



# A sensible solution for transmitting electricity

## ***'An invading army of Martians ...'***

*'I am especially aware of the situation that has arisen with regard to bringing electricity from Moneypoint power station to the East coast. In my view, that has produced an environmental horror. These great, gangling pylons seem to march across the countryside like an invading army of Martians. They are marching in a dead straight line up hill, down dale, across valleys and through woodlands without any regard whatever to their visual impact on the countryside.'*

*'There is no doubt that the huge pylons now being erected have a horrific effect on the visual aspect of the environment. In my constituency, historic hillsides have been marred by the presence of huge electric pylons.'*

*'Placing such cables above the land has detrimental effects on the natural beauty of the environment. The placing of cables below the land does not seem to be practiced sufficiently... and in this respect the ESB could make a greater contribution towards the preservation of the natural beauty of our environment.'*

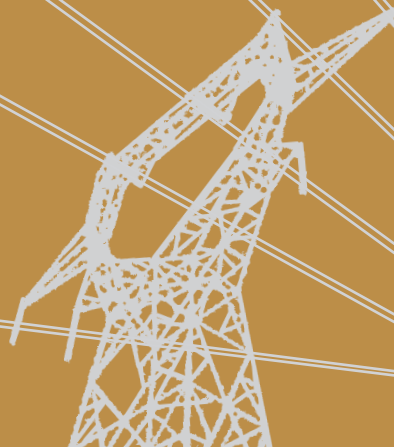
**Comments made by leading politicians in the Dáil debate on the Electricity Supply Amendment Bill, March 1985**



Produced by

**NORTH EAST  
PYLON PRESSURE**

PO Box 106, Navan, Co.Meath, Ireland  
www.pylonpressure.ie  
email: info@pylonpressure.ie



8004\_8k Printed on environment friendly paper

**Underground makes sense**



## CONTENTS

	Page
Introduction	3
The Challenge	4
NEPP Campaign	5
The case for Undergrounding	
Health	6
Environment and Ecology	7
Agriculture	8
Land and Property Devaluation	9
Visual impact and Tourism	10
Heritage and Landscape	11
The Solutions to achieving undergrounding	
Technical and Cost Challenges	12
Cost Benefit Analysis	13
Underground makes sense	14
Organisations that influence our campaign	15
NEPP contact information	16

## Introduction

North East Pylon Pressure (NEPP) is the overall representative group for the people in the North East counties of Monaghan, Cavan and Meath, who advocate that EirGrid's proposed high power electric cables should go underground. We have active, local committees in more than thirty towns, villages or parishes, representing more than 45,000 people potentially affected. We are not professional protesters. We are not 'rent-a-crowd'. We are ordinary, decent people who have been galvanised into action in this campaign because of the threat we face. We are not opposed to progress. In fact, we favour increased recourse to renewable energy sources for the generation of electricity. We also favour a strengthened national electricity grid. But not at any price. Not at the price of people's lives and health and irreparable damage to our environment, heritage and livelihoods.

There is deep frustration in rural communities on this issue and how it has unfolded. EirGrid wants to burden us with an unsafe, unsightly and outmoded technology. Our campaign looks to our elected representatives and to the public bodies charged with evaluating and adjudicating on EirGrid's proposal to have the vision and the knowledge to understand the superior value of an underground strategy. In this booklet, we outline our reasons for advocating that the proposed EirGrid high power electric cables be placed underground in the North Eastern counties of Monaghan, Cavan and Meath. We trust you will find it both helpful and informative. We rely on your continued support to ensure, as guardians of our countryside for present and future generations, that all proposed high voltage overhead lines are placed underground.



*Aimee Treacy, NEPP*



*Francis Lally, NEPP*



## THE CHALLENGE FACING US

There is now a Single Electricity Market on the island of Ireland and in a few years time this will be extended to include Britain and, ultimately, mainland Europe. The idea is to reduce prices by increasing competition in the electricity market, to allow for the import and export of electricity off the island of Ireland and to provide a greater security of supply. To facilitate these market developments, two interconnectors will be built on the sea bed between Ireland and Britain as well as an interconnector from Moy, in County Tyrone, to Batterstown in County Meath.

### North-South Interconnector

EirGrid, in collaboration with Northern Ireland Electricity (NIE) is proposing to build a North-South electricity interconnector through counties Meath, Cavan, Monaghan and Tyrone using 400 kV extra high voltage overhead lines and pylon towers, at an estimated cost of €280 Million. Three route corridor options have been chosen. All three route options are based on overhead lines only, with no consideration given to an underground cable alternative.

### All Island Grid Study

In January 2008, the Department of Communications, Energy and Natural Resources published the “All-Island Grid Study”, outlining a strategy to generate 42% of our electricity requirement from renewable resources. This will require a major upgrading of the electricity transmission network, with an estimated combined public and private industry investment cost of almost €10 billion. Additionally, the ESB has announced a €22 billion Development Programme up to 2020. Half of their planned expenditure - €11 billion – will be spent on moving ESB’s generating capacity from fossil fuels, like gas and coal, to renewable sources. Significantly, because the energy will be mainly generated along the Atlantic seaboard of the South West and West, over 650 km of additional high voltage lines, with 30 metre high pylon towers, will be necessary to carry the power. Also, a further 5,000 km of distribution overhead lines will be required.

Although the all-Island Grid Study took two years to complete and involved spending €1 million of taxpayers’ money, the option of undergrounding the extra high voltage transmission lines was not considered.

These related and interlinked announcements have a profound potential negative impact on our countryside. Yet, very little awareness or debate has taken place on this issue of national importance.

## NORTH EAST PYLON PRESSURE - OUR CAMPAIGN

North East Pylon Pressure (NEPP) was formed in November 2007 in response to the massive public outcry relating to EirGrid’s announcement of its plans for a North-South interconnector from Meath to Tyrone. There is major public disquiet and concern across Meath, Cavan and Monaghan in relation to the proposal to establish the North-South interconnector using 400 kV Extra High Voltage overhead power lines. The strong consensus is that the interconnector should be built using Underground cables instead of Overhead transmission power lines.



### Our campaign objectives are as follows:

- Build a rational, cohesive and comprehensive case for an underground cable alternative
- Influence the political process to achieve consensus on undergrounding
- Achieve a change in policy through public support and a people power campaign
- Challenge EirGrid policy, tactics, timelines and technicalities

### THE CASE FOR UNDERGROUNDING

The following aspects will be positively impacted by choosing the underground alternative:

- Our fears and anxieties in relation to health risks will be alleviated
- Our environmental and ecological responsibilities will be better served
- Our agriculture and farming industries and communities will not be penalised
- Our land and properties will not be devalued
- Our tourism industry and areas of scenic beauty will be preserved
- Our heritage and landscape areas will be protected
- Our responsibility as guardians of the countryside for future generations will be fulfilled

The following sections, under a number of important headings, summarise the main arguments in favour of undergrounding.

**Underground makes sense**



## HEALTH

### There are two aspects of relevance:

- Concerns over the potential health effects of overhead lines
- Health effects caused by the stress and anxiety of being near to these lines. The majority of people and a considerable number of leading experts believe that electro-magnetic fields from overhead electricity lines adversely affect health.

### Issues of Concern to the Public

- The International Agency for Research on Cancer classifies Extra High voltage overhead transmission lines as a “possible carcinogen (group 2b)” for childhood leukaemia.



- Threshold levels for exposure to electromagnetic fields should be set well below the level where there is a documented risk of developing childhood leukaemia. Current international compliance limits, however, do not reflect this requirement, as they are set at 250 times above the levels observed to double the risk of developing childhood leukaemia.

- Since the year 2000 there have been 107 scientific papers published in peer reviewed journals. Sixty nine of those linked electromagnetic fields to various forms of cancer, thirty were inconclusive and only eight showed no links.

- A significant body of research by Professor Draper of Oxford University in 2005 in Britain found that living within 200 metres of high power lines increases a child's chance of getting leukaemia by 69% and within 600 metres it was increased by an average of 20%. EirGrid currently will not even commit to placing the lines a minimum of 50 metres, without exception, from existing dwellings.
- A report in 2007 by the UK Government Stakeholder Advisory Group on electromagnetic fields notes that there is a cost/benefit analysis for all health issues of 1:50. That is, €1 million spent reducing electromagnetic field exposure is recouped in €50 million worth of health benefits.

## ENVIRONMENT AND ECOLOGY

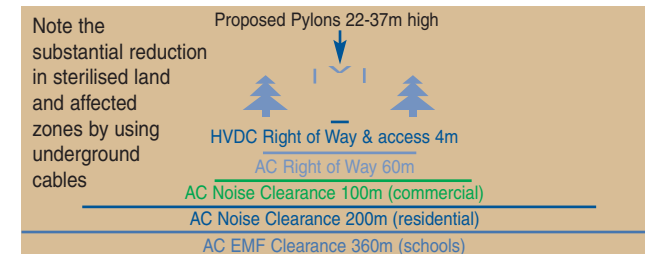
The subject of climate change and our responsibilities in relation to greenhouse gas emissions has been brought to centre stage. Undergrounding of the North-South interconnector and future proposed extra high voltage lines is significantly more environmentally responsible than the increased construction of overhead pylons, for a number of reasons:

### There will be reduced greenhouse gas emissions through reduced power transmission losses:

- Transmission losses represent a loss in value and an increase in fuel burn and environmental impact. In Europe, transmission line losses alone represent the waste of around 20 million tonnes of coal, 3.1 million tonnes of gas and 1.7 million tonnes of oil. The annual loss in value is around €12 billion. The annual increase in greenhouse gas emissions is around 60 million tonnes of carbon dioxide per year. In some countries, older transformer infrastructure and lines can yield losses as high as 21%. Ireland's grid losses are above the European average.

### There will be a reduced carbon footprint by using less land and materials:

- Underground cables and overhead lines have significantly different footprints through the countryside when completed. While an overhead line requires a strip of around 60 metres wide to be kept permanently clear for safety, maintenance, and repair, an underground cable of the same capacity requires approximately 10 metres.
- The use of high quantities of steel and concrete in the construction and placement of pylons on land adds greatly to the carbon footprint, in comparison with the latest advances in underground cabling.



### Undergrounding eliminates noise pollution associated with overhead lines

- Noise is one of the most pervasive pollutants of the modern world. Overhead Extra High Voltage lines contribute to noise pollution.

### Undergrounding eliminates collision and electrocution hazards related to wildlife, especially birds

- Above-ground power lines pose three main risks or perils to birds: risk of electrocution, risk of collision and loss of habitat quality in staging and wintering areas.



**Underground makes sense**





## AGRICULTURE

Agriculture and farming is an integral part of the region affected by the proposed North-South interconnector. Farmers and landowners are opposed to these pylons being placed on their land. There are a number of practical reasons for this:

### Overhead pylon towers and lines represent intrusion, invasion and inconvenience to farming:

- Overhead pylon towers are a source of significant intrusion and invasion onto farmers' lands, both in the construction phase and when established as permanent fixtures. Everyone involved in farming knows how troublesome and time-consuming it is to have to work around poles, never mind pylons, in fields from a machinery and working the land perspective. Undergrounding eliminates all of these problems forever.
- **Farmers and their employees' health and safety** are affected. Farmers and their employees will be at most risk from overhead lines. The public at large worry about how far away they will be located from these lines, but farmers on a daily basis will have to walk and work under these lines.
- There are numerous studies highlighting the **negative impact of overhead lines on livestock, bloodstock and indeed crops**. Bloodstock in particular are well known to react negatively in the vicinity of such lines. Additionally, detrimental effects associated with overhead lines have been recorded in a range of species, such as bees, where their directional sensing becomes distorted

- Farmers are very concerned about **exposure to future litigation issues**. This relates to the legally uncertain area of a possible link between land ownership and responsibility for health claims that might ensue from neighbours and neighbouring properties where pylons are located in adjacent farmers' fields.



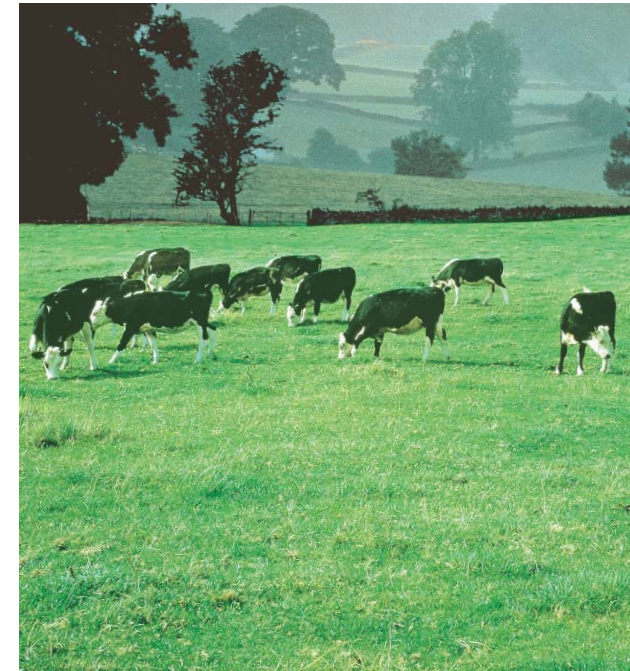
## LAND AND PROPERTY DEVALUATION

Studies have been carried out over the last fifty years to assess the impact of overhead power lines on the value of residential property and land in close proximity to pylon towers. The results of numerous such studies show that power lines have a statistically significant negative impact on both land and property values. Furthermore, properties with unrestricted views of such overhead lines are also significantly negatively affected.

Over sixty studies have been carried out over the last fifty years to assess the impact of overhead power lines on the value of residential property in close proximity. The most common effects identified and cited in court cases in the US are claims of reduction in market price, properties being slower to sell and a decrease in sales volume. Factors such as unsightliness, visual and noise pollution were often identified as negative influences on property values.

A study carried out in Britain in 2007 showed the value of detached properties at a distance of less than 100m from overhead transmission lines was 38 percent lower than comparable properties. The effect of devaluation has been seen up to two and a half kilometres from such lines.

In relation to non-residential holdings a rigorous and comprehensive study in Canada over 20 years ago found that the per acre values from more than 1,000 agricultural property sales were 16-29 percent lower for properties with easements for transmission lines than for similar properties without easements.



Underground makes sense

## VISUAL IMPACT AND TOURISM

The future of Irish tourism is closely associated with the quality of our environment. Ireland's distinctive scenic landscapes, rivers and lakes, and cultural heritage are the bedrock upon which Irish tourism has been built. Ireland is marketed heavily worldwide for its "natural scenic landscapes" and for its "environment".

In 2006, overseas tourist visits to Ireland increased to an estimated 7.4 million; tourism total foreign exchange earnings were €4.7 billion; and the tourism and hospitality sector supported 12% of jobs in Ireland. Annual visitor surveys repeatedly confirm that Ireland is prized by overseas visitors for its clean, green image. In 2006:

- **80% of visitors rated Ireland's scenery** as an important reason for visiting Ireland;
- **74% said they were attracted by the natural unspoilt environment;** and
- **75% of overseas visitors agreed with the statement that "Ireland is a clean and environmentally green destination".**
- Last year, Fáilte Ireland and the Northern Ireland Tourist Board surveyed 1,400 overseas and domestic tourists on their attitudes specifically to electricity pylons, mobile phone masts and wind farms. According to Fáilte Ireland, 'a majority of tourists consider that electricity pylons constitute a negative visual impact on the Irish landscape'.



Fáilte Ireland have further stated that they 'would favour underground cables rather than overhead electricity transmission lines as the preferred option'. Construction of extra high voltage lines across the North-East will negatively impact tourism in this region. Furthermore, special tourist attraction activities will be negatively affected, such as:

**Equestrian:** Stud owners and owners of centres have repeatedly voiced their objections to the erection of overhead pylons in the proximity of their lands. These concerns relate to health issues for their bloodstock.

**Angling:** Throughout the three proposed routes there are numerous rivers and lakes where angling generates significant tourist numbers such as the Blackwater, River Boyne, Lough Oughter and the Shannon and Erne rivers.

**Ballooning:** Meath is the main centre of hot air ballooning in Ireland. Hot air balloons by their nature, fly at fairly low levels and the risk of contact with power lines is certain to increase where there is a concentration of these lines.

It is important that visual impact criteria related to county development plans for Monaghan, Cavan and Meath are adhered to in relation to the proposed overhead route corridors.

## HERITAGE AND LANDSCAPE

Our heritage is inextricably linked to our identity as people, communities and as a nation. **Our heritage, although dynamic and constantly evolving, is a non-renewable asset and resource that requires careful and informed management.** It plays an essential role in maintaining a high quality of life and is a crucial basis of our tourism industry.

**The North East is an area endowed with strong heritage, from archeological sites of world renown, to scenic landscapes that need protection from visually obtrusive structures.**



**The North East is the heritage capital of the country.** It includes sites of world renown, such as Brú na Bóinne, one of only two world heritage sites in the country, and Tara.

County Monaghan has a unique natural, built and archeological heritage. The unique features include the drumlin landscape from which the county takes its name. The drumlin landscape has given rise to a variety of natural and semi-natural habitats including wetland, woodland, lake, river and upland habitats that support a wide range of plant and animal species. These areas are in the main extremely sensitive and are susceptible to any change that affects the ecological balance.

Monaghan county's rich archeological heritage includes a collection of ring forts, cairns, crannogs and burial grounds.

In Cavan, the proposed location of a substation is in one of the most scenic and environmentally sensitive regions of the county. The area is steeped in heritage. It has qualified as a National Heritage Area and is special policy within the Cavan Development plan 2009-2015.

There are hundreds of listed archeological features along the proposed route corridors.

**Future generations will not thank us if we needlessly erode the special character and quality of Ireland's landscape.** It would be a fitting legacy of our campaign that, while we facilitated economic development, we still took the time to provide a sound basis for protection of what is one of our irreplaceable assets, the Irish landscape.

**Underground makes sense**





## TECHNICAL AND COST CHALLENGES

For over a century electrical transmission systems have been based mainly on overhead transmission lines. The principal reason for this has been the cost advantage when compared to high-voltage underground transmission. Up to the late 1990's this cost premium against underground transmission was in the range of 5 or even 15 times the traditional overhead transmission alternative. However, this comparison is already out of date and multiples can now be as low as equal to or only twice the capital cost of overhead transmission lines. This can be seen in the increasing utilisation of underground cable methods throughout the world and in Europe in particular.

### A number of factors are affecting this change:

- Environmental restrictions are increasing the costs and implementation time for overhead transmission. EirGrid in its "Draft Transmission Plan 2007-2011", published in October 2007, highlight that the time from design to construction of an underground cable project is 4 years, compared to 7.25 years for a 400kV overhead line. The reality is that this is being exceeded in many cases, resulting in 10 to 15 year delays because of landowner and public opposition.
- Technological developments in recent years by companies such as ABB have significantly reduced unit and capital costs of underground line construction. With new burial and jointing techniques, underground cable projects that once took years to complete can now take only months to install.
- There is general industry acceptance that underground cables are far more reliable, have lower maintenance costs, and have greater longevity. Several studies confirm the reliability of underground transmission:
  - North Carolina Utilities Commission (Nov. 2003) found that underground outage rates are 50% less than overhead rates
  - Maryland Public Service Commission (Feb. 2000) found that underground systems of urban utilities have lower frequency and duration of outages
  - Australian Government (Nov. 1998) found that high voltage underground systems had 80% less outages than overhead lines

Accordingly, maintenance costs are substantially reduced to approximately 10% of those for overhead power lines.

- **Improved Monitoring:** To reduce outage time, power system operators can monitor underground cables through built-in temperature sensors. In the rare event of a cable fault, advanced monitoring will allow faults to be located immediately to within 1 metre and repairs to be carried out in a much shorter timeframe than in the past.

## COST BENEFIT ANALYSIS

When analysing a power project, **consideration must be given to the costs over the life-cycle of the system installed** as well as to the up-front costs:

- The up-front cost is paid in the first instance.
- The life-cycle cost includes not only the up-front cost, but also the costs of maintenance and cost of power losses in the system over time.

Efficient modern systems of any kind usually cost more up-front, but save money in the long term.

While every cable system has project specific costs, the interconnector cables running through Monaghan, Cavan and Meath would be cheaper because the flat terrain provides favourable conditions for laying cables.

NEPP examined a number of cost models using the above parameters. Based on the reduction in transmission loss alone NEPP believes that no additional costs would ensue to the consumer if underground costs were even 2.4 times that of overhead lines over a 30 year lifecycle.

NEPP estimates that **even at the extremely unlikely multiple of 5 times the cost of overhead lines the additional cost passed on to the consumer would be no greater than €2.20 per month.**



**Underground makes sense**



## UNDERGROUND MAKES SENSE

Worldwide, the use of underground transmission is increasing rapidly. Currently, there are approximately 5,500 km of high voltage underground cable in Europe. In the past ten years there has been a 73.1% rise in underground cabling. Denmark, for example, now has 19.43% of all of its transmission lines underground. The UK has 8.04%. In France, 25% of all high tension lines must now be placed underground. Even in Ireland, we see from EirGrid statistics that 5.01% of these lines are underground. Importantly, Eirgrid have already announced that it proposes to build a 30 km underground cable from Rush, County Dublin, to Batterstown, County Meath.



Cables laid-out prior to burying.



Purpose built machines cut channels causing minimal disturbance.



Land recovery after cable laying occurs quickly, leaving the land clean and more importantly, free of pylons.



## ORGANISATIONS THAT INFLUENCE OUR CAMPAIGN

### *Decision Making Bodies*

#### **Department of Communications, Energy and Natural Resources**

Responsibility for the Telecommunications, Broadcasting and Energy sectors. It regulates, protects and develops these critical sectors. <http://www.dcmnr.gov.ie/>

#### **Department of Environment, Heritage and Local Government**

Responsibility to promote sustainable development and improve the quality of life through protection of the environment, including noise pollution, and heritage. The Department is also legally entitled to make a formal submission to the planning authorities in relation to the heritage aspect of any planning proposal. <http://www.environ.ie/>

#### **The Commission for Energy Regulation**

Independent body responsible for overseeing the liberalisation of Ireland's energy sector. <http://www.cer.ie/>

#### **EirGrid**

Independent electricity Transmission System Operator in Ireland and the Market Operator in the wholesale electricity trading system. <http://www.eirgrid.ie/>

#### **ESB**

Founded in 1927, the Electricity Supply Board (ESB) is a statutory corporation in the Republic of Ireland. It is 95 per cent owned by the Government of Ireland, with the remaining shares held by an employee share option trust. [www.esb.ie](http://www.esb.ie)

### *Influence Organisations*

*Joint Oireachtas Committee on Communications, Energy and Natural Resources*

<http://www.debates.oireachtas.ie/>

Cavan County Council

Fáilte Ireland

Gaelic Athletic Association

Irish Auctioneers and Valuers' Association

Irish Countrywomen's Association

Irish Creamery Milk Suppliers Association

Irish Farmers Association

Macra na Feirme

Meath County Council

Monaghan County Council

National Heritage Council

<http://www.cavancoco.ie/>

<http://www.failteireland.ie/>

<http://www.gaa.ie/>

<http://www.iavi.ie/>

<http://www.ica.ie/>

<http://www.icmsa.ie/>

<http://www.ifa.ie/>

<http://www.macra.ie/>

<http://www.meath.ie/>

<http://www.monaghan.ie/>

<http://heritagecouncil.ie/>

Underground makes sense

