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## NIE and ESB National Grid

# Louth - Tandragee 275kV Feasibility Study ( South of Border )

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## **EXECUTIVE SUMMARY**

A Joint ESB National Grid (ESB) / Northern Ireland Electricity (NIE) steering committee requested that a feasibility study of potential 275kV Interconnection be carried out in February 2003. This report assessed the feasibility of a new 275kV line between Arva 110kV station and Drumkee 275kV Station.

Following further joint ESBNG/NIE planning studies a further much briefer feasibility assessment be made of two further options as follows

- (a) A new Louth-Tandragee 3 275kV circuit with system security measures in Louth and Tandragee Stations.
- (b) A new 275kV circuit from Drumkee 275kV Station to a new 275/220kV station looped into the Flagford – Louth 220kV line in the vicinity of Kingscourt.

This report studies (a) above south of the Republic of Ireland/Northern Ireland border. There is also a companion report produced by NIE which studies (a) north of the border.

The scope of the project agreed at the outset led to the production of Desktop studies which detailed all physical and environmental constraints that might hinder a route corridor. Typical constraints included Designated Ecological sites & Special Protected Areas, Archaeological & Heritage Sites, Scenic & Tourist Roads, along with all developments & Infrastructure.

Constraint maps were created for both sides of the border and based on a co-operative effort with Northern Ireland Electricity, a natural route corridor began to emerge and became very apparent. From this effort, it was possible to identify the border crossing point which is referenced in this report. The potential route corridors were developed during the desktop survey. Very limited site survey was carried out. However aerial photography flown in 2003/2004 was acquired from the Irish Ordnance Survey.

The on site investigation was very limited and consisted of a very basic 'drive through' survey. A sample of road crossings were inspected to assess if adequate clearances exist at present. Many road crossings could accommodate a route corridor of at least 200m, however routeing possibilities in a small number of areas will be limited by ribbon development.

In order to address security risks this report proposes to build a new 220/275kV station adjacent to the existing Louth 220kV station and looping in the Louth – Woodland 220kV line into the new station. This is considered to be placed on ESB owned land at Louth 220kV Station. It could alternatively be located at some distance from Louth 220kV Station along the Louth – Woodland 220kV line.

It is recommended that considerable further work be carried out on the Louth - Tandragee 275kV Project option south of the border in order to allow assessment to a similar level as that carried out for the Arva – Drumkee 275kV project option. An overall comparison can then be carried out of the two options.

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## 1.0 INTRODUCTION

Following discussions involving ESBNG, NIE and ESBI the following Scope of Work was agreed

The Scope of Work is defined to include:-

- Constraints map
- Desktop study
- Very limited field study
- Cost estimate for above including ESBI and NIE cost estimates both separate and combined to give total project cost. Cost estimates in euro and to be in a similar format to those provided for the recent Arva-Drumkeen feasibility study.
- Separate reports each side of the border to be in a similar format to those provided for the recent Arva-Drumkeen feasibility study.

### **Report Objective**

- The objective of the report is to assess the feasibility of obtaining an overhead line 275kV route between Louth and Tandragee.
- Initial assessment of possible 275/220kV Station adjacent to Louth 220kV Station.
- Overhead line routes will be selected based on achieving a fine balance between Environmental, Engineering and Economic criteria.
- This report was not researched to the same level as the Arva-Drumkeen report due to time constraints.

## **2.0 STUDY AREA**

### **2.1 Introduction**

The first task associated with the project was the defining of the study area. The study area is situated between Louth station and the proposed border crossing in the area of Dungooly cross roads, County Louth which was developed in close consultation with Northern Ireland Electricity and the constraint desktop studies undertaken by both sides of the border in mapping the physical and environmental parameters of the study area.

### **2.2 Makeup of study area**

The study area is between Louth Station and the border crossing area in the vicinity of Dungooly cross roads. The village of Inishkeen and the Special Protection Areas of Drumcah, Toprass and Cortial Loughs lie approximately 4km to the north and just over 3km to the northeast of Louth station respectively.

The study area encompasses approximately 100 km<sup>2</sup> in northwest County Louth and southeast County Monaghan.

The typical landscape throughout this study area is a gently undulating landscape. The land is of reasonable agricultural quality with pasture being the main use.

The study area includes, the N53, R177, R178 and numerous secondary roads. It also includes overhead transmission lines such as Dundalk-Louth 110kV, Dundalk-Louth No.1 110kV, Louth – Tandragee 275kV Line and all the lines exiting Louth station. There are two rivers in the study area, the Fane River and the Castletown River.

### **2.3 Conclusion**

It was concluded that the study area of approximately 100 km<sup>2</sup> would be sufficient in size to accommodate a possible overhead line route from Louth station to the border crossing at Dungooley cross roads.

## 3.0 CONSTRAINTS MAP

### 3.1 Introduction

With the limits of the study area defined, constraints need to be added so as to avoid routing the line in troubled areas. Some constraints were obvious while others were more difficult to quantify. The associated sections of this chapter give a more detailed account of the constraints.

Coloured 1:50,000 Ordnance Survey maps were used for the production of the constraints map. The 'Ordnance Survey Ireland' (Osi) map-sheet used was 36.

The constraints included;

- Land zoning, towns and rural dwellings
- Electrical Infrastructure
- General Infrastructure
- Designated Ecological Sites and Special protected areas
- Archaeological & Heritage sites
- Quarries, Mines and Airstrips

### 3.2 Landzoning, Towns and Rural Dwellings

The route corridor avoided large towns or clustered areas of settlement. In compiling the constraints map and carrying out the onsite investigations, relevant County Development Plans were consulted as to the extents and uses of land zoning around towns in the different counties. Routing was preferable outside these zones thus avoiding or reducing considerably, future conflict due to development etc.

Scattered rural dwellings were to be avoided, keeping the proposed corridors approximately 50-75 meters away from any existing dwellings. Generally along the major arterial routes once off housing would generally be discouraged by The County Councils. Instead developments along the minor roads are less restricted by the County Councils. As a result the minor roads are more congested with once off

housing developments, and building in the areas affecting the proposed route corridor will be inevitable.

### **3.3 Existing Transmission Lines and Substations**

In the Republic of Ireland 110kV line crossings are to be made at or near 90 degrees. There are several transmission lines in the study area namely: Dundalk-Louth 110kV, Dundalk-Louth No.1 110kV and Louth – Tandragee 275kV

### **3.4 General Infrastructure**

Other infrastructure to be highlighted included major roads e.g. N53, R177 and R178, again these need at or near 90 degree crossings where possible.

### **3.5 Designated Ecological Sites**

#### **Designated Areas for Flora and Fauna**

In the Republic of Ireland, such areas are formally designated, or proposed for designation, under EU Directives or national legislation, such as the Wildlife Act, 1976. They are administered by The Department of Environment, Heritage and Local Government (National Parks and Wildlife). The following is a summary of their main implications.

##### ***Proposed candidate Special Area of Conservation (pcSAC)***

This is a statutory designation which has legal basis in the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997 (S.I. 94 of 1997). The main implication of this designation is that any project likely to have a significant adverse impact on the integrity of the pcSAC may only be carried out for “imperative reasons of overriding public interest, including those of a social or economic nature”. Where a pcSAC includes a “Priority Habitat” or a “Priority Species”, as indicated in Annex I and Annex IV of the Directive, then “the only considerations which may be raised are those relating to human health or public safety or, further to an opinion from the Commission, to other imperative reasons of overriding public interest”.

***Designated Special Protection Area (SPA)***

This is a statutory designation, which has legal basis in the EU Wild Birds Directive (79/409/EEC) as transposed into Irish law through the European Communities (Conservation of Wild Birds) Regulations, (various dates). Most (though not all) of these sites are wetlands or coastal areas, which have significant concentrations of birds. The implications of this designation are similar to the pcSAC but there is a provision in the statutory regulations to prevent “pollution or deterioration of habitats or any disturbance whatsoever” affecting the birds which use a SPA.

***Proposed Natural Heritage Area (pNHA)***

This is presently a non-statutory designation which replaced the previous designation, Area of Scientific Interest (ASI), about 1994. It will become a statutory designation when the Wildlife (Amendment) Bill, 2000 becomes law. Most local authority development plans include an objective to protect pNHAs within their jurisdiction so this gives the designation some legal status under the Planning and Development Act, 2000. An application for planning permission for any development, which may have impacts on a pNHA, will be referred by the planning authority to the Department of Environment, Heritage and Local Government (D.o.E.H.& L.G.) for comment.

***Statutory Nature Reserve (SNR)***

This is a statutory designation which can cover either state or private land which is of scientific interest. Reserves are designated under the Wildlife Act, 1976. There is an obligation to manage the land in accordance with the objectives for which it was designated. Most nature reserves are in state ownership and are managed by the National Parks and Wildlife Service. Any state agency which is involved in activities that may affect a reserve is required to consult with D.o.E.H.& L.G. and to take all practical steps to avoid or minimise any damage.

Ecological areas of interest were highlighted from Department of Environment, Heritage and Local Government. These include NHAs (Natural Heritage Areas), SPAs (Special Protection Areas) and pcSACs (proposed candidate Special Areas of Conservation). These areas should be avoided as crossing them would normally be contrary to a future Planning Permission acquirement.

### **3.6 Archaeological & Heritage Sites**

In the Republic of Ireland, archaeological heritage sites are administered by the Department of the Environment, Heritage and Local Government, (D.o.E.H.L.G.).

The most recent boundaries of these designated areas were obtained from the departments' web site.

These include protected buildings, heritage sites including; Megalithic Monuments Earthworks, Ringforts and other types of enclosures, Ecclesiastical remains, crosses, holy wells and burial grounds, Stone fortresses, castles, tower, houses, bawns and forts etc.

For this study archaeological sites are not considered a major constraint due to the high degree of flexibility in locating overhead line structures.

### **3.7 Quarries, Mines and Airstrips**

Most quarries were already marked up from the Ordnance Survey mapping and were highlighted for the constraints study to be avoided. Whilst during the very limited on site investigation one previously unmarked quarry was found. There was no evidence to date, from the councils or from onsite scrutiny that there were any mines or airstrips within the study area.

### **3.8 Conclusion**

Constraint maps were created for both sides of the border and based on a co-operative effort with Northern Ireland Electricity, a low environmentally sensitive corridor was identified.

Using the above constraints plotted onto 1:50,000 map of the study area, a provisional initial 275kV overhead line could be routed and studied within the corridor.

The ideal general direction from Louth to the border crossing will travel in a northwest-southeast direction avoiding these constraints. This enabled a corridor to be marked up onto the map.

## 4.0 ROUTE OPTIONS

### 4.1 Introduction

The constraints map completed in the office was the foundation for on site assessing of suitable corridors. Conclusions from the desktop study were briefly assessed on site in a general way.

### 4.2 Louth – Tandragee Option

With this route option, although the landscape is less undulating than the Drumkee – Kingscourt option and the population density seems slightly less, there are still many obvious constraints. The congested nature of Louth 220kV station, as it exists today, offers very few opportunities for a new line to exit the station. A new 220kV GIS station immediately adjacent to Louth 220kV Station on ESB land is considered. It is assumed that the Louth – Woodland 220kV line would be looped into this new station. Some rerouting of existing lines into Louth 220kV station would be required to facilitate this development. A house is under construction very close to this site. It may be considered more beneficial to relocate this station some distance from Louth 220kV Station to facilitate security requirements which is achievable.

Exiting the station in the direction of Tandragee is also constrained by Drumcah, Toprass and Cortial Loughs (proposed NHA site code 1462), approximately 3km to the north east. This is an area with three sister lakes and surrounding reedswamps, which is of high ecological importance to the area.

Approximately 3.5km north of the station is the village of Inishkeen. The existing Louth – Tandragee 1&2 275kV Line runs very close to the village and it is envisaged that another line closer to the village would not be accepted by the planning authorities. Ribbon development will also pose some constraint to this option.

A possible route has been mapped (see appendices) which is roughly 13km in length. It exits the station in a northerly direction crossing the R178. It crosses the

Fane River just under 2 km north of Louth 220kV station. There is a pinch point here which is very tight, between Inishkeen and the NHA. This will need further examination on site and is critical to the feasibility of the route. The route turns in a northeasterly direction then for nearly 2km until it crosses the Dundalk-Louth 110kV line. From here in the townland of Carrickalust, it parallels a third class road, crossing the N53, the Castletown River, the R177, the Castletown River, the Cully Water river and five 3<sup>rd</sup> class roads before it reaches the border crossing point at Dungooly cross roads. There are several archaeological features in the townland of Dungooly which will limit the routing options in the area.

#### **4.3 Assumptions / Caveats of Route corridor**

This section details the assumptions, comments and caveats associated with the aforementioned route corridor.

##### **General Assumptions / Comments**

- No survey took place of the proposed corridor nor was it walked. Only a very brief drive by survey of all road crossings to check as to the feasibility of the corridor along with ensuring adequate clearances from existing developments.
- It is assumed no additional quarries, mines, airstrips, landfill sites will come on stream. Existing quarries will not extend beyond present geographical limits.
- Rights of way, historical trails etc. were not marked up on constraints maps. It is assumed walking routes (Walk ways) e.g. 'Ulster Way' walking route can be crossed without wayleave / planning problems.
- The Route has not been agreed with the Planning authorities, Public bodies or landowners at this stage.

##### **Planning permission for Substations**

- Planning permission will be received for the new station adjacent to Louth 220kV Station and any rerouting of overhead lines in the vicinity.

**Protection of route corridor**

- The corridor outlined is based on desktop studies and a very brief field study. The width of the corridor is not defined at present.
- It is assumed that the route corridor will not be further encroached by development including, housing Ribbon Development, Transmission lines, Roads etc.
- No additional areas are added to the NHA's, SAC's listings.
- No additional archaeological sites/monuments are added to listings.
- Urban commercial/residential zones are not expanded beyond present limits in towns e.g. Inishkeen.
- Additional scenic viewing points, scenic drives etc are not added by the County Councils.

**Electrical Infrastructure**

- Crossings of existing transmission lines were not investigated
- Conflicts with existing distribution network including 38kV, 10kV and LV have not been investigated or quantified
- Conflicts with existing communication lines including Eircom have not been investigated or quantified.
- No future transmission/networks lines are built in the corridor area.

#### **4.4 Conclusion**

This feasibility study identifies a possible overhead line route option from Louth 220kV Station to a proposed border crossing in the area of Dungooley crossroads, County Louth. The congested nature of Louth 220kV Station as it exists will need to be addressed to facilitate the proposed new 220/275kV GIS Station adjacent to Louth 220kV Station. The length of the route is approximately 13 kilometers. This route is dependent on a number assumptions as listed above in section 4.3.

## 5.0 COSTINGS

### 5.1 Introduction

This section provides the budgetary estimates of the project. The costs are split between station works and overhead line. The costs are subject to a number of caveats as detailed below.

### 5.2 Caveats

The caveats associated with this project are divided into various categories as detailed below:

#### Financial

- All costs are preliminary and gross based on Unscoped Estimates
- The costs assume February 2004 construction rates. Some costs especially those related to steel prices are likely to have escalated considerably since then.

#### Technical

- The costs are unscoped, i.e. the scope of the project has not been defined.
- The costs only assumed a nominal amount of difficult foundations for transmission line structures.
- The costs assume standard materials will be used for construction, i.e. no special camouflaged conductor, no cold formed steel on towers, no camouflage painting of towers.

#### Third Parties

- The costs assumed only nominal difficulty from wayleaves, with Easement purchasing at most road crossings.
- The costs assume no financial burden associated with organized objection groups.

### **Construction**

- The costs assume zero delay during construction phase.
- The costs assume no new archaeological site impacting upon the development will be discovered during construction,
- Scaffolding requirements for major and minor road crossings are an unknown entity.

### **5.3 Conclusion**

From Table 1 it can be seen that the approximate cost of construction for the single circuit 275kV Line to the border is €25,420,000.

**Table 1 Budgetary Estimates for Louth - Tandragee 3 275kV Line**

<b>Single circuit 275kV Lattice tower</b>	
<b>Total</b>	
	€
<b>Overhead Line</b>	15km in Republic. 11,700,000
<b>Station</b>	Louth Station 13,720,000
<b>Total (Lines &amp; Stations)</b>	25,420,000

Produced by: NIE & ESBI  
 Date: February 2005.

**Assumptions / Notes:**

All costs are preliminary and gross based on Unscoped Estimates  
 Louth substation costs assume that sufficient space is available in the station site for GIS option  
 It is assumed that there are no excessive costs arising from the planning process, planning conditions or foundations  
 Overhead Line costs include allowances for wayleave compensation  
 A rate of €1.43 to £stg is assumed  
 Costs based on February 2004 costs as per Arva - Drumkeen report  
 Costs north of the border have not been agreed with NIE

## 6.0 RECOMMENDATIONS

If a transmission line connection is required between Louth and Tandragee 275kV station it is recommended that a detailed route assessment be undertaken based upon the potential route corridor detailed in this report. The line connection will remain overhead from Louth station the border crossing. The line route is approximately 15 kilometres.

It is recommended the line should be constructed using standard lattice steel towers.

It is recommended that detailed site investigation towards developing this study up to the standard of the Arva – Drumkee 275kV study be carried out to aid comparison between the options.

## 7.0 CONCLUSION

This feasibility report concludes that after investigating the requirement of an additional transmission interconnector route corridor between Northern Ireland and Republic of Ireland, that a potential route corridor is currently available as detailed in this report and shown on the attached Map.

Indicative costs were provided on the same basis as that used for the previous Arva – Tyrone 275kV study.

The route corridor can accommodate an overhead line from the existing Louth 220kV station in County Louth to the proposed border crossing at Dungooly cross roads, County Louth.

The route corridor will remain under threat from expanding infrastructural development and one off housing.

## APPENDIX

- **North-/South Interconnector – Route Options Map**