

The background is a solid blue color with a complex, abstract pattern. It features several overlapping, wavy, light blue lines that create a sense of depth and movement. In the center, there is a grid-like pattern formed by these overlapping lines, creating a series of diamond-shaped or square-like cells. The overall effect is a modern, digital, and architectural aesthetic.

Infrastructure

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Article 23: Is the Northern Ireland Telecommunications Market Competitive?

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INTRODUCTION

Why is it that in most people's minds infrastructure means roads, water and electricity? Why is it that telecoms is assumed to be about phone calls and email? Is it, perhaps, because the United Kingdom has a fully privatised and competitive telecommunications market? While nobody claims it is perfect it has changed and grown dramatically over the last 21 years:

This article examines the development of the UK telecommunications market and, in particular whether there is a separate Northern Ireland telecommunications market. If there is, how competitive is it compared to other parts of the UK and the ROI market? All shall be revealed.

1984 - BIRTH OF THE UK TELECOMMUNICATIONS MARKET

Although the 1984 Telecommunications Act acted as midwife for the newborn privatised telecommunications market in the UK it was a rather protracted labour. It was in 1980 that the then Secretary of State for Industry, Sir Keith Joseph, separated the General Post Office (GPO) into two organisations - the Post Office and British Telecom - thus beginning the processes that lead to a privatised telecommunications market.

Up until that point the GPO (prior to 1969 a government department in its own right) had a complete monopoly not only in providing services but also in the supply of equipment. It had a UK wide pricing policy and its core business was enabling its customers to make phone calls and send faxes.

The GPO built and controlled the UK Public Switched Telephone Network (PSTN) - defined as the complete network of interconnections between telephone subscribers, operated for public use. The interconnection of the UK and other parts of the world is through submarine cable networks which are mostly owned and managed by multinational telecoms companies. The PSTN has two major and distinct elements:

- A nationwide core network which distributes traffic throughout the UK and is connected to other companies' networks and the international telecoms networks. The core network predominantly uses fibre optic cable;
- Local access network made up of pairs of copper wires spreading out from the telephone exchanges to the customers premises. The access network connects to the core through (telephone) exchanges.

UK telecoms market- revenues and capital expenditure

Table 1

	1984	1985	2002	% INCREASE
Telecoms revenues	£18billion		£50billion	277%
Telecoms as proportion of GDP		1.7%	2.3%	0.6%
Telecoms net yearly capital expenditure	£3.7billion		£9billion	243%
Telecoms as % of UK capital expenditure	4%		8%	100%

Note: All costs at 2002 prices

Source of data: OFCOM Strategic Telecommunications Review 2004.

The PSTN is the UK's legacy telecoms network, built originally to carry telephone calls (voice traffic). When BT plc was formed all parts of the UK had equal access to the PSTN (with the exception of some remote parts of the Scottish Highlands and Islands). Northern Ireland was so well integrated into the UK Telecoms infrastructure that BT was able to operate its Directory Enquiry service for the London area from Enniskillen.

The regulator, the Office of Communications (Ofcom), regards the UK as a single homogeneous market. It almost certainly was 21 years ago when the newly privatised BT was encouraging people to make phone calls (do you remember the BT Buzby adverts?)

There are now effectively three distinct telecoms markets:

- The fixed line market;
- The cellular or mobile market; and
- The Broadband market (including corporate services).

The separation of the overall telecommunications market in this way has implications for (and has to an extent been caused by) competition. Similarly it has (very expensive) implications for telecommunications infrastructure.

Fixed line, mobile phones and broadband services all use the telecoms core network. Mobile phones use masts for 'the last mile' to and from customers but connect to the fixed line core network to move calls around the country/world. The 'cuckoo' in the PSTN nest is BROADBAND. Like all cuckoos Broadband is literally eating its host out of house and home, and it all comes down to bandwidth.

Bandwidth is the amount of data that can be transmitted in a fixed amount of time. For digital devices (telecoms core networks have been digital for over 20 years) this is usually expressed as bits per second (bps). A phone call requires up to 56,000 bits per second (56Kbps). The lowest broadband speed is 512Kbps, domestic users often use between 1 - 2 Mbps (Megabit per second = 1000 Kbps). Many of BT's rivals are offering 8 Mbps.

There are now 9.8 million broadband users in the UK, 205,000 in Northern Ireland alone- that's a lot of broadband and a lot of ongoing and expensive investment in telecoms infrastructure.

The PSTN was not designed for broadband and over the years layers of new technology and systems (50% of modern telecoms systems is software) have been added to increase speeds and capacity. As broadband volumes increase so the industry has had to invest in extra capacity, upgrading switchboards, developing ways of increasing speeds over existing infrastructure. The critical factor is the percentage of the network that is fibre as opposed to copper. While the industry (especially BT's research & development laboratories) has been able to increase speeds over pairs of copper wires, the longer the distance to the customers' premises the slower the broadband speed.

Upgrades to the PSTN have been carried out where needed to meet the demand for services in the area reached by a telecoms exchange or exchanges. High demand is usually commensurate with high population density and/or organisations with significant telecoms needs. The PSTN has, as a result, become strongest in large urban or commercial areas and progressively weaker in

areas where the population and industry density is low.

As densely populated areas are also the areas with the biggest concentration of high capacity, broadband enabled exchanges, the cost of providing services to customers is lower than for lower density communities. There is a direct inverse relationship between population density, proximity to the telecoms exchange, broadband speed and cost:

- High population density in the area served by a telecoms exchange equals increased broadband speeds and lower broadband costs.
- Low population density in the area served by a telecoms exchange equals lower broadband speeds and higher broadband costs.

The result is that the UK market has fragmented into a collection of local markets determined by a combination of population/commercial density and the quality of the available telecoms infrastructure.

THE MANY FACES OF COMPETITION IN THE UK MARKET

Twenty one years ago, customers had a choice of BT or... BT or, if you were a business in the City of London, the recently formed Mercury Communications (now part of Cable & Wireless). The only exception was the Kingston upon Hull City Council area which has had its own telecommunications company since 1902 (http://en.wikipedia.org/wiki/Kingston_upon_Hull for more information).

Today there are now approximately 170 public fixed telecommunications providers, 5 mobile providers (with their own infrastructure), 59

Mobile Service Providers (MSPs) and 700 Internet Service Providers (ISPs). However according to OFCOM at the time of the 2002 market review “there are varying degrees of competition through the sector in the form of different services and at different points in the value chain”. By 2002, BT’s share of voice calls had fallen to 60% and international calls to 30%. However, in many markets such as residential access (82%) business access (87%) and wholesale call origination (78%), the regulator concluded that BT continues to have Significant Market Power.

The cost of infrastructure build is an obvious barrier to entering any telecoms market and equally provides BT with a significant market advantage. The regulator therefore set out from the start to make it possible for telecoms companies to have access to BT’s infrastructure and services on the same commercial terms as BT itself.

There have been many accusations over the years that BT gives itself preferential and/or better treatment than that provided to its competitors. There have also been some very vocal calls for OFCOM to split BT up as a means of encouraging competition. The Strategic Telecoms Review carried out by OFCOM in 2005 did not recommend splitting up BT. However a binding agreement was reached committing BT to create a new organisation within BT group called Openreach. Openreach came into operation in January 2006 and, as stated on their website (www.openreach.co.uk):

“Openreach has been created to deliver installation and maintenance services on behalf of Britain’s telephone and internet service providers. This means we will service, support

and maintain the wiring, fibres and connections that link millions of homes and businesses in Britain to communications networks. Openreach has been created to treat every communications provider in an even-handed way.”

It is very interesting that Northern Ireland is one of the very few locations where Openreach does not have an operational presence (the other being parts of the highlands and islands in Scotland). However in almost every other respect Openreach does business in Northern Ireland and all its products are available on an ‘equivalence of input’ basis and on exactly the same price, terms, conditions etc. as those available in other parts of the UK. Service providers (other telecoms companies) have the choice of buying Openreach products directly from them or through BTNI.

WHO ARE THE COMPETITION?

The main sources of competition within the UK are:

- Companies with their own fixed line networks;
- Companies who use BT infrastructure to deliver services - both voice and broadband; and
- The mobile phone operators.

COMPANIES WITH FIXED LINE NETWORKS

As stated earlier the cost of constructing a UK fixed line network on the scale of the BT infrastructure is a significant barrier to entering the market. Over the last 20 years no companies have attempted to do this opting instead to either rent services from BT or construct networks serving specific geographic regions.

The first company, other than BT, licensed to offer telecoms services was Mercury Communications Ltd in 1983. Their first network was built to serve the City of London and later became the first

company to offer an alternative telephone service. In 1997 Mercury was renamed Cable & Wireless Communications. The company is the 3rd biggest provider of IP services to FTSE 350 customers (behind BT and MCI/Verizon).

The recently merged cable companies, NTL and Telewest operate primarily in the domestic and business markets. They offer what is known as the ‘triple play’- telephone, broadband and television services. The addition of Virgin mobile to NTL Telewest means ‘quadruple play’ will soon be available. The company is the biggest fixed line competitor to BT in the UK and own networks covering around half of the UK.

None of the fixed line operators have extensive nationwide infrastructure. There are therefore significant differences in the level of competition in locations where these companies operate (all of which are urban) compared to other areas (smaller urban and rural).

COMPANIES USING BT INFRASTRUCTURE

Regulation of the UK telecoms market permits companies to rent services from BT and resell them to the public. In practice virtually all telecoms companies rely on access to BT’s infrastructure, although the degree of reliance varies greatly. However the companies I am referring to here rely completely on BT’s core infrastructure.

These companies tend to compete either in the market for voice services (business or domestic) or as Internet Service Providers using the BT ADSL broadband product. The companies can therefore provide services to well over 95% of UK businesses and households. However there has been, in the last 12 months, a significant development which

has lead to higher speeds and lower prices being offered in the most densely populated parts of the UK - **Local Loop Unbundling (LLU)**.

This is a process whereby a company installs its own equipment in the BT exchange and becomes responsible for the pairs of copper wires to the customer (infrastructure known as the local loop). After a very slow start, LLU has grown rapidly (over 4,000 lines per week are being added) but this has been concentrated in the very large urban and/or commercial areas. However, as explained earlier in this article, distance from the exchange also directly impacts on the service that can be delivered - basically as the distance from the exchange increases the ability to deliver a service reduces.

LLU has increased competition in the limited but increasing number of areas where it has taken place. It can reduce the cost to the telecoms company of providing a service to customers but requires a critical mass to do so and close proximity to BT exchanges. Easynet was one of the first companies offering LLU and its trigger for unbundling an exchange is 25 business customers requiring between 4 and 8 Mbps broadband services. In order to be able to get that sort of broadband speed the companies need to be within 2 km of a BT exchange. It is therefore limited to high density urban/commercial areas.

LLU is attracting very significant investment targeting the domestic market. Part of the reason is that the broadband speeds it can deliver make video to the home or broadband TV services possible. For example, AOL have announced that they will be spending £50 million in the first part of 2006 to reach up to 300 (BT) exchanges which will give them access to 20% of the population. If

successful, AOL is planning to invest £70 million to expand this to 1,000 exchanges and 50% of the UK population. AOL is proposing to deliver services in excess of 8Mbps through the use of a technology called ADSL2 (which in theory at least can deliver up to 24 Mbps). However the reach of ADSL2 may be limited to 1-2km from the exchange. To get an idea of the problem it should be pointed out that while 50% of the UK population can be reached through 1,000 exchanges, it takes a further 4,591 exchanges to reach the remaining 50%. There are 191 exchanges in Northern Ireland.

LLU is also the technology behind the offer of free broadband from the Carphone Warehouse. This offer depends on signing up for the company's voice offering called Talk, Talk. It is another example of communications services being assembled as packages to attract customers, be it voice and broadband services in this case to the cable companies offering voice, TV and broadband (with mobile telephony to be added to the list as a result of the NTL/Virgin Mobile deal).

THE MOBILE PHONE NETWORKS

The first licences to operate cellular (mobile phone) networks were granted to Cellnet and Vodafone in 1983. Mobile phones use wireless technology and consequently a network of masts, etc., had to be built before the first commercial services could be delivered in 1985.

The development of mobile telephony has provided an alternate telecommunications business model. Wireless networks are much cheaper to build than fixed line systems - there still has to be an interconnection with a core fixed line telecommunications network (otherwise it would be impossible to make calls from mobile phones

to conventional phones and vice versa) but as a business model it is proving very successful. Over 82% of adults and 90% of children over the age of 10 own mobile phones. Approximately 31% of all voice calls are now made from mobile phones clearly making a significant impact on the profits of the fixed line operators.

There are five mobile phone operators in the UK (not counting virtual operators using other company's networks) and, in order to meet their licence conditions, they operate in all regions of the UK (although not obliged to provide a universal service). The mobile phone sector is the most competitive part of the telecoms market. Although much hyped, mobile phone technology has not quite reached significant broadband speeds. It may only be a matter of time.

WHAT ABOUT COMPETITION IN NORTHERN IRELAND?

The UK telecommunications market has changed dramatically since 1984. Although BT continues to have over 80% of the overall market it faces strong competition in the voice market from around 300 service providers and the five mobile phone companies. It also faces competition from companies like Cable & Wireless in the commercial sector and from the cable companies in both the voice and broadband sectors.

Voice services are delivered either over the Public Switched Telephone Network (PSTN) or mobile (cellular) networks. Competition for voice services is more or less consistent across the UK except in very remote areas. Northern Ireland has the most extensive core and access telecommunications networks in the UK (and quite possibly in Europe). The percentage of the population in Northern Ireland within the reach of these companies

is between 97.5 and 100%. In terms of voice services Northern Ireland is easily as competitive as other parts of the UK.

In terms of telecoms services delivered by the mobile phone companies the issue is about the percentage of Northern Ireland covered by cellular phone masts. The mobile phone operators, as part of their licence conditions, are obliged to provide coverage to 80% of the UK. All five mobile phone operators provide service in Northern Ireland. Opposition to the location of mobile phone masts is common in many parts of the UK and ROI. Difficulty obtaining mast sites can be particularly strong in Northern Ireland's border area which has led to problems with both coverage and inadvertent mobile phone roaming (where a mobile phone user in Northern Ireland ends up using a signal from a mast in ROI). In terms of mobile phone services Northern Ireland is, overall, as competitive as any other part of the UK.

In addition to fixed line and mobile there are also telephone services delivered by Voice over Internet Protocol (VoIP). Examples of companies providing this service are SKYPE, Vonage and , although not well known for this, BT. VoIP relies on an internet connection (broadband) rather than the traditional telephone line. VoIP normally involves a subscription charge but calls to another user on the same network are often free. However calls to somebody using a traditional telephone usually attract a charge. The telecoms consultancy TeleGeography reported in February 2006 that VoIP traffic now accounts for 10% of all call transfers worldwide, up from 6% in 2001. Western Europe appears particularly slow in taking up this technology compared to Latin America, East Asia and Eastern Europe.

Competition in the provision of broadband in the UK can be very location specific.

Internet Service Providers who rely on BT's ADSL product offer services throughout the UK. Over 100 ISPs offer services in Northern Ireland including some local Northern Ireland companies.

For the higher broadband speeds the situation is different. It is not the typical situation where the market in all parts of the south east of England is more competitive than in the north east or that all parts of Wales or Scotland are less competitive. It is not a regional issue but rather a combination of population density and availability of infrastructure capable of delivering broadband.

It is therefore entirely possible to have very high levels of competition in one location and a much lower level of competition 5 km away. The further the customer is from the core network the more expensive it is to provide broadband services. For many years communities in Cambridge could not get broadband despite the proximity of Silicon Fen and the University and this story is repeated throughout Europe. As broadband speeds increase the digital divide problem may become greater.

Looking specifically at Northern Ireland a similar picture emerges. Northern Ireland's physical separation from the rest of the UK by the Irish Sea and peripheral location do not adversely impact on telecommunications because of the number of undersea cables, telecoms cables, linking the two islands.

The diagram shows the main telecommunication cables serving both Northern Ireland and ROI.

As can be seen from the map there are ample

communication links from other parts of the UK. These provide services not just to BT but also NTL, Cable & Wireless, MCI and local companies such as Bytel Networks. While the level of competition in the immediate Belfast area is not as great as in central London it is comparable to most large urban areas in the UK.

However the competitive telecoms market in Belfast, especially for business customers (Cable & Wireless, MCI and Bytel do not provide services directly to domestic customers) is not shared through Northern Ireland.

The main disadvantage is the low population density although this is partially offset by our immensely strong and extensive core telecoms networks. All 191 BT exchanges in Northern Ireland are linked by fibre and, as a result of the DETI broadband services contract, all are broadband enabled.

In addition to BT's network there is the NTL fibre network which provides competition in both the fixed line and broadband markets. There are smaller networks owned by Cable & Wireless and local telecoms companies, for example Bytel and NTR.

The reason why these networks and the area they cover is so important is that they give Northern Ireland an advantage over comparable areas in the rest of the UK. The main issue regarding the delivery of higher speed broadband is the cost of reaching consumers, business or domestic. The main factors determining cost is the distance between the exchange and the customer, and population density.

Northern Ireland's very extensive (fully fibre) core

International Links October 2001

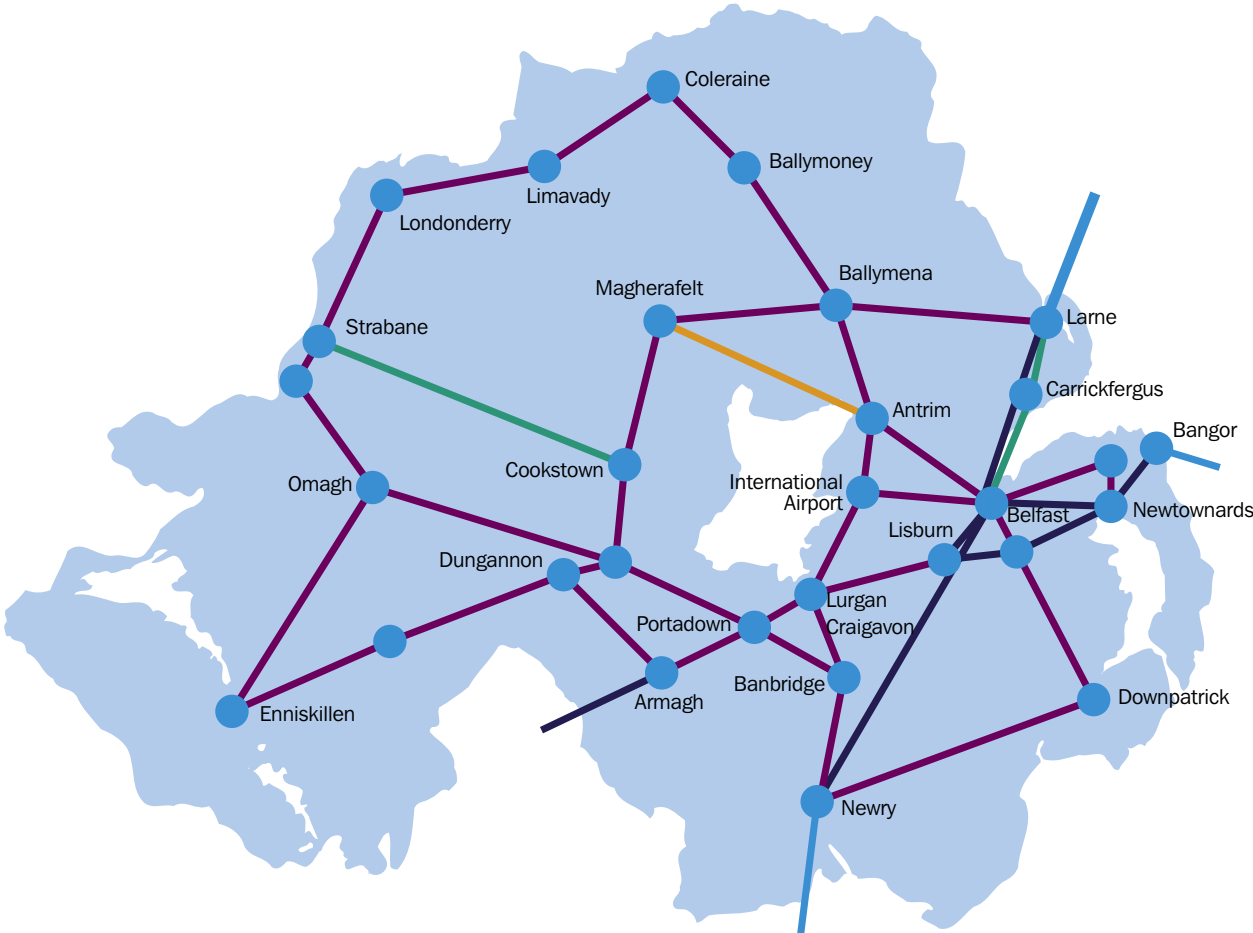
- SDH Fibre 2.4 Gbit/s
- SDH Fibre n x 24 Gbit/s
- DWDM (15 to 80 Gbit/s)
- Very high capacity (Terabit & Petabit transatlantic and Pan-European links)

- Dashed Line indicates in-country link
- City-to-city links precise landing station locations not indicated on map



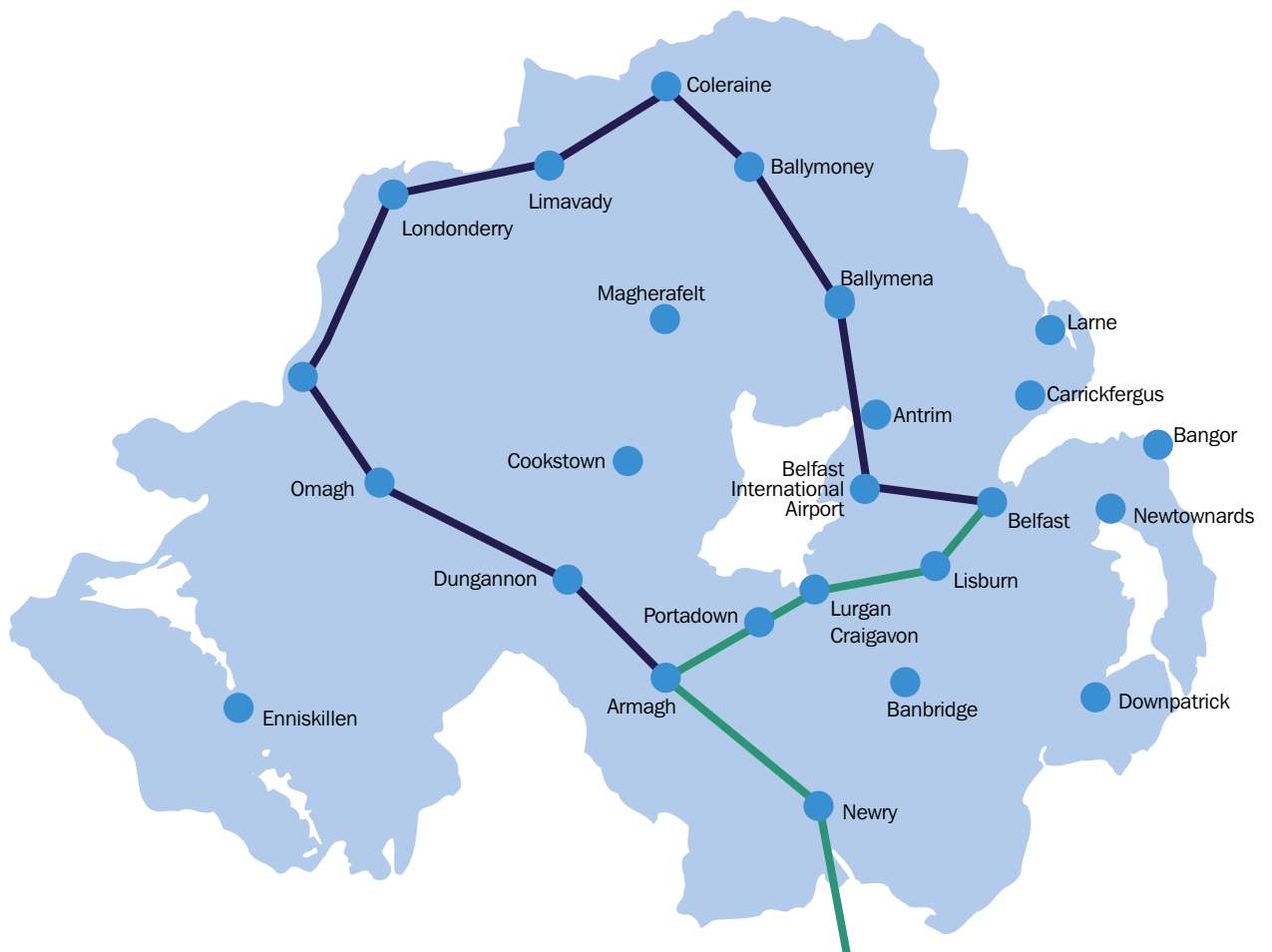
Combined Backbone Network in Northern Ireland

- DWDM (80Gb/sec)
- DWDM (15-80Gb/sec)
- SDH Fibre (10Gb/sec)
- SDH Fibre (2.5Gb/sec)
- PDH Fibre (565Mb/sec)



NTL:business smarter communications at work

- SDH Fibre (2.5Gb/sec)
- DWDM (80Gb/sec)



network means a much shorter access network (predominantly BT's pairs of copper wires). It means that more of Northern Ireland will be within the reach of the higher broadband speeds as the distance between the customer and the exchange is often shorter in Northern Ireland than elsewhere.

However the problem of population density means, with the possible exception of Belfast and maybe one of two other areas, few parts of Northern Ireland are likely to attract companies prepared to invest in installing their own equipment in Northern Ireland exchanges to provide services to customers here (Local Loop Unbundling). For example, as mentioned earlier, the Carphone Warehouse free broadband offer is built around LLU and, as a result, the free broadband offer will only apply in parts of Northern Ireland where exchanges are unbundled.

CONCLUSION

Is the Northern Ireland telecoms market competitive? The UK telecoms market was privatised back in 1984. Up until that time telecoms was a state run monopoly and the UK was a single market. Northern Ireland's telecoms infrastructure was, at that time fully integrated with the rest of the UK to the point where, for example, the Directory Enquiries facility for London operated out of Fermanagh.

The UK telecoms market is considered one of the most competitive in the G8 but what about Northern Ireland? The answer is that in terms of fixed line telecoms and mobile phone services the Northern Ireland market is as competitive as any other part of the UK. When we come to look at broadband Northern Ireland has the most extensive availability of anywhere in the UK (100%) and prices are competitive. However new developments, for example Local Loop Unbundling, are increasing competition in the larger urban areas where faster broadband speeds are being offered but the price is staying the same or reducing. We are already seeing special pricing offers available in other parts of the UK but not in Northern Ireland.

If this continues broadband prices in Northern Ireland will not increase but may become expensive in comparison to prices in London, Birmingham and other large cities. Within Northern Ireland prices may also start to vary with competition driving down prices in Belfast and possibly some other large urban areas but not in rural areas. This will be a problem for many other parts of the UK. Other areas, without the benefit of extensive telecoms infrastructure may find staying competitive even more difficult.

Yes, the Northern Ireland telecommunications market is competitive but in the larger urban areas of the UK it is becoming even more competitive.

Article 24: Enhancing the Electricity Infrastructure Through an All-Island Marketplace

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INTRODUCTION

The Department, working with its Republic of Ireland (RoI) counterpart¹ and the energy regulators, North and South, aims to have in place by July 2007 a new single electricity market (or SEM) for wholesale electricity trading on the island of Ireland. The challenge will be to deliver the anticipated benefits of enhanced security of supply, greater competition and investment opportunities, and efficiency gains from trading within a larger open market. The test by which the new market will be judged is that energy producers and users in both parts of the island become better off than they would be in two smaller isolated markets which are good neighbours but which trade together opportunistically under different market regimes.

The commitment of the Northern Ireland administration and the UK government to establishing the SEM is reflected by a similar commitment by the Irish government. The work is set within the overall strategic policy context established by the All-island Energy Market Development Framework agreed by Ministers in November 2004 and supported by energy sector stakeholders. It also supports the delivery of key priorities in the Northern Ireland Strategic Energy Framework.

The two Departments are leading on the overall policy and legislative requirements while the All-island Energy Market Joint Steering Group has taken a strategic oversight role, reporting regularly to Ministers on progress. Work on developing and implementing the proposed new structure is led by the two Regulators, working closely with the Transmission System Operators and electricity industry participants.

SEM DRIVERS

The Northern Ireland and RoI markets have both grown out of small public utility based generation, transmission and supply arrangements that focused on ensuring a secure supply of electricity to small customer bases - currently some 0.7m in Northern Ireland and 1.8m in RoI. While the combined size compares favourably with other small European markets, the relative sizes of the Northern Ireland-RoI and GB markets can be seen from a comparison of the relative generating capacities of some 8.5GW all-island and 70GW (gigawatts) in GB. The SEM will in fact have a customer base equivalent to that of Greater Manchester.

Under the impetus of the EU's Internal Market liberalisation policy both markets have opened up to competition in the generation and supply of electricity. However, this has not necessarily meant lower costs to consumers. Rising international prices for gas and oil have been reflected in recent electricity price increases across the EU.

While North South cooperation on energy issues has been ongoing for a number of years, accelerated development with the RoI to develop the SEM arose from a unique opportunity to agree how trading should be undertaken over the next decade or more on the island of Ireland due to the withdrawal in 2004 by the Irish regulator of plans for new market arrangements for wholesale trading in electricity. The start date of 1 July 2007 for trading under the new wholesale arrangements will also coincide with the deadline for full opening in each EU Member State of their retail electricity markets.

Collaboration is set in the context of EU policy on

an Internal Market for Electricity and the European Commission's strategy for the development of regional markets over the next decade. The European Regulator's Group for Electricity and Gas (ERGEG), in its role as an advisory group to the EC, has initiated a programme² to create seven regional markets, including a UK-Ireland Region linked to France to accelerate development of the single EU-wide market, linked to a European grid system.

A key benefit of closer EU collaboration will be to enhance security and diversity of supply³. This issue has come to the fore amongst Member States due to the recent action by Russia and GazProm to cut gas supplies to Eastern Europe at a time of peak winter demand. The increasing dependency on external oil supplies from the Middle East and gas from Russia via long pipelines has heightened the EU's concern to improve security and diversity of energy supplies linked to action to integrate electricity and gas networks.

Additional interconnection adds security and, alongside work on the new SEM, a significant investment is planned to strengthen the physical infrastructure of the island's electricity networks through the joint construction of a second North South interconnector by 2012 and the Republic's plan for a RoI-Wales interconnector. This work will improve overall transmission capacity and system stability on the island and enhance connection with Great Britain which is currently limited to the Northern Ireland-Scotland "Moyle" Interconnector. Other examples of recent energy infrastructure investment are the construction by Coolkeeragh ESB of the Combined Cycle Gas Turbine (CCGT) merchant plant in Londonderry and Viridian's first and second phases of the Huntstown CCGT plant

outside Dublin. These have required investments totaling some £200m and £500m respectively. Bord Gais Eireann (BGE), the Irish gas supply and distribution company now operating in Northern Ireland as Firmus is supplying consumers in the northwest, including the Coolkeeragh plant, as well as providing the soon to be completed South North gas pipeline.

Looking to the future, the SEM and the physical infrastructure improvements should facilitate the growth in renewable electricity generation over the coming decade in areas such as wind power, biomass generation, and combined heat and power as well as the future prospect of wave and current generation. The long term potential of these technologies forms part of the joint development of an all-island sustainable energy strategy that is presently focused on studies into renewable electricity and future Grid requirements⁴.

The legislation required to establish the new Market will provide for sound extra-territorial regulatory and operational arrangements that will help minimise risks for investors through a more certain investment and trading environment. A key element of this will be joint regulatory decision making.

The potential for abuse of market power will be present in the new Market due to the current concentration of generation ownership and control by the dominant player in the Republic. ESB is expected to have a 57% market share of installed capacity while Viridian will hold some 21%. The Regulatory Authorities are therefore examining what measures are needed to limit and control any abuse of that power. Northern Ireland Authority for Energy Regulations (NIAER) favours a

structural solution to this problem.

Market concentration is not unique to the SEM and there has been a trend towards European consolidation, which is of concern to the EC if it hinders competition and does not benefit consumers. Proposed mergers across national boundaries have caused concerns about the protective taken on indigenous generation players by some European countries. In comparison the UK government and regulator have focused on effective and equitable regulation of power providers, whether they are domestic or foreign companies.

IMPACT ON THE NORTHERN IRELAND ECONOMY

One of the strategic drivers of the government's Economic Vision⁵ with its focus on sustainable economic growth is the creation of a modern energy infrastructure that will help to deliver a more competitive, sustainable and reliable energy market at the minimum cost necessary, set in an all-island, UK and European context. The creation of the SEM is one of the key building blocks for delivering this vision.

The CBI Northern Ireland has welcomed the work based on its call to enhance regional and international competitiveness of industry supported by stable and competitive energy costs. While the rising world cost of energy has shown how elusive this can be to achieve, the SEM should help by bringing greater competitive opportunities as well as efficiencies and economies of scale for generators and suppliers.

BENEFITS

Detailed work on the costs and benefits of the new market arrangements is underway. Early work has indicated that implementation and operation

costs, could amount to some £16m over 2005-2016, but could result in a range of benefits with a value of some £45m. These should come from areas such as more efficient electricity production costs due to better integration of dispatch and operation of a single system and availability incentives that should lead to generation from low cost stations and installed electricity reserve savings.

There are other benefits. Improved competition should result from the wider scope for trading, better imbalance pricing which is important for smaller companies, development of greater levels of demand-side response, and better and more transparent pricing rules. Other benefits will come from greater coordination of the functions of the transmission system operators (ESB NG and SONI) including generation maintenance scheduling, reduced failure propagation, fewer voltage and frequency problems, potential for reduced requirements for automatic generation control and lower administrative costs for use of the North South interconnector. As and when the additional interconnection comes on stream 'loop flow', with the potential for parallel flows of electricity through the island system, could become an issue. This is a major reason for market consolidation because fragmented markets experiencing this problem can be forced to operate their transmission system very conservatively thus incurring additional generation costs.

The potential for greater fuel diversity due to the island-wide reach of the scheduling and market operation functions of the SEM should allow more efficient management of this strategic issue. Greater coordination of the TSO functions should encourage improved utilisation of the transmission systems and better coordination

of investment decisions. Environmental benefits will accrue from improved competition and fuel efficiency as well as facilitating the growth in participation from renewable electricity generators.

CONCLUSION

The need to build a more competitive energy market, facilitate new investment and enhance security of supply remains a priority for both governments and the SEM will help to meet those aims.

The SEM will be the key cornerstone for the development of the All-island Energy Market, helping to deliver mutual benefits to both jurisdictions and meeting EU policy on the Internal Electricity Market. Many challenging issues have still to be addressed, including market dominance, differential approaches to emissions trading and support for renewables. Both Governments and the Regulatory Authorities are committed, however, to meeting these challenges and delivering the new Market by July 2007.

¹ Department of Communications, Marine and Natural Resources, NI Authority for Energy Regulation, Commission for Energy Regulation.

² ERGEG 'The Electricity Regional Initiative: Making Progress Towards a Single European Market' 27 February 2006.

³ EU White Paper on security of supply sets out the investment and cooperation issues (EC 2000).

⁴ Further information on renewable energy can be found in this edition's article 25 – "Renewable Energy – No longer a fad".

⁵ Economic Vision for Northern Ireland, DETI, February 2005.

Article 25: Renewable Energy - No Longer a Fad

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INTRODUCTION

At the beginning of the 19th century there were 1 billion of us sharing the planet. By 1930 this had doubled but it took only 30 years to add a third billion, 14 more years to add a fourth - and today we stand at 6 billion.

As mature and emerging economies grow so does the use of natural resources, particularly oil which is part of 80% of everything we make today, including modern medicine. We are increasingly being reminded that the use of these resources raises environmental impacts which have begun to threaten the resource base on which our livelihoods and future economic growth depend. The challenge for Governments around the world therefore is to ensure a more sustainable use of these resources and reduce the environmental impacts of resource use whilst doing so in a growing economy. Decoupling environmental impacts from economic growth is one of the 21st century's most significant challenges. Nowhere is the challenge more obvious than with energy.

Northern Ireland is almost entirely dependent

on fossil fuels for its primary energy needs yet possesses a range of some of the best natural energy sources in Europe.

This article highlights our high dependency on imported fossil fuels and rehearses the actions being taken now and those needed for the future to address the potential for deficiencies in our long term energy supply and the environmental impact of our current energy consumption. Specifically it focuses on the role of renewable energy and why Northern Ireland's 12% target for the amount of our electricity to be sourced from renewable sources by 2012 is so critical for our well-being and that of future generations by setting us on the path to a sustainable energy system.

CURRENT AND HISTORICAL POSITION

The insignificant level of renewables in Northern Ireland's past energy mix was highlighted in the 2002 Northern Ireland Energy Study which was completed by the Carbon Trust. It indicates the primary energy consumption in Northern Ireland in 2002 equated to 58,448 GWh of which renewables represented only 0.2%.

Primary Energy Consumption in Northern Ireland - 2002

Table 1

ENERGY SOURCE	GWh	EMISSIONS (KILO-TONNES OF CARBON)
Coal	17,187	1,461
Oil and LPG (non-transport)	15,309	1,064
Natural gas	13,111	679
Import - Electricity	1,645	79
Renewable Generation	125	0
Fuels for transport	11,054	768
Others	17	1
Total	58,448	4,052

Source: Northern Ireland Energy Study 2002 - The Carbon Trust

The Carbon Trust work also looked at energy demand across the major sectors as shown in Table 2. Comparing the GWh totals of Table 1 with Table 2 shows losses of almost 28% of primary energy imported which are accounted for by the conversion of primary fuels (coal, oil and gas) to electricity by generating stations.

Also noteworthy in Table 2 is that the domestic and transport sectors together account for over 70% of final energy consumption.

Sector Energy Demand in Northern Ireland

Table 2

SECTOR	GWh(d)	(%)
Industry	6,737	16.8
Domestic	17,590	43.9
Commerce & Buildings	2,582	6.4
Public Sector	2,113	5.3
Transport	11,054	27.6
Total	40,076	

Source: Northern Ireland Energy Study 2002 - The Carbon Trust

Overall, the analysis highlights Northern Ireland's current high level of dependence on an imported fossil fuel supply base and raises questions over competition, sustainability and of course, in the longer term, security of supply due to volatility of world markets. This potential infrastructural deficiency and the extent of our unsustainable lifestyle in terms of energy consumption are reflected in our ecological footprint - a measure of 'how much productive land and sea' is needed to sustain our current per capita consumption. The Northern Ireland footprint, at 5.6 hectares per capita, is 3 times greater than our fair global share and the highest of any region in the UK.

Furthermore, energy accounts either directly or indirectly for two-thirds of that footprint.

This indicates a clear need to source local forms of energy that are reasonably secure, competitively priced and available in abundant quantities ideally if possible for an infinite period. A tall order but by no means impossible! The promotion of renewable energy, in particular electricity from renewable sources of energy, is an inescapable priority for DETI.

KEY DRIVERS

In the same way as Northern Ireland is exposed to global energy markets it is also affected by national and international energy policies. As a region of the UK we are obliged to contribute to commitments under the 1997 Kyoto Protocol, the requirements of EC Directives relating to energy and the environment as well as the national targets set within, say, the 2003 UK Energy White Paper ("Our Energy Future: Creating a Low Carbon Economy").

Climate change and the environment represent a common focus for all these commitments. Specifically the Kyoto Protocol seeks a reduction of 12.5% in greenhouse gas emissions by 2012 over 1990 levels while, at UK level, a more challenging target of 20% by 2010 was agreed with a longer term target of a 60% reduction in CO₂ emissions by 2050 being targeted within the 2003 Energy White Paper. Europe's 2001 EC Directive on the promotion of electricity from renewable sources placed indicative targets on individual Member States for the proportion of electricity consumption coming from renewable sources by 2010 - with an overall EU target of 22%. Individual Member State targets vary to reflect the levels already attained - the UK target

is 10% and the Republic of Ireland is pursuing 13.2%.

Within Northern Ireland, the key renewables target confirmed in the 2004 Strategic Energy Framework is that, by 2012, 12% of our electricity consumption will come from indigenous renewable sources, 15% of which will be from non-wind renewables.

A range of initiatives have been implemented or are planned in pursuit of these targets.

THE NORTHERN IRELAND RENEWABLES OBLIGATION (NIRO)

The EC Directive on the promotion of electricity from renewable sources provides for Member States to introduce appropriate support mechanisms to incentivise renewables generation in pursuit of its 2010 targets. In GB, the DTI and the Scottish Executive introduced Renewables Obligations which require electricity suppliers in GB to provide evidence that a specified and annually increasing proportion of their supply to final consumers can be accounted for by renewables generation. Evidence of compliance is in the form of Renewables Obligation Certificates (ROCs) that are issued to generators for each megawatt-hour (MWh) of eligible renewable electricity.

In Northern Ireland, separate consultations were undertaken to determine the way forward and the response needed to European and national drivers. A broad consultation on the potential for future energy took place in 1999 and was followed by studies commissioned to determine the potential renewables resource in Northern Ireland. These identified significant wind power resources - in fact, one of the highest potential wind energy

resources in Europe - as well as pockets of tidal energy off the Northern Ireland coast, which are also amongst the strongest in Europe.

Following further extensive consultation exercises, a Renewables Obligation (NIRO) was introduced with effect from 1 April 2005 as the main plank in Northern Ireland's renewables policy. The NIRO operates in a similar way to the GB Obligations and, indeed, runs in parallel with them within a UK-wide market for the trade in ROCs. This decision was taken principally because the small size of the Northern Ireland electricity market could not in itself sustain a viable market for the trade of Renewables Obligation Certificates.

The requirement to minimise the cost impact on Northern Ireland consumers led to tailoring of the NIRO in a way that makes it the most economic form of renewables support in place in Europe. Nevertheless it will provide over £150m of direct support to generators and is also expected to leverage around £500m of private investment in renewable energy generation assets in Northern Ireland up to 2012.

PROGRESS TO DATE

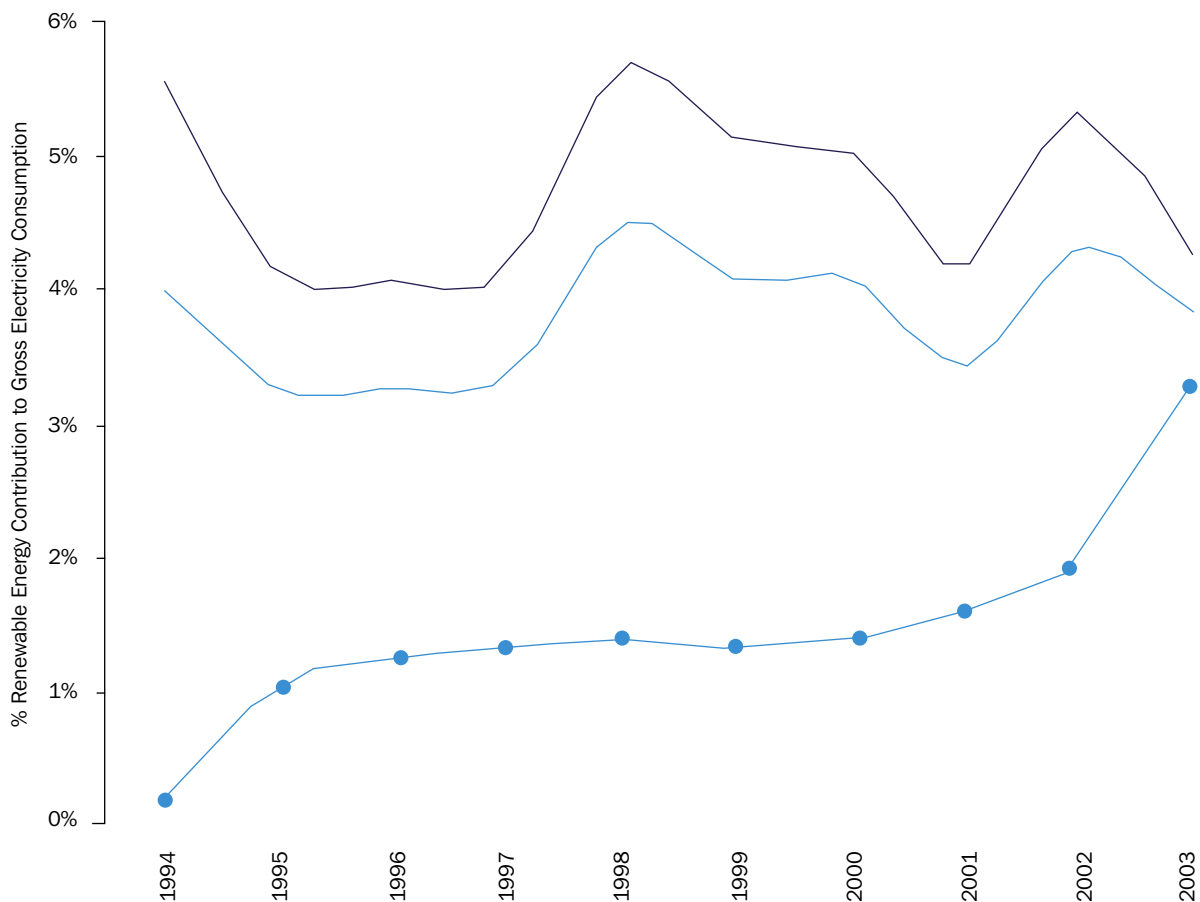
With the NIRO only in place for a year, it is difficult to assess its direct impact on renewables development in Northern Ireland. Nonetheless, there has been clear progress in recent years.

The Department has been working with Sustainable Energy Ireland to develop a set of sustainable energy indicators for the island of Ireland. Chart 1 is an indicator of the contribution of renewable electricity to the gross electricity consumption within the island of Ireland up to 2003.

% Renewable Energy Contribution to Gross Electricity Consumption

Chart 1

- Northern Ireland
- Republic of Ireland
- All Island



Source: Northern Ireland Electricity⁹, ROI Sustainable Energy Ireland

This graph illustrates that the penetration of renewable energy into the electricity market, on an All-Island basis, has fluctuated in the range 3.3% to 4.5% between 1994 and 2003. The trend is more influenced by ROI due to its proportionately larger electricity consumption. Electricity production from renewable sources increased by 46% during this period but this growth is concealed by the corresponding 52% increase in gross electricity consumption.

The noteworthy element of the graph, however, is that the trend in Northern Ireland indigenous energy shows a steady increase from practically nothing in 1994 to 2.7% in 2003 due largely to increased wind energy production over this period as a result of the Non-Fossil Fuel Obligation (NFFO) contracts.

Since 2003 renewables consumption in Northern Ireland has doubled and in the year ending

31 March 2006 was 5.8% of total electricity consumption with 3% from indigenous sources.

The development of Northern Ireland's wind farms continues to progress steadily without any capital support from Government but the support under the Northern Ireland Renewables Obligation is clearly an effective surrogate for capital grants. There are currently some 90MW of indigenous wind capacity in operation in Northern Ireland with a further 80MW approved by the planners and around 700MW in the planning process.

VISION 2020 - RENEWABLE ENERGY IN ALL-ISLAND CONTEXT

The ability of the electricity grid systems in Ireland to accommodate large volumes of non-firm energy is increasingly uncertain. What level of renewable penetration is possible by 2020, where will it locate, what energy source will it be, will it embed into the distribution system and to what extent will buildings generate their own energy through microgeneration, are all issues that need to be addressed.

In 2005, DETI, together with counterparts in the Republic of Ireland, set out to determine a longer term vision for renewables and to do so, in the context of a Single Electricity Market, on an All-Island basis. The consultation highlighted a number of areas for attention and workstreams are currently in place to develop aspects such as:

- the steps needed to take to arrive at a view on the appropriate level of renewables penetration for the island of Ireland in 2020;
- the optimum future energy mix for Ireland, having regard to technological advances, global developments in fuel availability and indigenous sources;

- the role of large remote generators, small scale embedded generators and buildings integrated renewables;
- the implications for future electricity grid management and infrastructure investment and how the costs of this should be apportioned;
- the effects of enhanced interconnection, both North South and East West, on the electricity system.

Once concluded, a 2020 target and implementation plan will be agreed and put in place to mainstream renewable energy to 2020 and beyond.

NON-WIND SOURCES OF RENEWABLE ELECTRICITY GENERATION

The Northern Ireland renewables target specifies as a sub-target that 15% of indigenous renewables generation in 2012 should be from non-wind sources. This target appreciates the need for a balanced energy mix rather than placing complete dependence on wind. It also recognises the importance of other fuel sources to the local economy. For example, the use of biomass as an energy source opens new opportunities for the rural and farming community and DARD through its Short Rotation Coppice Challenge Fund, introduced in 2005, has provided encouragement to such development. Balcas in Enniskillen also now uses sawmill residues in Europe's largest combined heat and power (CHP) pellet production facility. It is, however, important to develop demand for energy crops so that a balanced and efficient market develops.

The treatment of wastes, particularly in light of increasingly tighter environmental controls imposed by EC Directives, offers a further opportunity to develop alternative sources of renewable electricity generation and relieves

pressures on industry by offering profitable means of disposing of wastes and recovering energy.

The decision by Marine Current Turbines last year to develop the world's first tidal generator at Strangford Lough offers a further option for clean electricity generation and presents potential opportunities for Northern Ireland industry to get involved in the technology development of marine renewables.

MICROGENERATION

The potential contribution of micro-generation - which is defined to include both power and heat generation - has already been well recognised. While small in individual terms, if applied to households or businesses across Northern Ireland, the cumulative effect could be significant particularly given the high energy consumption of the domestic sector. Moreover, such small-scale electricity generation developments can play an important role in strengthening the grid infrastructure by providing locally generated electricity. The volatility of energy markets has also changed customer perceptions in favour of micro-generation, which if developed to its full extent, will have a profound impact on future energy planning.

THE ENVIRONMENT AND RENEWABLE ENERGY FUND (EREF)

The EREF, established in February 2006, provides £59m to address the current gaps in our renewable energy development and to further enhance renewables activity in Northern Ireland with the aim of making Northern Ireland an exemplar in the use of renewable energy. It will help up to 4,600 households to install micro-generators; invest £18m in energy from municipal, agricultural and industrial wastes; encourage

energy crops by developing renewable heat supply chains; enhance research and demonstration projects; and encourage the public sector to switch to renewable energy.

The Fund is expected to leverage an additional £300m of private sector investment in renewable energy over the next 3 years and has proven a catalyst for other private equity funds to focus on renewable energy opportunities in Northern Ireland.

CONCLUSIONS

Energy is clearly critical to the Northern Ireland economy. It permeates every sector from large industry to the individual household encompassing power, heat and transport. Within each sector, the relatively higher cost of energy continues to have an adverse impact - be it through constraining competitiveness or perpetuating fuel poverty. Furthermore, a continuance of the current high levels of imported fossil fuels will only serve to intensify our exposure to these weaknesses as supply sources continue to become more remote and initiatives such as the EU Emissions Trading Scheme add further to the cost of using carbon intensive fuels.

Increasing the proportion of renewables in the energy mix not only helps alleviate these problems but offers the potential for new economic activities, innovation and skill development and enhanced security of supply. With supply support mechanisms like the NIRO and the EREF in place, the challenge now is to tackle demand - this is a culture change issue as much as a technical matter. Energy efficiency measures have been a feature of energy policy since the oil crisis of the 1970s but global cost and security of supply concerns have put it at the top of the international

energy agenda. Put simply, it is a must. Electricity consumption in Northern Ireland continues to grow at 2% per annum which is unsustainable in the long term if there remains a reliance on fossil fuels for electricity generation. The Strategic Energy Framework targets a 1% per annum decrease in electricity consumption between 2007 and 2012 and DETI will soon publish a strategy to meet these targets.

While the work done to enhance renewables activity to date has helped establish a firm foundation on which to build much more is needed to secure the sustainable energy infrastructure that is needed for the future.

However, this challenge is not simply about reversing the negatives. It is more about seizing the opportunities - opportunities that permeate the economic, environmental and social well-being of Northern Ireland. It is about increased competitiveness for our industry, new products and new skills, a cleaner and safer environment for us all and an opportunity to address the issue of fuel poverty and it is at the heart of a sustainable economy. The Environment and Renewable Energy Fund will provide an incentive to do more but, while Government is leading the way, there is a challenge for individuals to play their part in achieving this better future for Northern Ireland. Renewables are no longer a minority sport in Northern Ireland - they are heading for the big league.