Best Performing Technology Option Report

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EirGrid
CP1233

Donegal Capacity Needs (Donegal – Srananagh Corridor Reinforcement)

Best Performing Technology Option Report

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Glossary

Acronym	Description
CENELEC	European Committee for Electrotechnical Standardisation
EMF	Electromagnetic Field
ESB	Electricity Supply Board
ESBN	Electricity Supply Board Networks
IEC	International Electrotechnical Commission
KV	Kilovolt
MCA	Multi-Criteria Analysis
MVA	Megavolt Ampere
OHL	Overhead Line
OPGW	Optical Ground Wire
SOEF	Shaping Our Electricity Future
UGC	Underground Cable

1. Introduction

1.1 Introduction

The purpose of this report is to identify the Step 3 Best Performing Technology Option to be progressed to Step 4 of the project development process for Capital Project (CP) 1233 – Donegal Capacity Needs, also known as the Donegal–Srananagh Corridor Reinforcement (hereafter referred to as *the Project*). This assessment relates to the proposed connection between Srananagh and Clogher substations.

An Emerging Best Performing Option (EBPO) was identified following a comparative assessment of the two primary technology options considered for the Project. One of these options included a pair of sub-options, each evaluated individually within the EBPO Report[1]. A 10-week consultation was undertaken, lasting between September and November 2025, to consult with the public and other relevant stakeholders during the decision-making process.

This report assesses feedback and other information received during the consultation period. The Multi-Criteria Assessment (MCA) presented in the EBPO Report is revisited to take into consideration the information received and to identify a Best Performing (Technology) Option (BPO). The BPO will be progressed to Step 4.

1.2 Overview of the Project

The Northwest area of Ireland (Mayo, Sligo and Donegal) has seen a significant increase in renewable electricity generation over the last number of years. As these connections continue to increase, the local transmission network is likely to come under increased stress.

The level of demand in the Northwest area of Ireland is forecast to be less than the generation, so the excess generation must be exported out of the area. This puts additional stress on the existing transmission circuits including the existing Srananagh – Clogher 110 kV lines.

Additional transmission network capacity will help ensure that continued economic growth in the area can be supported, including facilitating regional load growth.

The identified need requires additional transmission capacity to strengthen the network in the Northwest area of Ireland to export excess generation out of the region when needed.

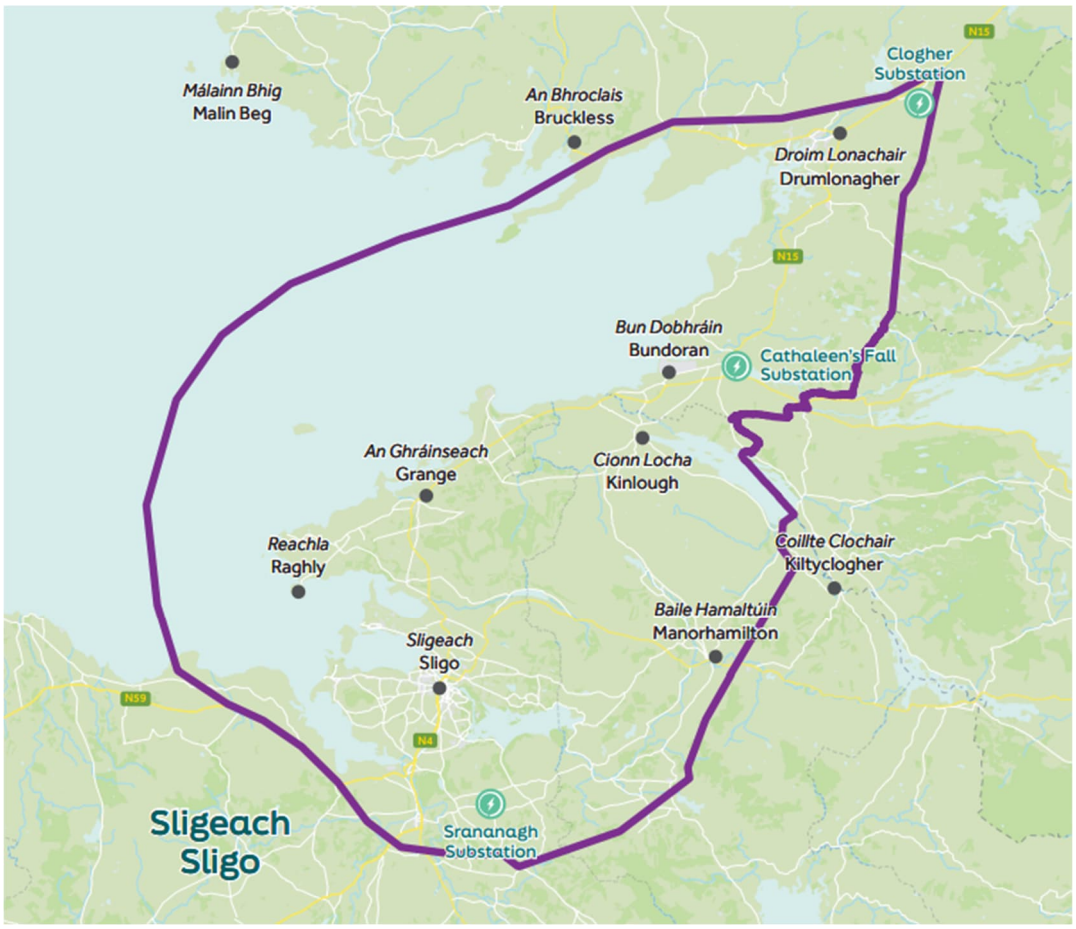
CP1233 is a proposed electricity development that will help to meet this network need identified in the Northwest area of Ireland. The location of the CP1233 Donegal Capacity Needs is illustrated in Figure 1.1.

Reinforcing the transmission system in the Northwest area of Ireland will enable the further integration of renewable generation in the Northern and Western Region of the country ensuring the continued economic growth of the region while also supporting efforts to meet the Government's renewable electricity target for 2030.

The need for this Project has been published in EirGrid's Shaping Our Electricity Future (SOEF) roadmap which supports the Government's 80% renewable electricity target by 2030.

[1] CP1233 Emerging Best Performing Technology Option Report Srananagh – Clogher Project, Jacobs, September 2025

Figure 1.1: Location of CP1233 Donegal Capacity Needs Project



1.2.1 Northern and Western Regional Context

The Strategic Framework for Grid Development in the Northern & Western Region (EirGrid, 2024)[2] identifies that the Northern and Western Region (NWR) "is characterised by a strong existing and potential renewable energy (primarily wind) resource, with many requests for further connections." This level of electricity generation is greater than the capacity of the existing network in the NWR, resulting in local constraints related to power transfer needs. Therefore, the "Reinforcement of the regional grid infrastructure network is mainly required to connect the forecasted significant level of renewable generation, with benefits for regional economic and social development including creating transmission capacity for increased demand."

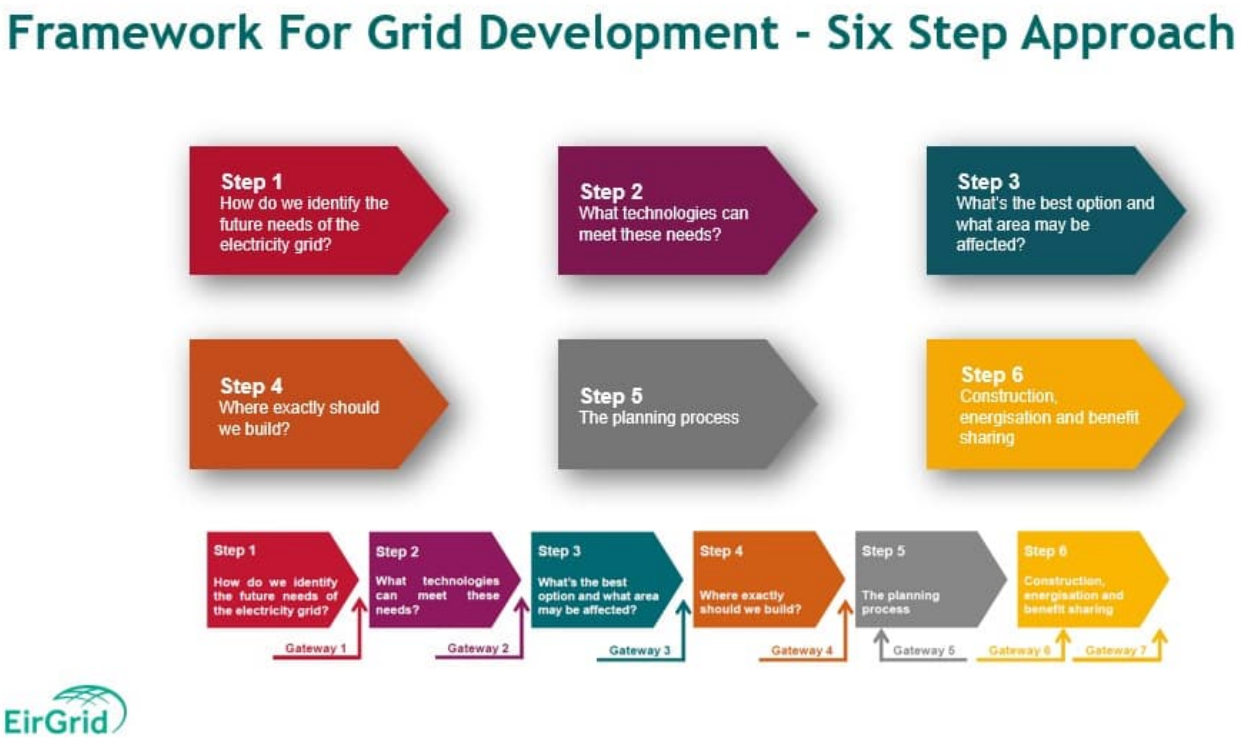
The Framework lists several proposed key strategic grid infrastructure projects located in the NWR, including the 'Donegal Capacity Needs' Project. The projects described in this Framework "…will enable the transmission network to accommodate more diverse power flows." And "…strengthen the network for all electricity users, and in doing so will improve the security and quality of supply."

The Framework notes that the proposed Project will help to strengthen the grid network in the Northern and Western Region.

[2] Strategic Framework for Grid Development in the Northern & Western Region, EirGrid, 2024

1.3 Overview of EirGrid's Framework for Grid Development

Figure 1.2: EirGrid's Six-Step Framework for Grid Development



The proposed Project is being developed in accordance with EirGrid's Framework for Grid Development and is currently in Step 3, as presented in Figure 1.2.

In Step 2, EirGrid performed a technology overview where technologies were explored, and possible options were identified. The aim of Step 3 is to identify the Best Performing (Technology) Option from the options identified in Step 2. Step 3 includes the following tasks:

- Task 1 - Further develop the options brought forward from Step 2 and perform an MCA of the options to identify an Emerging Best Performing (Technology) Option.
- Task 2 - Consultation with the public and engagement with stakeholders on the EBPO.
- Task 3 - Assess feedback from the public consultation and stakeholder engagement and carry out further assessment to identify the Best Performing Option (BPO).
- Task 4 - Review the MCA to incorporate the feedback from the consultation process.
- Task 5 - Other considerations including any new information that is not covered by the criteria in the MCA will be reviewed at this stage.

The outcome of Task 1 was detailed in the EBPO Report[1]. This report follows Task 2 and informs Tasks 3 to 5. A detailed methodology is presented in Chapter 3.

2. The Project

2.1 Introduction

The northwest part of the National Grid is considered a relatively weak part of the transmission network, with only three points of supply, two of which are the existing Clogher – Cathaleen's Fall – Srananagh 110 kV circuits, the other being the existing Cathaleen's Fall – Coraclassy 110 kV circuit. The existing Letterkenny - Strabane 110 kV circuit is used only during maintenance scenarios or in emergency situations where either the Ireland or Northern Ireland transmission system needs to support the other.

Capital Project 1233 is a proposed electricity development that will help to meet a network strengthening requirement identified in the northwest of the country along the Clogher – Srananagh network corridor. The need for the CP1233 project is a thermal transmission network issue relating to the transfer of power across the existing 110 kV transmission network corridor between Clogher and Srananagh. The issues encountered are thermal capacity problems on this corridor during high wind power output conditions and following the unplanned loss of the existing 110 kV circuits in the same network corridor.

The issues identified are in breach of the Transmission System Security and Planning Standards (TSSPS) and must be addressed by a new 220 kV high voltage connection into Donegal. This voltage level is not currently present in Donegal. Donegal is connected to the Irish Transmission system through 110 kV circuits with a far smaller transfer capacity. This lack of capacity is a constraint on the network and creates issues in terms of security of supply, technical issues, and robustness. A new high voltage connection is needed to bring the 220 kV network from Srananagh to a key substation in Donegal.

2.2 Project Study Area

The study area contains the substation nodes necessary to develop CP1233, namely the Srananagh, Cathaleen's Fall and Clogher substations, and the existing Srananagh-Clogher (via Cathaleen's Fall) 110kV lines. Figure 2.1 shows the Step 3 project study area.

Figure 2.1: CP1233 Study Area

This study area has been determined by considering a variety of factors, including the technical requirements of the project, road network presence, settlements, physical constraints e.g. motorway, river or rail crossings and some environmental constraints.

The overall study area has been identified to allow for flexibility when considering route options for both Options 1 and 2, and connections into the substations, ensuring that identified hazards can be avoided through routing.

The Northern Ireland border defines a large part of the eastern boundary of the study area. It would not be practicable for the project to extend into Northern Ireland because of the licensing agreements set by national governments of both jurisdictions. The area towards Lough Derg and towards Scraghey in County Tyrone has been avoided because of hills and bogs to the east of the study area. These would not be feasible/practical for either OHL or UGC routing.

An area of the marine environment has been considered extending west from the coastline to accommodate any potential marine cable routes and allow enough freedom to avoid adverse ground and associated hazards during route selection. This includes rock outcrops which are present on the seafloor between Inishmurray and Mullaghmore. While it is possible to engineer solutions through the rock, having a larger study area enabled various route options to be assessed. This was advantageous as it allowed for longer but less hazardous routes to be identified.

The study area has also been extended in both the northern and southern areas to include options for the land-based cable sections connecting the substations to the marine cable. From Clogher substation

in the north, the study area extends west of Donegal and Mountcharles, providing a larger area for suitable landfall sites. Similarly, the southern section has been extended past Meenashammer, to provide potential landfall sites either side of Ballysadare Bay.

2.3 Relationship with other projects

Projects CP1233 and CP0982 are interlinked and share a common connection point at the existing Srananagh 220 kV substation. CP0982 project entails the reinforcement of the existing transmission system in the northwest of Ireland specifically to reinforce the grid between Flagford, Srananagh and Sligo Substations.

Two options have been considered for the CP0982 project:

- Option 1: Voltage upgrade to 220 kV of the existing Flagford – Sligo 110 kV overhead line; and
- Option 2: Thermal uprate of the existing Flagford – Sligo 110 kV overhead line plus a new Flagford – Srananagh 220 kV UGC.

Option 1 has recently been announced as the Best Performing Option for CP0982.

A second 220/110 kV 250 MVA transformer will also be required in Srananagh station as part of the CP0982 project. These projects need to be coordinated in Step 4 regarding works at that site. This option assessment factors in the outline design information provided from CP0982.

2.4 Options Assessed in Step 3

Two main potential technology options have been brought forward from Step 2 for further consideration, one of which has been split into a pair of sub-options:

- **Option 1**: New 220 kV Overhead Line;
- **Option 2A**: Upgrade an existing 110 kV Overhead Line to 220 kV and install 110 kV Underground Cable on land; and
- **Option 2B**: Upgrade an existing 110 kV Overhead Line to 220 kV and install 110 kV Underground Cable on land and at sea.

These are presented in more detail in Sections 2.4.1, 2.4.2 and 2.4.3 respectively.

Why is a 220 kV Underground Cable between Clogher and Srananagh not possible?

EirGrid has determined that a new 220 kV extra high voltage (EHV) circuit is needed; however it is not technically feasible to accommodate this as a 220 kV underground cable between Clogher and Srananagh. The transmission network in the North West and in Donegal is an area of lower load levels and is made up of lower capacity, high impedance circuits with lower connectivity than other parts of the network. This makes this area of the transmission network more susceptible to instability following faults and disturbances.

Extra high voltage underground cables have different electrical characteristics to overhead lines. Long EHV cable circuits are highly capacitive while the surrounding network, largely made up of overhead lines, is highly inductive. This creates electrical resonances, which in weaker areas of the network like Donegal, can lead to instabilities, equipment damage and operating complexity. Long lengths of underground cables also require large amounts of equipment for voltage control purposes[3]. This makes the cable difficult to energise, increasing operational complexity and risk.

[3] Reactive compensation equipment to improve the power factors and stabilise voltage levels, amongst other issues.

Option 1 may however involve a short section of 220 kV underground cable (up to maximum of 10km) if required to address local physical obstructions etc. Further discussion on the technical limitations of using underground cable in this part of the network is presented in Appendix A.3.

2.4.1 Option 1: New Clogher – Srananagh 220 kV Overhead Line

Figure 2.2 - Option1

- Install a new Clogher – Srananagh 220 kV Overhead Line circuit.
- Approximately 80 km of OHL, with no major crossings of motorways or railways.
- Create a new 220 kV station at Clogher with two 220/110 kV 250 MVA transformers.
- Could incorporate new composite pole sets onto the route, offering visual improvements over steel lattice structures.
- Includes provision for up to 10 km of underground cable (UGC) to act as a circuit facilitator in areas where space or routing constraints make overhead line design challenging.

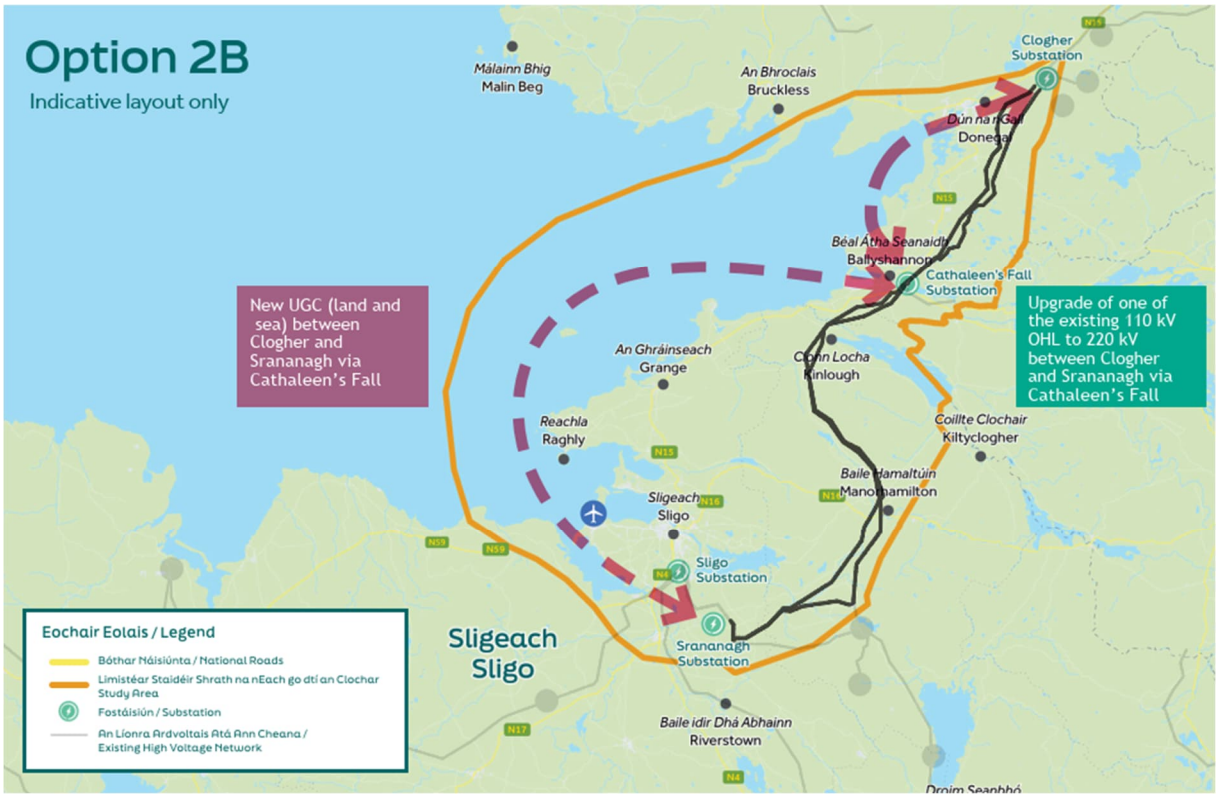
2.4.2 Option 2A: Upgrade of an existing 110 kV Overhead Line to a 220 kV Overhead Line, and install a new 110 kV Underground Cable circuit (land based)

Figure 2.3 - Option 2A

- Upgrade the voltage from 110 kV to 220 kV on one of the two existing 110 kV Overhead Lines between Clogher – Cathaleen's Fall – Srananagh.
- Install a new 110 kV Underground Cable **on land (terrestrial)** between Clogher - Cathaleen's Fall - Srananagh.
- The UGC requires installation of reactive compensation at both ends at Srananagh, Cathaleen's Fall and Clogher substations.
- Install power flow control devices at Srananagh and Clogher on the new 110 kV Underground Cable.
- Create a new 220 kV station at Clogher with two 220/110 kV 250 MVA transformers.

2.4.3 Option 2B: Upgrade of an existing 110 kV Overhead Line to a 220 kV Overhead Line, and install a new 110 kV Underground Cable circuit (marine)

Figure 2.4 - Option 2B



- Upgrade the voltage from 110 kV to 220 kV on one of the two existing 110 kV Overhead Lines between Clogher – Cathaleen's Fall – Srananagh.
- Install a new 110 kV Underground Cable **on land and in sea (terrestrial and marine)** between Clogher - Cathaleen's Fall - Srananagh.
- The UGC requires installation of reactive compensation at both ends at Srananagh, Cathaleen's Fall and Clogher substations.
- Install power flow control devices at Srananagh and Clogher on the new 110 kV Underground Cable.
- Create a new 220 kV station at Clogher with two 220/110 kV 250 MVA transformers.

The key difference between Option 2A and Option 2B is the route of the underground cable. The proximity of the sea means that it is possible to route the underground cable between Clogher and Srananagh on the seabed. Part of the route will need to be on land to get from the coast to the inland substations. For both Option 2A and 2B, the underground cable must be routed through Cathaleen's Fall substation for technical reasons in order to maintain the existing transmission circuit connectivity to Cathaleen's Fall substation, a vital transmission substation in south Donegal.

3. Methodology for Selection of Best Performing (Technology) Option

3.1 Description of Process

Section 1.3 highlights the Step 3 tasks based on EirGrid's Framework for Grid Development.

Task 1 - Further develop Step 2 options

The two shortlisted main options, and associated sub-options, brought forward from Step 2 were assessed using an MCA to identify an EBPO. The assessment and evaluation of the options was documented in the Emerging Best Performing Option Report published for public consultation[1]. The next tasks in the Step 3 process are discussed below.

Task 2 – Consultation

The Step 3 assessment process provides for public participation and stakeholder engagement during the decision-making process. A 10-week consultation, lasting between September and November 2025 was held on the assessment and evaluation of the options to determine the EBPO. This included landowner engagement, stakeholder engagement and public information events across the study area. The details of the consultation are provided in Chapter 4.

Task 3 – Assess feedback

The analysis of feedback and responses received during the consultation period was undertaken by an independent consultancy specialising in stakeholder engagement analysis and published as a consultation feedback report[4] The assessment of the feedback received during the consultation period is provided in Section 5.2.

Task 4 – Review the MCA

This review incorporated the feedback and any other new information received during the consultation period that concerns the criteria assessed in the MCA. A clear description of the new information received is provided in Section 5.2. The MCA was reviewed in Section 5.3 based on the consultation feedback and any new information received. A clear justification is provided in Section 5.3 if the review results in a change to the previous assessment.

Task 5 – Other considerations

In some cases, information emerges that is not covered by the criteria in the MCA. In such cases the information will be considered outside the MCA and may influence the identification of the BPO for the Project. A clear description of the new information received and a justification for any changes made to the original assessment will be provided.

In other cases, the MCA may result in an outcome with equal performance of options and other measures may have to be used to distinguish between the options. These measures may relate to technical and/or operational issues of the transmission system, strategic decisions in terms of the developments of the Irish transmission system in a timely manner and any risks that these items may impose to the transmission system. A clear description of the further considerations influencing the decision is provided in Section 5.4.

[4] Placeholder for feedback report

Based on the findings of Task 4 (Section 5.3) and Task 5 (Section 5.4), a BPO is identified in Section 5.5.

3.2 Scale used to assess each Criterion

Evaluations were carried out on the technology options as defined in Section 2.3 using the following criteria: Technical, Economic, Deliverability, Environment, and Socio-economic. The criteria were further broken down into sub-criteria, as listed below, and a multi-criteria evaluation matrix was used to identify the EBPO.

- **Technical performance criteria**
  - Safety Standard Compliance
  - Expansion or Extendibility
  - Repeatability
  - Technical Operational Risk
  - Security & Planning Standard compliance
  - Reliability performance
  - Headroom
- **Economic performance criteria**
  - Implementation Costs
- **Deliverability criteria**
  - Implementation Timelines
  - Project Plan Flexibility
  - Dependence on Other Projects
  - Risk of Untried Construction Technology
  - Supply Chain Constraints
  - Permits & Wayleaves
  - Constructability
- **Environmental criteria**
  - Biodiversity (flora & fauna, ornithology)
  - Soil and Water
  - Planning Policy and Land Use
  - Landscape & Visual
  - Climatic Factors
  - Archaeology and Cultural Heritage
  - Noise and Air
- **Socio-economic criteria**
  - Settlements & Communities
  - Recreation & Tourism
  - Humans and Human Health

- Traffic and Transport
- Telecommunication & Aviation
- Utilities

The assessment of each sub-criteria is presented along with a ranking from "more significant" / "more difficult" / "more risk" to "less significant" / "less difficult" / "less risk". The following scale has been used to illustrate the performance ranking.

The following scale is used to illustrate the performance of each criterion:

- High – (Dark Blue)
- High Moderate – (Blue)
- Mid-level Moderate – (Dark Green)
- Low-moderate – (Light Green)
- Low – (Cream)

The Multi-Criteria Assessment (MCA) at Step 3 is based on the technology appropriate to each option, and the identified constraints in the study area as relevant to the consideration of the appropriate technology.

Further detail on all criteria and sub-criteria is provided in Appendix A.

4. Consultation

4.1 Public and Stakeholder Consultation

The consultation period for CP1233 ran from 16 September 2025 to 25 November 2025 and was included as part of a wider consultation by EirGrid for their 'Powering Up the North West' strategy which also included the Flagford to Srananagh project. The consultation informed the public and various representatives of the technology option and consulted on the potential for routing constraints. The details of and the feedback from the consultation is summarised in the report 'Powering Up the North West - Step 3 Engagement and Consultation Report' by M-CO dated January 2026.

The consultation comprised:

- Six in-person events attended by c.90 participants.
- Two public webinars with a combined audience of over 40 attendees.
- An Energy Citizens Roadshow event in the Central Hotel in Donegal with 30+ people engaged.
- Pop-up information sessions held in local communities with engagement of 250+ people.
- Leaflet distribution to approximately 41,200 homes within the study area.
- Targeted engagement with landowners by the Agricultural Liaison Officers.
- Engagement with Local Authorities in line with the HV (High Voltage) Forum Engagement Protocol and EirGrid best practice.
- Feedback and response channels – including the consultation portal, postal submissions, and email – available throughout the consultation period.

4.2 Consultation feedback

The feedback received covered a range of themes as outlined in the table below, which is reproduced from the aforementioned M-CO Engagement and Consultation report.

Theme	Detail of Contributions
Location	There were notable consultation submissions from regional stakeholders regarding further extension of these projects into strategic locations in Donegal. For landowners, there were submissions regarding proximity to homes, land, and a heritage site. Most of the informal queries during engagement activities were about the general location of the infrastructure, with several landowners and homeowners attending to check project locations with relation to their own properties. There was also some concern regarding local disruption.
Grid Curtailment	Most of the consultation submissions focused on the imperative of securing and future-proofing the grid; particularly in submissions from regional stakeholders and two renewable energy developers. This was also noted within some of the informal engagement activities, where some local attendees referred to recent power outages. This was also raised by sectoral stakeholders, including energy developers, who attended engagement activities. This indicates that

Theme	Detail of Contributions
	grid investment to reduce curtailment issues is viewed as a priority among regional stakeholders, local communities, and energy developers.
Technology & Infrastructure	There were requests for information regarding the technology and delivery methods, both through the consultation submissions and informally through engagement activities. For most, these were general enquiries about the technology and infrastructure, although there were some concerns regarding visual and environmental impact. There were also enquiries at events from landowners who currently host technology on their land, to get a better understanding of potential disruptions due to a change in technology.
Access to Information & Communication	Access to information and further communication was a key theme of in-person and online engagement activities. The majority of information requests pertained to the location of planned infrastructure in relation to people's residence/land. Consultation submissions included requests from key stakeholders for further technical information.
Environmental & Land Impact	Some of the informal feedback from engagement activities focused on the impact on the natural landscape, forestry, and the potential degradation of land. There were concerns for local disruption, the impact on roads and the visual impact of the infrastructure. There was also a concern shared that, by improving the grid, these projects could facilitate more local development that could negatively impact the environment.
Community	There were engagements with community representatives, who communicated specific concerns as well as positive feedback, while also gathering information for their network. One attendee shared a concern about potential community conflict that may arise, as there had been legacy issues within the community, connected to a non-EirGrid energy project.
Economic Impact	There were concerns regarding the impact on the forestry industry due to land disruption. There were also positive contributions regarding the economic benefits a more resilient grid would provide to the area.

Feedback was also received from the following bodies/companies. Their feedback was all supportive of the overall strategy to reinforce the transmission system in the northwest of Ireland to facilitate and encourage growth in the area as well as providing transmission capacity to allow the realisation of the significant potential untapped wind power resources in the area:

- Western Development Commission
- Northern & Western Regional Assembly

- Donegal County Council
- Bord na Mona
- Plan Energy Developments Ltd

5. Selecting the Best Performing (Technology) Option

5.1 Multi-Criteria Assessment prior to Consultation

The MCA undertaken in Step 3 prior to the consultation period assessed the two main technology options, and associated sub-options, against EirGrid's five criteria and identified an EBPO[1]. The outcome of the MCA prior to the consultation is summarised in Table 5.1.

Table 5.1: Technology Options MCA prior to Consultation

	Technical	Economic	Environmental	Deliverability	Socio-economic
Option 1					
Option 2A					
Option 2B					

Option 1 was considered the Emerging Best Performing Option: Option 1's reduced construction duration (approximately four years compared to approximately six to eight years) results in much less construction traffic, and a significantly lower cost. There are also less technical, environmental, and socio-economic impacts than both other possible options (Options 2A and 2B).

5.2 Assessment of Feedback from Consultation (Consultation Feedback Assessment)

Much of the general public/local community feedback related to the wider transmission reinforcement strategy for the northwest of Ireland. The feedback that did relate specifically to the CP1233 project focussed on micro-siting issues and details regarding the scale and form of the planned OHL works. These do not have an impact on the MCA scoring for the preferred technical option and will be addressed at Step 4.

There were a few queries from members of the community regarding the decision not to use underground cables. The rational for this decision has already been presented in the technical reports provided.

The feedback from local government bodies and private companies is supportive of the overall strategy for CP1233.

5.3 Review of Multi-Criteria Assessment

The feedback received from the consultation has not materially impacted on the MCA and scoring undertaken to date.

5.4 Further Considerations

The consultation themes and raw data identified some public concerns in the North West, however none of the correspondence identified issues which would change the results of the MCA.

5.5 Best Performing (Technology) Option

Option 1 is still considered to be the BPO following the consultation exercise.

6. Conclusion

A new 220 kV connection is required to meet the need and objectives of the CP1233 project. The option of a 220 kV underground cable cannot be built as the grid cannot accommodate it – there would be significant issues with its operation, safety, and its reliability. Of the feasible options, Option1 was found to be the Emerging Best Performing Option. Table 6.1 below summarises the findings of the MCA for the five key criteria for each option.

Option 1 has been selected because of the following reasons:

- **Economic and Deliverability -** Option 1 entails constructing a new 220 kV OHL, whereas for Option 2, an existing 110 kV line is to be upgraded to 220 kV, and in addition a new 110 kV underground cable and other additional equipment (such as power flow control devices, reactive compensation and potential harmonic filters) are to be installed. Option 2 therefore results in additional work and thus a longer construction programme (with associated increased costs):
  - approximately four years for Option 1;
  - approximately eight years for Option 2A; and
  - approximately six years for Option 2B.
- **Technical -** OHLs (like Option 1) are widely adopted in Ireland and therefore operation and maintenance are well practiced. The OHL line can also be upgraded in the future depending upon system ratings, e.g. increasing the thermal rating of the existing conductors. Options 2A and 2B would require additional equipment (such as reactive compensation and power flow control) compared to Option 1 to resolve technical challenges.
- **Environment and Socio-Economics -** Option 1 may interact with scenic routes and other such areas of visual prominence, as well as potential for setting impacts on known archaeology, architectural heritage and cultural heritage assets. The adoption of the new composite pole technology could reduce the potential visual impact of the new OHL. There are also environmental designations with both geological and hydrogeological elements that could be affected by new OHL foundations, depending on their siting. Some of these risks will be greater for the underground cable element of Options 2A and 2B. Options 2A and 2B will have increased socio-economic effects due to the increased construction duration and additional construction traffic.

Option 2B competes closely with Option 2A. Option 2B has better environmental and socio-economic performance, as the majority of the route is marine based, thus resulting in less impact on archaeology, traffic and utilities. However, the submarine option has higher economic and technical risks due to the newer, more costly technology.

It is noted that a new 220 kV underground cable was not brought forward into Step 3 as a potential technology option as it is not technically feasible to accommodate a full 220kV underground cable between Clogher and Srananagh. These limitations are discussed in Section 2.4 and further in Appendix A.3.

A public/local community consultation exercise was undertaken in late 2025 by EirGrid to inform the public of the EBPO. The feedback received from the consultation did not materially impact on the MCA scoring undertaken to date.

To conclude, Option 1 is considered the Best Performing Option, with the new 220 kV OHL being taken through to Step 4. Option 1's reduced construction duration (approximately four years compared to approximately six to eight years) results in much less construction traffic and associated disruption, and a significantly lower cost. There are also fewer technical, environmental, and socio-economic impacts than the other possible options (Options 2A and 2B). Although Option 1 primarily comprises a 220 kV OHL, a short length of underground cable may still be feasible in order to address local physical obstructions etc. These will remain within the feasible limits for the area, and further cable integration analysis will be undertaken in

Step 4 to confirm the length of 220 kV UGC that is possible to integrate and ensure compliance with system performance requirements.

Table 6.1: Summary Table of MCA for all Technology Options

	Technical	Economic	Environmental	Deliverability	Socio-economic
Option 1					
Option 2A					
Option 2B					

7. Next Steps

As described in Section 1.3, public consultation was undertaken after the identification of the EBPO, to involve the public and other relevant stakeholders in the decision-making process for the proposed CP1233 Donegal Capacity Needs Project in accordance with the EirGrid Framework for Grid Development.

The feedback from the public consultation and stakeholder engagement was assessed and the MCA was reviewed. This, together with an assessment of any further considerations, resulted in Option 1 as the Best Performing (Technology) Option. The identification of the BPO (Technology) concludes the Step 3 process as per EirGrid's Framework for Grid Development.

This option will be progressed into Step 4 of EirGrid's Framework for Grid Development. At Step 4, additional assessments will be carried out to identify corridor options for the BPO (Technology). Stakeholder and landowner engagement will also be undertaken to inform the assessment and the decision-making process of the corridor selection.

The purpose of Step 4 is to utilise the high-level datasets used in Step 3 along with "on-the-ground" information and other local, social and environmental inputs to determine and verify local constraints and opportunities. Based on these assessments, a Step 4 BPO circuit corridor will be identified for the technology option selected at Step 3. Within this corridor a route will be developed which will specify the location of new equipment and infrastructure.

Appendix A. Multi-Criteria Assessment Sub-Criteria

The range of sub-criteria used for the assessment of the Shortlist of Technology Options are listed and described in the following sections.

Technical Sub-Criteria

The sub criteria used are listed below:

(1) *Safety Standard Compliance*: The project should comply with relevant safety standards such as those from the European Committee for Electrotechnical Standardisation (CENELEC). Materials should comply with IEC or CENELEC standards.

(2) *Expansion or Extendibility*: This considers the ease with which the option can be expanded, i.e. it may be possible to upgrading an OHL to a higher capacity or a new voltage in the future.

(3) *Technical Operational Risk*: "Technical Operational Risk" aims to capture the risk of operating different technologies on the network.

(4) *Security & Planning Standard compliance*: The solution option should comply with the network reliability and security standards defined in the Transmission System Security and Planning Standards (TSSPS) (EirGrid, TRANSMISSION SYSTEM SECURITY AND PLANNING STANDARDS , May 2016) and the Operating Security Standards (OSS) (EirGrid, Operating Security Standards, January 2021). All options investigated will meet the minimum technical requirements set out in the above standards. Options which extend or enhance technical performance margins beyond minimum acceptable levels are favoured over others.

The options are assessed against the need identified, i.e. thermal overload. A short description of this is given below.

Thermal overload criteria

The options are assessed for compliance with the TSSPS. If thermal overload violations are identified, additional potential reinforcements will be added to the options until the enhanced option fully meets the TSSPS. For this technical criterion, the options have been assessed based on identified thermal overloads remaining after the option has been added. This will provide an indication of how the options are performing in terms of adding thermal capacity.

(5) *Reliability performance*: The technologies and equipment associated with the different options have different performance and reliability characteristics. The reliability of transmission infrastructure is associated with two categories or type of outages, namely unplanned outages and planned outages. Each technology or type of equipment is associated with faults (unplanned outages) that routinely occur. These can be represented as average failure rates usually expressed as unplanned outages/100km/year.

This criterion will also account for the mean time to repair. This is the time taken to return the equipment to service after a fault has occurred. The assessment has been based on EirGrid's transmission performance statistics and industry standard reliability data.

This sub-criterion will also assess the typical time the options would be unavailable for during planned outages. Planned outages are normally associated with annual routine maintenance and will be based on typical outage durations taken from maintenance policies. The reliability for each option will be based on a combination of the above type of outages. The reliability of the station equipment associated with the options is assumed to be the same for all options and is therefore not included in this analysis.

(6) *Headroom:* This criterion assesses the ability of each option to accommodate increases in renewable generation in the North-West region.

Each option is compared relative to the other to determine the increase in renewable generation in the Northwest, that can be accommodated without further network reinforcements being required. The limit for each option can be found by increasing renewable generation in the North-West until a TSSPS limit is reached.

The headroom for each option is the difference between the renewable generation that can be accommodated by the network with that option included and the renewable generation that can be accommodated by the network with no option included.

(7) *Repeatability:* This criterion examines whether this option can be readily repeated in the Irish network. One-off or bespoke solutions carry additional system integration, operational, and maintenance complexity. For example, an OHL option is very repeatable, but a fully or partially underground cable option is less repeatable as there may be harmonic filter and reactive compensation requirements that are bespoke for each option. The amount of cable that can be integrated in certain parts of the network may also be limited.

Economic Sub-Criteria

The sub criteria used are listed below:

(1) Implementation Costs: Costs associated with the procurement, installation and commissioning of the grid development and therefore includes all the transmission equipment that forms part of the project's scope.

Environmental Sub-Criteria

The sub criteria used are listed below:

(1) *Biodiversity (flora & fauna, ornithology)*: Assessment of the potential impacts on protected sites for nature conservation, habitats, and protected species.

(2) *Soil and Water*: Potential impact on soils (geology, Irish geological heritage sites, etc) and water (water quality of surface waters and groundwater).

(3) *Planning Policy and Land Use*: Potential risks associated to land purchase and planning approvals.

(4) *Landscape & Visual*: Assessment of landscape constraints and designations and the potential impact on visual amenity.

(5) *Climatic Factors*: The potential for release of greenhouse gasses or impacts on climate change.

(6) *Archaeology and Cultural Heritage*: The potential for impacts on the cultural heritage and archaeological resources.

(7) *Noise and Air*: Potential for air pollution and vibration and operational noise impact of lines and substations, considering sensitive receptors.

Deliverability Sub-Criteria

The sub criteria used are listed below:

(1) *Implementation Timelines*: Relative length of time until energisation (assess significant differences).

(2) *Project Plan Flexibility*: Does the project plan allow for some flexibility if issues arise during design and construction?

(3) *Dependence on Other Projects*: Does the project depend on the completion of other projects?

(4) *Risk of Untried Construction Technology*: Has the technology been used by EirGrid and ESBN in the past.

(5) *Constructability*: Feasibility of construction (outage requirements?). Ease/difficulty of mitigation measures that may be required to prevent complications during construction.

(6) *Supply Chain Constraints*: Any constraints (e.g. small number of suppliers in Ireland or internationally) that would affect the procurement of materials or services (e.g. cable laying vessels waiting list lead time) to complete the project.

(7) *Permits & Wayleaves*: Various permissions and wayleaves required to proceed to construction.

Socio-economic Sub-Criteria

The sub criteria used are listed below:

(1) *Settlements & Communities*: The expected impact of a grid development option on towns, villages and rural housing, and the way of life of their communities, residents, workers and visitors.

(2) *Recreation & Tourism*: Impact on recreational activities (e.g. fishing, sports) and tourism during and after construction, that are not included in the other sub criteria.

(3) *Humans and Human Health*: The potential for impacts on people and their health – please see information on electromagnetic fields (EMF) in A.2.

(4) *Traffic and Transport*: Traffic disturbance and impacts that may occur during the construction phase and mitigation measures to reduce impacts

(5) *Telecommunication & Aviation*: Impact on wireless services such as radars, radio communications, TV, flight paths, etc.

(6) *Utilities*: Impact on existing utilities.

A.2 Electromagnetic Fields

The European Union recommendation (1999/519/EC) [5] outlines a set of basic restrictions and reference levels for limiting overall exposure of the general public to electromagnetic fields and ensuring an increased level of protection. This recommendation is based on ICNIRP guidelines (International Committee on Non Ionising Radiation Protection) for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz) as the scientific basis. The electric and magnetic fields associated with Ireland's transmission grid do not exceed the EU recommendation (1999/519/EC).

EirGrid operates the electricity grid to stringent safety recommendations set out by the EU as well as national and international agencies. These recommendations are based on peer-reviewed medical and health studies, independent of any grid operator. The purpose of the reference levels is to prompt further investigation to ensure the restriction levels are not exceeded. EirGrid designs the electricity network to make sure that public exposure to EMFs does not exceed EU restriction levels. For both the magnetic fields and the electric fields, the levels recorded are below the restriction levels set by the International Committee on Non-Ionising Radiation Protection (ICNIRP). This is an independent body, funded by public health authorities around the world. ICNIRP has reviewed the safety of EMFs and recommended limits on exposure that are far below levels where adverse effects might occur.

The EMFs created by the electricity grid are not high enough to be considered harmful to humans. Extensive scientific research has found no hazardous effects from long-term exposure to low levels of EMFs. This includes the small amounts of extremely low frequency EMFs produced by electricity infrastructure.

See the EirGrid website for additional information

https://www.eirgrid.ie/EMF

https://cms.eirgrid.ie/sites/default/files/publications/EMF-Information-Brochure-2024.pdf

[5] *1999/519/EC: Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). Available at: https://eur-lex.europa.eu/eli/reco/1999/519/oj/eng*

A.3 Undergrounding

The initial technical investigations during Step 2 determined that a full 220 kV EHV UGC solution option cannot be accommodated into the transmission network in the North West due to the length of the circuit required in combination with topology and the characteristics of the existing network in the North West and Donegal, which is largely low capacity 110 kV OHL. An EHV UGC of the length needed is highly complex to operate and could result in significant instabilities and damage to the national grid arising from the following phenomena:

- zero-miss phenomenon – circuit breakers may fail to interrupt, leading to damage to the grid and major safety issues;
- harmonic distortion – the national grid operates at a certain frequency; distortions result in instability and shut-downs; and
- temporary over voltages (TOVs) – these result in serious risks to insulation and system stability.

Issues with any of the phenomena above negatively impact transmission system reliability, security, and operability.

A partial undergrounded option using 220 kV is possible within certain technical limitations, where the maximum total length (with mitigation) of 220 kV UGC that can be used in the region is approximately 10km. A full assessment is required to determine if and/or where UGC is required.

Further cable integration analysis will be undertaken in Step 4 to confirm the length of 220 kV UGC that is possible to integrate and ensure compliance with system performance requirements.

An alternative technology using High Voltage Direct Current (HVDC) cable was also considered in Step 2. This was not brought forward as a viable technology as an HVDC solution would not integrate with the existing AC grid and would not provide a platform for the future expansion of the transmission network in the area, in addition to having a significantly higher cost than AC solutions.