

This paper is a background document for

Lower Carbon Futures

**APPENDIX N: NATURAL GAS AND NORTHERN
IRELAND – THE IMPLICATIONS OF CONNECTION**

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1 Introduction

1.1 Background

Northern Ireland suffers from an over-dependence on imported fuels. The geographical location and poor fossil fuel endowment of the region have resulted in an energy market that is both small and isolated. The small scale of the system requires a permanent spinning reserve as standby - an inefficiency that has resulted in Northern Ireland electricity prices being consistently the highest within the UK (EC Single Programming Document, 1994). A situation had developed by 1994 such that electricity generation was 63% dependent upon oil and 37% dependent on coal (EC Single Programming Document, 1994). With just two primary fuel sources, possible interruption meant that energy supply in Northern Ireland was unreliable. The supply of energy in Northern Ireland, pre-1996, can be described as expensive, inefficient, unreliable and insecure.

1.2 The introduction of natural gas

The rationale behind the introduction of natural gas to Northern Ireland varies according to the perspective of each financial backer. There were two original investors in the project, British Gas and the European Commission. The pre-1996 energy supply situation of high expense and unreliability represented a clear opportunity for competitive intervention by an alternative source.

British Gas, on the strength of a predicted 10-year connection profile to industrial and domestic consumers, considered the scheme a viable financial investment (Section 3). European Commission funding was attracted because the project satisfies criteria addressing “problems of peripherality in the provision of energy and of over-dependence on imported fuels for energy needs” (EC Single Programming Document, 1994). More specifically, European involvement was tailored to address three issues: 1) reliability and security of supply; 2) expense of fuel to the consumer; and, 3) environmental concern. The introduction of natural gas as an additional fuel option for consumers was predicted to reduce the isolation and increase the security of energy supply in Northern Ireland. By countering an over-dependence on oil and coal, a competitive dimension is added to the market place instigating a beneficial influence upon consumer fuel prices and increasing competitiveness of local industries by allowing them to reduce overheads. The environmental benefits associated with fuel switching from oil or coal to natural gas are reduced emissions of carbon, SO₂, nitrous oxide and local acid smut.

The total cost of introducing natural gas to Northern Ireland was 260 million ECU (EC Single Programming Document, 1994). The EC aid rate was set at 35% of the total cost, with private backing and public expenditure (168 million ECU and 91 million ECU respectively) providing the remaining 65%. The project forms one element of a three-pronged initiative by the European Commission to tackle the above energy issues in Northern Ireland. The other elements of this initiative being the introduction of two electricity interconnectors, linking to Scotland and to the Republic of Ireland, and a campaign to improve energy efficiency (EC Single Programming Document, 1994).

2 Description of gas connection

2.1 Overview

The impetus for connecting Northern Ireland to natural gas came in 1992 when British Gas bought a 100% share of Ballylumford power station (1067 MW), one of four contracted power generators in Northern Ireland. A condition for sale was to convert Ballylumford from heavy fuel oil to gas-firing. Consequently, the power station provides a base load demand for natural gas in Northern Ireland, with additional flow to the industrial or domestic sector acting to lower the cost of supply and increasing the rate of return on fixed infrastructure costs. Connection to the industrial sector was made in 1996. Domestic supply began in 1997.

2.2 Terms of connection

British Gas supplies the gas for Northern Ireland via a number of subsidiary companies. The gas originates from the North Sea, arriving at Larne, north of Belfast;

North Sea – Moffat (*British Gas Transco*) – Stranraer (*Premier Transco Ltd.*) –
Islandmagee (*Premier Transco Ltd.*) – Belfast (*Phoenix Natural Gas*)

The Scotland-Northern Ireland Pipeline (SNIP) connects the two countries and is 170 km in length, 42 km of which lie under the Irish Sea. The SNIP is jointly owned and operated by British Gas and Premier Transco Ltd. (of which British Gas has a 75.5% share, contributing further to its significant

investment in the overall project). A fifteen-year transportation agreement has been signed between the companies (Phoenix Natural Gas <http://www.phoenix-natural-gas.co.uk/natural/>).

Distribution of gas beyond Ballylumford power station is under exclusive operation of Phoenix Natural Gas which has an 8 year supply licence for domestic users (expiring 2002), and an 11 year supply licence for the industrial / commercial sector (expiring 2005). A 20-year exclusivity agreement has been granted for transporting gas into the licensed area of Greater Belfast, which represents 32% of the dwellings in Northern Ireland (Building Research Establishment, 1998). British Gas also has a 75.5 % share of Phoenix Natural Gas (Phoenix Natural Gas <http://www.phoenix-natural-gas.co.uk/natural/>).

2.3 Beyond Belfast

Although Phoenix Natural Gas plans to expand beyond Belfast, it does not have exclusive licence to do so, nor is expected to be the only operator. The SNIP is unlikely to remain the only entry point for natural gas to Northern Ireland. A feasibility study regarding a north-south gas interconnector linking the Republic of Ireland with Northern Ireland has been carried out (Northern Ireland Information Service <http://www.nio.gov.uk/971107g-ded.htm>). The study was commissioned by the Department of Economic Development, the Republic of Ireland's Department of Public Enterprise, Bord Gais Eireann and Phoenix Natural Gas. Initial findings of the report suggest that constructing the interconnector cannot be substantiated on a quantitative economic basis alone. The report also suggests that EU co-funding of the interconnector can be secured to support the venture. EU support is viable due to the peripheral nature of gas supply in both the Republic of Ireland and Northern Ireland: both are disadvantaged in terms of an acceptable security of supply relative to other Member States of the European Union (Northern Ireland Information Service <http://www.nio.gov.uk/971107g-ded.htm>).

If built, the interconnector would bring natural gas to the south and west of Northern Ireland, as well as secure delivery throughout Ireland from more than one source. (The estimated repair time for a sub-sea rupture in the SNIP being 30-70 days). Adequate gas supply from the Republic of Ireland is safeguarded for the foreseeable future due to a recent find in Corrib North field by Enterprise Oil – indeed, exportation of gas to the UK is anticipated in the future (The Irish Times, 3 March 1998). Dialogue concerning the development of a north-south interconnector is ongoing between the Department of Economic Development, Bord Gais Eireann and Phoenix Natural Gas. Construction of the interconnector cannot even begin until agreement is reached between the parties involved, and this in turn must wait until the report has been assessed. This process, in addition to the existence of the licensing agreements, makes it reasonable to expect that the natural gas supply in Northern Ireland will be dominated by Phoenix Natural Gas in the near future.

3 Expected trend

3.1 Fuel mix patterns for electricity generation

With the introduction of natural gas for electricity production, a marked shift is expected from a reliance on heavy fuel oil to natural gas (Figure 1) (EST *et al.*, 1997). A situation is predicted that involves a diversification of energy sources away from the two-fuel-split between coal and oil, apparent until 1996. (EST *et al.*, estimated the split as 50% to 49% in coal's favour, which is at odds with the declining use of coal and the EC figures for 1994 which have a split of 63% to 37% in oil's favour).

In addition to the domestic market, and concurring with the optimism of Phoenix Natural Gas, the Northern Ireland Affairs Committee has estimated that natural gas will dramatically capture 45% of Northern Ireland's electricity generation market by 1999/2000 (*ibid.*).

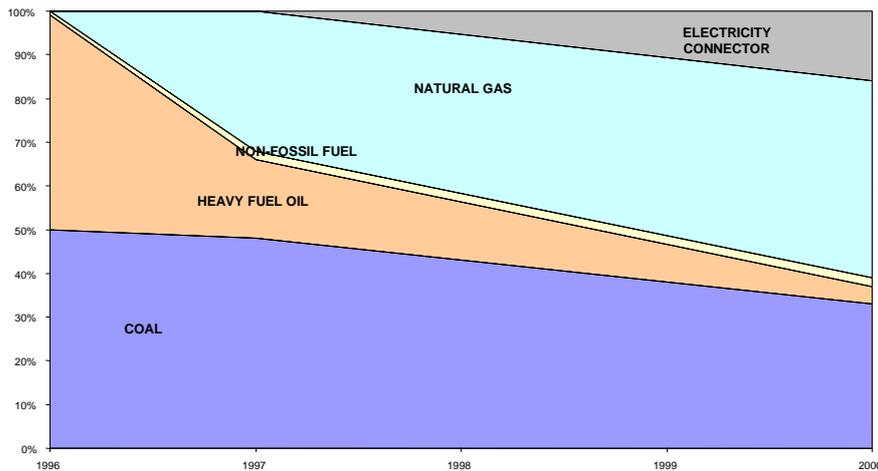


Figure 1: Predicted balance of fuel for electricity generation in Northern Ireland
 Source: Northern Ireland Affairs Committee

3.2 Phoenix Natural Gas and domestic connection in Greater Belfast

There is considerable discrepancy concerning the connection profile as estimated by Phoenix Natural Gas and other sources.

There are 296,000 homes in Greater Belfast (EST *et al.*, 1997). By the end of 2007, Phoenix Natural Gas plans to develop a gas grid to be in the position to serve 200,000 of these households (Table 1). Much of this development will harness the old town gas network, which is estimated to pass 20,000 homes in the Greater Belfast area.

Table 1: Phoenix Natural Gas development programme, 1997 - 2006

Year	Area
1997	North and West Belfast
1997	Duncrue
1998	South Belfast
1998	Newtownabbey
1998	Larne
1999	Carrickfergus
2001	Harbour
2002	Lisburn
2002	East Belfast
2003	North Down
2005	Carryduff and Castlereagh
2006	Newtownards

Source: <http://www.phoenix-natural-gas.co.uk/natural/>

Phoenix Natural Gas has predicted a connection profile of 6,000 households per year for the first five years, and 12,000 households per year for the following 5 years (i.e., 90,000 connections over the first ten-year period) (EST *et al.*, 1997). Natural gas has been made available to 92,500 properties within the licensed area of Greater Belfast (Jillian Ferris, pers. comm., 2000). Much of this development by natural gas in the domestic sector is anticipated to be at the expense of solid fuel (Figure 2).

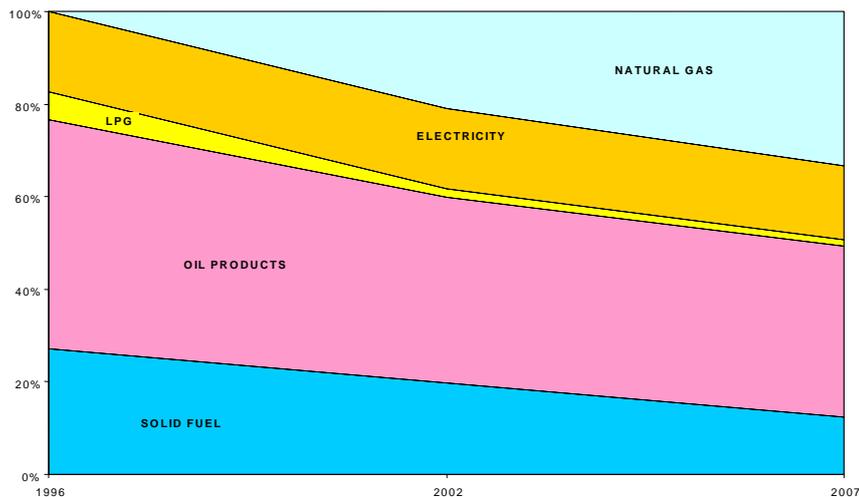


Figure 2: Predicted energy demand breakdown for Belfast

Source: EST et al., 1997

There is evidence to support the demise of solid fuel usage in Northern Ireland, although the actual figures are in dispute. In 1991, a survey conducted by the Northern Ireland Housing Survey estimated that solid fuel supplied 61% of the energy needs in the home (Northern Ireland Housing Survey, 1991, quoted in General Consumer's Council for Northern Ireland, 1997). Data for 1993 show that solid fuel supplied 52% of domestic non-transport energy (EST et al., 1997). By 1996, two reports suggested that the market share of solid fuel in Belfast had declined to 47% in one instance and 22% in the other (Ulster Marketing Surveys Ltd., 1996; Coopers and Lybrand, 1996, respectively). Despite this discrepancy in figures, all the reports agree that: firstly, there is an ongoing sea change in user trends, and secondly; that solid fuel is experiencing a declining share of the fuel mix. Such a perspective concurs with the fact that the coal imported for domestic use decreased by 24% between 1994-1997 (General Consumer Council for Northern Ireland, 1997).

With regard to this declining trend in the use of coal, it is predicted that 80,000 of the 118,000 solid fuel-burning homes in Greater Belfast will convert to natural gas between 1997 and 2007 (EST et al., 1997). Phoenix Natural Gas suggests three reasons for this change. Firstly, many of the homes in central Belfast do not have sufficient outside storage space for solid fuel. Secondly, it can be inconvenient to carry solid fuel into the house. Thirdly, natural gas is being increasingly perceived as a cleaner fuel (Phoenix Natural Gas press releases, 1996-1998 <http://www.phoenix-natural-gas.co.uk/natural>).

However, although there is consensus over the diminishing use of solid fuel, such a trend does not necessarily imply consumers will switch fuel to natural gas.

3.3 Initial indications of market trend

When domestic supply of natural gas started in 1997, approximately 3,000 households signed up for connection by the end of that year, with an estimated 275km of useable pipeline in place. The number of households having signed increased to 4,500 by April 1998 and the length of usable pipeline increased to 400km (<http://www.phoenix-natural-gas.co.uk/natural>). These figures are lower than the connection profile originally envisaged by Phoenix Natural Gas. While the number of households actually connected by June 1998 was a mere 400 (General Consumer Council for Northern Ireland pers. comm., 1998), more recent data show that the rate of sign-up is currently 350 new customers per week. There are now 25,000 domestic customers, and 1,000 km of pipeline have been laid (Jillian Ferris, pers. comm., 2000). Due to the rapid and extreme rise in oil prices over the 1999 Christmas period, Phoenix connection activity doubled in the New Year in response to the increase in demand (www.phoenix-natural-gas.com).

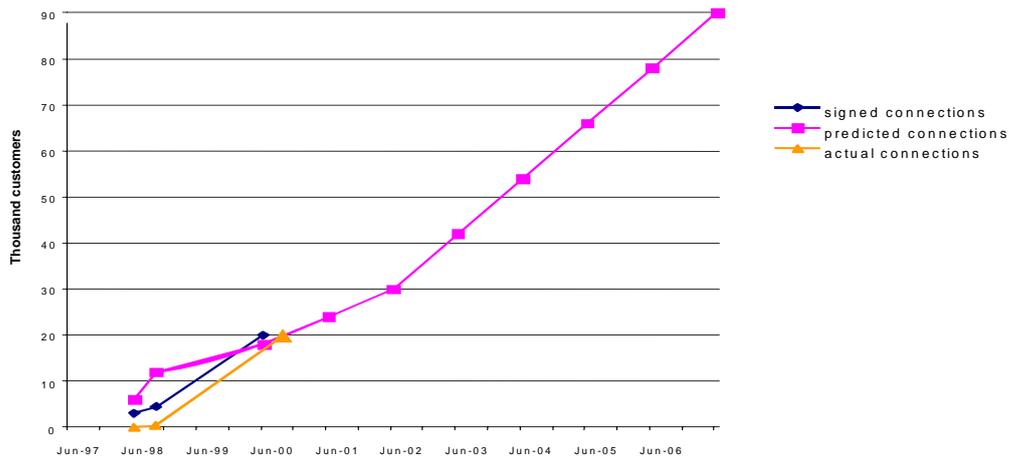


Figure 3: Northern Ireland domestic natural gas connections

Source: Phoenix Natural Gas and General Consumers Council for Northern Ireland, pers. comm., 1998)

Phoenix Natural Gas had estimated that it would be able to supply almost 68% of Belfast with natural gas by 2007. Data collected by Market Research Northern Ireland Ltd. critically asserts that the predicted connection profile is over-optimistic: only 39% of people in Belfast thought that they would be connected to a natural gas supply within 12 months of a survey carried out in 1997 (Market Research Northern Ireland Ltd., 1997). Although this figure does not necessarily contradict the predicted development rate of the *gas grid*, of those 39% who expect to be offered the choice, approximately two-thirds indicated that they would be unlikely to switch fuels. Only 17% felt that they would like to switch and the remaining 17% either had no strong views or ‘didn’t know’. In line with the reports charting the alteration in the fuel balance (EST *et al.*, 1997; Figure 3), solid fuel users indicated the highest propensity to switch to natural gas (23%). Electricity users were the most unlikely to convert (5%).

Although the Energy Saving Trust and Phoenix Natural Gas had correctly predicted the sections of the fuel market to which natural gas would most appeal, the estimated extent of appeal seems inflated. Market Research Northern Ireland Ltd. indicated that 93% of respondents had no plans of fuel switching within the next 5 years (Table 2).

Table 2: Fuel types used and associated views on fuel switching

Source: Market Research Northern Ireland Ltd. 1997

	very likely (%)	quite likely (%)	no strong views (%)	not very likely (%)	not at all likely (%)
Oil	5	13	11	23	41
Gas (LPG)	17	1	0	51	31
Electricity	1	4	3	11	69
Coal / solid fuel	12	11	5	14	43
Average	6	11	9	20	46

4. Identifying the barriers to change

It is clear that the development of Phoenix Natural Gas in Northern Ireland has been slower than anticipated. Public perception of natural gas and demand for connection has been disappointing. There are several contributing factors to this outcome.

4.1 The (mis)timing of connection

The timing of the project is undoubtedly fundamental to the slow growth rate. Part of the rationale behind connecting natural gas to Northern Ireland was based on the assumption that it would attract consumers switching from solid fuel. It was anticipated that the intervention of gas would capture those people shifting supply from solid fuel to oil as part of the developing trend in the fuel balance (EST *et al.*, 1997). In the event, the introduction of natural gas may have come too late to divert this flow. Although it is clear that coal had, and still has, a declining share of the market, this process of decline had set in prior to the arrival of gas. Consequently, many of the households that could switch away from coal, not only turned to oil as the only alternative, but did so before 1997. This observation is supported by analysis of the fuel trend over the last 12 years. (This has been partially reversed recently with the increase of the price of a standard 900 litre oil delivery from £85 at the end of 1998 to £190 a year later – www.phoenix-natural-gas.com). In 1985, solid fuel accounted for 70% of domestic non-transport energy consumption in Northern Ireland. Oil was only 12% (EST *et al.*, 1997). By 1997, statistics for the area of Belfast City Council show that oil was the main fuel for almost 66% of households, whereas solid fuel was the main choice in only 17% (Market Research Northern Ireland Ltd., 1997).

4.2 The cost of conversion as a barrier to change

For those people who switched away from solid fuel in recent years, the cost of conversion is likely to prohibit additional change again so soon. Even if consumers can be convinced that there are long term cost advantages of using natural gas, this can be an ineffective incentive when faced with the high initial outlay costs associated with conversion. Consumers are only likely to be susceptible to the option of fuel switching when they are considering major renovation in their homes, especially the kitchen, as conversion requires the purchase of new appliances. It would therefore appear that the 16% increase in the number of people using oil for central heating between 1991 and 1996 (Home Energy Conservation Authority, 1997) - many who will have converted from solid fuel - represent a missed opportunity for Phoenix Natural Gas, at least for the immediate future. To address this issue, Phoenix is now offering free connection (worth £400) for a limited period in the network area, and 1 year's half price gas from January 1, 2000 (www.phoenix-natural-gas.com).

The cost of fuel switching not only constrains those consumers who have recently changed to oil, but similarly restricts the poorer groups from considering a change in the first instance. A situation therefore develops whereby fuel type used becomes linked to socio-economic standing. For example, the traditional fuel in Northern Ireland has been coal and this legacy continues in the poorer groups where diversification to oil has been low. Coal is the fuel of choice for only 7% of richer socio-economic groups in Northern Ireland whereas as it is still used by 44% of those with less spending power (Market Research Northern Ireland Ltd., 1997).

Market Research Northern Ireland Ltd. (1997) has claimed that the slow connection rate can be blamed on inertia in the domestic energy market of Northern Ireland. This statement is supported by the fact that 40% of respondents to a recent survey were 'used to' their existing fuel system and saw no reason to change. From this it is argued that the impetus to convert to gas, based on potential economic gains from a lower running cost, are insufficient to overcome the economic demand of conversion.

"Householders are extremely hard to persuade to change unless they have some very good reason to do so" (Market Research Northern Ireland Ltd., 1997). However, such an interpretation fails to address the social dimensions that underlie fuel choice and inhibit conversion.

4.3 Fuel type, fuel price and fuel poverty

Before clarifying the social barriers to fuel switching, it is important to fully understand the existing pattern of fuel use within society. Fuel type is not independent from income level, age group, type of housing and so on. At least part of this discrepancy can be explained by the cost of fuel switching detailed above, but the variability in fuel price is also a contributing factor. Table 3a shows the considerable variation in weekly fuel expenditure depending upon the type of fuel used, and Table 3b relates fuel expenditure to income.

Table 3a: Average amount on main fuel, £ per week

Main Fuel Type	Irish £ per week
Oil	16
Gas (LPG)	15
Bottled gas	22
Electricity	14
Coal / solid fuel	17
Average	16.8

* expenditure on natural gas per week is presently unavailable.

Source: Market Research Northern Ireland Ltd., 1997: 15

Table 3b: Comparison of fuel expenditure in Northern Ireland and UK, 1992

Average Gross Income (£ per week)	Average Fuel Expenditure (£ per week)	
	Northern Ireland	United Kingdom
Under 100	11.82	10.13
100 - 200	14.38	11.85
200 - 320	15.34	12.71
320 - 470	16.72	13.63
Over 470	19.59	15.93
Average	15.24	13.02

Source: The Northern Ireland Anti-Poverty Network, 1994

The running costs for natural gas are claimed to undercut all other fuel prices in Northern Ireland (<http://www.phoenix-natural-gas.co.uk/news>). The estimated cost of coal in 1996 was 2.0 p/kWh (EST *et al*, 1997) whereas gas was introduced to the market at 1.3 p/kWh (http://www.phoenix-natural-gas.com/first-year/chief_executives.html). However, without the money for conversion, many consumers are compelled to buy relatively expensive fuel. It is important to bear in mind that the divisions between fuels are not necessarily discrete categories, as people are likely to use more than just one source of fuel. Table 4 details this spread of fuels used for domestic heating in Belfast.

Table 4: Main Fuel Used For Heating, Belfast (% Values)

	oil	gas#	electricity	solid fuel
Total	65	2	16	17
Socio Economic Group				
AB	75	5	13	7
C1	79	3	12	7
C2	71	*	15	14
D	36	0	10	54
E	34	0	31	35
Age of Respondent				
18-24	72	0	13	15
25-34	59	2	15	24
35-44	78	6	3	13
45-54	65	4	10	21
55-64	76	*	12	12
65+	51	*	31	17
Tenure				
<i>Owned outright</i>	78	3	8	12
<i>Rented – public</i>	6	0	51	43
<i>Rented – private</i>	40	0	34	25
Property Type				
<i>Detached</i>	92	2	2	4
<i>Semi</i>	76	1	9	15
<i>Terrace</i>	42	*	15	43
<i>Flat</i>	21	11	66	2

* less than 1%, # The gas that is mentioned refers to LPG and bottled gas. Natural gas does not feature due to the low number of users.

Source: Market Research Northern Ireland Ltd., 1997.

It is evident from Table 4 that solid fuel is concentrated into the D / E socio-economic groups, and in rented or terraced housing. From Table 3, it is known that solid fuel is also the second most expensive fuel after LPG Gas. This combination of factors implies that fuel constitutes a larger proportion of expenditure for those people on lower incomes. This is indeed verified by the Northern Ireland Anti-Poverty Network (Table 3b, which also shows that per unit (kWh) fuel is more expensive in Northern Ireland. While, on average, household incomes are lower in Northern Ireland, household sizes are larger; therefore, fuel poverty is more extreme in Northern Ireland and affects more people, as a percentage of the population.

It has already been shown that the domestic consumers that show the greatest propensity to switch to natural gas are solid fuel users (Section 3.3, Table 2). However, it is too simplistic to propose that coal users will automatically convert to natural gas: the mis-timing of connection convincingly demonstrates this. To compound matters, the conversion from coal is further complicated by this uneven spread of coal users across society and the associated circumstances that restrict consumer options.

The combined effect of low household income, high fuel expenditure and poor housing stock, increases the susceptibility to fuel poverty. Fuel poverty is defined as the inability to afford adequate warmth because of energy inefficiency in the home (Boardman, 1991). It has been identified as 'a major problem in Northern Ireland' (Building Research Establishment, 1998). The extent of fuel poverty is compounded by the fact that Northern Ireland has a disproportionately high number of people in the

poorer socio-economic groups and consistently high levels of unemployment. As a result, in Northern Ireland, large sections of society are likely to be dissatisfied with their energy supply or expenditure, and yet in a position to do very little about it in terms of investment. It is these low-income and under-heated households that stand to gain the most from more efficient heating (and other energy end use) systems. However, this section of society must focus their energy efficiency measures elsewhere, such as on reduced consumption.

The severity of this predicament for the poorer socio-economic groups goes a considerable way to explaining the over-ambitious forecast of connection made by Phoenix Natural Gas. They predicted 80,000 connections between 1997 and 2007, the majority of which would be converts from solid fuel. Unfortunately for Phoenix Natural Gas, the pattern that emerges from Northern Ireland shows that many owner-occupiers have already converted to oil and that most of the people burning solid fuel lack the financial capital to convert their fuel supply.

Figure 4 shows that there are additional reasons beyond the cost of conversion and the price of fuel as to the general consumer stance in opposition to gas connection. It is apparent that at least 28% of respondents may be reticent to switch, not because of a genuine dislike of gas, or that they feel it is dangerous (due to their lack of experience), but because their particular social circumstances make it problematic to convert (i.e., those listed in the groups 'house is rented' and 'difficult to change'). The social circumstance of fuel users is significant because social disparity is known to hinder the inclination towards greater energy efficiency as well as restrict access to various fuel-types due to price (Boardman, 1991). The structure of society, and the inequity involved therein, clearly influences the spread of natural gas connections.

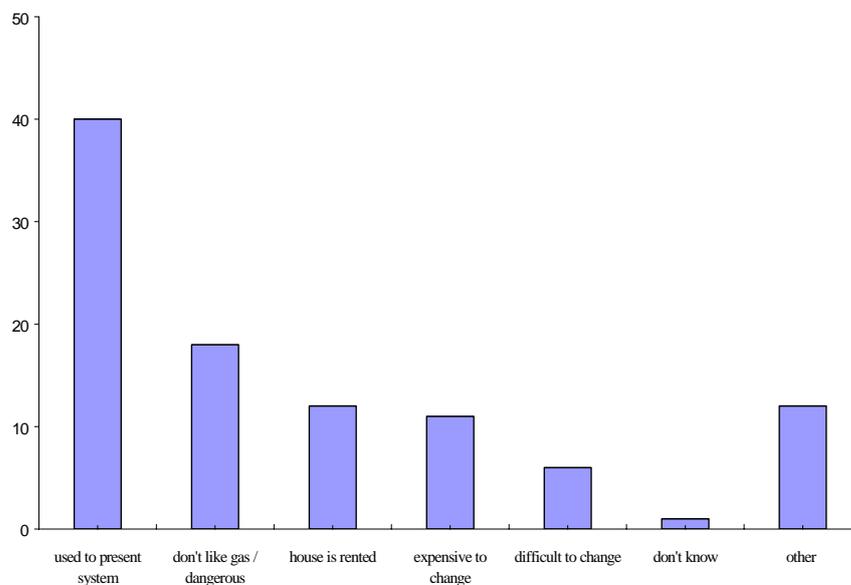


Figure 4: Main reasons expressed for not fuel switching to natural gas (% values)

Source: Market Research Northern Ireland Ltd., 1997

4.4 The impact of tenure

4.4.1 Privately rented accommodation

In 1996, approximately 32% of the dwelling stock in Northern Ireland was not owner-occupied (Home Energy Conservation Authority, 1997). Of this amount, privately rented accommodation accounted for 6%. The potential move towards greater energy efficiency by either landlord and tenant often results in stalemate. The burden of cost falls upon the landlord who may be reluctant to invest in energy saving measures (such as fuel switching) when it can be problematical to recoup costs through rent inflation. The landlord perspective centres upon keeping costs to a minimum relative to their return, whereas, in contrast, tenants - particularly the fuel poor - focus their attention upon running costs. Tenants have little incentive to invest in major energy efficiency measures within a property that does not belong to them, especially if the lease is short-term. In this case, neither landlord nor tenant are likely to be enthusiastic about paying for fuel switching.

4.4.2 Social housing and obstacles to consumer choice

Unlike in the rest of the United Kingdom where social housing is divided between many organisations, the Northern Ireland Housing Executive owns 98% of social housing. This amounts to over 140,000 households, which represents just under a quarter of the dwelling stock in Northern Ireland (Home Energy Conservation Authority, 1997). Four out of five of these houses were coal-heated in 1996. This in turn is a significant proportion of the total dwelling stock heated by solid fuel – some 43%. The majority of these properties are managed for the lower-income groups and it has been shown that the associated social circumstances constrain fuel options. As a result, the Housing Executive's policy concerning heating or fuel poverty will have a significant impact upon the trend of fuel switching.

Possibly the greatest restriction for tenants in Northern Ireland stems from a legacy of the social housing policy that historically limited fuel choice. It has been shown that there is an ongoing decline in solid fuel usage in the domestic, owner-occupied sector of Northern Ireland, with a corresponding rise in the use of oil (Section 3.2). This decline reflects owner-occupiers switching to oil at their own expense. It has not been reflected in privately rented sector or within social housing. Consequently, oil-users are being concentrated into the more affluent socio-economic groups and in owner-occupied or detached accommodation (see Table 4). The Housing Executive policy during this period of change in Northern Ireland's fuel mix has impeded tenants from following private sector trends. Fuel choice has essentially been restricted to coal. This restriction dates from the 1970s when a priority of the Housing Executive was to introduce central heating to all homes. At the time gas was unavailable and oil was discouraged because of the volatile prices resulting from the energy crisis. Solid fuel central heating is recognised as inefficient, expensive and environmentally unsound

4.4.3 BRE assessment of social housing fuel policy

The Housing Executive is now of the opinion that fuel switching should be part of their heating policy. There have been internal proposals by the Housing Executive to re-shape policy to incorporate issues of energy efficiency and environmental concern. In effect, this would have repercussions within the 78% of Housing Executive households that are heated by solid fuel (BRE, 1998). There are serious implications for the coal distribution industry should such policy be adopted. The Coal Importers Federation, an organisation set up in response to the perceived threat from the arrival of natural gas, is known to be concerned about the proposed change in policy. A report, conducted independently to ensure impartiality, was commissioned to assess the options available to the Housing Executive. This was conducted by the Scottish Laboratory of the Building Research Establishment and was published in May 1998. The report assesses the fuel and heating system scenario in Northern Ireland.

The report makes a statement on the Home Energy Conservation Act of Northern Ireland (1995) with respect to Housing Executive property. The Northern Ireland Housing Executive has been appointed Northern Ireland's Home Energy Conservation Agency and charged with reducing the consumption of energy in the existing housing stock by 34% (OFREG, 1999). The report by the Building Research Establishment concludes that the 30% target cannot be attained by insulation and draught proofing alone, but would require consideration of more energy efficient heating systems as well. In other words an element of fuel switching is required. The impact of this report, if accepted, will have considerable effect upon patterns of fuel use and is likely to contribute further to the decline of solid fuel.

A policy that encourages fuel switching is in the process of being implemented. It will be conducted through guidance and information in conjunction with the existing Housing Executive inspection programme that is carried out every 10-12 years. The Housing Executive will ensure that tenants are offered a choice of fuel, but will suggest conversion based on energy conservation and efficiency. The tenant is not expected to pay any of the conversion charge (Noel Rice, Housing Executive, *pers. comm.*, 1998).

4.4.4 Tenant-resistance to fuel switching

Not all tenant preference supports fuel switching. There are perceived benefits from existing heating systems. Many householders are attracted to the familiarity and simplicity of electricity as a source of energy, or are accustomed to paying for their solid fuel on a weekly basis, a facility that natural gas does not presently offer. Shifting to a system whereby payment is made in arrears could lead to customers falling into fuel debt, even though their present unit cost per week is higher. Without the benefit of a detailed attitude survey, it is hard to predict how the public perception of gas is likely to

change over time. Experience from the rest of the UK would suggest that gas is gradually accepted as a viable option on the energy market. Certainly, it is reasonable to assume that the trend of fuel switching experienced in the private, non-rented sector of the rest of the UK is attractive to a proportion of tenants in Northern Ireland unable to switch.

4.5 Safety issues as a barrier to change

Phoenix Natural Gas is conducting an extensive ongoing publicity campaign that started prior to the launch of natural gas in Northern Ireland. Publicity has been conveyed to the general public by means of local and national newspapers, the Internet and a mobile 'roadshow'. In an attempt to sell the concept of natural gas to the general public Phoenix Natural Gas has paid particular emphasis to the aspect of safety. Indeed, the company jointly hosted a conference with the Belfast Institute of Further and Higher Education that stressed the strict safety laws, the professionalism of installers, the established codes of practice and the independence of trade associations (CORGI). The comprehensive and professional manner in which the media campaign is being carried out by the company suggests that the safety issues have been carefully selected to address identified consumer concerns. It is too early to note whether these particular consumer concerns have been allayed.

4.6 Lifestyle issues

Natural gas is being promoted as more than merely another fuel option. It is also being sold as a concept, associated to a particular modern and comfortable lifestyle. At a practical level, it is argued that "the small houses in inner city Belfast have no room for fuel storage" and that as a "new source of energy [it] is versatile, controllable [and] convenient". Less tangibly, Phoenix Natural Gas claims to be "modern and right for your lifestyle" (<http://www.phoenix-natural-gas.co.uk/natural/>). Phoenix Natural Gas has tailored their sales manner to compete with the image of electricity that has been successfully promoted as the modern and clean energy source for domestic heating. Considerable attention has been also been paid to disassociating natural gas with the old style of appliances. Town gas was only phased out between 1985 and 1990, and a certain stigma is likely to still be attached to the use of gas - those who could afford to change from gas fuel had done so a long time ago.

5 Overcoming the barriers to change

The Housing Executive is directly dealing with barriers to fuel switching by altering its policy towards fuel choice. Other attempts to break down these barriers have been less direct.

5.1 Economic incentives for change

The economic benefits have been stressed in several ways. Firstly, the introduction of competitively priced fuel to the energy market is anticipated to instigate a fall in overall fuel price. While this is difficult to measure – oil prices for example, are largely dependent on the price of crude oil – there has been an observed increase in competitive activity since natural gas became available (Jillian Ferris, Phoenix Natural Gas, pers. comm., 2000). At the time of connection, Phoenix Natural Gas supplied the domestic market at a particularly low unit rate of 1.3p per kWh and claimed that "no other fuel can do so much so affordably" (http://www.phoenix-natural-gas.com/first-year/chief_executives.html). Phoenix Natural Gas also stresses the economic sense of using gas on the grounds that prices are "less volatile compared to other fuels". Other simple economic benefits can be associated with the higher efficiency of modern gas systems compared with other fuels and models.

Beyond the domestic sector, many industries prefer to use gas as their primary fuel and therefore the availability of gas may well encourage inward investment creating the associated additional jobs. Indeed, it is claimed that this "cost effective energy option [will] fuel economic prosperity and create jobs" (<http://www.phoenix-natural-gas.co.uk/natural/>). Phoenix Natural Gas have estimated that customers will spend more than £450 million on services and purchasing new products or on converting existing ones to burn on natural gas. If such estimates turn out to be correct there will obviously be beneficial impacts to the local economy.

Although the above claims by Phoenix Natural Gas may well transpire to be correct, there are other similarly important economic implications, although less positive. For instance, the coal industry is a major employer and the adoption of gas will speed its decline. Many of the jobs resulting from the development of the gas network, such as the laying of pipes, could prove to be temporary. Furthermore, the Northern Ireland Coal Advisory Service (NICAS) argues that the policy of the

Housing Executive to encourage fuel switching will result with gas dominating sections of the fuel market. This interference would reduce the level of competition between the fuel utilities and thereby have a detrimental impact on low-income tenants (BRE, 1998).

5.2 Environmental issues

Phoenix Natural Gas publicly links itself to the 'National Air Quality Strategy' which recognises the fact that Belfast has one of the poorest city air qualities in Europe. Indeed, Belfast is expected to miss the government deadline for improving city air quality, a situation directly linked to the historical dependence upon solid fuel. Phoenix Natural Gas exploits this situation and markets itself as a "clean energy" and the "the cleanest choice", in an attempt to promote itself as a 'green' alternative fuel supply. (<http://www.phoenix-natural-gas.co.uk/natural/>).

5.2.1 Opportunities for CO₂ saving

Three primary ways in which environmental impact will have an effect

- 1) reduction in electricity consumption therefore reducing power station emissions of CO₂
- 2) fuel switching to natural gas in domestic sector with lower CO₂ content and negligible SO₂ emissions
- 3) increased efficiencies, reduced consumption with properties converting to gas, again reduces CO₂ emissions

5.3 Expansion and constraints

In March 1999, additional shareholder investment allowed an acceleration of expansion plans for the licensed area. Phoenix's licence directs that gas must be made available to (i.e., pipelines taken past) 90% of the 250,000 properties in the, predominantly urban, licensed area. The primary constraint to such expansion is time – it takes years to construct such a major network (Jillian Ferris, Phoenix Natural Gas, pers. comm., 2000).

To date, rural and remote areas in Northern Ireland remain unlicensed.

5.4 Conclusion

The initial EU involvement in the introduction of natural gas to Northern Ireland aimed to address environmental, economic and security (of energy supply) concerns. While the projected move away from the two-fuel-split between coal and oil is occurring, presently the SNIP remains the only entry point for natural gas into Northern Ireland, and the supply is dominated by Phoenix Natural Gas. Rural areas remain under-serviced, and expansion of the network is slow. Since gas became available, an increase in competitive (market) activity has been noted, and with the recent huge and rapid rise in oil prices (largely dependent on the price of crude oil), the overall concept of gas as cheaper (economically and environmentally) will continue to gain credence.

Societal structure, and its inherent inequities, influences the uptake of connections, and thus the spread of the network. Positive schemes, such as free connection, may help to address the plight of the more disadvantaged socio-economic groups – large sections of society may be dissatisfied with their energy supply or expenditure, yet unable to resolve the situation financially. The role of policy is also important – for example, the Home Energy Conservation Act of Northern Ireland subscribed to a 30% improvement in the energy efficiency of residential accommodation by 2006. This in turn will have further impact on patterns of fuel-use and the decline of solid fuel.

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