



# **Gas for 'Ineligible' Towns: A review of the options**

**Western Development Commission**

**October 2007**

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## Executive Summary

### Introduction

- The Western Development Commission (WDC) was set up by government to promote, foster and encourage economic and social development in the Western Region<sup>1</sup>. One of the main functions of the WDC is regional policy development. In doing this, the WDC seeks to ensure that government policy reflects the needs of the region across such areas as infrastructure, natural resources, industrial and rural development. The WDC regards the provision of quality energy infrastructure and supply as important elements of the essential infrastructure required to underpin the economic development of the region. The WDC also views renewable energy as a sector with considerable potential for development in rural areas.
- This study has been prepared at the request of the Commission members who are concerned that towns in the region should have access to natural gas. They requested that the WDC should examine the options for the connection of ‘ineligible’ towns to the natural gas grid.
- The natural gas grid in Ireland has expanded very significantly in the last decade. As it has expanded there has been major industrial and domestic uptake. Gas is an important part of the energy mix in Ireland and the WDC believes that the development of the natural gas grid is an important element of the infrastructural development necessary to bring more balanced regional development.
- The original policy on the connection of new towns to the grid was very restrictive. Following a campaign by the WDC and others, a policy change was introduced in 2006 which made it easier for towns to qualify for connection to the natural gas grid and towns seeking connections were reviewed. Under the review, some towns were found to be still ineligible for connections. This study examines the options for investment in natural gas connections for these ‘ineligible’ towns, it considers the benefits of natural gas for the competitiveness of towns and provides some international examples of investment in natural gas pipelines to gain regional development benefits.

### Connection Policies

- The new connection policy (CER/06/032) for towns determines that towns which are assessed for connections must pass an ‘economic test’ which is applied to an individual town or a regional group of towns. This involves assessing the present values of the costs associated with the development of the town connection to the gas grid and the revenues associated with the projected load on the proposed connection. The town or group of towns must have a positive net present value (NPV) in order to be deemed eligible for a connection.

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<sup>1</sup> Counties Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Clare.

- This policy change in 2006 led to an increase in the number of towns which meet the economic criteria. Towns which are likely to meet the economic criteria are those which are relatively close to the network, or which have large loads, or “where there is a supplemental contribution available.”<sup>2</sup> This study examines the options for ineligible towns, in particular in relation to providing the supplemental contribution to fund the grid connection.
- In order to clarify the position of the ineligible towns for this study the WDC consulted with the Commission for Energy Regulation (CER) and Bord Gáis Éireann (BGÉ).
- BGÉ felt the connection of uneconomic towns was allowable where the amount of the negative NPV (as assessed under the connection policy for new towns described above) i.e. a supplemental contribution, was funded from another source and where the anchor loads committed to connect.
- The CER is concerned with achieving a balance between growing the grid on the one hand and the competitiveness of gas prices on the other. The focus of the connection policy is on ensuring that the network develops but that uneconomic connections which are a burden on existing customers, raising prices in the long term for all gas users, are not made. However, the CER is indifferent to other investments which do not have an effect on the market or price. This means that if the amount of the negative NPV as found in the BGÉ appraisals of a town’s connection, is funded from an outside source, so the connection does not lead to higher costs for potential users, the CER believes that this would be allowable.

### Other Policy

- The Energy White Paper states national energy policy. The overall objectives are security of supply, sustainability and competitiveness. In terms of security of supply there are concerns about the projected heavy reliance on gas especially in relation to electricity generation. However the White Paper does recognise that investment in the natural gas network may be made for reasons of security of supply and regional development and it supports the upgrade and renewal of the gas transmission and distribution networks taking account of regional development needs.
- The National Development Plan (2007-2013) (NDP) is reflective of the policies outlined in the White Paper. There is a focus on strategic energy infrastructure investment. More balanced regional development could be considered to be an objective requiring strategic investment.

### Gas and Regional Development

- The benefits of natural gas are well documented and include the following:

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<sup>2</sup> Bord Gáis Networks (2006) Connections Policy Document, CER/06/032, pg 22

- Improved economic competitiveness – natural gas is the most efficient of all energy sources, reducing production costs for a wide range of industries.
  - Combined Heat and Power (CHP) – a highly efficient use of energy which means lower costs for energy users, which in turn enhances their competitiveness.
  - Reduced greenhouse gas (GHG) emissions – natural gas is by far the cleanest burning fossil fuel, its use brings reductions in greenhouse gas emissions compared with other fossil fuels. When it is burned it produces virtually no emissions of sulphur dioxide and far lower levels of nitrogen oxides than competing sources of energy such as oil and coal.
  - Other environmental benefits – in addition, natural gas produces very few emissions of particulate matter, so its use brings improved air quality. It also produces virtually no solid waste and has much less potential to impact on water quality.
  - Health benefits – a cleaner environment always brings a reduced incidence of cardio-pulmonary diseases, and a substantial cost saving in health expenditures.
  - Social benefits – there is evidence from the UK that access to natural gas, which is currently the cheapest and most efficient fuel for domestic heating, contributes to keeping households out of fuel poverty.
- The key benefits for towns connected to the natural gas grid are the reduced energy costs over the longer term resulting in greater competitiveness for businesses as well as greater attractiveness for new industry which may choose to locate in towns with natural gas.
  - As the gas grid network expands nationally and more consumers (both industrial and domestic) gain access to the network, the availability of gas supply will be taken for granted in many regions. In this context, the lack of gas infrastructure in other regions may become a further disincentive to investment, reducing a region's competitiveness and thus increasing existing disparities. Furthermore, those industries in areas without natural gas face higher energy costs, lack choice of energy supply and will face higher costs arising from the use of more polluting energy sources. Homeowners in the region are likewise facing higher costs and using less energy efficient systems. Thus gas infrastructure makes an important contribution to the maintenance and development of the regional economy.

### Competitiveness of Gas

- One of the main arguments for the development of the natural gas grid is that gas is regarded as one of the most efficient and cost effective fuels available. There is, however, a lack of detailed data available in relation to the competitiveness of different fuels in Ireland. The WDC therefore commissioned the energy consultants Enercomm International to examine the relative fuel costs for process heating, space heating, hot water and cooking as they apply to a range of energy users.

- The study took four examples (three businesses and a domestic household) and examined fuel costs associated with typical usage. It shows very clearly the cost differences for the various fuels, with natural gas significantly cheaper than electricity, LPG and oil/kerosene in all cases. Biomass<sup>3</sup> was slightly cheaper than natural gas, in terms of fuel costs but when capital, and operation and maintenance (O&M) costs were included it was more expensive in the domestic and the small business cases.
- The factory or production facility case (which could be a food production or small pharmaceutical facility) was the largest user, requiring process heat in addition to other heat (space heating and for hot water and cooking). Natural gas is considerably cheaper (€95,158 annual cost including capital and O&M) than electricity (€199,140) or LPG (€211,680) or Oil/Kerosene (€160,538). Biomass using wood chips (€85,469) is cheaper than natural gas.
- The competitiveness of natural gas is also evident when a medium size commercial or service business such as a supermarket or a large garage is considered. With capital costs and O&M costs included, natural gas and biomass (wood chips) are again the cheapest fuel sources with a natural gas user saving 41% on fuel bills compared to LPG cost, 35% compared to cost of using electricity and 23% on the cost of oil. Natural gas in this situation is 6% cheaper than wood chip biomass
- For the small commercial or service business, such as a hairdresser, natural gas is the cheapest fuel, cheaper in this case than biomass (wood pellets), because of the relatively high capital and O&M costs relative to usage. If they used natural gas, a small business in this situation would save €1,995 each year compared to using electricity for their heating needs, €1,922 compared to LPG and €897 compared to oil or kerosene. Compared to using wood pellets they would save €825.
- Natural gas is the cheapest fuel for the domestic household, providing very significant savings over other fuel types. The results of the Enercomm study show that a domestic user with natural gas for space heating, hot water and cooking will pay €955 per year. This is compared to €1,391 for electricity, 46% more than natural gas. Using LPG would cost €1,539 per year, which is 61% more than the cost of natural gas, while oil or kerosene in this case costs €1,225 a year which is 28% more than the cost of natural gas. Even biomass (wood pellets) is substantially more expensive in this context, again because of the higher capital and O&M charges. It would cost €1,401 annually or 47% more than gas. High capital and O&M costs associated with solar energy use make it the most expensive of all options.

### International Examples

- A number of international examples of investments in natural gas networks which were made in order to stimulate development in remoter localities are provided in this study. The examples come from Canada, the US, and Australia. In general the most

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<sup>3</sup> In the case of the factory/production facility and the medium size enterprise the cost of wood chips is used for comparison. The cost of wood pellets is used in the small business and domestic examples.

significant benefit associated with the investments was the cost savings for those who could now use natural gas rather than being restricted to other types of fuels. Difficulties with the investment in the US highlight the importance of ensuring that the investment is well costed and the mechanism for operating the scheme and the pipelines is carefully planned.

- A case study of the Natural Gas Expansion Program (NGEP) in Victoria, Australia is provided. This scheme was introduced to extend gas connection availability beyond the 90% of the population who could already connect to the network. The NGEP provided public investment to expand the natural gas network in ‘regional’ Victoria and has brought natural gas connections to 34 towns, and more than 70,000 users. It is a good example of a well planned and costed scheme which involved both public and private investment. Economic analyses of the impact of the scheme indicate that the state investment of AUS\$70 million (€44.4m) brings benefits of AUS\$427.6 million (€271.4m) over 20 years. A large proportion of this is associated with the energy savings from connecting to natural gas.

### Funding Options for ‘Ineligible’ Towns

- There are a number of possible funding options for the amount required to make up a supplemental contribution to allow for the connection of ineligible towns. Options for public investment include making a strategic investment under the NDP, or funding it through the CLÁR programme. Local Authorities could also reduce the costs by waiving road opening licensing fees.
- A private investment of the amount of the supplemental contribution would also be allowable. Such an investment would not however give any returns to the investor as the revenues from the pipeline would go to the businesses which construct, operate and supply gas through the pipeline. A private investment would therefore be in effect an altruistic venture. A large user might also consider contributing to the shortfall.

### EU Issues

- The key area of concern in relation to gas infrastructure, such as that considered in this study, at EU level is the competitive energy market. The connection policy ensures that uneconomic connections are not made and allows for a supplemental contribution which might be considered as funding regional development benefits at no cost to existing gas consumers. It does not appear that there are any ‘State Aid’ rules which would preclude investment. There have been a number of recent examples of investment in infrastructure with the aim of gaining regional development benefits (gas infrastructure in Northern Ireland, investment in regional airports and in a broadband scheme for areas without coverage in the Republic of Ireland). Neither the CER nor BGE believed that State Aid rules would apply in this context.

- If a mechanism for funding gas connections to smaller towns is developed then the State Aid implications, if any, should again be clarified in relation to that specific mechanism.
- There does not appear to be any EU funding available to aid investment in gas infrastructure.

## Conclusions

- This study has examined the options for towns which have been found to be ineligible for a natural gas connection. This is the situation for a number of towns in the Western Region but the findings of this study are relevant to all towns which have been assessed as being ineligible for gas connections.
- The WDC believes that regional areas must have equity of access to services and infrastructure so that they can play a primary role in ensuring the economic and social future of the country. While the natural gas network has extended rapidly in Ireland in the last decade, there are still many small or remote towns which have not been connected to the grid. The WDC believes that natural gas infrastructure is an important element of the physical infrastructure which sustains and supports development.
- The connection policy which determines the method of assessing which towns may qualify for a gas connection has been examined in this study. Both the CER and BGÉ, which were instrumental in developing the policy, believe that if the amount of the negative NPV (as estimated when a town was appraised for a connection) is funded in the form of a supplemental contribution then the town can become eligible for a connection.
- There are many benefits associated with connection of towns to the natural gas network. These include cost competitiveness for local commercial and domestic users, the environmental benefits associated with the use of natural gas and enhanced attractiveness of an area as a location for new industry. In the context of high energy prices, companies in towns which will be connected to the natural gas grid will experience immediate savings while lack of access to gas affects the competitiveness of companies in remoter areas. Natural gas is a clean efficient fuel which is attractive to modern industry; it has lower greenhouse gas (GHG) emissions than other fossil fuels, which will be important in the event of any introduction of a carbon tax or similar policy to restrict GHG emissions. There is less air pollution associated with natural gas than other fossil fuels, and it is the cheapest fuel for domestic use which, associated with the regular billing structure, means that its availability can help to alleviate fuel poverty.
- These wider ‘non gas’ benefits are important and can make a contribution to the development of a town and its locality. It is argued in this study that providing supplemental contributions for the connection of the natural gas pipeline to towns which have been deemed ineligible under the connection policy, is, in effect a means of funding the ‘non gas’ benefits of such infrastructural development (only ‘gas’ benefits are assessed under the connection policy). Given that the ineligible towns



are usually remote and face a number of developmental disadvantages these are important benefits which could justify such investment.

- Indeed, the White Paper on Energy recognises that investment in the gas network is made both for reasons of security of supply and regional development. Programmes such as CLÁR could be used to provide the supplemental contribution. Private funding of the supplemental contribution would also be allowable.
- In Australia, the case study of the Natural Gas Extension Program (NGEP) showed that significant benefits were available from the extension of the natural gas grid. The economic evaluation of this scheme should be examined in relation to the development of natural gas infrastructure in Ireland which has tended to find very minimal benefits from such infrastructural investment. It may be that the elements found significant in relation to the NGEP are not being considered in Ireland. It would be useful to examine the Australian study and compare it to similar Irish analyses.
- A Canadian study also found that the main quantitative benefit of access to natural gas was found to be potential energy savings. The competitiveness of natural gas as a fuel source was also highlighted in the economic impact study for the NGEP in Australia. Clearly the relative cost of gas is a very important factor and bringing natural gas to smaller and remoter communities allows them to compete with other locations to attract new industry, but also importantly to allow local industry and business to be more competitive.
- There are, however, a number of additional points for consideration. While the benefits of natural gas connections have been outlined above, we need to consider whether investment in the natural gas network is the best way to achieve development in these towns, or whether there might be better ways to invest this money. In general a business case for bringing natural gas to towns, based only on serving existing businesses and domestic users may be difficult to make. New anchor businesses are likely to be required to make many of the towns more viable. It seems, therefore that bringing gas to towns should be linked to the identification and attraction of appropriate new industrial and commercial enterprises to the towns, and to an overall plan for the development of enterprise in the towns. Such linkage would improve the case for bringing gas to the towns and reduce the costs associated with the investment.

## 1. Introduction

There has been a rapid expansion of the natural gas network in Ireland in the last decade. Policy change in 2006 revised the conditions under which towns could be considered eligible to connect to the natural gas grid. Following the policy change, towns seeking connection to the gas grid via the Mayo-Galway transmission pipeline were reviewed and their connections assessed as ‘economic’ (where connections would be allowed as they show positive returns either individually or as part of a group) or ‘uneconomic’ or ‘ineligible’ to be connected. Towns tend to be classed as ineligible because their distance from the transmission pipeline makes connection very expensive, or because the population is small and demand relatively low, leading to low revenues from the connection. The focus of this study is on the options for ineligible towns i.e. those which are not deemed to qualify for connection.

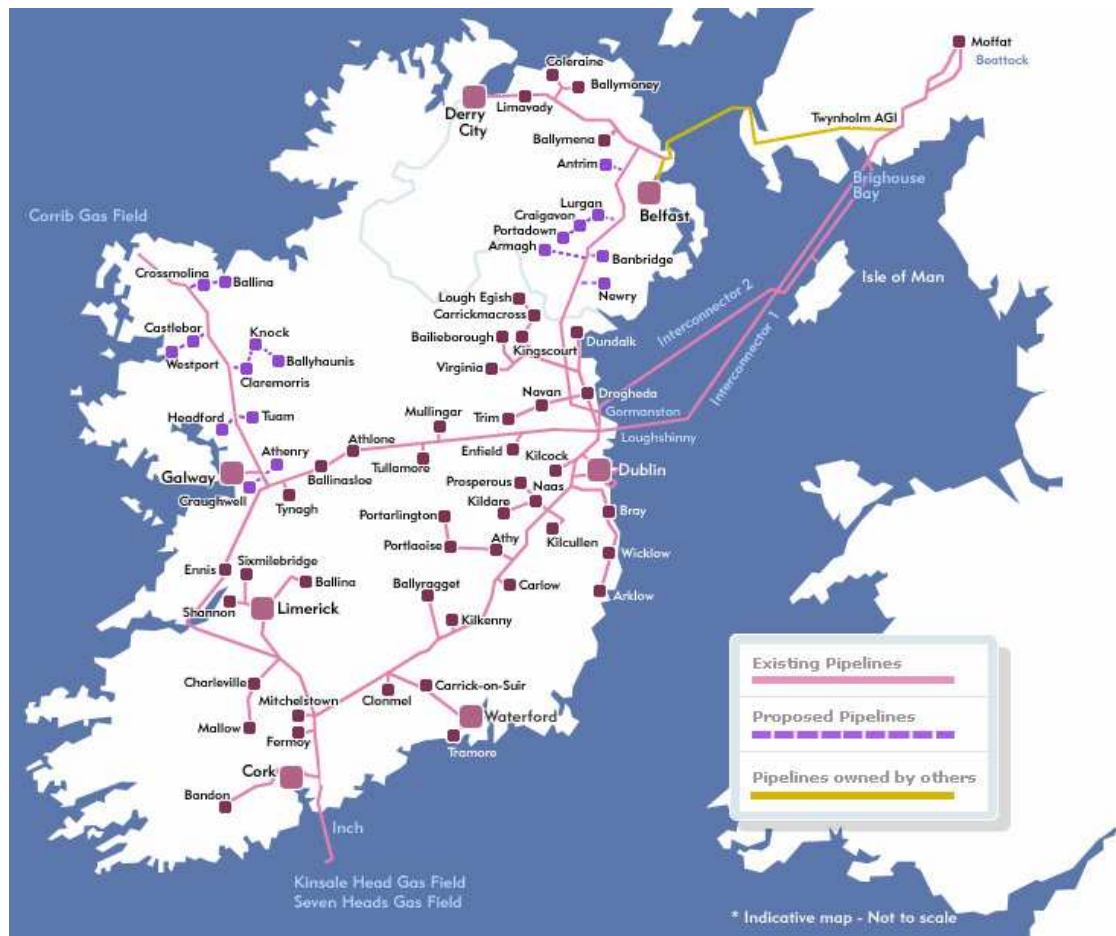
Gas is an important fuel source; it is cheaper and cleaner than other fossil fuels, emits fewer greenhouse gases and has many other benefits associated with its use. It is an important infrastructural asset for any town and can help the competitiveness of local businesses as well as making a location more attractive for new investors and reducing fuel poverty.

In this study the options for bringing gas to the towns which were deemed ineligible under the revised policy are reviewed, taking into consideration the wider social and economic benefits of gas connection. In the next section (2) the development of the natural gas network in Ireland is briefly described. In section 3 the current policy for the connection of towns to the grid, along with the policy situation for the ineligible towns is outlined. Then the benefits of using natural gas and its contribution to regional development are summarised in section 4. The findings of a study commissioned by the Western Development Commission (WDC), on the relative costs of various fuels are described in section 5. This is followed by a review of international examples of public investment in the natural gas network to provide social and economic benefits in section 6, which includes a case study from Victoria, Australia on a programme to extend the gas grid into the remoter parts of that State, which has useful lessons for Ireland. In sections 7-8 possible funding options for providing gas to ‘uneconomic’ towns in Ireland are considered and the key issues arising from this work are reviewed.

## 2. Natural Gas in Ireland

Demand for gas in Ireland has grown rapidly since Kinsale gas was brought ashore in 1976. As the grid infrastructure has developed there has been major industrial uptake wherever gas is available. Natural gas is increasing its already high market share in space heating; it is gaining more ground in industrial uses and is used significantly for power generation in Ireland. Natural gas is an important part of the energy mix throughout Ireland. In 2005 gas accounted for 22%<sup>4</sup> of our total primary energy requirement, and significantly more (40%<sup>5</sup>) in relation to electricity generation.

Figure 1: The Gas



Source: Bord Gáis Networks

Gas demand has been growing rapidly, largely as a result of network developments allowing the connection of new customers. In the last five years there has been very significant investment in the development of the natural gas network, and a

<sup>4</sup> This is the most recent available figure. Sustainable Energy Ireland 2006

<sup>5</sup> Energy White Paper 2007

number of major pipelines have been completed. In October 2002 the ‘Pipeline to the West’ was completed bringing gas from Dublin to Limerick via East Galway and connecting with the pipelines from Cork to form a ‘ringmain’ (see Figure 1). The Mayo Galway pipeline provides a transmission connection from east Galway to connect Bellanaboy where gas from the Corrib field will enter the network. These two pipelines in particular are significant in allowing businesses and households in the Western Region access to natural gas. Natural gas is now available in over 140 population centres and in 18 counties and there were more than 575,000 gas users in Ireland in 2006<sup>6</sup>.

As the transmission pipelines have been completed there have been distribution connections to the towns along the route. The policy for assessing which towns could have distribution connections was very restrictive until April 2006 and towns in the west were not qualifying for connection. This change is discussed in more detail in the next section.

The discovery of natural gas in the Corrib Field is significant for the Western Region. It is a major natural resource which has the potential to bring significant regional development benefits. In order for the region to benefit fully from the Corrib field, the gas grid needs to be developed and the wider social and economic benefits of extending the natural gas grid taken into account.

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<sup>6</sup> Bord Gáis (2006), Annual Report and Financial Statement 2006

### 3. Connection Policies

In 2002 the Commission for Energy Regulation (CER) took over the regulation of the natural gas sector in Ireland. It is responsible for the regulation of the Irish gas network and the supply or retail market. Because there is only one network provider (Bord Gáis Éireann), the CER must oversee costs, revenues and network charges. It aims to make sure that the network in place meets the needs of the Irish gas customer at a reasonable and efficient cost.

As part of the process of introducing competition into the market for natural gas, the CER has developed policies to ensure that there is no unfair competition and to ensure that gas customers are being charged a reasonable price for the gas they consume. The CER developed a policy which clearly defined under what economic criteria investments could be made in gas distribution infrastructure. The initial policy introduced in 2002 was very restrictive and did not allow for the connection of any towns in the Western Region (with the exception of Galway city for which a special connection was built) to the Mayo-Galway transmission pipeline.

The WDC highlighted the difficulties with the policy and actively sought significant changes to it. Bord Gáis Networks, a part of Bord Gáis Éireann (BGÉ), then developed policy proposals on the assessment of towns for connection to the natural gas grid (as part of a new connection policy which also covered several other areas). This policy was adopted by the CER in April 2006. It is described in the next section.

#### 3.1 Connection Policy for New Towns

Under this policy the economic viability of new town connections is determined by the economic test. In carrying out economic test appraisals of new town connections, or regional groups of such towns, the investment appraisals compare:

- The present value of full pipeline and ancillary capital equipment and operating costs (both transmission and distribution) attributable to meeting the projected load. Capital costs include local authority charges associated with road openings. The present value of any attributable upstream (deep) reinforcement costs is also included; and
- The present value of, in all cases, 100% of distribution and transmission (entry and exit) tariff revenue attributable to the projected load.

In relation to evaluating potential new town load, only new housing and Industrial and Commercial (I&C) loads are considered. All existing housing is treated as non-gas estates in accordance with the relevant policy for non gas estates.

To reflect the relatively lower risk of the diversified load base represented by a new town and the broader opportunities for growth of load, the present value appraisal for both domestic and I&C customers is carried out over a 25-year period (previously 20 years for domestic and 7 years for I&Cs), and using Bord Gáis Networks' regulated rate

of return as the discount rate. As an option, it is possible to appraise a new town either on its own or as part of a regional group of towns. **In order for the connection of a new town or a regional group of new towns to proceed, the present value of the revenues has to exceed the present value of the costs as determined above.**

As a group of towns can be appraised as a single project, it is possible for some towns that would not otherwise be economically viable on their own, to become viable when considered as part of a regional group. Whether or not a town is included in the group depends on a number of factors including: relative proximity to the network, size and load growth potential, connection costs involved and a town's ability to share the same operating costs with adjacent towns. For example, a town which does not have a sufficient load can be included into the group if it is located on route to a town which does have a significant load potential. However, in all cases the relative contribution of a town to the group of towns is the ultimate determining factor, i.e. a town with a higher present value of revenues less present value of costs will be given priority. The total group must work within the terms of the connection policy, i.e. the present value of total revenues less total costs must be positive.

Whether new towns are appraised individually or as part of a group, the construction of the connection would be expected to lead to a short term increase in tariffs. This is due to the fact that connection of new towns is typically associated with a high upfront investment and low initial load which can take a number of years to build up. However, as the load in newly connected towns builds up, it will push general tariffs down in the longer term, hence benefiting all network users.

This policy change led to an increase in the number of towns which meet the economic criteria. Towns which are likely to meet the economic criteria are those which are relatively close to the network, or which have large loads, or "*where there is a supplemental contribution available*"<sup>7 8</sup>[italics added].

Following the adoption of the new policy, BGÉ carried out an assessment of the towns in the west which might qualify for connection to the Mayo-Galway pipeline (Phase I). Of the 14 towns examined in this Phase 1 assessment, 11 towns were deemed to qualify for connection. These were Castlebar, Craughwell, Westport, Athenry, Claremorris, Ballyhaunis and Knock (which were examined together), Tuam, Headford, Ballina and Crossmolina (which were examined together). It should be noted, however, that as towns were considered as a group, each of the 11 towns and villages which were deemed to be eligible for connection in a group, were not necessarily eligible individually, but the overall group of 11 towns was deemed economic<sup>9</sup>. Three of the towns (or town groups) examined were not deemed to qualify. These were Kiltimagh,

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<sup>7</sup> Bord Gáis Networks (2006) Connections Policy Document, CER/06/032, pg 22

<sup>8</sup> This is not explained in the policy document but is taken to mean the contribution required (as discussed below) for 'ineligible' towns to connect.

<sup>9</sup> Towns in the group were deemed economic if together they had an overall positive Net Present Value (NPV). NPV is the discounted value of revenues less costs.

Foxford and Swinford (which were examined together as a group), Ballinrobe (this was reconsidered in Phase II, discussed below), and Belmullet.

The New Towns Analysis conducted by BGÉ provides the detail of the NPVs associated with each town. For Kiltimagh by itself (Stand Alone) the negative NPV was -€3.4m, while for Foxford (Stand Alone) it was -€3.38m and for Swinford (Stand Alone) it was -€3.46m. For the three towns together it was -€7.73m. This was changed to -€7.64m in the Phase II report which used a different rate of return. In the Phase II report of the New Towns Analysis the total negative NPV for Belmullet was -€6.83m. As discussed below the amount of the negative NPV is the amount that would be required as a supplemental contribution.

The second phase of the assessment process is has been completed and three western towns were examined in Phase II: Loughrea; Gort and Ballinrobe (which had been examined in Phase I and found not to be eligible. Next load info and population projections were used in Phase II). All of these were considered to be eligible for connection, when they were included in the Phase I grouping of Western towns assessed and the new rate of return was applied to the western towns.

Analysis of New towns will continue with a Phase III report due in Autumn 2008. More Western Region towns are being considered in this phase (in three groups Roscommon/Leitrim, Midlands and Donegal). The midlands towns to be assessed include Portuma, Co. Galway (in a group with Nenagh and Roscrea) and a group from Roscommon/Leitrim/Longford (Roscommon, Strokestown, Boyle and Carrick on Shannon and Longford). The Donegal group of towns is made up of Letterkenny, Lifford, Donegal, Ballyshannon, Bundoran and Sligo (their connection, however is dependent on a transmission pipeline being built to Sligo. If this is not built then these towns will not be assessed).

### **3.2 Situation for 'Ineligible' Towns**

The focus of this report is on the towns which were found to be ineligible even as part of a group. Under the current policy as described above, on the basis of their assessment these towns will not qualify for a connection to the natural gas grid. The assessment outlined above is restricted to considering the 'gas' benefits of connection, in other words only the revenues associated with a connection can be considered as a benefit. The WDC argues that the connection of towns to the natural gas network brings wider social and economic benefits from the extension of the natural gas network such as fuel choice options, and lower energy costs for the businesses, making existing businesses more competitive and helping to ensure their long term survival. It allows the towns which get natural gas connections to operate on a more level playing field with other towns in relation to energy infrastructure. Natural gas also brings the advantage of lower greenhouse gas emissions and social benefits of more affordable energy. These broader societal benefits could justify public investment in the development of the gas network, or indeed private investment with the objective of improving a towns development options.

It was therefore important to see whether investment in the gas network, justified on the basis of the ‘non gas’ benefits, would be allowable under the connection policy for new towns. The WDC met with the CER, and was involved in discussion with BGÉ in relation to this issue.

### 3.2.1 BGÉ position

BGÉ noted that their legislation requires them to invest only in commercially viable projects, and also that when the new policy for the connection of new towns was being developed that they did not deal with ‘non gas’ issues such as regional development benefits. This is not part of their remit. Nonetheless BGÉ did not see any difficulty with the development of the connection to uneconomic towns where the amount of the negative NPV, as assessed under the connection policy for new towns described above, was funded from another source.

BGÉ noted that there is a precedent relating to individual connections which might be followed in the case of towns. Where a connection to an individual customer is not commercially viable, the individual company can make up the shortfall (the amount of the negative NPV) as a lump sum. Therefore if a town applied for a connection and was found to be uneconomic, if the amount of the negative NPV was paid as a supplemental contribution, then BGÉ could construct the pipeline, subject to the commitment of the anchor tenants included in the revenue assessment for the connection policy. In small towns the viability of a load usually depends significantly on a single industrial or commercial load as domestic loads tend to be small. Thus the commitment of the anchor tenant, as well as the lump sum, is important.

While BGÉ feels that uneconomic towns could be connected, subject to the funding noted above, it is important that the detail of any mechanism for funding is developed in order to ensure that it is compatible with the current policy.

### 3.2.2 CER position

The CER was responsible for agreeing the connection policy which was proposed by BGÉ and with issuing the policy, as well as ensuring that it is correctly implemented.

The CER issued the new connection policy in April 2006 in order to ‘achieve a balance between growing the grid on the one hand and the competitiveness of gas prices on the other’<sup>10</sup>. The CER concern is with the development of the gas market and with gas revenues and costs. Other objectives which might be achieved with the development of the network, such as regional development objectives, are not the concern of the CER. The focus of the connection policy is on ensuring that the network develops but that

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<sup>10</sup> Bord Gáis Networks (2006) Connections Policy Document, CER/06/032



uneconomic connections which are a burden on existing customers, raising prices in the long term for all gas users are not made. However, apart from these issues relating to the gas market and the long term effect of developments on price the CER is indifferent to other investments which do not have an effect on the market or price. This means that if the amount of the negative NPV as found in the BGÉ appraisals of a town's connection, is funded from an outside source, so the connection does not lead to higher costs for users, the CER believes that this would be allowable.

### 3.3 Other Energy Policy

There are two other key areas of policy which are relevant to this WDC study: the White Paper on Energy (March 2007) and less significantly the National Development Plan (NDP) 2007 -2013.

#### 3.3.1 Energy White Paper

The overall focus of the White Paper is on three areas: security of supply, sustainability and competitiveness. All of these have relevance to this work. A key part of the policy for security of supply is to reduce dependence on natural gas. As noted above, in 2005 gas accounted for 22%<sup>11</sup> of our total primary energy requirement, and significantly more (40%<sup>12</sup>) in relation to electricity generation. In this context, additional public investment in the gas network may be difficult to justify, especially with the focus on sustainability and the development of renewable energy options.

However, specifically in relation to gas infrastructure, the White Paper does emphasise the importance of ensuring sustained investment in the gas network (3.1.4). It also notes that investment in the gas network is for reasons of security of supply *and regional development* (3.3.5, italics added). Among its actions it notes that:

- We will continue to support the major programme underway by BGÉ to upgrade and renew the gas transmission and distribution networks taking account of regional development needs;
- We will oversee the roll-out of the new town connections along the Mayo-Galway Pipeline to ensure completion to schedule;
- We will also support the connection of other new towns in line with regional growth and development objectives, having regard for BGÉ's economic criteria.

White Paper para 3.5.2 pg 30

There is therefore scope for allowing investment for regional development reasons under the White Paper. Furthermore, as will be shown in Section 5, natural gas is among the most cost competitive of fuels and thus access to the natural gas grid is important for ensuring the competitiveness of commercial and industrial enterprises.

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<sup>11</sup> This is the most recent available figure. Sustainable Energy Ireland 2006

<sup>12</sup> Energy White Paper 2007

### 3.3.2 National Development Plan 2007-2013

The NDP is reflective of the policies outlined in the White Paper. The focus on energy is on strategic energy infrastructure (mainly interconnectors) for reasons of ensuring security of supply. Energy infrastructure investments are noted with the proposed investment by BGÉ in generation, transmission and distribution networks of €1.97 billion.

While strategic energy infrastructure outlined in the NDP relates to investments associated with improving security of supply, energy infrastructure which is deemed to contribute to regional development might also be deemed ‘strategic’.

### 3.4 Conclusions

The policy for the connection of new towns was developed to provide a balance between the development of new connections on the natural gas grid and the necessity of ensuring that the cost of such additional connections did not, in the longer term, lead to higher prices for existing users.

This policy requires that all such connections should be ‘economic’. It does however allow for the payment of a supplemental contribution. In other words, towns which have been found to be ineligible under the ‘economic test’ can still be connected to the natural gas grid if funding for the amount of the negative NPV, found during the appraisal, is provided. Both the CER and BGÉ agreed that this form of contribution would be acceptable under the policy and would not lead to any higher costs for existing users.

The White Paper on Energy recognises the role of gas infrastructure in stimulating regional development, and at the same time among its key objectives is cost competitiveness. As will be shown later, natural gas is one of the most cost competitive of all fuel sources and hence access to natural gas allows companies in remoter towns to gain the competitive benefits of this fuel source. The focus of the policy is on the investment and returns as they relate to gas rather than on the wider benefits of the improved infrastructure. The funding of a supplemental contribution to allow for the connection of a town could be regarded as funding these wider ‘non gas’ benefits, which are discussed in the next section.

## 4 Gas and Regional Development

In this section of the study the benefits of natural gas, its role in regional development and competitiveness are outlined.

### 4.1 Benefits of Gas

In the last 35 years natural gas has become, like electricity, an energy infrastructure essential in Europe. Natural gas availability is important for continued economic viability and competitiveness in a wide range of industrial applications, ranging from food processing to pharmaceuticals.

The benefits of natural gas are well documented<sup>13</sup>, and include the following:

- Improved economic competitiveness – natural gas is the most efficient of all energy sources, reducing production costs for a wide range of industries.
- Combined Heat and Power (CHP) – a highly efficient use of energy which means lower costs for energy users, which in turn enhances their competitiveness.
- Reduced greenhouse gas (GHG) emissions – natural gas is by far the cleanest burning fossil fuel, its use brings reductions in greenhouse gas emissions compared with other fossil fuels. When it is burned it produces virtually no emissions of sulphur dioxide and far lower levels of nitrogen oxides than competing sources of energy such as oil and coal.
- Other environmental benefits – in addition natural gas produces very few emissions of particulate matter, so its use brings improved air quality. It also produces virtually no solid waste and has much less potential to impact on water quality.
- Health benefits – a cleaner environment always brings a reduced incidence of cardio-pulmonary diseases, and a substantial cost saving in health expenditures.

In social terms, there is evidence from the UK that access to mains gas, which is currently the cheapest and most efficient fuel for domestic heating, contributes to keeping households out of fuel poverty<sup>14</sup>.

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<sup>13</sup> See for example Gas to the West: An Evaluation of the Economic Case and Social and Environmental Benefits, Transition Management, 2003

<sup>14</sup> Report of the Working Group on Extending the Gas Network, Interdepartmental Group on Fuel Poverty, 2002

## 4.2 Gas for Regional Development

As has been discussed above in relation to the NDP and the White Paper, the development of natural gas infrastructure is important for regional development. The key benefits that getting access to natural gas can bring to regions are reduced energy costs for businesses over the longer term and greater attractiveness for new industry locating in or around towns in the Western Region.

The WDC believes that gas availability has become essential for successful regional economic development. Experiences in competition between locations, e.g. between Letterkenny and Dundalk, for Heinz, show that for energy intensive industries natural gas availability is an essential factor in location decisions<sup>15</sup>. Without access to natural gas new industrial development, outside the high-tech sector, will be more difficult.

The developments of the last five years have been very significant in offering choice of fuels to consumers, both domestic and commercial. Indeed, BGÉ has noted that ‘Industrial and commercial users favour Natural Gas because it is clean, economical and efficient. Consequently, new industries tend to locate in Natural Gas areas’<sup>16</sup>.

As the gas grid network expands and more consumers (both industrial and domestic) gain access to the network, the availability of gas supply will be taken for granted in many regions. In this context the lack of gas infrastructure in other regions may become a further disincentive to investment, reducing a region’s competitiveness and thus increasing existing disparities. Furthermore, those industries in areas without natural gas face higher energy costs, lack choice of energy supply and will face higher costs arising from the use of more polluting energy sources. Homeowners in the region are likewise facing higher costs and using less energy efficient systems. Thus gas infrastructure makes an important contribution to the maintenance and development of the regional economy

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<sup>15</sup> Gas to the West: An Evaluation of the Economic Case and Social and Environmental Benefits, Transition Management, 2003 (this document relates to Northern Ireland)

<sup>16</sup> Bord Gáis Éireann (2000), Gas Pipeline to the West, 2000, pg 4

## 5 Competitiveness of Gas

One of the main arguments for the development of the natural gas grid is that gas is regarded as one of the most efficient and cost effective fuels available. There is, however, a lack of detailed data available in relation to the competitiveness of different fuels in Ireland.

The WDC therefore commissioned the energy consultants Enercomm International to examine the relative fuel costs for process heating, space heating, hot water and cooking as they apply to a range of energy users<sup>17</sup>. The study was originally commissioned in July 2007 (and this still represents the basecase scenario) and has recently been updated with prices as expected at 1 November 2007. Sensitivity analyses of fuel price changes of +/-15% have also been included. The study considered four typical energy users that would be broadly representative of those in Irish towns; these energy users are described below as:

- A factory/production facility using process heat (e.g. food processor or small pharmaceutical facility)
- A medium commercial/service business (e.g. a garage or supermarket)
- A small commercial/service business (e.g. a ladies' hair-dressing salon)
- A domestic household (Urban<sup>18</sup>)

For households and commercial businesses the analysis is for fuel for space heating, hot water and cooking. For industrial businesses it also covers process heating. Six energy sources were considered in the study, on a fuel-only basis and also taking account of capital costs together with annual Operating and Maintenance (O&M) costs. The energy sources are electricity, LPG, oil/kerosene, natural gas, biomass (wood pellets) and solar panels. CHP fired on natural gas was also considered for the larger factory.

It is important to understand that while typical figures were employed throughout these should not be taken as specifically representative of individual cases. For example, the capital cost of installing a pellet-fired biomass boiler and its associated storage facility can vary considerably depending on the physical layout, topography and access to the particular site. Another example is where many boiler manufacturers claim their products have thermal efficiencies considerably in excess of 90%; nevertheless a more global figure of 85% for all boilers whether biomass, oil or gas has been adopted.

The study shows very clearly the cost differences for the various fuels, with natural gas significantly cheaper than electricity, LPG and oil/kerosene in all cases. Biomass<sup>19</sup> was cheaper than natural gas, in terms of fuel costs but when capital and

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<sup>17</sup> Enercomm International (2007) Report on Fuel Costs Analysis for WDC

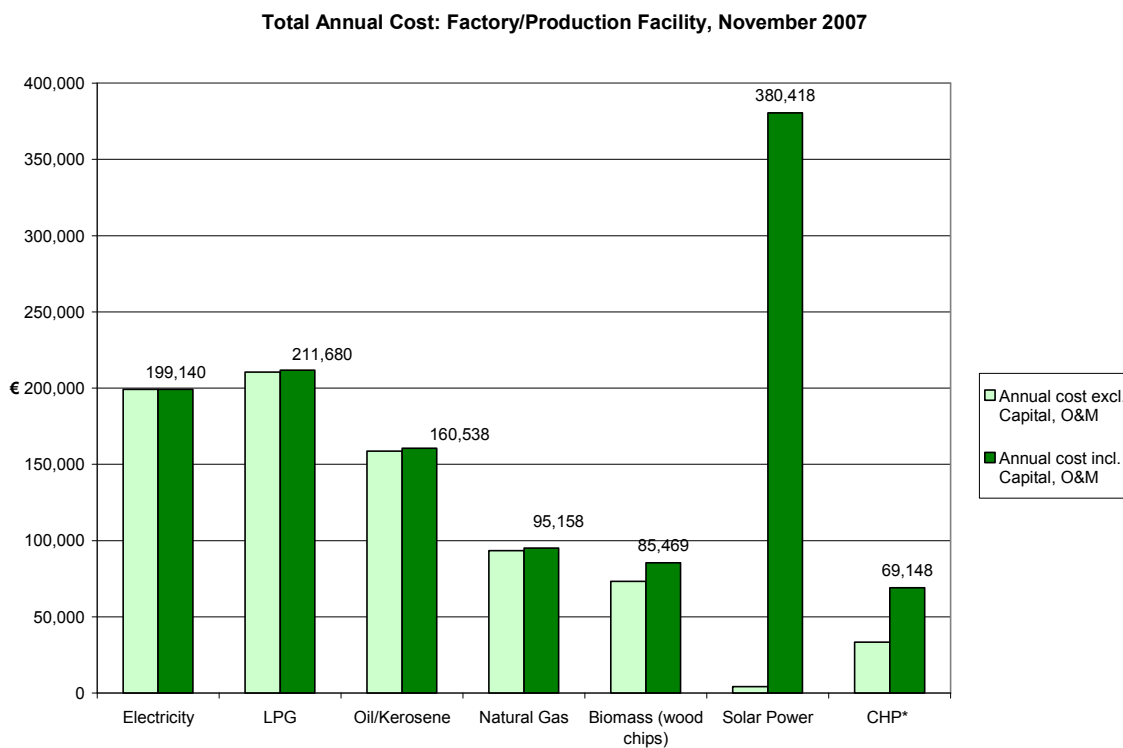
<sup>18</sup> Urban here refers to households which pay the 'urban' standing charge for electricity. These include small towns and villages. This is most appropriate as gas connections are most likely in such 'urban' areas.

<sup>19</sup> For biomass, in the case of the factory/production facility and the medium commercial/service enterprise, the costs of both wood chips and wood pellets have been calculated. In sections 5.1 and 5.2 the cost of

O&M costs were included it was more expensive in the domestic and the small business and medium business cases. The cost comparisons for the four cases are reviewed briefly in this section. Full details of the assumptions and the basis for the results are provided in the Enercomm report. Appendix 1 gives the headline cost figures for November 2007 which are discussed below.

## 5.1 Cost Comparison for a Factory/Production Facility

Economies of scale and different consumption patterns affect the cost comparisons. The factory or production facility case, (which could be a food production or small pharmaceutical facility) was the largest user, requiring process heat in addition to other heat (space heating and for hot water and cooking). As can be seen from the chart below, natural gas is considerably cheaper (€95,158 annual cost including capital and O&M) than electricity (€199,140) or LPG (€211,680) or Oil/Kerosene (€160,538). Biomass (wood chips) at (€85,469) was cheaper than natural gas. Gas fired CHP is the cheapest of all options for a large user.



Source: Enercomm Study for WDC

\* CHP is Combined Heat and Power

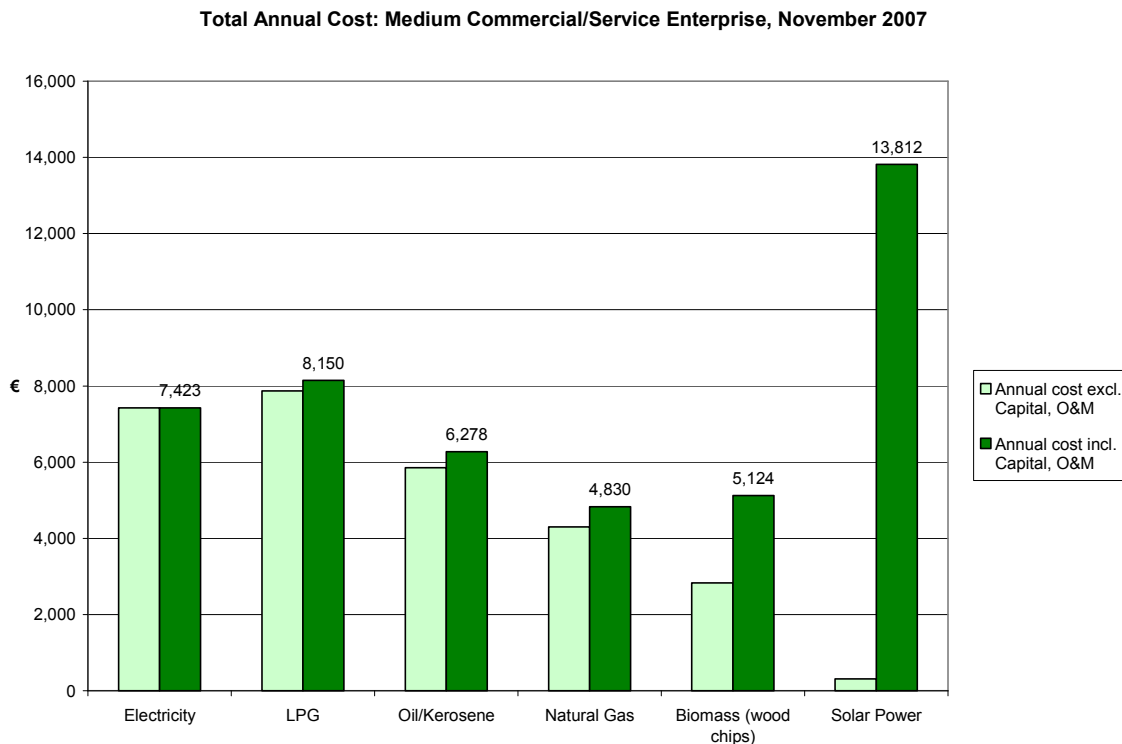
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wood chips is used. In the case of the small commercial/service enterprise and the domestic household the cost of wood pellets has been calculated and is used in sections 5.3 and 5.4.

Thus a production facility such as this could save about €65,000 per year if it were able to use natural gas as a fuel, compared to oil or kerosene, a 40% saving on their fuel bill with oil. The saving would be even higher compared to LPG and electricity (more than €100,000 in each case). The competitive advantage available to the company is clear, and when combined with the clean, steady nature of the fuel (which burns at a constant temperature and has very low levels of contaminate), and the lower greenhouse gas emissions which would be associated with it, the attractions of natural gas are evident. Although biomass (wood chips) is cheaper, at this stage the market is not well established and there is little experience of using wood biomass as a main factory fuel. Many companies therefore would opt for natural gas if it were available.

## 5.2 Cost Comparison for a Medium Commercial/Service Enterprise.

The competitiveness of natural gas is also evident when a medium sized commercial or service business such as a supermarket or a large garage is considered. With capital costs and O&M costs included natural gas is again the cheapest fuel sources, closely followed by biomass (wood chip) with natural gas costing only €4,830 annually, €2,593 less than the cost of using electricity and €3,320 less than the cost of LPG. A user would also save €1,448 compared to oil or kerosene.

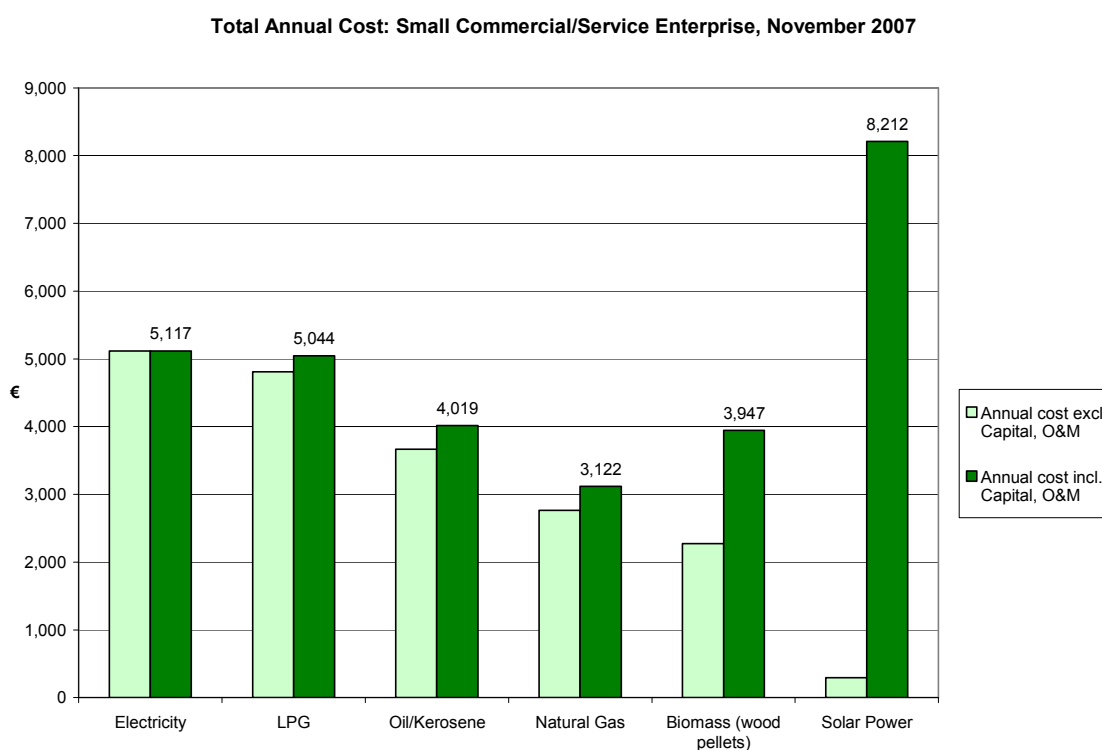


Source: Enercomm Study for WDC

In this case, as in the other cases, while solar energy has a very low cost (as the fuel is free) the capital and O&M costs are so high as to make it uncompetitive.

### 5.3 Cost Comparison for a Small Commercial/Service Enterprise

For the small commercial or service business, such as a hairdresser, natural gas is the cheapest fuel, cheaper in this case than biomass (wood pellets), because of the relatively high capital and O&M costs relative to usage. If they used natural gas, a small business in this situation would save €1,995 each year compared to using electricity for their heating needs, €1,922 compared to LPG and €897 compared to oil or kerosene.



Source: Enercomm Study for WDC

Small businesses can make savings by using natural gas. A recent study of rural enterprises conducted for the WDC found that energy was a significant cost for half of the companies.<sup>20</sup> With energy costs an increasingly important business cost, the availability of natural gas provides an opportunity for cost savings along with the benefit of greater convenience.

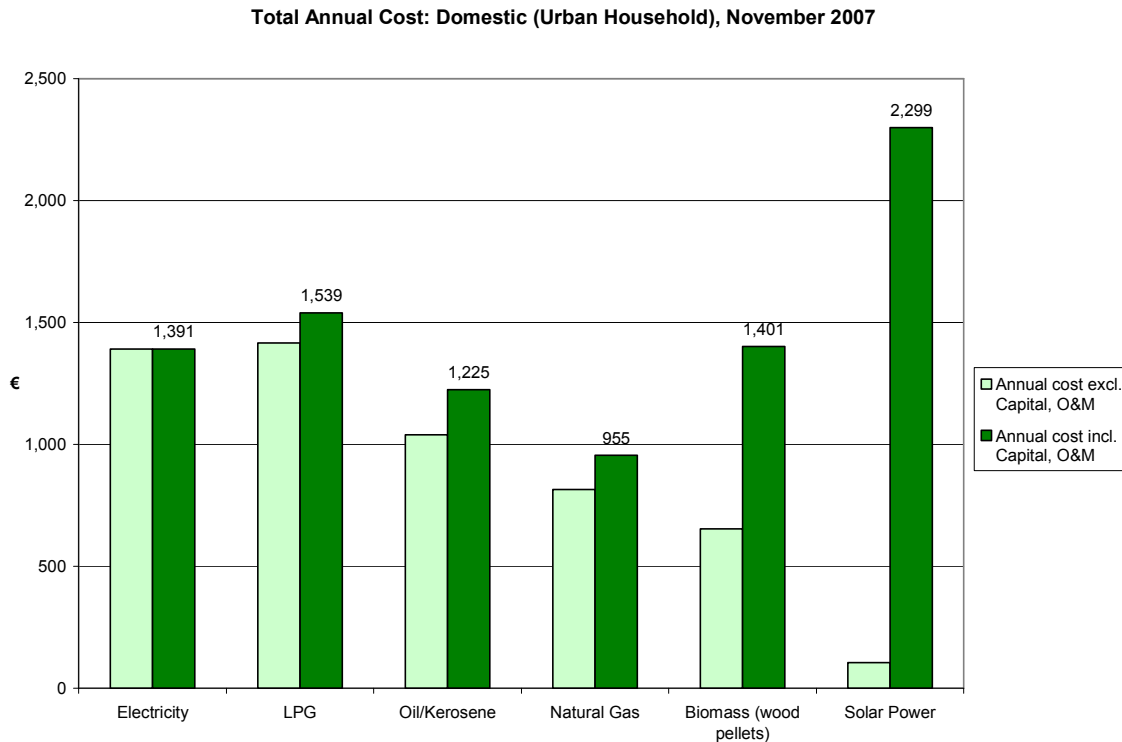
### 5.4 Cost Comparison for a Domestic Household

Natural gas is the cheapest fuel for the domestic household, providing significant savings over other fuel types. The results of the Enercomm Study show that a domestic user with natural gas for space heating, hot water and cooking will pay €955 per year. This is compared to €1,391 for electricity, 46% more than natural gas. Using LPG would

<sup>20</sup> WDC (2007), Rural Businesses at Work: Case Studies of Rural Enterprises in the Western Region



cost €1,539 per year, which is 61% more than the cost of natural gas while oil or kerosene in this case costs €1,225 a year which is 28% more than the cost of natural gas. Even biomass (wood pellets) is substantially more expensive in this context, again because of the higher capital and O&M charges. It would cost €1,401 annually or almost 47% more than gas. Once again the high capital and O&M costs associated with solar make it the most expensive of all options.

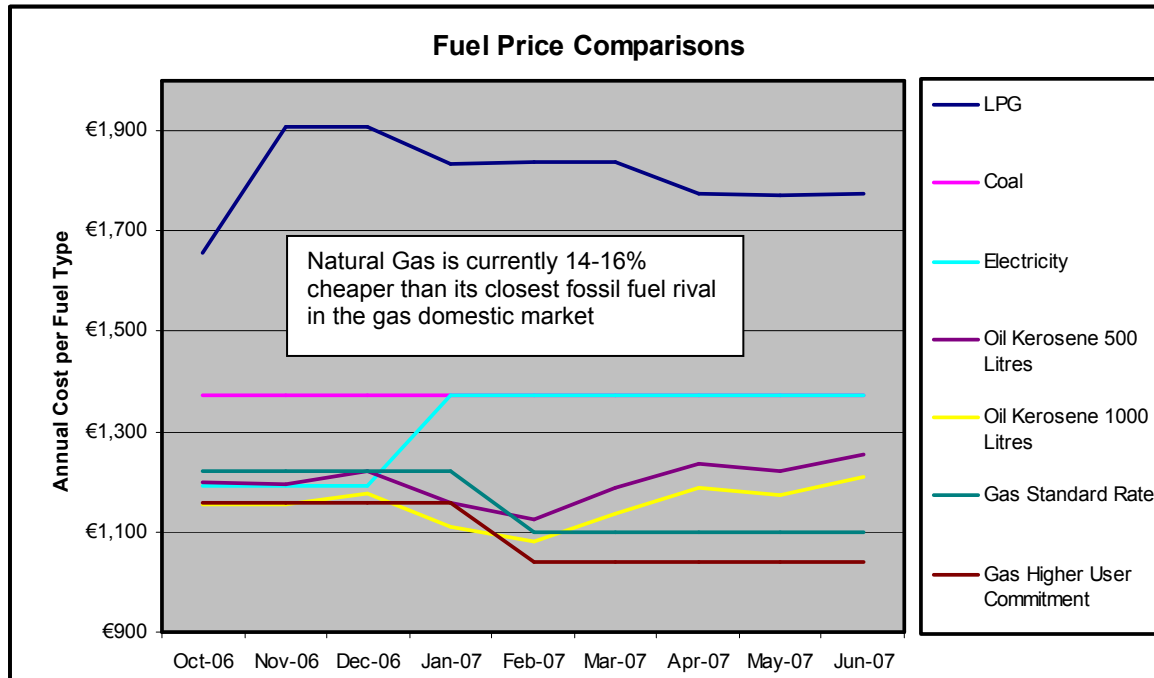


Source: Enercomm Study for WDC

For domestic users the competitiveness of gas is very striking. Customers who have access to the natural gas grid can avail of a substantially cheaper fuel. The role of natural gas in alleviating fuel poverty has been noted above; the benefit is clearly shown by the Enercomm study.

### 5.5 Other Cost Comparisons

The Enercomm report commissioned by the WDC has shown the competitiveness of natural gas compared to other fuels in a variety of different situations. This finding is supported by the Natural Gas Market Monitor from June 2007. The price of gas and a number of other fuels are shown over the last six months.



Source: Natural Gas Market Monitor, June 2007, from BGÉ

## 5.6 Conclusions

The competitiveness of natural gas is clear, and the benefit to both domestic and commercial users of access to the natural gas grid is evident. As was highlighted in the previous chapter, natural gas is important for regional competitiveness, both in terms of attracting new businesses but also, importantly in terms of maintaining the competitiveness of existing foreign and indigenous enterprises.

In cost benefit analyses carried out in Australia on public investment in the natural gas grid (discussed in detail in the next section) significant benefits were found, and the most important of these was the amount customers would save if they were to use natural gas rather than an alternative fuel. When considering supporting the development of the grid and its extension to 'uneconomic' towns, it is important that the cost savings associated with the fuel are considered.

## 6 International experiences

In the last few decades natural gas has become, like electricity, an energy source essential in developed countries. Most industrialised countries have a well developed natural gas network which covers towns and cities throughout the country. The investment in these networks was made incrementally, often, especially in Europe, by a public company with responsibility for natural gas. The investments were often not subject to the same detailed economic assessments as would currently be the norm.

For much of Europe, therefore, further investment in the natural gas network is not an issue. Outside of Europe, however, there are a number of countries and regions which have recognised the importance of natural gas to economic development and which have made investments in the natural gas network in order to achieve wider economic and social benefits.

While the situation in other countries is not always comparable with our own, as they have different markets and different regional governance, it is nonetheless interesting to consider some examples of where it has been found useful to extend the natural gas network for development purposes to areas where, because of distance or low population, it would not otherwise be viable.

In this section international examples<sup>21</sup> of public investment in extending the natural gas networks to towns which do not have sufficient demand to gain a commercially funded connection are considered. A case study of one programme is provided below.

### 6.1 Australia

In a number of Australian states there have been calls for government investment in the natural gas network to connect remoter towns. This has occurred in Victoria with the Natural Gas Extension Program (NGEP). That Program has been selected as a case study and is described in detail below.

#### 6.1.1 Case Study: Natural Gas Expansion Program, Victoria, Australia

A programme for the extension of the natural gas network in regional Victoria, Australia is of particular interest. As is the case for the towns which are the focus of this WDC study, towns which have been connected under this programme are small and did not qualify for connection under the regulations governing the development of the gas network. It is therefore an especially useful example of a government investment

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<sup>21</sup> The information has been sourced through internet searches.

programme to provide gas to towns. A description of the programme is provided below as a case study.

### **The Natural Gas Extension Program**

The Natural Gas Extension Program (NGEP) provides funding for the extension of the natural gas network to households and businesses in rural Victoria. The programme is one of the largest gas infrastructure projects undertaken outside Melbourne in more than a decade.

Before the introduction of the Program, approximately 90% of Victoria's residential and business premises had access to natural gas, with around 75% actually connected to the network. Most of these were in the Melbourne metropolitan area or in major towns.

Before developing the programme the State Government in Victoria consulted widely throughout rural and regional Victoria. During this process it became clear that there was a strong call from areas without natural gas for this service to be provided to support community and economic development in these centres.

As a result, the Natural Gas Extension Program aims to:

- Reduce household and business energy costs;
- Create opportunities for economic development;
- Maximise the number of Victorian households reticulated [connected to the natural gas network] under the Program.

The key objective of this Program is to ensure the widest possible rollout of natural gas distribution networks in regional Victoria.

Any new investments in networks by the Gas Distributors are required by the regulations of the Essential Services Commission (ESC) of Victoria, Australia, to be "economic" under the Economic Feasibility Test of the National Gas Access Code. Extensions to unreticulated towns also need to satisfy certain regulatory requirements under the Access Arrangement. Without Government NGEP assistance, all the towns announced under the Program would still fall short of passing the Economic Feasibility Test required under the Gas Code, even with a surcharge levy on the customer, no matter how large. As a result, without the Government assistance, the projects would not have proceeded.

The Government committed to providing AUS \$70 million (€44.43m<sup>22</sup>) from the Regional Infrastructure Development Fund to encourage the expansion of Victoria's

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<sup>22</sup> 1 Aus\$ = 0.634630 EUR XE.com currency converter 17.07.07

reticulated natural gas network. All of these funds have now been allocated under the Program.

The funds were allocated to the three incumbent Victorian Gas Distribution businesses to meet the economic shortfall of the announced projects.

As a result of the NGEP, 34 towns ranging in population from 921 to 11,000 will be connected to natural gas making it available to between 70,000 and 100,000 homes and businesses in country Victoria. This is the biggest extension of the natural gas network into regional Victoria since the 1970s. The towns are spread widely across the State. Most of the towns have a population of between 2,000 and 4,000 (the population of each of the towns is listed in Appendix 2).

Towns that missed out under the NGEP did so predominately because the economics of those towns were such that no gas distribution company placed a bid for the project. This was based on a commercial decision. In other cases – where bids were lodged – the cost of connection was so high, that these towns could not be included if the Government was to achieve its objective of maximising the benefits of extending the gas network for as many Victorians as possible within the available funds.

### **Tariffs and the Surcharge**

It is important to note that there is no single gas tariff in Victoria. Gas tariffs vary across the State, and vary from one town to the next depending on the distance from the principal transmission system and gas source and the economics of the individual gas projects. Tariffs are determined by the ESC in its role as an independent regulator of gas prices and service standards.

The key objective of this Program is to ensure the widest possible rollout of natural gas distribution networks in country Victoria. In order to maximise the benefit of the Program and the number who can benefit from it, the funding of the economic shortfall comes from a combination of the NGEP funds and a surcharge on the gas users connected under the Program.

The NGEP enables these towns to have access to gas at an equitable price and provides them with the choice to convert and save money on their energy bills. The Program provides sufficient financial support to keep 'end user' prices in the 34 NGEP towns within the existing tariff range both in Victoria and in neighbouring States.

### **Benefits of the Program**

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<sup>23</sup> KPMG (2005) Economic Impact of the Natural Gas Extension Program for the Dept of Innovation, Industry and Regional Development

<sup>24</sup> The executive summary of this economic impact study is appended in Appendix 3.

In Australia, at the time of the introduction of this Program, natural gas was around a third of the price of LPG and around half the price of off-peak electricity, and significantly more convenient than firewood. Extending the natural gas network is particularly advantageous to industrial users, who have the potential to save hundreds of thousands of dollars in energy costs.

Before the development of the NGEP, it was found that many gas extensions needed external funding in order to secure the commitment of a gas distribution business and that without such funding connections were not being developed. When providing public funding it was argued that the broader consumer benefits from gas extensions, through reduced energy costs, greenhouse emissions and the social benefits of more affordable energy, could justify such a contribution from Government.

### **Economic Impact of the Natural Gas Extension Program**

Regional Development Victoria commissioned KPMG to undertake a review of the economic impact of the NGEP. The review considers the impact on the Victorian economy of connecting the 34 announced towns to the natural gas network.

The review finds that the economic boost for Victoria will be AUS \$427.6 million (€271.4m) over the next 20 years, in addition to the Government's AUS \$70 million (€44.4m) contribution. A large proportion of this positive economic impact – AUS \$309.5 million (€196.5m) – will result from the redirection of household and business energy savings as a result of connecting to natural gas.<sup>2324</sup>

The KPMG review also found that the NGEP will generate around 395 new full-time equivalent jobs across Victoria each year over the next 20 years.

This case study provides an interesting example of how government intervention to extend the natural gas grid can be effective. It has brought about significant development of the network in remoter areas and has allowed these towns to compete better in terms of fuel costs.

#### **6.1.2 Western Australia**

Another Australian example is found in Western Australia, where the Great Southern Development Commission called for investment in the gas network to bring gas to its major town of Albany and other towns along the route. A study of such investment was conducted in 2001<sup>25</sup>.

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<sup>25</sup> Great Southern Development Commission (2001) Extending Natural Gas to the Great Southern: A case for regional development. [http://www.gsdc.wa.gov.au/File\\_Manager/documents/reportsandpubsgas.pdf](http://www.gsdc.wa.gov.au/File_Manager/documents/reportsandpubsgas.pdf)

It noted that a large part of the southern region of Western Australia is not connected to the natural gas network. The rapid and extensive growth of the plantation timber industry in the southwest part of the state was a major factor in prompting a closer examination of an extension to the natural gas pipeline to the South. It was argued that there is significant potential for value adding to blue gum timber. It was noted that other processing opportunities also exist which require a plentifully and competitively priced supply of energy.

A feasibility study by Epic Energy estimated the cost of extending the natural gas pipeline to the south coast of Western Australia at AUS \$76 million (€48.2m). Based on expected volumes, some form of capital or revenue subsidy would be required to make the operation of the pipeline commercially viable. It was argued that the extension of the natural gas pipeline to the Great Southern region had the potential to bring substantial benefits to the region, and Western Australia as a whole, which far exceeded the level of investment required by the State Government. The case was being made that there was significant demand, and that the investment would allow this demand to be realised, although the initial costs were too high for a private investment to develop the network in that area.

It was contended that from a regional development perspective, the State Government had the opportunity to enhance new industry growth through contribution to the capital cost of extending the pipeline. The study found that an investment by the State Government in all or part of the estimated AUS \$76 million (€48.23m) cost of extending the natural gas pipeline to the Great Southern had the potential to return an increased level of industry output of nearly AUS \$400 million (€253.83m) per annum and over 360 new jobs (in total). Flow-on effects to other sectors of the economy were estimated to generate a further AUS \$500 million (€317.36m) in output and an additional 700 jobs.

The gas pipeline has not been extended in that region. It does not seem that this investment will be made by the State Government despite the positive benefits associated with it.

## 6.2 Canada

In 1998, in Manitoba, Canada the Federal and Provincial Government provided a contribution of CAN\$3.2 million (€2.2m<sup>26</sup>) to a CAN\$9 million (€6.24m) investment in a transmission pipeline to extend the natural gas service to two rural municipalities Hanover and La Broquerie<sup>27</sup>. The pipeline involved the installation of more than 600km of new pipeline to provide gas to a potential 1,500 customers, it was expected that more than 120 jobs would be created during the construction phase of the pipeline, including direct and off site employment.

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<sup>26</sup> 1 CAN\$ = 0.69301 EUR XE.Com currency converter 17.07.07

<sup>27</sup> [http://www.wd.gc.ca/mediacentre/1998/nov06-1a\\_e.asp](http://www.wd.gc.ca/mediacentre/1998/nov06-1a_e.asp)

The expansion of the gas grid was expected to bring significant benefits to the area by creating new industry, developing employment opportunities through the attraction and expansion of agricultural based enterprises, providing residential and commercial customers with savings on energy bills and providing a low cost energy source to hog producers. This investment is part of the Canada-Manitoba Economic Development Partnership Agreement (a Federal-Provincial Agreement) to direct CAN\$40million (€27.72m) into strategic projects that will expand the international competitiveness of Manitoba's key growth sectors.

More recently a useful study of the public and private benefits of bringing natural gas into areas where none was available was conducted in Canada. The study 'Natural Gas and its Impact on Greenfield Areas'<sup>28</sup> was conducted to assist decision makers by developing a method for identifying the socio-economic benefits and costs, both private and public, attributable to the introduction of natural gas into greenfield areas.

It found that:

- Areas receiving gas service are better able to retain industries who might have otherwise had to relocate due to environmental standards and/or costs.
- Areas become more competitive with similar communities nearby who already had natural gas to offer to industry.
- Areas can offer present and future consumers a competitively-priced, clean energy source for their advantage.
- Capital subsidies were instrumental in system construction and encouraging fuel switching for commercial and residential users.
- There were a number of combinations of capital and operating subsidies in the Greenfield areas, including aids to construct and user fees.
- Energy cost savings were the key economic benefit in all sectors, especially for commercial and industrial applications.
- In most cases, the driving factor to bringing in natural gas was the potential load of large industrial users. Marketing to small commercial and residential consumers varied in effort.

However it also found that

- In the majority of case studies, it was difficult to attribute new commercial or industrial investment to the introduction of natural gas.
- No specific employment displacement was noted in any community (e.g. in the residential oil service) due to the introduction of gas service.

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<sup>28</sup> Gardner Pinfold Consulting Economists Limited (2002) Natural Gas and its Impacts on Greenfield Areas, submitted to Atlantic Canada Petroleum Institute. [http://www.pr-ac.ca/files/Geenfield\\_Gas\\_Report.pdf](http://www.pr-ac.ca/files/Geenfield_Gas_Report.pdf)



- Take up rates varied widely depending on the marketing strategy of the distributor/marketer, and the incentives offered to customers to switch to gas.

**The main quantitative benefit of access to natural gas was found to be potential energy savings.** The competitiveness of natural gas as a fuel source was also highlighted in the economic impact study for the NGEP in Australia. Clearly the relative cost of gas is a very important factor and bringing natural gas to smaller and remoter communities allows them to compete with other locations to attract new industry, but also importantly to allow local industry and business to be more competitive.

### 6.3 North Carolina, U.S.A.

In North Carolina a natural gas pipeline was built to a remoter part of the state using public funds in the form of tax payer backed bonds. Some US\$188.5 million (€136.66m<sup>29</sup>) of a US\$200 million (€145.0m) voter approved bond was used to construct a natural gas pipeline through 14 counties in the north east of the State where the population was too sparse to justify the project otherwise. The arrangement was that if the project became economically feasible at any point that the bond would be repaid.

This investment in the pipeline was in response to an initiative in the early 1990s which moved to create financing incentives for local natural gas companies to extend the service to unserved areas.

There have been a number of problems with this project since its completion including high costs incurred during construction and on-going operating losses. These indicate the importance of planning and monitoring a programme well and ensuring that there will be a sufficient number of customers to cover operating costs.

### 6.4 Conclusion

In this section a number of international examples of public investment in natural gas infrastructure have been given. The most important of these is the Natural Gas Extension Program (NGEP) in Victoria, Australia. This is a well planned Program for the development of natural gas infrastructure which has provided significant benefits for rural Victoria. If there is to be extension of the natural gas grid in Ireland to ineligible towns this model should be examined more closely and consideration given to how the experiences of this programme could be applied in Ireland.

Less information is available about the other examples of investment in natural gas pipelines. What is clear however, is that it is important that the programmes are well planned with the funding structures secure, and with clear objectives in relation to the selection of towns for participation in such a programme.

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<sup>29</sup> 1US\$ = 0.725030 EUR XE.com currency converter 17.07.07

## 7 Options for the ‘Ineligible’ Towns

Under the terms of the connection policy for new towns (see Section 3 for detail) BGÉ is not allowed to construct a connection to those towns which have been assessed as being ineligible for a natural gas connection unless the demand situation changes in which case another review would have to be carried out. If, however, the amount of the negative NPV assessed for such a town is provided to BGÉ from another source, i.e. “a supplemental contribution” as referred to in the policy, then the pipeline could be constructed provided that the main anchor tenants, as outlined in the analysis of potential town connections conducted by BGÉ, were committed to the connection.

### 7.1 Funding Options

There are a number of possible funding options for the amount required to allow the development of a new gas connection for a town which was ineligible for connection. These are outlined briefly below. If a decision were made that such a connection were to be a priority, and a particular funding option were preferred, more detailed investigation would be required.

#### 7.1.1 NDP Investment

There is the option of funding strategic energy infrastructure under the NDP. While the infrastructural developments such as the Ireland-Wales electricity interconnectors or the additional interconnector to Northern Ireland have security of supply and competitiveness of energy as their main justification, infrastructural investment can be made in line with other strategic government objectives such as balanced regional development. Funding of the extension of natural gas supplies to smaller towns could be considered under the NDP Strategic Infrastructure Sub-Programme.

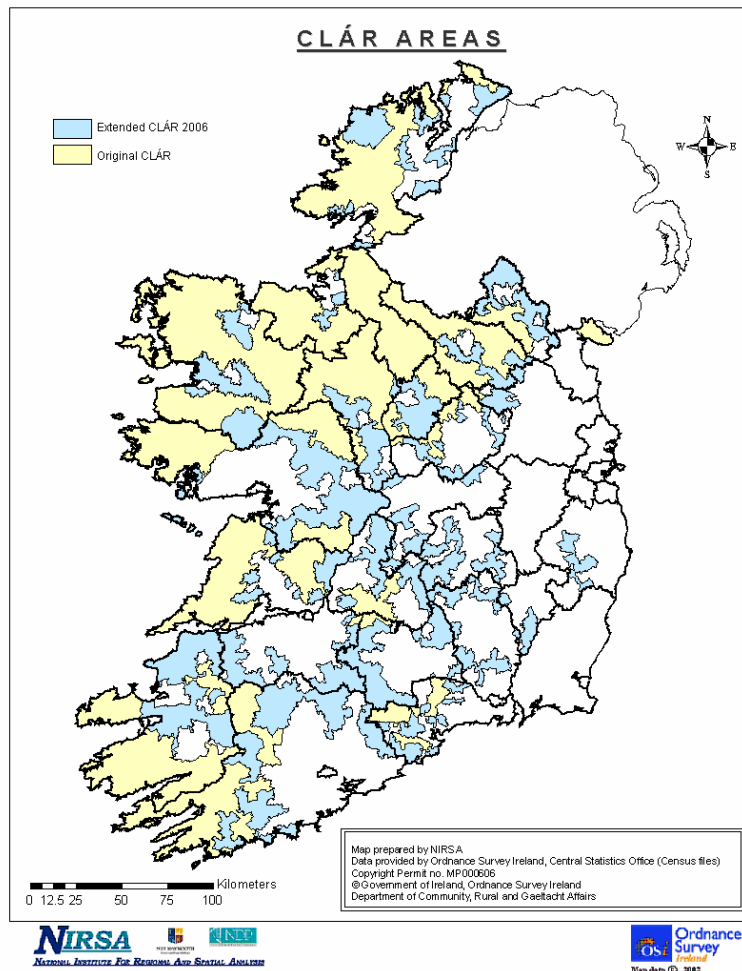
A programme such as the NGEP operated in Victoria, Australia could be developed.

#### 7.1.2 CLÁR

Another option for funding the extension of natural gas to smaller towns is the CLÁR Programme.

The CLÁR programme (Ceantair Laga Árd-Riachtanais), is an investment programme for disadvantage rural areas. It was introduced in October 2001 arising from a commitment in the Programme for Prosperity and Fairness to provide a targeted investment programme in disadvantaged urban and rural areas. CLÁR is the rural strand of the programme. The areas covered by the CLÁR programme are shown on the map below.

Figure 2: CLÁR Areas



CLÁR is co-ordinated by the Department of Community, Rural and Gaeltacht Affairs. CLÁR provides funding and co-funding to Government Departments, State Agencies and Local Authorities to accelerate investment in selected priority developments. These investments support physical, economic and social infrastructure across a variety of measures. The measures introduced under the programme reflect the priorities identified by the communities in the selected areas whom the Minister consulted at the outset.

The principle of additionality is central to CLÁR. Therefore, it seeks to encourage matching funding from Government Departments, State Agencies and Local Authorities. The measures are for the most part, operated in tandem with the lead Departments or Agencies, as appropriate, thus ensuring efficiency and effectiveness as well as meeting the needs of the people in the CLÁR areas.

As CLÁR is particularly focused on rural and less developed towns in Ireland it could be used to leverage funding for the investment in the natural gas infrastructure.

CLÁR provides matching funding for investments, contributing up to 50% of the total investment. Thus CLÁR could match the funding provided from another source.

### 7.1.3 Waiving of Fees

One of the costs of constructing a natural gas pipeline is the purchase of a ‘Road Opening Licence’ from the Local Authority which gives permission for the necessary digging. While this is not, in most cases a very significant cost, within towns it is an important element of the overall capital cost. If a Local Authority were to waive the charge for the Road Opening Licence, this could be subtracted from the overall Capital cost and so reduce the amount of the negative NPV which would have to be funded to make a connection to uneconomic towns.

### 7.1.4 BES or Similar Investment Schemes

The current rules for the new Business Expansion Scheme (BES) have not been published and the scheme is awaiting EU approval. However, even in the absence of the details a number of difficulties arise in relation to the use of this or a similar scheme.

The original objective of the BES is to provide a tax incentive for investors to risk their money in a company and so provide important early stage capital for that company. It is likely that the new scheme will restrict the investment to manufacturing (and possibly science and technology) and so it is unlikely that, even if a company were established to make the required investment in the pipeline, this would be allowed under the terms of the scheme.

Furthermore the nature of the BES is such that the investor, while taking a risk, is expecting to make a return (in addition to the tax rebate which provides the investment incentive in the scheme). An investment in a company whose purpose is to fund the development of the pipeline would not allow for any return as the revenues associated with the pipeline investment would go to BGÉ, or another gas provider. This is necessary as it is on the basis of the projected revenues that the amount of the required investment (the amount of the negative NPV) has been calculated.

It is possible however that if the revenues associated with the development were to be greater than those estimated in the original review that some money could be returned to the investors. This would however represent an optimistic scenario.

On the basis of the Phase 1 and 2 reports on the connection of new towns and the discussion above of the broader social and economic benefits of an investment in a natural gas pipeline, it appears that an investment by the state or other benefactor with regional development objectives rather than income concerns will be the only option.

### 7.1.5 Private Investor

A private investor or benefactor could also fund a gas connection for a town, paying the amount of the negative NPV to allow the connection. However, as was outlined in relation to the BES, as there would be no revenues associated with this investment it would have to be regarded as an altruistic venture. Individuals might be entitled to tax relief on such investment, depending on how it was structured. A company can also pay for the cost of a connection, though in the case of a town connection it is more likely that they could provide part of the supplemental contribution.

## 7.2 Options and Issues at EU Level

There do not appear to be significant issues at EU level relating to the development of the natural gas grid to smaller towns.

The key area, discussed above, is the EU concern that there should be a competitive energy market. In this context the CER developed the regulations on the connection of the gas grid to new towns to ensure that existing customers were not paying higher prices for gas because of the connection of uneconomic towns. The connection policy does explicitly allow for a supplemental contribution to make up a shortfall following assessment. It seems, however, that if the natural gas grid were to be expanded as part of an effort to stimulate local development and the amount of the negative NPV were funded by another source there should be no EU concerns.

The Irish Government provided funding for the development of the gas transmission pipeline to Derry from Belfast, a pipeline which was expected to provide significant regional benefits. Funding of more than €85 million has been made available to regional airports in order to stimulate regional development. More recently the Department of Communications, Energy and Natural Resources is tendering for a contract to provide broadband services in areas where there is currently no service. This contract will be given to a private company or consortium and the aim is to provide access to a basic infrastructure in an area where it was uneconomic to provide it commercially. On the basis of these examples there does not appear to be any concern that State Aid rules would preclude public funding of the amount of the negative NPV. Neither the CER nor BGÉ considered State Aid rules would, to their knowledge, apply in relation to the provision of a supplemental contribution.

### 7.2.1 Funding

From a very brief examination of the issues it appears that there is little likelihood of EU investment in the natural gas network, as part of the BMW Regional Operational Programme (2007-2013) which is part of the National Strategic Reference Framework (NSF) for Ireland 2007-2013 or as part of an Interreg programme.

## 8 Conclusions

This study has examined the options for towns which have been found to be ineligible for a natural gas connection. This is the situation for a number of towns in the Western Region but the findings of this study are relevant to all towns which have been assessed as being ineligible for gas connections.

The WDC believes that regional areas must have equity of access to services and infrastructure so that they can play a primary role in ensuring the economic and social future of the country. While the natural gas network has extended rapidly in Ireland in the last decade, there are still many small or remote towns which have not been connected to the grid. The WDC believes that natural gas infrastructure is an important element of the physical infrastructure which sustains and supports development.

The connection policy which determines the method of assessing which towns may qualify for a gas connection has been examined in this study. Both the CER and BGE, who were instrumental in developing the policy, believe that if the amount of the negative NPV (as estimated when a town was appraised for a connection) is funded in the form of a supplemental contribution then the town can become eligible for a connection.

There are many benefits associated with connection of towns to the natural gas network. These include cost competitiveness for local commercial and domestic users, the environmental benefits associated with the use of natural gas and enhanced attractiveness of an area for a location for new industry. In the context of high energy prices, companies in towns which will be connected to the natural gas grid will experience immediate savings while lack of access to gas affects the competitiveness of companies in remoter areas. Natural gas is a clean efficient fuel which is attractive to modern industry; it has lower greenhouse gas (GHG) emissions than other fossil fuels, which will be important in the event of any introduction of a carbon tax or similar policy to restrict GHG emissions. There is less air pollution associated with natural gas than other fossil fuels, and it is the cheapest fuel for domestic use which, associated with the regular billing structure, means that its availability can help to alleviate fuel poverty.

These wider ‘non gas’ benefits are important and can make a contribution to the development of a town and its locality. It is argued in this study that providing supplemental contributions for the connection of the natural gas pipeline to towns which have been deemed ineligible under the connection policy, is, in effect a means of funding the ‘non gas’ benefits of such infrastructural development (only ‘gas’ benefits are assessed under the connection policy). Given that the ineligible towns are usually remote and face a number of developmental disadvantages these are important benefits which could justify such investment.

Indeed, the White Paper on Energy recognises that investment in the gas network is made both for reasons of security of supply and regional development. Programmes such as CLÁR could be used to provide the supplemental contribution. Private funding of the supplemental contribution would also be allowable.

In Australia, the case study of the Natural Gas Extension Program (NGEP) showed that significant benefits were available from the extension of the natural gas grid. The economic evaluation of this scheme should be examined in relation to the development of natural gas infrastructure in Ireland which has tended to find very minimal benefits from such infrastructural investment. It may be that the elements found significant in relation to the NGEP are not being considered in Ireland. It would be useful to compare the Australian study to similar Irish analyses.

A Canadian study found that the main quantitative benefit of access to natural gas was potential energy savings. The competitiveness of natural gas as a fuel source was also highlighted in the economic impact study for the NGEP in Australia. Clearly the relative cost of gas is a very important factor and bringing natural gas to smaller and remoter communities allows them to compete with other locations to attract new industry, but also importantly to allow local industry and business to be more competitive.

There are, however, a number of additional points for consideration. While the benefits of natural gas connections have been outlined above, we need to consider whether investment in the natural gas network is the best way to achieve development in these towns, or whether there might be better ways to invest this money. In general a business case for bringing natural gas to towns, based only on serving existing businesses and domestic users may be difficult to make. New anchor businesses are likely to be required to make many of the towns more viable. It seems, therefore that bringing gas to towns should be linked to the identification and attraction of appropriate new industrial and commercial enterprises to the towns, and to an overall plan for the development of enterprise in the towns. Such linkage would improve the case for bringing gas to the towns and reduce the costs associated with the investment.

## Appendix 1 Tables showing annual costs of fuels

Full details of costs and assumptions in Enercomm International Consultants (2007) Report on Fuel Costs Analysis for the Western Development Commission

<b>Table 1 (S1): Total Annual Cost exclud. Annual Capital + O&amp;M Cost (Space Heating + Hot Water + Cooking)</b>				
Note: Gas, electricity, LPG and oil prices as expected to be on 1st Nov 2007				
All Costs in Euro	Factory/Production Facility	Medium Commercial /Service Enterprise	Small Commercial /Service Enterprise	Domestic Household
Electricity	199,140	7,423	5,117	1,391
LPG	210,446	7,867	4,809	1,416
Oil/Kerosene	158,688	5,852	3,668	1,040
Natural Gas	93,308	4,300	2,764	815
Biomass (wood pellets)	90,466	3,469	2,271	653
Biomass (wood chips)*	73,216	2,837	-	-
Solar Power	4,240	308	293	105
CHP with Natural Gas**	33,498	-	-	-
* Assumes wood chips are 20% cheaper than wood pellets with equivalent heat value				
** Depends on load profile of Factory/Production Facility + matching electricity costs				

<b>Table 2 (S1): Total Annual Cost includ. Annual Capital + O&amp;M Cost (Space Heating + Hot Water + Cooking)</b>				
Note: Gas, electricity, LPG and oil prices as expected to be on 1st Nov 2007				
All Costs in Euro	Factory/Production Facility	Medium Commercial /Service Enterprise	Small Commercial /Service Enterprise	Domestic Household
Electricity	199,140	7,423	5,117	1,391
LPG	211,680	8,150	5,044	1,539
Oil/Kerosene	160,538	6,278	4,019	1,225
Natural Gas	95,158	4,830	3,122	955
Biomass (wood pellets)	102,719	5,756	3,947	1,401
Biomass (wood chips)*	85,469	5,124	-	-
Solar Power	380,418	13,812	8,212	2,299
CHP with Natural Gas**	69,148	-	-	-
* Assumes wood chips are 20% cheaper than wood pellets with equivalent heat value				
** Depends on load profile of Factory/Production Facility + matching electricity costs				



## Appendix 2 Population of Victorian towns connected under the NGEF

<b>Town</b>	<b>Population</b>
Bairnsdale	11,000
Paynesville	3,600
Balnarring	1,852
Balnarring Beach	468
Merrick's Beach	92
Somers	1,268
St. Andrew's Beach	666
Hurstbridge	3,095
Launching Place	1,609
Inverloch	3,500
Korumburra	3,200
Lang Lang	921
Leongatha	4,500
Mullgrove	1,682
Seville	3,139
Seville East	609
Wandin East	484
Wandin North	1,453
Wesburn	565
Wonthaggi	6,136
Woori Yallock	3,139
Yarra Glen	1,371
Yarra Junction	1,639
Gisborne	4,231
Lancefield	1,151
Macedon	1,416
New Gisborne	
Riddell's Creek	2,258
Romney	2,950
Woodend	3,010
Barwon Heads	2,128
Camperdown	4,860
Port Fairy	2,523
Creswick	2,449
Maiden Gully	3,000

The populations in this table have been sourced from various websites. Most are from the 2001 Census. They are shown here to give an indication of the size of towns included in the Program.

## Appendix 3 Executive Summary of Economic Impact of the NGEP

*This executive summary of the report 'Economic Impact of the Natural Gas Extension Program' is provided for information purposes only. It was prepared by KPMG Australia and is copyrighted to them.*

### Executive Summary

Approximately 90 per cent of Victoria's residential and business premises have access to natural gas, with around 75 per cent actually connected to the network. Most of these are in the Melbourne metropolitan area or in major towns. In its first term, the Government consulted widely throughout regional and rural Victoria, discovering a relatively strong interest from areas without reticulated natural gas for this service to be provided to support community and economic development in these towns.

Due to a number of factors which adversely impact on the economics of supplying natural gas to regional Victoria including the limited size of the gas load in regional towns and the distance of towns from existing infrastructure, there has been little incentive for the privatised Gas Distribution Businesses to extend the existing network.

Through the financial commitment of \$70m to the Natural Gas Expansion Program (NGEP) and fostering an environment conducive to investment by the Private Gas Distribution Businesses, the Victorian Government has sought to overcome this impasse and facilitate expansion of the natural gas network. This report presents an economic review of the impacts arising from supplying 34 towns with reticulated natural gas. The capital cost of this network expansion is estimated at \$147 million, with 20 years of operational and maintenance costs estimated at \$14.6m, estimates made in June 2004 dollars. The Victorian Government is providing a financial incentive, by committing the available NGEP funds.

Regional Development Victoria (RDV), a division of the Department of Innovation, Industry and Regional Development, commissioned KPMG to provide an economic review of the NGEP. Our report is presented in four parts. Following an introduction to the program, we detail our data collection approach and the modelling undertaken. We then present our results and concluding comments.

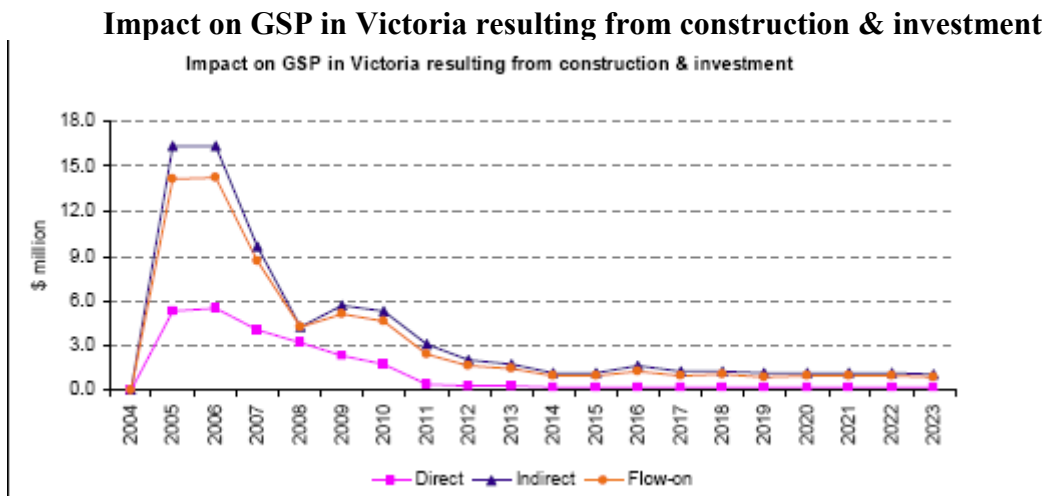
Data for this economic review was sourced from the documents provided by the gas distribution businesses as part of a tender process to select both which towns would benefit from the NGEP and the government's preferred supplier to construct and operate the expanded infrastructure. These bid documents detail expansion of the reticulated natural gas network to 34 towns with local households and small commercial premises having the potential to access the expanded network.

The economic implications of the tranche of the NGEP have been measured in terms of impact on gross state product (GSP) and employment creation. The approach adopted to quantify estimates of economic impact involved the use of a computable

general equilibrium (CGE) model. The economic implications of the project were also evaluated in terms of the construction phase of the project and its operations phase. We also considered direct, indirect and flow-effects on the economy as a result of the natural gas network expansion.

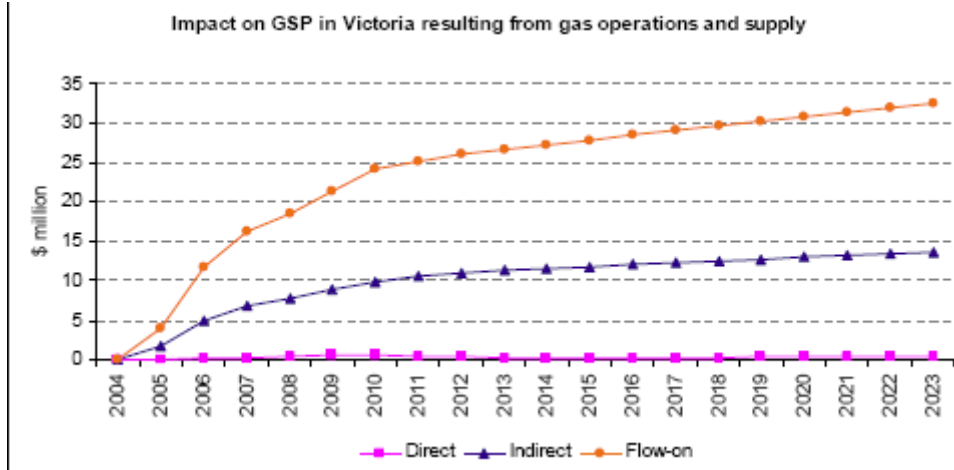
The chart below illustrates the impact on Victoria’s GSP resulting from construction and investment. The direct impacts are as a result of the pipeline construction activities. Indirect impacts include the effect of commercial and industrial facilities in the 34 towns expanding their operations having been stimulated to invest following the delivery of natural gas. Flow-on effects are broader economy wide implications arising from households directing their savings arising from the availability of a cheaper fuel source to other economic activity.

The net present value of the construction and investment effects illustrated below across the 20-year period of this analysis is estimated at \$118.1 million.

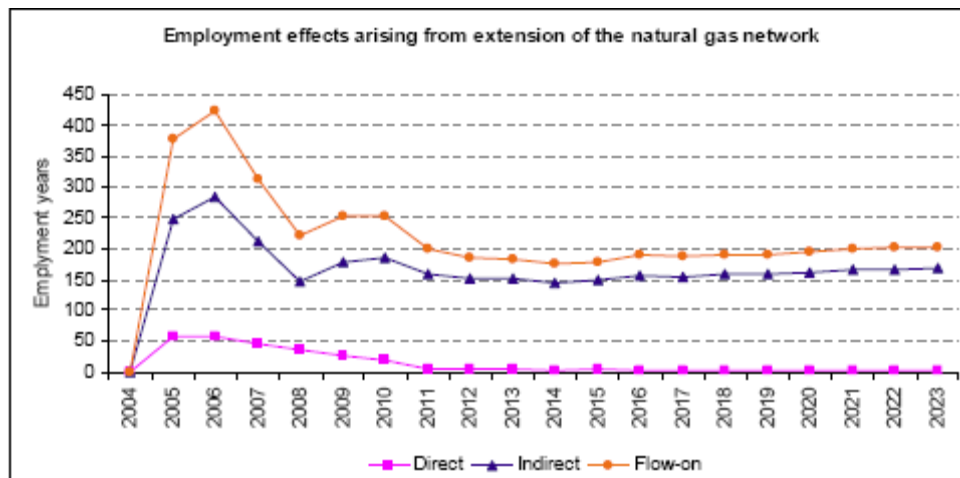


The chart below illustrates the impact on the Victoria’s GSP resulting from gas operations and supply to rural and regional areas. The direct impacts are the smallest of the three types of impact and arise from the increased activity in the gas distribution sector as they supply gas to an increased number of household and industrial/commercial facilities. The indirect impacts arise from estimates of increased turnover and exports from industrial and commercial facilities that may have been able to expand or convert to natural gas. The flow-on impacts represent broader economy-wide effects.

The net present value of the effects arising from increased business activity and customer savings illustrated below, across the 20-year period of this analysis is estimated at \$309.5 million.



Overall, the net present value of the entire project across the construction (\$118.1 million) and operations (\$309.5 million) phases is estimated at \$427.6 million. This increased economic activity will generate employment growth in Victoria. Over the 20-year period of this analysis additional employment is estimated at over 7,900 employment years (an average of around 395 full time equivalent employees each year sustained over the period of analysis).



A relevant question to ask in an economic review of the NGEP and the financial incentives provided by the Victorian Government, is whether this is a worthy intervention. The Victorian Government committed to the expansion of the natural gas network on the basis that it would provide positive economic benefit. This report has reviewed and attempted to quantify the economic implications of the program.

Overall we find positive returns to the Victorian economy that are greater than the incentive provided to the gas distributors. Importantly, this project delivers benefits to Regional Victoria and key industrial sectors, such as the food and beverage industry are likely to derive significant benefit from the availability of natural gas.

It is also worth noting that the introduction of natural gas to an additional 34 towns in regional Victoria for domestic and commercial applications has the potential to substitute a fuel that releases less pollutants into the atmosphere than its alternatives (e.g. less CO<sub>2</sub> than from brown coal fired power stations and less soot and smoke from wood burning). It was outside the scope of this report to describe more fully and attempt to quantify any of these potential environmental advantages.

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