

Environmental Appraisal Report

Transmission Development Plan Northern Ireland 2020-2029

September 2020





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1.0 Introduction

SONI, as Transmission System Operator (TSO), plays an important role in the economy of Northern Ireland. Through the provision of a secure electricity supply, SONI is responsible for ensuring that the lights stay on for homes and businesses across the region. Sustaining a reliable supply of electricity is not just important for existing consumers, it is also crucial to attracting investment. In order to ensure continued secure, reliable, economic and sustainable electricity supply SONI must continue to plan investment in the Northern Ireland transmission network.

The Transmission Development Plan Northern Ireland (TDPNI) 2020-2029 is the plan for the development of the Northern Ireland transmission network and interconnection over the ten years from 2020. This ten-year plan presents projects that are expected to be needed for the operation of the transmission network. In addition, future needs that may drive future potential projects are also discussed. The TDPNI is an annual rolling plan, updated each year to reflect the continuously changing nature of electricity requirements.

The TDPNI 2018-2027 was subject to SEA (Directive 2001/42/EC of the European Parliament and of the Council of Ministers, of 27 June 2001, on the Assessment of the Effects of Certain Plans and Programmes on the Environment) and Appropriate Assessment under the provisions of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC).

This Environmental Appraisal Report (EAR) has been prepared to ensure that the TDPNI 2020-2029 is in accordance with the provisions of the adopted TDPNI 2018-2027 and associated Strategic Environmental Assessment (SEA). The Grid Implementation Plan (IP) details the policies and objectives that drive a sustainable approach to Grid development and together with Strategic Environmental Objectives, and mitigation measures developed through SEA, ensure significant environmental impacts are avoided wherever possible.

A commitment of the SEA process is to conduct an environmental appraisal of each TDPNI. Each annual TDPNI subsequent to the 2018 Plan will contain an Environmental Appraisal to monitor the impacts of the TDPNI, in line with the adopted environmental monitoring from the SEA. The appraisal identifies any updates to the programme of projects as set out in the TDPNI 2018-2027 and examines these projects against the Strategic Environmental Objectives adopted in the TDPNI 2018-2027. The TDPNI does not set out a framework for project consent. It sets out the network investments needs and the projects that have been identified as required to meet the needs of the Northern Irish transmission system with the approval of the Utilities Regulator (UR). Individual projects will be subject to environmental assessment, including screening for Appropriate Assessment (AA) under the relevant planning requirements.

As the timeframes for all the potential developments in the TDPNI are currently not defined the EAR will assess these options for potential impacts in the short term - construction phase, the medium term – re-

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establishment and initial operational phase (0-5 years post construction) and the long term – operational phase (5 years onwards). There is no discussion provided on the decommissioning of any of the proposed developments, unless this is specifically part of the proposal. For note, for new lines and substations it would be assumed that any decommissioning of infrastructure, in line with all best practices and competent working, would have similar impacts to the short term construction phase impacts assessed in this report, and would look to provide no long term or permanent residual impact on a site.

This report has been prepared in accordance with Article 22 of European Directive 72/2009 and Condition 40 of the SONI TSO Licence.

2.0 Framework for Grid Development

A key 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. It must also include significant emphasis and focus on the environmental impact of the project, primarily in reference to the EU Habitats Directive, but also in terms of social impact.

SONI has been proactive in developing clear structured processes for the planning and development of electricity transmission infrastructure. This includes the technical development of projects in collaboration with matters of planning, environment, public affairs, administrative, financial and corporate governance.

The SONI Programme Delivery Unit has overall oversight of project development. It includes experienced experts in the areas of ecology, public planning, wayleaving and landowner engagement. These experts are assigned to all SONI projects, to advise and assist project managers and their project teams with ensuring a consistent approach to the sustainable planning and development of all projects.

The planning of grid development projects by SONI is done under a three part process (Figure 3.1). Asset replacement projects are progressed separately by NIE Networks. The process includes for stakeholder and public participation in the development of projects.



Figure 2.1: SONI's Grid Development Process

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

When a potential breach of the standards is identified, SONI will study the potential breach in detail including any other related issues. Consistent with good practice, as set out in the TSSPS, SONI may seek ways that

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would allow the potential breach to be managed operationally and put into place any changes to operational practice as may be required. However, in certain cases where that operational mitigation would lead to unacceptable cost or risk for customers, SONI will prepare plans to develop the transmission system.

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

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

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

Depending on the nature of the project, SONI will seek to engage with key stakeholders before progressing the recommendation further. SONI will consider the stakeholder engagement findings and amend any plans accordingly before progressing further. It will also publicise the results of the stakeholder engagement process and its decision.

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

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

SONI manages the pre-construction outline design of transmission projects once the need has been identified (part 1). This also includes consultation with the TAO, NIE Networks. The projects can involve the development of new substations, overhead lines or cable circuits operating at 110 kV and above.

SONI is responsible for preparing documentation required to apply for planning consent for the development of the projects - this entails developing the design to the level required for obtaining planning consent

including any necessary environmental reports or assessments, and consultations with stakeholders and landowners to obtain the right to gain access and install transmission equipment on their lands.

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

SONI submits planning applications with the relevant planning authority. SONI is also responsible for submitting any other consent applications that may be required, e.g. Marine License with the relevant consenting authority. The planning authority will make a legally binding decision on the project. It may grant full planning permission, grant permission on the basis that we make changes, or refuse permission. SONI is also responsible for the acquisition of any wayleaves, easements, access rights, land options, leases and any other legal rights required for the installation of the new infrastructure.

Following receipt of planning and landowner consents the project is handed over to NIE Networks for detail design. This includes a review of the SONI functional specification (outline design and consents) and preparation of a design specification. Separate preconstruction work for NIE Networks will include tendering and procurement. Following receipt and review of the design specification from NIE Networks, SONI issues a Transmission Project Instruction and enters into a Project Agreement with NIE Networks. NIE Networks then deliver the project.

3.0 Policies and Objectives

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

The planning and environmental considerations are embedded into the Framework for Grid Development and every grid development project that SONI undertakes in order 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 managed in the course of project development.

3.1 Environmental 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. All of the environmental policies and objectives detailed below have been assessed against Strategic Environmental Objectives.

Topic	Policy		Objective
General	ENVP1	To promote best environmental practice in the design and appraisal of transmission development projects.	
Biodiversity	ENVP2	To exercise its functions as a TSO in line with the Wildlife and Natural Environment Act (Northern Ireland) 2011 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.	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.
	ENVP3	To avoid adverse effects on sites designated for nature conservation including, Special Conservation Areas, Special Protection Areas, 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	
Climate Change	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.		
Noise	ENVP6	To employ methods on transmission infrastructure which minimise noise emissions in line with best industry practice.	ENVO2	To give careful consideration to the siting of transmission infrastructure so as to ensure that noise-sensitive receptors are protected from potential noise emissions.
			ENVO3	To seek to preserve and maintain noise quality in accordance with good practice and relevant legislation.
Landscape	ENVP7	To have regard to the Northern Ireland Landscape Character Assessment 2000, and the Northern Ireland Seascape Character Assessment in the design and appraisal of its transmission development projects.	ENVO4	To protect landscapes through the sustainable planning and design of transmission infrastructure and to have regard to important landscape designations including AONBs and the World Heritage Site.
Cultural	ENVP8	To take reasonable measures to ensure that the special interest of protected 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 when planning transmission infrastructure, by avoidance or by best practice mitigation measures.		
Water	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.	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.
	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.		
Air Quality	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.		
Tourism	ENVP15	To consider the potential impact upon tourism in the planning of transmission projects.	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.

3.2 Strategic Environmental Objectives

The SEA of the TDPNI 2018-2028 set out nine Strategic Environmental Objectives (SEOs). SEOs are methodological measures against which the potential environmental effects of the TDPNI can be examined. The SEOs are set out under a range of environmental topics below. The SEOs guide sustainable grid development and are used as standards against which the provisions of the TDPNI can be evaluated. This is in order to help identify areas in which potential significant impacts may occur. The new projects as set out in the TDPNI 2019-2028 are evaluated against these SEOs. These SEOs will be used as part of a Monitoring Framework for the wider TDPNI 2020-2029 with targets, indicators data sources specified through the SEA process.

Table 3.2: Strategic Environmental Objectives as set out in the SEA of the TDPNI 2018-2029				
Topic	Objective	Sub-Objective		
Biodiversity, Flora & Fauna	1	Avoid damage to, and where possible enhance, biodiversity, flora and fauna.	A	Preserve, protect, maintain and where possible enhance internationally protected species and their key habitats.
			B	Preserve, protect, maintain and where possible enhance national and local nature conservation sites and protected species, or other know species of conservation concern.
Population & Human Health	2	Minimise the risk to and provide benefit for the community and human health.	A	Minimise disruption and displacement to the local population, while providing robust transmission infrastructure.
			B	Minimise risks to human health and social deprivation, while providing robust transmission infrastructure.
Soils, Geology and Landuse	3	Minimise damage to the function and quality of the soil resource in the study area in construction and operation of transmission infrastructure.	A	Minimise damage to the function and quality of the soil resource in the study area in construction and operation of transmission infrastructure.
Water	4	Avoid impacts and interaction with water quality, quantity and resource.	A	Avoid damage to or deterioration of water status, quality and resource.
			B	Avoid interactions with coastal, pluvial or fluvial flood extents.
Air	5	Minimise risk to local air quality and contribute to improving regional emissions	A	Minimise risk to local air quality and contribute to improving regional emissions
Climatic Factors	6	Adaption of infrastructure to potential climatic change and reduced GHG emissions	A	Adaption of infrastructure to potential climatic change and reduced GHG emissions
Material Assets & Infrastructure	7	Provide new, robust electrical transmission infrastructure with minimal disruption to other assets and infrastructure.	A	Provide new, robust electrical transmission infrastructure with minimal disruption to other assets and infrastructure.
Cultural, Architectural & Archaeological Heritage	8	Protect the historic environment and cultural heritage.	A	Protect the historic environment and cultural heritage.
Landscape & Visual	9	Minimise the potential for negative impacts on landscape and visual amenity.	A	Minimise the potential for negative impacts on landscape and visual amenity.

4.0 Update on Projects in TDPNI 2018-2027

To ensure adequate security of electricity supply, further market integration, and the integration of renewable energy sources, it is necessary to provide ongoing and timely reinforcement of the Northern Ireland electricity transmission system. These reinforcement needs can be divided into the following categories:

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

The TDPNI 2019-2028 included no. 81 projects. This list has been updated for TDPNI 2020-2029 with no. 79 projects now in progress. This is a decrease of no. 2 projects in total. There are no. 42 projects which are NIE Networks asset replacement projects and 37 are network development projects. There is no. 1 project which is new to the TDPNI 2020-2029 and therefore was not considered in the environmental appraisal carried out for TDPNI 2018-2028 or as part of the SEA process. Changes to SONI network development projects are listed in Tables 4.1 below.

No.	Project Title	Status	Type	Region
1	Coolkeeragh – Killymallaght 110 kV Uprate	Combined	Uprate/Modify (Line)	N-W
2	Killymallaght – Strabane 110 kV Uprate			
3	Limavady Transformer Replacement	New Project	Uprate/ Modify (Station)	N-W
4	Belfast City 110 kV Redevelopment Project	Scope Change	Uprate/Modify (Line)	S-E
5	Belfast Power Station Connection	Cancelled	New Build (Line)	S-E
6	Castlereagh 275 kV New no. 4 Inter-Bus Transformer (See No. 4 above)	Combined	Uprate/Modify (Line)	S-E
7	Augmentation of Capacity at Transmission/Distribution Interface	Cancelled	Uprate/Modify (Station)	Both

See Table 1-1 TDPNI 2020-2029 for full details

Table 4.2 summarises the no. 79 (active) projects into their respective categories as detailed in TDPNI 2020-2029. These projects are categorised as either “New Build”, “Uprate/Modify” or “Refurbish/Replace” projects¹. Over 72% of projects relate to existing assets i.e. Uprate/Modify or Refurbish/Replace projects.

¹ **New Build projects:** Projects that involve the construction of new stations or new circuits. This category also includes projects that involve the installation of new equipment in existing stations. An example of a new build project is the installation of new transformers or new reactive support devices within existing stations.

Uprate/ Modify projects: Projects that involve the uprating of existing assets. An example of an uprate project is changing equipment to increase the capacity rating of circuits or busbars. This can include changing the overhead line (conductor) with a more efficient and higher ‘rated’ conductor. This category also includes projects that involve the modification of existing assets. An example of a

Table 4.2: Summary of Active Projects by Category TDPNI 2020-2029	
Project Category	No. of Projects
New Build	16
Uprate/Modify	20
Refurbish/Replace	40
Other	3
Total	79

Table 4.3 outlines where the projects sit in the context of the Framework for Grid Development, which is described in Section 2.0.

Table 4.3: No of Projects in Each Stage					
Part 1 Planning	Part 2 Outline Design	Part 3 Consents	Asset Replacement	Under Construction	TOTAL
25	1	9	42	2	79

Power flows on the transmission network are not contained within specific localities. Therefore, from a transmission planning viewpoint, it is more appropriate to represent planning areas that best reflect the conditions and power flows on the transmission network. The regions and planning areas that best reflect the conditions and power flows on the transmission network are illustrated in Figure 4.1 below.

modification project is the installation of new couplers or new bays in existing stations. Reconfiguration of existing stations is also included in this category.

Refurbish/ Replace projects: Projects that involve the maintenance of existing stations or existing 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.

Other: Other: are projects that do not fall naturally into any of the three categories above.

Planned Network Developments in Parts 1, 2 and 3

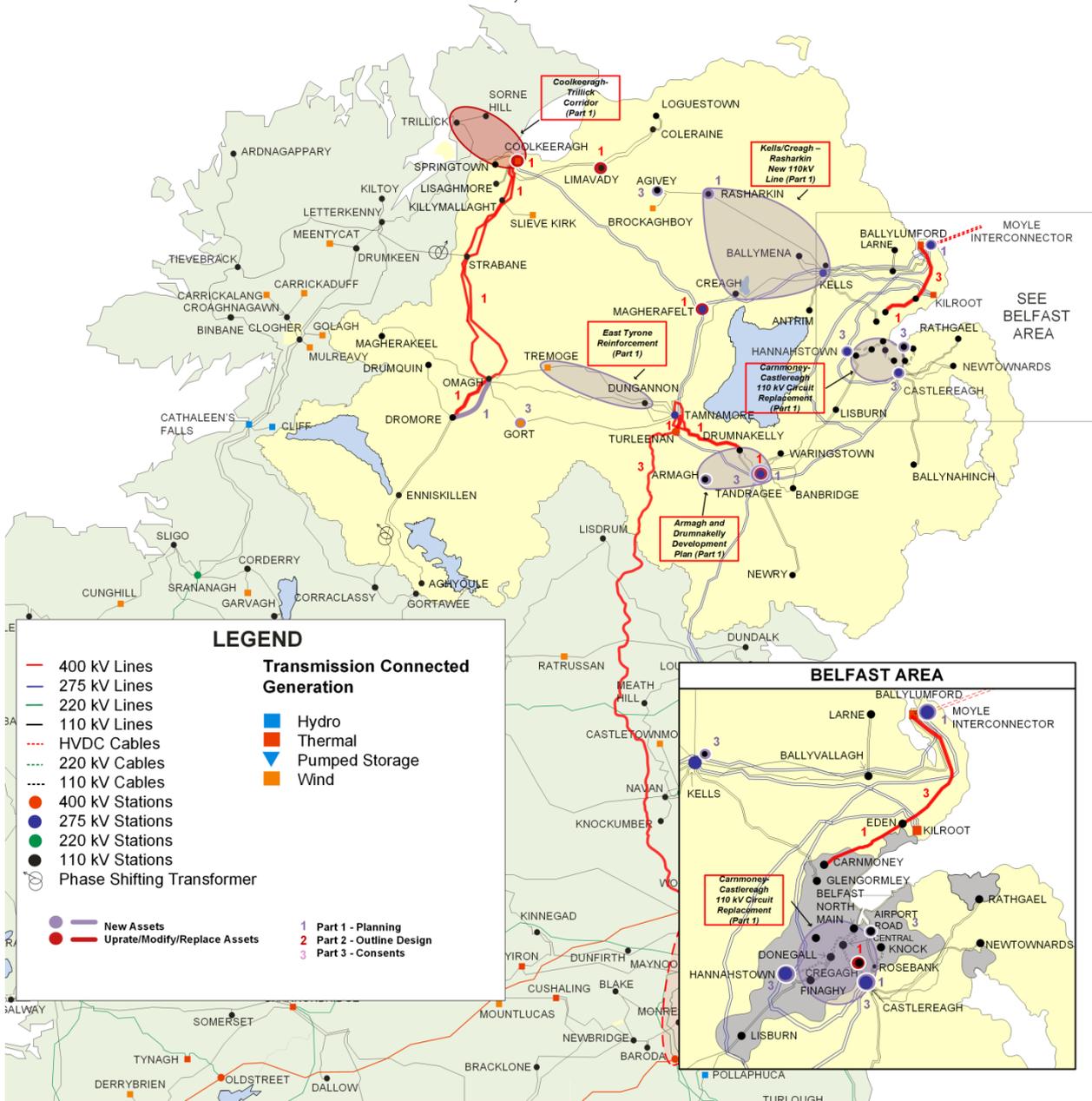


Figure 4.1 Illustration of the Northern Ireland planning areas

5.0 Evaluation of New Projects

5.1 New Projects

The TDPNI 2020-2029 has defined a list of the potential new projects that could be developed within the Plan period up to 2029. A number of these potential projects are screened out of requiring evaluation as the works are of such a scale as not to be considered significant and / or are localised to within existing electrical transmission sites / substations. Many of these proposals that have been screened in may require future environmental studies at the project level, such as Environmental Impact Assessment under the Environmental Impact Assessment (EIA) Directive 85/337/EEC as transposed by the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 and recent amendment The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017.

5.1.1 Limavady Transformer Replacement

The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the vicinity of Limavady Main there is a need to replace the exist 2 x 45 MVA transformers with 2 90 MVA units. Completion date: 2023.

5.2 Combined, Changed and Cancelled Projects

Several projects have had their status or scope changed since the previous TDP. These changes are of a clerical or contractual nature such as combination of up to two projects into a singular project for the purposes of governance and oversight,

5.2.1 Coolkeeragh – Killymallaght - Strabane 110 kV Uprate

Both Coolkeeragh – Killymallaght 110 kV Uprate and Killymallaght – Strabane 110 kV Uprate has been combined into the Coolkeeragh – Killymallaght - Strabane 110 kV Uprate. The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110 kV circuit between Coolkeeragh and Killymallaght and Killymallaght and Strabane. Completion date: 2027.

5.2.2 Belfast City 110 kV Redevelopment Project'

Formerly 'Carnmoney – Castereagh 110 kV Circuit Uprate/Reconfiguration'. The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. The preliminary preferred option is to install a 4th interbus transformer at Castlereagh and establish a 110 kV

cable connection between Hannahstown and Castlereagh substations through Belfast city centre. This will enable removal of the existing 110 kV double circuit between Carnmoney and Castlereagh. This option is pending approval by the Utility Regulator and will be subject to full stakeholder engagement. We anticipate that this will be a phased project and that elements will be completed before the final completion date of Winter 2028.

5.2.3 Belfast Power Station Connection

This project is now cancelled as the connection offer has expired.

5.2.4 Castlereagh 275 kV New no. 4 Inter-Bus Transformer

Now part of 'Carnmoney – Castlereagh 110 kV Circuit Replacement' project as set out in Section.5.2.2.

5.2.4 Augmentation of Capacity at Transmission/Distribution Interface

This project is now cancelled as the needs are anticipated to be met by Limavady Transformer Replacement, Gort 110/33 kV 2nd Transformer, Rasharkin Cluster 110/33 kV 2nd Transformer, East Tyrone Reinforcement Project, NW of NI 110 kV Reinforcement.

5.3 Evaluation of New Projects against SEOs

As detailed in Tables 42 there are three types of new reinforcement projects in the TDPNI 2020-2029 – new builds, refurbishment/replacement projects and uprate/modifications projects. The integration of renewable energy sources is a key driver in new projects. This will be achieved through new build, uprate/modification and refurbishment projects. This key driver is in accordance with SEO7 and is likely to continue improve this SEO in the longer term. By making improvements to the existing transmission system through uprates/modifications and refurbishment/replacements, potential impacts to the receiving environment can be minimised. The utilisation of existing assets would have a neutral impact on SEOs related to landscape (SEO9), ecological connectivity (SEO1), population centres (SEO2) and sustainable land use (SEO 3). Potential issues can arise where (existing) transmission infrastructure assets are located in sensitive areas such as sites designated for nature conservation (SEO1A), areas of significance for cultural heritage (SEO8) and or sensitive water catchments (SEO4). In general, these issues can be identified early in the project planning process and mitigation measures developed to ensure that no significant effects arise. A detailed evaluation of each projects is contained in Appendix A.

The impact of any new build project is a function of the project type and the sensitivities of the environment in which it is to be developed. There is the potential for impacts on a range of environmental factors. However, with proper planning and robust environmental assessment, significant effects (and conflicts with SEOs) can

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be mitigated in the vast majority of cases. Certain new build projects have the potential to conflict with the SEO related to landscape. The application of mitigation through avoidance (of sensitive landscape areas), sensitive routing and screening may not be sufficient in all instances to remove significant effects on localised landscapes.

A high-level review of the new projects listed on the TDPNI 2020-2029 indicates that there is unlikely to be any potential for significant residual impacts post mitigation for any of the new build projects. Table 5.2 summarises the evaluation of SEOs against the three different types of reinforcement projects. Mitigation measures as detailed in the SEA Environmental Report and Natura Impact Statement, which remain relevant for this environmental appraisal of the TDPNI are presented in Appendix B.

Table 5.1 Summary evaluation of planned network developments (new to TDPNI 2020-2029)																														
Project Type	No. of Projects	SEO1A	SEO1B	SEO2A	SEO2B	SEO3A	SEO3B	SEO4	SEO5	SEO4	SEO5	SEO6	SEO7	SEO8	SEO9															
New Build (Line)	0																													
New Build (Station)	0																													
Uprate/Modify (Line)	2	*	*	*	*	*	*	*	*	*	*	+	*	*	*															
Uprate/Modify (Station)	1	*	*	*	*	*	*	*	*	*	*	+	*	*	*															
Refurbish/Replace (Line)	0																													
Refurbish/Replace (Station)	0																													
<i>Discussion</i>																														
<p>Where a modification, uprate, redevelopment or refurbishment is taking place within a station there is minimal work required and this work will typically be undertaken within the footprint of an existing station. Where a refurbishment or line uprate is taking place, there will be minimal change operationally but there is potential for some small-scale construction works. Therefore, there could be construction related impacts including but not be limited to the following:</p> <ul style="list-style-type: none"> - habitat removal or disturbance to species for access requirements; - disturbance to local residents from construction works i.e. noise or dust emissions; and - Potential pollution of nearby watercourse. - Depending on the receiving environment, there may be potential for impacts on designated sites, therefore screening for the need for Appropriate Assessment is undertaken for all refurbishment and uprate projects <p>These refurbishment projects will be subject to the inherent mitigation and in particular the construction best practice. The adherence to this construction best practice will facilitate the avoidance and reduction of significant effects. Therefore, the likely effects associated with the construction works from these refurbishments projects are not likely to be significant however, on a precautionary basis the magnitude of impacts have been determined to be unknown for three of the SEOs. There are no LSEs anticipated for the remaining SEOs. All new build projects will be subject to environmental assessment as part of the relevant planning process for these projects. Refurbishment/replacement and uprate/modification projects are generally considered to be permitted development under relevant sections of the Planning Act. Where there is potential for significant effects on a European Site, this permitted development status is lost and planning permission must be sought.</p>																														
<table border="1"> <thead> <tr> <th>Description of Effect</th> <th>Effect</th> </tr> </thead> <tbody> <tr> <td>Likely to have a positive effect</td> <td>+</td> </tr> <tr> <td>Likely to have a negative effect</td> <td>-</td> </tr> <tr> <td>Effects are uncertain/there is insufficient information on which to determine effect</td> <td>?</td> </tr> <tr> <td>Likely to have a neutral effect</td> <td>*</td> </tr> <tr> <td>Likely to have a mixed positive & negative effect</td> <td>+/-</td> </tr> <tr> <td>Likely to have a mixed negative & positive effect</td> <td>-/+</td> </tr> <tr> <td>Not Applicable</td> <td></td> </tr> </tbody> </table>															Description of Effect	Effect	Likely to have a positive effect	+	Likely to have a negative effect	-	Effects are uncertain/there is insufficient information on which to determine effect	?	Likely to have a neutral effect	*	Likely to have a mixed positive & negative effect	+/-	Likely to have a mixed negative & positive effect	-/+	Not Applicable	
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Likely to have a mixed positive & negative effect	+/-																													
Likely to have a mixed negative & positive effect	-/+																													
Not Applicable																														

5.4 Mitigation

Mitigation measures have been recommended where potential negative impacts have been identified. These mitigation measures aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to implementation of the projects within the TDPNI. The mitigation measures that have arisen in the TDPNI and SEA processes have been included Appendix B and should also be referred to.

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of detailed planning and design, when the specifics of the development infrastructure options can be optimised through detailed feasibility studies and design in order to limit the potential impacts on sensitive receptors. Further environmental studies based on the more detailed designs and construction methodologies should be undertaken as appropriate. These studies may involve, but are not limited to, marine, aquatic and terrestrial ecology surveys, ornithological and bat surveys, fish surveys, landscape and visual assessments, WFD assessments, geotechnical investigations and heritage surveys.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, including timing of works, information on the specific mitigation measures to be employed for each works area, and mechanisms for ensuring compliance with environmental legislation and statutory consents. The timing of construction and maintenance works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects, yet look to optimise any potential positive cumulative impacts or inter-relationships.

Contractors should be required to prepare Construction Environmental Management Plans (CEMPs), which would include a requirement for related plans to be prepared, as appropriate, for project implementation, such as Erosion and Sediment Control, Invasive Species Management, Emergency Response, Traffic and Safety Management, Dust and Noise Minimisation, and Stakeholder Communication Plans.

Works should only be carried out once the method statements have been consulted on with competent authorities, such as the NIEA. At the project level it will not be sufficient to defer the production of construction method statements. These should be completed in the detailed design stage and may be subject to further Appropriate Assessment where potential impacts have been identified. Where there may be unavoidable impacts on protected habitats and/or species the necessary derogation licences should be applied for prior to seeking planning permission or approval for a scheme.

Marine construction and in stream works have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic and marine protected species. No marine or instream works should occur during restricted periods for relevant species and consultation should be undertaken with the appropriate authorities in this regard. Monitoring of project-level mitigation measures should be undertaken during and after works, to ensure effectiveness. All works and planning of works should be undertaken with

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regard to all relevant legislation, licensing and consent requirements, and recommended best practice guidelines. An ecological clerk of works should be appointed for environmental management of each infrastructure development, and where specific sensitive species may be impacted, an appropriate expert should also be appointed. To ensure mitigation effectiveness, monitoring should be undertaken by the Contractor's technical experts. Monitoring will be required as a minimum when identified in planning documentation. Monitoring may be additionally prudent, in case where novel materials or methods are employed. The results of monitoring should inform adaptive management, where required (i.e. altered mitigation methods). Monitoring reports should be provided to SONI, NIE and the relevant statutory agencies

6.0 Conclusion

The TDPNI 2020-2029 has been examined in terms of the provisions of the SEA of the TDPNI 2018-2027. There is no. 1 new projects are detailed in TDPNI 2020-2029 since the adoption of TDPNI 2018-2027 and TDPNI 2019-2028. Therefore, to ensure consistency with the provisions of the most recent SEA, the no. 1 new project and other combined, changed and cancelled projects, have been examined against the strategic environmental objectives as detailed in the Environmental Report (2018).

These projects consist of refurbishment/replacement projects and uprates/modification projects of existing assets. These categories of projects (as they relate to the project listed) have been assessed against the Strategic Environmental Objectives from the SEA and it has been determined that following the implementation of mitigation measures the SEOs will be achieved. The mitigation measures are included in Appendix B for information.

Environmental assessments, as part of Environmental Reports or Environmental Impact Assessments in respect of specific projects, will seek to minimise and where possible avoid significant effects on the natural environment and landscape.



Appendix A: Detailed Evaluation of Projects

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
Ballylumford 275 kV CVT Replacement	Asset Replacement	S-E	The Capacitor Voltage Transformers (CVTs) on a number of 275 kV circuits at Ballylumford are to be replaced due to the age and condition of the existing assets.	2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Ballylumford Switchgear Replacement	Asset Replacement	S-E	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 fault.	2020	X	O	O	O	Very localised impacts only within existing sites	N/A
Ballymena Transformer 3 and 4 Replacement	Asset Replacement	N&W	The 110/33kV transformers TX 3 and 4 at Ballymena Main are to be replaced due to the condition of the assets.	2020	X	O	O	O	Very localised impacts only within existing sites	N/A
Castlereagh and Tandragee Capacitor Bank Replacement	Asset Replacement	S-E	Capacitor cans at Castlereagh and Tandragee are due for replacement due to age, corrosion and di-electric failure.	2024	N/A	N/A	N/A	N/A	Very localised impacts only within existing sites	N/A
Castlereagh Inter-Bus Transformer 3 Replacement	Asset Replacement	S-E	The 275/110kV 240 MVA interbus transformer IBTx 1 at Castlereagh is to be replaced due to the age and condition of the existing transformer.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh - Magherafelt 275 kV Circuits Refurbishment	Asset Replacement	N&W	The need for this project arises from the condition and rating of the existing conductor on the double circuit tower line, originally installed in the 1960s. Under certain scenarios there is a risk of overloading the existing conductor. The rating of the replacement conductor will be increased to cater for increased generation and will be defined as part of the redesign of the circuit.	2022	X	I	I	I	Assessed in SEA	N/A
Donegall Main (North) Transformer Replacement	Asset Replacement	S-E	The 60 MVA transformer Tx B at Donegall North is to be replaced by a new 90 MVA unit. The need for this arises because of the condition of the asset. The rating of 90 MVA is the standard rating now procured for 110/33kV transformer applications.	2021	X	O	O	O	Very localised impacts only within existing sites	N/A
Enniskillen Main Transformer 1 and 2 Replacement	Asset Replacement	N&W	The 110/33kV transformers TX 1 and 1 at Enniskillen are to be replaced due to the condition of the assets.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Glengormley Main Transformer Tx B Replacement	Asset Replacement	S-E	The 110/33 kV transformer Tx B is to be replaced due to the age of the existing transformer.	2022	X	O	O	O	Very localised impacts only within existing sites	N/A
Hannahstown 110 kV Disconnectors Replacement	Asset Replacement	S-E	All of the 110 kV Current Transformers (CTs) at Hannahstown are to be replaced due to the age and condition of the existing transformers.	2020	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Hannahstown Inter-Bus Transformer 1 and 2 Replacement	Asset Replacement	S-E	The 275/110kV 240MVA interbus transformers IBTx 1 and 2 at Hannahstown are to be replaced due to the age and condition of the existing transformers.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Kells and Tandragee Shunt Reactor Replacement	Asset Replacement	S-E	The TR1 and TR2 reactors at Kells and Tandragee 275kV substations (respectively) are to be replaced by 2027 due to the age and condition of the existing assets.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Kilroot 275 kV CT Replacement	Asset Replacement	S-E	The Current Transformers (CTs) on the 275 kV circuits at Kilroot are to be replaced due to the condition of the existing assets.	2024	N/A	N/A	N/A	N/A	Very localised impacts only within existing sites	N/A
Limavady Main 110kV Refurbishment	Asset Replacement	N&W	The 110 kV mesh at Limavady Main is to be refurbished due to the condition and rating of the existing assets. Consideration will also be given to the installation of a GIS switchboard.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Strabane Main 110kV Refurbishment	Asset Replacement	N&W	The 110 kV mesh at Strabane Main is to be refurbished due to the condition of the existing assets. Consideration will also be given to the installation of a GIS switchboard.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Tandragee Transformer Replacement	Asset Replacement	S-E	One of the 275/110 kV transformers (yet to be determined) at Tandragee is to be replaced during RP6 due to the age and condition of the transformer.	2024	x	O	O	O	Very localised impacts only within existing sites	N/A
RP6 275 kV Tower Maintenance	Asset Replacement	Both	This project includes maintenance of 275 kV towers and condition assessment of towers and foundations.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes conductor replacement on some 110 kV spans, wood pole replacement, tower maintenance and tower and foundation condition assessments.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Cable Maintenance	Asset Replacement	Both	This project includes 110 kV cable refurbishment, cable flushing and maintenance of ancillaries.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 110 kV substations.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
RP6 275 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 275 kV substations.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
RP6 22 kV Transmission Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection relating to 22 kV connected reactors at 275/110 kV stations.	2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Miscellaneous RP6 Works	Asset Replacement	Both	This includes a number of small, within-station works including asbestos removal, concrete refurbishment, transformer bunding, station electrical systems, civil works, painting,	2024	X	O	O	O	Very localised impacts only within existing sites	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
			earthing transformer replacement, transformer cooler replacement, security upgrades, health and safety upgrades, and provision of spares.							
Banbridge Main Transformer 1, 2, 3 and 4 Replacement	Asset Replacement	S-E	The 110/33kV transformers Tx 1-4 at Banbridge Main are to be replaced due to the age and condition of the existing transformers.	>2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Castlereagh 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Castlereagh are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh 275 kV Structures, Busbars and Disconnectors	Asset Replacement	N&W	The 275 kV structures, busbars and disconnectors at Coolkeeragh are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh 110 kV Disconnectors Replacement	Asset Replacement	N&W	The 110 kV disconnectors at Coolkeeragh are to be replaced due to the age and condition of the existing assets	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Hannahstown 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Hannahstown are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Kells and Hannahstown Shunt Reactor Replacement	Asset Replacement	S-E	One shunt reactor at each of Hannahstown and Kells is due to be replaced due to the condition and age of the existing assets.	>2024	N/A	N/A	N/A	N/A	Very localised impacts only within existing sites	N/A
Kells 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Kells are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Kells Inter-bus Transformer Replacement	Asset Replacement	S-E	The 275/110 kV 240 MVA interbus transformers IBTx 1 and 2 at Kells are to be replaced due to the age and condition of the existing transformers.	2025	N/A	N/A	N/A	N/A	Very localised impacts only within existing sites	N/A
Magherafelt 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Magherafelt are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Rathgael 110 kV Structures and Disconnectors Replacement	Asset Replacement	S-E	The 110 kV structures and disconnectors at Rathgael are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Tandragee Inter-bus Transformer Replacement	Asset Replacement	S-E	One of the interbus transformers at Tandragee is to be replaced due to the age and condition of the existing transformers.	>2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Tandragee 275 kV Structures and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures and disconnectors at Hannahstown are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
RP7 275 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes maintenance of 275 kV towers and lines and condition assessment of towers and foundations.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
RP7 110 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes conductor replacement on some 110 kV spans, wood pole replacement, tower maintenance and tower and foundation condition assessments.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
RP7 110 kV Cable Maintenance	Asset Replacement	Both	This project includes 110 kV cable refurbishment, cable flushing and maintenance of ancillaries.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
RP7 110 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 110 kV substations.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
RP7 275 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 275 kV substations.	>2024	X	O	O	O	Very localised impacts only within existing sites	N/A
Miscellaneous RP7 Works	Asset Replacement	Both	This includes a number of small, within-station works including station electrical station upgrades, auxiliary transformer replacement, transformer cooler replacement, refurbishment of earthing systems, health and safety upgrades, transformer bunding, civil works, and provision of spares.	>2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Agivey 110/33 kV Cluster	Renewable Generation Substations and Connections	N&W	The driver of this project is RES integration. It is planned to establish a 110/33 kV cluster substation near Garvagh to allow connection of new wind generation. This will be connected to the existing 110kV Brockaghboy to Rasharkin overhead line.	2022	X	I	I	I	Assessed in SEA	N/A
Gort 110/33 kV 2nd Transformer	Renewable Generation Substations and Connections	N&W	The driver of this project is RES integration and security of supply. Slieve Divena wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Gort to allow the transfer of Slieve Divena wind farm to Gort.	2022	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Rasharkin Cluster 110/33 kV 2 nd Transformer	Renewable Integration Developments	S-E	The driver of this project is RES integration and security of supply. Gruig wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Rasharkin to allow the	2025	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
			transfer of Gruig wind farm to Rasharkin.							
Coolkeeragh Reactive Compensation	Renewable Integration Developments	N&W	The drivers of this project are security of supply and RES integration. The continued development of wind generation in the North and West of Northern Ireland has resulted in a need for voltage support. Reactive support will be installed at Coolkeeragh, connected to the 110 kV busbar.	2025	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh – Killymallaght – Strabane 110 kV Uprate	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110 kV circuit between Coolkeeragh and Strabane (including Killymallaght).	2027	x	I	I	I	Assessed in SEA	N/A
Coolkeeragh – Magherafelt 275 kV Switchgear	Renewable Integration Developments	N&W	The drivers of this project are RES integration and security of supply. During periods of high generation in the North West, there is a risk of overloading 110 kV circuits following tripping of the 275 kV line between Coolkeeragh and Magherafelt. This project involves installing single phase tripping and high speed auto-reclose circuit breakers on these circuits to minimise the impact of a fault, and to allow rapid reinstatement following a transient fault.	2024	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh – Trillick New 110 kV Line	Renewable Integration Developments	N&W	The drivers for this project are security of supply, RES integration and market integration. A need has been identified to strengthen the electricity network on both sides of the border in the north-west to assist in the integration of renewable power sources. This project will interact with the North West of NI Reinforcement (see below) and the scope of the solution required to be delivered through that project.	2027	X	I	I	I	Assessed in SEA	N/A
Creagh/Kells-Rasharkin New 110 kV Circuit	Renewable Integration Developments	N&W	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 construct a second 110 kV circuit between either Creagh or Kells and Rasharkin 110/33 kV cluster substation.	2026	X	I	I	I	Assessed in SEA	N/A
Limavady Transformer Replacement	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the vicinity of Limavady Main there is a need to replace the exist 2 x 45 MVA transformers with 2 x 90 MVA units.	2023	X	O	O	O	Very localised impacts only within existing sites	N/A
North West of NI Reinforcement 110 kV reinforcement	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the west there will be a need to construct a new circuit between the 275kV system and the 110kV system electrically close to Coolkeeragh. A long list of options shall be narrowed down to a short list. A combination of these may be required. The long list of main and supporting options will include the following: <ul style="list-style-type: none"> HVDC link from Kilroot to Coolkeeragh; 275 kV or 110 kV circuit from Magherafelt to Coolkeeragh; 275 kV or 110 kV circuit from Magherafelt to Strabane (new s/s); and Turleenan - Omagh South – Co. Donegal New 275 kV Line. 	>2026	X	I	I	I	Assessed in SEA	N/A
North West of NI Large-scale Reinforcement	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the west there will be a need to construct a new circuit between the 275kV system and the 110kV system electrically close to Coolkeeragh. A long list of options shall be narrowed down to a short list. A combination of these may be required. The long list of main and supporting options will include the following: <ul style="list-style-type: none"> HVDC link from Kilroot to Coolkeeragh; 275 kV or 110 kV circuit from Magherafelt to Coolkeeragh; 275 kV or 110 kV circuit from Magherafelt to Strabane (new s/s); and Turleenan - Omagh South – Co. Donegal New 275 kV Line. 	>2026	X	I	I	I	Assessed in SEA	N/A
Omagh Main – Dromore Uprate	Renewable Integration Developments	N&W	The drivers of this project are facilitation of a connection and RES integration. With the connection of Curraghamulkin cluster substation to Dromore it is necessary to restring the Omagh Main – Omagh South tower line with higher capacity	2022	X	I	I	I	Assessed in SEA	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
			conductor.							
Omagh Main – Dromore Third Circuit	Renewable Integration Developments	N&W	The drivers of this project are security of supply and RES integration. There is a significant amount of wind generation connected connected to the distribution network in Fermanagh and west Tyrone. During periods of high wind, there is a risk of overload on one of the Omagh – Dromore circuits in the event of the loss of the other. This risk constrains wind output in the area. This project will involve construction of a third circuit to alleviate these constraints and overload risk.	2028	N/A	N/A	I	I	Assessed in EAR 2019	N/A
Strabane – Omagh 110 kV Uprate	Renewable Integration Developments	N&W	The drivers of this project are RES integration. 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 tower lines with new conductor of a higher rating.	2026	N/A	N/A	I	I	Assessed in EAR 2019	N/A
Coolkeeragh T1 Transformer Cabling Uprate	Load Related and Security of Supply	N&W	The driver for this project is security of supply. The increase in wind generation in the north-west of NI has resulted in an increase in power flows at Coolkeeragh. The project is to uprate the 110 kV cabling associated with Transformer 1 in order to accommodate these flows.	2021	X	O	O	O	Very localised impacts only within existing sites	N/A
East Tyrone Reinforcement Project	Load Related and Security of Supply	N&W	The driver for this project is security of supply. The driver of this project is security of supply. There is a need to reinforce the distribution system supplying Cookstown and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Dungannon 110/33kV substation. Options being considered include: Installation of a 2nd Transformer at Tremoge and reconfiguration of the distribution network supplying Cookstown; Construction of a 2nd 110/33 kV substation at Dungannon; establishing a new 110/33kV substation at Cookstown with new 110kV circuits from Dungannon, Tremoge or Tamnamore.	2023	N/A	N/A	I	I	Assessed in EAR 2019	N/A
North West Special Protection Scheme Upgrade	Load Related and Security of Supply	N&W	The drivers of this project are security of supply and RES integration. This scheme was installed to protect the network in the north-west in the event of faults on the 275 kV network before the large-scale installation of wind generation in the north and west of NI. As wind generation capacity has increased, a need has been identified to replace and upgrade the existing special protection scheme.	2020	X	O	O	O	Very localised impacts only within existing sites	N/A
Ballylumford-Eden 110 kV Circuit Uprate	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The conductor on the existing tower line as well as a number of towers and foundations will be replaced due to the condition and age of the existing assets. The conductor will also be uprated to cater for increased demand.	2022	X	I	I	I	Assessed in SEA	N/A
Eden-Carmoney 110 kV Circuit Uprate/Reconfiguration	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course.	2026	X	I	I	I	Assessed in SEA	N/A
Belfast City 110 kV Redevelopment Project	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course.	2028	X	I	I	I	Assessed in SEA	N/A
Kells 110/33 kV Cluster	Renewable Generation Substations and Connections	S-E	The driver of this project is RES integration. It is planned to establish a 110/33 kV cluster substation near to the existing Kells 275/110kV substation to connect new renewable generation to the transmission system. This will be connected to the existing Kells 110kV station via an underground cable.	2023	X	I	I	I	Assessed in SEA	N/A
Tamnamore – Turleenan 275 kV Uprate	Renewable Integration Developments	S-E	The drivers of this project are security of supply and RES integration. Pending the establishment of Turleenan substation it is planned to uprate the conductors between Turleenan and Tamnamore 275kV substation in order to improve inter-region power flow.	2024	X	I	I	I	Assessed in SEA	N/A
Tandragee 275 kV Second Bus Coupling Circuit Breaker	Load Related and Security of Supply	S-E	The driver of this project is security of supply. This project is to install a second busbar coupler onto the existing 275 kV double busbar. This project will improve resilience and redundancy of the protection at Tandragee.	2023	N/A	N/A	O	O	Very localised impacts only within existing sites	N/A
Tamnamore – Drumnakelly 110 kV Uprate	Load Related and Security of Supply	S-E	The driver of this project is security of supply. These circuits may be subject to overload under high wind generation conditions and are operated out of service. This project is to replace the conductor on these circuits with higher capacity conductor. This will allow these circuits to fully return to	2027	N/A	N/A	I	I	Assessed in EAR 2019	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
			service.							
Airport Road 110/33kV substation	Load Related and Security of Supply	S-E	The driver of this project is security of supply. 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 33kV) from Rosebank to Sydenham Road. The need for this project arises from the increasing load in the Belfast Harbour and city centre area.	2022	X	I	I	I	Assessed in SEA	N/A
Castlereagh, Tandragee and Hannahstown Reactors	Load Related and Security of Supply	S-E	The driver of this project is security of supply. Further shunt reactors are planned to be installed at Castlereagh, Tandragee and Hannahstown substations in order to improve voltage regulation when the network is lightly loaded.	2022	X	O	O	O	Very localised impacts only within existing sites	N/A
Drumnakelly and Armagh Reinforcement	Load Related and Security of Supply	S-E	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 110/33kV substation. Options being considered include: <ul style="list-style-type: none"> Establishing a new 110/33kV substation adjacent to the existing Drumnakelly Main along with associated 33kV reinforcements to the Armagh area; and Establishing a new 110/33kV substation at Armagh with new 110kV circuits from Tandragee or Drumnakelly. 	2026	X	I	I	I	Assessed in SEA	N/A
Castlereagh 110 kV Switchgear Replacement	Fault Level Replacements	S-E	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Castlereagh.	2021	X	O	O	O	Very localised impacts only within existing sites	N/A
Castlereagh – Knock 110 kV Cables Uprate	Fault Level Replacements	S-E	The driver for this project is safety. The protection on this circuit will be replaced and uprated as well as the cable sealing ends and a section of cabling. This project is necessary due to the fault level exceeding the short circuit rating of the cable under certain conditions.	2021	X	I	I	I	Already Assessed in SEA	N/A
Cregagh Transformer B Realignment and Switchgear Replacement	Fault Level Replacements	S-E	The driver of this project is security of supply. This project is to replace and uprate the 110 kV switchgear on Tx B at Cregagh and to increase the clearance between the two transformers. This project is needed as there is potential for the fault level to exceed the short circuit rating of the equipment under certain conditions.	2022	X	O	O	O	Very localised impacts only within existing sites	N/A
Tandragee 110 kV Switchgear Replacement	Fault Level Replacements	S-E	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Tandragee.	2022	X	O	O	O	Very localised impacts only within existing sites	N/A
North-South Interconnector	Fault Level Replacements	S-E	The drivers for this project are market integration, security of supply and RES integration. This project involves construction of a new 400 kV circuit from existing Woodland 400 kV station in County Meath (Ireland) to a proposed 400/275 kV station at Turleenan in County Tyrone (Northern Ireland). This project is needed to remove constraints within the single electricity market, improve security of supply and facilitate safe and secure operation of renewables.	2024	X	O	O	O	Already Assessed in SEA	Planning Approved.
Moyle 275 kV Reinforcement	Interconnection	S-E	The drivers for this project are market integration, security of supply and RES integration. At present, full utilisation of the 500 MW export capability of the Moyle Interconnector is prevented by the potential for network overloads in the event of the loss of the 275 kV double circuit between the Moyle converter station at Ballycronan More and the nearby Ballylumford substation. This project involves construction of a new 275 kV cable between Ballylumford and Ballycronan More in order to secure operation of the Moyle against this contingency. It will be subject to cost-benefit analysis before proceeding.	2028	N/A	N/A	I	I	Assessed in EAR 2019	N/A
Enhancement to the low frequency load disconnection scheme	Security of Supply	Both	It is planned to modify existing under-frequency automatic load shedding schemes to prevent tripping of distribution-connected windfarms.	2023	N/A	N/A	N/A	O	Very localised impacts only within existing sites	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	EAR 2020	Appraisal	Evaluation
CVT Upgrade for Harmonic Measurement	Security of Supply	Both	It is planned to replace Capacitor Voltage Transformers (CVTs) at a number of sites with models capable of power quality monitoring, in order to improve monitoring of power system harmonics.	2022	N/A	N/A	N/A	O	Very localised impacts only within existing sites	N/A
Filter Tuning/Replacement	Security of Supply	Both	The driver of this project is security of supply. With increasing use of cable on the transmission system as well as an increase in non-linear load and generation, harmonic levels on the transmission system are increasing. This project will analyse the requirement for harmonic filters and re-tune/augment these accordingly.	2025	N/A	N/A	N/A	O	Very localised impacts only within existing sites	N/A
22 kV Switchgear Upgrades	Security of Supply	Both	It is planned to upgrade the 22 kV switchgear on the tertiary windings of a number of 275/110 kV transformers. The exact number of sites and scope of the work is yet to be determined.	2022	N/A	N/A	N/A	O	Very localised impacts only within existing sites	N/A



Appendix B: SEA Mitigation Measures