

Best Performing Options Report Step 3 of Grid Development Framework

North Connacht 110 kV Project

January 2018

Executive Summary

In Step 1 for the North Connacht Project, the need for grid development has been identified for the North West. In order to meet this need, the *Long List of Technology Options* was created in the Step 2 – Options Report which could meet the need identified. The *Long List of Technology Options* included a set of 23 different development options which comprised 110 kV line upgrades and 110 kV new build of circuits. For the new build of circuits both underground cable (UGC) and overhead line (OHL) were studied. The technology options were subject to a high-level technical and economic analysis. Based on the results of the high-level analysis, the *Refined List of Technology Options* of four OHL and two UGC technology options was created for a more detailed, but still high level, multi criteria analysis against technical, economic, environmental, socio-economic and deliverability criteria. The result of this multi criteria analysis is the *Shortlist of Technology Options* of four options which were taken into the Step 3 of The Framework for Grid Development.

In the Step 3 – Best Performing Options Report, the developed *Shortlist of Technology Options* of four options was assessed in greater detail. The technology options were as follows:

ID	Scheme	Method	High Level Work Packages
OHL-MT	New Moy – Tonroe 110 kV	Overhead Line (OHL)	New Build: 58 km Line Upgrade: 32 km Station Upgrade: 1
UGC-MT	New Moy – Tonroe 110 kV	Underground Cable (UGC)	New Build: 58 km Line Upgrade: 32 km Station Upgrade: 1
OHL-MS	New Moy – Srananagh 110 kV	Overhead Line (OHL)	New Build: 66 km Line Upgrade: 58 km Station Upgrade: 0
UGC-MS	New Moy – Srananagh 110 kV	Underground Cable (UGC)	New Build: 66 km Line Upgrade: 0 km Station Upgrade: 0

Table 1: Shortlist of Technology Options

All the technology options have Moy 110 kV substation (Ballina) as the starting point and either Tonroe (Ballaghaderreen) or Srananagh as the terminating 110 kV substation. The two point to point connections could be built as OHL or UGC¹.

Taking all five criteria of the multi criteria analysis and its respective sub-criteria into account, the best performing option is Moy-Tonroe 110kV OHL.

ID		OHL-MT	UGC-MT	OHL-MS	UGC-MS
Type		OHL	UGC	OHL	UGC
Scheme		Moy – Tonroe 110 kV	Moy – Tonroe 110 kV	Moy – Srananagh 110 kV	Moy – Srananagh 110 kV
Multi-Criteria Assessment	Technical	Green	Dark Green	Dark Green	Blue
	Economic	Green	Dark Green	Dark Green	Dark Green
	Environmental	Dark Green	Dark Green	Dark Green	Dark Green
	Socioeconomic	Dark Green	Green	Blue	Green
	Deliverability	Dark Green	Blue	Dark Green	Blue
Overall		Green	Dark Green	Dark Green	Blue

More significant/difficult/risk

Less significant/difficult/risk

Dark Blue	Blue	Dark Green	Green	Cream
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A more detailed breakdown on the assessment is given below.

Technical: the Moy – Tonroe 110 kV OHL option performance is better to the other options. Therefore, the Moy – Tonroe 110 kV OHL option performs best on the technical impact assessment.

¹ The hybrid of overhead line and underground cable as technology option was not analysed yet and could represent a viable technology option.

Economic: the variations in the economic assessment effectively are balanced out with the exception of total implementation costs. Here, the OHL options perform better than the UGC options due to lower implementation costs for the new circuit. The Moy – Tonroe 110 kV OHL option performs best in this regard, despite the additional cost for the upgrade of the existing Tonroe 110 kV station near Ballaghadreen.

Environmental: the findings of the environmental analysis illustrated that the various options have different potential impacts on the various environmental criteria. Both OHL options score similarly with Moy - Srananagh scoring worst for landscape and visual and biodiversity/flora and fauna. Both UGC options score similarly, with potential impacts on soils and water in sensitive catchments a significant issue for consideration. Overall, the impact of these created a balance, with a ‘moderate’ environmental impact predicted for the various options.

Socio-Economic: both UGC options perform equally and are the best performing options. Comparatively, at this stage the UGCs present less risk and have less impact than the OHL options, lessening the socio-economic impacts generally.

Deliverability: the OHL options perform better or equally to the UGC options with the exception of the requirements for permits and wayleaves. Relatively poor ground and road conditions can be expected in the study area. This could result in significant changes in scope of work and would be associated with delays in construction and installation timelines of the UGC options. Therefore, the 110 kV OHL options perform better for the deliverability assessment.

Overall, the best performing option is **Moy – Tonroe 110 kV OHL** with low-moderate impact (**Green**). **The Moy – Tonroe 110 kV UGC** is the best UGC option with a moderate impact (**Dark Green**). In line with the Framework, these two options will be brought forward into Step 4.

The project now enters Step 4 of The Framework for Grid Development. Here EirGrid will develop various corridors for the two best performing options. EirGrid will engage actively on different corridor options for each of the options. Following that, based on the landowners’ and stakeholders’ feedback, the best performing corridor is specified. Within the corridors we will develop a route which will specify the location of any new equipment or infrastructure.