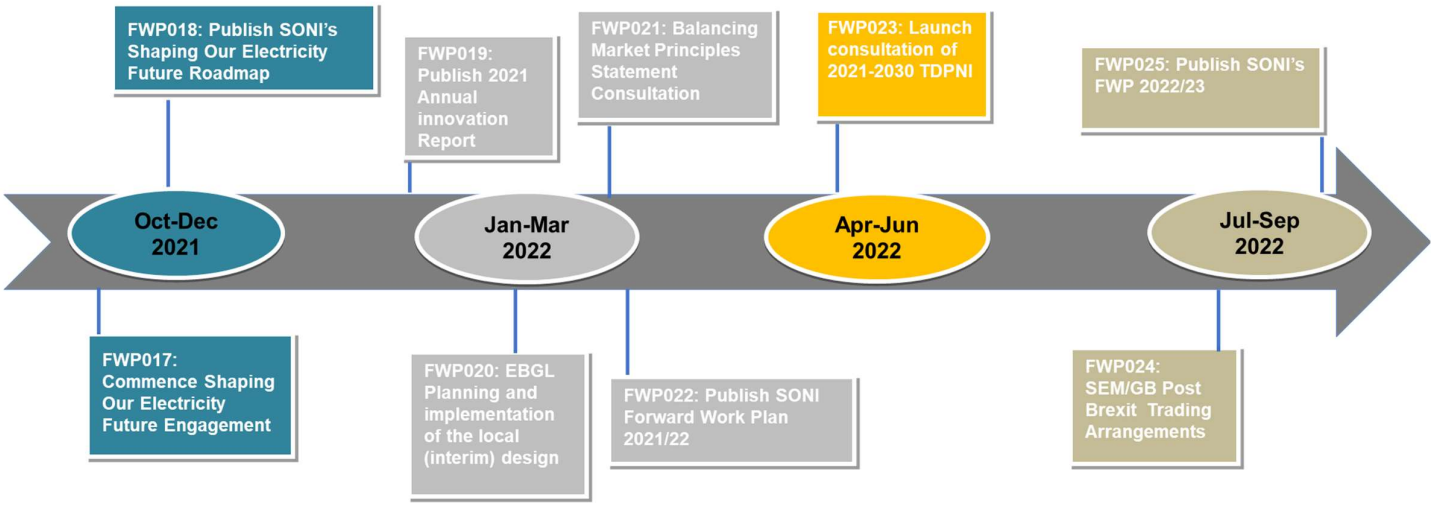
This is an area for development and SONI anticipates that we will be able to devise suitable measurements given the assessment by the UR and the independent panel. Furthermore, any stakeholder submissions provided to the UR on SONI's Forward Work Plan should provide beneficial feedback which may be applied to this role.

SONI Deliverables for Role 2

Throughout this section, which covers Independent Expert, we have provided an overview of each area within the business which contributes to this role. At the end of each of these corresponding business areas, we have indicated the key strategic initiative or business improvement to be undertaken which we expect to result in improving the metrics provided in the previous section or enhance the four SONI outcomes. We have detailed below the associated programme of activities for each of these areas, alongside the benefits we anticipate it will bring and any corresponding performance indicator that we will use to measure our success.

SONI has considered our planned activities and engagements for the period against our historic performance, using 2019 as a baseline for our role as Independent Expert. SONI considers that our performance has similarities in this role and as such, that we are demonstrating a baseline performance in this area.

An overview of our activities is detailed in the figure below.



Shaping Our Electricity Future Engagement

<table>
<tr><td>Project ID</td><td>FWP017</td></tr>
<tr><td>Project Name</td><td>SONI Shaping Our Electricity Future Engagement Plan</td></tr>
<tr><td>Project Milestone to be Achieved during period</td><td>SONI Shaping Our Electricity Future Engagement Opportunities</td></tr>
<tr><td>Project Description</td><td>SONI has undertaken its most extensive stakeholder engagement initiative for Shaping Our Electricity Future. We consider this as a step change in our approach to engagement and collaboration in line with our 5 year strategy.

Through Shaping Our Electricity Future engagement we know that there is an appetite for increased engagement on electricity from all sectors; we also know that we are uniquely placed due to our role, to impart independent, data based thought leadership; the success of Shaping Our Electricity Future engagement programme, has given us the expertise and confidence to do so.

An overview of our programme of activities is provided in the table below:
<table>
<tr><th>Project Name</th><th>Description</th><th>Start Date</th><th>Finish Date</th></tr>
<tr><td>Engage for Better Outcomes for All</td><td>Embed SONI’s enhanced 3 part process and Consultation and engagement toolkit within NI project delivery – “Putting Communities at the Heart of Grid Development.”</td><td>Q4 2021</td><td>Ongoing and subject to annual review</td></tr>
<tr><td>Council Roll out</td><td>Engage elected representatives’ CEOs, Planning officials – complete a biennial cycle of council engagement on key topics such as SOEF, TDPNI and individual project and how we engage. Including annual workshop with council planners; and regular updates to SOLACE. Supported by colleagues in NIE Networks as appropriate.</td><td>Q1 2022</td><td>Biennial Cycle subject to regular review</td></tr>
<tr><td>SOEF Updates</td><td>Support as and when required with cost-effective engagement programme with earned and organic media</td><td>Q4 2021</td><td>Until Project end</td></tr>
<tr><td>Support SONI Thought Leadership and Awareness</td><td>Support SOEF – via cost effective key influencer engagement, platform opps and earned media</td><td>Q4 2021</td><td>Ongoing</td></tr>
<tr><td rowspan="2">Engage for Better Outcomes for All</td><td>Establishment of Shaping Our Electricity Future Advisory Council</td><td>-</td><td>Q1 2022 / every 4 months</td></tr>
<tr><td>Industry briefing webinar</td><td>-</td><td>every 4 months</td></tr>
</table>
</td></tr>
</table>

		Coordinate regular Shaping Our Electricity Future Industry Forum	-	every 6 months
Target Completion Date	Ongoing throughout the period – a lot of these engagement opportunities will be recurring, and individual target dates have been identified in the table above.			
Project Benefits	Enhanced SONI Service Quality			
Key Performance Indicator	SONI will measure our success in these areas through formal and informal feedback provided by stakeholders for these engagement activities. As such, this is more of a qualitative indicator than quantitative measure for the moment.			

Publish SONI's Shaping Our Electricity Future Roadmap

Project ID	FWP018
Project Name	Shaping Our Electricity Future
Project Milestone to be Achieved during period	Publish SONI's Shaping Our Electricity Future Roadmap
Project Description	SONI undertook one of the largest engagement exercises through the Shaping Our Electricity Future Consultation which included:  Through these engagement activities, workshops and the consultation process, SONI received a substantial amount of responses from industry and the public. We have been addressing these responses in the preparation of our Shaping Our Electricity Future Roadmap and considering the synergy with the Northern Ireland Energy Strategy and are planning to launch our Roadmap in November 2021. This Roadmap draws on an extensive public and industry engagement in the first half of 2021. It identifies the network reinforcements needed to manage a fundamentally different generation fleet, new technologies and demand growth. SONI have developed corresponding engagement plans to underpin successful delivery of this network, recognising that engagement is key. In parallel, SONI will continue to work with key stakeholders in exploring the necessary market reforms to attract investment in renewable energy and System Services and to optimize participation of community owned and demand-based energy resources. The capability and tools required to operate a power system with large levels of renewable generation are also considered as part of the Roadmap. SONI will adopt a whole system approach. Our networks analysis identifies key transmission network projects in Northern Ireland. These projects will now need to be progressed appropriately through the SONI grid development frameworks. In addition, we will seek to maximise the use of existing power grid infrastructure,

	apply proven technologies, optimise the delivery of renewables and demand connections pipeline – all in the context of overall system reliability.
Target Completion Date	November 2021
Project Benefits	This activity will enhance our transparency with our stakeholders and allow SONI to listen to feedback from stakeholders in which activities are considered to bring the most benefit to consumers.
Key Performance Indicator	SONI will measure its success in this area by monitoring our target completion date for the launch of our Shaping Our Electricity Future Roadmap.

Annual Innovation Report

Project ID	FWP019
Project Name	Annual Innovation Report
Project Milestone to be Achieved during period	Preparation and Publication of SONI Annual Innovation Report
Project Description	A key business improvement that we will be undertaking over the period will be the preparation and publication of our 2021 Annual Innovation Report. As part of this annual innovation reporting process, we will seek to consult on our multi-year innovation programmes. This reporting includes both programmes covered by the regulatory price controls as well as proposed new strategic programmes. The proposed strategic innovation programmes are SONI's view of the crucial areas of innovation that need to be investigated to ensure we can respond effectively to the challenges ahead. SONI expects the Annual Innovation Report to be published in February 2022, with a consultation to be open for feedback from February 2022 to March 2022. SONI will then consider all responses provided and use this feedback to inform our decision making process on which projects stakeholders consider bringing the most benefit to the transmission system and grid security.
Target Completion Date	Q2 2022
Project Benefits	This activity will enhance our transparency with our stakeholders and allow SONI to listen to feedback from stakeholders in which activities are considered to bring the most benefit to consumers.
Key Performance Indicator	SONI will measure its success in this area by monitoring our target completion date to ensure this is achieved. Feedback from stakeholders will also be gathered to inform SONI as to which activities stakeholders consider relevant, which is particularly important in the context of the energy strategy.

Future Arrangements – Electricity Balancing Guidelines ("EBGL")

Project ID	FWP020
Project Name	Electricity Balancing Guidelines
Project Milestone to be Achieved during period	Plan/implementation of the local (interim) design and approach through to implementation
Project Description	The Electricity Balancing Guideline (EB GL) entered into force on 18th December 2017. The guideline's aim is to create a market between Transmission System Operators (TSOs) in balancing timescales. The guideline contains numerous obligations for TSOs and market participants, with potentially the biggest change being the introduction of European Balancing Platforms The purpose of these Balancing Platforms is to enable: – TSOs to access service provision from a wider market than just their own immediate area; and – Balancing Service Providers (BSPs) to offer balancing services into a wider market than their own immediate market. This work is dependent on the TSC modifications decisions approval and SEM Committees High Level Design. Milestones include: Submission of Market Design Proposal for approval anticipated Q2 2022; Note: Approval of the Market Design Proposal is dependent on the RAs decision on HLD.
Target Completion Date	During 2022 (see dependencies)
Project Benefits	Compliance with Electricity Balancing Guidelines.
Key Performance Indicator	In order to measure our success in this programme of work we will monitor our timelines to achieve the associated milestones. It should be noted that some activities will be dependent on approval from the UR.

Balancing Market Principles Statement

Project ID	FWP021
Project Name	Balancing Market Principles Statement Update
Project Milestone to be Achieved during period	Updating and consulting upon BMPS V6.0
Project Description	An important business improvement activity to be focus on the enhancement of the Balancing Market Principles Statement ("BMPS"). SONI will shortly begin the review process of the BMPS, which will then be consulted on with industry, stakeholders and the UR. SONI will then be responsive to feedback and prepare a final version for publication. This will take place over the period 2021-2022, with the final version BPMS V6.0 due to be published by June 2022.
Target Completion Date	June 2022
Project Benefits	Updated version of Balancing Market Principles Statement
Key Performance Indicator	We will monitor the timelines for implementing the consultation and addressing comments in order to measure our success in this area.

Publish SONI's 2021/22 FWP

Project ID	FWP022
Project Name	Evaluative Performance Framework (Transition year)
Project Milestone to be Achieved during period	Publication of SONI's 2021/22 FWP
Project Description	During the period, SONI will be progressing our implementation of the Evaluative Performance Framework (EPF). This will include following the processes involved in a standard year of the EPF as per the guidance issued by the UR.
Target Completion Date	March 2022
Project Benefits	This activity will enhance our transparency with our stakeholders and allow SONI to listen to feedback from stakeholders in which activities are considered to bring the most benefit to consumers.
Key Performance Indicator	Our key measure of success in this area is ensuring that we achieve our target delivery date as indicated above.

TDPNI Consultation

Project ID	FWP023
Project Name	TDPNI
Project Milestone to be Achieved during period	Consult on 2021 TDPNI
Project Description	At SONI, we plan for the future of the electricity transmission grid and operate it every minute of every day. This includes interconnection to neighbouring grids and running the wholesale electricity market. To ensure the Northern Ireland grid is efficient, strong and reliable we develop a ten year programme of work known as the 'Transmission Development Plan for Northern Ireland'. This considers those areas of the grid which need to be upgraded and provides recommended solutions, which may be adopted. We consult on our plan and update it annually; over the period we will be seeking views on our outlook to 2030. SONI has a pivotal role to play in the implementation of Northern Ireland's new energy strategy, in particular, to achieving an average of at least 70% of our electricity from renewable sources by 2030, an important step on the journey to 80% and on to net-zero carbon emissions by 2050. SONI is committed to delivering the transformation required in the electricity system to facilitate Northern Ireland's new Energy Strategy. The transmission grid needs to be made stronger and more flexible so that it can safely and reliably transport the increasing volume of clean energy we expect to see this decade. The way consumers use electricity is also rapidly changing. As more of us move to electricity to heat our homes and power our vehicles it is important that the grid has the capacity to meet this demand. The consultation will be open from mid-January 2022 to mid-March 2022; then, we will update our plan before submitting it to the Utility Regulator for consideration. The Utility Regulator will carry out a further consultation following this, later in the period which will be another opportunity for you to have your say on the future of the Northern Ireland electricity transmission grid.
Target Completion Date	Submission to UR in April, with final publication following UR consultation and decision
Project Benefits	This activity will enhance our transparency with our stakeholders and allow SONI to listen to feedback from stakeholders in which activities are considered to bring the most benefit to consumers.
Key Performance Indicator	A measure of our success in this activity will be achieving the target completion date as indicated above and ensuring engagement activities are conducted so stakeholders are aware of the opportunity to participate in the consultation process.

SEM/GB Post Brexit Trading Arrangements

Project ID	FWP024
Project Name	SEM/GB Post Brexit Trading Arrangements
Project Milestone to be Achieved during period	Develop a plan for implementation of Post Brexit SEM-GB Trading Design
Project Description	SEM-GB - Brexit has decoupled the SEM and GB markets from the European day-ahead market and capacity calculation process and as a result, there is no longer any day-ahead trading on the SEM-GB border. The pre-existing (interim) intraday arrangements between SEM-GB are still active, which enables trading across the two interconnectors in this time frame. Under the Trade and Cooperation Agreement (TCA) between the GB and EU, new arrangements will be required for day-ahead capacity allocation and capacity calculation. The proposed capacity allocation process that is being examined at present is based on multi region loose volume coupling (MRLVC) for the day-ahead time frame with an associated capacity calculation process. This work is being progressed in a co-ordinated approach between the GB TSOs, EU TSOs and ENTSO-E. Guidance on the final technical procedures will be agreed upon by the GB/EU Specialised Committee on Energy (SCE). The initial high-level timeline for implementation of the day-ahead arrangements is April 2022; however, this may be subject to amendment based on more detailed assessments by the relevant parties. Work on the technical procedures for other timeframes (intraday, forwards or balancing markets) will be undertaken in the medium term as required. Arising out of BREXIT the SEM has been effectively locked out of the pan EU coupled day-ahead markets for now and progress for full participation of the SEM in the EU single intraday coupled markets (SIDC), and the Balancing Platforms (TERRE and MARI) has been suspended given our isolated status from EU systems. This means work has to be done in the near term to try to establish new Day ahead arrangements between SEM-GB and work is already established in this area, with GB TSOs and EU TSOs progressing developments. Separately we need to ensure that, in time for the planned Celtic interconnector go live, we have completed all preparatory work that will enable full integration into the pan EU Day ahead, intraday and balancing markets, and have fully established market related services from the regional coordination centre. Note: This programme may be impacted by issues concerning Brexit.
Target Date	Dependant on progress on Brexit.
Project Benefits	Enhanced compliance
Key Performance Indicator	The key measure of our success in this programme of work will be the monitoring of our timelines for the contribution from SONI as required.

Publish SONI's 2022/23 FWP

Project ID	FWP025
Project Name	Evaluative Performance Framework
Project Milestone to be Achieved during period	Publication of SONI's 2022/23 FWP
Project Description	During the period, SONI will be progressing our implementation of the Evaluative Performance Framework (EPF). This will include following the processes involved in a standard year of the EPF as per the guidance issued by the UR. The first phase of this process will commence in September 2022 with the publication of our annual Forward Work Plan for the period 2022/23.
Target Completion Date	September 2022
Project Benefits	This activity will enhance our transparency with our stakeholders and allow SONI to listen to feedback from stakeholders in which activities are considered to bring the most benefit to consumers.
Key Performance Indicator	Our key measure of success in this area is ensuring that we achieve our target delivery date as indicated above. SONI will also be considering responses to the UR's request for stakeholder submissions on SONI's 2021-2022 FWP and as such we will also review responses provided as part of this submission and work to address any feedback stakeholders provide. This will be highlighted as part of the next FWP and addressing any feedback will also be form the basis for an indicator of SONI's success.

SONI Stakeholder Engagement for Role 2

Stakeholder engagement is a core activity that SONI is regularly undertaking. Collaboration is one of our core values, in that we drive the most benefit from these engagements by listening to our stakeholders, being responsive to feedback that we receive and learn from our successes and our failures by engaging with stakeholders.

SONI publish a number of detailed documents and reports through our website and notify our stakeholders who are subscribed to updates from the info@SONI.ltd.uk channel. We also update our website to reflect recent publications, as well as our twitter feed for any followers.

A high level of detail is provided in our publications in order to ensure that stakeholders are sufficiently informed, which is detailed within the Industry Governance section earlier in the role.

Within this role, stakeholder engagement is a key activity. It is important that SONI ensures that stakeholders are informed about issues that impact on them, which are within SONI's remit, and we are therefore able to make informed decisions. We recognise that customers must be at the heart of decisions. They will need to support grid infrastructure development and customers will have to be empowered in how they use and pay for electricity. We are committed to working with UR, DfE and the Consumer Council and other representative bodies to find new and effective ways to bring customers and their representatives into what are challenging and technical conversations.

Implementation of the Evaluative Performance Framework will also create new opportunities for SONI's stakeholder engagement. Stakeholders will be invited by the UR to comment on our Forward Work Plan, which will provide beneficial information for SONI future plans as we will aim to be responsive to the needs of stakeholders whilst meeting the UR's assessment criteria.

Outcomes

In SONI's first Forward Work Plan, we have highlighted below what success will look like, alongside any relevant KPIs against the four SONI outcomes.

Decarbonisation

SONI play an important role with regard to decarbonisation, and for TSO Role 2 Independent Expert, this is an important area for SONI.

Through the NI Voice service, SONI has provided expert support for the UR, DfE and NIE Networks. SONI supported the DfE's Energy Strategy Consultation, and we expect to play an important role in progressing this as future programmes of work evolve. A key part of this service is listening too, to what expertise and support our stakeholders require and what types of solutions they are investigating, and by listening to our stakeholders this allows SONI to ensure that the NI Voice is represented as the energy transition progresses.

Over the period 2021/22, SONI anticipates that we will continue to enhance our decarbonisation goals as highlighted in Role 1, including through our support for the UR, government bodies and third parties' activities and providing our expertise where possible.

Grid Security

SONI play an active role in ensuring our grid security is to a high standard. We anticipate our actions over the next period will bring enhancements to this SONI outcome.

Some of the ways we will do this have been described in SONI's TSO Role 1, but in Role 2 we expect that our activities through Transparency Information and our Representation in Europe activities will bring a benefit to this area through the development of updated Network Codes, to our Grid Code updates also, as well as publishing an updated Balancing Market Principles Statement and our Annual Innovation Report which will detail the projects and ways that we will enhance Grid Security.

System Wide Costs	SONI anticipates that our work within Role 2 will bring enhancements to the outcome pertaining to System Wide Costs. Through our activities representing the Northern Ireland Consumer in Europe, we are gaining access to expertise through other TSOs, with our work in EU SysFlex for instance, we are learning from other TSOs experience and collaborating innovatively, in order to ensure that we can maintain high levels of electricity from renewable sources on the transmission system, which ensures that the consumer can also play an active role in the energy transition. Through these associated activities within our Representation in Europe service area, we are also gaining access to lower cost electricity from outside of the SEM, through our use of interconnectors and participation in the Inter-TSO Compensation scheme.
SONI Service Quality	SONI aims to build on our **stakeholder engagement** over the 2021/22 period. As part of the Shaping Our Electricity Future Consultation, we received feedback from stakeholders that engagement had improved. We have a number of engagement activities which will be published as part of our Shaping Our Electricity Future Roadmap due in November 2021. SONI is also planning to publish our Annual Innovation Report, which will give an insight into our planned trials, operational programmes and studies over the year in Q2 2022. We are also planning to consult on version 6.0 of the Balancing Market Principles Statement. Other publications include an updated GCS and TDPNI. Publications like these are key to ensuring that stakeholders are informed, and to inform SONI of stakeholder opinion so that we are also actively listening to our stakeholders, as only through listening to feedback can we improve upon our SONI Service Quality. Our work through implementing the Evaluative Performance Framework in this Role 2, will be key towards improving our SONI Service Quality outcome. These engagements will give SONI additional opportunities to listen and be responsive to the stakeholder needs and what they would like to see captured and reported on as part of the EPF. SONI plans to be responsive to the stakeholder submissions to this Forward Work Plan which will be requested by the UR over the coming weeks.

Ambition

Ambition is one of the core SONI values. We stretch ourselves to accomplish our goals. We drive transformation, take appropriate risk and recognise achievements throughout industry.

In order to play our role in the energy strategy, as well as maintaining a safe and reliable transmission system at a time when we seek to facilitate an increased amount of renewable generation, SONI will be required to implement plans which may be considered ambitious.

SONI considers our Forward Work Plan to demonstrate our ambition to enhance our four SONI outcomes as described in this role and across all four TSO roles.

For Role 2 Independent Expert, we expect our ambition here to be stretched over the period, and with the progression of the energy transition and its associated action plans, we anticipate a number of working groups and consultation exercises. Furthermore, SONI will play a key role due to its associated activities relating to its Representation in Europe service alongside the EU Network Code Implementation. Finally, with the Electricity Balancing Guideline programme of work, the Common Grid Model Delivery and support for the DfE Energy Strategy, we are confident this will be a significant area of growth.

Our engagement plan for our Shaping Our Electricity Future Consultation was the biggest engagement plan undertaken by SONI. We sought the views of the public, industry and civil society, so we could refine and improve our proposed approaches to preparing the grid to reach this goal.

SONI worked with a range of partners to help stakeholders have their say and engage directly with us. This included working with local authorities, chambers of commerce and rural communities across Ireland and Northern Ireland. By engaging and deliberating at grassroots level, it is the stakeholders who will ultimately facilitate, deliver and benefit from the work of SONI.

In addition to this, we directly facilitated engagement events in Northern Ireland including stakeholder workshops, civil society fora, a deliberative dialogue and a youth assembly. These engagements were designed around informing and discussing the four draft approaches to Shaping Our Electricity Future. This included exploring the costs, likelihood of success and unique infrastructural features of each approach. Gathering this feedback was done at an unprecedented scale and was the largest public consultation and engagement programme undertaken in this sector.

From this programme of consultation and engagement, SONI produced a range of consultation and engagement reports which have been considered and published online.

The feedback and inputs from public and civil society stakeholders was analysed and used to inform the final Shaping Our Electricity Future Roadmap. Specifically, the feedback was used to:

- influence the network/generation modelling that we have based our studies on;
- develop the Network Infrastructure Roadmap;
- develop the Stakeholder Engagement Roadmap; and
- more broadly, influence and reinforce SONI's overall approach to Public engagement.

The activity undertaken by SONI throughout this consultation and engagement process has uncovered significant support from stakeholders for the necessity and objectives of Shaping Our Electricity Future.

This is a significant demonstration of our ambition with regards to stakeholder engagement and our recognition of how central this is to our activities, and the role we play in representing the Northern Ireland Voice within this role.

In addition, through the publication of our Annual Innovation report, we will demonstrate the key programmes, consultations and studies that we have planned over the period, that are being concluded over the period and what the associated next steps are in the innovative process in order to assist us in achieving our government targets with regard to net zero.

Accountability

SONI considers Role 2 Independent Expert has provided clarity around our planned activities and initiatives and how the success of each programme's performance will be measured.

For each of our service areas within this role, we have detailed the key day to day activities and the outputs or benefits they bring to the consumer. In addition, we have set out the key strategic initiatives, relevant business improvements necessary and details of performance monitoring processes required to ensure our 2030 renewable targets are met.

For Role 2, we consider accountability is particularly relevant considering our relevant activity for Transparency for Regulatory Purposes is pertaining to our work in implementing the Evaluative Performance Framework. Accountability is particularly significant here as this is our first year being assessed by an independent panel and awarded a grade for our Forward Work Plan. SONI will be accountable for this assessment, and part of this will be taking on board the views of the Panel, the UR and stakeholders.

We aim to demonstrate Accountability through our various monthly interactions with the UR, where we provide regular updates and notify the UR of any potential issues and the proactive steps taken to counteract these problems. We expect this to continue and for SONI to demonstrate this value over the next period actively throughout interactions with the UR and by the steps evidenced throughout this role and Forward Work Plan.

Alignment to the UR Priorities

In the UR's Guidance on the Evaluative Performance Framework, it advised on its service and strategic priorities which they would like SONI to demonstrate an alignment against. We have taken each of these priorities in turn below and expanded on how we will demonstrate our alignment to these over the period October 2021 to September 2022 and beyond.

UR Strategic Priorities

A culture of effective engagement and collaboration

SONI considers that its Expert Voice service area is aligned to the UR's strategic criteria. This is demonstrated through our planned engagements and website improvements, in order to promote a consultation portal, to allow SONI to share information and have it easily accessible to stakeholders. SONI has been fully supportive in our response to the Northern Ireland Energy Strategy consultation by DfE and DAERAs Green Growth Strategy, as well as NIE Networks consultation Networks for Net Zero to name a few. SONI is fully engaged in its activities regarding the energy transition and will welcome any collaboration over the period with the UR, DfE and DAERA etc ensuring our specialist knowledge of the Transmission System is shared to achieve the full benefits of the energy transition.

A culture of open and collaborative innovation

SONI works in innovative collaboration with a number of other TSOs across Europe exploring the challenges in training the future operators and the TSO-DSO coordination. These activities are ongoing throughout the period. SONI publish a vast range of data under the Balancing Market Principles Statement in order to provide a transparent approach with customers and stakeholders.

The REMIT & Transparency Platforms European Agency Reporting includes the market data which will be made available for sending to the European Agencies. This information is made available for ACER (Agency for the Cooperation of Energy Regulators) and ENTSO-E (European Network of Transmission System Operators for Electricity) as part of our statutory obligations. This activity demonstrates SONI's transparency as well as our open engagement with ENTSO-E and ACER and other European TSOs in order to share information and resolve common issues collaboratively.

A culture of organisational learning, accountability and planning that supports SONI agility and responsiveness in meeting policy, regulatory and market developments

SONI considers that the work undertaken in relation to the Shaping Our Electricity Roadmap aligns closely with this criterion as we have taken a whole of system approach and considered what is needed across networks, operations and markets.

SONI would highlight the key activity in relation to EU Network Code Implementation is the development of additional European Network Codes to cover technologies / issues not addressed at present. This is a significant activity in this service area, given the importance of the energy transition in achieving our renewable and net zero carbon targets. There will be an emergence of new technologies over the next number of years and it is imperative that SONI is proactive in its approach, rather than reactive. This approach will ensure SONI is not an obstacle to progress, and will help us to achieve these targets whilst enabling stakeholders to play their role in the energy transition.

Furthermore, SONI considers itself to be engaged in open and innovative collaboration in this area and operating in alignment with the UR's Energy Transition Service Priorities as per the Guidance on the Evaluative Performance Framework.

UR Energy Transition Service Priorities

Collaborating and coordinating to promote a holistic, customer-based service approach to digitisation

In terms of the upcoming energy strategy publication, SONI considers that collaboration with the UR, Department for the Economy ("DfE") etc is of the utmost important. We gained significant feedback from industry on our Shaping Our Electricity Future which provided pertinent information to the views of stakeholders on transforming our electricity sector for the energy transition and we continue to represent those views as we engage and support consultations and working groups throughout this transformation.

As evidenced throughout this Forward Work Plan, most, if not all, of our initiatives cut across other service areas, therefore maximising the benefits available to the business and stakeholders whilst keeping cost at a minimum by having overarching initiatives.

Collaboration with our partners has been fundamental in delivering on our current innovation programmes. Enhancing these strong relationships, as well as building new ones will be vital as we strive to innovate further with our strategic programmes of work.

Developing markets through competition and stakeholder engagement and collaboration

SONI considers that the Ensuring Stakeholders are Informed service is aligned to the UR strategic and service priorities as set out in the UR's Guidance on the Evaluative Performance Framework. Given the vast range of publications made available to stakeholders through the SONI website, the Balancing Market Interface and SEMO websites, there is a lot of information available to promote competition in the markets and promote a culture of open information and collaborative engagement.

SONI would highlight its alignment to the UR's strategic and service priorities as per the Guidance on the Evaluative Performance Framework. In particular, UR Strategic Objective 1 - Promoting markets that deliver effective competition, informed choices and

fair outcomes. SONI considers its work in the implementation of the European Network Codes will further promote competition and also allow for increased renewables on the transmission system, as well as encouraging consumers to take a more active role in the energy transition and promote a green economy. SONI will also promote an alignment to the DfE Consultation of the Energy Strategies guiding principles of “Replace Fossil Fuels with Renewable Energy” and “Create a Flexible, Resilient and Integrated Energy System”, therefore endorsing its alignment with the UR’s energy transition service priorities.

Whole system collaboration and coordination with 3rd parties, and NIE Networks across its various roles as TO, DNO and DSO

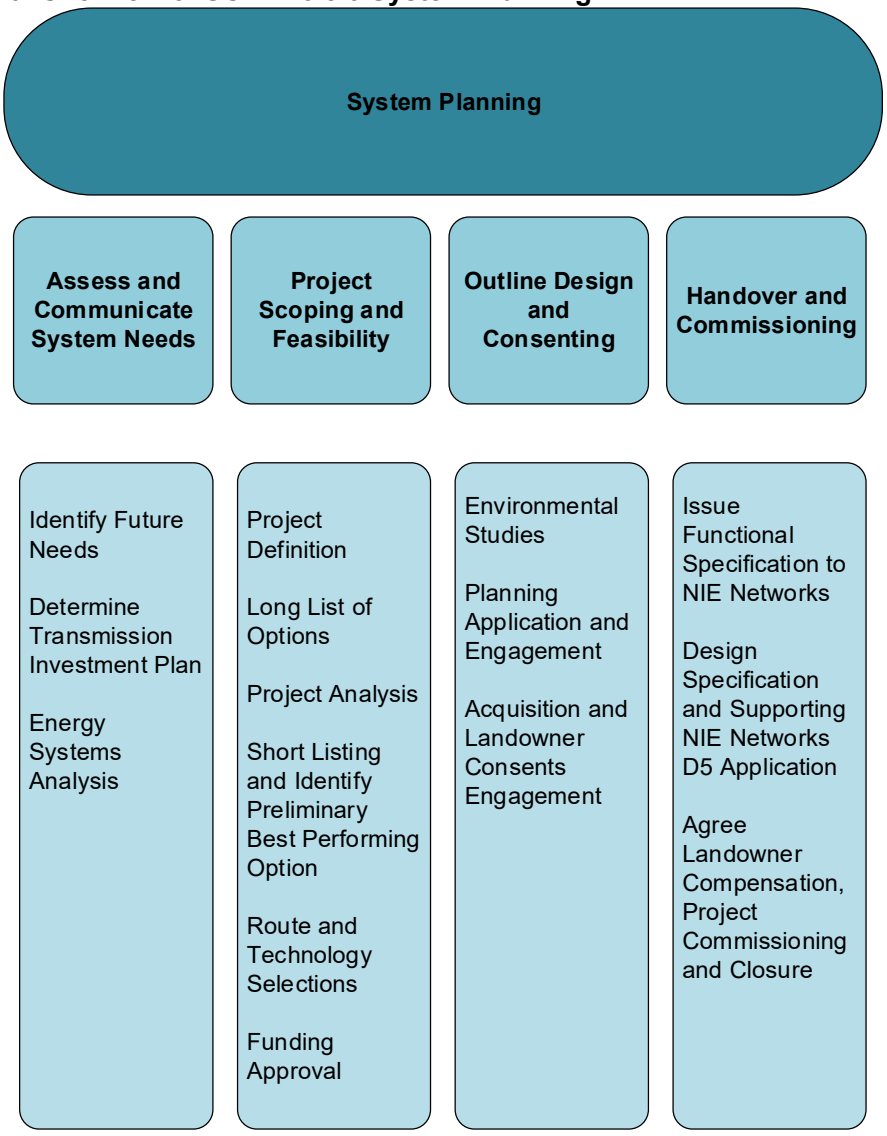
SONI considers itself to be aligned to the strategic and service priorities as stated in the UR’s Guidance on the Evaluative Performance Framework. We believe that this can be aligned to “Whole system collaboration and coordination with 3rd parties, and NIE Networks across its various roles as a TO, DNO and DSO”. Our ENTSO-E membership and engagement with Europe, especially in relation to initiative the development of new and updated Network Codes demonstrates our aim to build consistency in power system operations between Northern Ireland and the rest of Europe. Compliance with the European Network Codes will ensure there is a more consistent approach to connection requirements, operational practices, and testing procedures across Northern Ireland and the rest of Europe. This could therefore be considered in the context as a whole system approach extending into the European context.

SONI TSO Role 3 – System Planning

1. Overview

In 2014 responsibility for planning the transmission network was reallocated to SONI as part of the implementation of the IME3 Directive. The objective of this is to ensure that decisions relating to network capacity and its allocation are taken independently from any market participants.

Figure 16: Overview of SONI Role 3 System Planning



1.1 Layout of Role 3

The SONI TSO Forward Work Plan is comprised of a number of sections for each SONI TSO Role. To aid with the review of our plan, we have provided an overview of the chapter below, with the relevant section headings

1.2 Section Overview

Role 3: System Planning

- **Assess and Communicate System Needs**
  - Identify Future Needs
  - Determining Transmission Investment Plan
  - Energy Systems Analysis
- **Project Scoping and Feasibility**
  - Project Definition
  - Long List of Options
  - Project Analysis
  - Short Listing and Identify Preliminary Best Performing Option
  - Route and Technology Selections
  - Funding Approval
- **Outline Design and Consenting**
  - Environmental Studies
  - Planning Application and Engagement
  - Acquisition and Landowner Consents Engagement
- **Handover and Commissioning**
  - Issue Functional Specification to NIE Networks
  - Design Specification and Supporting NIE Networks D5 Application
  - Agree Landowner Compensation, Project Commissioning and Closure

SONI Key Performance Indicators for Role 3

SONI Deliverables for Role 3

SONI Stakeholder Engagement for Role 3

SONI Performance against Regulatory Criteria

- **Outcomes**
- **Ambition**
- **Accountability**
- **Alignment to the UR Priorities**

Assess and Communicate System Needs

SONI's Licence requires it to publish three documents each year that set out its expectations for developments over the next ten years. These are:

- The Generation Capacity Statement;
- The Ten-Year Transmission Forecast Statement (TYTFS); and
- The Transmission Development Plan for Northern Ireland (TDPNI).

The first two are required to consider trends across the all-island system, and must be coordinated with EirGrid, as TSO in Ireland. The UR approves these three documents. In order to deliver this service, SONI also works closely with NIE Networks. The Transmission Investment Plan, which remains under continuous review, is a key input to the published documents. These are also informed by SONI's forecasts of future demand for electricity. The network models that SONI produces are incorporated into the Europe wide model that is maintained by ENTSO-E.

The objectives that SONI is meeting when it delivers this service are set out in conditions 18, 33, 35 and 40 of its TSO Licence.

This service includes the identification of future investment requirements on the Northern Ireland transmission system, by comparing predicted system conditions with the Transmission Planning and Security Standards[57] and agreeing the potential Transmission Investment Programme (TIP) with NIE Networks (as set out in the TIA). It also includes the extensive modelling of generation outputs to assess the impact of market outcomes and the potential benefits of new investment to end users.

When combined with the Generation Capacity Statement[58], this work provides essential information for current and potential market participants and ensures that decisions made by SONI, the UR and participants are based on the best possible data.

The UR approves a number of the outputs that we deliver under this service, and we work closely with the UR, NIE Networks, EirGrid, the SEM Committee and the Department for the Economy to ensure that the outcomes from this work meet expectations.

[57] http://www.soni.ltd.uk/media/Northern-Ireland-TSSPS-September-2015.pdf
[58] https://www.soni.ltd.uk/media/documents/208281-All-Island-Generation-Capacity-Statement-LR13A.pdf

1. Identify Future Needs

What SONI does
SONI is responsible for planning and operating high-capacity electricity grid infrastructure. This includes overhead line and underground cable circuits that transmit power, and the pylons and poles that carry the overhead lines. Grid infrastructure also includes substations. Substations are used to transfer power to different voltage levels so that it can be distributed to towns and cities, and eventually homes, farms, and small businesses through NIE Networks distribution system.

NIE Networks build, own and maintain the grid infrastructure, while SONI plan new additions or changes to the grid. This means we are responsible for seeking the views of local communities when new infrastructure is needed. We also lead the process of seeking planning consent from the relevant authorities.

We plan for the future of the transmission grid to ensure that it works safely and efficiently. This can be categorised into two types of project – maintaining or upgrading the grid. Electricity grid infrastructure is a long-term, large-scale investment. Each piece of equipment can last for over 40 years. As the grid is a network, we have to think of the entire grid when making changes at local level.

We plan for the future of the grid in order to;

- replace or upgrade old infrastructure;
- respond to changes to the demand for electricity;
- accommodate new ways to generate electricity; or
- respond to new locations for generation.

The final network development approach is subject to a system needs assessment, which identifies the elements of the transmission system that do not meet the required performance levels. This is tested using the Transmission System Security and Planning Standards (TSSPS) for Northern Ireland. This helps to confirm the network reinforcements that are required and has helped in identifying the projects required to deliver the renewable targets for 2030 and beyond.

The work we undertake in this area relates to future scenarios, Transmission Investment Policies, Power System Data Files and the All-Island Network Model for ENTSO-E and SONI use.

In 2019, SONI undertook a wide-ranging consultation to ensure that our future energy scenarios are appropriate for Northern Ireland and reflect the specific circumstances of our economy. Our first consultation on Tomorrow's Energy Scenarios Northern Ireland ("TESNI") was published on 11th September 2019[59]. The TESNI 2020 outlines a number of credible pathways for Northern Ireland's energy transition and considers the electricity system beyond the ten-year planning horizon. They are not forecasts of expected pathways; rather, they allow a range of future options and opportunities to be analysed. How the transmission system develops could be a combination of some or all of the scenario pathways.

[59] http://www.soni.ltd.uk/customer-and-industry/energy-future/

Along with the TSSPS, the development of the transmission network is informed by transmission investment policies which describe acceptable practices, minimum requirements and equipment specification. These policies complement the TSSPS and are also applicable when developing network reinforcement alternatives. In Northern Ireland, SONI makes use of certain policies, such as those relating to technologies, which are set by the asset owner NIE Networks.

ENTSO-E produces a biannual Ten Year Network Development Plan ("TYNDP"). The TYNDP is built around a number of scenarios, which provide guidance on the energy transition at a European level and is therefore an important reference for TESNI. Network reinforcements identified from our grid development process which are of European significance can be submitted and assessed in the TYNDP. Some infrastructure projects of pan European significance may ultimately be deemed Projects of Common Interest[60] (PCIs).

How SONI does this
As part of our Shaping Our Electricity Future project, we have published an associated Roadmap in November 2021. We have reported on a comprehensive set of network planning studies which were undertaken to determine what potential network reinforcements are needed to ensure the target of 70% of electricity from renewables is achieved by 2030.

Although these studies are strategic in nature for the purposes of our Shaping Our Electricity Future Roadmap, each individual project will undergo a detailed assessment to determine the optimum path forward, with engagement being at the heart of grid development.

The generation and demand from the final network development approach is modelled on the transmission network. The transmission network configuration used in the analysis is based on the network as it is at that point in time, but with a number of approved reinforcements included.

The volume and scale of transmission elements that perform outside of the planning standards will indicate where additional capacity is required on the transmission network to accommodate the level of RES needed to achieve the target of at least 70% electricity from renewables by 2030. This is in spite of the inclusion of a number of approved reinforcements.

So far, we have identified 12 potential network reinforcements that will be required. These are detailed in our Shaping Our Electricity Future Roadmap.

Table 6: Potential Transmission Network Reinforcements

Reinforcement Category	Amount
New Circuits	3
Uprate Existing Circuits	7
Dynamic Line Ratings	2
Total	12

[60] Information on PCIs at https://ec.europa.eu/energy/topics/infrastructure/projects-common-interest_en

2. Determining Transmission Investment Plan

What SONI does

In determining the Transmission Investment Plan, SONI works closely with NIE Networks and follows the processes as provided within Section C of the Transmission Interface Arrangements[61] ("TIA"). This section of the TIA deals with the planning, development and construction of the Transmission System and sets out the process for SONI to produce, with NIE Networks assistance, the Transmission Investment Plan. NIE Networks is responsible for identifying any asset replacement requirements, while SONI identifies the areas of the grid where additional capacity is required.

To ensure the Northern Ireland grid is efficient, strong and reliable, the Transmission Investment Plan includes a ten-year programme of work. Once a year, SONI publishes this as the 'Transmission Development Plan for Northern Ireland' ("TDPNI"). This considers those areas of the grid which need to be upgraded and provides initial views on solutions, which may be adopted. It also includes details of the asset replacement projects identified by NIE Networks. The TDPNI outlines the drivers of network development, network investment needs, and the projects required to address these needs. SONI consults on this plan before submitting it to the UR for approval.

We also contribute to a European Ten-Year Network Development Plan[62] ("TYNDP") every two years.

The All-Island Ten-Year Transmission Forecast Statement ("TYTFS") provides the following information:

- Network models and data for the all-island transmission system;
- Forecast generation capacity and demand growth;
- Maximum and minimum fault levels at transmission system stations;
- Predicted transmission system power flows at different points in time; and
- Demand and generation opportunities on the transmission system.

The TDPNI, TYNDP and TYTFS are some of the publications that SONI provides to stakeholders which ensures they remain fully informed. Providing a high level of detail in these reports also ensures the appropriate investment signals for market participants. The TYTFS draws attention to the specific areas in Northern Ireland which are going to require network reinforcements, and details the capacity required in various locations across Northern Ireland that will be required to meet the forecasted demand. It also highlights areas where there are opportunities for generation or large demand sites to connect and identify opportunities for Investors.

How SONI does this

Over the period, SONI is planning to run a consultation on the Transmission Development Plan for Northern Ireland. This consultation began in January 2022 and will finish in March 2022. Taking stakeholder feedback into consideration, we will then update our plan before submitting it to the UR for their consideration. The UR will then carry out a further consultation which will provide stakeholders with another opportunity to have their say on

[61] TIA-18-November-2021-approved.pdf (soni.ltd.uk)

[62] The TYNDP 2020 is available here: https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2020/FINAL/entso-e_TYNDP2020_Main_Report_2108.pdf

the future of the Northern Ireland Transmission System. Following this process, the TDPNI document will be published.

We will also submit the 2021-30 TYTFS to UR for approval, prior to publishing it on our website.

3. Energy Systems Analysis

What SONI does
Energy Systems Analysis is a key enabler of some of our key publications such as the Transmission Development Plan for Northern Ireland and the Generation Capacity Forecast Statement. Within Energy Systems Analysis, SONI is focused on the modelling support that is carried out to underpin the assessment of system needs and input provide input to capacity auctions.

SONI carry out generation adequacy studies to assess the balance between supply and demand for a number of realistic scenarios which are detailed in both the Generation Capacity Statement and the Tomorrows Energy Scenarios Northern Ireland. SONI's Generation Capacity Statement has been used as the basis of the capacity requirement for the new capacity auctions.

The driver for a new projects study could be either of the following:

- Known network issue (i.e. output of TAS)
- New connection (generation or demand)
- New Interconnection; or
- Load growth in an area.

Energy Systems Analysis provides generation dispatch information to the various planning teams within SONI. The objective of the 'new projects study' is first to either verify 'the need' highlighted in the TAS or determine if there is a network issue (i.e. a need) as a result of a new connection, new interconnection or load growth in an area. Once the project need had been confirmed, the next steps are as follows:

- Identify solution options;
- Analyse the technical performance of the solution options; and
- Propose solution(s).

SONI is required to produce an annual Generation Capacity Statement ("GCS"), in accordance with Condition 35 of the TSO Licence
The development, planning and connection of new generation capacity to the transmission or distribution systems can involve long lead times and high capital investment. Consequently, this report provides information covering a ten-year timeframe. The main purpose of the GCS is to inform market participants, regulatory agencies and policy makers of the likely minimum generation capacity required to achieve an adequate supply and demand balance for electricity for the next decade.

SONI will be publishing the next GCS for the period 2022-2031 at the start of the summer, subject to Regulatory Approval from UR.

How SONI does this
SONI undertakes analysis of demand and generation over the coming years to inform both internal studies and the public facing documents such as the TDPNI and the GCS. The expertise required to undertake this background work is vital to securing a safe and economic energy transition.

Other key pieces of analysis include curtailment and constraints studies and cost benefit analysis.

SONI will commence on the demand forecasting aspect of preparing the GCS, applying our detailed modelling assessments across a range of different scenarios and translating this into the relevant information to be captured in the final GCS publication.

We will then commence work on the generation/adequacy forecasting element of the GCS, which is also dependent on the final capacity market auction results in order to develop our adequacy assessment. Once the final capacity market auction results are published (T-3 for 2024/25 in March 2022 and T-4 for 2025/26 in May 2022) we will then prepare the final generation forecast and final adequacy forecast. At this stage, SONI will then prepare the final version of the GCS for approval by the Regulatory Authorities.

Engagement at an early stage is important in order to ensure we achieve our target date of publication for the GCS. SONI is planning to engage regularly with the UR throughout this process to ensure transparency. SONI considers that through these engagements for the duration of the workstream, this will provide valuable insight into the questions that UR consider important, and we can ensure that this is consistent in ensuring the same clarifications are made in the 2022-2031 publication.

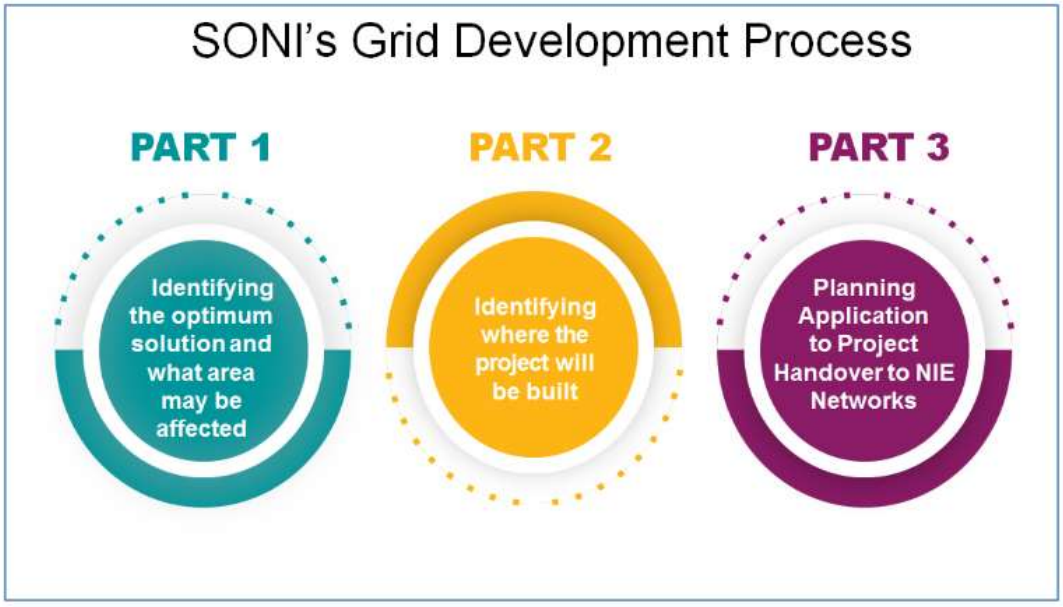
Project Scoping and Feasibility

The Transmission Investment Plan process identifies areas of the network where investment is expected to be required to ensure that the system can continue to comply with the Transmission System Security and Planning Standards. When delivering this service, SONI examines the potential solutions to these needs and identifies the best performing solution in terms of technical capability, environmental impact and stakeholder acceptability.

This is an area where considerable value can be realised for customers both through the solutions that are chosen to resolve predicted network issues and also through the way that SONI delivers this service

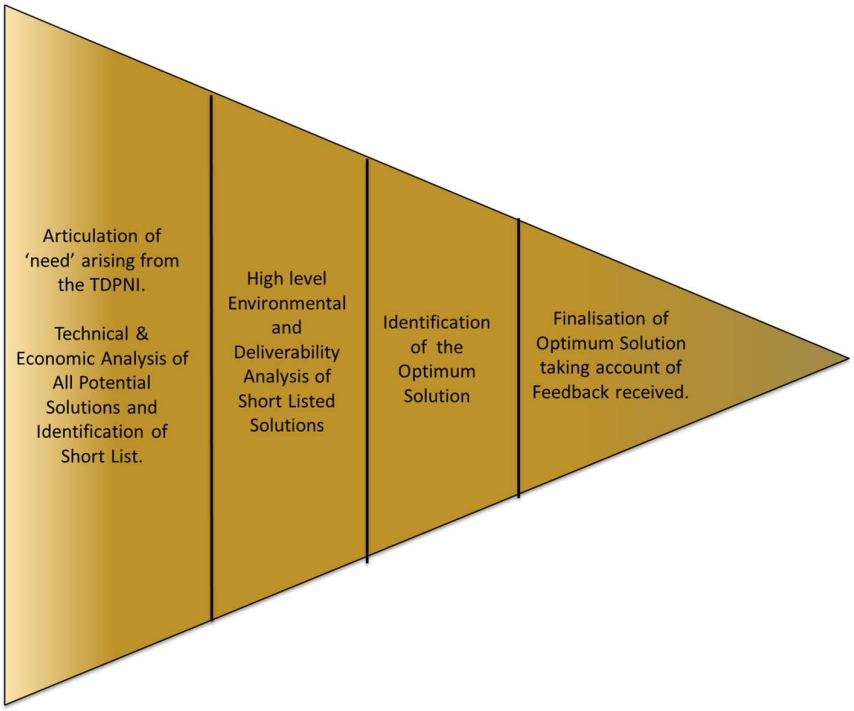
SONI works closely with NIE Networks to ensure that their valuable perspective as developer and owner of the assets is considered and will seek to increase the joined up working in this area. The respective roles and responsibilities of SONI and NIE Networks in the area of Transmission project delivery is set out in the TIA.

Project Scoping and Feasibility covers the first part of the Grid Development Process. SONI's grid development forms a three part process which is identified in the diagram below.



Part 1 Identifying the optimum solution and what area may be affected is covered in this section, and is particularly concerned with considering all potential technology solutions and identifying the optimum solution. How this is achieved is demonstrated in Figure 17 below.

Figure 17: Part 1 Consider of All Potential Technology Solutions and Identify the Optimum Solution



1. Project Definition

What SONI does
When a potential breach of the standards is identified, SONI will study the potential breach in detail including any other related issues. Consistent with good practice, as set out in the TSSPS, SONI will seek ways that would allow the potential breach to be managed operationally and put into place any changes to operational practice as may be required. However, in certain cases where that operational mitigation would lead to unacceptable cost or risk for customers, SONI will prepare plans to develop the transmission system.

When we identify the need to develop a transmission project we have to consider how it is best delivered. This means looking at a number of solutions and narrowing these down based on their technical viability, deliverability, cost, potential impact on the environment and on those living and working in the general area where the project may be located.

SONI is responsible for providing equitable access to the network for all transmission users and to secure a continuation of their agreed level of access, operation and quality of supply for existing users of the network. SONI's primary objective is to provide an economic, efficient and coordinated system for the transmission of electricity.

When commencing work around the project scoping and feasibility, we review the background to the work that is required and define this down to our understanding of the predicted gap to the Transmission System Security and Planning Standards ("TSSPS"). Ultimately, we need to ensure that any proposed project is needed and will bring a benefit to the transmission system security, by reinforcing or upgrading the network.

We prepare a Project Definition document which defines the aims and objectives of the project alongside the benefits that this will bring. It highlights the needs which the project has arisen from, and the predicted gap to the TSSPS that needs to be remedied through this action in a proactive approach.

An analysis is carried out of the network and a cost benefit analysis is prepared of the options available and whether investment is appropriate or whether a derogation is required.

How SONI does this
For example, with the Castlereagh – Hannahstown Reinforcement project, we completed a number of studies to determine the predicted gap to the TSSPS. This included network analysis and modelling of future scenarios with different rates of decarbonization of heating and transport. The analysis confirmed the project need and was supported by a techno-economic and probabilistic analysis of the impact of a High Impact Low Probability event affecting transformer capacity at Castlereagh Grid Supply Point.

2. Long List of Options

What SONI does
In carrying out this process, SONI then assesses the options available to progress this potential work. We detail a long list of feasible options that would address the objective, what reinforcement or upgrading work is required and how we can achieve this.

The first step in the planning process is to identify a long list of options across a range of different technologies. Such options will include the need for any new substations or overhead line and underground cables. In some cases where appropriate the use of flexible AC transmission systems (FACTS) and HVDC will also be considered depending on the need identified. The long list of options will be assessed against multi-criteria analysis including technical implications, asset management issues, and environmental and cost benefit assessments to identify a shorter list of potential options.

We investigate a wide range of options that may achieve the aim and objective required, and then we rationalize the long list, modelling each option and ensuring that it complies with the minimum requirements of the planning standards. To further reduce the length of the long list, we may consider the power flow from any PSSE analysis alongside the capital cost of the project.

How SONI does this
For example, with the Castlereagh – Hannahstown Reinforcement project each of the options considered in the long list was subject to PSSE analysis to ensure compliance with the TSSPS. Six of the options identified in the long list were not carried forward as these had very similar technical characteristics as other options but at a significantly higher cost than the shortlisted options.

3. Project Analysis

What SONI does
As TSO, we are obliged to plan the development of a safe, secure, reliable, economical, efficient, and coordinated transmission network that is able to meet all reasonable demands for electricity, in accordance with the activities permitted by our Licence.

With the increase in the pace of decarbonisation driven by the 2015 Paris Agreement and local and UK-wide targets and legislation, we anticipate a significant change in how energy is used over the coming decades. The form this change will take and the exact role that the electricity transmission system will play is uncertain and so SONI carries out analysis on a range of scenarios of energy usage out to 2040 as part of Tomorrow's Energy Scenarios Northern Ireland (TESNI) which we published for the first time in 2020[63].

This analysis outlines the impact of three potential scenarios on the power system. These scenarios (Modest Progress, Addressing Climate Change, and Accelerated Ambition) consider different paces of decarbonisation, with different levels of government and citizen engagement. Two of these scenarios see Northern Ireland delivering its contribution to the UK's 2050 net-zero emissions target.

We now use these scenarios to identify future needs of the transmission grid. These needs arise from changes in the usage of the grid, which is influenced by the scale and location of electricity consumption, generation, interconnection and storage. The scenarios informed the TESNI 2020 System Needs Assessment, published in 2020, which considers these future needs.

How SONI does this
When assessing development options to address future potential network needs, we consider the impacts of each possible option on other potential development needs. Sometimes by making more effective use of the existing network, we can delay large investment or avoid the need for additional circuits. In some cases, a proposed project may meet more than one development requirement and prove more economic and have less impact on the environment than multiple projects. Where possible, we seek to find single development projects to meet multiple network requirements.

For example, the options analysis for the Castlereagh – Hannahstown Reinforcement project took into account the future load growth in Belfast arising from increased urbanisation and electrification of heating and transport as well as the initial need to improve network resilience and address an increasingly unsuitable network configuration. This analysis identified underground cable circuits in the city which would likely reach their capacity and thus require replacement within ten years. As a result, the preliminary preferred option includes the replacement of these cables with higher capacity replacements, allowing this project to efficiently address several different network needs at once.

[63] https://www.soni.ltd.uk/customer-and-industry/energy-future/

4. Short Listing and Identify Preliminary Best Performing Option

What SONI does
Following the completion of the long list of options and the reduction of the long list into a short list of options, the next step is identify the preliminary best performing option.

SONI will consider the short list in greater detail and in some cases engage expert consultants to assist. These studies may include sensitivity studies to assess the performance of the options against different generation and demand assumptions. The process culminates with a recommendation for a preferred solution and tiering to establish the level of stakeholder engagement and consultation required. At this stage SONI will engage with the UR in regard to cost recovery.

We conduct specialist technical studies which will also be beneficial in later stages when the project and scope of work is determined.

We look at the evidence provided in favour of rejecting some of the options and following this, we prepare and publish a preliminary preferred options report which is published on our website.

Ultimately, to help reduce the short list to a preferred option, we assess the options against criteria such as:

- Electrical performance (including long term technical performance);
- Capital cost
- Economic performance – Net Present Value Analysis
- Deliverability; and
- Environmental and Social impact.

SONI engage with NIE Networks throughout the development of this Options Report, and this collaboration results in an open process, where we highlight in the report whether NIE Networks are also in support of our identified preferred option. We also maintain regular communication with the UR through our monthly meetings to highlight our findings and share the report before publication in order to demonstrate the proposed activities. SONI will also progress stakeholder engagement with the local authorities and elected representatives of areas affected by the project at an early stage.

How SONI does this
SONI will then consider the short list in greater detail. Depending on the nature of the project, SONI will seek to engage with key stakeholders before progressing the recommendation further. We engage throughout with NIE Networks and in some cases engage expert consultants to assist. These studies may include sensitivity studies to assess the performance of the options against different generation and demand assumptions. SONI will consider the stakeholder engagement findings and amend any plans accordingly before progressing further. We will also publicise the results of the stakeholder engagement process and further decisions.

A multi criteria assessment is completed, using evidence from our studies and feasibility, and the preliminary best performing option was identified as the:

- Slightly above average cost option;
- Best technical performance option;
- Second most deliverable option;
- Second best net present value option; and
- Timeliest method of addressing existing issues.

This forms the basis of our TNPP submission for project funding and is communicated to elected representatives within the project study area.

5. Route and Technology Selections

What SONI does
During this stage in the process we need to further develop the best solution and define the likely corridors for a project.

SONI is responsible for preparing the functional specification of transmission projects once the need has been identified. This includes the proposed connection route and points of connection. This also includes consultation with NIE Networks in their role as Transmission Owner. The projects can involve the development of new substations, overhead lines or cable circuits operating at 110 kV and above

During this part, we explore which technology will best resolve the specific need. In doing so, we will also learn more about the broad area where we are likely to locate new infrastructure

How SONI does it
SONI considers the kinds of solution that will best address the particular needs of a project. These solutions could include a new overhead line or underground cable, a new station or substation, or an upgrade to existing assets. We then narrow down our list of potential solutions based on several fact-based, objective criteria.

We further assess the viability of the technology selected in the feasibility studies, how practical it is to deliver, and how much it costs. Each potential solution has a likely “footprint” within a geographic area. Knowing this, we also consider more closely the potential for each solution to impact the people who live and work in the area where we may locate the project. We examine these locations and the technical specifications of the project in more detail based on their technical, deliverability, cost and environmental merits.

For example, with the Castlereagh – Hannahstown Reinforcement project the short-listed options were all broadly similar in terms of their environmental merit but they differed due to their deliverability, cost and technical impact.

We always consider how new projects may impact individuals and communities, and we work hard to minimise this, where possible. During this phase, there will be opportunities for stakeholders and communities to tell us their views on our plans. We will consider all feedback and will respond with changes where practical and possible.

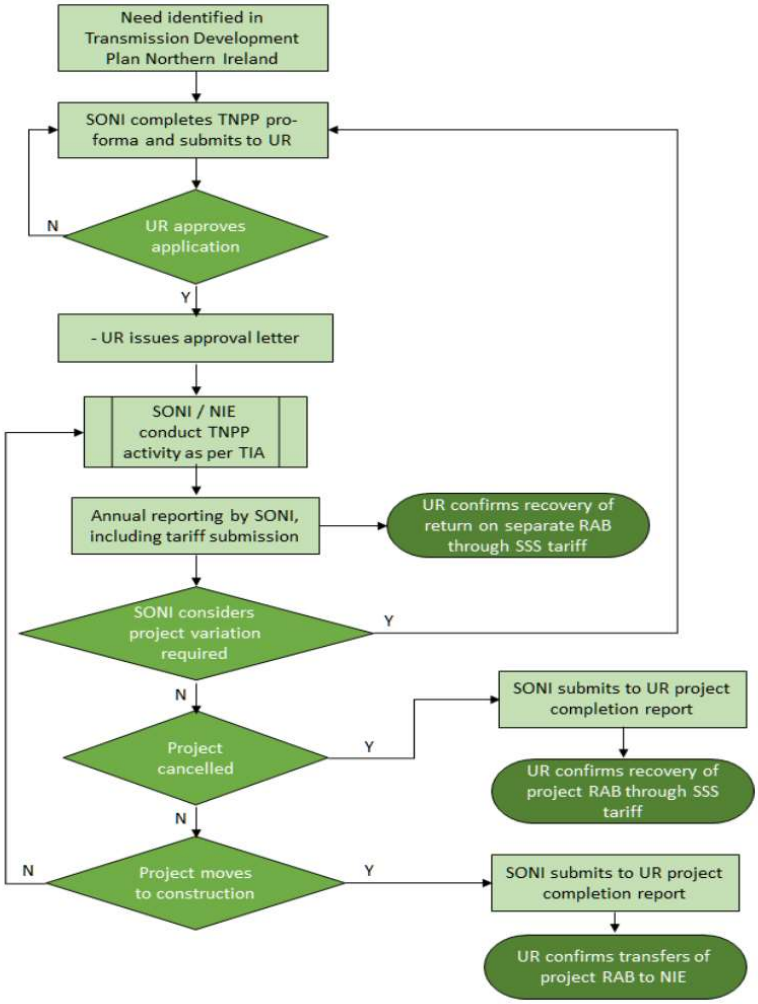
6. Funding Approval

What SONI does
The Preliminary Preferred Option Report is prepared as a basis for the preparation of a Transmission Network Pre-Construction Project ("TNPP") submission to the UR. The TNPP may also include a funding request for the Part 1 stakeholder engagement costs.

SONI follows the process as set out in the UR's Guidance document, Requirements and Guidance on Transmission Network Pre-Construction Projects costs[64] as published on the UR's website, for the preparation of a TNPP.

An overview of the process for the cost recovery of a Transmission Network Pre-Construction Project cost is set out in Figure 18 below.

Figure 18: Overview of TNPP cost recovery process



[64] 2018-03-09 Exhibit 1 - TNPP Finalised Guidance_1.pdf (uregni.gov.uk)

In parallel with the stakeholder engagement phase and recognising that the UR is also a key stakeholder, SONI will seek approval for cost recovery through The UR and progress the project to the outline design stage. This stage will identify any study areas for identification of new substations or corridors for overhead line and/or cable routes.

SONI will populate the agreed TNPP form. This includes input from NIE Networks with regards to its pre-construction costs.

How SONI does this

Where SONI has identified the nature of a project to address a need and we expect to start incurring pre-construction costs in the near future, we then apply to the UR for approval. That application must take the form of the submission to the UR of the pro-forma for TNPPs appended to their associated Guidance document.

Outline Design and Consenting

This service includes obtaining all consents required to implement projects that change the functionality of the transmission system in Northern Ireland.

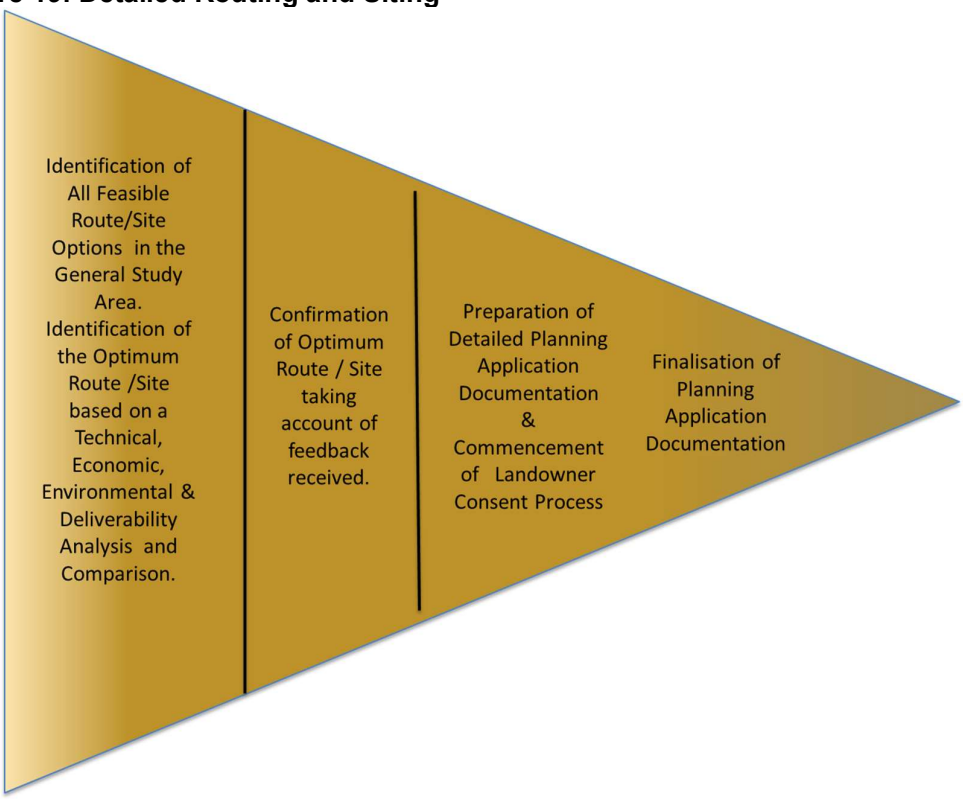
This includes preparation and submission of all planning applications, provide to NIE Networks a Functional Specification and a Transmission Project Instruction (TPI) consisting of all relevant information necessary to obtain the approvals that they require and the technical information that SONI holds which is necessary to design and construct the proposed project.

Project Management responsibility for delivery of this work entails: financial governance including the case of need for the project, development of desk top survey, constraint mapping & environmental assessment (including formal Environmental Impact Assessment (EIA) if required); outline design to approved specifications including surveys; deliver planning permissions for project; deliver necessary consents and agree land options as required; DfE consents / vesting & Article 40 consents to construct and all other 3rd party consents.

Outline Design and Consenting marks the start of part 2 of the 3-Part Grid Development Process described in Project Scoping and Feasibility.

Figure 19 below gives an overview of the activities which are included as part of this phase of the process.

Figure 19: Detailed Routing and Siting



1. Environmental Studies

What SONI does
We now consider all the possible locations within the general area where we need to site the project. This sees us examine the agreed technical specifications of the project in greater detail. Based on these specifications, we then consider how the physical landscape will affect how we can deliver the technology, and at what cost. During this phase NIE Networks will develop an initial design for the circuit and provide the designs to SONI. We also consider the potential for impact on landowners, local communities and on the natural environment. We also listen to stakeholder and community feedback to gain valuable local knowledge and insights about potential project locations. Based on a factual assessment of these topics, we then narrow our choices down to a location or locations that performs best across all criteria.

SONI will give stakeholders and communities the chance to take part in this process, and to tell us what they think. We want to hear from anybody who has a concern about a project, or who has local knowledge that has a bearing on our decision. Working in partnership with the public is key to this process, and we always aim to respond to any concerns where possible and practical.

Once all feedback is received, we will then make a final decision in collaboration NIE Networks, on where the project will be located.

How SONI does this
Environmental considerations are integrated into the functioning of grid development at both the strategic (i.e. plan level) and at the project level.

The requirements for Environmental Impact Assessment (EIA - for projects) and Appropriate Assessment (AA) (see below) are transposed into Northern Ireland law in Statutory Rules of Northern Ireland 2017 No. 83 The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017 and Conservation (Natural Habitats) Regulations 1995 (as amended).

Where necessary applications for statutory consent are accompanied by an Environmental Statement (ES) or an Environmental Report (ER) the need for a statutory ES is informed by way of an EIA Screening report. Similarly, screening for the need for AA for impacts on sites specifically designated for nature conservation is routinely undertaken for all our grid projects.

<u>Environmental Impact Assessment (EIA)</u>
EIA is the process of examining the environmental effects of projects, from consideration of environmental aspects at design stage to preparation of a non-statutory Environmental Report, through to preparation of an Environmental Statement (ES). Projects where an ES is mandatory are identified in Schedule 1 of the EIA Regulations. This includes transmission of electricity by overhead lines where:

- The voltage is 220 kV or more; and
- The circuit length is more than 15 km.

An ES may be required for sub-threshold development where likely significant impacts on the environment are identified by the relevant planning authority. The content and scope

of the EIA is defined by the EIA Regulations; however, detail varies between projects depending on local environmental sensitivities.

Appropriate Assessment (AA)

In accordance with the provisions of the EU Habitats Directive (92/ 43/ EEC), any plan or project not directly connected to a Natura 2000 site (Special Area of Conservation (SAC) or Special Protection Area (SPA), that is likely to have a significant effect on the site, is subject to Appropriate Assessment (AA) of its implications on the site.

The Habitats Directive is implemented via the Conservation (Natural Habitats) Regulations 1995 (as amended) in Northern Ireland.

The Appropriate Assessment process in Northern Ireland is generally referred to as a Habitats Regulations Assessment (HRA). A Screening for Appropriate Assessment is referred to as a Test of Likely Significance (ToLS), with the resultant report being referred to as a ToLS Report.

In Northern Ireland, the HRA process is undertaken by Shared Environmental Services (SES), a centralised body comprising specialist staff that provides expert environmental advice and support to Councils. SONI as project proponent will usually submit a ToLS Report or a HRA Report as part of a bundle of environmental information when seeking planning permission.

2. Planning Application and Engagement

What SONI does
SONI adheres to the planning act (The Planning Act (Northern Ireland) 2011) and related subordinate legislation and guidance. We must prepare and submit a project to the planning authorities before it can start. This ensures our proposals for new infrastructure are independently reviewed before work begins. The planning process also gives stakeholders another chance to consider a proposed project. If we are granted planning consent, SONI then hands the project over to NIE Networks, who build and own electricity infrastructure.

SONI is responsible for preparing documentation required to apply for planning consent for the development of the projects. This entails developing the design to the level required for obtaining planning consent including any necessary environmental assessments (including formal EIA if required), and consultations with stakeholders and landowners to obtain the right to gain access and install transmission equipment on their lands. As part of this NIE Networks will provide all asset related technical and engineering designs.

SONI submits planning applications with the relevant planning authority. SONI is also responsible for submitting any other consent applications that may be required, e.g. Marine License with the relevant consenting authority. The planning authority will make a legally binding decision on the project. It may grant full planning permission, grant permission on the basis that we make changes, or refuse permission

How SONI does this
We start by preparing and submitting a detailed planning application to the relevant authority. This will consider and respond to concerns raised in the previous parts. The planning authorities will look for written submissions from anyone with an interest in on the project. The planning authority will then make a legally binding decision on the project. This may grant full planning permission, grant permission on the basis that we make changes, or refuse permission. If we receive a positive decision from the planning authority, we will hand the project over to NIE Networks. They will then construct the new infrastructure. During construction, the SONI team will remain in contact with those who we engaged with in the project planning process.

Stakeholders and communities can make a submission to the planning authorities, indicating support for the project, asking the planning authority to make changes to our plans, or to refuse permission for our plans. Throughout the planning process, we will update people who are directly affected by our plans, and their local communities. This will ensure they have every opportunity to make their views known, and to influence the decision of the planning authorities

The following policies and objectives have been adopted by SONI in order to ensure an appropriate and sustainable approach to consultation and engagement in the development of our transmission projects. Under the TIA, NIE Networks will support SONI in this engagement.

It is the policy of SONI:

- To consult and engage with statutory and non-statutory stakeholders including communities, landowners and the general public, at the earliest appropriate stage of a project's development.

- To recognise and develop the essential role that communities, landowners and other stakeholders play in transmission infrastructure development and to engage with different stakeholders as appropriate during the life of a grid development project.
- To ensure consultation and engagement feedback is appropriately considered in decision making.

3. Acquisition and Landowner Consents Engagement

What SONI does
SONI is also responsible for the acquisition of any wayleaves, easements, access rights, land options, leases and any other legal rights required for the installation of the new infrastructure.

SONI and NIE Networks have a Land Rights Code Of Practice agreed between both companies which we will follow for all transmission projects. Our aim is to reach agreement and to minimise disruption when we plan new power lines, cables or substations.

Before we look to add new infrastructure to the grid, we work with those who may be affected by our plans. We aim to make grid development a consultative process with communities and landowners at the heart of it.

We have a three-part grid development process which puts public consultation at the heart of how we develop the transmission grid. On each project, we want to engage with the community, elected representatives and other key stakeholders with a goal of finding the best possible solution, and key to this is understanding local concerns.

Early and Meaningful Engagement with Landowners
SONI is committed to early and meaningful engagement with landowners. We recognise that landowners are the key to unlocking the success of a project and so we have a dedicated landowner engagement team to bring landowners the project journey.

SONI has developed a series of commitments to landowners, which they can use to hold us to account in relation to our standards of engagement with them, we encourage landowners to review the SONI Landowner Charter[65] and to let us know if we are not meeting expectations.

SONI typically carries out two periods of landowner engagement at the preconstruction stage of a project:

- Before obtaining planning approval, SONI will engage with landowners to carry out environmental surveys on their land, and to secure landowner consent where possible.
- After planning permission is obtained, SONI will notify landowners and will engage with them to secure their consent for NIE Networks to access their lands for construction.

Agreeing land access arrangements
During the pre-construction stage of any project, SONI and NIE Networks may require access to the necessary lands. This could be for a variety of surveys and site investigations. SONI aim is to mutually agree access, and to provide advance notice of any such works.

Over the course of a decade, SONI has maintained and grown relationships with landowners on the North South Interconnector route in Northern Ireland. Our specialist

[65] https://www.soni.ltd.uk/media/documents/194007Landowner-A5-Leaflet.pdf and https://www.soni.ltd.uk/media/documents/206319-SONI-A5-booklets_FIN.pdf

landowner engagement team has taken the time to meet, know and understand the perspectives of all landowners on the route.

This year, the landowner engagement team, supported our colleagues at NIE Networks in the carrying out of borehole surveys on the route. Over all surveys for 16 towers were successfully conducted.

We believe that the trusted relationships we have built with a large number of landowners on the route were key to the ease and success of this surveying work.

We look forward to continuing to engage with landowners on the route in order to move the project onto the construction phase.

Working together to minimise Impact

SONI and NIE Networks recognise that farms are businesses, and that landowners plan their activities well ahead of time, and with care. For this reason, NIE Networks will aim to notify landowners about construction start dates and duration as early as possible. This allows landowners to revise existing plans or make new arrangements.

SONI's and NIE Networks' wayleave officers understand the concerns of landowners. We will detail our plans step by step to find any potential issues, and to resolve them by agreement where possible. This allows farms to continue to operate with minimum disruption.

How SONI does this

Each landowner on a project will be assigned a wayleave officer who will liaise with them to sign a wayleave agreement or an easement depending on the circumstances. In the event SONI needs to issue survey notices or other statutory notices to affected landowners, these will be identified through a preliminary survey and agreed with the landowner by mutual consent.

The wayleave agreement or easement will include a map showing the proposed route of the line. This will show the proposed structure locations on each property. To help SONI and the landowner agree the necessary landowner arrangements, they typically meet to discuss the project. SONI will explain the practical details of the project, provide an expected start date, and answer any questions. This meeting normally happens a considerable time before construction starts.

Handover and Commissioning

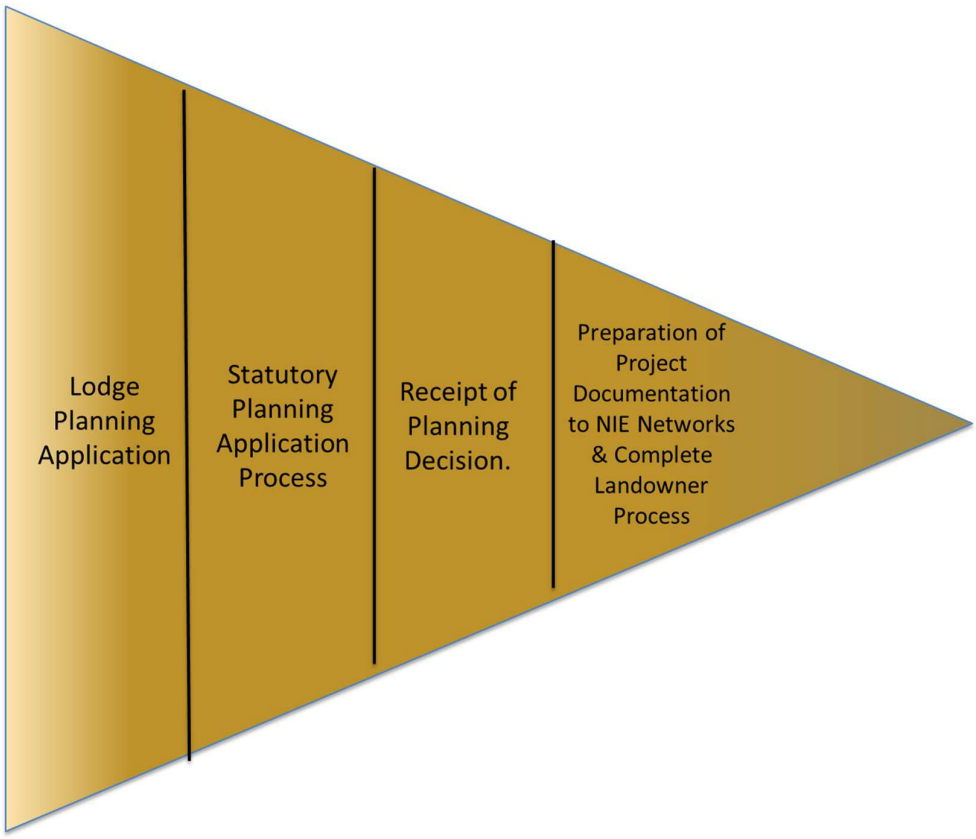
This service covers the handover of a project to NIE Networks for development and any commissioning activities before energisation. This service focuses on the important processes that take place to ensure that the correct changes are made to the transmission network.

A lot of the activities within this section are completed by NIE Networks and we support them collaboratively in this process. We have included these activities for completeness of the plan as we will contribute to these activities over the period.

Handover and Commissioning marks the third phase of the three part Grid Development Process as detailed in Project Scoping and Feasibility and Outline Design and Consenting above.

Figure 19 below highlights the key activities undertaken during this phase of the process.

Figure 19: Planning Application to Handover to NIE Networks



1. Issue Functional Specification to NIE Networks

What SONI does
Alongside obtaining planning and landowner consents, SONI prepares the functional specification (outline design and consents), which is carried out through our pre-construction work. Once the consents are obtained, we then progress the functional specification through to NIE Networks as Transmission Owner, for their review.

Throughout all stages of the process, and when any new information comes to light, we check that the case of need for network development remains robust, and make any changes necessary to ensure that the proposed development continues to meet this need.

How SONI does this
The Functional Specification is developed by SONI and is a high level conceptual design with a “system planning” outline in order to inform the Grid Development process – used alongside the Transmission Project Instruction, which contains details of the planning conditions and landowner consents, this therefore provides a whole overview of the project to inform NIE Networks about the basic elements of the proposed project – and culminating in a detailed final description / specification for the developed proposal.

2. Design Specification and Supporting NIE Networks D5 Application

What SONI does
This design specification prepared by NIE Networks is assessed by SONI, including the costing and we then engage with NIE Networks to discuss the various pieces within the design specification and agree that this meets the requirements and objectives of the project.

How SONI does this
The **Design Specification** is produced by NIE Networks and develops the Functional Specification to include firm costs and execution programme information.

During this process, SONI reviews the case of need to ensure that only economic and necessary projects progress and the need is robust. If the case of need is still justified, SONI will then issue a Transmission Project Instruction ("TPI") to NIE Networks. Following receipt and review of the design specification from NIE Networks, SONI issues a Transmission Project Instruction ("TPI") and enters into a Transmission Project Agreement ("TPA") with NIE Networks. NIE Networks then deliver the project.

Once the construction costs are clear, NIE Networks requests funding from the UR for the construction phase through a D5 mechanism. SONI provides supporting information for this submission as required

3. Agree Landowner Compensation, Project Commissioning and Closure

What SONI does
SONI's landowner engagement team are a key part of the system planning process. They are our people on the ground, interacting with landowners who may own land which we require access to in order to carry out the work required for the project.

It is important that SONI maintain relationships with the landowners throughout the project and engage regularly. This helps build a good rapport with landowners for both existing and future projects. SONI's landowner engagement team take the lead and are responsible for agreeing compensation with landowners.

SONI and NIE Networks recognise that, where overhead lines or underground cables are placed on lands, landowners may be entitled to statutory compensation. Statutory compensation to landowners can include the required purchase of an easement or negotiation of a wayleave to recognise the sterilisation of a corridor on/under the relevant lands in respect of the relevant overhead line or underground cable. SONI is responsible for determining the circumstances in which statutory compensation applies in relation to specific land rights associated with proposals for the construction of a transmission circuit.

Typically for each landowner that is affected by our projects, we will purchase an easement, enter into a wayleave agreement or obtain a necessary wayleave, all of which attract a compensation payment.

When SONI pre-construction activities have been concluded SONI will provide NIE Networks with a full and detailed schedule of all the wayleave agreements that have been acquired by SONI for the purposes of the specific project.

How SONI does this:
The purchase of an easement or agreement of a wayleave from a landowner will incorporate a number of stages, which can be outlined as follows. Prior to issue of the Transmission Project Instruction, SONI is responsible for agreeing compensation settlements with landowners and is also responsible for making all necessary payments in accordance with the terms and arrangements agreed with the relevant landowner. Negotiation and agreement with the landowner (by SONI) includes compensation, which may include either an easement or an "agreement to an easement" or a wayleave agreement.

A representative of SONI's dedicated landowner engagement team will arrange the payment of any fees and ensure all relevant conditions are captured in the agreement.

SONI's landowner engagement specialist will then agree with each landowner the works needed to access the site, and to construct the new infrastructure. It is our aim, where possible, to decide these issues by mutual agreement.

If agreement can't be reached for an easement or wayleave, SONI will apply for what is called a "necessary wayleave" from the Department for the Economy. SONI will only do this as a last resort for project progress, and in accordance with the provisions of the Electricity (Northern Ireland) Order 1992.

When SONI applies for a necessary wayleave, the Department for the Economy independently assesses this request. This means the landowner and SONI both make their case to an independent wayleave officer. This officer will assess the need for this particular wayleave and will consider the concerns of the landowner. This process can lead to three possible outcomes.

1. A necessary wayleave is granted, permitting the installation of the new infrastructure.
2. SONI's application is refused, and so must find an alternative route or site for the new infrastructure.
3. A necessary wayleave is granted. This permits the installation of the new infrastructure, subject to specific conditions.

Throughout the entire landowner engagement process, SONI will comply with its own internal procedures and our Code of Practice in negotiating and approving easements and wayleaves.

SONI Key Performance Indicators for Role 3

It is important to SONI that we are able to monitor our success as detailed by the UR in their associated Guidance on the Evaluative Performance Framework. As such, SONI has conducted a review of our baseline performance, using historic data available from the tariff year 2019/20 and compared these to our target performance for 2021/22.

For Role 3 System Planning, the relevant key performance indicator is achieving the upcoming milestone, for instance should this be a TNPP submission, then we will monitor the TNPP submission date and so forth.

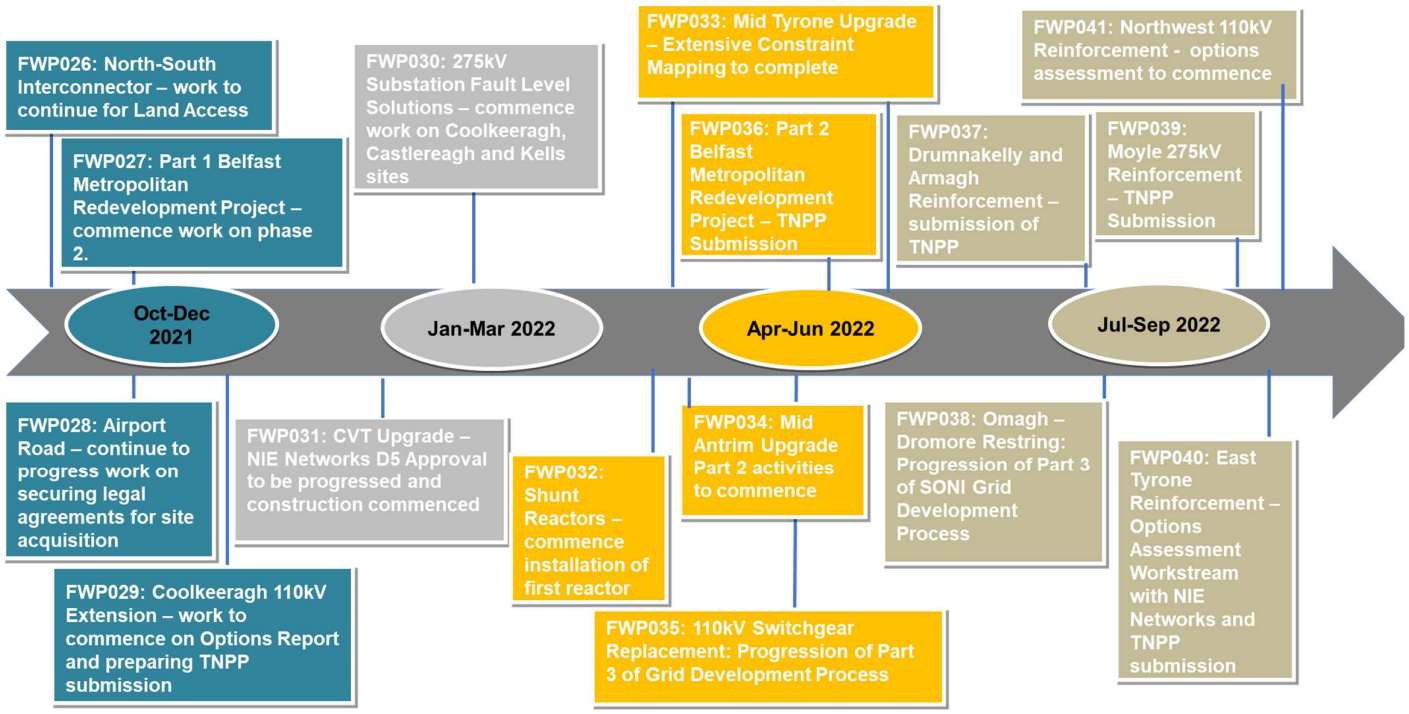
These milestone timelines are key in terms of measuring our success and demonstrating our growth towards our shared renewable ambitions and government targets and set the path to achieving these.

SONI has reviewed our planned activities for the period ahead in comparison to our historic performance. SONI considers that we exceed our baseline performance in this area given the vast quantity of activities and engagements planned over the period.

SONI Deliverables for Role 3

Throughout this section, which covers System Planning, we have provided an overview of each area within the business which contributes to this role. At the end of each of these corresponding business areas, we have indicated the key activity to be undertaken which we expect to result in improving the metrics provided in the previous section or enhance the four SONI outcomes. We have detailed below the associated programme of activities for each of these areas, alongside the benefits we anticipate it will bring and any corresponding performance indicator that we will use to measure our success.

We have provided an overview of the projects below over the period October 2021 through to September 2022, with each project taken in turn to highlight the work being carried out individually throughout the year.



North South Interconnector

Project ID	FWP026
Project Name	North – South Interconnector
Project Milestone to be Achieved during period	Work to continue for Land Access
Project Description	This project involves construction of a new 400 kV circuit from existing Woodland 400 kV station in County Meath (Ireland) to a proposed 400/275 kV station at Turleenan in County Tyrone (Northern Ireland). This project is needed to remove constraints within the single electricity market, improve security of supply and facilitate safe and secure operation of the power system with high renewable penetration levels. The estimated completion of this project has been delayed due to a delay in obtaining planning permission. Planning permission has now been confirmed, and as such SONI will continue to engage with landowners over the year as the programme of work progresses. SONI will also continue to engage with elected representatives, business representatives, media and communities in relation to the project. The North-South Interconnector will also be included as part of the Transmission Development Plan in Northern Ireland 2021-2030 (TDPNI)
Target Completion Date	Winter 2025
Project Benefits	The project is expected to bring enhancements to market integration, security of supply and RES integration.

Part 1 of the Belfast Metropolitan Redevelopment Project

Project ID	FWP027
Project Name	Belfast Metropolitan Redevelopment Project – Part 1 – Castlereagh – Hannahstown 110kV Reinforcement (Previously Castlereagh – Carnmoney 110kV)
Project Milestone to be Achieved during period	Phase 2 Work to Commence
Project Description	The existing conductor on the Castlereagh – Carnmoney 110 kV double circuit is due for replacement due to the condition of the assets. The preliminary preferred option is to install a 4th interbus transformer at Castlereagh and establish a 110 kV cable connection between Hannahstown and Castlereagh substations through Belfast city centre. This will enable removal of the existing 110 kV double circuit between Carnmoney and Castlereagh. We will undertake full stakeholder engagement as part of our work to finalise the choice of preferred solution and subsequent process to obtain any consents that are required. We anticipate that this will be a phased project and that elements will be completed before the final completion of the project. We anticipate launch of Part 2 Stakeholder Engagement in September 2022, with extensive engagement to planning application submission. As per Part 1 Engagement our colleagues at NIE Networks will be available to answer queries on construction, including timeline and potential traffic disruption. Currently Part 1 internal approval has been achieved. Functional specifications are being prepared as the next step. NI Projects team are awaiting project handover. Upcoming actions between Q4 2021 to Q4 2023: • Associated environmental reports required for planning • Detailed environmental investigations for 2 substation sites (locations to be determined) • Associated environmental reports for new cable installation
Target Completion Date	2027
Project Benefits	Enhancements to security of supply

Airport Road

Project ID	FWP028
Project Name	Airport Road Main 110/33 kV substation
Project Milestone to be Achieved during period	Work ongoing with regard to the substation site and progressing on securing legal agreements for site acquisition.
Project Description	It is planned to construct a new 110/33 kV substation in the Belfast Harbour Estate, close to the existing Airport Road 33/6.6 kV substation. The substation will be connected to the existing Rosebank substation via the existing 110 kV tower line (currently operated at 33 kV) from Rosebank to Sydenham Road. The need for this project arises from the increasing load in the Belfast Harbour and city centre area. Planning permission has been received for this substation. SONI work ongoing with regard to the substation site and progressing on securing legal agreements for site acquisition.
Target Completion Date	Winter 2024
Project Benefits	This project is anticipated to bring enhancements to security of supply.

Coolkeeragh 110kV Extension

Project ID	FWP029
Project Name	Coolkeeragh 110kV Extension
Project Milestone to be Achieved during period	Options Report and TNPP submission
Project Description	The driver for this project is security of supply, renewable integration and future connections. This project will involve provision of additional 110 kV bays at Coolkeeragh through an extension of the existing substation. Actions to be completed between October'21 and September'22: • Options Report identifying options for extension of the substation. Compare options based on a range of criteria and identify a pre-liminary preferred option subject to stakeholder engagement. • Part 1 stakeholder engagement • Preparation and submission of the TNPP to the Utility Regulator seeking approval of the pre-construction costs required to get consents for the project.
Target Completion Date	2029
Project Benefits	This project will enhance security of supply, renewable integration and opportunities for economic development in the area.

275kV substation Fault Level Solutions

Project ID	FWP030
Project Name	275kV Substation Fault Level Solutions
Project Milestone to be Achieved during period	Risk assessment, options assessment scope, obtain client engineer and engage environmental consultant. Three substations to be commenced in 2022 are; Castlereagh, Coolkeeragh and Kells.
Project Description	**Castlereagh 275kV Redevelopment:** The driver for this project is security of supply. A re-appraisal of the original design using modern standards has found that the concrete structures at Castlereagh are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process by SONI and NIE Networks. SONI and NIE Networks are considering the impact on the feasibility of additional connections at these sites. This project will address this issue through redevelopment of the existing substation or replacement. **Coolkeeragh 275kV Redevelopment**: The driver for this project is security of supply. A re-appraisal of the original design using modern methods has found that the concrete structures at Coolkeeragh are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process by SONI and NIE Networks, but it is currently not possible to facilitate additional connections at Coolkeeragh 275 kV. This project will address this issue through redevelopment of the existing substation or replacement. **Kells 275kV Redevelopment:** The driver for this project is security of supply. A re-appraisal of the original design using modern methods has found that the concrete structures at Kells are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process by SONI and NIE Networks. SONI and NIE Networks are considering the impact on the feasibility of additional connections at affected sites. This project will address this issue through redevelopment of the existing substation or replacement. Upcoming actions: • Multi criteria analysis & environmental report to be carried out by SONI (expected mid 2022) for Castlereagh substation; • Kells and Coolkeeragh to follow in order of priority.

Target Completion Date	As above.
Project Benefits	These projects will bring enhancements to security of supply.

CVT Upgrade

Project ID	FWP031
Project Name	CVT Upgrade for Harmonic Measurement
Project Milestone to be Achieved during period	NIE Networks D5 Approval to be progressed during the period and construction commenced
Project Description	It is planned to replace Capacitor Voltage Transformers (CVTs) at a number of sites with models capable of power quality monitoring, in order to improve monitoring of power system harmonics. SONI entered into Transmission Project Agreement with NIE Networks in January 2021.
Target Completion Date	Summer 2023
Project Benefits	The project is expected to bring enhancements to security of supply.

Shunt Reactors

Project ID	FWP032
Project Name	Additional Shunt Reactors (Castlereagh, Tandragee and Tamnamore Reactors)
Project Milestone to be Achieved during period	
Project Description	Shunt reactors are planned to be installed at Castlereagh, Tandragee and Tamnamore substations in order to improve voltage regulation when the network is lightly loaded. The reactors for this project will be installed in phases with the first reactor expected to connect in early 2022. Final completion has been delayed as several of the initially procured reactors are required to replace existing units which have failed in service, meaning that further units will be needed to complete the programme. New estimated completion: late 2023
Target Completion Date	Late 2023
Project Benefits	The projects are expected to bring enhancements to security of supply.

Mid Tyrone Upgrade

Project ID	FWP033
Project Name	Mid Tyrone Upgrade
Project Milestone to be Achieved during period	Extensive constraint mapping to complete by Q3 2022
Project Description	The 110 kV circuit between Omagh and Tamnamore is subject to high levels of constraint under high RES conditions. This project will increase network capacity in this area. Options analysis ongoing, stakeholder engagement is expected to commence in late 2022 and a TNPP submission made in 2023.
Target Completion Date	2030
Project Benefits	The project is expected to bring enhancements to RES Integration.

Mid Antrim Upgrade

Project ID	FWP034
Project Name	Mid Antrim Upgrade (formerly Reinforcement of 110 kV Circuit; Kells to Rasharkin)
Project Milestone to be Achieved during period	Part 2 Activities to Commence from April 2022
Project Description	As a result of increasing growth in renewable generation there is a need to increase grid capacity south of Rasharkin 110/33 kV cluster substation. TNPP submission prepared and SONI has engaged with the UR. Stakeholder engagement is completed for phase 1 and indicated risk to the project in terms of social acceptance of the overhead line. As such, a robust schedule of project engagement including project launch, pilot of community forum and pilot of new digital tools such as a virtual consultation portal will take place in Q4 2022 and run up until planning application submission. A long list of options has been developed and assessed in Part 1. Needs & Options reports on SONI website alongside Environmental report and project website for Mid Antrim Upgrade Upcoming activities for the period include: • TNPP approval, Part 1 internal approval and Part 2 Commencement – by April 2022 • Overhead line route/substation site identification/selection including public consultation events – From May 2022 to August 2023; • Project Environmental Assessments – From July 2022 to August 2023.
Target Completion Date	Winter 2028
Project Benefits	The project is expected to bring enhancements to security of supply and RES integration

110kV Switchgear Replacements

Project ID	FWP035
Project Name	Castlereagh 110 kV Switchgear replacement and Tandragee 110 kV Switchgear replacement
Project Milestone to be Achieved during period	Progression of Part 3 of the SONI grid development process (Project handover)
Project Description	**Castlereagh 110 kV Switchgear Replacement**: The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Castlereagh. The estimated completion of this project has been revised after assessment of the phasing and availability of outages. Estimated completion: Summer 2027 **Tandragee 110 kV Switchgear Replacement:** The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Tandragee. The estimated completion of this project has been delayed due to the availability of outages and reprioritisation of projects. Estimated completion: Summer 2027 SONI reconfirmed the project need for the above projects and they have been issued to NIE Networks for detailed design. NIE Networks costing and design specifications are expected in Q2 2022. SONI will review and progress a transmission project agreement and transmission project instruction (TPA/TPI) to finalise project handover and instruct NIE Networks to commence these works, expected Q3 2022
Target Completion Date	As above
Project Benefits	These projects are anticipated to enhance security of supply.

Part 2 of the Belfast Metropolitan Redevelopment Project

Project ID	FWP036
Project Name	Belfast Metropolitan Redevelopment Project – Part 2 - Eden to Carnmoney
Project Milestone to be Achieved during period	TNPP Submission
Project Description	The existing tower line is due for refurbishment due to the condition of the assets. TNPP is currently under preparation (target date of mid 2022). Environmental report to be prepared. Options report to be prepared and further engagement with NIE Networks to discuss option costs and the cable access to Carnmoney substation. Part 1 stakeholder engagement complete. . Targeting mid 2022 for submission.
Target Completion Date	Winter 2026
Project Benefits	The project will bring enhancements to security of supply

Drumnakelly and Armagh Reinforcement

Project ID	FWP037
Project Name	Drumnakelly and Armagh Reinforcement
Project Milestone to be Achieved during period	Submission of TNPP early 2022
Project Description	There is a need to reinforce the distribution system supplying Armagh city and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Drumnakelly 110/33 kV substation. Options being considered include: • Establishing a new 110/33 kV substation adjacent to the existing Drumnakelly Main along with associated 33 kV reinforcements to the Armagh area; and • Establishing a new 110/33 kV substation at Armagh with new 110 kV circuits from Tandragee and/or Drumnakelly. Work is currently being planned for the preparation of a TNPP with the scope of works nearing finalization. NIE Networks and SONI are jointly working on this project. An environmental study is commencing in Q1 2022. Option appraisal will take place once the environmental study is complete and will determine the preliminary preferred option for the TNPP submission. It is anticipated that the TNPP submission will take place in Q4 2022
Target Completion Date	2028
Project Benefits	The project is expected to bring enhancements to security of supply.

Omagh – Dromore Restring

Project ID	FWP038
Project Name	Omagh Main – Dromore Uprate Restring
Project Milestone to be Achieved during period	Progression of Part 3 of the SONI grid development process (Project handover)
Project Description	**Omagh Main – Dromore**: With the connection of Drumquin cluster substation to Dromore it is necessary to restring the Omagh Main – Dromore double circuit tower line with higher capacity conductor. Estimated completion: Summer 2023 NIE Networks are commencing pre construction works – design specification expected in Q4 2022.
Target Completion Date	As above
Project Benefits	The project is anticipated to bring enhancements towards RES integration.

Moyle 275kV Reinforcement

Project ID	FWP039
Project Name	Moyle 275kV Capacity Increase
Project Milestone to be Achieved during period	TNPP Submission
Project Description	As detailed in the Transmission Development Plan Northern Ireland 2021-2030, full utilisation of the 500 MW export capability of the Moyle Interconnector is limited due to network overloads and voltage steps in the event of the loss of the 275 kV double circuit between the Moyle converter station at Ballycronan More and the nearby Ballylumford substation. This project involves works to allow reconfiguration of the connection to Moyle to address this issue. TNPP submission expected in Q4 2022
Target Completion Date	2026
Project Benefits	The project is expected to bring benefits such as market integration, security of supply, RES integration, CO2 emissions reduction and increase of congestion revenues.

East Tyrone Reinforcement

Project ID	FWP040
Project Name	East Tyrone Reinforcement Project
Project Milestone to be Achieved during period	Options Assessment Workstream with NIE Networks and TNPP submission
Project Description	NIE Networks and SONI are jointly assessing the level of security of supply on the distribution system supplying Cookstown and the 110/33 kV substation at Dungannon. Upcoming work in terms of TNPP submission expected to be completed by Q4 2022: Completion of detailed environmental investigations and reports, and preparation and submission of planning applications.
Target Completion Date	Winter 2026
Project Benefits	This project is expected to bring enhancements to security of supply.

Northwest 110 kV Reinforcement

Project ID	FWP041
Project Name	Northwest 110 kV Reinforcement
Project Milestone to be Achieved during period	Options assessment to begin end 2022
Project Description	The 110 kV network between Limavady and Rasharkin will require increased capacity to deliver RES integration targets and complete the upgrade of the 110 kV network. Options analysis ongoing, stakeholder engagement is expected to commence in late 2022 and a TNPP submission made in 2023.
Target Completion Date	2030
Project Benefits	The project is expected to bring enhancements to RES Integration.

SONI Stakeholder Engagement for Role 3

Stakeholder engagement is a core activity that SONI regularly undertakes. Collaboration is one of our core values, in that we drive the most benefit from these engagements by listening to our stakeholders, being responsive to feedback that we receive and learn from our successes and our failures by engaging with stakeholders.

Role 3 System Planning depends upon extensive and quality stakeholder engagement. We are actively engaged with stakeholders and third parties throughout the process. Our project engagement team consists of specialists who liaise with landowners to negotiate the access for SONI and NIE Networks to their land; communication and engagement specialists who design and implement consultation programmes so that all stakeholders can influence decision making; and technical specialists who support engagement, delivering technical information relating to the project in an accessible manner; this approach evidences that the consumer, is ultimately at the heart of our work.

We require landowners and communities to be willing to work with us to allow us to build the necessary infrastructure for a safe and resilient Transmission System and the only way to facilitate this is to engage openly and transparently with landowners from the early phases of a project, through the planning application processes to explain the work that is required and how we will conduct these activities, in order that they are fully informed throughout the process. A significant part of this engagement is providing clarity on our timeline; highlighting at which milestones our decision making can be influenced; and providing a range of opportunities for interested parties for provide feedback. We are committed to explaining our decision making, pointing out where we have taken on feedback; and if we haven't explaining why this is the case.

The SONI *Three-Part Grid Development Process*[66] is designed to put our stakeholders at the core of our decision making; it commits us to early, meaningful and accessible engagement on grid investment projects. It sets a best practice standard for us in terms of our consultation, aligned to the Aarhus Convention (the international agreement that grants three core rights to the public for projects that affect the environment). Giving the public access to information on the environment. 2. Public participation in environmental decision making. 3. Public access to justice, or the right to review procedures and challenge decisions.

Our goal is to provide exemplary pre-application consultation and engagement which goes above and beyond the statutory requirements. SONI uses a pro-active, early engagement approach on grid projects to ensure stakeholders are aware of the proposal from an early stage, when options are being considered by the Future Networks team.

The SONI *Three-Part Grid Development Process* is embedded in our grid development processes and is regularly reviewed. We are in the process of carrying out a review in 2021 and are proposing additional activity such as the implementation of community fora and the use of innovative digital tools such as a consultation portal, virtual consultation room and 3D mapping. .

[66] SONIs-Powering-The-Future-Grid-Development-Process-brochure-20-8-21.pdf

In 2022, we will begin piloting these new and innovative tools to improve the quality, depth and reach of our engagement on the Mid Antrim Upgrade Project. We look forward to tracking and analysing the success of these approaches and of our other engagement tools.

The Preliminary Preferred Option Report is prepared as a basis to begin stakeholder engagement with statutory consultees and elected representatives. Depending on the nature of the project, SONI will seek to engage with key stakeholders before progressing the recommendation further. SONI will consider the stakeholder engagement findings and amend any plans accordingly before progressing further. We will also publicise the results of the stakeholder engagement process and its decision in a high level Part 1 Stakeholder Analysis report. Part 1 engagement is important as it involves community leaders, business bodies and elected representatives at a very early stage in the project and can shape our Part 2 engagement and technical approaches.

NIE Networks will provide feedback on the preliminary preferred options report in their role as asset owner and in line with the Transmission Interface Arrangements (TIA). NIE Networks will confirm whether they are supportive of the preliminary preferred option and of the conclusions reached in the preliminary preferred options report. NIE Networks will be consulted on the stakeholder engagement and communications plan in each part of the process and will be invited to participate in relevant external meetings, agree messaging and approach; and drive engagement through their own communications channels.

SONI will also discuss the project with the UR at the monthly SONI-UR meeting. SONI will carry out a high-level stakeholder engagement exercise with the local authorities affected by the project. This will allow the TNPP submission to be finalised and submitted to the UR.

In Part 2, SONI assesses all locations within the general area where the project will be situated. We examine these locations and the technical specifications of the project in more detail based on their deliverability, cost and environmental merits. This enables us to select a '*best performing location'*. We then, if required, prepare the documentation for the proposed development to be submitted to the relevant planning authority, which is either the local Council or the Department for Infrastructure (DFI).

Throughout Part 2 of the *Three-Part Grid Development Process*, we will also provide the public, elected representatives, landowners and local businesses with opportunities to participate in the process and to provide feedback. We will consider all views before we finalise our proposals. For projects falling within the 'major' threshold of development as defined by the Planning (Development Management) Regulations (Northern Ireland) 2015, engagement during Part 2 will take place within a statutory Pre-Application Community Consultation process.

If a project is deemed to be challenging from a social acceptance point of view, we will endeavour to carry out three phases of consultation in Part 2 of the Grid Development Process.

a. First phase - Consult on potential zones for new infrastructure
b. Second phase - Consult on an indicative route
c. Third phase - Consult on a proposed final route

In Part 3, SONI, if required, will submit the planning application for the project to the relevant planning authority. The planning authority will make a legally binding decision on the project. If SONI receives a positive decision from the planning authority, we will then hand the project over to NIE Networks for construction and energisation. Throughout this part of the process, SONI will continue to engage with stakeholders to inform them of the progress of the planning application.

Social acceptance is a key challenge to Northern Ireland's clean energy future and to the success of the forthcoming Northern Ireland Executive's Energy Strategy.

In the next 9 years we will need to successfully complete the consenting process on a number of network investments. More than ever before, we need the support of individual landowners, their neighbours, and their wider communities. We must acknowledge the challenges of what we ask of individuals and communities for the benefit of the entire population.

Outcomes

In SONI's first Forward Work Plan, we have highlighted below what success will look like, alongside any relevant KPIs against the four SONI outcomes.

Decarbonisation

SONI plays an important role with regard to decarbonisation. As a result, the activities within Role 3 of System Planning are of vital importance. We need to ensure that we have carried out appropriate network upgrades and reinforcements in order to facilitate increasing RES on the Transmission System. As demonstrated through our SONI Deliverables section, the next period has a large range of activities across Northern Ireland to bring these enhancements to the Transmission System.

Over the period 2021/22, SONI anticipates that we will continue to enhance our decarbonisation goals via the ongoing planning and development of the transmission network, in partnership with NIE Networks.

Grid Security

SONI plays an active role in ensuring our grid security is to a high standard. We anticipate our actions over the next period will bring enhancements to this SONI outcome.

In Role 3 we expect that our activities through our various planning publications and new development projects will demonstrate the importance of our grid security. We are planning activities which will reinforce the network and bring enhancements to security of supply as well as working in collaboration with NIE Networks in order to develop the Transmission System – all these activities will therefore bring enhancements to our Grid Security outcome.

System Wide Costs

Through our activities in the development of the North South Interconnector, we are seeking to reduce future costs for consumers. This is a key strategic investment. In addition, the close working relationship we have with NIE Networks ensures that we work collaboratively across the Transmission and Distribution networks to achieve best value solutions for customers.

This service area also allows us to receive the benefits of access to lower cost electricity from the use of interconnection.


SONI Service Quality
SONI aims to build on our stakeholder engagement over the 2021/22 period. As part of the Shaping Our Electricity Future Consultation, we received feedback from stakeholders that engagement had improved.
SONI's activities in our TSO Role 3, such as landowner engagement and wider community engagement during the network planning process are key activities which ensure we provide a high level of service to our customers, listening to the wider communities and being responsive to their concerns.

Ambition

Ambition is one of the core SONI values. We stretch ourselves to accomplish our goals. We drive transformation, take appropriate risk and recognise achievements throughout industry.

In order to play our role in the energy strategy, as well as maintaining a safe and reliable transmission system at a time when we seek to facilitate an increased amount of renewable generation, SONI will be required to implement plans which may be considered ambitious.

SONI would emphasise that our activities within Role 3 System Planning are wide ranging. From initial assessment and scoping the need for a project, to reaffirming that need through analysis and collaborative engagement with NIE Networks and third parties throughout the process. In addition, we would highlight the wider engagement with communities and stakeholders as the project develops. From meeting the communities and landowners at the initial planning stage and addressing their concerns, to working and liaising with them as the project evolves towards the final options. As the volume of new projects across Northern Ireland increases, so too does the work and commitment from SONI.

We have highlighted some of these key projects currently in progress, in the previous section, SONI Deliverables. The significant volume of work undertaken from the initial stages through to the completion of the project, demonstrates the high level of ambition to which SONI is bound.

Some of the other key activities are also detailed in our publication of the Transmission Development Plan for Northern Ireland. This is a key document which informs stakeholders and the public on the potential activities planned for the next ten years. Furthermore, as was also experienced following the Shaping Our Electricity Future Consultation, its publication allows us to gain valuable and informative feedback from stakeholders.

We have been set ambitious targets in terms of the renewable electricity sources to be integrated on to the Transmission System and, as such, we need equally ambitious plans to ensure these targets become a reality.

Accountability

SONI considers Role 3 System Planning has provided clarity around our planned activities and initiatives and how the success of their performance will be measured.

For each of our service areas within this role, we have detailed the key day to day activities and the outputs or benefits they bring to the consumer. In addition, we have set out the key strategic initiatives, relevant business improvements necessary and details of performance monitoring processes required to ensure our 2030 renewable targets are met.

SONI has detailed throughout the document, the processes that we carry out and demonstrated how we go about these activities, including the engagement opportunities from the beginning of the project through to its completion.

For each project identified within the SONI deliverables we have provided a timeline for the individual activity being performed over the period as well as the overall timescale for the project to be completed. We consider that this highlights how we will measure our success in these areas.

Alongside monitoring our projected timelines for completion in order to hold ourselves accountable throughout the process, we provide the UR with updates as each project progresses. Being held to account by the UR and ensuring they remain fully informed throughout the project evolution, also proliferates SONI's accountability.

SONI accountability is also now further enhanced by the implementation of the Evaluative Performance Framework. We have provided details throughout Role 3 of the work we will be conducting over the period and we will be assessed by the UR and an independent panel based on this information. This further ensures that we can hold ourselves fully accountable on the delivery of these projects and programmes of work.

Alignment to the UR Priorities

In the UR's Guidance on the Evaluative Performance Framework, they advise on their service and strategic priorities which they would like SONI to demonstrate an alignment against. We have taken each of these priorities in turn below and expanded on how we will demonstrate our alignment to these over the period October 2021 to September 2022 and beyond.

UR Strategic Priorities

A culture of effective engagement and collaboration

SONI actively promotes a culture of effective engagement and collaboration within all service areas pertaining to Role 3, and across all four TSO roles. For Role 3, SONI must effectively engage across a wide range of platforms. This includes, but is not limited to:

- Stakeholder engagement throughout the process to gain insight into the project's reception.
- Highly collaborative engagement with NIE Networks in order to develop the project from initial stages to completion.
- Engaging with the wider communities across Northern Ireland, most notably as a project approaches the planning application stages.

To ensure the support of the wider community it is important for SONI to be mindful of any issues the public might have regarding the project, and subsequently address those concerns satisfactorily. We continue this engagement during the planning submission process and provide updates to projects on our websites as they progress closer to completion.

A culture of open and collaborative innovation

SONI actively promotes a culture of open and collaborative innovation throughout our normal activities and within our programmes of work. We engage and collaborate with NIE Networks in particular, as documented throughout Role 3, in the planning of the Transmission System. The majority of these projects require innovative collaboration, in particular when it comes to identifying the need for reinforcement. Furthermore, following the project needs assessment and subsequently identifying the potential long list of options, a project options report is published. At this stage SONI and NIE Networks collaborate further at a high level so that both parties views on preferred approaches and solutions are explored and documented.

UR Energy Transition Service Priorities

Whole system collaboration and coordination with 3rd parties, and NIE Networks across its various roles as TO, DNO and DSO

As detailed above, SONI operates in a whole system collaboration and coordination, especially with NIE Networks in the System Planning role that we conduct. SONI requires close engagement with NIE Networks in order to work together in affirming a project need, identifying a long list of options and then refining this to a short list, with consideration given towards NIE Networks preferred approach, the benefits of each approach and risks, whether this aligns with SONI's preferred approach. This is a key priority, in particular in the context of the energy strategy, it is important that we work collaboratively and cohesively with NIE Networks as TO, DNO, and DSO in this regard to make our electricity targets a reality and ensure that we have a safe, secure and resilient network to cope with increased RES integration.

The updating and publication of the Transmission Interface Arrangement is a key activity which assists in providing clarity to both parties as to how we both discharge our obligations efficiently, and given this is published in November 2021 this is a welcome beginning to the planned activities over the period and the programme of work planned with NIE Networks.

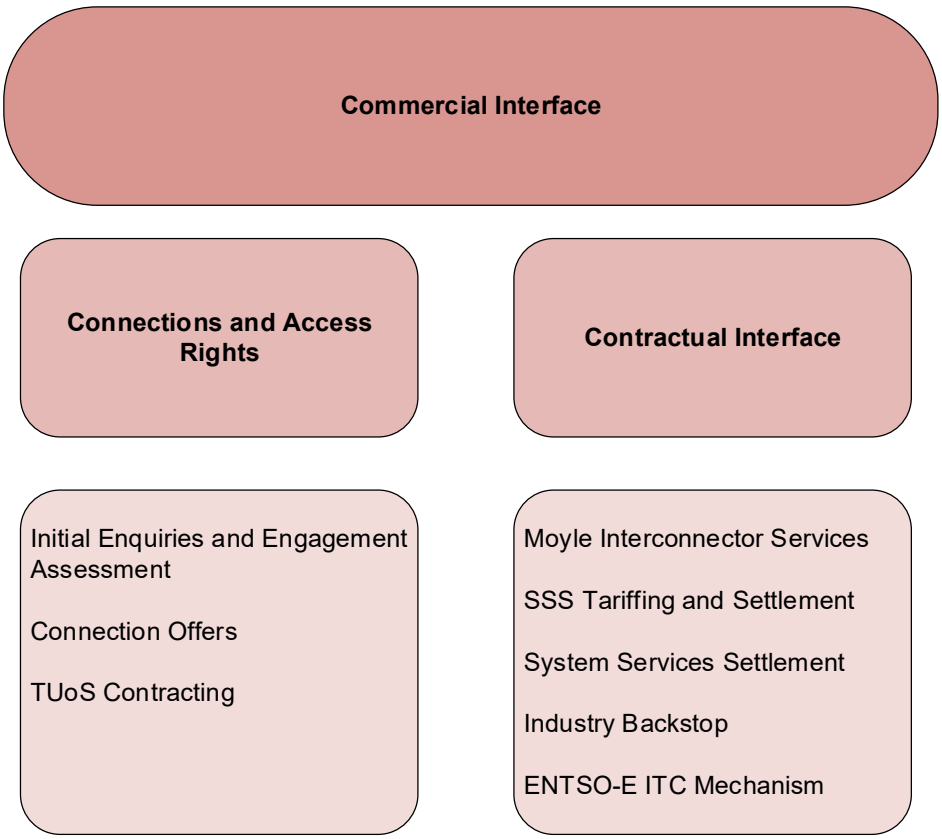
SONI TSO Role 4 – Commercial Interface

1. Overview

As Transmission System Operator, SONI is responsible for issuing connection offers to any person[67] that applies to SONI to connect their projects to the Transmission System and this should be done in a way that also facilitates competition in the SEM. We are also responsible for providing access to the Transmission System and for charging for use of it. SONI is at the centre of the electricity wholesale market, but without a commercial interest in it, and therefore we are able to provide a vital contractual interface between competing parties in a non-discriminatory basis which facilitates competition.

An overview of the role is provided in Figure 20 below.

Figure 20: Overview of SONI Role 4 Commercial Interface



[67] Subject to Condition 25(6) if the SONI Licence.

1.1 Layout of Role 4

The SONI TSO Forward Work Plan is comprised of a number of chapters and appendices. To aid with the review of our plan, we have provided an overview of this chapter below, with the relevant section headings

1.2 Section Overview

Role 4: Commercial Interface

- **Connection and Access Rights**
  - Initial Customer Enquiries and Engagement
  - Connection Offers
  - TUoS Contracting
- **Contractual Interface**
  - Moyle Interconnector Services
  - SSS Tariffing and Settlement
  - System Services Settlement
  - Industry Backstop – Capacity Remuneration Mechanism (CRM) and Balancing Market
  - ENTSO-E ITC Mechanism

SONI Key Performance Indicators for Role 4

SONI Deliverables for Role 4

SONI Stakeholder Engagement for Role 4

SONI Performance against Regulatory Criteria

- **Outcomes**
- **Ambition**
- **Accountability**
- **Alignment to the UR Priorities**

Connection and Access Rights

A level playing field is vital for a functioning market in wholesale electricity. Legislation has been enacted at both local and European level to promote competition in generation and supply of electricity. SONI processes all connections to the Transmission System, without undue discrimination, and grants enduring access to the network via Connection Agreements and Transmission Use of System Agreements. We undertake the modelling necessary to determine which Connection Assets are required to enable a connection to be made and we also identify any deeper reinforcement that is necessary to facilitate fully firm Transmission access.

We work closely with NIE Networks, in its role as Transmission Owner, via the Transmission Interface Arrangements, to deliver the connection of generation or demand projects to the Transmission System.

Transmission access is an important consideration for generation. The level of access to the Transmission Network i.e. Firm Access Quantity (FAQ) can impact on the commercial returns for a generator.

If a generator has Firm Access it means that if its scheduled generation export is lowered by the Transmission System Operator due to network or specific operational reasons (known as 'constraint'), then it may be eligible for financial compensation within ISEM. A generator's Firm Access Quantity (FAQ) is assessed alongside existing generators to determine its impact on the system across a range of scenarios using the Incremental Transfer Capability (ITC) methodology. This process determines the point at which the generator causes any issues (i.e. the Transmission System is not compliant with the planning standards) during circuit or other outages on the Transmission System. The point at which the output of the generator causes an issue becomes that generator's FAQ. This process also identifies the associated transmission reinforcements (ATRs) that would have to be delivered to provide the generator will full access. This assessment is carried out at the post offer acceptance stage.

These ATRs feed into the network development processes which are set out in Role 3.

How SONI does this

Over the coming period, SONI is planning the following activities within this role:

- Progression of all effective customer connection applications. This quantity of applications is subject to customer interest and is anticipated to increase following publication of the Northern Ireland Energy Strategy;
- Execution of Connection Agreements and GTUoS Agreements as customer projects near energisation;
- Engaging with potential new applicants during the period;
- FAQ Assessments for all generation connections greater than 5MW connecting to the transmission or distribution system.

- Ongoing review and collaboration with NIE Networks regarding the updating of the Transmission Interface Arrangement and Transmission Contestability Guidelines.

1. Initial Enquiries and Engagement

What SONI does

Our Connections & Contracts team's role is to provide professional, reliable and efficient assistance and support to business and industry customers. The team is the first point of contact in relation to applications to connect to the transmission grid. Our team will guide customers through the application process and help with any other relevant queries

We encourage early engagement with developers to discuss any queries they have in regard to their new potential connections to the Transmission System. By working closely with our technical teams, we can also help share publicly information on relevant network projects and insights that may relate to their project.

Throughout our initial enquiry process we maintain regular contact with the customer to ensure we provide a high level of service and make sure they are fully informed in order to facilitate their decision-making process.

We actively engage and collaborate with our counterparts within NIE Networks, as Transmission Owner (TO) and Distribution Network Operator (DNO), to both deliver the connections process, consider if there is sufficient network capacity available and resolve any customer queries.

How SONI does this

We encourage customers to initiate contact with SONI at early project phases when we receive initial email enquiries from potential applicants, so that we can direct them to the information which is publicly available, therefore maintaining a level playing field for all potential applicants, and to ensure they have all information required to inform their projects and ensure they are fully aware of the requirements in order to participate in the Connection Offer process and the following stages through to project energisation.

SONI considers these activities will bring enhancements to the four SONI outcomes, in particular SONI service quality.

Key Activities: Over the period we will continue to engage openly with customers and new potential applicants and help to answer queries they may have.

Key Performance Indicator: In order to measure our success in this area we will monitor the timescales involved in processing any requests to ensure these are satisfactory and appropriate for the complexity of the request.

2. Connection Offers

What SONI does

SONI is obliged under our TSO Licence Condition 25 to offer to enter into a Connection Agreement for connection to the all island transmission networks at entry or exit points on the NI Transmission System to any person.

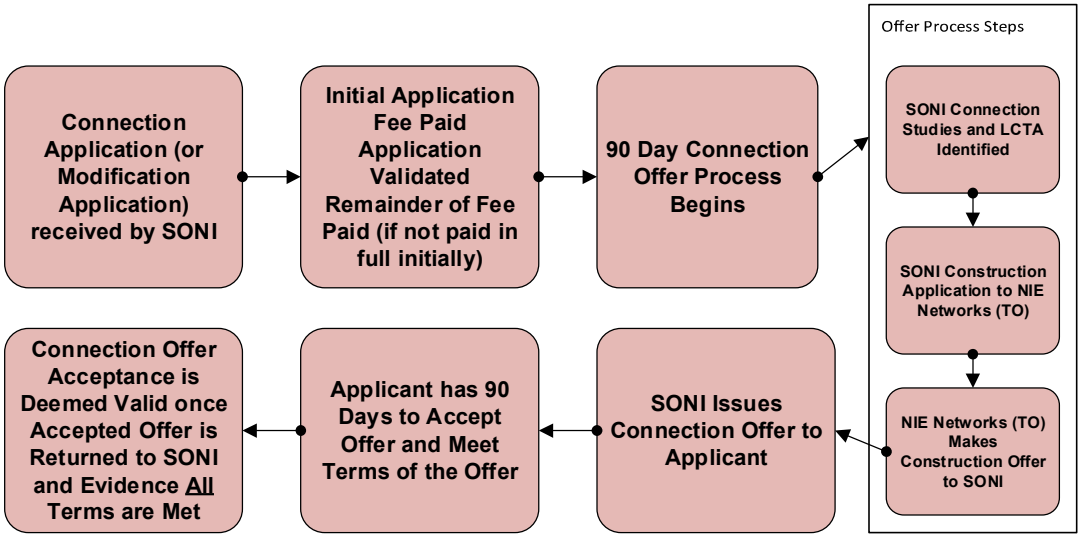
The Connection Offer process works in alignment with:

- TSO Licence Condition 25;
- TSO Licence Condition 27;
- SONI Connections Policy[68];
- Transmission System Security and Planning Standards[69] (TSSPS)
- Transmission Connection Charging Methodology Statement[70] ("TCCMS");
- The Transmission Interface Agreement[71] ("TIA"); and
- The System Operator Agreement[72] ("SOA").

These are reviewed periodically, and amendments proposed as required.

In order to do so, SONI follows certain procedures as detailed within our SONI Connections Policy[73]. An overview of this process is provided in Figure 21 below:

Figure 21: Overview of the Connection Offer Process



[68] https://www.soni.ltd.uk/media/documents/SONI-Connections-Policy.pdf
[69] https://www.soni.ltd.uk/media/Northern-Ireland-TSSPS-September-2015.pdf
[70] https://www.soni.ltd.uk/media/documents/SONI-TCCMS-1-April-2019.pdf
[71] https://www.soni.ltd.uk/media/documents/TIA-18-November-2021-approved.pdf
[72] https://www.soni.ltd.uk/media/System-Operator-Agreement.pdf
[73] https://www.soni.ltd.uk/media/documents/SONI-Connections-Policy.pdf

Upon completion of the final stage above, SONI will then accept the NIE Networks Construction Offer, which has been passed through to the customer in the Connection Offer.

This is the final stage within the Connection Offer process (prior to the development of a Connection Agreement) and SONI will then engage with the customer and NIE Networks to confirm the agreement to progress on to the next phase of the project, which is the pre-construction phase and subsequently the construction phase with our Infrastructure Projects Team.

SONI also liaises regularly with NIE Networks via the Connections TIA panels to discuss ongoing projects and discuss any complexities in order to reach a shared solution through our innovative collaboration.

As the project progresses through the construction phase and an energisation date is determined the Connections Team will then commence work on the Connection Agreement and TUoS agreement approximately three to six months ahead of this energisation date and liaise closely with the applicant and NIE Networks in preparation of this Agreement.

How SONI does this

For the period 2021-2022, SONI currently have a number of projects awaiting the issue of a Connection Offer, projects currently where SONI is awaiting acceptance of an open Connection Offer, and also projects in pre-construction/construction phase awaiting a Connection Agreement by September 2022.

In considering the above activities, SONI will continue to monitor these projects to ensure that they meet the relevant obligation whether it is the issue of a Connection Offer or execution of a Connection Agreement, subject to no additional complexities arising during this process.

Throughout this process, SONI is continuously engaged with the applicant, so they are fully aware of what stage of the Offer process they are at. Should any issues arise (for instance complexities which may impact on the timescales of the Offer) SONI will liaise with the applicant in order to keep them updated. Where an offer cannot be issued within the three month licence condition requirement, SONI will consult with the applicant and NIE Networks and seek a derogation from the Utility Regulator.

SONI also receives a number of enquiries from potential applicants, seeking information and engagement on their project, ranging from stages where the project is in early conceptual phase to applicants who are ready to submit an application but seek further guidance on the processes and potential route selections. SONI actively engages with applicants on these discussions, but it is important to highlight that in order to promote competition and present a level playing field, SONI can only advise where information is

available on our website (such as the Connections Register[74], Transmission Development Plan Northern Ireland[75] or Ten Year Transmission Forecast Statement[76]) such that no applicant is at an advantage over another. These are expected to continue ad hoc throughout the period.

Throughout the Connection Offer process, SONI actively engages with stakeholders and publishes up to date information in order to ensure stakeholders are fully informed. Once an application is deemed effective (that is, the full application fee is paid and the application has been fully validated), the SONI Connections Register is updated to reflect the new applicant, which is then published on the SONI website.

Engagement is a key activity within the Offer process. It is important that we have an open and collaborative relationship which promotes transparency when preparing the Connection Offer. That engagement is maintained throughout the process with regular update meetings throughout the project with both NIE Networks and the applicant. This carries through from the Offer process into the pre-construction and construction phases with our Infrastructure Projects Team.

As well as our day to day engagement with NIE Networks, we also engage in regular working group meetings such as the Connections Innovation Working Group[77] and Contestability Working Group. This is a key activity as it promotes the collaboration and open discussions between the two organisations, and this is expected to continue over the period.

A key part of the engagement we have with customers is the process by which customers apply for connections. This process is standard however the technical complexities can be relatively bespoke, given that needs vary from customer to customer. The nature and complexity of connections is changing though, with a higher number of potential connections coming to us and the needs of customers becoming more complex. We need to ensure that our connections processes are working efficiently and are delivering the level of service that our direct customers expect and our planned activities over the period are expected to ensure this robust service provision.

Key Activity: Over the period the key activities within this area are the continued progression of any new applications for a Connection Offer as they are received, and preparation of the Connection Agreement and GTUoS Agreement for the upcoming projects which are due to be energised. Another important activity within this area is the continued review of the Transmission Interface Arrangements to ensure that NIE Networks

[74] https://www.soni.ltd.uk/customer-and-industry/general-customer-information/connections-and-applicati/index.xml
[75] https://www.soni.ltd.uk/media/documents/SONI-Transmission-Development-Plan-Northern-Ireland-2020-2029.pdf
[76] https://www.soni.ltd.uk/media/documents/All-Island-Ten-Year-Transmission-Forecast-Statement-2020.pdf
[77] Attended by representatives from the TSO, DNO, DER developers, DS3 project developers, and representatives from the UR and DfE

and SONI can discharge their obligations efficiently, and the publication of an updated version.

Key Performance Indicator: We will continue to monitor the timescales involved in the Connection Offer process to ensure we continue to adhere to our obligations in line with our licence, the SONI Connections Policy and associated guidance.

3. TUoS Contracting

What SONI does

Suppliers and Generators seeking to use the Transmission System will be required, prior to using the Transmission System, to enter into a Transmission Use of System Agreement ("TUoSA") with SONI setting out the obligations of both parties. Also, before a Supplier or Generator can participate in the Single Electricity Market ("SEM") the TUoSA must be signed by both the TSO and Supplier/Generator.

The charges for generators to use the transmission system are harmonised across the island, therefore we work closely with EirGrid, as TSO of Ireland, to calculate the locational use of system tariffs for generators each year. Supplier tariffs are jurisdictional.

GTUoS rates are published for comment by the TSOs annually and then approved by the SEM Oversight Committee once finalised. Supplier TUoS ("STUoS") methodology was approved by the UR in 2011. The annual SONI tariffs and Statement of Charges are approved by NIAUR.

The Transmission Statement of Charges[78] which is published annually describes the charges for use of the All-Island Transmission Networks in respect of generation and supply in Northern Ireland and also sets out Other System Charges in respect of centrally dispatched generators in Northern Ireland.

Transmission Use of System charges are designed to recover the NIE Networks' Transmission Revenue Entitlement as approved by The Utility Regulator. The Transmission Revenue Entitlement is calculated as a percentage of NIE Networks' Transmission and Distribution Entitlement which includes costs such as return on assets, depreciation of assets and operating expenditure.

Currently 75% of the Transmission Revenue Entitlement is recovered from Suppliers via the charges set out in Schedule A of the Charging Statement. The remaining 25% of the Transmission Revenue Entitlement is recovered from Generators through the Generator export charge, outlined in Schedule B of the Charging Statement. For this tariff year 21/22 as well as the 25% for NIE Networks revenue entitlement and additional amount relating to SONI's revenue entitlement is being recovered via the GTUoS tariffs.

The charging statement covers four tariffs that together cover the costs owning and operating the transmission network in Northern Ireland. Transmission Use of System (TUoS) charges comprises of three parts:

- Network Charges - Designed to recover NIE Networks Transmission Revenue Entitlement for the transportation of electricity and a portion of SONI's costs;

[78] FINAL-TUoS-Statement-of-Charges-2021-22.pdf (soni.ltd.uk)

- System Support Services - Designed to recover SONI's costs of operating the Transmission System including the costs of System Services (not designed to recover NIE Networks Transmission Revenue Entitlement);
- Collection Agency Income Requirement - Moyle Interconnector Ltd.'s (Moyle) transmission licence, and the direction issued under it, permit Moyle to recover the balance of its revenue requirements from payments received from SONI under the Collection Agency Agreement. SONI is obliged to enter into this agreement under Condition 37 of the System Operator Licence (not designed to recover NIE Networks Transmission Revenue Entitlement).

Transmission tariffs are designed to:

- Promote efficient use of the transmission system
- Be cost reflective
- Provide reasonable stability and predictability
- Promote fairness and avoid undue discrimination
- Be practical and reasonably simple to understand and administer
- Collect the TSO's allowed revenue, including the payments that it needs to make to NIE Networks and Moyle Interconnector Limited.

How SONI does this

During June of each year, SONI calculates the TUoS charges for the next year (1st October to 30th September). The NIE revenue requirement is typically split between the two types of TUoS as follows:

- Generator TUoS ("GTUoS") 25%
- Supplier TUoS ("STUoS") 75%

A proportion of SONI's internal costs is also added to the GTUoS revenue requirement. SONI and EirGrid jointly calculate the GTUoS tariffs, which are charged on a locational basis to all generators participating in the SEM and are approved by the SEM Committee. Suppliers are changed for use of the transmission system on a time-of-use basis. These STUoS tariffs are sent to the UR for approval. The UR will formally write to SONI with approval – this will usually take place around July.

Once regulatory approval has been received, the SONI Commercial Department will prepare the Statement of Charges (which also includes the SSS and CAIRt tariffs) for the following year. This is published on the SONI website in accordance with condition 30 of the SONI Licence. The Statement of Charges sets out all the tariffs (as approved by the UR) which are used for invoicing both generators and suppliers.

GTUoS Agreement

This charge is calculated based on the Network Capacity Charge Rate (€/MW/month) and the Maximum Export Capacity (MEC) of the Generating Unit.

The development of harmonised all-island transmission Generator charges was an objective stated in the original 2005 SEM high level design.
On 29 September 2011, Utility Regulator of Northern Ireland and the CER approved implementation of all-island Generator TUoS.

Supplier TUoS Agreement
As mentioned above Suppliers seeking to use the Transmission System will be required, prior to using the Transmission System, to enter into a Transmission Use of System Agreement ("TUoSA") with SONI. The process is managed and administered by SONI as Transmission System Operator. Access to the Transmission System involves meeting the terms of and executing a Supplier TUoSA. A current Supplier TUoSA template can be found here[79]. Suppliers under the terms of the TUoSA are required to provide security cover for a total of five weeks of tariff charges per customer.

Settlement- Generator and Supplier
Invoices are issued on a monthly basis to both Suppliers and Generators and payment terms are outlined in the relevant TUoS Agreement.

Network Charges
There are two types of network charges:

1) **Generator TUoS (GTUoS)**

This charge is calculated based on the Network Capacity Charge Rate (£/MW/month) outlined in Schedule B of the Charging Statement and the Maximum Export Capacity (MEC) of the Generating Unit outlined in the Generator TUoSA.

2) **Supplier TUoS (STUoS)**

This charge is calculated p/kWh for each unit delivered through the Transmission System at the trading point. There are four tariff rates based on time of use (see Schedule A of the Charging Statement) and are higher at peak times to reflect the higher demands placed on the Transmission System at these times.

System Support Services (SSS)
This charge is calculated p/kWh for each unit delivered through the Transmission System at the trading point. The rate applied is a flat rate and is outlined in Appendix 1 of the Charging Statement. The SSS charge is levied on Suppliers only.

Collection Agency Income Requirement CAIRt
This charge is calculated p/kWh for each unit delivered through the Transmission System at the trading point. The rate applied is a flat rate and is outlined in Schedule D of the Charging Statement. The CAIRt tariff, which SONI collects from Suppliers only and pays to Moyle Interconnector Limited, is apportioned across the units transmitted.

[79] Please note the Supplier TUoSA is currently undergoing review and may be subject to change.

Contractual Interface

SONI undertakes the role of commercial interface in the electricity market. This is possible because SONI has contracts with all relevant market participants, and because it provides the services that are related to those contracts. SONI collects any revenue required by the Moyle Interconnector through its SSS tariff. This enables Mutual Energy to access low cost financing, reducing costs for all consumers in Northern Ireland.

SONI acts as the “financial backstop” for the market. This reduces the collateral required by all market participants, reducing the overall cost of doing business in the SEM and increasing access to the market. This increases competition and lowers overheads, with consequential benefits for consumers.

SONI is a member of ENTSO-E; as part of this we are required to be a member of the Inter-TSO compensation mechanism.

Pooling all of these commercial interface activities into one organisation that already has contracts with all the relevant parties unlocks synergies.

1. Moyle Interconnector Services

What SONI does

There are three parties licensed to participate in the transmission of electricity in Northern Ireland. Northern Ireland Electricity Networks (NIE Networks) is responsible for the development and maintenance of the transmission system in accordance with the NIE Networks Licence and the Transmission Interface Arrangements (TIA), as mandated by Condition 18 of the SONI licence. SONI holds the Transmission System Operator licence and is responsible for the operation and planning of the transmission system. Moyle Interconnector Limited also holds a transmission licence as the owner of the interconnector to Scotland.

The HVDC Moyle Interconnector is the 500 MW HVDC link between Auchencrosh, South Ayrshire in Scotland and Ballycronan More, County Antrim in Northern Ireland, which went into service in 2001 and is owned and operated by Mutual Energy.

The Moyle Interconnector provides major benefits for consumers. It is made up of two 250MW cables and can operate in either direction, providing a total connection of 500MW between the all-Ireland Single Electricity Market and the GB market. Since 1 October 2018, with the arrival of the new I-SEM market on the island of Ireland, the SEM and GB markets are coupled, meaning the physical interconnector flows are determined by the relative prices in the two connected markets.

The interconnector is operated by SONI, we act as Interconnector Administrator ("IA") and the performance of the interconnector is detailed in the Annual All Island Transmission System Performance Report as published on the SONI website. We also provide information for stakeholders regarding Moyle and its planned activities through our All Island Ten Year Transmission Forecast Statement, in conjunction with EirGrid, which is published on the SONI website.

As Interconnector Administrator, SONI performs several functions and assessments regarding the SONI/Moyle interactions. These include:

- Outage Management:
    - Outage coordination, which is governed through the Interconnector Operator Protocol ("IOP");
    - Recording outages in the Interconnector Capacity Management Platform ("ICMP");

- Interconnector Reference Programme ("ICRP") Calculation:
    - Determination of ICRP;
    - Communication of ICRP;
- Net Transfer Capacity Calculation and Management:
    - Long term input data determination;
    - Long term input data capture;

- Long term NTC calculation;
- Long term communication to National Grid Electricity Tranmission ("NGET");
- Short term determination and capture;
- Short term communication to NGET;

- PN Submission;
  - Calculation of PN's to be sent to NGET;
  - Communication to NGET;
  - Calculation and communication of SO-SO trade prices and volumes;
  - Agreement to proposed SO-SO trades;

- Cross-Border Actions:
  - Emergency Assistance Services;
  - Emergency Instruction;
  - Static Frequency Response Service;
  - Reactive Power;
  - Black Start;
  - Coordinated third party trades;

- Settlement Interactions

How SONI does this

Over the period SONI will be commencing work on the Moyle Controller Project as detailed further under SONI Deliverables within Role 1 (see Project ID FWP001) alongside our network project to increase the export capacity of Moyle Interconnector (see SONI Deliverables, Role 3 Moyle 275kV Capacity Increase).

The control systems installed at the Moyle site are now end of life and as such this programme will address the upgrade required, with SONI working in open collaboration with Mutual Energy. This includes the SCADA connectivity back to the SONI control rooms. In addition, there a new set of requirements for the data to be dispatched, displayed and captured in the SONI EMS.

As part of our work in the SONI Transmission Development Plan for Northern Ireland, we review the projects planned and in particular Moyle Interconnector, which requires a 275kV reinforcement project, originally due to be completed by 2028, which has now been reprioritised and a new target completion date of 2024. The drivers for this project are market integration, security of supply and RES integration. At present, full utilisation of the 500 MW export capability of the Moyle Interconnector is prevented by the potential for network overloads in the event of the loss of the 275 kV double circuit between the Moyle converter station at Ballycronan More and the nearby Ballylumford substation. This project involves works to allow reconfiguration of the connection to Moyle to address this contingency. It will be subject to cost-benefit analysis before proceeding.

Interconnection with neighbouring countries offers many benefits, which include:

- Enhancing the security of supply of the transmission system;
- Facilitating the integration of variable renewable generation; and
- Facilitating greater competition and the potential for wholesale electricity prices to be reduced.

The measure of success for these areas will be against the timescales involved in the project delivery as indicated above and making efficiencies where possible to minimise associated costs.

Another key indicator is the availability of the Moyle Interconnector. The annual availability of the Moyle Interconnector for 2019 was 97.68%. At that time, this was the highest availability on the Moyle interconnector since its connection to the system in 2002. In the All Island Transmission System Performance Report for 2020[80] this increased again to annual availability being 99.37%, again being the highest availability for the Moyle Interconnector.

With the planned activities in this area, SONI expects that the Moyle availability will continue to meet these high standards.

SONI is engaged in regular communication with National Grid regarding the above activities. This provides up to date knowledge sharing on a regular basis and SONI is embracing the TSO-TSO engagement activities that this brings.

We anticipate that the work in this area will enhance the four SONI outcomes, namely, decarbonisation, grid security, SONI service quality and system-wide costs.

Key Activity: An important programme of work within this service area is the Moyle Controller Upgrade which is due to complete by September 2022. This is expected to bring enhancements to our grid security SONI outcome.

Key Performance Indicator: In order to measure our success in this area a key performance indicator will be system minutes lost, given the enhancements that we expect this programme of work to bring to our grid security outcome. We will also monitor the timeframes involved in this programme to ensure they meet our targets as detailed within the section SONI Deliverables.

[80] All-Island-Transmission-System-Performance-Report-2020.pdf (soni.ltd.uk)

2. System Support Services Tariffing and Settlement

What SONI does

Each System Service considered in the scheduling and dispatch process is remunerated using common tariffs (i.e. a fixed payment rate per service is applied to each service provider). System Service providers are therefore selected based on their Balancing Market commercial offer data (where applicable) and their technical capability to provide a service. Providers are selected following a procurement process which also factors in their technical capability. We select the appropriate commercial data set (complex or simple) for use in the scheduling and dispatch process as set out in Appendix 2.1 of the Balancing Market Principles Statement[81]. The objective of the scheduling and dispatch process is to minimise the cost of diverging from participants' Physical Notifications. Unit commercial data forms the basis of determining this cost.

It is important to highlight that Tariffs do not include the costs of connections (offer preparation, pre-construction, construction, testing and commissioning).

System Support Services collects all of SONI's internal and external costs. The UR approves this annually and as such a new tariff takes effect on 1 October each year.

How SONI does this

The agreed calculations have been included in the Settlement system. This includes the annual updating of rates based on the information provided in the Statement of charges. Settlement is run on a monthly cycle. All figures are reviewed in a sign off meeting with management from Settlement, System support and Finance. Once signed off and agreed the information is then shared with Customers and invoices issued.

[81] https://www.soni.ltd.uk/media/documents/EirGrid-and-SONI-Balancing-Market-Principles-Statement-V5.0.pdf

3. System Services Settlement

What SONI does

We have an agreed settlement process following consultation with the RAs. It is a joint process with EirGrid. Generators are invited to take part in a procurement process whereby their technical ability to provide certain services is assessed and if they are successful, they are awarded a DS3 contract. The services available are FFR, POR, SOR, TOR1, TOR3, RR SIR, SSRP, RM1 RM3, RM8. The services which are currently unable to be contracted for are DRR and FPFAPR.

Service Name	Abbreviation	Unit of Payment	Short Description
Synchronous Inertial Response	SIR	MWs^2h	(Stored kinetic energy)*(SIR Factor – 15)
Fast Frequency Response	FFR	MWh	MW delivered between 0.15 and 10 seconds
Primary Operating Reserve	POR	MWh	MW delivered between 5 and 15 seconds
Secondary Operating Reserve	SOR	MWh	MW delivered between 15 to 90 seconds
Tertiary Operating Reserve 1	TOR1	MWh	MW delivered between 90 seconds to 5 minutes
Tertiary Operating Reserve 2	TOR2	MWh	MW delivered between 5 minutes to 20 minutes
Replacement Reserve – Synchronised	RRS	MWh	MW delivered between 20 minutes to 1 hour
Replacement Reserve – Desynchronised	RRD	MWh	MW delivered between 20 minutes to 1 hour
Ramping Margin 1	RM1	MWh	The increased MW output that can be delivered with a good degree of certainty for the given time horizon.
Ramping Margin 3	RM3	MWh	
Ramping Margin 8	RM8	MWh	
Fast Post Fault Active Power Recovery	FPFAPR	MWh	Active power (MW) >90% within 250ms of voltage >90%
Steady State Reactive Power	SSRP	MVArh	(Mvar capability)*(% of capacity that Mvar capability is achievable)
Dynamic Reactive Response	DRR	MWh	Mvar capability during large (>30%) voltage dips

We receive data inputs into the settlement system and payments are worked out using the formula Payment = Volume x Scalar x rates.

Volumes are calculated using various data inputs into the settlement system.

Scalars relate to Performance (these are based on the performance of the unit over the past year i.e. availability), the product, Location, temporal scarcity, and the market to physical aspect.

Rates are agreed each year by the RAs. They're agreed in Euro and an agreed Sterling exchange rate is used. Rates are approved by the Utility regulator and the SONI statement of payments is published (this usually occurs before the start of the Tariff year in October). The rates are added to and applied in the settlement system.

There are also charges related to the performance of units such as Other System Charges including Generator Performance Incentives (GPIs). Other system charges can be based on trips and short notice declarations (SNDs). GPIs are applied to conventional units. These are also settled in the Settlement system.

How SONI does this

For DS3 System Services & Other System Services a bilateral contract (the DS3 System Services Agreement) will be in place to define the payment arrangements, along with unit-specific parameters. SONI receives the submission of data (15 second and 30 minute data) into our Settlement system. We also hold the contract information and declarations for all units. Once the data is acquired, we perform Quality controls on it and then process it through the running of bill cases. We execute the billing run to determine Reserve, Steady State Reactive Power, Ramping Margin, Synchronous Inertial Response, Fast Frequency Response, Fast Post Fault Active Power Recovery, Dynamic Reactive Response, Black Start, Short Notice Declarations (SNDs), Trips and Generator Performance Incentives (GPIs), Local Reserve Services for all units.

Once these are calculated we verify the details and again perform quality control. Reports are created and analysis carried out. The bill case processing takes into account the contract information, the declarations and the performance scalars.

At the conclusion of the monthly billing process we ensure that issues and follow up activities are documented and reviewed at a management sign-off meeting. There will be a presentation delivered which contains a comparison of monthly figures against budget and against previous months and deviations highlighted. There is also a year to date summary which is shown against budget. Any issues encountered or anomalies are also highlighted before signing off. Once the review of the billing month is satisfactory, and internal governance processes are completed, reports and invoices are then issued to customers and website updated appropriately.

4. Industry Backstop – Capacity Remuneration Mechanism ("CRM") and Balancing Market

What SONI does

The industry backstop is a function whereby SONI can recoup or socialise the costs of any bad debts in relation to the Capacity Remuneration Mechanism and the Balancing Market.

SONI has access to a funding mechanism which was put in place to manage cash flow issues which could arise from variances in capacity market changes, Dispatch Balancing costs forecast errors, residual errors and so forth.

How SONI does this

Once the fund has been put in place the ongoing work involves:

1. Monitoring the adequacy of the funding arrangements.
2. Drawing down on the fund if a cashflow gap emerges
3. Paying the fund back once the cashflow recovers (this recovery could be through an increase in tariffs or simply a time of year correction)
4. Seeking an increase in fund size if draw down reaches a very high level

SONI reviews these as part of our ongoing business activities to ensure these issues are addressed at an early stage.

5. ENTSO-E ITC Mechanism

What SONI does

Despite the UK leaving the EU on 31 January 2020, SONI continues to be required to comply with EU legislation relating to the electricity wholesale market[82] .

The ITC ("Inter Transmission System Operator Compensation") mechanism allows transmission system operators (TSOs) to receive compensation for the costs of hosting cross-border flows on their networks. This compensation shall be paid by the operators of national transmission systems from which cross-border flows originate and the systems where those flows end. The details of the ITC mechanism were developed by ENTSO-E. These were approved by the European Commission and are set out in Regulation 838/20103. This regulation states that:

- Article 1 Transmission system operators shall receive compensation for costs incurred as a result of hosting cross-border flows of electricity on their networks on the basis of the guidelines set out in Part A of the Annex.
- Article 2 Charges applied by network operators for access to the transmission system shall be in accordance with guidelines set out in Part B of the Annex.

ACER monitors[83] the implementation of the ITC mechanism as well as the management of the ITC fund and reports to the European Commission.

The ACER monitoring report[84] advises:

"*TSOs or groups of TSOs being treated as a single unit participating in the ITC mechanism ('ITC Parties') receive compensation from the ITC Fund based on the transits they carry and contribute to the ITC Fund based on their net import and export flows. Non-participating countries connected to the ITC Parties' networks ('Perimeter countries'3) pay a transmission system use fee for their scheduled imports from and scheduled exports to the ITC Parties' networks. As such the ITC Fund is mainly a redistribution of yearly payments among the ITC Parties"*

Northern Ireland benefits from the transfer of electricity across the European Network because it is a net importer of electricity. Losses are incurred on these transfers of electricity across Europe and the purpose of the ITC mechanism is to ensure that the losses are paid for by the countries that benefit from the flows.

The Ireland and Northern Ireland power system is a synchronous system with limited High Voltage Direct Current (HVDC) interconnection to Great Britain. At the time of writing this report, the power system had experienced an all-time peak load of 6.78 GW which

[82] https://www.legislation.gov.uk/nisr/2020/307/regulation/8/made
[83] http://acer.europa.eu/en/Electricity/Infrastructure_and_network%20development/Pages/Inter-TSO-compensation-mechanism-and-transmission-charging.aspx
[84] Microsoft Word - 2021-10-18_ITC monitoring report 2020-draft-for-BoR (europa.eu)

occurred in January 2021, and a maximum all-time wind output of 4.47 GW[85] which occurred in February 2021. Presently there are two HVDC interconnections between the island of Ireland and Great Britain: the 0.5 GW Moyle Interconnector and the 0.5 GW East-West Interconnector. There is over 5.57 GW[86] of wind capacity installed on the power system and there is approximately 9.7 GW of dispatchable capacity, including the interconnectors[87].

Given's SONI's pivotal role in both operating the electricity system, the wholesale market and managing the flows on the interconnectors, it is crucial that we advance a green energy system, ready for the increasing levels of non-synchronous generation and increasing electricity demands, if Northern Ireland is to play its part in delivering net zero carbon by 2050.

Northern Ireland is connected to Great Britain through the Moyle Interconnector. Interconnection with neighbouring countries offers many benefits, which include:

- Enhancing the security of supply of the transmission system;
- Facilitating the integration of variable renewable generation; and
- Facilitating greater competition and the potential for wholesale electricity prices to be reduced.

How SONI does this

The key outputs of SONI's participation within the ENTSO-E ITC Mechanism are:

- Compliance with Northern Ireland and European Legislation;
- Membership of the ITC mechanism, which provides access to cheaper power imports from other markets across Europe.

A project that is relevant under the ENTSO-E ITC Mechanism is the multi region loose volume coupling (MRLVC). Under the Trade and Cooperation Agreement (TCA) between the GB and EU, new arrangements will be required for day-ahead capacity allocation and capacity calculation. The proposed capacity allocation process that is being examined at present is based on multi region loose volume coupling for the day-ahead time frame with an associated capacity calculation process. This work is being progressed in a co-ordinated approach between the GB TSOs, EU TSOs and ENTSO-E. Guidance on the final technical procedures will be agreed upon by the GB/ EU Specialised Committee on Energy (SCE). The initial high-level timeline for implementation of the day-ahead arrangements is April 2022; however, this may be subject to amendment based on more detailed assessments by the relevant parties.

[85] https://www.soni.ltd.uk/media/documents/System-and-Renewable-Data-Summary-Report.xlsx
[86] https://www.soni.ltd.uk/media/documents/Wind20Installed20Capacities.png
[8787] 208281-All-Island-Generation-Capacity- Statement-LR13A.pdf (soni.ltd.uk)

As part of our Shaping Our Electricity Future Consultation, SONI will be publishing our associated Shaping Our Electricity Future Roadmap in November 2021. It will detail out some of our planned activities, in relation to interconnection these include:

- Developing operational protocols, policies and procedures for new Interconnectors, in order to facilitate the transition to at least 70% RES-E by 2030;
- Identifying the needs for enhanced and new tools driven by factors such as increasing levels of variable non-synchronous RES, increasing demand and new demand categories, new transmission network including flexible devices, new interconnectors, and new scheduling and dispatch processes driven by market and System Services changes
- Full integration of SEM in the Great Britain and EU Markets – evolving the market structures to best utilise interconnection to improve the economic outcomes for SEM consumers and to facilitate the long-term the export of renewable energy efficiently and effectively.

Through these activities SONI will be able to enhance the efficient operation of interconnection within the Single Electricity Market.

SONI will continue in our role to enhance the efficient use of cross border interconnection, as detailed in the section Moyle Interconnector Services, which will bring benefits such as being a key enabler for achieving our targets with regard to RES-E and therefore SNSP.

SONI considers given the activities planned over the period within this service area, we anticipate this will bring enhancements to our four SONI outcomes, in particular decarbonisation and grid security.

SONI Key Performance Indicators for Role 4

For Role 4 Commercial Interface, the main Key Performance Indicators for this area are linked to the timeframe to deliver on our programmes of work which are detailed in SONI Deliverables.

Alongside these programme activities, other business activities include those detailed throughout the role, such as the delivery of Connection Offers, Connection Agreements, GTUoS Agreements and so forth. SONI will continue to monitor these and ensure that we follow the appropriate processes in line with our Licence obligations.

The UR will be calling for submissions from stakeholders for feedback on SONI's Forward Work Plan, and this would present an opportunity for stakeholders to present their views as to what metrics they would consider relevant to measuring SONI's success in this role. SONI would welcome the feedback from stakeholders in this area for consideration during the period.

Table 7: Baseline Performance Versus Target for each Performance Indicator

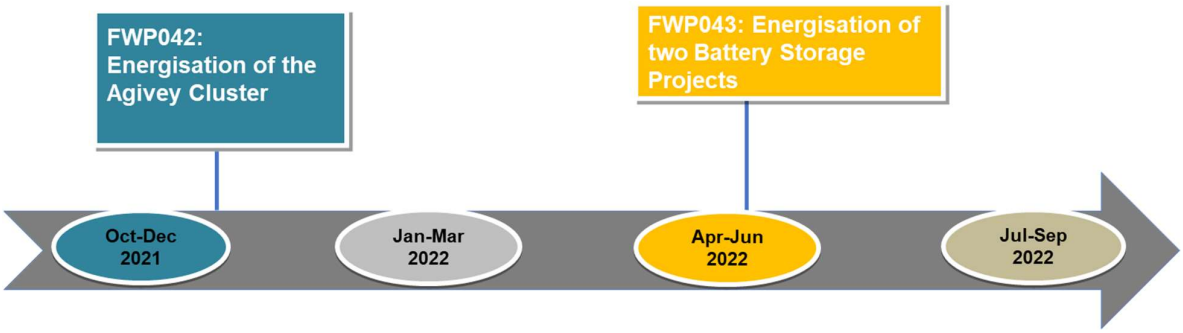
Performance Indicator	Description	2019 Baseline	2021/22 Target
RES-E (%)	To increase the percentage of electricity from renewable sources in Northern Ireland.	39%	41%
SNSP (%)	To increase the maximum level of Synchronous Non-Synchronous Penetration (SNSP) that SONI will allow on the system at any one point in time	65%	75%

SONI Deliverables for Role 4

Throughout this section, which covers the Commercial Interface, we have provided an overview of each area within the business which contributes to this role. At the end of each of these corresponding business areas, we have indicated the key strategic initiative or business improvement to be undertaken which we expect to result in improving the metrics provided in the previous section or enhance the four SONI outcomes. We have detailed below the associated programme of activities for each of these areas, alongside the benefits we anticipate it will bring and any corresponding performance indicator that we will use to measure our success.

SONI has considered our planned activities in this role for the period in comparison to our historic performance for 2019/20 where we delivered the energisation of two battery storage projects and the execution of their Connection Agreement and associated GTUoS Agreement. As a result, we consider this area to be operating in line with our baseline performance as there are no additional activities or engagements outside of the scope of our standard operating practice.

SONI have planned the energisation of two battery storage projects and the Agivey Cluster as detailed in the graphic below. This are expanded on further within this section.



Energisation of the Agivey Cluster

Project ID	FWP042
Project Name	Agivey Cluster
Project Milestone to be Achieved during period	Energisation of the Agivey Cluster
Project Description	The completion of the Agivey Cluster Project is an important scheme for the delivery of clean energy in Northern Ireland. It will help facilitate our transition to a low carbon energy future, enhance security of supply for electricity consumers and strengthen the local transmission network. This project will help to decarbonise the power system for future generations and support the Stormont's ambition for 70% of electricity from renewable sources by 2030. In February 2020 the Agivey Cluster Project has been granted planning permission by the Causeway Coast and Glens planning committee. SONI has continued close engagement with all stakeholders before formally handing the project to NIE Networks for construction. Construction is nearing completion and we have a target energisation date of early December 2021.
Target Completion Date	Early December 2021
Project Benefits	The Agivey Cluster Project will bring benefits, including: • Help in facilitating Northern Ireland's transition to a low carbon energy future; • Enhance security of supply for electricity consumers in Northern Ireland; • Strengthening of local transmission network in the North-West region.
Key Performance Indicator	In order to measure our success in this area, SONI will continue to monitor our delivery timelines in order to ensure we are successful in this area. Given the key drivers are RES Integration and strengthening the transmission network in the North-West, SONI considers this will bring enhancements to the RES-E metric

Energisation of two Battery Storage Projects

Project ID	FWP043
Project Name	Energisation of two Battery Storage Projects
Project Milestone to be Achieved during period	Energisation of the customer sites Execution of associated Connection Agreements Execution of associated GTUoS Agreements
Project Description	SONI is progressing the energisation of two customer battery storage projects within Northern Ireland. We are working towards the planned energisation of both of these projects prior to the end of April 2022. SONI is therefore continuing ongoing engagement with NIE Networks in the final construction, testing and commissioning of both project sites and simultaneously preparing the Connection Agreement and associated GTUoS Agreements for both individual customers. These will be executed by both SONI and the customers prior to energisation and the SONI Connections Register updated accordingly.
Target Completion Date	Both projects to be completed by end of April 2022
Project Benefits	Both projects are expected to bring benefits to grid security and decarbonisation, providing the availability of additional capacity as required and the possibility for driving forward clean energy.
Key Performance Indicator	Our key performance indicator for measuring our success for both projects will be the executing of both the Connection Agreements and GTUoS Agreements within the required timescales. This is a complex task as a number of factors are susceptible to last minute adaptations and as such will be a good measure of our success.

SONI Stakeholder Engagement for Role 4

Stakeholder engagement is a core activity that SONI is regularly undertaking. Collaboration is one of our core values, in that we drive the most benefit from these engagements by listening to our stakeholders, being responsive to feedback that we receive and learn from our successes and our failures by engaging with stakeholders.

Throughout SONI TSO Role 4 Commercial Interface, we are engaged in open and transparent communication with current and potential new customers, through the application process, through construction and entering into the final agreement processes.

SONI engages with potential new applicants periodically as required and maintains a flow of information between our internal departments and customers as their projects progress through the connection offer, construction and energisation phases of work to ensure both parties remain fully up to date.

SONI is working with partners to prepare the Northern Ireland electricity system to support the forthcoming Department for the Economy's energy strategy. SONI together with governments, regulators, the DSOs and industry will both lead and underpin Northern Ireland's response to climate change in the electricity sector.

Industry engagement was a key feature of SONI's impactful and inclusive consultation on the Shaping Our Electricity Future Consultation and will continue as we develop our Roadmap. Seeking the views, needs and opinions of new and existing customers enabled collaborative discourse and innovative solutions.

We will continue to engage with Industry bodies, in relation to the evolution of the Shaping our Electricity Future project, through our industry webinars and specifically through the Shaping Our Electricity Future Industry Forum and Shaping Our Electricity Future Industry Advisory Council.

While Shaping Our Electricity Future considers the changes required to operations, markets and the transmission grid, this role, is more focused on the later; SONI has a responsibility to work with customers to prepare the grid for Northern Ireland's 2030 renewable energy ambition.

For this to happen, SONI not only needs to collaborate with Industry and deliver for Customers, but we also must meaningfully engage with those landowners and communities who will host transmission infrastructure.

In recognition of the importance of meaningful and early engagement with communities and landowners; in 2021 SONI is in the process of reviewing its public engagement strategy. We have also drawn from our extensive engagement learnings from the Shaping Our Electricity Future project, which raised the bar in terms of our already high engagement standards.

We have reviewed our public engagement tool kit, benchmarked our processes against other utilities and are in the process of finalising our strategy and associated engagement programme. The application of our revised public engagement strategy on individual

projects will be dependent on funding from the Utility Regulator for consultation, communication and engagement activity via the TNPP process.

It is SONI's role to ensure the grid is ready for the 2030 renewable energy ambitions. For this to happen, SONI needs to make an evolutionary shift in how we engage with the public and evolve our Public Engagement strategy.

Our Public Engagement strategy must be a process of continuous improvement. Only with the support of all stakeholders will we be able to achieve the scale of change required in the next few short years. The scale of this challenge is enormous.

When we work together, we make better decisions. If we can collaborate with the public, with communities and with landowners to find a shared solution, then together we can create a better future for generations to come.

Outcomes

In SONI's first Forward Work Plan, we have highlighted below what success will look like, alongside any relevant KPIs against the four SONI outcomes.

Decarbonisation	Through the Connection Offer service, SONI provides expert support for the potential applicants bringing clean energy generation sources to the Transmission System. SONI also supported the DfE's Energy Strategy Consultation, and we expect to play an important role in progressing this as future programmes of work evolve. The energisation of the Agivey Cluster will also assist in facilitating the increased volume of renewable generation that has access to the Transmission System.
Grid Security	SONI play an active role in ensuring our grid security is to a high standard. We anticipate our actions over the next period will bring enhancements to this SONI outcome. In Role 4 we expect that our activities through our Connection Offer Process will play a key role here alongside our future Grid Code updates and working in collaboration with NIE Networks in order to develop the Transmission System and therefore enhance our Grid Security.
System Wide Costs	Through our ENTSOE-E membership we are gaining access to expertise through other TSOs and activities and in participating in the Inter TSO Compensation Mechanism, we are gaining access to maintain high levels of electricity from renewable sources on the transmission system, which ensures that the consumer can also play an active role in the energy transition. This service area also allows us to receive the benefits of access to lower cost electricity produced in the markets beyond the island of Ireland.

SONI aims to build on our stakeholder engagement over the 2021/22 period.

SONI's activities in our TSO Role 4, such as initial enquiries and the Connection Offer Process are a key activity in ensuring we provide a high level of service to our customers. From initial contact we ensure that customers are aware of the key areas where they can easily access information and we envision that this will continue and likely grow as areas providing renewable generation become more important as the energy strategy evolves.

Ambition

Ambition is one of the core SONI values. We stretch ourselves to accomplish our goals. We drive transformation, take appropriate risk and recognise achievements throughout industry.

In order to play our role in the energy strategy, as well as maintaining a safe and reliable transmission system at a time when we seek to facilitate an increased amount of renewable generation, SONI will be required to implement plans which may be considered ambitious.

SONI would emphasise that our planned activities within this role are ambitious, as they will need to be in order to facilitate the actions which evolve out of the Northern Ireland Energy Strategy.

Northern Ireland has been set an ambitious target of achieving 70% of electricity generated from renewable sources by 2030. In order to meet these targets, our activities in Role 4 Commercial Interface will need to be robust and ready to meet this challenge.

SONI will need to facilitate increasing numbers of connection applications, over the coming years in the approach to 2030 and it is important that are processes are aligned to match the increasing level of complexity that these applications may bring.

By engaging with customers early in the process, we can identify bespoke technical complexities relating to each location or specific project and be proactive in our response to address these difficulties. Furthermore, by engaging at an early stage with the UR and identifying potential roadblocks, solutions to these issues can be identified and implemented swiftly and efficiently.

SONI is focused on our interface arrangements with NIE Networks, in order to ensure the highest level of collaboration between TSO and DSO, DNO and TO so that we can both execute our obligations in an efficient manner and not to the detriment of the NI Consumer. We will continue to review our obligations here and work collaboratively with NIE Networks, the UR and other third parties in order to ensure that we conduct our services under role 4 to the best of our ability in the evolving world as we keep pace with the energy transition.

Accountability

SONI considers Role 4 Commercial Interface has provided clarity around our planned activities and programmes of work and therefore how the success of their performance will be measured.

For each of our service areas within this role, we have detailed the key day to day activities and the outputs or benefits they bring to the consumer. In addition, we have set out the key strategic initiatives, relevant business improvements necessary and details of performance monitoring processes required to ensure our 2030 renewable targets are met.

Accountability is one of SONI's core values. We have full transparency in this TSO Role 4 with the UR, with monthly working level meetings for information sharing in order that they are fully aware of the progression of our work with regards to grid security, current/potential new projects and to share the progress of the current programme of work. Through this open and transparent engagement with the UR, SONI is held wholly accountable, we are proactive in our approach and will continue to build upon the successes that this relationship has brought over the previous years.

SONI's accountability will not only be demonstrated through our active engagements with the UR in this role, but also through our implementation of the Evaluative Performance Framework over the period. We are aware that in this role we are measuring our success by monitoring the timeframes to implement our programme of work and ensure they are achieved and also meeting our day to day activities such as issuing Connection Offers or Energising a customer site. Through implementing the Evaluative Performance Framework over the period, we will be seeking to increase our level of accountability, by being responsive to the feedback provided by stakeholders for which metrics they considered relevant and applying these to the service areas within this role. We will be aiming over the period to increase this measure of success through the improved use of key performance indicators to give a more quantitative and qualitative measure of our success which stakeholders consider relevant as well as monitoring our timelines to complete a programme of work, so we can recognise the impact of our work on our four SONI outcomes, decarbonisation, grid security, system wide costs and SONI service quality.

We are ultimately accountable for the work which we conduct over the period through the implementation of the Evaluative Performance Framework. We will be assessed against our Forward Work Plan and awarded a score as such, which is something we will also use in future in order to measure our success in each TSO role.

SONI considers that we have provided suitable measures of our success in each service area, but that this is something that we will continue to improve on during the period in order to translate this into a meaningful response for our stakeholders and the UR.

Alignment to the UR Priorities

In the UR's Guidance on the Evaluative Performance Framework, they advise on their service and strategic priorities which they would like SONI to demonstrate an alignment against. We have taken each of these priorities in turn below and expanded on how we will demonstrate our alignment to these over the period October 2021 to September 2022 and beyond.

UR Strategic Priorities

A culture of effective engagement and collaboration

SONI is actively engaged in collaboration with NIE Networks, the UR and other third parties throughout our work within the TSO Role 4 Commercial Interface. We engage with NIE Networks from an early stage in the Connection Offer process and have periodic working level meetings in order to ensure both parties can work effectively through the Transmission Interface Agreement. As we pass through the Construction Offer from NIE Networks into the customers Connection Offer, effective engagement is a vital aspect of this work. Ensuring a high level of detail is present in the Construction Application and having a clear line of communication with our counterparts at NIE Networks ensures that significant engagement is maintained throughout the process. SONI anticipates that this will continue to play an important role throughout the period as we continue to receive applications for a connection to the Transmission System and as our current projects approach their respective energisation dates.

A culture of open and collaborative innovation

A key activity within Role 4 is our obligation to engage with NIE Networks through the Transmission Interface Arrangement. This is an ongoing collaboration and we regularly meet with our counterparts within NIE Networks to discuss our programme of work and engage in transparent communication in order to resolve complexities as they arise. This is particularly evident with some new projects as there is often additional technical complexities as new technologies emerge on to the Transmission System. We will continue this collaboration over the period, and beyond, as we review the Transmission Interface Arrangement and deliver our updated publication. As the energy transition programme of work evolves this may also require additional collaboration with NIE Networks and other third parties.

Appendix 1 – Self-Assessment

As part of our obligations under the Evaluative Performance Framework, SONI is required to provide a self-assessment of our Forward Work Plan against the criteria as specified in the UR's Guidance on the Evaluative Performance Framework. This also includes the provision of a proposed grade or grade range for the plan in each role, which we have explained in the sections within each Role (SONI Outcomes, SONI's alignment to the UR Service Priorities, and so forth).

SONI have provided our self-assessment in the table below.

SONI Role	Associated Score
Role 1 System Operation and Adequacy	5
Role 2 Independent Expert	3
Role 3 System Planning	4
Role 4 Commercial Interface	3

For Role 1 System Operation and Adequacy, SONI conducted a self-assessment of the role as per the UR's guidance. As demonstrated throughout the corresponding sections in Role 1, SONI considers our Service Ambition exceeds expectation, given the significant number of projects, many of which are world leading when compared to the baseline activities. We consider our UR Service Priority Alignment and Service Accountability meet expectations as this match our historic performance in these areas. We also considered, as evidenced throughout Role 1, that our stakeholder engagement exceeds expectations, when compared to the level of stakeholder engagement in the base year. We have significant engagements planned over the period which are detailed throughout Role 1. Using the scoring methodology provided by the UR in their associated guidance, SONI's calculations provided a score of 5 for this role.

For Role 2 Independent Expert, SONI has called out the criteria for the assessment throughout this role. As such, in conducting our self-assessment it was determined that we met expectations across all four criteria per the associated guidance. This provided SONI with a score of 3 for a baseline performance in this area.

Given the quantity of stakeholder engagement opportunities throughout this role, SONI considered that we exceed expectations in this criterion, whilst meeting expectations in the three other criteria (Service Ambition, Service Accountability and UR Service Priority Alignment). Using the calculation provided in the UR's guidance, this provided SONI with a self-assessment score of 4 for the System Planning role.

For Role 4 Commercial Interface, SONI considers that we meet expectations across all four criterion, and as such the calculation provides this with a score of 3 for a baseline performance, which aligns with our historic performance in this area.

The UR have provided weights to relate to each role which are:

- Role 1 System Operations and Adequacy – 27.5%;
- Role 2 Independent Expert – 25%;
- Role 3 System Planning – 25%; and
- Role 4 Commercial Interface – 22.5%

In considering the above information, SONI has calculated an overall grade for the Forward Work Plan as 3.8.

Glossary of Terms and Abbreviations

Term	Abbreviation	Description
Active Power		The product of voltage and the in-phase component of alternating current measured in Megawatts (MW). When compounded with the flow of 'reactive power', measured in Megavolt-Amperes Reactive (Mvar), the resultant is measured in Megavolt-Amperes (MVA).
Agency for the Cooperation of Energy Regulators	ACER	
Aggregated Generator Unit	AGU	A number of individual generators grouping together to make available their combined capacity.
Alternating Current	AC	A type of electrical current, in which the direction of the flow of electrons switches back and forth at regular intervals or cycles.
Associated Transmission Reinforcement	ATR	Refers to new or upgraded transmission infrastructure. They are associated with a generation project and must be complete to release a generation project's Firm Access Quantity
Battery Energy Storage	BES	Capture of energy at one time to use at a later time using battery technology.
Capacity Market	CM	Auctions four years, two years and one year in advance of physical supply of the electricity.
Circuit		A line or cable, including associated switchgear, which carries electrical power.
Clean Energy Package	CEP	EU Commission package of measures to facilitate the clean energy transition. The EU has committed to cut CO2 emissions by at least 40% by 2030 while modernising the EU's economy.
Combined Cycle Gas Turbine	CCGT	A collection of gas turbines and steam units; waste heat from the gas turbine(s) is passed through a heat recovery boiler to generate steam for the steam turbine(s).
Combined Heat and Power	CHP	A plant designed to produce both heat and electrical power from a single heat source.
Commission for Regulation of Utilities	CRU	The Commission for Regulation of Utilities is the regulator for the electricity, natural gas and public water sectors in Ireland.
Constraint		Constraint (either up or down) refer to a change to any generator's output from the planned

		"market schedule" due to transmission network limitations or operating reserve requirements.
Contingency		An unexpected failure or outage of a network component, such as a generation unit, transmission line, transformer or other electrical element.
Coupler		This is a device which can be used to either connect or disconnect sections of busbars. A coupler increases security of supply and flexibility under both fault and maintenance conditions. A coupler can also be known as a Sectionalising Circuit Breaker.
Curtailment		Curtailment refers to the dispatch-down of wind for system-wide reasons (where the reduction of any or all wind generators would alleviate the problem).
Deep Reinforcement		Refers to network reinforcement additional to the shallow connection that is required to allow a new generator or demand to operate at maximum export or import capacity respectively.
Delivering a Secure Sustainable Electricity System	DS3	In response to binding National and European targets, EirGrid Group began a multi-year programme, "Delivering a Secure, Sustainable Electricity System" (DS3). The aim of the DS3 Programme is to meet the challenges of operating the electricity system in a secure manner while operating with high levels of renewable generation.
Demand		The amount of electrical power that is consumed by a customer and is measured in Megawatts (MW). In a general sense, the amount of power that must be transported from transmission network connected generation stations to meet all customers' electricity requirements.
Demand Side Unit	DSU	Consists of one or more Individual Demand Sites that can be dispatched by the Transmission System Operator (TSO) as if it was a generator.
Department for the Economy	DfE	
Dispatchable Generation		Sources of electricity that can be used on demand and dispatched at the request of power grid operators, according to market needs. Does not include wind and solar generation which are non-dispatchable generation
Distribution System Operator	DSO	The Distribution System Operator is the designated authority responsible for the operation of the distribution system.

EirGrid		The independent statutory electricity Transmission System Operator in Ireland.
Electronic Dispatch Instruction Logger	EDIL	Communication platform between TSO and Units, used to issue dispatch instructions.
Embedded Generation		Refers to generation that is connected to the distribution network or at a customer's site.
Energy Management System	EMS	Network of computer servers and workstations used to monitor and control the Grid.
Environmental Appraisal Report	EAR	
Environmental Impact Assessment	EIA	
Environmental Impact Statement	EIS	
Estimated Completion Date	ECD	
EU-SysFlex		Aiming to achieve a pan-European system with an efficient coordinated use of flexibilities for the integration of a large share of renewable energy sources. EU-SysFlex will come up with new types of services that will meet the needs of the system with more than 50% of renewable energy sources.
European Commission	EC	
European Union	EU	
European Network of Transmission System Operators for Europe	ENTSO-E	The European Network of Transmission System Operators, represents 43 electricity transmission system operators from 36 countries across Europe.
Electric Vehicle	EV	
Firm Access Quantity	FAQ	The level of firm financial access available in the transmission network for a generator is that generator's Firm Access Quantity. Firm financial access means that if a generator is constrained on or off, it is eligible for compensation in the manner set out in the Trading & Settlement Code.
Flexibility [electricity system]		The ability to respond to both expected and unexpected changes in demand and generation.
Forced Outage Probability	FOP	This is the statistical probability that a generation unit will be unable to produce electricity for non-scheduled reasons due to the failure of either the generation plant or supporting systems. Periods when the unit is on scheduled outage are not included in the determination of forced outage probability.
Generation Dispatch		The configuration of outputs from the connected generation units.

Generation Capacity Statement	GCS	SONI, the TSO in Northern Ireland, is required by licence to produce an annual Generation Capacity Statement.
Generation Adequacy		The ability of all the generation units connected to the electrical power system to meet the total demand imposed on them at all times. The demand includes transmission and distribution losses in addition to customer demand.
Gigawatt Hour	GWh	Unit of Energy
Grid		A network of high voltage lines and cables (275 kV and 110 kV, and in future 400 kV) used to transmit bulk electricity supplies around Northern Ireland. The terms grid, electricity transmission network, and transmission system are used interchangeably.
High Voltage Direct Current	HVDC	
Infrastructure		Structures and facilities of a region or country, such as buildings, roads, bridges and the electrical grid.
Interconnector		The electrical link, facilities and equipment that connect the transmission network of one EU member state to another.
Interconnector Administrator		An Interconnector Administrator (IA) facilitates the allocation of capacity and energy trading. Trading is carried out using an Auction Management Platform (AMP) for the Moyle and East West Interconnectors.
Micro-generation		Micro-generation refers to generation that is less than 11 kW, usually for self-consumption purposes, connected to the low voltage distribution grid.
Maximum Continuous Rating	MCR	The maximum capacity (MVA) modified for ambient temperature conditions that the circuit can sustain indefinitely without degradation of equipment life. The MCR of a generator is the maximum capacity (MW) modified for ambient temperature conditions that the generation unit can sustain indefinitely without degradation of equipment life. All generation capacity figures in this Transmission Forecast Statement are maximum continuous ratings (defined as its MCR at 10°C), expressed in exported terms i.e., generation unit output less the unit's own load.
Maximum Export Capacity	MEC	The maximum export value (MW) provided in accordance with a generator's connection agreement. The MEC is a contract value which the generator chooses as its maximum output and is used in the design of the Transmission System.

Mega Volt Ampere	MVA	Unit of apparent power. MVA ratings are often used for transformers, e.g. for customer connections.
Megawatt	MW	Unit of power
Need		A future deficiency identified on the grid that arises as a result of one or more drivers, such as additional generation or demand in certain locations. Our technical planning standards play a central role in identifying future needs.
Network Development Driver		A factor, based on national and European energy policy objectives, that influences or "drives" the investment in the transmission network.
Network Development Need		A deficiency or problem on the network which arises as a result of one or a number of network development drivers. Network reinforcement is required to solve a network development need.
Node		Connecting point at which several circuits meet. Node and station are used interchangeably
Northern Ireland Electricity Networks	NIE NETWORKS	NIE Networks owns the electricity transmission and distribution network and operates the electricity distribution network which transports electricity to customers in Northern Ireland.
Northern Ireland Renewables Obligation	NIRO	NIRO is the main policy measure for supporting the development of renewable electricity in Northern Ireland. NIRO is closed for applications.
Power Factor		The power factor of a load is a ratio of the active power requirement to the reactive power requirement of the load.
Power Flow		The physical flow of electrical power. It is typically measured in Megavolt-Amperes (MVA) which is the product of both 'active' and 'reactive' electrical power. The flow of 'active' power is measured in Megawatts (MW); the flow of 'reactive power' is measured in Megavars (Mvar).
Reactive Power		Reactive power is that portion of electricity that establishes and sustains the electric and magnetic fields of alternating current equipment. Reactive power is measured in Megavars (Mvar).
Real Time Commitment	RTC	The TSOs' software used to provide indicative commitment decisions (i.e. which units should be on-line or off-line) close to real time.
Real Time Dispatch	RTD	The TSOs' software used to provide indicative incremental and decremental dispatch decisions close to real-time for units which are on-line or scheduled to be on-line.

Renewable Energy Sources	RES	Energy obtained from Wind Solar Hydro Tidal Geothermal and Biomass
Regulatory Authority	RA	Authorities with obligations to regulate utilities in the public interest.
Renewable Ambition		At least 70% of electricity from renewables by 2030.
Renewable Energy Sources	RES	Sources of electricity generation that use renewable processes, such as wind, solar radiation, tidal movement etc. to produce electricity.
Renewable Energy Sources for Electricity	RES-E	Electricity from renewable energy sources, i.e. the electricity generated from clean energy sources such as photovoltaic, hydro, tidal or wave, wind, geothermal, and renewable biomass.
Reserve		Capacity available for assisting the balancing of deviations in generation and demand.
Single Electricity Market	SEM	The Single Electricity Market (SEM) is the wholesale electricity market operating in Ireland and Northern Ireland. Further information is available at www.sem-o.com and www.semcommittee.com.
Single Electricity Market Committee	SEMC	Decision making authority for the Single Electricity Market on the island of Ireland.
Strategic Environmental Assessment	SEA	Environmental report prepared as part of the Transmission Development Plan NI - TDPNI
Switchgear		A combination of electrical equipment such as disconnects and/or circuit breakers used to isolate equipment in or near an electrical station.
System Operator Northern Ireland	SONI	See above
System Non-Synchronous Penetration	SNSP	System Non-Synchronous Penetration is a real-time measure of the percentage of generation that comes from non-synchronous sources, such as wind and HVDC interconnector imports, relative to the system demand.
Ten-Year Network Development Plan	TYNDP	To ensure the Northern Ireland grid is efficient, strong and reliable SONI develops a ten year programme of work
Ten Year Transmission Forecast Statement	TYTFS	EirGrid and SONI publish the All-Island Ten-Year Transmission Forecast Statement The joint publication describes and presents the following; • Network models and data for the all-island transmission system; • Forecast generation capacity and demand growth; • Predicted transmission system power flows at different points in time

Tomorrow's Energy Scenarios Northern Ireland	TES / TESNI	Scenario plans for Northern Ireland.
Transformer		An item of electrical equipment that allows electrical power to flow between typically two different voltage levels in an alternating current (AC) power system.
Transmission Asset Owner	TAO	The entity that owns the transmission assets. In Northern Ireland NIE Networks owns the transmission assets.
Transmission Development Plan	TDP / TDPNI	Transmission Network Development Plan Northern Ireland See also Ten-Year Network Development Plan
Transmission Interface Station		A station that is a point of connection between the transmission system and the distribution system or directly-connected customers.
Transmission Losses		A small proportion of energy is lost as heat or light whilst transporting electricity on the transmission network. These losses are known as transmission losses.
Transmission Loss Adjustment Factor	TLAF	Electricity (Power) can be lost through the transmission system as it travels. To ensure that the wholesale market is settled correctly, the transmission losses are allocated to generators this way.
Transmission Owner	TO	The entity that owns the transmission assets. In Northern Ireland NIE Network owns the transmission assets.
Transmission Planning Criteria		The set of standards that the transmission system of Ireland is designed to meet.
Transmission System		The transmission system is a meshed network of high-voltage lines and cables (400 kV, 275 kV, 220 kV and 110 kV) for the transmission of bulk electricity supply around Ireland and Northern Ireland. The transmission system and network and grid are used interchangeably
Transmission System Operator	TSO	License entity that is responsible for transmitting electricity from generators to regional or distribution operators
Transmission System Security and Planning Standards	TSSPS	The set of standards that the transmission system is designed to meet. The criteria are deterministic as is the norm throughout the world. They set out objective standards which have been found to deliver an acceptable compromise between the cost of development and the transmission service provided.
Uprate / Uprating		To increase the capacity or rating of electrical equipment.
The Utility Regulator	UR	The Utility Regulator is responsible for regulating the electricity, gas, water and sewerage industries in Northern Ireland,

		promoting the short and long-term interests of consumers