Draft Transmission Development Plan

Northern Ireland

2025 - 2034

SONI

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Contents

Glossary of terms

Bay

A bay is a connection point to a busbar and comprises switchgear and measurement equipment.

Busbar

An electrical conductor located in a station that makes a common connection between several circuits.

Capacitor

An item of plant normally used on the electrical network to supply reactive power to loads (generally locally) and thereby support the local area voltage.

Circuit

A line or cable, including associated switchgear, which carries electrical power.

Circuit Breaker

A device used to open a circuit that is carrying electrical current.

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.

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.

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 Management

The modification of normal demand patterns usually through the use of financial incentives.

Deterministic

The deterministic methodology is often referred to as the N-1 criterion. This means that the system must have sufficient capacity so that in the eventuality of a probable system outage, there are no resulting system problems such as overloading, under-voltage, over-voltage, or instability.

Distribution System Operator (DSO)

In the electrical power business, a distribution system operator is the licensed entity responsible for:

- operating and ensuring the maintenance and development of the distribution system in a given area (and its interconnections), if necessary and where applicable; and
- ensuring the long-term ability of the system to meet reasonable demands for electrical power.

The DSO in Northern Ireland is Northern Ireland Electricity Networks (NIE Networks). NIE Networks is also the asset owner of the Northern Ireland distribution system.

EirGrid

The independent statutory electricity Transmission System Operator in Ireland.

Embedded Generation

Refers to generation that is connected to the distribution network or at a customer’s site.

Gas Insulated Switchgear (GIS)

A compact form of switchgear where the conductors and circuit breakers are insulated by an inert gas (that is, SF6).

Generation Dispatch

The configuration of outputs from the connected generation units.

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 in this Development Plan.

Interconnector

The electrical link, facilities and equipment that connect the transmission network of one balancing zone to another.

Joint Programme Management Office (JPMO)

The team established by SONI and NIE Networks, with joint governance, responsible for overseeing and coordinating the programming of the whole transmission investment programme.

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.

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).

Phase Shifting Transformer (PST)

A type of plant employed on the electrical network to control the flow of active power.

Reactive Compensation

The process of supplying reactive power to the network to compensate for reactive power usage at a point in time.

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).

Reactor

An item of plant comprising a coil of electrical wire. Depending on its installation and configuration, it is typically employed on the electrical network to either:

- limit short circuit levels; or
- prevent voltage rise.

Shallow Connection

Shallow Connection means the local connection assets required to connect a customer, or customers, to the transmission network. These types of connections are typically for the specific benefit of that particular customer or group of customers.

SONI

The electricity Transmission System Operator in Northern Ireland.

Summer Peak

The week-day peak electrical demand value between March and September, inclusive, which is typically 79 % of the winter peak.

Summer Valley

The annual minimum electrical demand that usually occurs in August. Annual minimum demand is typically 30% of the winter peak.

Switchgear

A combination of electrical equipment such as disconnects and/or circuit breakers used to isolate equipment in or near an electrical station.

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 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 Peak

The peak demand that is transported on the transmission network. The transmission peak includes an estimate of transmission losses.

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.

Transmission Owner (TO)

In the electrical power business, a transmission asset owner is the entity which owns all of the assets associated with the transmission system, including substations, cables, overhead lines and associated structures. The TO is responsible for the condition of transmission assets and thus all maintenance and asset replacement projects. The TO in Northern Ireland is Northern Ireland Electricity Networks.

Transmission System Operator (TSO)

A transmission system operator is a licensed entity that is responsible for:

- operating and ensuring the maintenance and development of the transmission system in a given area (and its interconnections), if necessary and where applicable; and
- ensuring the long term ability of the system to transmit electrical power from generation plants to transmission connected demand and regional or local electricity distribution operators.

SONI shares this role with NIE Networks and Moyle Interconnector Ltd in Northern Ireland.

Uprate

To increase the capacity or rating of electrical equipment.

Winter Peak

This is the maximum annual system demand. It occurs in the period October to February of the following year, inclusive. Thus, for transmission planning purposes the reference to winter 24 covers the period from October 2024 to February 2025. The winter peak figures take account of the impact of projected Demand-Side Management initiatives.

Executive Summary

Introduction

SONI is the electricity transmission system operator for Northern Ireland.

Our role is to operate the transmission system, or the electricity grid as it's better known, every minute of every day to ensure electricity can flow from where it is generated to where it is needed at the lowest price possible for the Northern Ireland consumer.

The transmission grid safely brings power from generators and sends it to NIE Networks' distribution system. They then supply electricity to every home, farm, community and business in Northern Ireland.

In addition to maintaining a safe, secure and reliable supply of electricity in real time, SONI also has the crucial responsibility of planning and helping to deliver a transformation of the power system to enable a cleaner, affordable, more secure energy future for everyone in Northern Ireland. This includes interconnection to neighbouring grids and running the wholesale electricity market.

In this respect, SONI has a critical enabling role when it comes to delivery of Northern Ireland's Energy Strategy[1] and ambitious climate change targets.

The transmission grid and its infrastructure need to be made stronger and more flexible to transport the increases in clean energy generation which we expect to see over the next number of years. It also needs to be secure so that consumers have the high quality and reliable electricity supply they have come to expect.

This infrastructure upgrade is the most significant in its complexity, scale and impact since rural electrification and is a critical step on the collective journey to net-zero carbon emissions by 2050.

In 2024, SONI and NIE Networks established a dedicated Joint Programme Management Office (JPMO) to oversee, co-ordinate and where possible accelerate this transmission investment programme. The focus of JPMO is on integrated planning, deeper collaboration, accountability and more regular reporting, to provide more robust timelines for individual project delivery and the overall development plan.

The investment and projects outlined in this draft Transmission Development Plan 2025-2034 will ensure the transmission grid is fit for the future, providing for Northern Ireland's environmental, societal and economic aspirations.

[1] The Path to Net Zero Energy, Northern Ireland Executive, 2022, https://www.economy-ni.gov.uk/sites/default/files/publications/economy/Energy-Strategy-for-Northern-Ireland-path-to-net-zero.pdf

The level of transformation required within the energy system is unprecedented and it requires a whole system, whole society approach. Given the importance of this Plan in supporting this transformation and ambition, the views and feedback from the energy industry, local and central government and other key stakeholders on its details are of vital importance.

We would like to thank all stakeholders and interested parties who respond to this draft Transmission Development Plan Consultation. Your feedback is important to us. We look forward to your consultation responses on the proposals contained in this document.

Please visit consult.soni.ltd.uk for access to our consultation portal where you can review all associated documents and make a digital submission.

Draft TDPNI consultation responses can also be emailed to info@soni.ltd.uk or via Post to Draft TDPNI Consultation 2025, SONI Ltd, 12 Manse Road, Belfast, BT6 9RT.

The consultation opens 17 October 2025 and closes 17 January 2026.

Background context and our role

Our purpose is to transform the power system for future generations. The environment, economy and our society are at the heart of what we do and as such, we are committed to delivering a clean energy system as a direct response to the climate crisis.

SONI is an independent entity, with no vested interest in the generation or selling of electricity. We don't own the grid infrastructure and have no self interest in adding to it. We work every day with NIE Networks who build, own and maintain the grid transmission assets.

As a monopoly service provider, we are regulated by the Utility Regulator for Northern Ireland. Our funding is provided through a rigorous price control process and each project proposed in this document will be subject to funding approval by the Utility Regulator, either on a project specific basis or via NIE Networks price controls[2].

In 2022, the Assembly passed the Climate Change Act (Northern Ireland)[3], setting a collective goal of 80% of electricity consumed to come from renewable energy sources (RES-E) by 2030. SONI set out a plan-led approach to achieving this ambition via our *Shaping Our Electricity Future* roadmap[4] in 2023. A key pillar of this roadmap is the development of the transmission system and network. Significant progress continues to be made towards this milestone, and to achieving the ultimate goal of net zero emissions by 2050. This means we need to add more energy from renewable sources to the power

[2] The asset replacement projects listed here are covered by NIE Networks' RP6, RP7 & RP8.
[3] Climate Change Act (Northern Ireland), 2022, https://www.legislation.gov.uk/nia/2022/31/enacted
[4] Shaping Our Electricity Future, 2023, https://www.soni.ltd.uk/the-grid/shaping-our-electricity-f/

system, with the electricity grid needing to carry more power from energy sources that vary depending on the weather. This power will also need to be carried over longer distances.

As a result, we need to make the grid stronger and more flexible. The projects outlined in this document will ensure Northern Ireland's grid is fit for the future and ensure Northern Ireland continues to have a reliable and high-quality power supply.

Northern Ireland's electricity system has a strong track record when it comes to the integration of renewable energy and SONI's innovation and operations are a key part of that success. In 2022, our energy system was the first in the world capable of having 75% of electricity flowing through our grid at any point in time coming from variable renewable sources.

To build on this we need a strong, resilient, and flexible transmission grid. Our corporate strategy outlines our commitment to meeting the energy needs of Northern Ireland today and into the future[5].

While SONI has a unique role to play in making the grid ready for Northern Ireland's low carbon future, we are also responsible for security of supply for consumers. We manage the balance between supply and demand on a second-by-second basis and model medium and long-term adequacy in order to prepare industry and the market for what will be required to keep the lights on.

We have a wealth of natural resources and expect to see an increase in onshore wind and solar as well as offshore wind, storage technologies, new interconnection and cleaner, more efficient, gas plant coming online in the coming decade and beyond.

Northern Ireland can import and export electricity via the Moyle Interconnector. In addition, the All-Island Grid is supported by both the East West Interconnector and the Greenlink Interconnector, both of which connect Ireland and Wales. Interconnection is a critical pillar of today's power system and market operation, and further interconnection capacity is under construction in the form of the Celtic Interconnector, which will connect Ireland to France. A new interconnector between Northern Ireland and Scotland, the LirIC interconnector, is also in development.

Progress since TDPNI 2023-2032

Since the publication of the TDPNI 2023-2032, there have been a number of significant developments in Northern Ireland.

[5] SONI, Strategy 2025-31, SONI Strategy Document 2025-2031 Final.pdf

Progression of the second North South Interconnector

SONI and NIE Networks are collaborating closely to deliver the new North South interconnector. In 2025, delivery of the section of the new North South interconnector located in Northern Ireland was handed over to NIE Networks and construction of the project in Northern Ireland has commenced. The North South interconnector provides a second connection between the transmission systems in Northern Ireland and Ireland. The project is critical for enabling the integration of additional renewable generation capacity in Northern Ireland as it removes operational constraints within the Single Electricity Market, enabling larger transfers of power between the two jurisdictions, and facilitates the safe, secure and economic operation of the power system with higher penetrations of renewable generation. SONI and NIE Networks continue to work closely with our counterparts in Ireland, EirGrid and ESB Networks, to support the delivery of this critical infrastructure across both jurisdictions.

Progress of other network development projects

As well as the North South interconnector progressing to the delivery stage, SONI and NIE Networks have continued to work together to progress other projects through the Grid Development Framework:

- **3 projects** have been completed: The 110 kV circuits between Omagh and Dromore have been uprated, and second transformers have been installed at Gort and Garvagh clusters. These projects facilitate the integration of renewable generation.
- **4 projects** have been handed over to NIE Networks for delivery. This is a major milestone as at this stage, projects have received their major consenting milestones, allowing construction to commence. Alongside the North South interconnector, Airport Road, Kells Cluster and the transformer replacement at Larne have progressed to the delivery stage.
- **5 projects** have moved to Part 2 Outline Design. This is a significant stage of the Grid Development Framework, as it means the Utility Regulator has approved a budget to allow pre-construction works to commence on a project. The uprate of the 110 kV circuits between Drumnakelly and Tamnamore, the East Tyrone reinforcement, the Moyle Interconnector Capacity increase, Cam Cluster and Cam Cluster Substation Extension have all progressed to Part 2 since publication of the previous TDPNI.

Approval of NIE Networks RP7 Asset Replacement plan

In October 2024, the Utility Regulator made a final determination on NIE Networks' RP7 Price Control.

The approved plan sees £2.23bn of investment over the period 2025 to 2031. This is the level of investment on both the transmission and distribution networks that is needed to allow the homes and businesses of Northern Ireland to invest in electric vehicles and electric heating to the scale needed to meet Northern Ireland's climate change commitments.

In addition to increased development on both the transmission and distribution systems to deliver the RES-E targets, another factor driving increased investment is maintaining the reliability, resilience and safety of the existing ageing network. The initial development of the electricity network in Northern Ireland occurred primarily in the 1950s and 1960s, and much of the original network that was built at that time largely remains in place today. These assets are now upwards of 60 years old or more and need, or will soon need, replacement in order to maintain reliability of supply. So, during RP7 NIE Networks will undertake a comparatively larger programme of network renewal than ever before.

275 kV substation redevelopments

Some of the most critical asset replacement required to be carried out over the next decade will be at large substations on the 275 kV network.

There are ten substations connected to the Northen Ireland 275 kV network. The majority of these are Grid Supply Points, which take power off the 275 kV network and supply it to the 110 kV network. From here, it is sent out to 110/33 kV Bulk Supply Points, which ultimately supply all of the electricity demand in Northern Ireland via NIE Networks' distribution network.

Five of these critical Grid Supply Points require refurbishment and/or replacement due to asset condition. SONI is commencing optioneering on all five of these substations, with one substation having a preliminary preferred option determined.

Delivery of these five substation refurbishments will be a lengthy and complex piece of work for a number of reasons, including:

- A lack of adjacent land at many of these substations to facilitate offline rebuilds or extensions;
- A need to maintain security of supply at all times whilst managing a complex set of equipment outages;
- The requirement to programme these complex projects effectively alongside NIE Network's Asset Replacement Plan and routine circuit maintenance;
- Ensuring all substation equipment and workforce required to deliver each project can be procured in a timely manner; and
- A need at all times to ensure the health and safety of all workers on each site during the delivery of the refurbishment works.

Completion of these refurbishment works is essential for ensuring the long term security and reliability of the transmission network in Northen Ireland. Maintaining security of supply as well as the safety of all on site workers during each rebuild will ultimately inform when each of these critical projects can be completed.

Introduction of SONI and NIE Networks Joint Programme Management Office

Delivering Northern Ireland's Energy Strategy and ambitious climate change targets requires a transformation of the energy system at a scale, pace and level of complexity that is unprecedented. The scale of this challenge is significantly increased when considering the level of outages required to safely replace so many assets.

To more effectively manage and progress this work, SONI and NIE Networks established a Joint Programme Management Office (JPMO) in 2024, with the aim of determining a more robust set of Estimated Completion Dates, taking into account the complex challenges of delivering the entire portfolio of transmission reinforcement projects required.

The findings of the JPMO forms the basis of this draft TDPNI. Further detail on the JPMO is provided in **Section 6**.

Increased collaboration

SONI believes that closer collaboration across the whole energy industry will help Northern Ireland deliver on its climate change ambitions. Together with EirGrid we have established the Shaping Our Electricity Future Advisory Council, where we regularly engage with the electricity industry on the issues, challenges and activities set out in our *Shaping Our Electricity Future* roadmap. We have also updated our Operational Policy Roadmap in 2025 to reflect the current state of implementation, new initiatives, challenges, updated policies and targets out to 2035.

We welcome the Department for the Economy's establishment of a new Grid Development Monitoring Group and are keen to ensure that this working group can be used as a vehicle to deliver meaningful change in the delivery of complex transmission infrastructure.

We continue to support the Department for the Economy in their 80 x 30 Working Group and as they progress Northern Ireland's Energy Strategy through involvement in groups such as the Offshore Renewable Energy Action Plan Steering Group and the Offshore Transmission Working Group.

Other technologies to integrate RES

While the delivery of new grid is vital for the integration of additional renewable generation capacity, we also have to change how we operate the transmission system.

In 2024 we stood up a working group to investigate ways to reduce the dispatch down of renewable generation and published the Dispatch Down Action Plan[6] in 2024. In 2025, we trialled a change to our minimum thermal generation operation constraint, where we reduced the minimum number of thermal generators required to be dispatched at all times from 3 to 2. As part of this, we reviewed our Operational Security Standards (OSS), seeking to enable more flexible classification of contingencies in real time operations.

Together with NIE Networks, we are investigating the use of innovative solutions such as Dynamic Line Rating and Smart Power Control devices to maximise the use of the existing grid ahead of new network development.

Important system services, traditionally provided by thermal generators, will have to be sourced from other technologies in the future. Since the TDPNI 2023-2032 we have awarded two contracts for the delivery of Low Carbon Inertia Services (LCIS) and are supporting their delivery. We will be seeking to procure more through a second LCIS auction in 2026.

Working with EirGrid, we have progressed the Future Arrangements for System Services (FASS) project. FASS will deliver a competitive framework for procuring the essential services to allow us to have up to 95% of electricity flowing through our grid at any point in time coming from variable renewable sources. We are planning to perform a flexibility needs assessment which will ultimately inform new flexibility targets for Northern Ireland, in particular the role Long Duration Energy Storage (LDES) is expected to play in enabling higher integration of renewable generation.

Towards a plan led approach

Our *Shaping Our Electricity Future* roadmap sets out a plan led approach to achieve the target of 80% RES-E as set by the Climate Change Act (Northern Ireland). Delivering the level of change set out in the roadmap requires a collaborative effort across the whole energy ecosystem.

By moving to a plan-led approach, Northern Ireland can really move the dial when it comes to delivering the Energy Strategy and a net zero future. SONI is committed to identifying key enablers for transitioning to a plan-led approach to network development, and we are collaborating with both the Utility Regulator and the Department for the Economy to define

[6]Dispatch Down Action Plan, SONI, 2024 Draft Dispatch Down Action Plan - System Operator for Northern Ireland - December 2024.pdf

the policy process and licence changes needed to facilitate this. SONI believes that a more proactive plan-led model will provide greater efficiency for consumers, more certainty for investors and stronger alignment with Northern Ireland's climate change targets. We aim to produce a recommendations report in 2026.

As part of this work, SONI has recently consulted on a Proposed Transmission Cluster Policy. This proposed policy represents a more plan-led approach to developing new connection opportunities for large quantities of renewable generation capacity, and we look forward to working with the Utility Regulator and the industry to see this policy adopted.

The Draft Transmission Development Plan Northern Ireland 2025-2034

This document, The Draft Transmission Development Plan Northern Ireland (TDPNI) 2025-2034 is the blueprint for the asset replacement and development of the transmission network and interconnection over the next ten years.

This ten-year plan presents projects that are expected to meet the operational needs of the transmission network. The plan also outlines future needs that may drive future potential projects.

The plan fully incorporates information from SONI and NIE Networks' JPMO, which considers the deliverability of the whole portfolio of transmission reinforcement projects. As a result, there are changes to Estimated Completion Dates of many projects compared to those in TDPNI 2023-2032.

At SONI, we understand that local communities, businesses and landowners must be at the heart of the energy transition. That is why Engagement is a core pillar of SONI's corporate strategy and the *Shaping Our Electricity Future* roadmap.

Before we develop or add to the grid, we work closely with those who may be affected by our plans to ensure they have an opportunity to shape them at the earliest possible stage.

Our Three-Part Grid Development and Engagement Process puts public engagement at the heart of how we develop the transmission grid. On each project, we want to engage with local communities, local businesses, elected representatives and other key stakeholders at the earliest possible stage with a goal of finding the best possible solution.

In order to provide a balanced solution, we aim to ensure that our approach minimises costs to the consumer whilst also contributing to Northern Ireland's clean energy targets and also supporting security of supply. By working with these principles at our core, we can transform the power system to deliver for consumers and our economy, while keeping Northern Ireland's switch to clean energy on track.

Drivers of Transmission Network Development

This report has been prepared in accordance with Article 51 of European Directive 944/2019, the Withdrawal Agreement between the UK and the European Union (EU), and Conditions 18, 20 and 40 of the SONI Transmission System Operator Licence.

The development of the Northern Ireland electricity sector is guided by a number of national and EU rules and strategic objectives. These objectives guide investment in the Northern Ireland transmission network and are summarised as follows:

- Ensuring the security of electricity supply;
- Ensuring the transmission system is an economical system; and
- Ensuring the long-term sustainability of electricity supply.

In order to achieve these strategic objectives, we must invest in the planning, and operation of the electricity transmission network. Drivers of investment include:

- Securing transmission network supplies;
- Promoting market integration; and
- Facilitating the economic and efficient integration of RES-E, low carbon technologies, and complementary thermal generation.

As demand or generation changes, or as the transmission network becomes more interconnected with neighbouring transmission networks, the flow of electrical energy throughout the transmission network changes. To accommodate these changes in power flows it is often necessary to modify or strengthen the transmission network to ensure performance and reliability levels are upheld. SONI and NIE Networks are obliged[7] to develop an economic, efficient and coordinated transmission system.

In addition, the condition of transmission network assets is a factor. The timely maintenance or replacement of assets is required to provide the necessary level of security of supply. This is the responsibility of NIE Networks.

Reinforcement drivers and needs can be separated into a number of categories:

- Reinforcements required to support changes in, or connection of new generation or new system service providers;
- Reinforcements related to interconnection;
- Reinforcements to facilitate inter-regional power flows;
- Investments to address the condition of existing assets; and
- Reinforcements required to support changes in, or connection of new demand

[7] The Electricity Order (Northern Ireland), 1992, Article 12, https://www.legislation.gov.uk/nisi/1992/231

SONI develops the grid through the use scenario planning in the form of 'Tomorrow's Energy Scenarios" (TES)[8]. This approach involves developing a range of possible energy scenarios dealing with renewables and the electrification of heat and transport.

In the process of developing the range of energy scenarios, key policy makers, industry experts, and stakeholders are asked how they see the energy landscape changing over time. The final scenarios are published and reviewed periodically. These scenarios act as an input to our grid development process, aid in the identification of system needs and the practicality and merit of different solutions. The most recent version of TES[9] was developed on an all-island basis with EirGrid and published in 2024.

Strategic Environmental Assessment

The TDPNI 2023-2032 was subject to Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA). As the SEA is valid for five years, an Environmental Appraisal Report (EAR) has been prepared for the draft TDPNI 2025-2034 which assesses the projects in this plan against the adopted SEA. This EAR accompanies the draft TDPNI and the main findings have influenced and are incorporated into the Plan.

Projects in this Plan

The draft TDPNI 2025-2034 sees the introduction of 13 new network development projects:

- Belfast Power Flow Control;
- Cam substation extension;
- Cam second 110/33 kV transformer;
- Coleraine transformer replacement;
- Drumnakelly – Tandragee Uprate;
- Fermanagh and West Tyrone Transmission Cluster;
- Fermanagh Upgrade;
- Kells Cluster second 110/33 kV transformer;
- Kilroot Transmission Substation;
- Lisburn Upgrade;
- Rasharkin second 110/33 kV transformer;
- Tamnamore Land Purchase; and
- Tremoge second 110/33 kV transformer.

Details of these projects can be seen in **Section 1.8**.

[8] SONI, https://www.soni.ltd.uk/future-energy/tomorrows-energy-scenarios
[9] TES 2023, https://cms.soni.ltd.uk//sites/default/files/2024-11/TES-2023-Final-Full-Report.pdf

The network development projects are shown by region and project category in table E.1 below.

Table E.1: Summary of Number of Network Development Projects in Progress by Region and Project Category

Network Development Projects by Planning Area				
Project Category	**North And West**	**South-East**	**Both areas**	**Total**
New Build	11	12	0	**23**
Uprate/Modify	9	10	1	**20**
Refurbish/Replace	0	0	0	**0**
Combination	0	2	0	**2**
Total	**20**	**24**	**1**	**45**

As well as the project categories detailed in table E.1, **Appendix B** highlights the drivers and needs of each project. Changes to projects including costs are described in **Section 8**.

Capital Expenditure

SONI's expenditure on transmission development projects due for completion over the period 2025 - 2034 is estimated at £123.49 million. This figure is the amount required to bring projects to the point of handover to NIE Networks and to support NIE Networks during the construction and commissioning phase. The projects are subject to the Utility Regulator, through the Transmission Network Preconstruction project (TNPP) process and SONI's governance procedures. Estimated Transmission Owner (TO) costs associated with these projects are £971.06 million. The Utility Regulator will determine the amount that can eventually be recovered from customer and generator tariffs for these projects.

The Utility Regulator has approved RP7 expenditure for Transmission asset replacement of £90.3 million for NIE Networks for the period 2025 - 2031. Approximately £20.63 million of transmission asset replacement works from RP6 will continue into RP7.

There are five further asset replacement projects sitting outside this Price Control mechanism with indicative costs estimated at £103.9 million. The total estimated Transmission asset replacement costs over the ten years covered by this plan are approximately £214.83 million.

The total estimated cost of all projects described in the draft TDPNI 2025-2034 is £1,309.38 million.

Data Management

The Transmission network development plan is updated regularly. To allow for comparison of network development projects on a year-on-year basis, data is represented at a fixed point in time – the data freeze date. The data freeze date for project details and costs in this draft TDPNI was the 13th August 2025. The Estimated Completion Dates are accurate as of the date of publication of this document.

1 Introduction

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.

Electricity supply is essential to everyday life and to the Northern Ireland economy, and a reliable electricity network is the means by which we move electricity around Northern Ireland. The development of transmission network infrastructure is, therefore, of strategic importance.

This draft TDPNI outlines the:

- Drivers of transmission network development;
- Transmission network investment needs; and
- Projects required to address these needs.

1.1 Statutory and Legal Requirements

Regulations that are relevant to planning the transmission network include:

1.1.1 Statutory and Licence Requirements

- The Electricity Order (Northern Ireland) 1992:
  - Article 12
  - Article 32
- The Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012.
- The Construction (Design and Management) Regulations (NI) 2016.
- SONI's TSO Licence:
  - Condition 18 – Transmission Interface Arrangements
  - Condition 20 – Operation of the Transmission System and the Transmission System Security and Planning Standards
  - Condition 40 – Transmission Development Plan NI
- NIE Networks Transmission Licence:
  - Condition 17 – Transmission Interface Arrangements
  - Condition 19 – Developing and Maintaining the Transmission System

1.1.2 European Statutory Requirements

- Withdrawal Agreement between the UK and EU:
  - Article 9 of the Protocol on Ireland/Northern Ireland
  - Annex 4 of the Protocol on Ireland/Northern Ireland
- Regulation (EC) No 943/ 2019 on conditions for access to the network for cross-border exchanges in electricity:
  - Article 28; Article 30 paragraph 1(b); Article 34.
- Directive 2019/ 944/ EC concerning common rules for the internal market in electricity:
  - Paragraphs 1 and 4 of Article 51.
- Regulation (EC) No 943/2019 on the promotion of the use of energy from renewable sources:
  - Article 13 paragraph 5; Article 12 paragraph 2 and 6
- Regulation (EC) No 943/2019 on energy efficiency:
  - Paragraph 4 and 6 of Article 13.

The Withdrawal Agreement between the UK government and the EU provides for the continuation of the Single Electricity Market (SEM) on the island of Ireland and the continued application of European legislation that relates to the wholesale electricity market[10]. Therefore, the format of the draft TDPNI will remain consistent with previous editions, with no change to the legal basis upon which it is prepared.

SONI is responsible for the planning and operation of the transmission network within Northern Ireland. We have a licence obligation to produce a TDPNI and as per European requirements we contribute to a European Ten-Year Network Development Plan[11] (TYNDP) every two years.

NIE Networks is responsible for the development and maintenance of the transmission system[12], including asset replacement projects, in accordance with the Transmission Interface Arrangements (TIA)[13]. SONI reviews all asset replacement proposals and these are incorporated in this Plan.

[10] Withdrawal Agreement between the UK government and the EU: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12019W/TXT

[11] TYNDP, ENSTSO-E, 2024, https://2024.entsos-tyndp-scenarios.eu/wp-content/uploads/2025/01/TYNDP_2024_Scenarios_Report_FInal_Version_250128_web.pdf

[12] NIE Networks Transmission Licence, Condition 19,https://www.uregni.gov.uk/files/uregni/media-files/NIE%20Transmission%20Licence%20effective%2018%2001%202020.pdf

[13] These are described in **section 3.3**

1.2 Context of the Plan

This draft TDPNI covers a period of ten years which, as well as being a statutory requirement under our licence, is in line with the European Network of Transmission System Operators for Electricity's (ENTSO-E) Ten Year Network Development Plan (TYNDP). As part of the preparation of the draft TDPNI, we consult with EirGrid as TSO in Ireland and with NIE Networks in their respective capacities as licensed by the relevant authorities. SONI is obliged to undertake a public consultation on the draft TDPNI. Following feedback received from the public consultation we update the draft TDPNI, as required, and provide a report to the Utility Regulator on feedback received. We prepare the final version of the TDPNI and submit it to the Utility Regulator for approval. A public consultation on the TDPNI is held by the Utility Regulator for Northern Ireland before approval and final adoption[14].

This draft TDPNI 2025-2034 has been assessed against the Strategic Environmental Objectives (SEO) as established in the adopted Strategic Environmental Assessment (SEA) Environmental Report, through the accompanying Environmental Appraisal Report (EAR). An SEA was undertaken on TDPNI 2023-2032 under the provisions of the European Communities Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) as transposed through the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004). A Habitat Regulations assessment (HRA) was also prepared (Council Directive 92/43/EEC, and Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995). The SEA and HRA are anticipated to be valid for five years. The SEA aims to provide a high level of protection for the environment and to promote sustainable development; the appraisal of the transmission development projects describes their respective potential to affect the established SEOs.

The Transmission Owner (TO), NIE Networks, is responsible for the detailed design and construction of all projects detailed in this draft TDPNI. NIE Networks is also responsible for planning and delivering asset replacement projects.

The development of the transmission network involves forecasting future needs. Solutions chosen to address these needs must maintain security and quality of supply within standards, while balancing costs and environmental impacts. The process is flexible to enable the long-term development of the network, and derogations against standards can be obtained in exceptional circumstances.

[14] Directive 2019/944/EC, Article 51, Paragraph 4: *"The regulatory authority shall consult all actual or potential system users on the ten-year network development plan in an open and transparent manner. Persons or undertakings claiming to be potential system users may be required to substantiate such claims. The regulatory authority shall publish the result of the consultation process, in particular possible needs for investments."*

Considerations that shape the medium and long-term development of the transmission network are outlined below.

1.2.1 GB, All-Island and European Context

Our TSO licence obliges SONI to carry out transmission planning on a coordinated all-island basis in conjunction with EirGrid. Means of co-operation between the TSOs are enshrined in the System Operator Agreement in place between SONI and EirGrid. Together we jointly publish assessments of generation adequacy (previously the Generation Capacity Statement – latterly and for reasons of alignment with other European TSOs, the All-Island Resource Adequacy Assessment[15]) and Ten-Year Transmission Forecast Statements[16]. The aim of coordinated planning is to ensure, as far as possible, that projects developed, particularly in border areas, will benefit the entire island.

European legislation requires all European TSOs to cooperate through ENTSO-E. ENTSO-E has six regional groups that co-ordinate network planning and development at regional level. We are members of the Regional Group North Sea (RGNS), which also includes EirGrid and the TSOs of Belgium, Denmark, France, Germany, Luxembourg, the Netherlands and Norway. One of the duties of RGNS is to produce a Regional Investment Plan (RegIP) every two years. This RegIP together with the other five RegIPs feed into ENTSO-E's Ten-Year Network Development Plan (TYNDP).

SONI also liaises with the Electricity System Operator in Great Britain, including where relevant regarding interconnection between our synchronous systems and related matters.

Projects of pan-European and regional significance[17] are identified in the draft TDPNI using the following labels: "TYNDP/ TYNDP_Project_No" or "RegIP/ RegIP_Project_No". The most recent final versions of TYNDP[18] was issued in 2024 and the RGNS RegIP[19] was issued in June 2025. Northern Ireland projects of European significance are listed in **Appendix C**.

[15] https://cms.soni.ltd.uk/sites/default/files/publications/All-Island%20Resource%20Adequacy%20Assessment%202025-2034%20Main%20Report.pdf

[16] https://cms.soni.ltd.uk/sites/default/files/publications/All-island-Transmission-Forecast-Statement-2024.pdf

[17] Please see Appendix C for information on what qualifies a project to be of pan-European significance.

[18] TYNDP 2024 can be found here: https://2024.entsos-tyndp-scenarios.eu/wp-content/uploads/2025/01/TYNDP_2024_Scenarios_Report_FInal_Version_250128_web.pdf

[19] Northern Seas Regional Investment Plan available from - https://tyndp.entsoe.eu/news/deep-dive-into-regional-planning-of-transmission-grids-with-entso-e-s-regional-investment-plans

1.3 Period Covered by the Draft TDPNI 2025-2034

The draft TDPNI 2025-2034 presents SONI's view of future transmission needs and our plan to develop the network through specific projects to meet these needs over the next ten years. It also includes NIE Networks' view of asset replacement needs on the transmission system, including those provided for through its price control[20].

It is possible that changes will occur in the need for, scope of, and timing of the listed developments. Similarly, it is likely, given the continuously changing nature of electricity requirements, that new developments will emerge that could impact the plan as presented. These changes will be identified in future studies and accommodated in future TDPNIs. As such, the long-term development of the network is continuously under review.

This draft TDPNI presents the projects which are currently being advanced to solve the needs of the transmission network. In addition, future needs with the potential to drive further projects are also discussed.

1.4 Data Management

The transmission system and the needs that drive its development are continuously evolving. To help assess network development projects year-on-year, and in the interest of routine reporting, data is represented at a fixed point in time – the data freeze date.

The draft TDPNI summarises transmission projects applicable as at the data freeze date, 13th August 2025. Future TDPNIs will highlight the changes that have happened since the previous plan.

1.5 Planning Area Categorisation

Power flows on the transmission network are not contained within specific localities. Therefore, from a transmission planning viewpoint, it is more appropriate to consider planning areas that best reflect the conditions and power flows on the transmission network. For this purpose we refer to two planning areas in Northern Ireland:

- The North and West; and
- The South-East.

The regions and planning areas that best reflect the conditions and power flows on the transmission network are illustrated in Figure 1.1 below.

[20] https://www.uregni.gov.uk/files/uregni/documents/2024-10/Annex%20Q%20-feeze%20Planned%20Network%20Investment%20Volumes%20and%20Allowances.pdf

Figure 1.1: Illustration of the Northern Ireland planning areas

1.6 The TDPNI and Other SONI Publications

SONI and EirGrid are responsible for the publication of a number of statutory documents under their respective TSO licences. Two of these documents (the Resource Adequacy Assessment and the Ten-Year Transmission Forecast Statement) are published on an all-island basis by both TSOs.

The other statutory documents published by both SONI and EirGrid are detailed below. All statutory documents can be found on the SONI website[21]. Figure 1.2 shows the relationships between the statutory documents published by SONI.

[21] SONI website documents library, https://www.soni.ltd.uk/library/

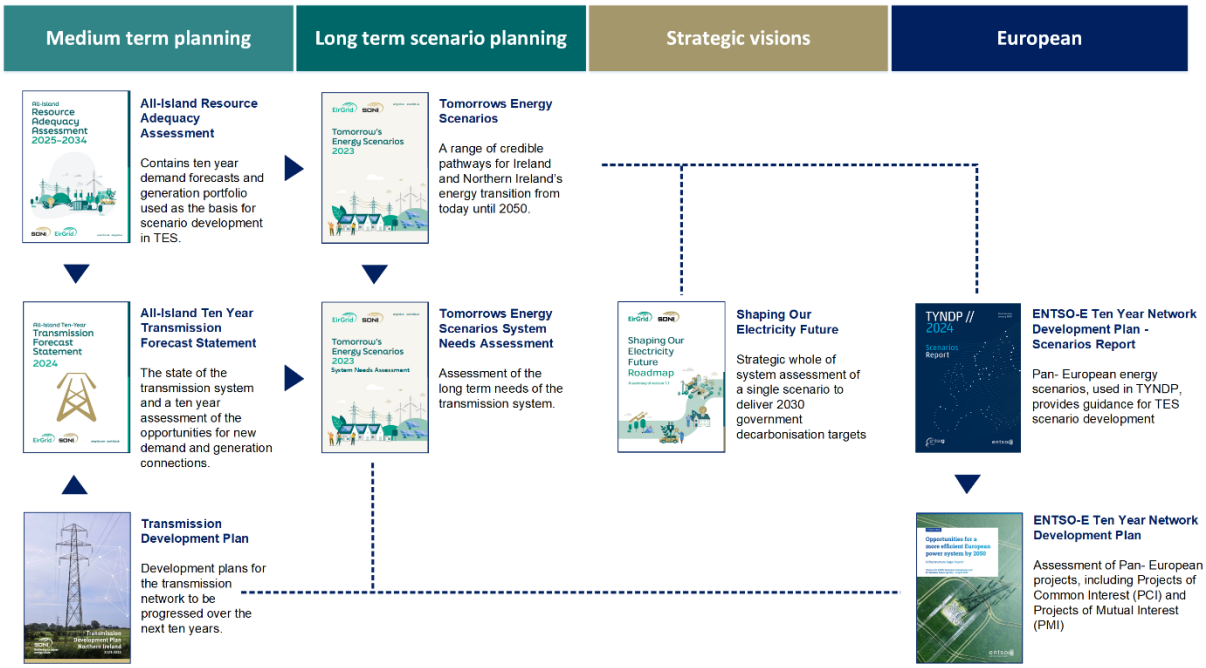

Figure 1.2: The TDPNI in context with other SONI publications

1.6.1 All-Island Resource Adequacy Assessment

The All-Island Resource Adequacy Assessment (AIRAA) is published annually by SONI and EirGrid. The AIRAA provides:

- A ten-year forecast of electricity demand in Northern Ireland and Ireland;
- Contracted changes to conventional generation;
- Forecasted changes to renewable generation; and
- A ten-year forecast of the generation capacity required to meet demand.

The most recent version of the AIRAA is for 2025-2034 and is available from the SONI website[22].

1.6.2 Ten Year Transmission Forecast Statement

The Ten-Year Transmission Forecast Statement (TYTFS) is published annually by SONI and EirGrid. The TYTFS provides:

- Network models and data of the all-island transmission system;
- Forecast generation capacity and demand growth (taken from the AIRAA);
- 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.

[22] AIRAA, SONI, 2025, https://cms.soni.ltd.uk/sites/default/files/publications/All-Island%20Resource%20Adequacy%20Assessment%202025-2034%20Main%20Report.pdf

The most recent version of the TYTFS is Ten Year Transmission Forecast Statement 2024 and is available from the SONI website[23].

1.6.3 Transmission Development Plan (Ireland)

The Transmission Development Plan (TDP) for Ireland is published annually by EirGrid. It is the equivalent document to the TDPNI for Ireland and is the plan for the development of the Irish transmission network and interconnection. It covers a ten-year period. The TDP presents projects that are needed for the secure operation of the Irish transmission network. EirGrid and SONI work to co-ordinate their respective development plans.

The most recent version of the TDP (Ireland) is TDP 2024-2033 and is available from the EirGrid website[24]. The CRU consulted on TDP 2024 – 2033, with the report and responses available on the CRU website[25].

1.6.4 Tomorrow's Energy Scenarios

Tomorrow's Energy Scenarios (TES) Northern Ireland was published for the first time in 2020, setting out a range of possible ways that energy usage in Northern Ireland may develop as new technologies evolve and proliferate in the future. Our scenarios are regularly reviewed and updated and our most recent TES 2023, prepared jointly with EirGrid, was published in 2024[26]. These scenarios will be used to inform power system studies out to 2050 and will form a key input to future versions of the TDPNI. For TES 2023, SONI consulted on four potential pathways for the transformation of the power system as the energy system in Northern Ireland decarbonises to meet the target of net zero emissions by 2050 as set in the Climate Change Act (Northern Ireland) 2022.

1.6.5 Associated Transmission Reinforcements

Associated Transmission Reinforcements (ATRs) refer to new or upgraded transmission infrastructure. They are associated with a generation project and must be complete to release that project's Firm Access Quantity (FAQ) allocation up to the Maximum Export Capacity (MEC) value in the SEM, in addition to which the project in question must be connected to the all-island system via its enduring connection arrangement. Planned ATRs are captured within this draft TDPNI.

[23] TYTFS 2024, SONI, https://cms.soni.ltd.uk/sites/default/files/publications/All-island-Transmission-Forecast-Statement-2024.pdf

[24] TDP 2024, EirGrid, https://cms.eirgrid.ie/sites/default/files/publications/Transmission-Development-Plan-2024.pdf

[25] Consultation On TDP 2024, CRU, https://www.cru.ie/publications/28264/

[26] TES 2023, SONI, https://cms.soni.ltd.uk//sites/default/files/2024-11/TES-2023-Final-Full-Report.pdf

Normally, SONI publishes ATR status reports[27] on its website so that customers can track the status of the ATRs associated with their generation project(s). Where the scheduled FAQ date for a generation project changes as a result of a change to the scheduled completion date or the completion of an ATR for a given generation project, the customer is notified in writing and the website is updated. Recently, publication of these ATR Status Reports has been paused to allow SONI and NIE Networks to establish the Joint Programme Management Office (JPMO). Going forward, the ATR Status reports will be replaced by regular updates from the JPMO on our Network Delivery Portfolio.

1.7 The Joint Programme Management Office

Since the publication of TDPNI 2023-2032, SONI and NIE Networks have established a Joint Programme Management Office (JPMO). Through the JPMO, SONI and NIE Networks have undertaken a comprehensive review of all transmission reinforcement projects in our portfolio. The culmination of this work is a robust set of jointly agreed Estimated Completion Dates taking into account the deliverability of the portfolio as a whole.

The output from our JPMO forms the basis of this draft TDPNI and will also inform all future updates from the JPMO on our Network Delivery Portfolio.

Full details on the JPMO are set out in **Section 6**.

1.8 Changes Since TDPNI 2023-2032

Since the publication of TDPNI 2023-2032, as well as the introduction of a number of new projects, there have been changes to the name, scope and status of several ongoing SONI projects. All project changes are described in Table 1.1.

[27] ATRs, SONI, https://cms.soni.ltd.uk//sites/default/files/2024-09/Q2-2024-Associated-Transmission-Reinforcement-for-publication-Final.pdf

Table 1.1: Project changes since TDPNI 2023-2032

Project	Change	Rationale
Armagh and Drumnakelly Reinforcement	Renamed Armagh Upgrade	Clarity
Belfast Power Flow Control	New Project	Load related, security of supply
Cam 2nd 110/33kV Transformer	New Project	Driven by new potential connections
Cam Substation Extension	New Project	Renewable Integration
Coleraine Transformer Replacement	New Project	Driven by new connections
Coolkeeragh – Killymallaght – Strabane Uprate	Renamed Coolkeeragh – Strabane Upgrade	Clarity
Coolkeeragh T1 Transformer Cabling Uprate	Renamed Coolkeeragh 275/110 kV Transformer 1 Cabling Uprate	Clarity
Drumnakelly – Tandragee Uprate	New Project	Renewable Integration
Fermanagh and West Tyrone Transmission Cluster	New Project	Driven by new connections
Fermanagh Upgrade	New Project	Renewable integration, security of supply
Filter Tuning	On hold	Requires CVT Upgrade to be complete to provide input data
Gort 2nd 110/33 kV Transformer	Removed	Project Completed
Kells Cluster 2nd 110/33 kV Transformer	New Project	Driven by potential new connections
Kilroot Transmission Substation	New Project	Renewable integration, security of supply
Limavady Mesh Extension and Transformer Replacement	Renamed Limavady Transformer Replacement	Clarity, progressing as transformer replacement only
Lisburn Upgrade	New Project	
Mid Tyrone Project	Renamed Connect West	Preliminary preferred option identified
Northwest Special Protection Scheme		On hold
Omagh Main – Dromore Uprate	Removed	Project Completed
Rasharkin 2nd 110/33 kV Transformer	New Project	Driven by potential new connections
Tamnamore Land Purchase	New Project	Renewable Integration, Security of Supply
Tremoge 2nd 110/33kV Transformer	New project	Driven by potential new connections

2 Strategy for developing the grid

As the TSO for Northern Ireland, we have a statutory duty to ensure the transmission network is able to support all reasonable demands for electricity. In addition, we are required to make an offer for connection to parties seeking to connect to the transmission network. This in turn supports economic development in Northern Ireland.

Changes to demand, generation merit order, or to interconnection with neighbouring transmission networks may alter the flow of electrical power throughout the Northern Ireland transmission network. To accommodate these changes in power flows it is sometimes necessary to reinforce the transmission network to ensure adequate performance and reliability levels are maintained and that the cost of constraints is minimised.

The Northern Ireland electricity industry and its development take direction from a number of broad local[28][29], UK[30] and European[31] strategic objectives. These objectives guide investment in the Northern Ireland transmission network and are summarised in the legislation[32] which requires SONI to:

- ensure the development and maintenance of an efficient, co-ordinated and economical system of electricity transmission which has the long-term ability to meet reasonable demands for the transmission of electricity;
- contribute to security of supply through adequate transmission capacity and system reliability; and
- facilitate competition in the supply and generation of electricity.

To ensure these objectives are met we must provide on-going and timely reinforcement of the Northern Ireland transmission network. In the development of the network reinforcement projects, we are led by the following strategy statements:

- Inclusive consultation with local communities and landowners will inform how we plan the development the network;
- All practical technology options will be considered for network development; and
- The network will be optimised to minimise the requirement for new infrastructure to be built.

[28] The Path to Net Zero Energy, Northern Ireland Executive, 2022, https://www.economy-ni.gov.uk/sites/default/files/publications/economy/Energy-Strategy-for-Northern-Ireland-path-to-net-zero.pdf

[29] Climate Change Act (Northern Ireland), 2022, https://www.legislation.gov.uk/nia/2022/31/enacted

[30] The UK 2030 Strategic framework for climate can be found here: 2030 Strategic Framework for International Climate and Nature Action

[31] https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2030-climate-energy-framework_en#ecl-inpage-911

[32] Article 12, The Electricity (Northern Ireland) Order 1992

3 General approach to developing the grid

3.1 Scenario Planning

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 a continued increase in the pace and ambition of decarbonisation targets, most recently with the introduction of the Climate Change Act (Northern Ireland) 2022, 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. SONI uses scenario planning as a way to factor in these future uncertainties, and to identify areas of the transmission network needing reinforcement. Needs appearing in multiple scenarios may be considered to present a stronger case for new reinforcement. SONI published its most recent scenarios, Tomorrow's Energy Scenarios (TES) 2023, in May 2024[33].

TES 2023 contains four scenarios. Each scenario considers a different pathway to decarbonise our power system, the pace of change and how we might achieve the energy transition in terms of energy demand, transmission and generation. We make use of these to identify future needs of the transmission grid.

The TES 2023 System Needs Assessment (SNA) is complete and will be published shortly. The SNA uses the scenario data to identify future needs; this, in turn, informs this draft TDPNI.

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.

3.2 Planning Standards

We plan the development of the transmission network taking account of the long-term needs and the economics of various development options. The need for development is determined by assessing long-term future network performance against technical standards. To ensure transmission system reliability and security, predicted power flows of the network are

[33] TES 2023, SONI, https://cms.soni.ltd.uk//sites/default/files/2024-11/TES-2023-Final-Full-Report.pdf

compared with the requirements of the Transmission System Security and Planning Standards (TSSPS[34]).

The TSSPS establishes a set of design criteria for the transmission system. This includes setting the minimum level of redundancy that should be incorporated into the design to deal with credible faults and outages. The standard includes checking for any circuits that would be overloaded or where voltages would fall below statutory levels.

SONI assesses the present and future transmission system against these standards and, when breaches are forecast, establishes plans to address these breaches. However, in some limited circumstances it may be more appropriate to seek derogation in the case, such as economic reasons. This derogation would be directed by the Utility Regulator following consultation with SONI and materially affected electricity undertakings, including the TO and the TSO of Ireland.

Under Condition 20 of the Licence, SONI is required to periodically review the TSSPS. The TSSPS was most recently updated in 2023. Further updates to the TSSPS are planned to be consulted on later in 2025.

3.3 Roles and Responsibilities

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 delivery of SONI-planned transmission projects, as well as maintenance of the transmission system in accordance with the NIE Networks Licence and the Transmission Interface Arrangements (TIA). 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 Moyle interconnector to Scotland.

The arrangements between NIE Networks and SONI are governed by the TIA. The TIA arrangements include responsibilities regarding the preparation of draft asset replacement plans by NIE Networks, and the system development plans prepared by SONI. The TIA allows for the ongoing development of an asset replacement and system development investment plan. SONI is responsible for ensuring that asset replacement and system development are integrated into an investment plan.

Some projects included in the investment plan will be well developed whereas others will be conceptual or indicative and therefore more likely to be changed from year to year. The plan is modified regularly as planning assumptions and scenarios are changed.

[34] Transmission System Security and Planning Standards, SONI, 2023, https://cms.soni.ltd.uk//sites/default/files/2024-09/Transmission-System-Security-and-Planning-Standards-June-2023.pdf

The investment plan is then circulated between SONI and NIE Networks before becoming a draft Transmission Development Plan Northern Ireland (TDPNI). The draft TDPNI is subject to public consultation by SONI and consultation and approval by the Utility Regulator.

3.4 SONI's Grid Development Process

The planning of grid development projects by SONI follows a three-part process, shown in figure 3.1. Asset replacement projects are progressed separately by NIE Networks. The process includes stakeholder and public participation in the development of projects.

Figure 3.1: SONI's Grid Development Process

3.4.1 Part 1: Planning: Identifying the optimum solution and what area may be affected

When a potential breach of the standards is identified (operationally or through SONI's planning studies, including the Ten-Year Transmission Forecast Statement and Tomorrow's Energy Scenarios), 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 initially 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. For example, SONI can manage potential overloads of the transmission system by constraining the output of generators. In particular, high output of renewables can lead to bottlenecks on the network and a need to constrain the output until reinforcement options are assessed and developed. Any potential project will be compared with the costs, risks, and impact on carbon emissions of this constraint. If constraining renewable generation becomes untenable in terms of relative or absolute levels of dispatch-down, cost, or carbon emissions, SONI will initiate a project to develop the transmission system to resolve the constraint.

When we identify the need to commence a transmission project, we will consider how best to deliver it. 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. This process is conducted in close cooperation with NIE Networks.

Once it has been established that an operational solution is not feasible, the first step in the planning process is to identify a long list of options across a range of different technologies that could resolve the issue. Such options will include the need for any new substations or overhead lines 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. The long list of options includes Do Nothing and / or Derogation against standards.

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. The process culminates with a recommendation for a preferred solution or solutions to bring forward for further development, and tiering to establish the level of further stakeholder engagement and consultation required. During subsequent phases SONI will consider the input provided by stakeholder engagement and amend any plans accordingly before progressing further. We will also publicise the results of the stakeholder engagement process and further decisions.

In parallel with the early (Part 1) stakeholder engagement phase, and recognising that the Utility Regulator is also a key stakeholder, SONI will seek approval for cost recovery through the Utility Regulator through the Transmission Network Preconstruction Project (TNPP) process and progress the project to Part 2 of SONI's Grid Development Process i.e. 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.

3.4.2 Part 2: Outline Design: Identifying where the project will be built

SONI manages the pre-construction outline design of transmission projects once the preferred option or options has been identified (Part 1 in Figure 3-1). This also includes consultation with the TO (NIE Networks). Under the TIA, NIE Networks supports SONI throughout the pre-construction phase by providing critical asset-related technical expertise and design input. This includes, amongst other things, developing engineering designs for new transmission plant and equipment, contributing to route alignment, maintaining transmission asset-related policies, and collaborating with SONI on stakeholder engagement and legal processes.

Their input ensures that SONI can progress projects efficiently from concept through to construction readiness, while safeguarding the integrity and operability of the transmission assets. The projects can involve the development of new substations, overhead lines or cable circuits operating at 110 kV and above.

SONI is responsible for identifying all feasible route / site options in the general study area based on a technical, economic, environmental and deliverability analysis and comparison.

SONI is responsible for preparing documentation required to apply for planning consent for the development of the projects. This entails working with NIE Networks to develop the design to the level required for obtaining planning consent including any necessary environmental reports or assessments, and further consultations with stakeholders and landowners to obtain the right to gain access and install transmission equipment on their lands.

3.4.3 Part 3: Consents: Planning application to NIE Networks project handover

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. a Marine Licence, with the relevant consenting authority. The planning authority will make a legally binding decision on the project. It may grant full planning permission, request that we make changes or refuse permission. SONI is 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.

Following receipt of planning and landowner consents the project is handed over to NIE Networks for detailed design. This includes a review of the SONI Functional Specification (outline design and consents) and preparation of a Design Specification by NIE Networks. Separate pre-construction work for NIE Networks will also include procurement. 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 construct and deliver the project.

Throughout all stages of the process, and when any new information comes to light, we check that the need for network development remains robust, and make any changes necessary to ensure that the proposed development continues to meet this need and provides value for money for the Northern Ireland consumer.

3.5 Public Planning and Environmental Considerations

Planning and environmental considerations are integrated into the three-part process for grid development. This section details SONI's public planning and environmental responsibilities and how these issues are considered in grid development (See also **Section 4**).

3.5.1 Public Planning Considerations

SONI is supported by experienced professional planning and ecological consultants. These consultants assist in the development of transmission infrastructure projects and in other aspects of network development from a planning and environmental perspective.

3.5.2 Environmental Considerations

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 (Northern Ireland) (as amended).

Where necessary applications for statutory consent are accompanied by an Environmental Statement (ES); 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, with Stage 2 AA undertaken as required.

3.5.3 Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is a systematic process of predicting and evaluating the environmental effects of a proposed plan or programme, in order to ensure that these effects are adequately addressed as early as possible. A SEA is prepared in respect of this transmission development plan. The purpose of the SEA is to ensure that environmental considerations are integrated into the development plan and that to anticipate and avoid, where possible, potential adverse environmental impacts arising from the draft TDPNI.

The SEA has a five-year lifespan, with review and drafting processes for the next SEA beginning in the final year. A SEA was last carried out on the previous TDPNI 2023-2032. However, as the preparation of a TDPNI is a rolling process, each TDPNI prepared is accompanied by an Environmental Appraisal Report (EAR) which assesses the plan against the provisions of the adopted SEA statement. This process ensures consistency of approach in environmental issues of each TDPNI across the lifespan of the SEA. The first TDPNI due to be published after the five-year lifespan of a valid SEA will be accompanied by the new SEA.

A summary of the environmental assessment and mitigation measures of this SEA is presented in **Section 9** of this report. The relationship between the TDPNI, SEA and EAR is set out graphically in figure 3.2.

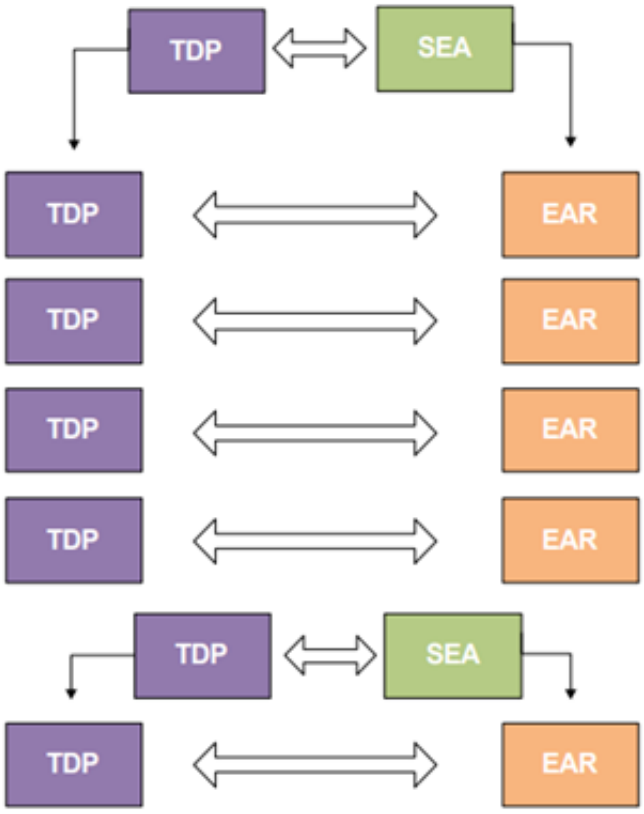

Figure 3.2 Structure for TDPNI, SEA, and associated EARs

3.5.4 Environmental Impact Assessment (EIA)

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, or Environmental Statement (ES) required by the EIA Directive. Annex 1 of the Directive, as transposed by Northern Irish regulations sets out the projects which require mandatory EIA. In the context of electricity transmission projects, this notably includes the construction of overhead electrical powerlines 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. For modification of existing

overhead lines, an ES is not required inside the parameters provided in Northern Irish regulations[35] (including a maximum length of 850 m).

The content and scope of the EIA is defined by the EIA Directive and Northern Irish regulations[36]; however, detail varies between projects depending on local environmental sensitivities.

3.5.5 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), or Ramsar sites 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)[37] 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.

[35] Overhead Lines (Exemption) Regulations (Northern Ireland) 1992 S.I.
[36] The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017.
[37] And aligned with The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 No. 582

4 Implementation: How the strategy for developing the grid will be implemented

In this chapter we set out how our strategy for developing the grid is implemented. SONI is responsible for the inclusion of asset replacement projects in the investment plan and draft TDPNI, but the delivery of these asset replacement projects (including planning, consents and all detailed assessments) are the responsibility of the TO, NIE Networks.

SONI's strategy for planning the development of the grid is discussed under the following headings:

- Our approach to the environment;
- Our approach to technology;
- Our approach to project development;
- Our approach to planning and consenting of projects; and
- Our approach to consultation and engagement.

These topics build upon the previous chapter which detailed our general approach to developing the grid. Policies and objectives are set out to facilitate delivery of transmission infrastructure in line with SONI strategy objectives and according to license obligations.

4.1 Our Approach to the Environment

4.1.1 Introduction

SONI has a legal responsibility to comply with planning law, including all relevant environmental legislation. In practice this means that environmental issues inform the decision-making process when it comes to developing the grid in Northern Ireland.

This draft TDPNI is subject to Strategic Environmental Assessment as outlined in previous sections.

Planning and environmental considerations are embedded into every grid development project that SONI undertakes to ensure that environmental issues are at the forefront of decision-making. Early involvement in projects allows potential environmental issues to be identified and avoided or mitigated in the course of project development.

4.1.2 Policies and Objectives

The following environmental policies (ENVP) have been compiled to ensure that SONI has due regard for existing environmental protection legislation and environmental best practice when developing projects.

Environmental objectives (ENVO) have also been developed for a number of environmental topics.

4.1.3 General

It is the policy of SONI:

ENVP1: To promote best environmental practice in the design and appraisal of transmission development projects.

4.1.4 Biodiversity

It is the policy of SONI:

ENVP2: To exercise its functions as a TSO in line with the Wildlife and Natural Environment Act (Northern Ireland) 2011, the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended), The Wildlife (Northern Ireland) Order 1985 (as amended) and the Northern Ireland Biodiversity Strategy (2015) to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions.

ENVP3: To avoid adverse effects on sites designated for nature conservation including, Special Conservation Areas, Special Protection Areas, Marine Conservation Zones (where appropriate), RAMSAR Sites, Areas of Special Scientific Interest and National Nature Reserves.

ENVP4: To protect NI priority species and habitats and other species protected under legislation in the development of any transmission infrastructure and to preserve key ecological linkage features.

ENVP5: To go beyond nature protection and seek funding, or other mechanisms, to deliver site-specific, measurable and lasting biodiversity restoration and enhancement on suitable projects to fulfil the 'Biodiversity Duty' attaching by law to public authorities in Northern Ireland.

It is the objective of SONI:

ENVO1: To prepare and utilise industry specific Ecology Guidelines for the development of Transmission projects. This will ensure a standard approach to ecological impact assessment for transmission projects.

ENVO2*: To regularly monitor, document, and report specific actions taken for biodiversity restoration and enhancement under ENVP5.

4.1.5 Climate Change

It is the policy of SONI:

ENVP5: To integrate measures related to climate change into grid development, by way of both effective mitigation and adaptation responses, in accordance with available guidance and best practice.

4.1.6 Noise

It is the policy of SONI:

ENVP6: To employ methods on transmission infrastructure which minimise noise emissions in line with best industry practice.

It is the objective of SONI:

ENVO2: To give careful consideration to the siting of transmission infrastructure so as to ensure that noise-sensitive receptors including marine mammals are protected from potential noise emissions.

ENVO3: To seek to preserve and maintain noise quality in accordance with good practice and relevant legislation.

4.1.7 Landscape

It is the policy of SONI:

ENVP7: To have regard to the Northern Ireland Landscape Character Assessment 2000, and the Northern Ireland Seascape Character Assessment 2014 in the design and appraisal of its transmission development projects.

It is the objective of SONI:

ENVO4: To protect landscapes through the sustainable planning and design of transmission infrastructure and to have regard to important landscape designations including AONBs, ASAIs, Regional Seascape Character Areas (where appropriate) and World Heritage Sites as well as non-designated heritage assets.

4.1.8 Cultural Heritage

It is the policy of SONI:

ENVP8: To take appropriate measures to ensure that the special interest of protected sites and structures, including their curtilages and settings, are protected when considering site or route options for the planning of transmission infrastructure.

ENVP9: To protect archaeological material and take account of the setting of archaeological remains when planning transmission infrastructure, by avoidance or by best practice mitigation measures.

4.1.9 Water

It is the policy of SONI:

ENVP10: That there is no increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed.

ENVP11: To promote the use of sustainable urban drainage systems in any new developments where it is appropriate.

ENVP12: To have regard to Planning Policy Statements and Supplementary Planning Guidance: PPS 15 Planning and Flood Risk Development Control Considerations in the preparation of grid development strategies and plans.

It is the objective of SONI:

ENVO5: That all grid development proposals, and in particular, transmission substation developments, shall carry out, to an appropriate level of detail, a site-specific Flood Risk Assessment that shall demonstrate compliance with all current Guidelines, standards and best practice. The Flood Risk Assessment shall pay particular emphasis to residual flood risks, site-specific mitigation measures, flood-resilient design and construction, and any necessary management measures.

4.1.10 Air Quality

It is the policy of SONI:

ENVP13: To preserve and maintain air quality in accordance with good practice and relevant legislation in the proposed construction of its transmission projects.

ENVP14: To ensure appropriate dust suppression during construction works.

4.1.11 Tourism

It is the policy of SONI:

ENVP15: To consider the potential impact upon tourism in the planning of transmission projects.

It is the objective of SONI:

ENVO6: To identify the nature of tourism in a project area; to consider the cumulative / in combination impact on tourism of a project and to consider short term and long-term impacts of grid development projects on tourism as appropriate.

4.1.12 Conclusion

All of the environmental policies and objectives detailed above are assessed against Strategic Environmental Objectives. This is provided in the SEA Environmental Report.

4.2 Our Approach to Technology

4.2.1 Introduction

As outlined in Chapter 2 of this document, the SONI Strategy sets out three strategy statements, two of which directly relate to technology in transmission infrastructure development:

- We will consider all practical technology options; and
- We will optimise the existing grid to minimise the need for new infrastructure.

The use of new technologies can bring a number of advantages, including enhanced operational performance, improved system reliability and shortened construction times. All of these have the potential to reduce system costs. Environmental impact may also be reduced via the adoption of new technologies.

Our *Shaping Our Electricity Future* roadmap, most recently updated in 2023, sets out a plan led approach to support a secure transition to delivering 80% RES-E. The roadmap details the key developments required from networks, engagement, operations and markets to achieve this transition.

We continue to examine the performance of underground cables and their technical impact on the network, noting their advantage in terms of the potential for reduced visual impact compared with overhead lines. However, this must be balanced against costs as well as the potential impacts on sensitive environmental and ecological areas from what can be significant civil engineering works. Underground cables also present limitations to dynamic rating schemes as well as future uprating and may impose additional obstacles in terms of reactive compensation. We will continue to assess technological developments in this area to ensure the full capability of this technology is available for use on the Northern Ireland grid.

The transmission grid in Northern Ireland, similar to other European and international grids, uses high voltage alternating current (HVAC). Where power is to be transferred over long distances it may be cost effective to do so using high voltage direct current (HVDC). Over the last number of years we have continued to examine the performance of HVDC and its technical impact on the network. Where technically advantageous and economically feasible HVDC will be considered in options appraisal for network development projects.

Demand Side Management and Response has been used in Northern Ireland for many years, primarily at industrial level. It works by customers reducing their electricity

consumption on request. This helps us to operate the grid more securely and is now actively participating in the energy, capacity and system services markets.

Together with NIE Networks, we are investigating the use of dynamic line rating and modular power flow control technologies that may enable us to make better use of the existing transmission network.

In most cases overhead line technology remains the most reliable and least expensive option for developing new circuits.

Developments in recent years have increased uncertainty over the future usage of the grid; projections for demand growth must account for potential electrification of heat and transport as well as demographics and industrial development, and generation in Northern Ireland is no longer dominated by large, thermal, synchronous machines but includes an increasing proportion of distributed, non-synchronous, renewable sources of energy. To cater for this, we have changed how we plan the grid. Our approach involves developing a range of energy scenarios (possible situations or events that impact on energy) and assessing their impact on the grid. This approach is called ‘Tomorrow’s Energy Scenarios’, with the most recent set of scenarios published in May 2024.

In the process of developing the range of energy scenarios, key policy makers, industry experts, and stakeholders are asked how they see the energy landscape changing over time. The final scenarios are published and reviewed every two years. We use these scenarios throughout our planning analysis to assess the future needs of the electricity system, and to test the practicality and merits of different options for grid development.

4.2.2 Policies and Objectives

It is the policy of SONI:

TP1: To promote and facilitate the sustainable development of a high-quality transmission grid to serve the existing and future needs of NI.

TP2: To consider all practical technology options in the development of projects, including maximising use of existing transmission grid.

4.3 Our Approach to Project Development

4.3.1 Introduction

SONI undertakes a number of grid development projects as part of its statutory role in planning the development of and operating the transmission grid.

A focus in the development of our projects is on matters of proper planning and sustainable development. This requires a careful balancing of the technical need and solutions for a

project with appropriate and adequate opportunities for public participation in the project development process.

SONI has established an approach to developing grid projects in Northern Ireland. This is a three-part process, from the identification of need to develop the grid to the eventual hand over to NIE Networks for construction and operation of a project by SONI. The details of this process can be seen in **Section 3.4**.

4.3.2 Policies and Objectives

The following policies and objectives have been adopted by SONI in order to ensure an appropriate and sustainable approach to the development of our transmission projects.

It is the policy of SONI:

PDP1: To engage with stakeholders in accordance with SONI's Process for Developing the Grid in Northern Ireland.

PDP2: To promote sustainable grid development by balancing complex and/or competing technical, economic, environmental, social and deliverability goals and priorities in decision-making.

PDP3: To ensure that grid development is carried out in an economically efficient manner and seek derogation from the Utility Regulator when this is not possible.

4.4 Our Approach to Planning and Consenting of Projects

4.4.1 Introduction

The SONI licence requires it to plan and operate the transmission system. SONI is also required to carry out these duties in accordance with the Transmission Interface Arrangements (TIA). SONI is responsible for the design of projects up to the point where consents are obtained, with NIE Networks playing a key supporting role in the pre-construction phase of transmission projects. They provide all asset related technical and engineering input required for planning applications and design development, including preparation of the Design Specification following SONI's Functional Specification. NIE Networks also supports SONI in acquiring land rights and consents by supplying necessary documentation and engaging in stakeholder discussions, as required and directed by SONI, carrying out some aspects of this work under SONI direction. Our grid developments occur within a planning and environmental context. In this context the focus is on matters of proper planning and sustainable development. Public participation is of key importance alongside the environmental and ecological impact of our projects in order to provide an economic solution for end-users of the network.

4.4.2 Policies and Objectives

The following policies and objectives have been adopted by SONI to ensure an appropriate and sustainable approach to the planning and consenting of our transmission projects. Projects will also be subject to the policies of NIE Networks.

It is the policy of SONI:

PCP1: To have regard to relevant legislation and guidelines in respect of planning and consenting of transmission infrastructure development projects and make provision for any policies for the provision of transmission infrastructure set out in these documents.

PCP2: To have regard to precedent arising from decisions of the Competent Authorities, and of the High Court in Judicial Review of decisions, relating to the planning and consenting of transmission infrastructure development projects.

PCP3: To promote sustainable grid development by balancing complex and/or competing technical, economic and environmental goals and priorities in decision-making.

4.5 Our Approach to Consultation and Engagement

4.5.1 Policies and Objectives

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

It is the policy of SONI:

CEP1: 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.

CEP2: 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.

CEP3: To ensure consultation and engagement feedback is appropriately considered in decision making.

5 Investment needs

SONI is responsible for planning and operating an economic, efficient and coordinated electricity transmission network in Northern Ireland. Key to achieving this is a reliable and high-quality electricity infrastructure which powers the Northern Ireland economy and supports investment in the region.[38]

For Northern Ireland, the United Kingdom's Committee on Climate Change advised that it is necessary, feasible and cost-effective for the UK to set a target of net -zero Green House Gas (GHG) emissions by 2050. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 came into effect on the 27 June 2019. The revised legally binding target towards net zero emissions covers all sectors of the economy. This update to the Order demonstrates the UK's commitment to targeting a challenging ambition in line with the requirements of the Paris Agreement on climate change.

Energy Policy is a devolved matter for Northern Ireland and the Department for the Economy (DfE) published its Energy Strategy at the end of 2021[39], which was followed in June 2022 with the passing of the Climate Change Act (Northern Ireland) 2022 which set a legal target of meeting 80% of electricity from renewable energy sources (RES-E) by 2030 and a target of net zero emissions by 2050.

SONI continues to provide analysis and data to the DfE to support the implementation of the Energy Strategy.

In order to meet Northern Ireland's future commitments, investment will be needed in new renewable generation capacity, supporting technologies, operational policies and electricity networks. The transition to low-carbon and renewable energy will have widespread consequences; it will require a significant transformation of the electricity system.

In February 2025 SONI launched its Strategy 2025-2031 which was a culmination of extensive stakeholder engagement. The core purpose of SONI's strategy is "meeting Northern Ireland's energy needs today, and in the future".

To deliver against our Purpose, we have also detailed four strategic ambitions which align with our role as the Transmission System Operator:

- **Advise** government and regulators on electricity systems and markets with the provision of expertise and data.

[38] Grant Thornton: "Powering Northern Ireland A report exploring SONI's role in the economy", October 2016. Available here: http://www.grantthorntonni.com/globalassets/1.-member-firms/ireland/insights/publications/powering-northern-ireland_grant-thornton.pdf

[39] https://www.economy-ni.gov.uk/publications/energy-strategy-path-net-zero-energy

- **Plan** the optimal future design of the electricity system and markets through a range of evidence-based scenarios and forecasting research.
- **Deliver** the crucial projects in partnership with NIE Networks to transform the grid's infrastructure, and how we operate it, to support the delivery of Northern Ireland's energy ambitions.
- **Operate** the grid safely, securely, and reliably so power can flow from where it is generated to where it is needed in homes, businesses, farms and public services across Northern Ireland, while introducing new technologies to enable the use of more renewable electricity.

At the heart of delivering the strategy is understanding the needs of the power system and implementation of solutions to address these needs.

SONI published an update to its *Shaping Our Electricity Future* roadmap in 2023, setting out the key developments required from networks, engagement, operations and market to support a secure transition to at least 80% RES-E by 2030 – an important step on the journey to net zero by 2050. Inherent in this transition is continuing to operate, develop and maintain a safe, secure, reliable, economical and efficient electricity transmission system with a view to ensuring that all reasonable demands for electricity are met.

The roadmap identifies the transmission network reinforcements needed to manage renewable generation and demand growth. As part of this roadmap, SONI has developed corresponding engagement plans to underpin delivery of this network, recognising that engagement and public acceptance is key to a successful transition. The operation of a power system with large levels of renewable generation needs an enhanced operating capability, market changes and tools are also considered as part of the roadmap.

SONI is committed to updating the *Shaping Our Electricity Future* roadmap at regular intervals to cater for evolving energy policy. We updated our Operational Policy Roadmap in 2025 to reflect the current state of implementation, new initiatives, challenges, updated policies and targets out to 2035. 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 optimise participation of community owned and demand-based energy resources.

In this regard, the draft TDPNI is developed to support Northern Ireland government and local council objectives and enable this energy transition.

By facilitating new connections onto the network, reviewing maintenance plans and identifying the future electrical needs of Northern Ireland, SONI can direct and plan

investment in the transmission system. This investment will, in turn, secure the electricity supply into the future.

5.1 Policy Drivers of Transmission Network Investment

In order to achieve the identified strategic objectives laid out by the Northern Ireland Energy Strategy and UK policies, we must continue to produce investment plans and progress individual projects to develop the electricity transmission network. Specific drivers of investment in transmission network infrastructure are identified and described in the following sections.

5.1.1 Security of Transmission Network

Security of supply generally addresses two separate issues:

- The need to ensure that all reasonable demands in Northern Ireland for electricity are met (which is the responsibility of the UR and the Department for the Economy)[40]; and
- The ability of the transmission network to reliably transport electrical energy from the generators, where it is generated, to the demand centres, where it is consumed[41], as set out in the TSSPS.

The draft TDPNI is aimed at addressing the security of supply issues that relate to the transmission network.

For this document, security of supply means the ability of the transmission network to transport electrical energy reliably and securely from where it is generated to the demand centres where it is consumed.

5.1.2 Market Integration

With increased market integration, electrical power can flow from areas where it is cheaper to produce to areas where it is more highly valued. Therefore, the aim is to make the UK and NI electricity markets more integrated.

The integration of Renewable Energy Sources (RES) and other forms of low carbon generation significantly increases the power exchange opportunities across the region. Differences in national targets combined with varying availabilities of renewable sources across Great Britain and Europe will lead to greater penetration of RES in certain areas compared to others. Therefore, there is a need to reinforce the transmission networks between and within NI, GB and European countries to obtain these economic benefits.

[40] 2003 Energy Order, Article 12 "The principal objective and general duties of the Department and the Authority in relation to electricity", Paragraph 2(a)
[41] The Electricity Order (Northern Ireland), 1992, Article 12, https://www.legislation.gov.uk/nisi/1992/231

5.1.3 Renewable Energy Sources Integration

Developing renewable energy is an integral part of Northern Ireland's sustainable energy objectives and climate change strategy. In comparison to fossil fuels, RES have lower or no net emissions. RES contribute to the decarbonisation of the energy supply and to the reduction in greenhouse gas emissions. They also contribute to energy security being, for the most part, an indigenous energy source. In a period of volatile energy costs RES can also contribute to cost competitiveness by reducing dependence on imported fossil fuels. Currently, onshore wind farms are the main source of renewable electricity generation in Northern Ireland. However, additional forms of renewable energy have developed in Northern Ireland with increases in solar and biomass generation in the last decade. It is expected that onshore wind and solar energy will be further developed in the coming years to support Northern Ireland's net zero ambition. We are also expecting offshore generation to begin connecting to the system in the next decade.

In order to fulfil government renewable targets, many RES-related projects are expected to be initiated throughout the period of this draft TDPNI. A considerable number of these projects are located in rural areas where the transmission network is less developed. This places pressure on the electricity transmission network in these areas. Significant challenges will arise in extending and reinforcing the network to connect new RES.[42]

While the development of new grid is vital for the integration of additional renewable generation capacity, delivery of other technologies will also be crucial to ensuring we can safely and securely operate the grid with higher volumes of RES generation. Working with EirGrid, we have progressed the Future Arrangements for System Services (FASS) project. FASS will deliver a competitive framework for procuring the essential services to allow us to have up to 95% of electricity flowing through our grid at any point in time coming from variable renewable sources.

Important system services, traditionally provided by thermal generators, will have to be sourced from other technologies in the future. We have awarded two contracts for the delivery of Low Carbon Inertia Services (LCIS) and are supporting their delivery. We will be seeking to procure more through a second LCIS auction in 2026.

We are planning to perform a flexibility needs assessment which will ultimately inform new flexibility targets for Northern Ireland, in particular the role Long Duration Energy Storage (LDES) is expected to play in enabling higher integration of renewable generation.

[42] Northern Ireland Climate Act 2022; https://www.legislation.gov.uk/nia/2022/31/contents/enacted

5.1.4 Transmission Clusters

To date, the vast majority of renewable generation connections in Northern Ireland have been to the Distribution System. Much of this has been connected directly to Distribution Cluster 110/33 kV Substations[43], which have proved to be a successful way to co-ordinate the connection of 33 kV generation, reduce the complexity of the Distribution System, and has meant less need for system reinforcement.

Presently there are only two renewable generation projects connected at Transmission level in Northern Ireland, with a total of 121 MW of capacity[44]. However, more than half of known future large scale generation connections are expected to be of a scale that will require a connection to the Transmission System. This means a step-change in the number of Transmission connections – but there are a limited number of existing available connection opportunities at Transmission substations and many of these are already allocated to either current connection projects or network reinforcement projects being progressed.

SONI is seeking to put in place a Transmission Cluster Policy to ensure that new Transmission infrastructure can be delivered in a more efficient, economic and co-ordinated manner in keeping with Condition 20 of the SONI Licence (the "Licence")[45]. A Transmission Cluster Policy will:

- help to minimise the amount of new Transmission network reinforcement required;
- maximise the use of existing Transmission network capacity;
- deliver the total scope of necessary works and as much firm access as is economical in a more timely and anticipatory manner; and
- provide a way for the cost of reinforcement for connections to be initially paid for by the Northern Ireland electricity consumer and paid back by developers as projects connect, in a similar way to the Distribution Cluster Policy.

The core principles of the Proposed Transmission Cluster Policy form a key foundation in moving to a more plan led approach to connections and grid development. As set out in our new Strategy, by moving to a more plan-led approach, working with industry, government and regulatory partners, collectively we can increase grid capacity in a proactive and more timely manner through more anticipatory investment while reducing costs and connecting generation more efficiently.

[43] The Distribution Cluster Policy is set out in Appendix 2 of the Statement of Charges for Connection to NIE Networks' Distribution System: https://www.nienetworks.co.uk/connections/statement-of-charges.
[44] https://www.soni.ltd.uk/customer-and-industry/general-customer-information/connections-and-applicati/index.xml.
[45] https://www.uregni.gov.uk/electricity-licences.

The primary aim of the Proposed Transmission Cluster Policy is to efficiently and economically connect technologies that are needed to help enable Northern Ireland's decarbonisation targets to be met. By creating new Transmission infrastructure designed from the outset with this long-term need in mind, it will be possible to minimise the overall scale of new network required while enabling a power system that is fit for contributing to the delivery of 2050 net zero target. Additionally, this policy allows for the extension of existing Transmission substations ahead of need where this is the appropriate way to facilitate connections, in a way that fairly allocates cost between projects.

In keeping with SONI's obligations under Condition 20 of the Licence, the Proposed Transmission Cluster Policy will allow anticipatory development of new Transmission assets, developed and delivered in parallel with the connection of renewable generation and enabling technologies required to Northern Ireland's net zero ambitions in an overall efficient, economic and coordinated manner.

By adopting a similar application of connection charging principles to those under the NIE Networks Distribution Cluster Policy, but adapted for connection to the Transmission System, the cost of network development can be fairly divided between those connecting into Transmission Clusters, with barriers to investment in connections being reduced without undue risk to the Northern Ireland consumer. Importantly, this will allow firm access to be delivered faster than would otherwise be possible which will reduce constraints on the system and put downward pressure on associated constraint payments.

Following conclusion of the consultation process, SONI will publish a response and incorporate the Proposed Transmission Cluster Policy into the TCCMS such that it can be consulted upon, reviewed and approved by the Utility Regulator. Adoption of the Proposed Transmission Cluster Policy is ultimately a decision for the Utility Regulator and we will continue to work closely with them as we progress the policy.

5.2 Technical Drivers for Transmission Network Investment

Technical drivers of transmission network investment include changes in demand, generation and interconnection, inter-regional power flows and changes in asset conditions.

5.2.1 Demand, Generation and Interconnection

Changes in Demand and Generation

Demand growth and the connection of new demand can give rise to higher power flows which may trigger the need to reinforce the network as a result. Closure or reduction in the size of demand facilities can reduce the power flows on lines feeding the load. However, in certain cases where the demand is absorbing local generation and reducing the amount of generation exported from the area, the closure can lead to increased power flows on specific

transmission lines. Our All-Island Resource Adequacy Assessment (AIRAA) 2025-2034 details the forecast of electricity demand for Northern Ireland for the years 2025 to 2034. Table 5.1 presents the peak demand for each of the years covered by this draft TDPNI; the peak demand corresponds to the forecast median transmission system peak demand published in AIRAA 2025. Also shown in table 5.1 is a summary of non-dispatchable (wind and solar) and dispatchable (conventional, biogas and hydro) generation capacity in each of the years covered by this draft TDPNI; all generation figures are based on information published in AIRAA 2025.

Table 5.1: Forecast Peak Demand and Generation Capacity over the period 2025 to 2034[46]

Year	Peak Demand (GW)	Generation capacity (GW)	
		Non-dispatchable	Dispatchable
2025	1.57	1.685	2.197
2026	1.63	1.785	2.197
2027	1.71	1.885	2.197
2028	1.76	2.035	2.197
2029	1.80	2.310	2.197
2030	1.84	3.035	2.197
2031	1.88	3.210	2.197
2032	1.91	3.435	2.197
2033	1.96	3.660	2.197
2034	2.00	3.885	2.197

Our All-Island Ten-Year Transmission Forecast Statement (TYTFS) 2024[47], includes information[48] on how the demand forecast relates to each individual demand centre node over the period covered by this draft TDPNI.

Because of the relative size of individual generators, changes in generation installations, whether new additions or closures can have a more significant impact on power flows than demand. This is equally so in the case of interconnectors which are treated as generators during periods when power is imported.

The addition of new generation capacity requires network development to connect the new generator to the network. This provides a path for electric power flow between the new

[46] This forecast is based on information presented in AIRAA 2025. The Moyle interconnector is not included in these figures.

[47] Ten Year Transmission Forecast Statement, SONI, https://cms.soni.ltd.uk/all-island-ten-year-transmission-forecast-statement-2024

[48] It is important to note that the information in the TYTFS 2024 is based on the best information available at the freeze date, January 2024.

generator and the transmission network. This is known as the shallow connection. The new generation capacity will inevitably alter the power flows across the network, which has the potential to create overload problems deep into the network. To resolve these overloads we need further reinforcements (known as deep reinforcements) to allow full network access.

It is important to note that the generation figures do not include additional generation that is in the applications queue but is not contracted as of the freeze date of the AIRAA in May 2024, as these generators do not yet have an agreed connection method.

The projected changes in generation are accommodated by the reinforcements included in this TDPNI. This includes the identified future potential projects discussed in **Section 8**.

The connection of large generators, or groups of generators, combined with the increasingly meshed nature of the transmission network results in lower network impedance and consequently increased short circuit levels. This is a safety issue as under fault conditions such high short circuit levels may cause catastrophic failure of high voltage equipment. We monitor fault levels on the network and take measures to prevent such conditions occurring. The areas where the network is close to the fault rating of installed equipment, without mitigation, are highlighted on the map in figure 5.1.

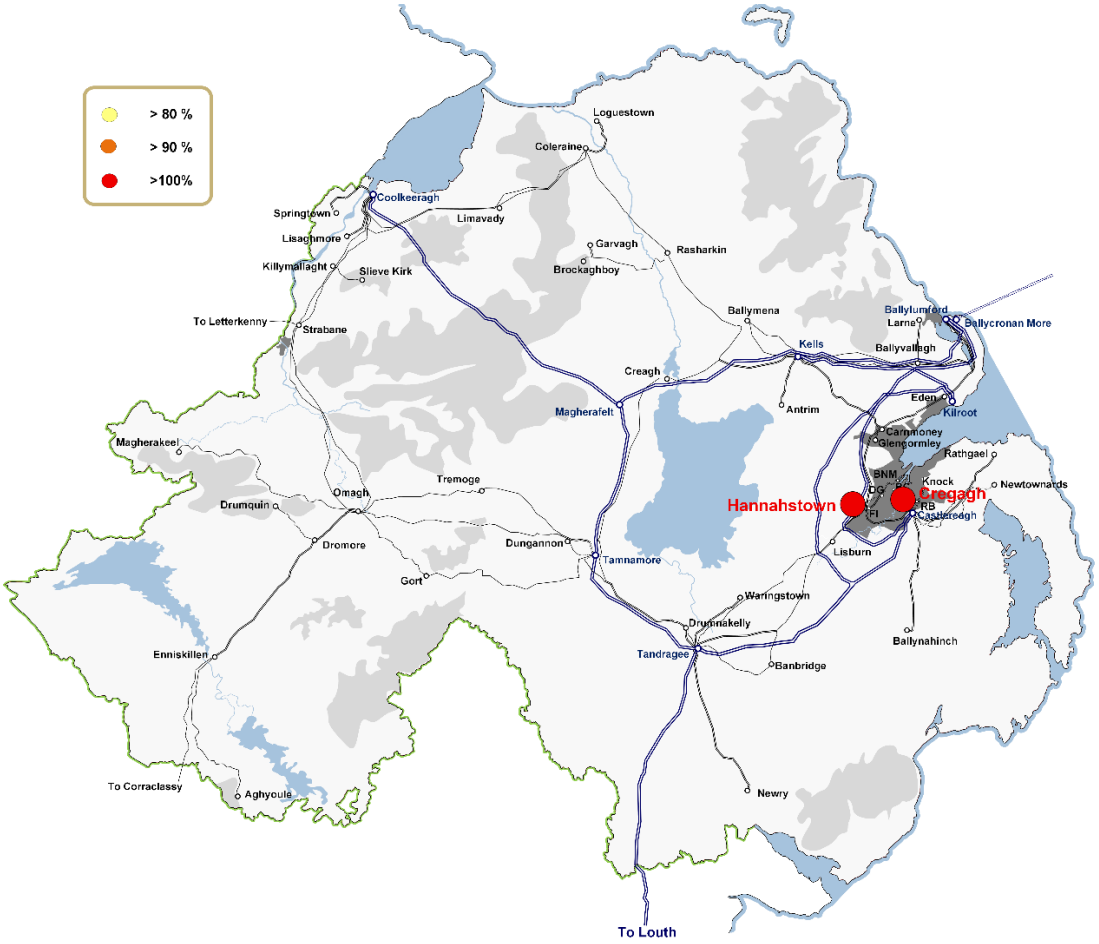

Figure 5.1: Substations with forecast high fault levels from TYTFS 2024

Note that mitigation measures will be used to manage fault levels that would otherwise exceed switchgear rating. This may include reconfiguration of the transmission system as necessary until switchgear is replaced or alternative permanent solutions put in place.

Changes in Northern Ireland's Interconnection

UK policy recognises the economic and technical benefits associated with increased interconnection and therefore seeks to promote interconnection between Great Britain, Northern Ireland and Ireland's transmission systems. Increased interconnection between transmission networks results in a larger energy market. With increased market integration there is greater competition and the potential for prices to be reduced. There is also access to a broader generation base which enhances the networks' security of supply. This can potentially defer the need for additional generation to be constructed to meet security of supply standards or requirements.

In 2025, delivery of the section of the new North South interconnector located in Northern Ireland was handed over to NIE Networks for delivery, and construction of the project in Northern Ireland has commenced. The Moyle Interconnector Capacity Project is progressing through our Grid Development Process, the completion of which will allow the full import and export capacities of the Moyle Interconnector to be utilised.

In Northern Ireland there is potential for additional interconnection capacity to Scotland in the form of the LirIC Interconnector. This project is being progressed by a third-party developer and it has moved into the pre-construction phase of grid delivery. Given the early development status of this project, it is not included within any studies or tables in this report.

5.2.2 Changes in Inter-Regional Power Flows

The following factors have the potential to significantly change the flow of electrical power throughout the transmission network. They can drive the need for network reinforcements over the next ten years and beyond:

- Changes in demand;
- Development of storage and Low Carbon Inertia Services;
- Further integration with neighbouring countries; and
- Integration of significant levels of new generation (both conventional and renewable).

There is now a growing need to accommodate a much broader range of plausible and credible flow patterns across the network. This is due to the extent of the likely changes that are envisaged for Northern Ireland, particularly in respect of RES integration. To cater for a broader range of flow patterns greater transmission network flexibility is required.

5.2.3 Changes in Asset Condition

Transmission network assets have a finite lifespan their useful life is impacted by a number of factors. These include:

- The age of the asset;
- Technology type and its propensity for obsolescence;
- Maintenance adequacy and effectiveness;
- Environmental conditions; and
- Utilisation.

In order to ensure that security of supply is not compromised, routine condition assessments are carried out by the TO. These assess the condition of the assets and estimate remaining useful life.

Typically, where assets are considered to have reached the end of their useful life and they continue to be required, assets are:

- Refurbished;
- Replaced on a “like-for-like” basis; or
- Replaced with higher rated equipment to cater for future needs.

6 SONI and NIE Networks Joint Programme Management Office

SONI, along with NIE Networks, understand the important role we play in meeting Northern Ireland's energy ambitions and we are committed to doing everything we can to support this within the confines of our licences, the wider policy and regulatory landscape and public acceptability.

6.1 What is the Joint Programme Management Office?

In response to concerns relating to grid delivery timelines, SONI and NIE Networks established a Joint Programme Management Office (JPMO) in 2024. The JPMO is a centralised and dedicated team with joint governance, created to oversee and co-ordinate the transmission investment programme. The focus of JPMO is on integrated planning, deeper collaboration, accountability and more transparent reporting, to provide more robust timelines for individual project delivery and ensure that the development plan as a whole is achievable and deliverable.

Through the JPMO, SONI and NIE Networks have undertaken a comprehensive review of all transmission reinforcement projects in our portfolio. The scope of this review (subject to project specific details) included each project from need identification, optioneering, selection of preferred option, pre-construction activities and final construction.

We assessed the status and risks of each project, identified potential areas of acceleration, and using our experience to date alongside new modelling capability improved our understanding of the time required to deliver each milestone. The culmination of this work is a robust set of jointly agreed Estimated Completion Dates taking into account the deliverability of the portfolio as a whole.

The JPMO has facilitated:

- More detailed and accurate assessments of project timelines, learning from experience and using data to provide better forecasts;
- Robust challenge on project activity timescales, assumptions and sequencing;
- A streamlined, co-ordinated and standardised approach to the development of project timelines;
- Strengthened communication, project management and change control processes;
- Enhanced milestone tracking and reporting supported by integrated governance;
- Open and constructive challenge on schedule risks, and a focus on accountability;
- Ongoing development of portfolio management, aligning individual projects to an integrated and optimised programme for delivery understanding interdependencies across investment streams i.e. transmission reinforcement, connections and asset renewal;

- Better alignment of priorities across projects and key stakeholders;
- Enhanced risk management, including earlier identification, tracking and implementation of mitigation measures; and
- Generation of innovative ideas to optimise our programme and accelerate delivery.

The Estimated Completion Dates reflect the current policy and regulatory landscape of Northern Ireland that NIE Networks and SONI operate within.

6.2 Why are there changes to Estimated Completion Dates?

The JPMO's comprehensive review of the transmission reinforcement projects in our portfolio has resulted in grid delivery timelines being extended for several projects, compared to Estimated Completion Dates published in the Transmission Development Plan 2023-2032.

In our assessment, these extended timelines can largely be attributed to factors set out in the subsections below.

6.2.1 Increasing project demands

- Unprecedented number, scale and complexity of transmission reinforcement projects alongside a significant ramp up in transmission connections and asset renewal. This is the most significant investment in the transmission system since its construction.
- Securing initial resource capacity and capability across all organisations involved in grid infrastructure delivery due to the unprecedented nature of the transformation for the industry.

6.2.2 Early-stage limitations

- Conceptual and Part 1 stage programmes have historically been high-level, with limited data supporting previously published estimated completion dates.
- Optimism bias which has now been removed by utilising recent experience to inform delivery timelines.
- TDPNI publications were not clear on the stage a project was at in its life cycle and the associated uncertainty in its Estimated Completion Date.

6.2.3 Project management, design and change management issues

- Less focus on best in class project and programme management practices and did not scale with growth in the portfolio.
- Evolving technical specifications and designs aimed at better outcomes lacked robust change control processes.
- Interdependencies between projects and programmes were not previously considered.

6.2.4 Stakeholder engagement challenges

- Difficulties in engaging with landowners and securing timely agreements.
- Limited acceptance of new infrastructure by host communities.

6.2.5 External and regulatory pressures

- Global supply chain challenges have extended procurement timelines for transmission plant and equipment.
- Planning and regulatory requirements have evolved over time.
- Planning and regulatory timelines are now on the critical path for many transmission projects.

6.3 Explanation of Estimated Completion Dates

We have introduced a set of project categories, aligned with SONI's three-part Grid Development Framework, to reflect the certainty of a project's Estimated Completion Date. These categories are shown in figure 6.1 and explained in more detail in table 6.1.

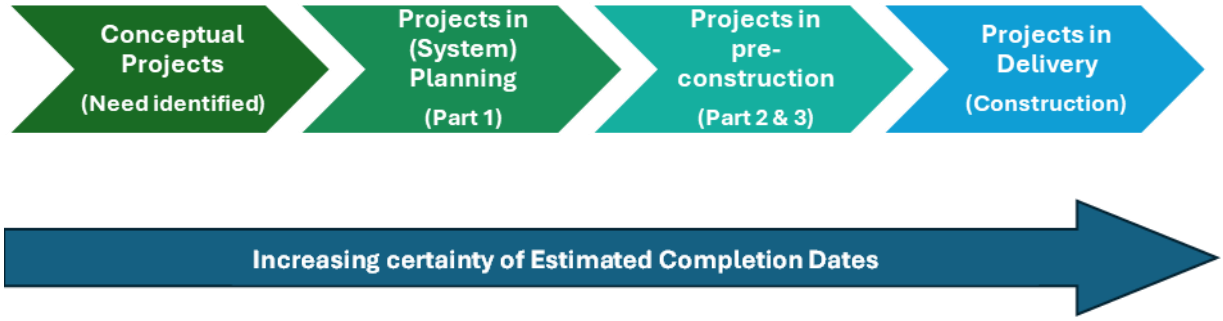

Figure 6.1: Project categories

Conceptual projects have not formally moved into Part 1 of the Grid Development Framework; no initial project programme is determined at this stage and as a result, these projects do not have an Estimated Completion Date. As projects move into and progress through the framework, there is increasing certainty over the Estimated Completion Date. Many projects in this draft TDPNI 2025-2034 are at Part 1 of the framework, and this is reflected in extensions to the Estimated Completion Dates for many of these projects.

SONI and NIE Networks are committed to continuously seeking opportunities to bring Estimated Completion Dates forward, and to enhance transparency, will provide quarterly updates on these dates.

Table 6.1: Details of the project categorisations for determining Estimated Completion Dates

Project Categorisation	
Conceptual Projects	These are early-stage projects which have been identified as necessary to meet the long-term needs of the Transmission system. Conceptual projects have not yet formally entered SONI's 3-Part Grid Development Framework. As such, at this very early stage in the project's lifecycle, where no preliminary preferred option has been selected, the ***initial* Estimated Completion Dates** have been determined based on high-level initial assessments and indicative scoping or it is simply too early to determine an ***initial* Estimated Completion Date** at this stage.
Projects in (System) Planning	These projects are progressing through Part 1 of the Grid Development Framework where the project need has been confirmed (or under consideration) and potential solutions are being identified and assessed and brought forward by SONI for Transmission Network Pre-construction Project (TNPP) approval with the UR. The ***indicative* Estimated Completion Dates** associated with these projects are subject to further refinement as the needs, options and designs develop, along with feedback from early stakeholder engagement.
Projects in Pre-construction	These projects are progressing through Part 2 and 3 of the Grid Development Framework where TNPP approval has been received. These projects are undergoing route and/or site selection, outline design and consenting. Whilst ***forecast* Estimated Completion Dates** have been defined, they are subject to significant external risks such as the planning process, landowner negotiations and environmental constraints. The Estimated Completion Dates for these projects reflect a range of constraint scenarios but acknowledge that many projects remain constrained or at risk of delays from the consenting process and/or third-party challenges.
Projects in Delivery	These projects have passed through Part 2 and 3 of the Grid Development Framework and are fully consented, going through detailed design, procurement, execution of land agreements and construction. At this stage in the project's lifecycle, risks have materially reduced so the ***planned* Estimated Completion Dates** in this category are the most certain.

6.4 Further opportunities for change

Enabling infrastructure projects is essential to achieving Northern Ireland's climate and energy targets — but their impact will only be fully realised if they are matched by a corresponding increase in renewable generation connecting to the transmission network. To accelerate the energy transition, a more proactive and coordinated approach is required.

We are keen to continue working collaboratively with industry partners, government, regulatory authorities, businesses and local communities to achieve Northern Ireland's renewable energy ambitions. We welcome the Department for the Economy's establishment of a new Grid Development Monitoring Group, recognising the complexity of grid infrastructure delivery and the critical interdependencies with external partners beyond SONI and NIE Networks. We are keen to ensure that this working group can be used as a vehicle to deliver meaningful change.

The Estimated Completion Dates in this draft TDPNI 2025-2034 reflect the current policy and regulatory landscape of Northern Ireland that NIE Networks and SONI operate within. In our assessment, there are opportunities for change that have the potential to deliver more transformational impacts for grid delivery in Northern Ireland and positively impact upon the Estimated Completion Dates for grid delivery projects. Whilst these changes are beyond the remit of SONI and NIE Networks to deliver, and will require commitment from government and key stakeholders, we are committed to supporting the exploration and implementation of these opportunities, which include:

- **Moving towards a Plan-led approach including anticipatory investment** to accelerate delivery timescales for new connections and wider network infrastructure which requires DfE and UR support. We must work collaboratively and at pace with the DfE and UR to move to a more plan-led approach. This will allow greater flexibility to signal the most appropriate and strategic locations for new connections, including technology type. In our view, this would quicken the timescales and reduce costs by reducing the technical complexity of connections and manage the need for wider network reinforcement.
- **A Spatial Energy Plan for Northern Ireland** across the whole energy system to bring together network development planning with the appropriate investment signals for industry. This would have the benefit of providing greater certainty for all partners and deliver better efficiency and value for money for consumers.
- **Change the regulatory model** whereby the UR approves a transmission investment plan as a whole, rather than approvals on a project-by-project basis. Given the scale of existing and future infrastructure upgrades, it would be beneficial to remove regulatory approvals from the critical path. Based on precedent elsewhere, we

believe there is scope to consider a change in approach that recognises the urgent need to accelerate grid delivery, while still protecting consumers by building in appropriate mechanisms to monitor delivery.

- **Public awareness campaign** on the importance of grid infrastructure and the benefits for consumers. We believe there is an opportunity for SONI and NIE Networks to work together with the DfE, and the industry on a joint campaign. People must be at the heart of Northern Ireland's energy transition. Maintaining the trust and confidence requires a collective effort to increase awareness, knowledge and understanding about the energy transition with consumers and the benefits of their investment in the grid.
- **Community benefit model** that recognises the critical enabling role host communities play in the energy transition. As well as recognising their important role, community benefit models can help increase understanding and public acceptance for grid infrastructure that could help mitigate against the potential for delays in the planning system due to public opposition. We have had initial discussions with the UR and the DfE on a community benefit model that provides host communities with direct financial benefit commensurate to the vital role they play.
- **Enhance collaboration with planning authorities** to strengthen the planning system, enabling it to effectively support the achievement of Northern Ireland's statutory energy and climate targets.

7 Planned network developments

7.1 Overview of the Plan

This chapter summarises the network development projects that are a result of the transmission network development planning process (outlined in **Section 2.4**). Projects are described in greater detail in **Section 8** and **Appendix B**.

The draft TDPNI includes a total of 150 projects that are currently in progress. These projects are categorised as either:

- New Build;
- Uprate/Modify;
- Refurbish/Replace related projects; or
- Combination.

New Build projects: are projects that involve the construction of new substations or new circuits. This category also includes projects that involve the installation of new equipment in existing substations.

An example of a new build project is the installation of new transformers or new reactive support devices within existing stations.

Uprate/ Modify projects: are projects that involve the uprating of existing assets. An example of an uprate project is the changing of equipment to increase the capacity of circuits between stations; or busbars within existing stations.

This category also includes projects that involve the modification or reconfiguration of existing assets.

An example of a modification project is the installation of new couplers in existing substations.

Refurbish/ Replace projects: are projects that involve the refurbishment of existing substations or circuits. This category also includes projects that involve the replacement of existing assets. For example, the replacement of stations at, or close, to the end of their useful life or replacement and upgrading of protection in existing stations.

Combination: are projects that involve a combination of any of the three categories above.

Table 7.1 below summarises the 150 active projects into their respective categories.

Table 7.1: Summary of Projects by Category

Project Category	Network Development Projects	Asset Replacement projects
New Build	23	
Uprate/ Modify	20	
Refurbish/ Replace	0	105
Combination	2	
Total	**45**	**105**

7.2 Summary of Stage of Projects

Table 7.2 below summarises the number of development projects (not including the 105 asset replacement projects) in each project category determined by the JPMO. Full details on the categories are provided in **section 6.3**. Table A.1 in **Appendix A** shows the alignment between the project categories in the JPMO and the three parts of SONI's Grid Development Framework.

Table 7.2: Summary of Projects by JPMO Project Category

Number of development projects in each stage				
Conceptual	**System Planning**	**Pre-construction**	**Delivery**	**Total**
10	15	10	10	**45**

Figure 7.1 below illustrates the location of the larger network development projects in Parts 1 to 3 of the Grid Development Framework across Northern Ireland. For clarity, figure 7.2 shows projects located within the greater Belfast area.

For those projects in the early stages of the planning process, indicative corridors are shown on the map as a specific solution or line route has not yet been decided on. A full list of projects and their corresponding stage of development is given in **Appendix B**.

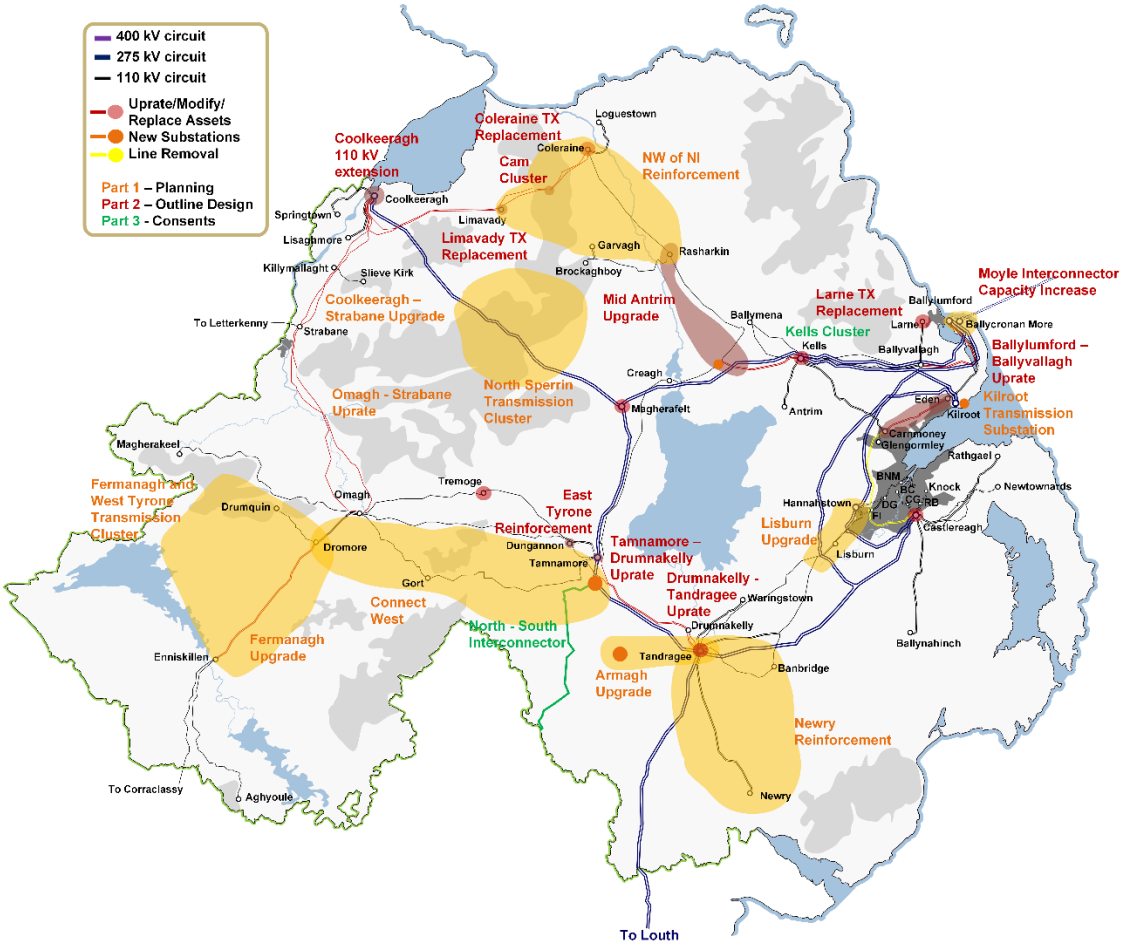

Figure 7.1: Planned network developments in Parts 1, 2 and 3

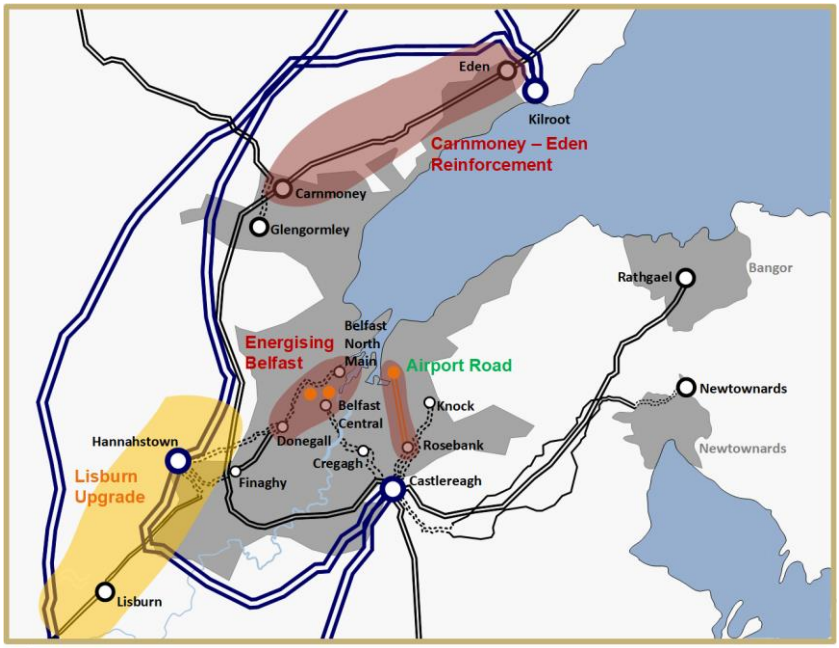

Figure 7.2: Planned network developments in greater Belfast area

8 Project description

8.1 Overview

As described in **Section 1,** planned development projects are categorised on a planning area basis as per figure 1.1. Asset Replacement projects are listed together as these are the responsibility of NIE Networks and are not subject to SONI's grid development process. There is one network development project that is in both planning areas. This project is listed in table B.5 in **Appendix B**.

Projects of pan-European and regional significance in, or partly in, Northern Ireland are identified in ENTSO-E's 2024 TYNDP and RegIP documents. Such projects are identified in this draft TDPNI using the following labels: "  TYNDP/ TYNDP_Project_No" or "  RegIP/ RegIP_Project_No" and are listed in **Appendix C**.

8.2 NIE Networks asset replacement projects

NIE Networks' asset replacement projects (in both areas) are detailed below.

For asset replacement projects forming part of NIE Network's RP7 plan, each of the 93 projects has been assigned to a project category. Each project category is set out in **section 8.2.2** with a reference to the sub-project codes used by NIE Networks in their RP7 price control submission where applicable.

Projects forming part of NIE Network's D5 asset replacement projects are large scale projects or projects where the scope of works cannot yet be determined and there is therefore greater uncertainty in project costs and timelines. Full details of these, including the original cost estimates, are available on the UR website[49] in Annex P[50] and Annex Q[51].

8.2.1 Asset replacement projects in RP6

RP6 275 kV Switchgear and 275/110 kV Transformers Including 22 kV Tertiary Windings and Shunt Connected Equipment

These projects were carried forward from the RP6 period and are due to be completed within the RP7 period. The projects carried forward include replacing transformers at Castlereagh, Hannahstown and Tandragee as well as replacing shunt reactors at Kells and Tandragee.

RP6 110 kV Switchgear and 110/33 kV Switchgear

These projects were carried forward from the RP6 period and are due to be completed within the RP7 period. The projects carried forward include the replacement of a 110/33 kV transformer at Donegall and refurbishment of the 110 kV mesh at Strabane.

[49] RP7 Annex A-Z | Utility Regulator
[50] Annex P - Assessment of Network Investment Direct Allowances.pdf | Utility Regulator
[51] Annex Q - Planned Network Investment Volumes and Allowances.pdf | Utility Regulator

8.2.2 Asset replacement projects in RP7

RP7 110 kV Overhead Line and Cable Works

RP7 Sub project codes

T19p, T19ah, T19e, T19ab, T19g, T19aj, T19z, T19ai, T19c, T19t, T19ac, T19af, T19a, T19aa, T19y, T19n, T19f, T19b, T19v, T19ag, T19g1, T19ad, T19r, T20n, T20k, T20r

Works will be undertaken to assess and maintain, or – where necessary, replace the 110 kV overhead line and cable assets on the Northern Ireland transmission system. Examples include tower and foundation assessments and remedial works, insulator, damper and steelwork replacement, pole replacement, tower painting, cable refurbishment and decommissioning. Figure 8.1 indicates all 110 kV circuits planned for maintenance or refurbishment as part of RP7.

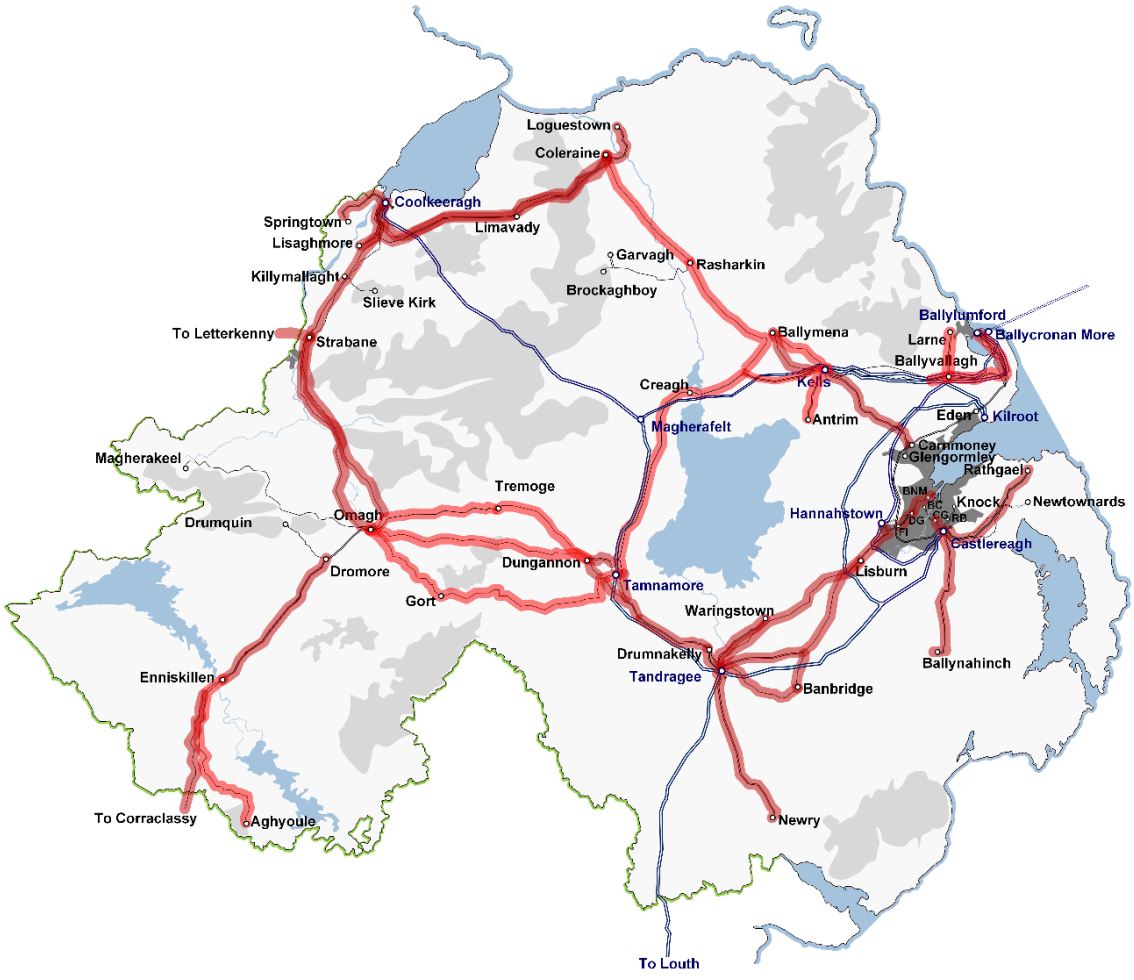

Figure 8.1: 110 kV circuits with works planned for RP7

RP7 110 kV Switchgear and 110/33 kV Switchgear

RP7 Sub project codes

T10c, T10d, T10e, T11a, T11d, T11e, T11m, T11n, T12ab, T12ad, T12o, T12r, T12x, T12z, T13c, T13f, T14b, T14c, T14e

Works will be undertaken to assess and maintain, or – where necessary, replace the 110 kV switchgear on the Northern Ireland transmission system. Examples include 110 kV isolators, 110kV earthing spigots, and 110/33 kV transformers. Figure 8.2 indicates all substations where 110 kV switchgear is planned for maintenance or refurbishment as part of RP7.

Figure 8.2: 110 kV substations with switchgear works planned for RP7

RP7 275 kV Overhead Line Works

RP7 Sub project codes

T17m, T17z, T17s, T17d, T17n, T17j, T17t, T17x, T17r, T17e, T17aa, T17k, T17v, T17y, T17q

Works will be undertaken to assess and maintain, or – where necessary, replace the 275 kV overhead line and cable assets on the Northern Ireland transmission system. Examples include tower and foundation assessments and remedial works, insulator, damper and steelwork replacement, and tower painting.

Figure 8.3: 275 kV circuits with works planned for RP7

RP7 275 kV Switchgear and 275/110 kV Transformers Including 22 kV Tertiary Windings and Shunt Connected Equipment

RP7 Sub project codes

T11p, T11q, T11r, T11s, T11t, T11w, T11x, T12d, T13c, T13d, T14d, T15e, T16a

Works will be undertaken to assess and maintain, or – where necessary, replace the 275 kV switchgear on the Northern Ireland transmission system. Examples include replacing 275 kV surge arrestors, replacing 275/110 kV transformers and maintenance of other 275 kV plant ancillaries.

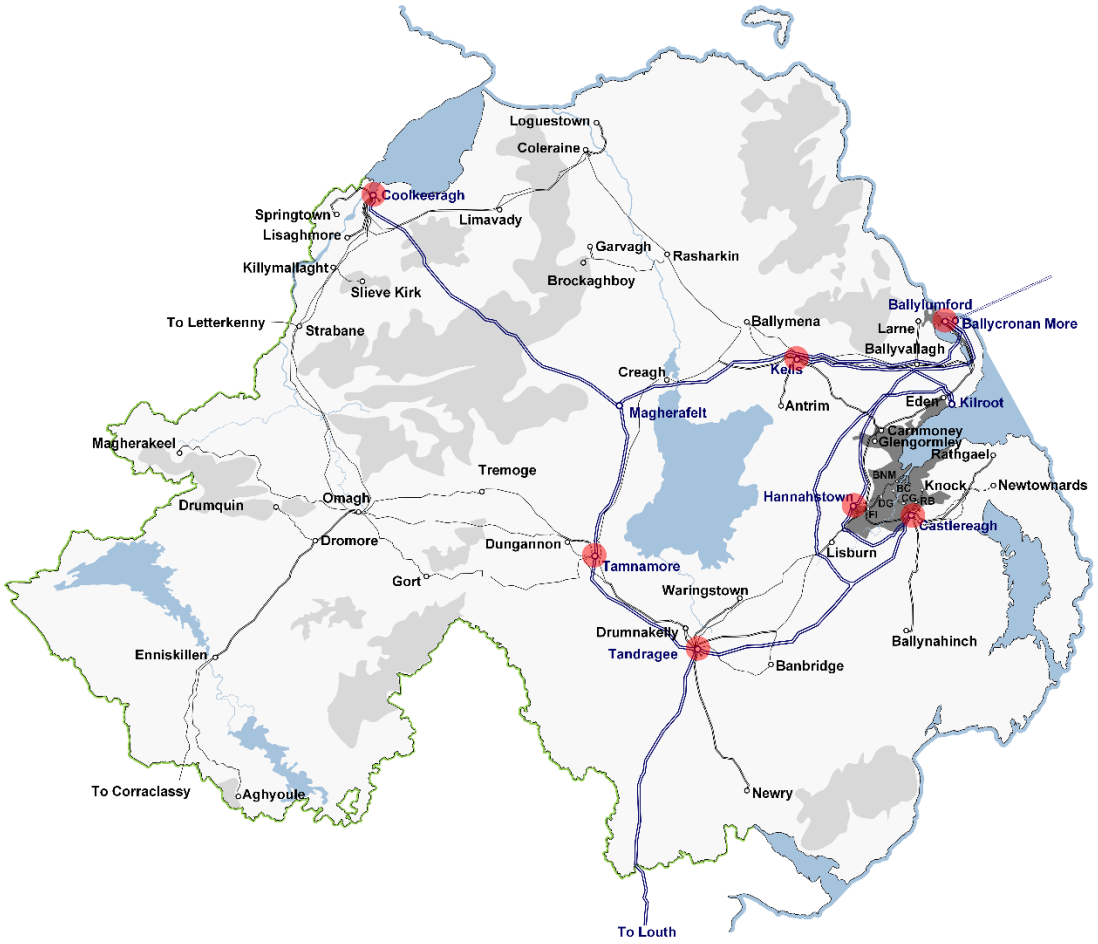

Figure 8.4: 275 kV substations with switchgear works planned for RP7

RP7 Transmission Protection and Control

RP7 Sub project codes

T602n, T602aa, T602af, T602o, T602t, T602u, T602ah

Works will be undertaken to assess and maintain, or – where necessary, replace the protection and control equipment on the Northern Ireland transmission system. Examples include installing 275 kV circuit breaker fail protection, 110 kV transformer protection and 22kV reactor protection.

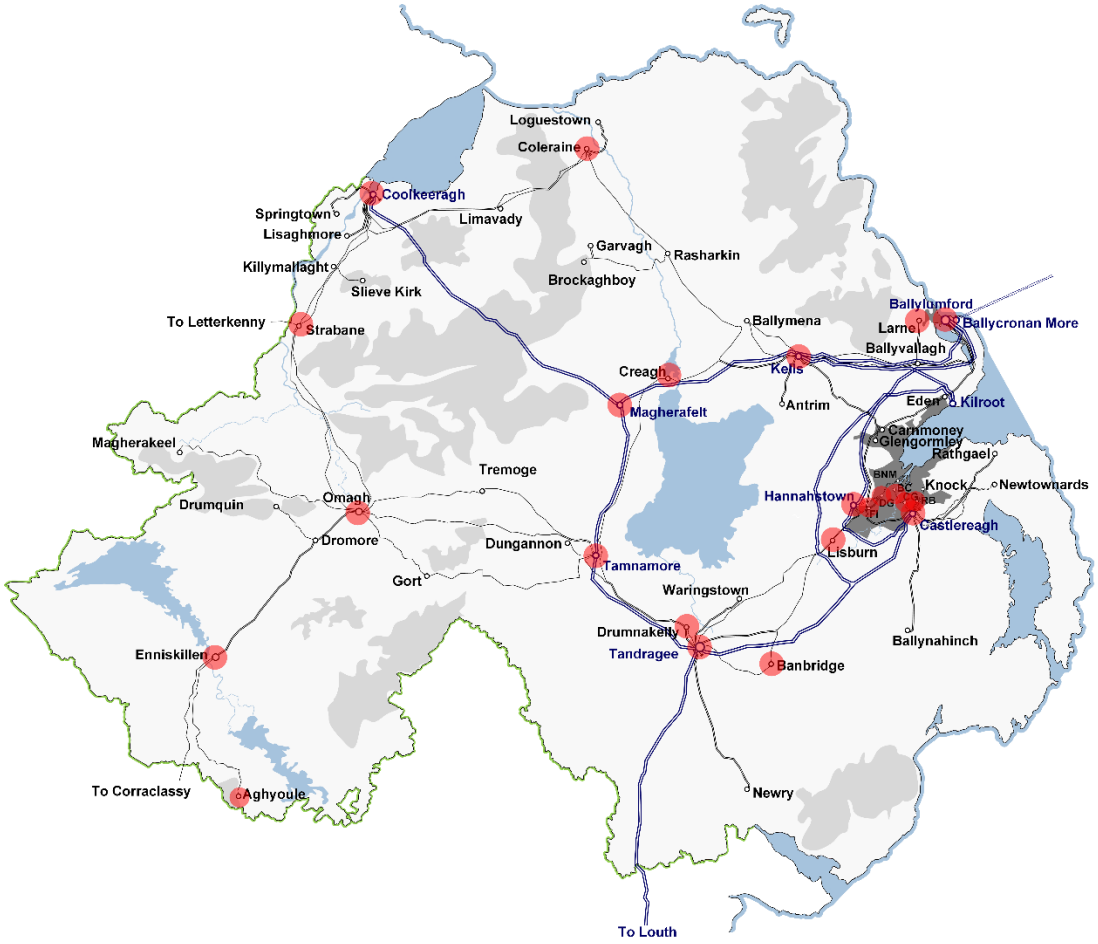

Figure 8.5: Substations with protection and control works planned for RP7

8.2.3 D5 Asset replacement projects

Ballylumford 110 kV Switchboard Replacement

The existing 110 kV switchgear at Ballylumford is to be replaced with a new 110 kV GIS double busbar and the 110 kV circuits diverted accordingly. The need for this project arises from the age, condition and obsolescence of the existing equipment as well as the potential for high short circuit currents in the event of a transmission fault. This project is expected to cost £42.0m.

Estimated completion: 2030

Castlereagh – Rosebank Towerline Removal

The redundant 110 kV double circuit overhead line from Castlereagh to Rosebank will be removed due to obsolescence, the connection having been replaced with underground cable. This project is expected to cost £1.0m.

Estimated completion: 2027

Strabane – Omagh Fibre Replacement

This project will replace the fibre optic telemetry line on the Strabane to Omagh tower line. This project is expected to cost £10.0m.

Estimated completion: 2028

Ballylumford – Hannahstown 275 kV Refurbishment

The 275 kV circuits between Ballylumford and Hannahstown will be refurbished owing to the age and condition of the existing assets. This project is expected to cost £34.9m.

Estimated completion: 2030

Hannahstown – Castlereagh 275 kV Refurbishment

The 275 kV circuits between Castlereagh and Hannahstown will be refurbished owing to the age and condition of the existing assets. This project is expected to cost £16.0m.

Estimated completion: 2031

8.3 The North and West Planning Area

The North and West Planning Area Overview	
The North and West planning area comprises all areas connected to the transmission system north and west of the 275 kV double circuit ring around Lough Neagh.	
Summary of TDPNI Projects	
TDPNI project category	**Number of projects**
New Build	11
Uprate/ Modify	9
Refurbish/ Replace	0
Combination	0
Total	**20**
Regional Description	
This area is characterised by the installed capacity of wind generation connected directly and via 110/33 kV substations to the 110 kV network, which exceeds local demand. Conventional generation in this area is provided by Coolkeeragh Power Station, connected to the main 275 kV ring by a double circuit spur line which crosses the Sperrin mountains from Magherafelt. There are two cross-border connections on the 110 kV system, connecting Strabane with Letterkenny in County Donegal and Enniskillen with Corraclassy in County Cavan. Cross-border power flows are managed by phase-shifting transformers (PSTs). There is limited high capacity 275 kV infrastructure in this area and currently little or no spare capacity for generation on the 110 kV system. The planning area has considerably more generation than demand. Significant further generation capacity is expected to connect in this area over the coming years, most of which is expected to be renewable in order to meet the 80% target. This will be a combination of existing generators replacing old plant with new, higher capacity equipment, and new connections. An increasing number of battery energy storage schemes have also applied to connect, as well as participants seeking to provide Low Carbon Inertia Services.	

To cater for the high levels of generation described above network reinforcement is necessary. This will enable the efficient export of generation from this area towards areas with high load, such as the South-East.

Reinforcement is also necessary to relieve local constraints related to a shortage of transmission capacity, and to provide voltage support.

The projects described in this section will enable the transmission network to safely accommodate the more diverse power flows which are the result of excess generation in the region, and will also provide benefits to existing and future users of the transmission network in the planning area, facilitating regional load growth. Given that some of the projects described are in the early stages of needs identification, with options being assessed and refined ahead of submissions for approval of capital expenditure, this list is reflective of the status at the time of publication. It will be updated in future TDPNIs to reflect the changing nature and understanding of the needs of the power system and the progress of projects described.

The 20 development projects in the North and West planning area are discussed in more detail below as are any changes to the expected completion date from TDPNI 2023-2032. The status of the network development projects is noted in **Appendix B**.

Please refer to figure 7.1 for locational information of planned Network Developments in the North and West Planning Area.

Unless otherwise mentioned, any changes in project costing since the previous TDPNI are due to inflation.

8.3.1 Renewable Generation Cluster Substations

Cam 110/33 kV Cluster

Under NIE Networks' cluster methodology, a generation cluster has been designated between Limavady and Coleraine in the Cam area. This will be connected to the 110 kV circuit between Coolkeeragh and Coleraine. As a cluster substation, although initially underwritten by the NI consumer, this is then funded by the connecting generators and there is ultimately no cost to the Northern Ireland consumer.

Estimated completion date: 2030 (Project in Pre-Construction)

Cam Cluster Substation Extension

A network development project is being progressed to facilitate future reinforcement of the transmission system in this area by extending the planned Cam cluster and additionally turning in the Coleraine – Limavady 110 kV circuit. The estimated cost is £8.72m, of which £8.60m of this spend is expected to be within the period of this draft TDPNI.

Estimated completion date: 2030 (Project in Pre-Construction)

Cam Cluster Second 110/33 kV Transformer (NEW)

The driver for this project is renewable integration and facilitation of new connections at the Cam Cluster. This project will involve the installation of a second 110/33 kV transformer at Cam Cluster which will enable connection of additional generation capacity at 33 kV. This project is chargeable to the users connecting to the system via Cam Cluster.

Estimated completion date: 2030 (New – JPMO Programme under development)

Fermanagh and West Tyrone Transmission Cluster (NEW)

The driver of this project is renewable integration and new connections. There are increasing numbers of renewable generators seeking to connect in the Fermanagh and West Tyrone area, as well as existing wind farms replacing original turbines with new, higher power units. Under the Proposed Transmission Cluster Policy it is proposed to establish a transmission cluster substation in the Fermanagh/West Tyrone area to connect new renewable generation to the transmission system. The estimated cost is £70.57m, which, under the current Proposed Transmission Cluster Proposal would be initially underwritten by the NI consumer and then recouped from users connecting via the cluster. Note that only £3.5m of this estimated spend is expected to be within the period of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

North Sperrin Transmission Cluster

The driver of this project is renewable integration and new connections. There are increasing numbers of renewable generators seeking to connect in the North Sperrin area, as well as existing wind farms replacing original turbines with new, higher power units. However, there are a lack of strong connection points in this area, and existing transmission infrastructure in the area is heavily loaded. Under the Proposed Transmission Cluster Policy it is proposed to establish a 275/110 kV cluster substation near to the existing Coolkeeragh – Magherafelt 275 kV double circuit corridor in the North Sperrin region, including the associated circuit reconfigurations into the site to connect new renewable generation to the transmission system.

Provision of a new transmission substation has the potential to provide an efficient means of connecting future generation and reconfiguring existing generation to reduce constraints. The estimated cost is £50.34m which, under the current Proposed Transmission Cluster Proposal would be initially underwritten by the NI consumer and then recouped from users connecting via the cluster.

Estimated completion date: TBC (Conceptual Projects)

Rasharkin Cluster Second 110/33 kV Transformer (NEW)

The driver for this project is renewable integration and facilitation of new connections at the Rasharkin Cluster. This project will involve the installation of a second 110/33 kV transformer at Rasharkin Cluster which will enable connection of additional generation capacity at 33 kV. This project is chargeable to the users connecting to the system via Rasharkin.

Estimated completion date: 2028 (New – JPMO Programme under development)

Tremoge Cluster Second 110/33 kV Transformer (NEW)

The driver for this project is renewable integration and facilitation of new connections at the Tremoge Cluster. This project will involve the installation of a second 110/33 kV transformer at Tremoge Cluster which will enable connection of additional generation capacity at 33 kV. This project is chargeable to the users connecting to the system via Tremoge.

Estimated completion date: TBC (New – JPMO Programme under development)

8.3.2 Renewable Integration Developments

Coleraine Transformer Replacement (NEW)

The capacity of the existing 110/33 kV transformers at Coleraine is insufficient for further connection of renewable generation to the Coleraine distribution system. Due to the age and condition of the existing transformers and in order to facilitate the new generation planned in this area the existing 60 MVA transformers at Coleraine will be replaced with 90 MVA units. This project is expected to cost £5.12m.

Estimated completion date: 2028 (Projects in (System) Planning)

Connect West (formerly Mid-Tyrone Project)

The drivers for this project are security of supply and RES integration. Due to the increase in the renewable generation in the North and West there is a need to address expected overloads in the grid between Omagh and Tamnamore. Several options are being assessed in this project including:

- uprating the existing 110 kV circuits;
- construction of a new 110 kV circuit from Dromore to Tamnamore; and
- construction of a new 275 kV circuit from Tamnamore or Turleenan to Dromore, and establishment of a 275 kV substation at the existing Dromore 110 kV switching site.

The estimated cost is £124.41m based on a preliminary preferred option of a 275 kV circuit to Dromore, of which £17.28m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2037 (Projects in (System) Planning)

Coolkeeragh 110 kV Extension

The driver for this project is security of supply, renewable integration and new connections. This project will involve construction of additional 110 kV bays at Coolkeeragh through a double busbar extension including enlarging the existing substation compound. The estimated cost is £17.44m, of which £17.39m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2030 (Project in Pre-Construction)

Coolkeeragh – Limavady – Coleraine 110 kV Uprate

The drivers for this project are renewable integration and security of supply. As a result of increasing growth in renewable generation in the North West of NI there will be a need to uprate the 110 kV circuits between Coolkeeragh, Limavady and Coleraine with a higher capacity conductor in order to mitigate overloads under high wind conditions. This project will be assessed alongside the ‘North West 110 kV Reinforcement’ project, including the feasibility of restringing the existing circuits. The estimated cost is £73.26m, of which £39.96m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

Coolkeeragh – Strabane 110 kV Upgrade (formerly Coolkeeragh – Killymallaght – Strabane 110kV Uprate)

The drivers for this project are security of supply and renewable integration. As a result of increasing growth in renewable generation in the North West of NI there will be a need to uprate and reconfigure the 110 kV circuits between Coolkeeragh and Strabane (including Killymallaght). Several options are being assessed in this project including:

- uprating the existing 110 kV circuits,
- restoring the existing Coolkeeragh – Strabane 110 kV double circuit towerline, reconfiguring and uprating the existing 110 kV circuits, and
- establishing a second Killymallaght switching site, reconfiguring and uprating the existing 110 kV circuits (partially).

The estimated cost of this project is £42.96m, based on an emerging preferred option of restoring the Coolkeeragh to Strabane 110 kV double circuit towerline and uprating the existing 110 kV circuits.

Estimated completion date: 2036 (Projects in (System) Planning)

Fermanagh Upgrade (NEW)

The drivers of this project are renewable integration and security of supply. The Enniskillen - Dromore circuits may be subject to overload under high wind generation conditions. This project is to restring these circuits with higher capacity conductor. The estimated cost is £35.55m, of which £3.23m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

Limavady Transformer Replacement

The capacity of the existing 110/33 kV transformers at Limavady is insufficient for further connection of renewable generation to the Limavady distribution system. Due to the age and condition of the existing transformers and in order to facilitate the new generation planned in this area the existing 45 MVA transformers at Limavady will be replaced with 90 MVA units. This project is expected to cost £5.12m.

Estimated completion date: 2029 (Conceptual Projects)

Mid-Antrim Upgrade

The drivers of this project are security of supply and RES integration. As a result of increasing growth in renewable generation there will be a need to increase grid capacity south of Rasharkin 110/33 kV cluster substation. This project proposes constructing a new switching site at Terrygowan and constructing a new circuit from Terrygowan to Rasharkin 110/33 kV cluster substation. There will be further network reconfigurations into the new switching site of Terrygowan of the nearby110 kV and an uprate of the double circuit overhead line section between Kells and Terrygowan. The estimated cost is £45.0m, of which £42.13m is projected to be spent within the timeframe of this draft TDPNI. The estimated cost of this project has increased due to inflation and progression of substation design, overhead line design and cable design changes from the original proposal.

Estimated completion date: 2030 (Project in Pre-Construction)

North West of NI 110 kV Reinforcement

The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the North West and potential for voltage instability there will be a need to reinforce the 110 kV transmission system between Limavady and Rasharkin. As well as likely uprating of the circuits from Coolkeeragh to Limavady, the new circuit options to be investigated as part of this project will include:

- A 110 kV circuit from Cam cluster – Rasharkin; and
- A second 110 kV circuit from Coleraine – Rasharkin.

The estimated cost is £34.42m, of which £17.94m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2037 (Project in Delivery)

Strabane – Omagh 110 kV Uprate

With increasing generation in the North West there is a risk of overload of the 110 kV circuits between Strabane and Omagh. This project will involve replacement of the conductor on the existing overhead lines with new conductor of a higher capacity. The estimated cost is £57.36m, of which £22.59m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

8.3.3 Load Related and Security of Supply

Coolkeeragh 275 kV 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 fault conditions. This project will address this issue through redevelopment of the existing substation or replacement. Options being considered are currently undergoing feasibility investigations. The estimated cost is £53.32m, of which £48.08m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: ECD is subject to scope and outage requirements. This project will be progressed for completion between 2034 – 2038.

Coolkeeragh 275/110 kV Transformer 1 Cabling Uprate

The increase in wind generation in the North West of Northern Ireland has resulted in an increase in power flows at Coolkeeragh. This project is to uprate the 110 kV cabling associated with 275/110 kV Interbus Transformer 1 in order to accommodate these flows, mitigating a potential constraint. This project will likely be executed in parallel with the 275 kV redevelopment project at Coolkeeragh. The estimated cost of this project is £0.64m.

Estimated completion date: TBC (Conceptual Projects) - subject to Coolkeeragh 275 kV redevelopment project

East Tyrone Reinforcement

The driver for this project is security of supply. There is a need to reinforce the distribution system supplying the Dungannon and Cookstown areas, where the result of a joint security of supply assessment by SONI and NIE Networks was that demand is forecast to exceed the capacity of the existing 110/33 kV substation. This project will involve the construction of a second 110/33 kV substation at Dungannon adjoining the existing Dungannon Main site, along with the associated reconfiguration of the local 33 kV network to transfer demand to the new substation. The estimated cost of this project is £13.22m. The estimated completion date of this project has changed following selection of the preferred option and assessment of the works required.

Estimated completion date: 2030 (Project in Pre-Construction)

8.4 The South-East Planning Area

The South-East Planning Area Overview
The South-East planning area comprises all areas within the 275 kV double circuit ring around Lough Neagh, as well as Greater Belfast, South Antrim and County Down.

Summary of TDPNI Projects	
TDPNI project category	**Number of projects**
New Build	12
Uprate/ Modify	10
Refurbish/ Replace	0
Combination	2
Total	**24**

Regional Description
This area is characterised by its relatively high demand, particularly in the Greater Belfast area. There are two large conventional power stations; Ballylumford near Larne and Kilroot near Carrickfergus. Wind generation makes up a small proportion of installed capacity. There is one cross-border connection on the 275 kV system, connecting Tandragee with Louth. The Moyle HVDC interconnector provides a connection between the 275 kV system near Ballylumford with the power system of Great Britain, via Scotland. There is strong 275 kV infrastructure in this area, with significant spare capacity for generation and demand. However, there is a need to refurbish or replace several 275 kV substations to fully enable access this capacity. The development of the transmission network in the area is characterised by the need to meet increasing demand and improve system resilience and flexibility. Investment is required to increase transmission of wind power from the North and West as well as cross-border interconnection. There are also reinforcement needs due to local constraints related to a shortage of transmission capacity and voltage support, as well as accommodating further market integration with Ireland.

The projects described in this section will enable the transmission network to safely accommodate the more diverse power flows which are a result of excess regional generation. This project list is not definitive and will be updated in future TDPNIs to reflect the changing nature and understanding of the needs of the power system. They will also provide benefits to existing and future users of the transmission network in the planning area and facilitate broad future regional load growth.

The 24 development projects in the South-East planning area are discussed in more detail below. The status of the network development projects is noted in **Appendix B**.

Please refer to figures 7.1 and 7.2 for locational information of planned Network Developments in the South-East Area in Parts 2 & 3.

Unless otherwise mentioned, any changes in project costing since the previous TDPNI are due to inflation.

8.4.1 Dual Asset Replacement/ Load Related and Security of Supply Projects

Carnmoney – Eden Reinforcement

The driver for this project is security of supply. The existing conductors are due for replacement as a result of the age and condition of the assets. This project will involve the refurbishment of the rural section of the existing tower line and replacement of the urban sections with a new underground cable and increasing the capacity of these circuits. A second 110/33 kV transformer will also be installed at Glengormley Main substation. The estimated cost of this project is £38.51m.

Estimated completion date: 2031 (Project in Pre-Construction)

Energising Belfast

The driver for this project is security of supply. The existing conductor on the Castlereagh – Carnmoney 110 kV double circuit is due for replacement as a result of the age and condition of the assets. This project will install a fourth interbus transformer at Castlereagh and establish new high-capacity 110 kV cable connections between Hannahstown and Castlereagh substations through Belfast city centre, including the construction of new GIS switching sites, which will be interconnected. This will enable removal of the existing 110 kV double circuit between Carnmoney and Castlereagh. The estimated cost is £85.17m, of which £79.47m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2032 (Project in Pre-Construction)

8.4.2 Renewable Generation Cluster Substations

Kells 110/33 kV Cluster

The driver of this project is RES integration. It is planned to establish a 110/33 kV cluster substation within the existing Kells 275/110 kV substation compound to connect new renewable generation. This will be connected to the existing Kells 110 kV substation via an underground cable. As a cluster substation, although initially underwritten by the NI consumer, this is then funded by the connecting generators and there is ultimately no cost to the NI consumer.

Estimated completion date: 2026 (Project in Delivery)

Kells Cluster Second 110/33 kV Transformer (NEW)

The driver for this project is renewable integration and facilitation of new connections at Kells Cluster. This project will involve the installation of a second 110/33 kV transformer at Kells Cluster which will enable connection of additional generation capacity at 33 kV. This project is chargeable to the users connecting to the system via Kells Cluster.

Estimated completion date: 2029 (New – JPMO Programme under development)

8.4.3 Renewable Integration Developments

Ballylumford – Ballyvallagh Uprate

The drivers for this project are renewable integration and security of supply. These circuits may be subject to overload under high wind generation conditions. This project is to restring these circuits with higher capacity conductor. This project is expected to cost £25.06m.

Estimated completion date: TBC (Conceptual Projects)

Drumnakelly - Tamnamore 110 kV Uprate

The drivers of this project are renewable integration and security of supply. These circuits may be subject to overload under high wind generation conditions and may be operated out of service as a result. This project is to restring these circuits with higher capacity conductor. For the ‘A’ circuit, a new underground cable section will also replace sections of the existing overhead line which are no longer required. The estimated cost is £24.32m, of which £24.23m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2031 (Project in Pre-Construction)

Drumnakelly - Tandragee Uprate (NEW)

The drivers for this project are renewable integration and security of supply. These circuits may be subject to overload under high wind generation conditions. This project is to restring these circuits with higher capacity conductor. This project is expected to cost £9.46m.

Estimated completion date: TBC (Conceptual Projects)

Larne Transformer Replacement

The capacity of the existing 110/33 kV transformers at Larne is insufficient for further connection of renewable generation to the Larne distribution system. Due to the age and condition of the existing transformers and in order to facilitate the new generation planned in this area the existing 45 MVA transformers at Larne will be replaced with 90 MVA units. This project is expected to cost £4.73m.

Estimated completion date: 2026 (Project in Delivery)

Tamnamore Land Purchase (NEW)

This project comprises acquisition of land adjoining the existing Tamnamore substation. This will lead to addition of new transmission bays to facilitate new network projects or new connections via eventual substation extension and/or reconfiguration. This project is expected to cost £1.79m.

Estimated completion date: 2027 (Project in Pre-Construction)

8.4.4 Load Related and Security of Supply

Airport Road 110/33 kV Substation

The driver of this project is security of supply. The need for this project arises from the increasing load in the Belfast Harbour and city centre area. 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 and a new section of underground cable. The estimated cost is £17.84m, of which £16.94m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2027 (Project in Delivery)

Armagh Upgrade

The driver of this project is security of supply. 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. This project will involve establishing a new 110/33 kV substation at Armagh Central supplied by two new 110 kV circuits from Tandragee. This will require the extension of the existing Tandragee 110 kV substation to facilitate construction of new circuit bays. A new 33 kV underground cable between the existing Armagh Central and Armagh North substations is also required, including reconfiguration of the local 33 kV system. This project is expected to cost £39.16m.

Estimated completion date: 2036 (Project in (System) Planning)

Belfast Power Flow Control (NEW)

The driver of this project is security of supply, given the projected demand growth in the centre of Belfast. Upon completion of the Energising Belfast project, there will be a risk of congestion on the Hannahstown – Donegall cable circuits under certain conditions. This project would require a land purchase local to the existing Donegall Main substation to facilitate installation of power flow control devices to balance power flows in Belfast. This project is expected to cost £7.01m.

Estimated completion date: TBC (Conceptual Projects)

Kilroot Transmission Substation (NEW)

The drivers for this project are renewable integration and security of supply. There is a need to reinforce the existing 275 kV substation at Kilroot. Several options will be assessed in this project including a switching site. The estimated cost is £117.87m, of which £88.85m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

Lisburn Upgrade (NEW)

The driver for this project is security of supply, additional capacity and new connections. Due to demand growth in the Lisburn area, there is a need to provide additional capacity to reinforce the existing substation which supplies Lisburn and surrounding area. Several options will be assessed in this project including additional transmission circuits and/or a new grid supply point and associated bulk supply point. The estimated cost is £121.15m, of which £20.59m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: TBC (Conceptual Projects)

Newry Reinforcement

The driver of this project is security of supply. Due to demand growth in the Newry area there is a need to provide additional capacity to reinforce the existing substation which supplies Newry and the surrounding area. Several options are being assessed in this project including:

- a new 110/33 kV bulk supply point to the North of Newry;
- one or more new 110 kV overhead lines from Tandragee; and
- a new switching site in the Banbridge area.

The estimated cost is £61.77m, of which £10.29m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2038 (Project in (System) Planning)

Shunt Reactors - Castlereagh, Tandragee and Tamnamore

The driver of this project is security of supply. Further 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 estimated cost is £6.80m, of which £3.40m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2031 (Project in Delivery)

8.4.5 Fault Level Replacements

Castlereagh 110 kV Switchgear Replacement

The driver for this project is safety. Due to increasing fault levels, it is planned to replace the 110 kV circuit breakers and current transformers at Castlereagh with uprated equipment. This Project is expected to cost £3.35m.

Estimated completion date: 2031 (Project in Delivery)

Castlereagh 275 kV 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 Castlereagh are not sufficient to meet expected mechanical loading under fault conditions. This project will address this issue through redevelopment of the existing substation or replacement. Options being considered are currently undergoing feasibility investigations. This Project is expected to cost £34.46m.

Estimated completion date: ECD is subject to scope and outage requirements. This project will be progressed for completion between 2034 – 2038.

Kells 275 kV 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 fault conditions. This project will address this issue through redevelopment of the existing substation. Options being considered have completed feasibility investigation and a preferred option has been determined. This project will involve the construction of new 275 kV diagonals and a phased rebuild of the existing 275 kV diagonals. This will also involve construction of new double circuit terminal towers into the Kells 275 kV site and associated circuit reconfigurations. This Project is expected to cost £52.04m.

Estimated completion date: ECD is subject to scope and outage requirements. This project will be progressed for completion between 2034 – 2038.

Magherafelt 275 kV 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 Magherafelt are not sufficient to meet expected mechanical loading under fault conditions. This project will address this issue through redevelopment of the existing substation or replacement. Options being considered are currently undergoing feasibility investigations. This Project is expected to cost £25.42m.

Estimated completion date: ECD is subject to scope and outage requirements. This project will be progressed for completion between 2034 – 2038.

Tandragee 110 kV Switchgear Replacement

The driver for this project is safety. Due to increasing fault levels it is planned to replace the 110 kV circuit breakers and current transformers at Tandragee with uprated equipment. The estimated cost is £2.96m, of which £2.22m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2029 (Project in Delivery)

Tandragee 275 kV 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 Tandragee are not sufficient to meet expected mechanical loading under fault conditions. This project will address this issue through redevelopment of the existing substation or replacement. Options being considered are currently undergoing feasibility investigations. The estimated cost is £43.70m, of which £39.50m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: ECD is subject to scope and outage requirements. This project will be progressed for completion between 2034 – 2038.

8.4.6 Interconnection

North-South Interconnector

The drivers for this project are market integration, security of supply and renewable integration. This project involves construction of a new 400 kV circuit from the existing Woodland 400 kV station in County Meath (Ireland) to a proposed 400/275 kV substation at Turleenan in County Tyrone (Northern Ireland), where the existing Tamnamore – Tandragee 275 kV double circuit overhead line will be turned in. This project is needed to remove generation constraints within the Single Electricity Market (SEM). The estimated cost is £239.09m, of which £220.0m is projected to be spent within the timeframe of this draft TDPNI. The estimated cost of this project has increased due to inflation and an improved understanding of costs arising from project progress including an updated cost estimate from NIE Networks.

Estimated completion date: 2031 (subject to consenting and legal challenges)

Moyle Interconnector Capacity Increase

The drivers for this project are market integration, security of supply and renewable integration. At present, full utilisation of the 500 MW capability of the Moyle Interconnector is prevented by the potential for network overloads in the event the loss of the 275 kV double circuit between Ballylumford, Ballycronan More and Hannahstown. This project will involve construction of a new dual 275 kV cable between Ballylumford and Ballycronan More and restoration of the 275 kV double circuit overhead line arrangement between Ballylumford and Hannahstown in order to secure operation of the Moyle Interconnector against this contingency. The estimated cost is £9.69m, of which £9.65m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2030 (Project in Pre-Construction)

8.5 Projects in Both Planning Areas

CVT Upgrade for Harmonic Measurement

It is planned to augment Capacitor Voltage Transformers (CVTs) at a number of substation sites with equipment capable of accurately measuring the extent of harmonic distortion, improving power quality monitoring. The estimated cost of this project is £0.8m, of which £0.32m is projected to be spent within the timeframe of this draft TDPNI.

Estimated completion date: 2026 (Project in Delivery)

9 Environmental Appraisal Report of Draft TDPNI 2025-2034

An Environmental Appraisal Report (EAR) has been prepared as an accompanying document to this draft TDPNI. The purpose of the EAR is to ensure the draft TDPNI 2025-2034 is in line with committed Strategic Environmental Objectives (SEOs). These objectives were first set out in the Strategic Environmental Assessment (SEA) prepared for TDPNI 2018-2027 and continued in the SEA prepared for TDPNI 2023-2032. The objectives are integrated into the overall approach to grid development. A series of environmental, planning, social and technical policies and objectives guide sustainable Grid development.

As outlined in the earlier sections, this draft TDPNI includes 45 reinforcement projects. Of these, 11 projects are new to the draft TDPNI 2025-2034 and therefore were not considered in the Strategic Environmental Assessment (SEA) carried out for TDPNI 2023-2032. These projects are examined in the EAR and potential for impacts on the SEOs is identified. Following the implementation of mitigation measures (where necessary) the SEOs will be achieved.

Therefore, we consider the draft TDPNI 2025-2034 to be in accordance with the provisions of the Strategic Environmental Obligations as set out in TDPNI 2023-2032 and the most recent SEA.

Appendix A: Project terms

This appendix explains terms that are used to describe projects in the following appendices.

Estimated Completion Date (ECD): the estimates provided are subject to:

- Increasing project demands;
- Early stage limitations;
- Project management, design and change management issues;
- Stakeholder engagement challenges; and
- External and regulatory changes.

All dates are subject to change, and the JPMO is committed to continuously seeking opportunities to bring Estimated Completion Dates forward.

TDPNI Project Capex: The anticipated capital expenditure associated with a project that falls within the current TDPNI time frame, 2025-2034, comprising the combined total of the TSO (SONI) and TO (NIE Networks) costs.

Total Project Capex: The total anticipated capital expenditure associated with a project, including those years outside the TDPNI timeframe, comprising the combined total of the TSO (SONI) and TO (NIE Networks) costs.

Stage: the stage the project has progressed to on the data freeze date. The stage of each project is indicated in the tables in **Appendix B**. Table A.1 sets out the project stages, and how they align with both the JPMO and SONI's Grid Development Framework.

Table A.1: Categorisation of project stages used in this draft TDPNI

Categorisation in TDPNI		JPMO project categorisation	Three-Part Grid Development Framework
Project Stage	Appendix B		
Conceptual	**C**	Conceptual Projects	
Part 1	**1**	Projects in (System) Planning	1
Part 2	**2**	Projects in Pre-construction	2
Part 3	**3**		3
Handed over to NIE Networks	**NIE N**	Projects in Delivery	

Asset replacement projects are carried out by NIE Networks outside of SONI's Grid Development Process.

Appendix B: Planned network developments

This appendix details active draft TDPNI 2025-2034 projects and their driver(s), need(s), location, stage and ECD, as at the data freeze date 13th August 2025. Projects are categorised by planning area[52]. Also shown are changes in project cost estimates (where applicable) since TDPNI 2023-2032.

Please note the following labels:

- " TYNDP/ TYNDP_Project_No" or " RegIP/ RegIP_Project_No" included with a project's title signifies that it is in ENTSO-E's TYNDP 2024 report or Regional Investment Plan (RegIP) 2024, Northern Seas. Projects included in the TYNDP are projects of pan-European significance. Projects included in the RegIP Northern Seas are projects of regional significance. These projects are listed in **Appendix C**.
- "*" included with a project's length signifies that the circuit length is an estimate at this time.

[52] Some projects are in, or have the potential to be in, both planning areas. These projects are listed in Table B-6.

NIE Networks Asset Replacement projects

There are 2 groups of projects carried over from RP6 in NIE Networks' Asset Replacement Plan; these groups are listed in table B.1.

Table B.1: NIE Networks RP6 Asset Replacement Project Groups (2 Project groups)

Project title	Type	Planning area	Project CAPEX (£m)	ECD
RP6 275kV Switchgear and 275/110 kV Transformers (including 22kV tertiary windings and shunt-connected equipment)	Refurbish/ Replace	South-East	16.63	2031
RP6 110kV Switchgear and 110/33 kV Switchgear	Refurbish/ Replace	South-East	3.80	2029

There are 5 groups of projects in NIE Networks' RP7 Asset Replacement Plan; these groups are listed in table B.2.

Table B.2: NIE Networks RP7 Asset Replacement Project Groups (5 Project groups) [53]

Project title	Type	Planning area	Project CAPEX (£m)	ECD
RP7 110 kV Overhead Line and Cable	Refurbish/ Replace	Both	21.41[54]	2031
RP7 110 kV Switchgear and 110/33 kV Switchgear	Refurbish/ Replace	Both	20.63[55]	2031
RP7 275 kV Overhead Line	Refurbish/ Replace	Both	18.82[56]	2031
RP7 275 kV Switchgear and 275/110 kV Transformers (including 22 kV tertiary windings and shunt-connected equipment)	Refurbish/ Replace	Both	17.06[57]	2031
RP7 Transmission Protection and Control	Refurbish/ Replace	Both	12.38[58]	2031

Further to the above, separate capital approval has been secured for the following asset replacement projects. Due to their scale and nature, these projects entail greater risk for the asset owner - hence the D5 approval mechanism, in place since RP5, was used. These projects are listed in table B.3 below.

[53] https://www.uregni.gov.uk/files/uregni/documents/2024-10/Annex%20Q%20-%20Planned%20Network%20Investment%20Volumes%20and%20Allowances.pdf
[54] Costed from NIE Networks RP7 Annex Q section 3 categories: 110 kV Overhead Line Asset Replacement, Transmission Cables.
[55] Costed from NIE Networks RP7 Annex Q section 3 categories: 110 kV Switchgear Replacement, 110/33 kV Transformer Replacement, 110 kV Plant Ancillaries.
[56] Costed from NIE Networks RP7 Annex Q section 3 categories: 275 kV Overhead Line Asset Replacement.
[57] Costed from NIE Networks RP7 Annex Q section 3 categories: 275/110 kV Transformer Replacement, Transmission Transformer Refurbishment, 275 kV Plant Ancillaries, 22 kV Reactor Replacement.
[58] Costed from NIE Networks RP7 Annex Q section 3 categories: Transmission Protection, Network Access & Commissioning, Strategic Spares, and Transmission Earthing.

Table B.3: NIE Networks Asset Replacement D5 Projects (5 Projects)

Project title	Type	Planning area	Project CAPEX (£m)	ECD
Ballylumford 110 kV Switchboard Replacement	Uprate/ Modify	South-East	42.0	2030
Castlereagh – Rosebank Towerline Removal	Other	South-East	1.0	2027
Strabane-Omagh Fibre Replacement	Refurbish/ Replace	North and West	10.0	2028
Ballylumford-Hannahstown 275 kV Refurbishment	Refurbish /Replace	South-East	34.9	2030
Hannahstown-Castlereagh 275 kV Refurbishment	Refurbish/ Replace	South-East	16.0	2031

Projects in the North and West planning area

There are 20 projects in the north and west planning area; these projects are listed in table B.4.

Table B.4: Planned projects in the North and West planning area (20 projects)

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period				
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)	CAPEX change (£m)	ECD
Cam 110/33 kV Cluster	New build	0	✓		✓				✓			2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2030
Cam Cluster Substation Extension	New build	0	✓		✓				✓			2	0.52	8.20	8.72	0.40	8.20	8.60	+3.52	2030
Cam Cluster Second 110/33 kV Transformer (NEW)	New build	0	✓		✓				✓			NIE N	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2030
Coleraine Transformer Replacement (NEW)	Uprate/ Modify	0			✓			✓	✓			1	0	5.12	5.12	0	5.12	5.12	0	2028
Connect West	New build	53		✓	✓		✓	✓				1	17.28	107.13	124.41	17.28	0	17.28	+80.41	2037
Coolkeeragh 110 kV extension	Uprate/ Modify	0		✓	✓			✓	✓			2	0.49	16.95	17.44	0.44	16.95	17.39	+5.24	2030
Coolkeeragh 275 kV Redevelopment	Uprate/ Modify	0		✓					✓		✓	1	1.13	52.19	53.32	1.11	46.97	48.08	+35.12	2034-2038

Table B.4: ctd.

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period			CAPEX change (£m)	ECD
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)		
Coolkeeragh 275/110 kV Transformer 1 Cabling Uprate	Uprate/ Modify	0		✓				✓				C	0	0.64	0.64	0	0.64	0.64	+0.04	TBC
Coolkeeragh – Limavady – Coleraine 110 kV Uprate	Uprate/ Modify	95		✓	✓		✓	✓				C	6.66	66.6	73.26	6.66	33.30	39.96	+58.16	TBC
Coolkeeragh - Strabane 110 kV Upgrade	Uprate/ Modify	15		✓	✓		✓	✓				1	7.15	35.81	42.96	7.15	35.81	42.96	+22.96	2034
East Tyrone Reinforcement	New Build	0		✓				✓	✓			2	0.41	12.81	13.22	0.41	12.81	13.22	+5.32	2030
Fermanagh and West Tyrone Transmission Cluster (NEW)	New Build	0	✓	✓	✓		✓	✓	✓			C	3.64	66.93	70.57	3.50	0	3.50	n/a	TBC
Fermanagh Upgrade (NEW)	Uprate/ Modify	26		✓	✓			✓				C	3.23	32.32	35.55	3.23	0	3.23	n/a	TBC
Limavady Transformer Replacement	Uprate/ Modify	0			✓			✓	✓			1	0	5.12	5.12	0	5.12	5.12	+2.12	2029
Mid-Antrim Upgrade	New build	37		✓	✓		✓	✓	✓			2	7.70	37.30	45.0	4.83	37.30	42.13	+14.4	2030
North Sperrin Transmission Cluster	New build	0	✓	✓	✓		✓	✓	✓			C	3.64	46.70	50.34	3.64	46.70	50.34	n/a	TBC

Table B.4: ctd.

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period			CAPEX change (£m)	ECD
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)		
North West of NI110 kV Reinforcement	New Build	21		✓	✓		✓	✓				1	9.69	24.73	34.42	9.69	8.24	17.94	+0.82	2037
Rasharkin Cluster second 110/33 kV transformer (NEW)	New Build	0	✓		✓				✓			NIE N	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2028
Strabane – Omagh 110 kV Uprate	Uprate/ Modify	36		✓	✓			✓				C	5.21	52.14	57.36	5.21	17.38	22.59	+45.36	TBC
Tremoge Cluster second 110/33 kV transformer (NEW)	New Build	0	✓		✓				✓			1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	TBC

Projects in the South-East planning area

There are 24 projects in the south-east planning area; these projects are listed in table B.5.

Table B.5: Planned projects in the South-East planning area (24 projects)

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period				
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)	CAPEX change (£m)	ECD
Airport Road	New Build	0		✓				✓	✓			NIE N	0.91	16.93	17.84	0.01	16.93	16.94	+11.14	2027
Armagh Upgrade	New Build	17		✓				✓	✓			1	9.73	29.43	39.16	9.73	29.43	39.16	+12.06	2036
Ballylumford – Ballyvallagh 110 kV Uprate	Uprate/ Modify	17			✓		✓		✓			C	2.28	22.78	25.06	2.28	22.78	25.06	+16.76	TBC
Belfast Power Flow Control (NEW)	New build	0		✓				✓				C	0.50	6.51	7.01	0.50	6.51	7.01	n/a	TBC
Carnmoney – Eden Reinforcement	Refurbish/ Replace/ Uprate/ Modify	12		✓			✓				✓	2	1.18	37.33	38.51	1.18	37.33	38.51	+7.51	2031
Castlereagh 110 kV Switchgear replacement	Uprate/ Modify	0		✓				✓				NIE N	0	3.35	3.35	0	3.35	3.35	+0.25	2031
Castlereagh 275 kV Redevelopment	Uprate/ Modify	0		✓					✓		✓	1	1.13	33.33	34.46	1.13	33.33	34.46	+9.86	2034-2038

Table B.5: ctd.

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period			CAPEX Change (£m)	ECD
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)		
Drumnakelly - Tamnamore 110 kV Uprate	Uprate/ Modify	22		✓	✓		✓	✓				2	0.85	23.47	24.32	0.76	23.47	24.23	+1.82	2031
Drumnakelly - Tandragee Uprate (NEW)	Uprate/ Modify	5		✓	✓			✓				C	0.86	8.60	9.46	0.86	8.60	9.46	n/a	TBC
Energising Belfast	Refurbish/ Replace/ New Build	25		✓			✓				✓	2	3.0	82.17	85.17	0.65	78.83	79.48	+39.67	2032
Kells 110/33 kV Cluster	New Build	0	✓		✓			✓	✓			NIE N	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2026
Kells Cluster second 110/33 kV transformer (NEW)	New Build	0	✓		✓				✓			1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2029
Kells 275 kV Redevelopment	Uprate/ Modify	0		✓					✓		✓	1	0.98	51.06	52.04	0.98	51.06	52.04	+27.44	2034-2038
Kilroot Transmission Substation (NEW)	New build	0		✓	✓			✓				C	1.8	116.07	117.87	1.8	87.05	88.85	n/a	TBC
Larne Transformer Replacement	Uprate/ Modify	0			✓			✓	✓			NIE N	0	4.73	4.73	0	4.73	4.73	+1.73	2026
Lisburn Upgrade	New Build	3*	✓	✓				✓	✓			1	20.69	100.46	121.15	20.59	0	20.59	n/a	TBC

Table B.5: ctd.

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period			CAPEX Change (£m)	ECD
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)		
Magherafelt 275 kV Redevelopment	Uprate/ Modify	0		✓					✓		✓	1	1.14	24.28	25.42	1.14	24.28	25.42	+0.82	2034-2038
Moyle Interconnector Capacity Increase	New Build	1		✓	✓	✓	✓	✓		✓		2	0.68	9.01	9.69	0.64	9.01	9.65	+0.19	2030
North South 400 kV Interconnection Development (TYNDP/ 81)	New Build	137 (34)[59]		✓	✓	✓	✓	✓		✓		NIE N	22.09	217.0	239.09[60]	6.0	214.0	220.0	+119.89	2031
Newry Reinforcement	New Build	TBD		✓				✓				1	10.29	51.48	61.77	10.29	0	10.29	+32.47	2038
Shunt Reactors - Castlereagh, Tandragee and Tamnamore	New Build	0		✓				✓				NIE N	0	6.80	6.80	0	3.40	3.40	+0.50	2031
Tamnamore Land Purchase (NEW)	New Build	0		✓				✓	✓			2	0.29	1.5	1.79	0.29	1.5	1.79	n/a	2027
Tandragee 110 kV Switchgear replacement	Uprate/ Modify	0		✓				✓				NIE N	0	2.96	2.96	0	2.22	2.22	+0.26	2029

[59] The total length is 137 km: 103 km in Ireland and 34 km in Northern Ireland

[60] Included in this amount are the costs associated with obtaining planning consent plus the cost of developing the new substation at Turleenan and the cost of looping the existing 275 kV double circuit overhead line into that new substation. The cost increase since 2019 is due to inflation. Final costs may change following NIE Networks procurement

Table B.5: ctd.

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period				
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI TSO (£m)	TDPNI TO (£m)	TDPNI Total (£m)	CAPEX Change (£m)	ECD
Tandragee 275 kV Redevelopment	Uprate/ Modify	0		✓					✓		✓	1	1.13	42.57	43.70	1.11	38.39	38.50	+18.4	2034-2038

Projects in both planning areas

There is one project in both planning areas; this project is listed in table B.6.

Table B.6: Planned projects in both planning areas (1 project)

Project			Drivers				Needs						Total Project cost			Project cost in TDPNI period				
Project title	Type	km	New Connection	Security of Supply	RES Integration	Market Integration	Inter-regional power flows	Local Constraints	Connection	Inter-connection	Asset Condition	Stage (part)	Total TSO (£m)	Total TO (£m)	Total (£m)	TPDNI (£m)	TDPNI (£m)	TDPNI Total (£m)	CAPEX change	ECD
CVT Upgrade for Harmonic Measurement	Uprate/ Modify	0		✓			✓	✓				NIE N	0	0.8	0.8	0	0.32	0.32	+0.1	2026

Appendix C: Northern Ireland projects in European plans

How are Northern Ireland transmission projects included in ENTSO-E's TYNDP?

Licensed TSOs, who are members of ENTSO-E, and third-party promoters propose transmission projects to ENTSO-E for inclusion in ENTSO-E's TYNDP. If these projects match the project of pan-European significance criteria below, they are included in the TYNDP.

Criteria for Inclusion in TYNDP

A project of pan-European significance is a set of Extra High Voltage assets, matching the following criteria:

- The main equipment is at least 220 kV if it is an AC overhead line or at least 150 kV otherwise and is, at least partially, located in one of the 34 countries represented within ENTSO-E;
- The project increases the grid transfer capability across a network boundary within the ENTSO-E interconnected network[61] or at its borders[62];
- The grid transfer capability increase (expressed in MW) meets at least one of the following minimums:
    - At least 500 MW of additional Net Transfer Capacity; or
    - Connecting or securing output of at least 1 GW/ 1000 km² of generation; or
    - Securing load growth for at least 10 years for an area representing consumption greater than 3 TWh/ year.

SONI Projects in TYNDP 2024 and RegIP NS

Table C.1 lists the Northern Ireland projects we proposed, that are in ENTSO-E's final versions of TYNDP 2024 and RegIP NS. These were issued in 2024.

Table C.1: Our projects in ENTSO-E TYNDP 2024

TYNDP Project number	Project title
81	North South Interconnector

[61] For example, additional Net Transfer Capacity between two market areas.
[62] That is, increasing the import and/or export capability of ENTSO-E countries in relation to others.

Northern Ireland Projects of Common Interest (PCIs)[63]

The European Commission (EC) oversees the designation of Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI). The PCI and PMI selection is a process separate from the TYNDP process. However, to be eligible for PCI or PMI status, inclusion in the last available TYNDP is an explicit condition. There are no Northern Ireland PCIs or PMIs on the first Union list of PCIs and PMIs. The list was published by the European Commission in November 2023 and is available here[64].

Previously the North South 400 kV Interconnection Development project was designated as a PCI. This was removed in the 5th and first Union lists but has been submitted for inclusion in the TYNDP 2026 and is under review to qualify for Project of Mutual Interest (PMI) status.

How are Northern Ireland and European Plans related?

It is worth highlighting how the TDPNI and the European plans and designations are related. Figure C.1 below illustrates the relationship. All our capital projects, irrespective of size, are described in the TDPNI.

Only high voltage projects that involve a large increase in transmission capacity are included in European plans. Of those only a small number of large cross border projects which increase the import and/ or export capability of ENTSO-E countries are designated Projects of Common Interest.

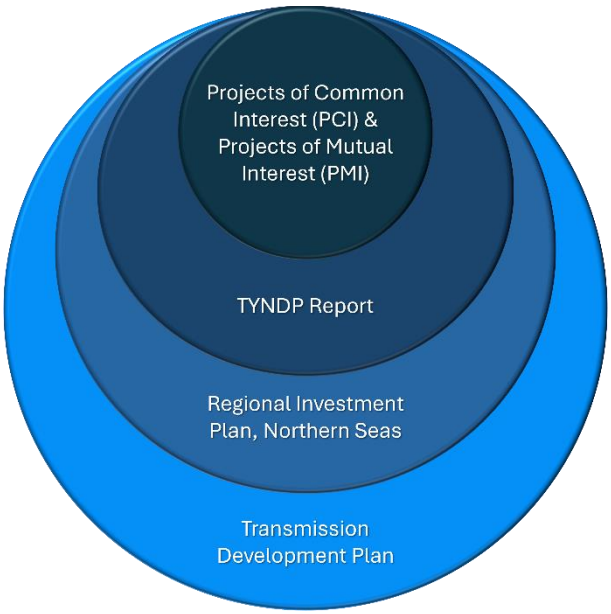

Figure C.1: Relationship between Northern Irish and European Plans

[63] EUR-Lex - C(2023)7930 - EN - EUR-Lex

[64] Annex on the first Union list of Projects of Common and Mutual Interest - European Commission

Appendix D: References

SONI Published Documents

i. All-Island Resource Adequacy Assessment 2025–2034, March 2025
ii. All-Island Ten Year Transmission Forecast Statement 2024, July 2025
iii. Becoming a Customer, July 2021
iv. Powering The Future: SONI's Grid Development Process, August 2021
v. Q2 2024 Associated Transmission Reinforcement (ATR) Status Update, June 2024
vi. Shaping Our Electricity Future Roadmap 2023, July 2023
vii. SONI's Strategy, September 2024
viii. Ten-Year Generation Capacity Statement 2023-2032, January 2024
ix. Tomorrows Energy Scenarios 2020 System Needs Assessment - Northern Ireland, June 2021
x. Tomorrows Energy Scenarios 2023 - Northern Ireland, May 2024
xi. Transmission Development Plan Northern Ireland 2023-2032, January 2025
xii. Transmission Interface Arrangements, November 2021
xiii. TSSPS 2023, June 2023

ENTSO-E Published Documents

i. ENTSO-E's Regional Investment Plans, June 2025
ii. TYNDP 2024, Scenarios Report, January 2025

Utility Regulator Published Documents

i. NIE Networks RP7 Annex Q - Planned Network Investment Volumes and Allowances, October 2024
ii. NIE Networks Transmission Licence, May 2023
iii. SONI's TSO Licence, July 2025

Government Published Documents

i. Energy Strategy for Northern Ireland, The Path to Net Zero Energy, December 2021
ii. The UK Climate Change Strategy 2021–2024: 2030 Strategic Framework for International Climate and Nature Action, March 2023

Other Published Documents

i. Grant Thornton: "Powering Northern Ireland A report exploring SONI's role in the economy", October 2016
ii. Draft Transmission Development Plan 2023-2032, April 2023
iii. Transmission development plan 2024, July 1905
iv. RP7 NIE Networks Business Plan, March 2023

v. Statement of Charges for Connection to NIE Networks' Distribution System, January 2021

Local Legislation

i. 2003 Energy Order, February 2003
ii. Climate Change Act (Northern Ireland) 2022, June 2022
iii. Overhead lines (Exemption) regulations (Northern Ireland) 1992 S.I, March 1992
iv. The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019
v. The Construction (Design and Management) Regulations (NI) 2016, March 2016
vi. The Electricity Order (Northern Ireland) 1992, February 1992
vii. The Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012, October 2012
viii. The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017, May 2017

European Legislation

i. Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, December 2018
ii. Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, June 2019
iii. Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, October 2012
iv. EU 2030 Climate Targets, September 2020
v. Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, June 2019
vi. Withdrawal Agreement between the UK and EU, February 2019