

**REVIEW OF ENERGY  
COMPETITIVENESS  
ISSUES AND  
PRIORITIES FOR  
ENTERPRISE  
DECEMBER 2011**

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## Executive Summary

A reliable, sustainable and competitively priced supply of energy is vital for Irish firms to compete successfully in international markets. The purpose of this paper is to review Ireland's energy competitiveness performance and highlight the main energy policy priorities from an enterprise development perspective. We are at an important juncture in Irish energy policy. The International Energy Agency (IEA) is currently carrying out an in-depth review of Ireland's energy policy - the last one was done in 2007. The IEA review will also include an assessment of the efficiency of the Irish electricity and gas markets as required under the EU-IMF Programme for Financial Support for Ireland. The Department of Communications, Energy and Natural Resources (DCENR) has indicated that it will publish a new energy policy framework during 2012.

### Key Findings

- Each of the three energy areas (electricity, heat and transport) accounts for approximately a third of energy use in Ireland;
- Energy costs in Ireland are primarily determined by international fuel prices (oil, coal and gas). In recent years, electricity and gas prices have been more competitive; between 2008 and 2010, the cost of electricity for large energy users in Ireland decreased by 32.1 per cent while SME prices fell by 20.3 per cent. But prices are currently increasing sharply, mainly due to increases in the price of gas and the phasing out of the temporary rebate for large energy users;
- Ireland is heavily reliant on fossil fuels and imports around 90 per cent of its energy needs. In 2010, oil accounted for 52 per cent of Ireland's primary energy needs while gas makes up a further 33 per cent. 61 per cent of electricity was generated from gas in 2010. Given the limited potential for additional hydro generation and the ban on nuclear power, this dependence on gas for electricity generation is likely to continue in the medium term even with significant increases in renewable energy (mainly wind). Ireland is almost totally dependent on oil for its transport energy needs; in 2010, oil accounted for almost 98 per cent of energy consumption in transport;
- The level of spare electricity generation capacity (peak demand relative to supply) was a particular concern in Ireland until recently. However, the combination of falling demand, new gas generation plant, increased wind capacity and increased interconnection (from 2012) means that Ireland's position has improved considerably and the outlook to 2020 is positive;
- Ireland has to meet 16 per cent of total energy needs from renewables. This will require meeting 40 per cent of electricity consumption from renewables, 12 per cent of heat needs and ten per cent of transport needs. Ireland is making good progress in meeting the electricity target. In 2010, 14.8 per cent of electricity needs were met by renewables (the national 2010 target was 15 per cent). However, meeting the 2020 targets will be more challenging as partly due to planning delays, the rollout of new wind generation is falling behind schedule. In transport only 2.4 per cent of energy used was from renewable sources in 2010 while in heat, renewables accounted for 4.4 per cent of energy consumption;

- Ireland performs comparatively well in terms of energy efficiency improvements in the industrial sector over the last 20 years. Of the benchmarked countries, Ireland together with Finland were the best performing nations with an annual average energy efficiency improvement of close to two per cent; and
- The global market for energy goods and services is vast and it continues to grow quickly. Ireland is well placed to capture a significant share of this growing market in niche areas for the export of technologies and services. We have strong capabilities in key areas such as wind energy, electronics and software. There is also potential for the supply of renewable energy into the British and continental European markets as grid connectivity is developed and as onshore and offshore renewable technologies develop.

### Energy Policy Priorities for Enterprise

Balancing the energy policy objectives of improving cost competitiveness while ensuring secure and sustainable supply in the medium to long term presents enormous challenges for energy policymakers. There are complex trade-offs between these energy objectives that need to be carefully considered; for example decisions around fuel choices may improve security of supply and environmental sustainability performance but may have an adverse effect on long term cost competitiveness and vice versa. The key policy actions that need to be prioritised to support enterprise development are outlined below.

#### *Improving Cost Competitiveness*

We divide the cost competitiveness actions into longer term and short term policy priorities:

1. In the longer term, there are two key areas where policy decisions taken today will have significant implications for future price competitiveness:
  - The move to the single European electricity market is likely to require significant and costly changes to the all island electricity market. Ireland needs to ensure that any changes to the market design that are required to deliver the single European electricity market deliver efficiencies and least cost electricity to consumers (see Section 3.1). However, in the longer term, it should have benefits for our cost competitiveness (i.e. bring us more into line with EU prices) and for security of supply; and
  - The need to adapt the fuel mix will not only affect cost competitiveness but also our ability to meet security and sustainability objectives. While the choice of fuels will be determined by investment decisions by market players, policy tools can be used to incentivise investment in particular fuels or type of generation plant. One of the key challenges for the Government's proposed energy policy framework in 2012 will be to decide what mix of fuels will best deliver Ireland's long term energy objectives (see section 3.2 on the Forfás Energy Tetralemma study) and ensure incentives (e.g. price supports) and market rules are put in place to achieve them (see Section 3.1).

2. There are also a number of short term actions that need to be progressed including:
- Continuing to bring the differential in controllable domestic costs (i.e. non-fuel costs) into line with costs in our main competitor countries. In particular, a strong regulatory focus is needed to drive greater efficiencies in operating, maintenance and capital costs for transmission and distribution networks. From an enterprise perspective, further reform of the electricity market is also required to improve transparency and increase competition. Among the actions highlighted in the recent OECD Economic Survey of Ireland to improve competitiveness and support export-led growth were transferring the ownership of the transmission grid to Eirgrid to enhance competition and transparency and reduce costs, and divesting some of ESB's price setting generation plant to reduce ESB's dominance and increase competition in the generation market;
  - Reviewing the timeframes of grid investment plans to take account of the implications of reduced demand and planning delays while ensuring that future enterprise needs are met. As the cost of network investment is passed directly through to energy users in the form of higher energy prices, any over or premature investment adds unnecessarily to energy bills. Work underway by Eirgrid to examine the timing of specific projects under the grid development strategy, Grid 25, is a welcome development;
  - We also need to ensure more geographically focused renewables investment to minimise the amount of additional grid investment required. In particular, optimal wind sites in terms of electricity generation potential and proximity to the grid should be prioritised for development;
  - High-tension transmission lines should continue to be placed overhead as it provides a technically superior solution at a fraction of the cost to all energy users. It is critical that the decision of the expert international commission, appointed by DCENR in July 2011 to review the case for undergrounding part or all of the north-south electricity interconnector, is made quickly and that it provides the policy certainty required to progress the significant energy infrastructure investment needed to support future growth and competitiveness;
  - DCENR is reviewing the PSO levy on peat in 2012. For 2011/2012, the total PSO levy amounts to €92.1 million, of which €40.4 million is for peat subsidies. Given the cost implications for electricity customers and the impact on the environment, subsidies for peat generated electricity should be abolished. Proposals to convert the peat plants to biomass generated capacity should not be progressed until a full cost benefit analysis of the implications for Irish electricity prices and energy security and sustainability is undertaken; and
  - As a mature technology, the existing price support scheme for onshore wind should be revised so that the price support levels for new onshore wind projects are phased out over time. A recent study on the effect of price supports on Irish wholesale prices found that if there are 6,000 MW of wind on the system (i.e. the level of wind required to meet the 40 per cent target), the cost of REFIT would be between 3.2 per cent and 9.8 per cent of the wholesale price. At lower levels of wind, the cost of REFIT is much lower - between 0.8 per cent and 2.3 per cent when there are 2,000 MW of wind on the system. In the short term, price supports should be reviewed to ensure they support investment certainty without allowing windfall profits and adversely affecting cost competitiveness.

- While there are potentially significant enterprise and employment opportunities in the emerging energy renewables technologies (wave, tidal, offshore wind) sector, they should be funded through funding mechanisms for R&D, if deemed competitive, rather than by energy customers through expensive guaranteed price supports. The recent OECD Economic Survey of Ireland called for the discontinuation of supports for offshore, wave and tidal energy.
- Opportunities to export renewable power are welcome as it could create employment in Ireland and offset Ireland's traditional balance of trade deficit in energy. However, as proposed by the ESRI, price supports should not be paid for exports and offshore wind farms should be charged the full cost of grid connection.

### *Ensuring Security of Supply*

The key security of supply policy actions are:

- Reduce Ireland's reliance on imported fossil fuels to ensure long term energy security. While progress to date has been good in the electricity market, performance in the heat and transport markets is weak. Overall, just under six per cent of energy consumed in Ireland is from renewable sources. In spite of our ambitious plans to increase the use of renewable energy sources, Ireland is expected to remain largely reliant on imported fossil fuels for its total energy needs well beyond 2020. This presents a range of short and long term challenges in terms of adapting our fuel mix to ensure a cost-effective, secure and diverse fuel mix for electricity, heat and transport:
  - In the short term, it is important that the Corrib reserves are brought on stream without further delay. It is critical that the new energy policy framework prioritises the actions required to increase oil and gas storage so as to ensure security of supply (see Section 3.2). In the event that new gas supplies/sources do not come on stream and/or are delayed, security of supply concerns could be mitigated through the installation of a twin pipeline at Moffat, increased gas storage and/or the development of a new interconnector with a different point of origin in Great Britain. It is also important that a decision on how to replace baseload electricity generation at Moneypoint is made, as the decisions taken there will shape Ireland's security of supply for decades to come. Ireland has very limited oil and gas storage capacity; and
  - In the longer term, increasing interconnection to Great Britain and continental Europe will reduce our reliance on gas and wind and help diversify the electricity fuel mix. The potential of individual renewable heat sources is limited in an Irish context (e.g. CHP, district heating, geothermal). However, if we want to diversify the heat fuel mix and meet the 2020 renewables target, we need to promote investment in alternative sources that are cost effective. For example, in the case of CHP, removing regulatory barriers at local level (e.g. single wire rule) could enable what potential does exist in sectors such as food to be realised. In terms of transport, reducing Ireland's reliance on oil and the private car will require significant behavioural change;

- Address planning delays and inefficiencies to ensure network investment and new generation/storage capacity are delivered on time to meet future enterprise needs at least cost. It is vital that actions to reduce planning delays and improve the efficiency of planning approval system are progressed quickly (see Appendix 2); and
- Climate change proof Ireland's critical energy infrastructure (e.g. generation plants in coastal areas) to ensure that risks are minimised at least cost (see Section 3.2).

### *Improving Environmental Sustainability*

The key policy actions to improve environmental sustainability include:

- Continued and enhanced efforts are required by Government departments, enterprise agencies and business representative associations to ensure that businesses are fully aware of how best to reduce their energy use. Actions to improve domestic energy efficiency (e.g. smart metering, retrofitting of homes) also need to be progressed as reducing peak domestic electricity use will lead to benefits for all users (see Section 3.3);
- A continued focus on delivering new renewable energy capacity (wind, geothermal, biomass) (see Section 3.3). In particular, actions to reduce planning delays and to improve the efficiency of the grid connection process need to be prioritised; and
- Implementation of the Department of Transport's smarter travel policy is critical to changing behaviour and reducing use of the private car (see Section 3.3). Key actions include selective investment in public transport in the main cities, promoting other modes of transport (walking, cycling, public transport) and consideration of the introduction of congestion charges in key urban centres to facilitate better use of road infrastructure and increased mobility.

### *Realising Enterprise Opportunities*

There are significant export and employment opportunities presented by Ireland's favourable wind and wave energy resources. It is critical that the appropriate supports are put in place to promote and develop those enterprise opportunities. However, energy is an important input to the entire enterprise base. We need to find a way to support the development of the renewable energy sector without adversely affecting the cost competitiveness of the wider enterprise base and Ireland's attractiveness as a location to do business. Actions to support the development of the renewable energy sector and meet our targets should focus on reforming the regulatory and planning framework (e.g. foreshore licensing issues; planning delays; the need for an international framework agreement to facilitate energy exports).

The High Level Group on Green Enterprise identified policy actions to realise the clean-technology opportunities for enterprise (see Section 3.4). Some of these actions have already been mentioned earlier in this executive summary. Additional actions identified by the group, which are relevant to the energy sector, include:

- Progressing green R&D recommendations on pooling of research expertise and developing research alliances, and developing an R&D strategy for the green sector<sup>1</sup>;
- Accelerating foreshore licensing for offshore energy projects;
- Developing and marketing Ireland's potential as a Green IFSC; and
- Developing and implementing a green public procurement action plan immediately which will meet the EU target of 50 per cent green procurement by 2011.

The Expert Group on Future Skills Needs identified the skills requirements of enterprise within the green economy in Ireland. It will be important that the policy actions set out by the Expert Group are implemented to ensure the required skills base is in place to support growth in these sectors.

Forfás, Enterprise Ireland, IDA Ireland and DJEI, together with Science Foundation Ireland and SEAI are currently developing a coordinated agency strategy to realise green enterprise opportunities.

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<sup>1</sup>The Government appointed Research Prioritisation Steering Group, chaired by Jim O'Hara, has prepared a report recommending priority areas of focus for publicly funded R&D together with action plans for each of the areas recommended.



## 1. Introduction

Energy competitiveness remains an important issue for enterprise development. Ireland's ability to maintain and grow our existing export base and to continue attracting high levels of foreign direct investment is dependent on our capacity to deliver a more secure and sustainable energy supply while ensuring a sustained improvement in cost competitiveness. Forfás works closely with IDA Ireland, Enterprise Ireland and the Department of Jobs, Enterprise and Innovation (DJEI) to ensure that Irish energy policy takes account of enterprise and competitiveness issues.

The International Energy Agency (IEA) is currently carrying out an in-depth review of Ireland's energy policy; it is due to be published in 2012. IEA reviews generally have a strong impact on ensuing national energy policy. The IEA review will also include an assessment of the efficiency of the Irish electricity and gas markets as required under the EU-IMF Programme for Financial Support for Ireland. The Department of Communications, Energy and Natural Resources (DCENR) has indicated that it will publish a new energy policy framework during 2012<sup>2</sup>.

Given the forthcoming reviews of Irish energy policy by the IEA and DCENR, it is a timely opportunity to review Ireland's energy objectives and ensure that we are making the right energy policy choices today to support long term economic growth and international competitiveness. The purpose of this paper is to benchmark Ireland's energy performance on cost competitiveness, security of supply and sustainability issues and identify the energy competitiveness issues and priorities for enterprise. Previous Forfás energy work has focussed largely on electricity due to significant pressures on the cost competitiveness and the security of supply of electricity for enterprise. This time the scope of the work has been expanded to include an assessment of the key transport and heat energy issues for enterprise.

## 2. Overview of Ireland's Energy Performance

This section provides a high level analysis of Ireland's energy competitiveness performance in terms of costs, security of supply and sustainability. It also looks briefly at how Ireland is performing with regard to realising enterprise opportunities in the energy sector.

### Methodology

Forfás commissioned Pöyry Management Consulting to assess Ireland's energy competitiveness (electricity, transport and heat) in meeting the needs of enterprise against a selection of competitor and comparator countries. Included were countries with a similar geographic profile, similar market structures and similar regulatory and policy environments as well as countries with whom we compete for trade and investment. For electricity, Ireland was benchmarked against 12 countries while for heat and transport, six countries were benchmarked.

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<sup>2</sup> The last Energy White Paper was published in 2007.

## 2.1 Introduction

### *Energy Use by Category*

Energy use is categorised by three main modes of applications; electricity, transport and heat (thermal). Over the past two decades transport has become a much larger component of Ireland's total energy usage (Figure 1). In 1990, heat accounted for 45 per cent of total usage, electricity for 33 per cent and transport just 22 per cent. By 2010 (most recent data) heat accounted for 35 per cent of usage, electricity for 33 per cent and transport for 32 per cent<sup>3</sup>.

**Figure 1: Primary Energy Use by Category**



Source: SEAI, Energy in Ireland 1990-2010 (2011 report)

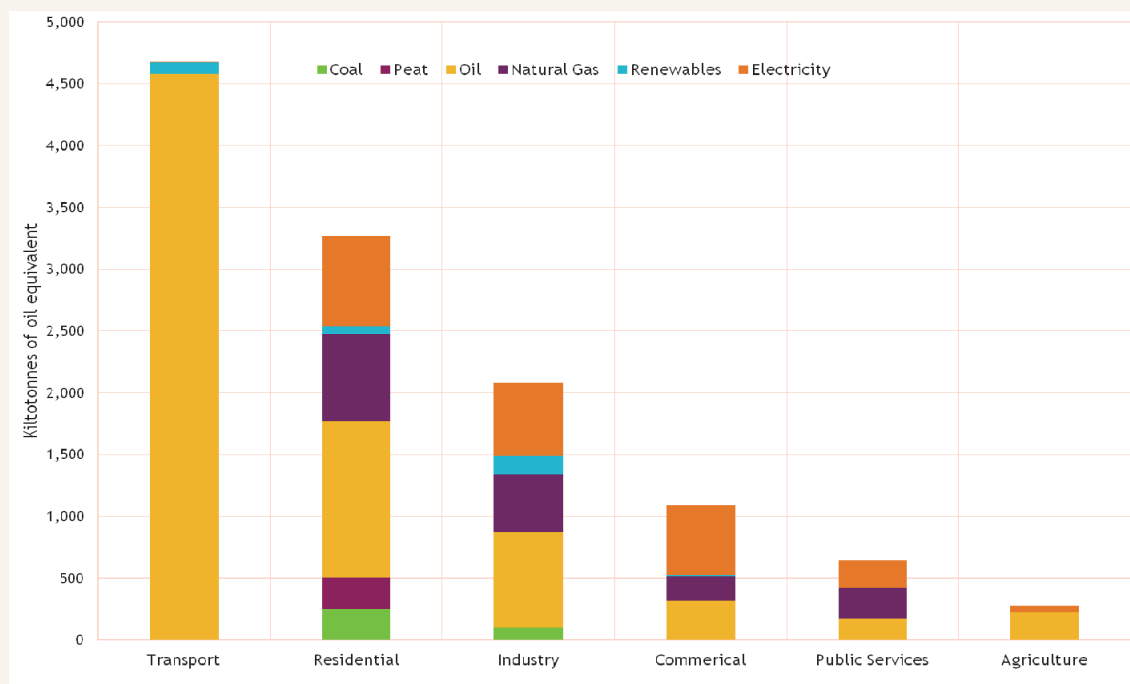
<sup>3</sup> Energy in Ireland 1990-2010, SEAI, December 2011.

### Energy Use by Sector

This report focuses on the enterprise sector which consists of industry and commercial services and had a combined consumption of about 3.2 million tonnes of oil equivalent (Mtoe) in 2010 - 26.4 per cent of total Irish energy consumption (Figure 2). This mainly consisted of electricity, oil and gas and there was a 66:34 split between the industrial sector and commercial sector.

The transport sector is also important for the enterprise sector as it includes the energy requirements for road, rail and aviation freight, and also employee commuting. In total, the transport sector consumes 4.7 Mtoe (39 per cent of total Irish consumption) and almost exclusively uses oil and oil products.

Figure 2: Final Energy Consumption in Ireland, 2010 by sector (ktoe)



Source: SEAI, Energy Balance 2010 (2011 report)

### Energy Intensity

Despite a substantial increase in energy used, Ireland's energy intensity (energy use/ GDP<sup>4</sup>) dropped significantly between 1999 and 2007. This was due to a range of factors including rapid GDP growth, energy efficiency improvements, significant growth in the lower intensity services sector and the closure of energy intensive manufacturing plants such as steel

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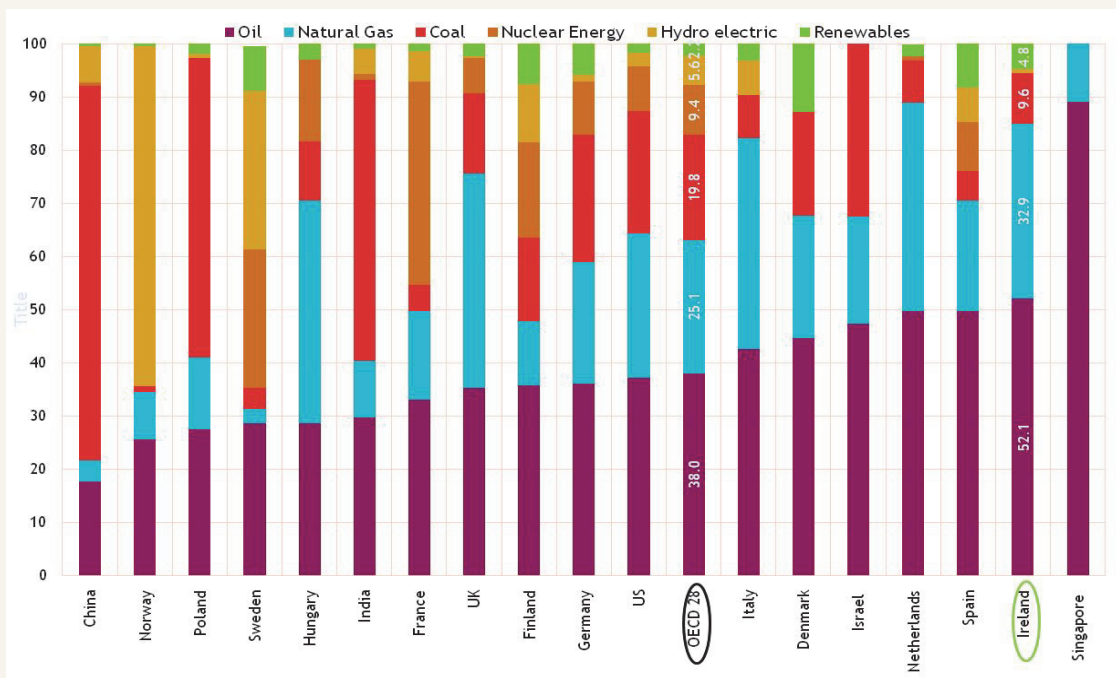
4 In greater detail, it is the ratio between gross inland consumption of energy and gross domestic product (GDP).

production (Irish Ispat) and fertilizer manufacture (Irish Fertilizer Industries). While economic activity declined by 10.1 per cent between 2007 and 2010, energy use fell by 9.4 per cent. Industrial energy use fell by 22.1 per cent over the period. This decrease is due to a combination of factors, including increased energy efficiency and structural changes in the industrial sectoral profile over the period. In other sectors, commercial energy use increased marginally (0.7 per cent), transport energy use declined by 17.8 per cent while residential energy use increased by 11.6 per cent<sup>5</sup>.

*Sources of Fuel*

Ireland is heavily reliant on fossil fuels. It is amongst the countries most dependent on oil as a source of energy consumption (52 per cent of primary energy use). Within the standard group of comparator countries, only Singapore consumes more energy generated through oil than Ireland. Natural gas also forms a relatively large component of Ireland’s energy consumption (33 per cent of energy use). The use of hydroelectric power is dependent on natural geographies and explains the small role it plays in Ireland (Figure 3). Wind (which is not included in the Eurostat definition of primary energy consumption) is making an increasing contribution to Ireland’s electricity generation capacity.

Figure 3: Components of Primary Energy Consumption per capita, 2010<sup>6</sup>



Source: BP Statistical Review of World Energy, June 2011

5 Energy in Ireland 1990-2010, SEAI, December 2011.

6 Primary energy comprises commercially traded fuels only. Excluded, therefore, are fuels such as wood, peat and animal waste which, though important in many countries, are unreliably documented in terms of consumption statistics. Wind, geothermal and solar power generation are also excluded.

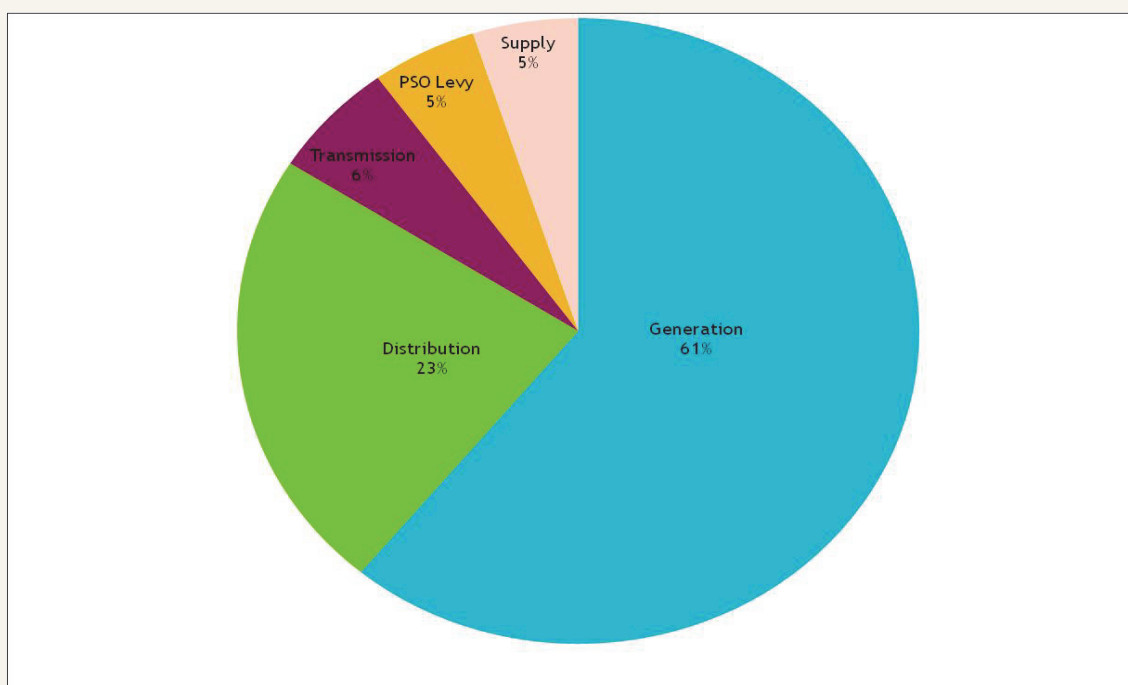
## 2.2 Cost Competitiveness

While energy generally represents a small share of business costs, it can comprise a large component of the direct non-wage costs for some firms. For large energy consumers in sectors such as the food sector and other manufacturing sectors such as engineering, ICT, medical devices and pharmaceuticals, high energy prices can be particularly challenging. They also have an influence in terms of the costs of transporting people and goods.

### *International Fuel Markets*

Ireland's fuel choice has created a heavy dependence on fossil fuels, with around 90 per cent of total fuel imported to the country. As a result, a substantial proportion of energy costs are outside domestic control as the prices for these fuels are set on international markets. For example, over 60 per cent of the average SME's electricity bill in Ireland is composed of generation costs and this figure rises further for large energy users (Figure 4).

**Figure 4: Sample Breakdown of 2010/2011 Electricity Bill for Small and Medium Enterprises**

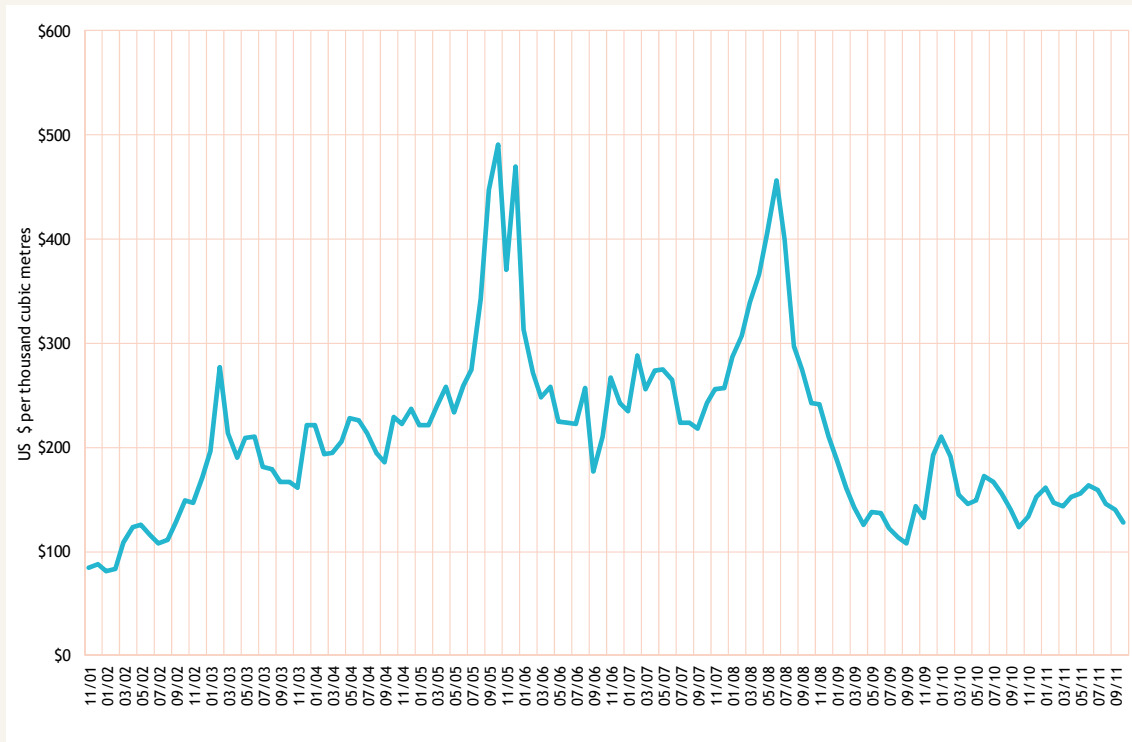


Source: CER, Understanding Your Electricity Bill

The scope for domestic actions to influence energy costs is limited to achieving competitiveness gains in the non-fuel components of energy costs. Driving competition in imports, both channels (e.g. interconnectors) and sources, is important.

Volatility is a significant characteristic of global fuel markets (Figure 5). Monthly variations in natural gas prices routinely reach above ten per cent with a peak increase of 45.4 per cent in December 2009. Similar volatility can be observed in other international fuel markets such as crude oil.

Figure 5: Average Monthly Price for Natural Gas, US\$, Nov 2001 - Oct 2011



Source: Index Mundi, Commodity Price Index

A range of factors create volatility in international fuel markets including international demand levels, political instability and natural disasters<sup>7</sup>. In addition to the security of supply benefits provided by the development of domestic fuels products, cost competitiveness benefits arise by helping to smooth spikes in international fuel prices as they occur.

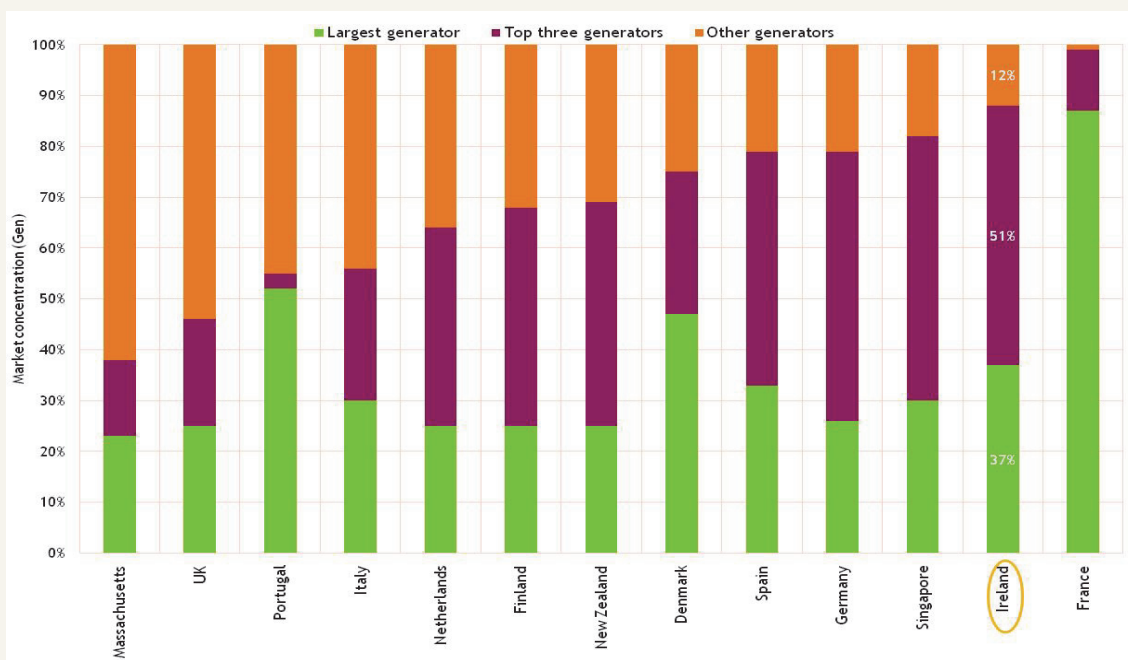
<sup>7</sup> For example, in recent months unrest in the Middle East, the impact of the Japanese earthquake on nuclear stations and the German decision to cease using nuclear energy have all affected world energy markets.

### Concentration of the Electricity Market

This section looks at the market share of the biggest three companies in both the generation and supply markets in each of the benchmark countries; the market concentration data for Ireland refers to the all island Single Electricity Market (SEM). It can be seen that the all island market has a higher market concentration than most other countries in the analysis - France is an obvious exception due to the dominance of EDF. Nonetheless, a number of other small countries/ regions have lower levels of concentration. Given the relatively small size of the all island market, it is also useful to look at the market share of the largest generator and supplier relative to the benchmarked countries.

In the SEM, the largest generator accounts for less than 40 per cent of the market while the largest supplier has a market share of 48.4 per cent of the large energy user market, 29.3 per cent of the medium sized business market and 30.7 per cent of the small business market in Q1 2011<sup>8</sup>. Figure 6.A shows the levels of concentration in the generation market for Ireland and a number of other countries in 2009 (latest available comparable data). The market share of the largest generator in the SEM has been reducing in recent years due to the divestments made by ESB power generation and new generation capacity by other generators. The full liberalisation of the electricity retail sector is also resulting in a reduction in supplier concentration - though that is not yet fully reflected in the latest EU statistics in Figure 6.B as the domestic market was only liberalised in April 2011<sup>9</sup>.

**Figure 6.A: Market Concentration in the Total Electricity Market - Generation, 2009**

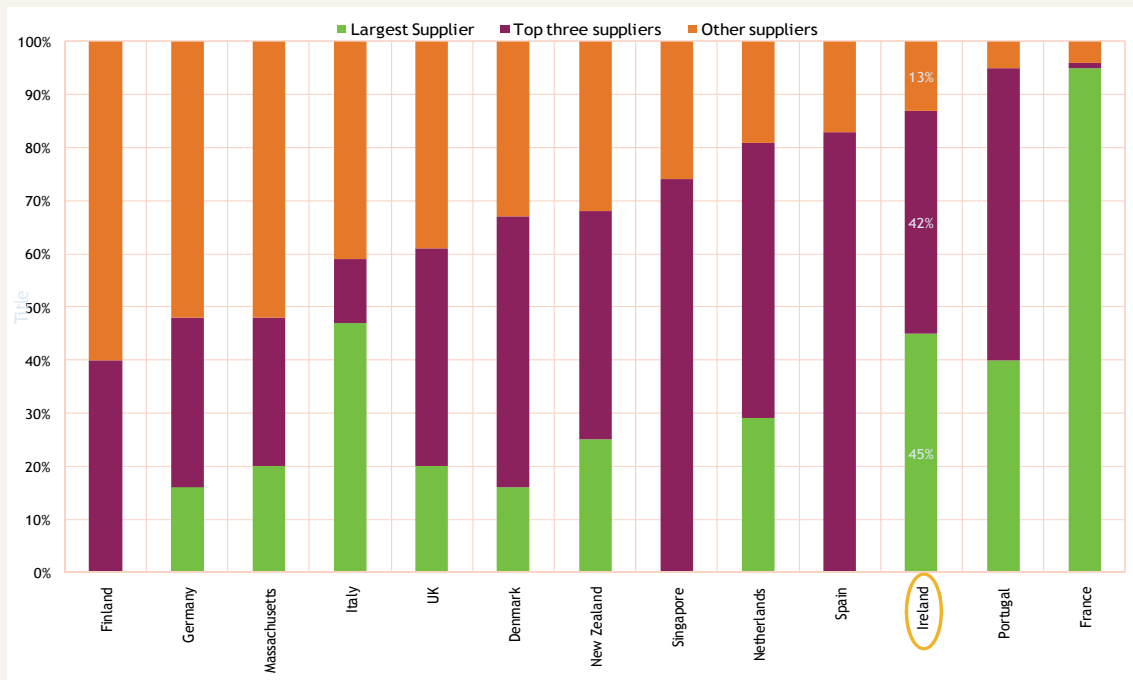


Source: EU, Global Data, Pöyry Management Consulting

<sup>8</sup> Electric Ireland (ESB) is the largest supplier in the country. It remains the largest supplier in all markets with the exception of the small business market where Energia holds 32.3 per cent of the market. Source: Electricity Retail Market Report, CER, Q1 2011.

<sup>9</sup> All business markets were deregulated from 1st October 2010.

Figure 6.B: Market Concentration in the Total Electricity Market - Supply, 2009



Source: EU, Global Data, Pöyry Management Consulting

In March 2011, the CER announced that it was deregulating the residential market as ESB Electric Ireland’s market share of the domestic electricity market had reduced below the 60 per cent threshold. This was attributed to strong competition in the retail electricity market since early 2009 with about 1 million customers switching electricity supplier. About a third of the million customers that switched have changed supplier more than once<sup>10</sup>.

<sup>10</sup> [www.cer.ie/en/information-centre-newsroom.aspx?article=5b61e52c-cd0e-4f05-88e0-ff72efa58a79](http://www.cer.ie/en/information-centre-newsroom.aspx?article=5b61e52c-cd0e-4f05-88e0-ff72efa58a79)



### Comparative Energy Costs

Since the last Forfás electricity benchmarking analysis in 2008, the gap between electricity costs in Ireland and the EU average has narrowed significantly. Between the second half of 2008 and the second half of 2010, the cost of electricity for large energy users in Ireland decreased by 32.1 per cent<sup>11</sup>. However, electricity prices are on the increase; in the first half of 2011 they were 4.2 per cent higher than in the same period in 2010 (Figure 7).

In the first half of 2011, electricity prices for large users in Ireland were the 15<sup>th</sup> most expensive in the EU-26<sup>12</sup>. While electricity costs in Ireland for large energy users are currently lower than euro area and EU-26 average costs, this is partly as a result of a temporary rebate for large energy users in Ireland. This rebate is due to be phased out in 2012.

Figure 7: Industrial Electricity Prices for Large Users (excl VAT), H1 2008 to H1 2011<sup>13</sup>



Source: Eurostat, Energy and Environment

11 Electricity prices for large energy users are based on an annual consumption of 2,000 to 20,000 kilowatt hours. Prices are half-yearly and the most recent data available is for the first half of 2011.

12 No Eurostat data was available for Austria.

13 Countries are ranked based on the H1 2011 prices.

Following significant reductions in 2009, electricity costs for SMEs in Ireland continued to fall in 2010 - overall SME costs fell by 20.3 per cent between 2008 and 2010<sup>14</sup>. Electricity prices for SMEs increased by 2.8 per cent in the first half of 2011 compared to the first half of 2010 (Figure 8). In the first half of 2011, Ireland was the sixth most expensive country in the EU-26<sup>15</sup>. Electricity prices for SMEs in Ireland were at the EU-26 average but were five per cent above the euro area average.

Figure 8: Industrial Electricity Prices for SMEs (excluding VAT), H1 2008 to H1 2011<sup>16</sup>



Source: Eurostat, Energy and Environment

Industrial gas prices in Ireland declined by 19.9 per cent between the second half of 2008 and the second half of 2010. However, between the second half of 2010 and the first half of 2011, that decrease was reversed and gas prices increased by 20.6 per cent. As a result, industrial gas prices in Ireland in the first half of 2011, were the seventh most expensive in the EU-23 compared to the 17<sup>th</sup> most expensive in the same period in 2010 (Figure A.2 in Appendix 1)<sup>17</sup>.

14 Electricity prices for SMEs are based on an annual consumption of 500 to 2,000 kilowatt hours.

15 No Eurostat data was available for Austria.

16 Countries are ranked based on the H1 2011 prices.

17 No Eurostat data was available for Austria, Cyprus, Greece and Malta.

In addition to favourable movements in international fuel prices which benefit Ireland disproportionately given our fuel mix, the deregulation of the electricity market in Ireland has led to greater competition and improved choice for consumers. The enactment of legislation to recover the carbon windfall gains and increased efficiencies arising from the medium term review of the electricity networks have also contributed to improving energy cost competitiveness.

Despite the recent improvements in energy costs, some of these competitiveness gains are set to be eroded as price increases for electricity increased by between 12 and 15 per cent this autumn while domestic gas prices rose by over 20 per cent<sup>18</sup>. While competitor countries will also experience increases, Ireland's fuel mix and import dependency means Irish energy consumers will be more exposed than others.

Recent work by the ESRI found that the price of electricity in Ireland broadly reflects the long run marginal cost of production which is necessary to ensure future energy security<sup>19</sup>. Prices in Great Britain will have to rise over the coming decade if the required investment is to take place<sup>20</sup>. In other countries, such as Germany and France, investment needs will also put upward pressure on future prices. This should result in a partial improvement in Irish energy cost competitiveness in the longer term<sup>21</sup>.

In July 2011, the UK government published its energy white paper which sets out proposals for electricity market reform in the UK to deliver the transition to a decarbonised electricity sector. The UK government's preference is that the proposals relating to the carbon price floor, feed in tariffs and emission limits are implemented across the UK, which would have implications for SEM participants, either directly or indirectly.

The most significant impact is likely to be as a result of the carbon price support. Under this proposal, fossil fuels used to generate electricity in the UK will be taxed at rates relating to their average carbon content. This would significantly disadvantage Northern Ireland's coal and gas-fired power stations (such as Kilroot, Ballylumford and Coolkeeragh), as they would be required to pay a higher carbon price in comparison to stations located in the Republic of Ireland. This carbon tax would have to be included in the generator bids resulting in a competitive disadvantage, and a possible increase in the wholesale electricity price during periods when these plants are the marginal plant (i.e. the plant that sets the wholesale price

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18 The CER recently approved a 22 per cent price increase in residential gas prices for Bord Gáis. The electricity market is no longer regulated by the CER; ESB announced a 14.8 per cent increase in residential unit electricity prices from the 1<sup>st</sup> October 2011. Bord Gáis's domestic electricity prices increased by 12 per cent from the 1<sup>st</sup> August 2011, while Airtricity's electricity prices rose by 12.3 per cent from the 1<sup>st</sup> September, and its gas prices went up by 21.2 per cent from the 1<sup>st</sup> October 2011.

19 A Review of Irish Energy Policy; Research Series Number 21, ESRI, 2011.

20 According to the UK Department of Energy and Climate Change, Great Britain will have to replace a quarter of its electricity generation capacity over the next decade.

21 A Review of Irish Energy Policy; Research Series Number 21, ESRI, 2011.

in any half hour period). In Ireland, as power generation is included within the emission trading scheme, they are not subject to carbon price supports.

As a result of the potential competitive disadvantage facing generators in Northern Ireland, in the short term, less efficient generators in the Republic of Ireland could be placed higher on the merit list, thus resulting in a slightly higher wholesale (and retail) price of electricity and increased carbon emissions. However in practice, because of the constraints on electricity flows between the two jurisdictions caused by the delays to the rollout of the north-south interconnector, Northern Ireland generators are likely to be required to meet demand in the north. In the long run, the introduction of the carbon price support may mean there will be little incentive to build new fossil fuel (gas, coal, oil) generation plants in Northern Ireland.

### 2.3 Security of Supply

Security of supply is of critical importance to enterprise. It depends on a range of factors including our reliance on imported fuels, energy storage capacity, our generation capacity (to convert fuel to power) and our ability to import power (interconnection).

#### *Import Dependency*

Ireland imported 88 per cent of its energy (electricity, heat and transport) needs in 2009 which compares unfavourably with the EU-15 average of 57 per cent (Figure A.3 in Appendix 1). Unlike other countries, Ireland has limited hydro resources and no nuclear generated electricity. Since the mid 1990s, import dependency has grown significantly in Ireland due to an increase in energy use, a decline in indigenous natural gas production and a decrease in peat production. Reducing our dependence on imported fossil fuels is a significant competitiveness challenge for Ireland in the longer term.

#### *Oil Storage Capacity*

The absence of the development of new oil storage capacity on the island of Ireland for many years despite a sustained period of increase in oil consumption resulted in existing storage capacity becoming increasingly under pressure. The introduction of biofuels requiring some existing tank storage has resulted in reduced storage capacity for the National Oil Reserves Agency (NORA) in commercial storage. Government policy aims to increase the proportion of strategic stocks that are wholly owned by NORA and stored on the island of Ireland. To address the scarcity of commercial storage, NORA is continuing its work on the development of long term storage plans. Two new storage facilities (Ringsend, Dublin and Kilroot, Co. Antrim) were brought online in 2011 which have significantly enhanced the security of oil supply on the island of Ireland. In addition, NORA is progressing a new storage project in Tarbert, Co Kerry, which is to be completed in Q2 2013.

From a transport perspective, Ireland has a high level of import dependency on both crude oil and products derived from oil (e.g. petrol, diesel). A number of other countries also have a high crude oil dependency as they have no indigenous reserves of their own; however, due to limited refining capacity, Ireland also imports over 60 per cent of its oil products

requirements (Figure 9). It is the only benchmarked country with an oil product import dependency of over 25 per cent<sup>22</sup>.

**Figure 9: Oil Import Dependency (Crude Oil/Oil Products), 2010**



Source: Eurostat, IEA, Pöyry Management Consulting

The refining capacity in Ireland remains low. According to a report prepared in 2008 for the DCENR, there is an expectation that post 2016, the Whitegate refinery will close given its dependency on increasingly distant crude supplies and the fact that it is a relatively simple refinery of modest scale<sup>23</sup>. If this occurs Ireland will be the largest IEA member market without its own operating refinery and would need to import all of its oil products. The 2008 report for DCENR highlighted a number of risks in relation to Ireland’s ability to physically access oil supplies and made recommendations to ensure the quantity of strategic oil stocks in Ireland are maximised through improved storage and import and distribution infrastructure.

### Gas Storage Capacity

Ireland imports over 90 per cent of its gas requirements but only has around three per cent of annual consumption in storage capacity. This leaves us with a very high dependency on short term imports<sup>24</sup>. Given Ireland’s location on the edge of the European gas network, its

<sup>22</sup> Pöyry Management Consulting research.

<sup>23</sup> Review of the Security of Ireland’s Access to Commercial Oil Supplies, Purvin Gertz, Byrne Ó’Cléirigh, 2008.

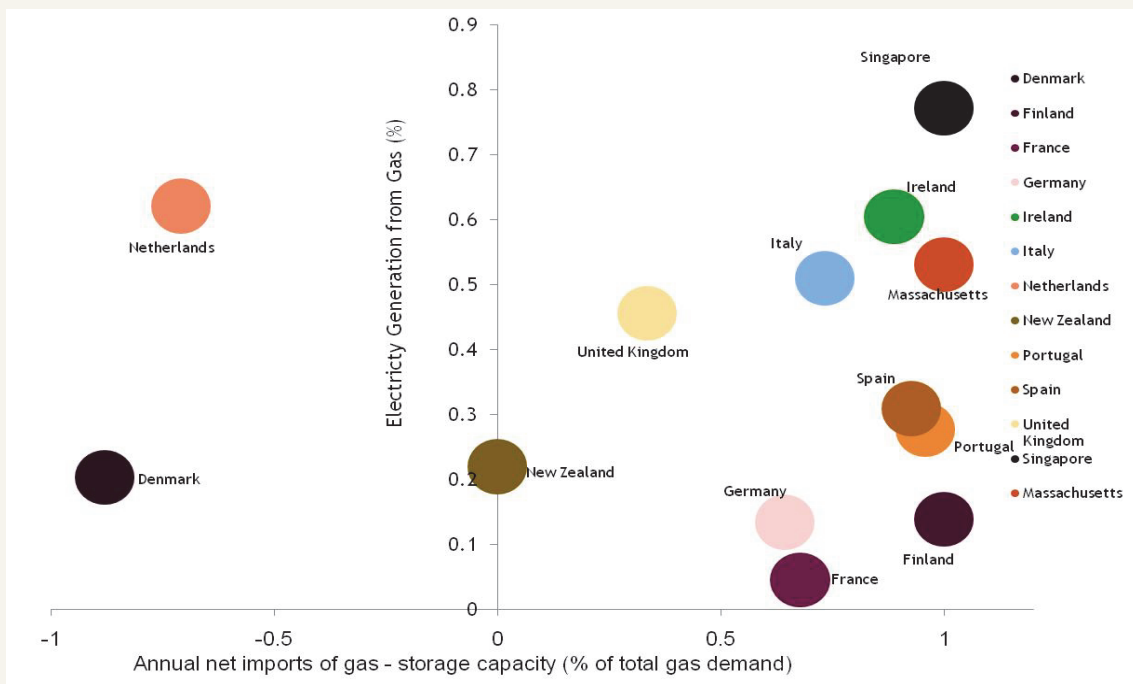
<sup>24</sup> Pöyry Management Consulting research.

dependence on gas for 61 per cent of electricity generation<sup>25</sup> and the fact that all of the pipelines are to the British market, security of gas supply is a significant concern<sup>26</sup>. Increased storage capacity in the UK, development of the Corrib field, a potential new storage facility at Larne and the proposed Liquefied Natural Gas (LNG) terminal in north Kerry may alleviate this shortage of storage capacity.

Figure 10 looks at gas security by calculating the total imports of gas minus the level of gas storage capacity, as a proportion of total gas demand against the percentage of electricity generated from gas. Ireland scores poorly on this indicator due to very high levels of electricity generated from gas, high levels of gas imports and low levels of gas storage. Only Singapore has a lower ranking than Ireland, but it does have a greater diversity of import routes (including four pipelines from three different countries) making it less reliant on individual pipelines.

Ireland's two gas pipelines are to Great Britain where we are able to access a relatively liquid market at competitive wholesale prices but at the same time we can also be significantly exposed to price fluctuations. Any physical incidents such as pipeline outages could also have a dramatic impact on security and prices, despite the fact the current pipeline is not fully utilised.

Figure 10: Gas Storage and Gas Import Dependency, 2010



Source: IEA, EIA, Pöyry Management Consulting

25 Refers to 2010. Source: Energy in Ireland 1990-2010, SEAI, December 2011.

26 A fault discovered on the Moyle interconnector in July 2011 is expected to halve the interconnector capacity for 3-6 months.

### *Renewables*

Ireland has to meet 16 per cent of total energy needs from renewables. This will require meeting 40 per cent of electricity consumption from renewables, 12 per cent of heat needs and ten per cent of transport needs. Ireland is making good progress in meeting the electricity target. In 2010, 14.8 per cent of electricity needs were met by renewables (the national 2010 target was 15 per cent and the EU target was 13.2 per cent). However, meeting the 2020 target will be more challenging as partly due to planning delays, the rollout of new wind generation is falling behind schedule<sup>27</sup>. In 2008, the 2010 target for renewable sources in transport energy was reduced from 5.75 per cent to three per cent. In 2010, 2.4 per cent of energy used in transport was from renewable sources while in heat, renewables accounted for 4.4 per cent of energy consumption (the 2010 target was five per cent). Even if Ireland meets the 16 per cent energy renewables target, it is expected to remain largely reliant on imported fossil fuels for its total energy needs well beyond 2020.

### *Generation Capacity*

In previous Forfás benchmarking studies (2005 to 2008), the level of spare capacity in electricity generation (peak demand relative to supply) had been a particular concern in Ireland. However, the combination of falling demand, new gas generation plant, increased wind capacity and increased interconnection (via the east-west interconnector from 2012) means that Ireland's position has improved considerably and the outlook to 2020 is positive<sup>28</sup>.

### *Interconnection*

Many European countries have significant interconnection to other markets, notably Denmark and Finland which are part of a regional electricity market, the Nordic pool. Currently, Ireland's interconnection is limited. Interconnection capacity accounts for only six per cent of total installed capacity in the all island market<sup>29</sup>. Denmark (albeit more centrally located in Northern Europe) has a similar market to Ireland with high levels of wind, but is has interconnector capacity that is equivalent in size to over 30 per cent of its generating capacity; plus its interconnection is to three different countries (Norway, Sweden and Germany). This provides a much higher level of security in case of any unforeseen issues around electricity supply.

The delivery of the East-West interconnector to Great Britain is on schedule for completion by the end of 2012. This will increase the contribution of interconnection capacity to 12 per cent of total installed capacity<sup>30</sup>. However, the second North-South interconnector (which

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27 To meet the 40 per cent target, we need approximately 400MW of additional wind capacity per annum - in the past year, only about 200 MW was added. However, 471 MW of new wind capacity is contracted for connection in 2012. As of September 2011, there were 1,535 MW of wind on the system. Source: Energy in Ireland 1990-2010, SEAI, December 2011.

28 All Island Generation Capacity Statement 2011-2020, Eirgrid/SONI, December 2010.

29 Pöyry Management Consulting research.

30 Ibid.

was to be delivered by 2011) is experiencing significant delays due to planning difficulties and is imposing substantial costs on electricity users in both jurisdictions.

## 2.4 Sustainability

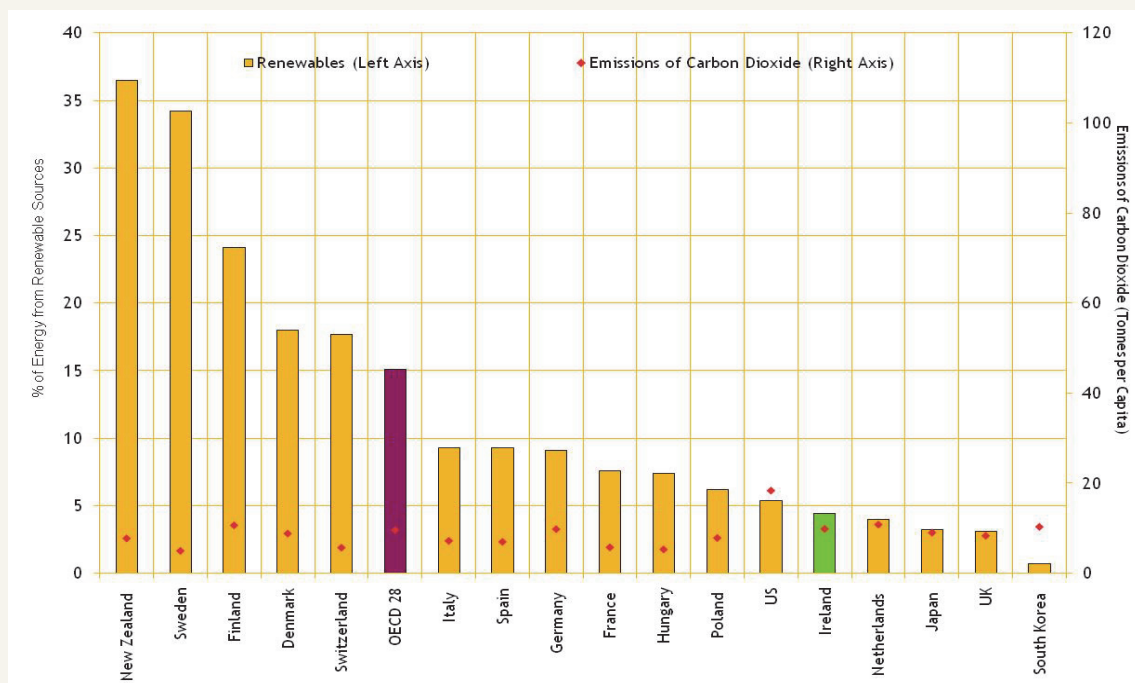
Historically, Ireland’s sustainability performance has been weak but there has been some progress recently. Sustained actions will be required in order to successfully address the challenges of sustainability and climate change.

### Renewable Energy

As mentioned in the previous section, Ireland’s share of energy derived from renewable resources is growing, but remains approximately a third of the OECD average (Figure 11). Ireland’s share of electricity produced from non-hydro renewable sources is above the OECD average. This is driven by rapid developments in wind generation which is supporting progress towards achieving the 2020 target.

Ireland is among the highest carbon emitters in the OECD on a per capita basis driven by increases in transport emissions.

Figure 11: Percentage of Energy from Renewable Sources (2009) and Per Capita Carbon Dioxide Emissions from Fuel Combustion (2008)



Source: International Energy Agency, CO2 Emissions from Fuel Combustion, 2010 Edition

Ireland performs comparatively well in terms of energy efficiency improvements in the industrial sector over the last 20 years. Using the energy efficiency measure of the ODEX

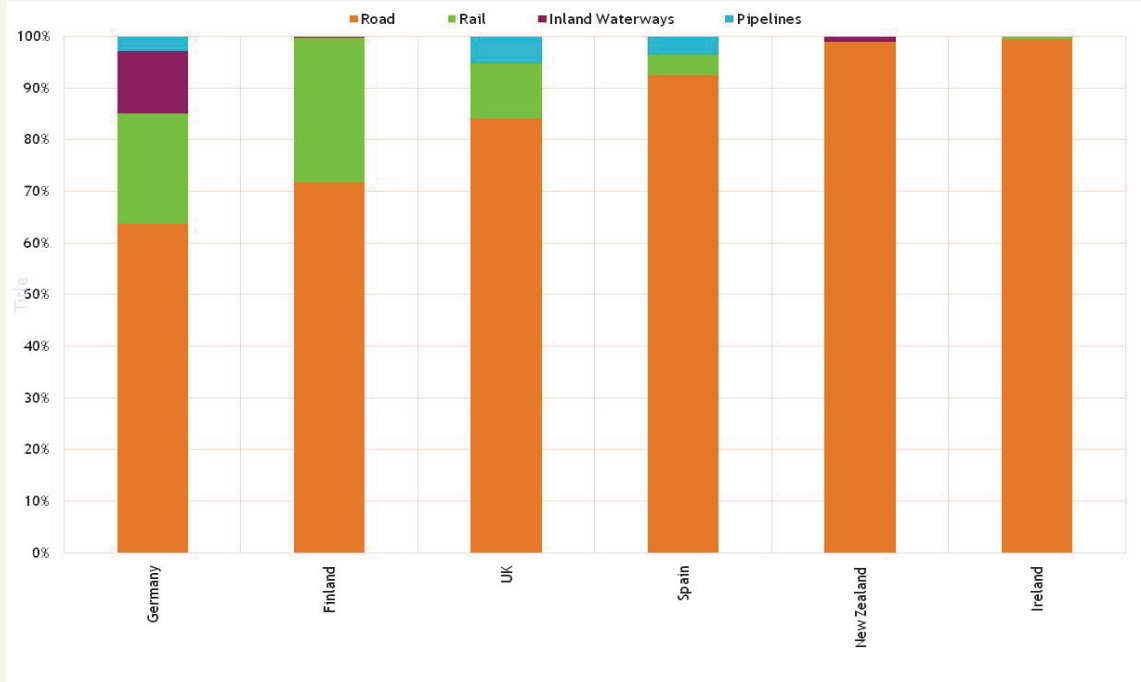


indicators<sup>31</sup>, Ireland together with Finland were the best performing nations with an annual average energy efficiency improvement of close to two per cent. These improvements have been driven by government policy to achieve a 20 per cent reduction in energy consumption by 2020 and have been helped by the structural shift towards less energy intensive, high value added industries throughout the 1990s.

*Renewable Energy - Transport*

Ireland has the lowest modal diversity for freight transport per kilometre within the group of comparator countries (Figure 12). Freight transportation in Ireland is almost exclusively dependent on the road network which puts it at a significant disadvantage compared to countries like Germany that have well developed transportation routes using railways, inland canals and rivers.

**Figure 12: Modal Diversity of Freight Transport (tonne -km), 2009**



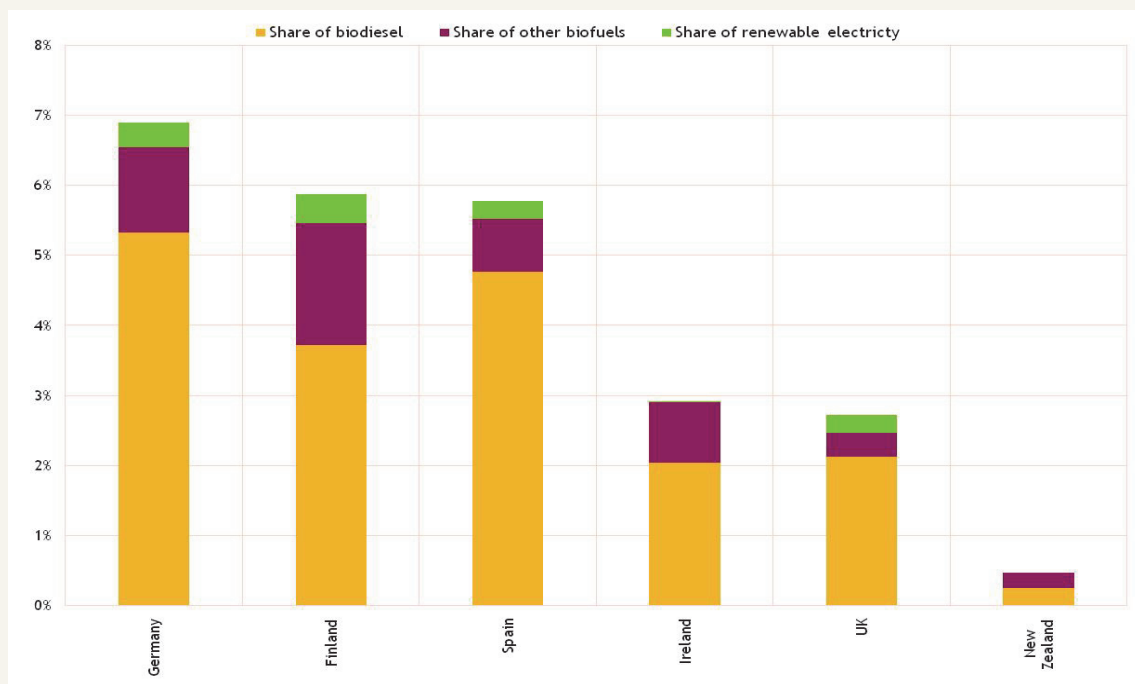
Source: Eurostat, IEA, Pöry Management Consulting

31 ODEX is an index formulated in the European Odyssey project which measures the energy efficiency progress by the main sectors (industry, transport, households) and for the whole economy. ODEX indicators represent a better proxy for assessing energy efficiency trends at an aggregate level (e.g. overall economy, industry, households, transport, services) than the traditional energy intensities, as they strip out the effects of structural changes and other factors not related to energy efficiency such as more appliances or more cars. [www.odyssee-indicators.org/registred/definition\\_odex.pdf](http://www.odyssee-indicators.org/registred/definition_odex.pdf)

While Ireland is making good progress towards its 2020 electricity renewables target, its performance with regard to using renewables such as biomass and biofuels for transport and heat has been relatively poor. Throughout the EU, renewables still form a very small component of transport fuel consumption and many countries will find it very challenging to meet the EU target of ten per cent of transport energy from renewable sources by 2020. In terms of the level of biofuels as a percentage of the oil supply and the level of transportation using electricity sources, Ireland lags other EU countries (Figure 13). Biofuels (biodiesel and other biofuels) accounted for 2.9 per cent of oil supply in transport in Ireland. This compares to 6.5 per cent of oil supply in Germany (if renewable electric transport is included, the share in Germany is 6.9). In 2010, Ireland enacted the Biofuel Obligation Act which requires fuel suppliers in Ireland to include an average of four per cent biofuels in their annual fuel sales from July 2011. Biofuels increased by 20 per cent in 2010, albeit from a low base<sup>32</sup>.

Transportation using electricity as a primary energy source is much lower in Ireland than comparable European countries. It is currently only 0.01 per cent in Ireland compared to 0.42 per cent in Finland. There are very low levels of electric road vehicles in comparator countries despite published targets in most countries to grow the penetration of electric vehicles over the next ten years. Most current European electric transport is due to electrified rail networks.

Figure 13: Renewable Transport Energy as a Percentage of Oil Supply, 2010



Source: Eurostat, IEA, Pöyry Management Consulting

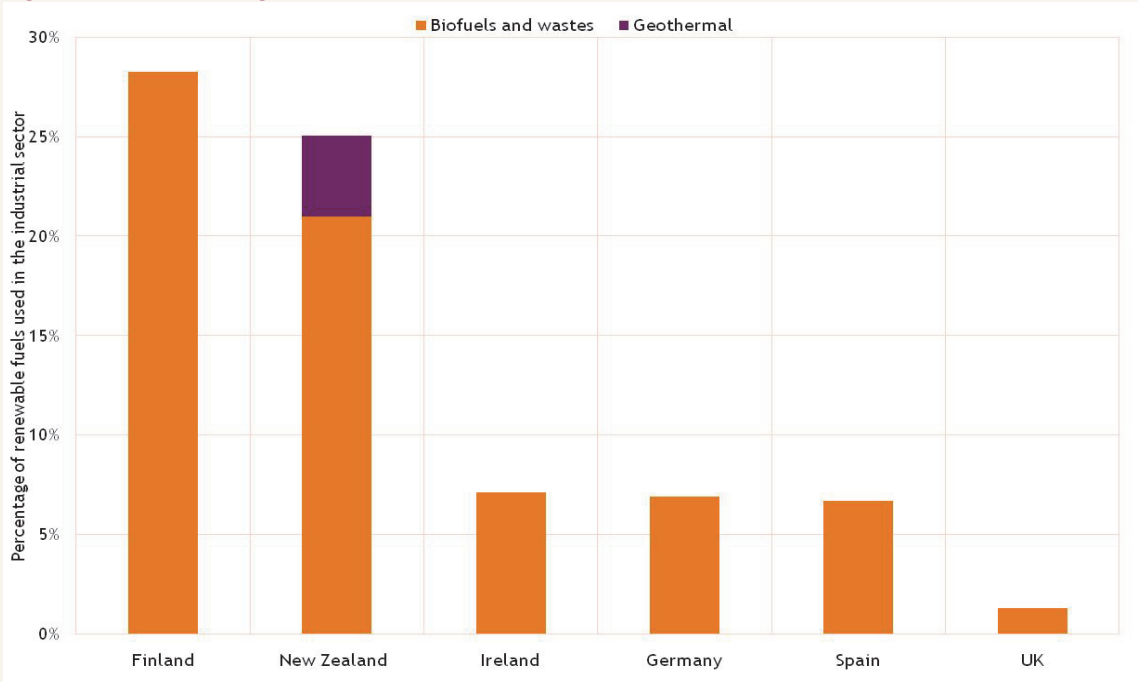
32 Energy in Ireland 1990-2010, SEAI, December 2011.

Ireland’s climatic and soil conditions are very suitable for the planting of willow and miscanthus for biofuels. To date activity in this area has largely been driven by State supports<sup>33</sup>. The degree to which the growth of biofuels can be commercially viable in Ireland will be determined by the international price of biofuels and the market price for alternative produce grown on the same land area<sup>34</sup>.

**Renewable Energy - Heat**

Ireland’s fossil fuel reliance is also observed in the low proportion of renewable heat used in the generation of heat in the industrial sector. Although Ireland performs slightly better than the UK, Germany and Spain, it remains a long way behind both New Zealand and Finland (Figure 14).

**Figure 14: Percentage of Renewable Fuels used in the Industrial Sector, 2009**



Source: IEA, Pöyry Management Consulting

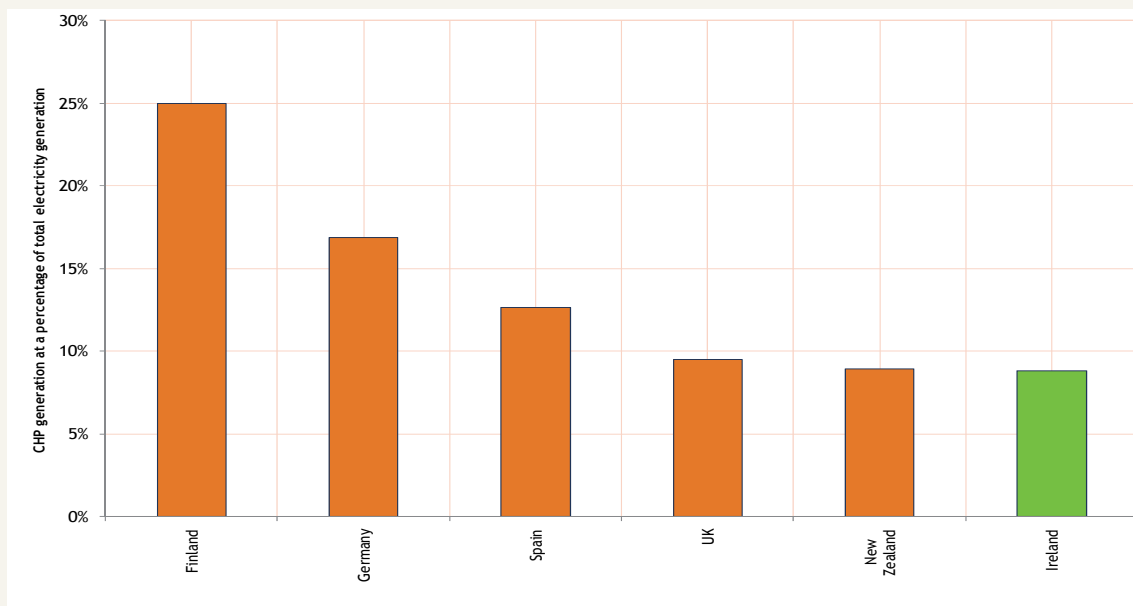
33 [www.agriculture.gov.ie/publications/2011/annualreviewandoutlookforagriculturefisheriesandfood20102011/environment/energycrops/](http://www.agriculture.gov.ie/publications/2011/annualreviewandoutlookforagriculturefisheriesandfood20102011/environment/energycrops/)

34 A move away from agri-food production towards biofuels could have significant implications for food security.

Heat delivered from CHP plants may be used for process or space-heating purposes in any sector of economic activity including the residential sector<sup>35</sup>. CHP thus reduces the need for additional fuel combustion for the generation of heat and avoids the associated environmental impacts, such as CO<sub>2</sub> emissions<sup>36</sup>.

At 8.8 per cent, Ireland lags the EU-27 average (11.4 per cent) with regard to the percentage of electricity generated from CHP (Figure 15). A number of government initiatives were introduced to support and incentivise CHP investment<sup>37</sup>. Although it is not clear why these policies have not had the desired impact, the results could suggest that the levels of grants put in place were not sufficiently attractive to customers. Another important factor is likely to be the reduction in the market for CHP. Due to the change in the profile of the industrial sector in Ireland in recent years, suitable heating loads for CHP are disappearing, making the deployment of CHP more difficult. In addition, raising the significant funds required to develop these facilities has become more challenging. On the residential side, Ireland's spatial patterns (low density) and climatic conditions (we do not require as much heating and cooling as other countries) limit the potential for CHP.

**Figure 15: Percentage of CHP Generation in Total Electricity Generation**



Source: IEA, Pöyry Management Consulting

<sup>35</sup> Combined heat and power (CHP) or co-generation is a technology used to improve energy efficiency through the generation of heat and power in the same plant, generally using a gas turbine with heat recovery.

<sup>36</sup> Sustainable Development, Metadata, Eurostat.

<sup>37</sup> These initiatives have included the CHP scheme which provided €11 million grant support for CHP projects in the 2006 - 2010 period and the Renewable Heat Deployment Programme which provided capital grants for renewable heat installations between 2006 and 2010. This scheme covered biomass boilers, heat pumps (all types) and solar thermal. This continued the previous Bioheat Boiler Deployment Programme, which provided grants of up to 30 per cent for boilers.

## 2.5 Energy Opportunities

As an exporting economy with a strong existing enterprise base, Ireland has opportunities to develop domestic companies in energy and related areas and to attract a greater share of foreign direct investment in the global environmental goods and services sector.

The global market for energy goods and services is vast and it continues to grow quickly. Ireland is well placed to capture a significant share of this growing market in niche areas. We have strong capabilities in key areas such as wind energy, energy management and consultancy, electronics, financial services and software. Our commitment to research and development and the export focus of indigenous industry, in addition to a considerable track record as a base for overseas investment, will be key to capturing the potential of this sector.

The High Level Action Group on Green Enterprise published its report “Developing the Green Economy in Ireland” in November 2009, containing 55 recommendations that needed to be addressed to capitalise on the opportunities afforded by the green economy which includes opportunities in the energy goods and services space. Employment in six key sectors of the green economy (which includes renewable energies and efficient energy use and management) is estimated by Forfás/Expert Group on Future Skills Needs to stand at 18,750 (Nov. 2010). If key barriers are immediately addressed, employment is predicted to rise to between 23,000 and 29,000 in these six sectors by 2015.

A progress report on the implementation of the High Level Action Group’s recommendations was published in March 2011, showing that almost 2,000 jobs were announced for the sector within the intervening period. However the progress report highlights a number of outstanding actions that need to be progressed quickly to fully realise the enterprise opportunities in this area (see Section 3.4)<sup>38</sup>. Forfás, Enterprise Ireland, IDA Ireland and DJEI, together with Science Foundation Ireland and SEAI are currently developing a coordinated agency strategy to realise green enterprise opportunities.

In 2010, Forfás/Expert Group on Future Skills Needs published a report identifying the future skills needs of enterprises engaged within the green economy in Ireland<sup>39</sup>. The Group noted that Ireland is well placed to access opportunities in the areas of renewables energy and energy efficiency provided that a number of policy actions are taken to develop the necessary skills base to support growth in these sectors. It is important that the recommendations made by the Group in relation to the green economy are implemented quickly and coherently.

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<sup>38</sup> Progress Report on the Implementation of the Report of the High Level Group on Green Enterprise, Department of Enterprise, Trade and Innovation and Forfás, March 2011.

<sup>39</sup> Future Skills Needs of Enterprise within the Green Economy in Ireland, Expert Group on Future Skills Needs, 2010.

### 3. Energy Priorities for Enterprise

A reliable and competitively priced supply of energy is vital for Irish firms to compete successfully in international markets. Balancing the energy policy objectives of improving cost competitiveness while ensuring secure and sustainable supply in the medium to long term presents enormous challenges for energy policymakers. There are complex trade-offs between these energy objectives that need to be carefully considered; for example decisions around fuel choices may improve security of supply and environmental sustainability performance but may have an adverse effect on long term cost competitiveness and vice versa. Likewise, decisions on energy prices will affect investment decisions, which will influence long term security of supply and system reliability.

Policy coherence is critical to ensure we are making the right energy policy choices today to support long term economic growth and international competitiveness. In particular, we need to align energy policy objectives and priorities with policies and priorities across energy related areas such as climate change, transport and spatial planning. For example, Ireland cannot expect to have a secure, sustainable and competitively priced energy supply if we continue to have dispersed population settlements and a high reliance on the private car.

There are plans by DCENR to develop a new energy policy framework during 2012. The Department of the Environment recently published its climate change review and set out the steps to develop a national 2050 low-carbon plan<sup>40</sup>. Given the overlaps between the two areas, it is critical that the new energy and climate change policies are developed in tandem to ensure that policy decisions taken support national competitiveness as well as environmental sustainability policy objectives.

#### 3.1 Improving Cost Competitiveness

As highlighted in Section 2, Ireland's cost competitiveness improved significantly in the past two years. However, some of that improvement is likely to be reversed in the short term as international fuel prices increase and temporary rebates for large users are phased out by the end of 2012. While Ireland's high exposure to imported fossil fuels limits the actions that can be taken in the immediate term to improve energy cost competitiveness, there is further scope to lower controllable costs in the Irish energy market. A number of these actions have been highlighted previously by Forfás and the NCC<sup>41</sup>.

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40 The Minister for Communications, Energy and Natural Resources announced at the Energy Ireland conference in June 2011 that a new energy policy framework would be published in 2012. The Minister for the Environment announced his review of climate change policy in November 2011: [www.environ.ie/en/Environment/Atmosphere/ClimateChange/ClimatePolicyReview2011/News/MainBody,28331,en.htm](http://www.environ.ie/en/Environment/Atmosphere/ClimateChange/ClimatePolicyReview2011/News/MainBody,28331,en.htm)

41 Making it Happen - Growing Enterprise for Ireland, Forfás, October 2010, Statement on Energy, National Competitiveness Council, October 2009 and joint agency submissions to DCENR/CER consultations.

### *Improve the Efficiency of the Electricity and Gas Markets*

Ireland needs to continue to bring the differential in controllable domestic costs (i.e. non-fuel costs) into line with costs in our main competitor countries, in particular we need to drive for greater efficiencies in operating, maintenance and capital costs for transmission and distribution networks (electricity and gas)<sup>42</sup>. There are trade-offs to having large vertically integrated utilities; they offer economies of scale benefits but transparency levels and competition are higher if the level of vertical integration is reduced.

There has been much debate of the role of State owned assets, particularly as a source of revenue given the significant hole in the public finances. There are a number of semi-state companies active in the energy space; these include the ESB Group; Eirgrid; Bord Gáis Eireann, Bord na Mona and Coillte. For each of those companies, Government needs to<sup>43</sup>:

- Evaluate the mission and goals of the above companies;
- Develop clear criteria to guide sale of energy assets;
- Need to develop contestability in markets;
- Need to develop a clearer policy towards internationalisation; and
- Address the issue of the vertical integration of networks, generation and retail.

From an enterprise perspective further reform of the electricity market is required to improve transparency, increase competition and reduce inefficiencies and prices. The following actions were highlighted in the recent OECD Economic Survey of Ireland to improve competitiveness and support export-led growth<sup>44</sup>:

- Transferring the ownership of the transmission grid to Eirgrid can enhance competition and transparency and reduce costs<sup>45</sup>; and

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42 Every five years the regulator reviews the non-fuel costs allowable for electricity and gas networks, in line with Government legislation. In summer 2010, the CER carried out a comprehensive review of the electricity network charges to apply for the period 2011-2016. As a result of that review, the networks cost component of the electricity bill was reduced by 45 per cent for large energy users from the 1st October 2010. Under the review, the CER sets targets for the network operator to cut the operating expenditure required to run the system, as well as ensuring that capital expenditure is fully scrutinised in terms of it being necessary (e.g. in terms of long term benefits outweighing costs). See CER/10/198 and CER/10/206 for further details. Each year the allowed revenue is refined in an annual review that updates a range of assumptions. This determines the allowed revenue in that relevant year which is then used to calculate tariffs and charges to users of the transmission and distribution systems. The review of the gas networks for the period 2012/13-2016/17 will be completed in 2012.

43 In 2010, Forfás undertook a review of the role of the State owned enterprises to assess the factors required to ensure that State owned enterprises are providing high-quality, competitively priced infrastructure and services to Irish enterprise and are maximising their broader contribution to supporting economic recovery and opportunities for enterprise and innovation. Source: The Role of State Owned Assets, Forfás, July 2010.

44 OECD Economic Survey: Ireland, OECD, October 2011.

45 The Minister for Communications, Energy and Natural Resources announced in July that the ownership of the grid would remain with ESB. However, the decision will have to be certified by the CER and the European Commission.

- Some of ESB's price setting generation plant should be divested to reduce ESB's dominance and increase competition. While competition in generation has increased in recent years, particularly since the establishment of the SEM, ESB retains a significant share of the price setting generation plant.

#### *Ensure Cost Effective Network Investment*

Significant investment in the transmission and distribution networks is planned over the period to 2025 to meet our renewables target and to ensure that key regional centres can support energy intensive investment projects<sup>46</sup>. As the cost of network investment is passed directly through to energy users in the form of higher energy prices, the timing of grid investment plans need to be reviewed to take account of the implications of reduced demand and planning delays while ensuring that future enterprise needs are met<sup>47</sup>. We also need to ensure more geographically focused renewables investment to minimise the amount of additional grid investment required. In particular, optimal wind sites in terms of electricity generation potential and proximity to the grid should be prioritised. Eirgrid is reviewing the rollout of specific projects under Grid 25 to best meet the changed circumstances such as the reduction in demand<sup>48</sup>.

There has been much debate about whether high-tension cables should be placed underground or overhead. The costs of placing the cables for the planned grid investment underground are prohibitive and would be borne by all customers. Underground cables would also be technically inferior from the perspective of guaranteeing security of supply<sup>49</sup>. High-tension transmission lines should continue to be placed overhead as it provides a technically superior solution at a fraction of the cost. An international expert commission was appointed by DCENR in July 2011 to review the case for undergrounding part or all of the north-south electricity interconnector and is to report within six months<sup>50</sup>. It is critical that the decision of the expert commission is made quickly and that it provides the policy certainty required to progress the significant energy infrastructure investment needed to support future growth and competitiveness.

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[www.dcenr.gov.ie/Press+Releases/GOVERNMENT+DECISION+ON+ELECTRICITY+TRANSMISSION+ASSETS+IN+THE+CONTEXT+OF+EU+3RD+PACKAGE+ON+ENERGY.htm](http://www.dcenr.gov.ie/Press+Releases/GOVERNMENT+DECISION+ON+ELECTRICITY+TRANSMISSION+ASSETS+IN+THE+CONTEXT+OF+EU+3RD+PACKAGE+ON+ENERGY.htm)

46 Eirgrid originally estimated the cost of delivering Grid25 at €4 billion but in light of significant technology developments, this has been reduced to €3.2 billion.

47 The capital investment plan notes that it is important that planned investment is delivered in a manner conducive to cost competitiveness and that excess capacity - which can lead to higher costs - is avoided. Source: Infrastructure and Capital Investment 2011-2016, Department of Public Expenditure and Reform, November 2011.

48 <http://www.eirgridgroupconference.com/images/Louis%20Fisher.pdf>

49 Eirgrid estimated the incremental cost of using underground cables to strengthen the transmission grid (circa 650 km of transmission cables and 100 km for the North-South interconnector) would be €6 billion – costs that would be borne by all customers. A study commissioned by DCENR from Ecofys in 2008 also found that from an economic perspective, overhead cabling is the most attractive option and that technically the track record of underground cabling has been limited and is insufficient for deriving significant statistical data and generalising experience.

50 For details of the recently appointed international expert commission, see: [www.dcenr.gov.ie/Press+Releases/Minister+Rabbitte+names+international+expert+Commission+on+the+North+South+Electricity+Interconnecto.htm](http://www.dcenr.gov.ie/Press+Releases/Minister+Rabbitte+names+international+expert+Commission+on+the+North+South+Electricity+Interconnecto.htm)



Delays in completing the North-South interconnector are negatively affecting the efficient functioning of the SEM and as a result are leading to higher costs for Irish electricity consumers. It is estimated that the total costs of the delay are of the order of €20 million to €30 million per annum and are expected to increase each year that the interconnector is not operational<sup>51</sup>. Delays in delivering the interconnector and the grid upgrades will lead to greater curtailment and constraint costs which will be borne by the customer through higher electricity bills. Constraints on the grid can also affect the commercial viability of electricity generation capacity (conventional or renewable) as it increases the risk of them not being required to provide capacity.

An efficient and responsive planning system is essential to ensure that investment in the transmission and distribution system is achieved in a cost effective manner (See Section 3.2 and Appendix 2).

#### *Review Price Supports for Electricity*

DCENR is reviewing the PSO levy on electricity generated from peat<sup>52</sup>. Subsidies for peat generated electricity should be abolished due to the cost implications for electricity customers and the impact on the environment. There are proposals to convert the peat plants to biomass generated capacity. Subject to a positive result on a rigorous cost benefit analysis of the implications for Irish electricity prices and energy security and sustainability of supply, the proposal to convert peat plants to biomass should be progressed.

Onshore wind is regarded as a mature technology (i.e. proven, low risk) and it is projected that it will account for approximately one third of electricity demand by 2020. In terms of the implications of price supports for cost competitiveness, a recent study found that when there are only 2,000 MW of wind on the all island grid, the cost of the Renewable Energy Feed-In Tariff (REFIT) is relatively small - between 0.8 per cent and 2.3 per cent of the wholesale electricity price. However, if there are 6,000 MW of wind on the all island system (the level of wind required to meet the 40 per cent renewables target), the cost of REFIT would be between 3.2 per cent and 9.8 per cent of the wholesale price<sup>53</sup>.

As recommended in the joint agency submission (Forfás, Enterprise Ireland and IDA) to DCENR's consultation on the National Renewable Energy Action Plan (NREAP) in 2010, the

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51 Speech by the Minister for Communications, Energy and Natural Resources at the Energy Ireland conference, June 2011.

52 According to the decision document (CER/11/130) on the 2011/2012 PSO levy, DCENR is reviewing the operation of the peat PSO. For 2011/2012, the PSO levy amounts to €92.1 million, of which €40.4 million is for peat subsidies.

53 The Effect of REFIT on Irish Wholesale Electricity Prices, Conor Devitt and Laura Malaguzzi Valeri, The Economic and Social Review, Autumn 2011. The report also found that the wholesale price decreases with more renewables when fuel prices are high. However, network costs will be higher the more renewables there are on the system.

existing price support scheme, the REFIT, should be revised so that the price support levels for new onshore wind projects are phased out over time. Consideration should also be given to the ESRI proposals that while the subsidies should provide investment certainty with a floor price, the subsidy should be capped to avoid windfall profits and adversely affecting cost competitiveness. In addition, there should be no payments to wind generators under the SEM rules when wind is curtailed off the system.

The cost of supporting the research and development for emerging energy renewables technologies (wave, tidal, offshore wind) should continue to be funded directly through existing funding mechanisms for research and development (as is the case for other emerging sectors), rather than by energy customers through price support mechanisms<sup>54</sup>. The recent OECD Economic Survey of Ireland called for the discontinuation of supports for offshore, wave and tidal energy<sup>55</sup>.

As offshore wind and wave/tidal technologies become commercially viable, the terms and conditions for price supports need to be carefully considered. In particular, the price support schemes should provide for periodic reviews of the level of support and a progressive reduction of support levels as technologies mature. In addition, proposals by the ESRI that price supports should not be paid for exports and that offshore wind farms should be charged the full cost of grid connection merit serious consideration<sup>56</sup>.

Not only is energy efficiency regarded as one of the most effective tools to improve environmental sustainability performance but it is also effective in reducing costs and improving security of supply. Measures to improve energy efficiency are outlined in Section 3.3.

In the longer term, there are two key areas where policy decisions taken today will have significant implications for future price competitiveness:

- the development of a single European electricity market which requires changes to the market rules for the all island electricity market; and
- the choice of fuels in all three energy areas but particularly for electricity and heat.

#### *Single European Electricity Market*

Plans for the development of a single European electricity market are advancing and the target date to achieve the single market is 2014. The integrated electricity market will have

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54 A REFIT of €140 per MWH is proposed for offshore wind (the onshore wind REFIT is currently €66 per MWH for large scale wind farms - it is adjusted annually for any increases in CPI) and the proposed ocean energy REFIT is €220 per MWH.

55 OECD Economic Survey: Ireland, OECD, October 2011.

56 The Effect of REFIT on Irish Wholesale Electricity Prices, Conor Devitt and Laura Malaguzzi Valeri, The Economic and Social Review, Autumn 2011.

significant implications for Ireland. Under the all island electricity market, the Single Electricity Market (SEM), which was established in 2007, all electricity generated must be sold into a gross market pool and all wholesale electricity for consumption must be purchased from that pool. Most other EU member states operate bilateral markets (contracts between electricity generators and suppliers). If we decide to put in place transitional arrangements, we must be fully compliant with the single European electricity market requirements by 2016 - otherwise we must comply with the new rules by 2014. Transitional arrangements must be in place by 2014<sup>57</sup>.

Options to transition the SEM to meet the EU single market requirements are currently being considered by both jurisdictions (north and south) and a decision will be made in early 2012<sup>58</sup>. It is not clear at this stage whether the SEM can be amended or if it needs to be replaced with a new market design.

The establishment of the SEM has been a very positive development and has led to increased efficiencies in generation and much greater transparency (particularly around the formulation of the wholesale electricity price). However, there are a number of issues that if addressed would lead to a better functioning electricity market. In particular, the following issues need to be prioritised in the context of the transitional arrangements to be put in place by 2014:

- **Market liquidity:** The gross electricity pool that is the SEM ensures a highly liquid market for wholesale prices in each half-hour. However due to the volatility of half-hourly prices it is crucial for suppliers to hedge their demand against price movements; the easiest way to do this is through contracts with generators. The dominance of a small number of generators and suppliers mean that it can be difficult for smaller players to obtain appropriate contracts and reduce the market dominance of the bigger companies; and
- **Market regulation:** Although the all island wholesale market is monitored by the energy regulators (north and south), it is often difficult to understand the true costs of generating electricity (particularly the non-fuel costs of each individual plant). This arises if the market schedule in the SEM (on which financial transactions are based) becomes detached from the physical schedule determined by the system operator which is less transparently determined<sup>59</sup>.

While the move towards the single EU market and increased cross border trading is likely to help mitigate some of these issues of market concentration, that will not happen until after 2016. Therefore, it is important that the transitional arrangements to be put in place in the short term prioritise these issues and put in place measures to improve liquidity and reduce market concentration.

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57 Transitional arrangements relate to capacity allocation and congestion management issues.

58 The SEM Committee has commenced the market integration project to meet the EU requirements: [http://www.allislandproject.org/en/TS\\_Decision\\_Documents.aspx?article=c67daa67-ab4a-4ff8-8098-32a8edbfd91e&mode=author](http://www.allislandproject.org/en/TS_Decision_Documents.aspx?article=c67daa67-ab4a-4ff8-8098-32a8edbfd91e&mode=author)

59 Among the reasons why the physical schedule would differ from the market schedule are unexpected constraints in the network affecting electricity flows or if a generating plant becomes unavailable.

In the long term, the move to a single European electricity market offers significant benefits both in terms of security of supply and cost competitiveness. However, the costs of radical changes to the SEM could be substantial relative to the small size of the all island electricity market; the ESRI estimates the costs at €100 million (e.g. software to support the market). Furthermore, additional investment in interconnection with the Great Britain and particularly mainland Europe will be required to underpin the development of the single European electricity market. A recent ESRI study maintains that to participate fully in the single EU market that electricity interconnection capacity will have to at least double. The study concluded that additional interconnector capacity of between 1,000 MW and 3,000 MW (in addition to the 500 MW East-West interconnector) lowers the price of electricity in Ireland as the difference with Great Britain narrows. However, the ESRI cautions that the benefit, measured in terms of lower electricity prices in Ireland, of additional interconnector capacity, is likely to decline as more capacity is built<sup>60</sup>. Without interconnection to mainland Europe, Ireland is likely to become increasingly exposed to increases in UK electricity prices, which could impact negatively on retail electricity prices here. Although prices are currently lower in the UK than in Ireland, there is an expectation that UK prices will rise in the future as it has to replace at least a quarter of its electricity generation in the next decade.

#### *Fuel Choices*

Reducing Ireland's reliance on imported fossil fuels is key to improving cost competitiveness. In 2010, Forfás published the Irish Energy Tetralemma report which analysed the suitability of 20 different fuels for meeting long term energy objectives and provided a summary of the relative attractiveness or appropriateness of each fuel under different scenarios, for different time periods, and with different weights given to the different policy pillars<sup>61</sup>. The main findings of the report are:

- A complex picture emerges from bringing together the range of dimensions explored by the study. There is recognition that fossil fuels will continue to play a part in Ireland's future fuel mix, particularly as back-up generation will be required for a heavy penetration of renewables (specifically wind);
- Overall the relative ranking of fuels was most influenced by three factors - the national policy and regulatory framework, commodity and technology prices, and the stage of technological development;
- The prospect of renewable energy becoming fully competitive in terms of delivered energy costs as technology matures is significantly influenced by policy and regulatory support;
- Fossil fuels continue to outperform renewables and nuclear energy under the competitiveness pillar out to 2030 in terms of their attractiveness in meeting cost competitiveness objectives. However, fossil fuels are not as attractive in terms of security of supply, sustainability and climate change over that period; and

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60 The Internal EU Electricity Market: Implications for Ireland, Paul K. Gorecki, ESRI Research Series Number 23, October 2011.

61 Irish Energy Tetralemma - Framework for Fuel Choices in Ireland, Forfás, August 2010.

- Black coal and in some instances Liquefied Natural Gas (LNG) are the exceptions to the relative unattractiveness of fossil fuels and perform well under security of supply and climate change pillars, although this is on the assumption that clean coal and other technologies will develop commercially by 2030.

While the choice of fuels will be determined by investment decisions by market players, policy tools can be used to incentivise investment in particular fuels or type of generation plant. Among the key challenges for the new energy policy framework will be to decide what mix of fuels will best deliver Ireland's long term energy objectives and ensure incentives (e.g. price supports) and market rules (e.g. changing the capacity payment mechanism to incentivise investment in more flexible plant) are out in place to achieve them<sup>62</sup>. Options for alternative fuel sources for electricity, heat and transport are discussed in Section 3.2.

### 3.2 Ensuring Security of Supply

Ireland currently imports approximately 90 per cent of its energy (electricity, heat and transport) needs and has low levels of interconnection and storage capacity<sup>63</sup>. Reducing Ireland's reliance on imported fossil fuels for its energy needs is critical for long term energy security. Ireland has ambitious plans to increase the use of renewable energy sources and progress to date has been good. Nonetheless, Ireland is expected to remain largely reliant on imported fossil fuels for its total energy needs well beyond 2020. This presents a range of short and long term challenges in terms of adapting our fuel mix to ensure a cost-effective, secure and diverse fuel mix.

#### *Electricity security of supply*

From an enterprise perspective, the availability of adequate electricity capacity to meet demand is critical. Ireland has a very good record in terms of the reliability of its electricity supply compared to other countries where there have been significant power outages from time to time. We must ensure that this continues.

Ireland's reliance on gas as a primary fuel source for electricity generation is likely to continue in the medium to longer term. The fact that wind requires significant conventional back-up generation increases Ireland's reliance on gas further. Ireland only has gas interconnection to Great Britain and while there are two gas pipelines with two separate entry points into Ireland, both pipelines are connected through a single facility in Scotland (Moffat). The proposed new gas supply infrastructure at Corrib and plans for gas storage facilities (including LNG) will help mitigate the issue as they will increase the diversity of Ireland's gas supply. It is important that new supplies are brought on stream quickly to diversify the sources and channels of supply. In the event that new gas supplies/sources do

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62 Eirgrid and SONI, through the recently launched Programme for a Secure, Sustainable Electricity System (DS3), are putting in place the infrastructural and operational requirements to manage high levels of variable renewable generation (mainly wind) on the power system in a safe, secure and reliable manner.

63 Electricity interconnector capacity is equivalent to only six per cent of Irish generating capacity and gas storage capacity is equivalent to three per cent of annual gas consumption.

not come on stream and/or are delayed, the issue could also be mitigated through the installation of a twin pipeline at Moffat, increased gas storage and/or the development of a new interconnector with a different point of origin in Great Britain<sup>64</sup>.

As mentioned previously, Forfás' Tetralemma study looked at the potential for 20 different fuels types to meet Ireland's long term energy needs. Eirgrid has looked at possible electricity generation portfolios for 2035. In terms of electricity, given the limited potential for additional hydro generation and the ban on nuclear power, gas and wind are likely to continue to dominate the all island electricity generation portfolio after 2020. The development of the single European electricity market, and the increase in interconnection with Britain and mainland Europe required to underpin it, will reduce our reliance on gas and wind and help diversify the electricity fuel mix. It will also have benefits for our cost competitiveness and bring us more into line with EU prices in the future.

The potential to use the recently announced EU fund to support energy infrastructure investment, particularly further interconnection, needs to be explored. In October 2011, the European Commission announced plans to fund a €50 billion investment - the Connecting Europe Facility (CEF) - to improve Europe's transport, energy and digital networks. It proposes a €9.1 billion fund between 2014 and 2020 to support investment in trans-European infrastructure to help meet the EU 2020 energy targets. It is proposed that the investment fund would be used to finance cross-border projects (involving at least two member states) that are not deemed commercially viable<sup>65</sup>.

As highlighted above in the context of the gas interconnectors, in the short term, it is important that the Corrib reserves are brought on stream without further delay<sup>66</sup>. Access to LNG opens different market sources and supply pathways for gas<sup>67</sup>. Shannon LNG is proposing to develop an LNG facility in North Kerry<sup>68</sup>. Enhanced storage facilities for LNG have the capacity to partially shield customers from volatile spot-prices and enhance security of

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64 According to the 2011 Joint Gas Capacity Statement, the feasibility of developing salt cavity storage in the Larne area of Northern Ireland and salt cavern storage in the Kish Bank Basin off the east coast is being looked at. It is expected that the gas storage in Larne will commence commercial operations in 2015/16 and the Kish Bank facility in 2018/19. Source: Joint Gas Capacity Statement 2011, CER and the Northern Ireland Utility Regulator, August 2011.

65 For more details, see: [http://ec.europa.eu/energy/infrastructure/strategy/2020\\_en.htm](http://ec.europa.eu/energy/infrastructure/strategy/2020_en.htm)

66 According to the 2011 Joint Gas Capacity Statement, Corrib is expected to meet about half of the annual all island gas needs at its peak but will decline rapidly within six years of coming on stream. Source: Joint Gas Capacity Statement 2011, CER and the Northern Ireland Utility Regulator, August 2011.

67 LNG is natural gas that has been converted temporarily to liquid form for ease of storage or transport by sea and road rather than by pipeline.

68 The maximum capacity of Shannon LNG in the initial phase (which is expected to be operational in 2015/16), will be 11mscm per day. Peak gas demand for the island of Ireland is approximately 30mscm per day.

supply. However, LNG tankards can be quickly re-directed towards where the highest bidder is located which will affect security of supply<sup>69</sup>.

Another important decision on the electricity side is how to replace baseload electricity generation at Moneypoint<sup>70</sup>. The policy decisions taken there will shape Ireland's security of supply for decades to come. The options for replacing this source need to be carefully examined, including analysis of the potential of clean coal technologies and nuclear power<sup>71</sup>. The potential for pumped storage and other storage options to improve the stability of wind in a cost effective fashion should also be considered in the context of the energy policy framework to be developed by DCENR in 2012.

The promotion of micro-generation also has potential to improve electricity - and heat - security of supply. It can also contribute to environmental sustainability objectives. However, enterprises that want to collaborate with a local renewable energy source, such as a wind turbine or CHP facility, are dis-incentivised from doing so by the 'single premises' rule. Other European countries allow firms other than the incumbent network company (the equivalent of Eirgrid/ESB Networks in Ireland) to build and operate new distribution lines subject to agreed regulatory standards (e.g. health and safety standards, integrity of the grid). Creating a mini-grid on a business park would lower costs and improve security of supply as it reduces the amount of electricity a company has to buy from the grid and any excess capacity created by the business park could be sold back to the grid. We need to address the barriers to micro-generation in Ireland. In particular, the 'single premise' regulation should be amended to allow for multi-user renewable energy installations and the third-parties should be allowed build power lines subject to agreed regulatory standards<sup>72</sup>.

As mentioned in the previous section, significant investment in the transmission and distribution networks is planned over the period to 2025<sup>73</sup>. Addressing planning delays and inefficiencies to ensure network investment and new generation/storage capacity are delivered on time to meet future enterprise needs at least cost is critical. The Irish Academy of Engineering report on the cost effective delivery of essential infrastructure, which was partially sponsored by Forfás, outlines a series of policy actions to enable more efficient infrastructure delivery<sup>74</sup>. It is vital that actions to reduce planning delays and improve the efficiency of planning approval system are progressed (see Appendix 2). In particular, we

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69 Since the tsunami in Japan earlier this year, there has been a shortage of LNG in Europe as supplies have been diverted to Japan to replace the electricity generation capacity lost following the closure of nuclear generation plants.

70 ESB's coal-fired Moneypoint generation plant, which accounts for about a fifth of ESB's generation capacity, is due for decommissioning in 2020-2025.

71 There are currently two statutory prohibitions on the production of energy from nuclear technology in Ireland.

72 SEAI is undertaking a pilot to assess the technical, financial and regulatory issues surrounding the deployment of small and micro generation technologies in Ireland.

73 Eirgrid's Grid 25 strategy is available at: <http://www.eirgrid.com/media/Grid%2025.pdf>

74 The full report from the Irish Academy of Engineering can be found at [www.forfas.ie/publications/2011/title,8075,en.phpm](http://www.forfas.ie/publications/2011/title,8075,en.phpm)

need to make the planning approval system more effective so that it can deliver greater certainty of outcome in a consistent, timely and transparent manner, while protecting rights to fair process.

Planning delays are not unique to Ireland. The recently announced proposals to develop an energy infrastructure investment fund also included measures to reduce planning delays across Europe. In particular, it proposed one single national competent authority who would be responsible for coordinating the permit granting process and issuing a comprehensive decision. The Commission estimates that this would cut administrative costs for a given project throughout Europe by on average about 30 per cent on the promoters' side and about 45 per cent on the authorities' side<sup>75</sup>.

#### *Heat security of supply*

The majority of heat generation in the industrial sector is gas and oil fired, exposing Ireland to the volatility of the international markets<sup>76</sup>. In an attempt to address dependence on a limited number of fossil fuels, the Government has put in place schemes to promote the use of renewable fuels in heat generation. This includes a renewable energy grant scheme targeted at businesses, schools and hospitals for the installation of biomass-fuelled and anaerobic digestion CHP units. New feed-in-tariffs ranging from €100 to €150 per MWh were announced in May 2010 (State aid approval for the new tariffs was recently obtained)<sup>77</sup>. However, these policies appear to have had little impact in increasing fuel diversity in heat.

The Forfás Tetralemma study found that solar and geothermal energy technologies are potential options for heat applications in terms of diversity and sustainability but they are not attractive from a cost competitiveness perspective. Other possible sources of heat energy of particular relevance to enterprise include CHP and district heating. The Sustainable Energy Authority of Ireland (SEAI) has identified a range of barriers to the uptake of CHP, ranging from poor economic conditions, insufficient supports in terms of advice and long term financial assistance, and an enterprise base and infrastructure unsuited to the large scale uptake of CHP. While some of these barriers can be addressed, the largest barrier is likely to remain Ireland's lack of large industrial heat loads and a dispersed, low density population with no history of district heating<sup>78</sup>.

The potential of individual renewable heat sources is limited in an Irish context (e.g. CHP, district heating, geothermal). However, if we want to diversify the heat fuel mix and meet

<sup>75</sup><http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/710&format=HTML&aged=0&language=EN&guiLanguage=en>

<sup>76</sup> Based on the Shannon-Weiner Index, which was used to test for the concentration in the fuels used for heat generation within the industrial sector, Ireland is highly dependent on a small number of fuels, mainly gas and oil fired heat generation. The lower the score, the lower the diversity. Ireland scored 1.41 compared to Finland's score of 1.60 and Germany's 1.53 and ranked fifth of the six countries benchmarked. Spain was the lowest with a score of 1.34. Source: Pöyry Energy Consulting research.

<sup>77</sup> <http://www.dcenr.gov.ie/Energy/Sustainable+and+Renewable+Energy+Division/REFIT.htm>

<sup>78</sup> Combined Heat and Power (CHP), Potential in Ireland, SEAI, 2009. In 2007, a national target of 800 MW of installed CHP capacity was set for 2020.



the 2020 renewables target of 12 per cent, we need to promote investment in alternative sources that are cost effective. Given the constraints on Exchequer funds, the potential to use greater incentives to generate heat from alternative fuels and to encourage existing heat generation to switch to alternative fuels such as biomass (where possible) will be limited. In addition, in light of the potential implications for energy cost competitiveness, Forfás cautions against the use of price supports to promote investment in alternative technologies. However, in the case of CHP, removing regulatory barriers at local level (e.g. single premise rule) could enable what potential does exist in sectors such as food to be realised.

In addition, Ireland needs to consider its energy crops policy in the context of the implications for the food sector<sup>79</sup>. Initially, energy crops were grown on poorer land but if indigenous energy crop production is to be cost competitive, the crops will have to be grown in more fertile areas. This could displace land used for food production, which would negatively affect Ireland's potential to realise the significant growth opportunities (exports and jobs) identified in the food sector. However, as long as the energy opportunities and real returns (not subsidies) are better than those in food, this should not be a problem.

The European Union has recently been called upon to review its policies in relation to biofuels. Organisations like the World Bank and the European Environmental Agency contend that the EU's approach to measuring carbon absorption and emissions from biofuels is flawed as it supposedly double counts the carbon absorbed by the biofuels during their growth, and omits to count their exhaust pipe carbon emissions<sup>80</sup>.

Given the potential for solar and geothermal in Ireland is limited because of Ireland's industrial profile and geography, it is therefore important that we maximise the available opportunities for district heating from waste to energy plants. The Department of the Environment needs to work closely with DCENR to determine how waste policy can support the development of district heating and help achieve energy security and sustainability objectives<sup>81</sup>.

In particular, the new waste policy should prioritise recovery processes that will have greatest potential from an energy policy perspective. The Department of the Environment, in conjunction with DCENR, needs to undertake a comprehensive review of opportunities for adopting economically viable waste to energy technologies in the public, industrial and agricultural sectors. Given Ireland's size, we need policies that can combine the potential in each of these sectors to generate the scale of production that would be required to be economic (e.g. anaerobic waste treatment to produce biogas).

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79 The Bio-energy Establishment Scheme, which is designed to incentivise the development of indigenous energy crops, provides capital grants for the development of energy crops.

80 [www.euractiv.com/climate-environment/top-scientists-condemn-eu-land-use-values-biofuels-news-508190?utm\\_source=EurActiv+Newsletter&utm\\_campaign=0172f1e933-my\\_google\\_analytics\\_key&utm\\_medium=email](http://www.euractiv.com/climate-environment/top-scientists-condemn-eu-land-use-values-biofuels-news-508190?utm_source=EurActiv+Newsletter&utm_campaign=0172f1e933-my_google_analytics_key&utm_medium=email)

81 The agencies also raised this issue in their recent submission to the Department of the Environment's consultation on a new waste policy.

*Transport security of supply*

Options for alternative fuels to oil for transport are limited. As there is more potential to diversify the electricity fuel mix than the transport fuel options, we will need to electrify transport infrastructure. However, it will be challenging. It is also likely to be a longer term goal. It is unlikely that the ambitious targets for the rollout of electric cars will be met in the medium term without high cost policy intervention. Given the significant reductions in the capital budget, electrifying the rail network may not be feasible in the medium term but should be a longer term priority. Reducing Ireland's reliance on oil and the private car in the short to medium term therefore will require behavioural change. Measures to do this are discussed in the next section.

A lack of investment in new storage capacity coupled with increasing demand for oil resulted in existing storage capacity becoming increasingly under pressure. To address the scarcity of commercial storage, NORA is continuing its work on the development of long term storage plans. As mentioned in Section 2.2, two new storage facilities were brought online in 2011 and NORA is progressing a new storage project, which is to be completed in Q2 2013. A 2008 report prepared for DCENR highlighted that the oil refinery in Whitegate is likely to close after 2016 as the commercial outlook is poor given the refinery's dependence on increasingly distant crude supplies and a simple refinery configuration of modest size<sup>82</sup>. If the Whitegate refinery does close, Ireland would be the largest IEA member market without an operating refinery and totally reliant on product imports. However, an increase in oil storage capacity and continued access to international traded oil markets should mitigate the consequences of closing Whitegate. It is critical that the new energy policy framework prioritises the actions required to increase oil storage to ensure security of supply.

*Encourage climate change adaptation measures*

Rising temperatures, increased risks of floods, wetter winters, drier summers and more intense storms are some of the climate changes anticipated to impact on Ireland in coming years. Critical pieces of infrastructure such as those that generate and distribute energy will be affected by climate change. Early consideration of the need to adapt to climate change within the policy system can ensure that risks are minimised at least cost or that measures are cost-effective over the lifetime of the decision/policy. In 2010, Forfás published a report which identified the actions required to climate change proof Ireland's critical energy infrastructure<sup>83</sup>. The main actions that need to be progressed are to:

- Undertake a climate change risk assessment of all critical energy infrastructure;
- Require all energy providers to develop robust contingency plans; and
- Monitor climate change trends and impacts on energy infrastructure (future wind, wave potential).

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82 Review of the Security of Ireland's Access to Commercial Oil Supplies, Purvin Gertz, Byrne Ó'Cléirigh, 2008.

83 Adaptation to Climate Change: Issues for Business, Forfás, August 2010.

### 3.3 Improving Environmental Sustainability

Ireland is committed to meeting a number of EU targets to improve environmental sustainability. Sixteen per cent of our total energy needs must be met from renewable sources by 2020. We must also improve energy efficiency by 20 per cent and reduce carbon emissions by 20 per cent by 2020.

#### *Improve energy efficiency*

Not only is energy efficiency regarded as one of the most effective tools to improve the environmental sustainability performance but it is also effective in reducing costs and improving security of supply. Significant progress in improving energy efficiency has been made by business, particularly large users under the Large Industry Energy Users Network and the SEAI programmes for SMEs<sup>84</sup>. These initiatives have resulted in significant savings for business.

As highlighted in previous Forfás benchmarking studies, continued and enhanced efforts are required by Government departments, enterprise agencies and business representative associations to ensure that businesses are fully aware of how best to reduce their energy use. Given that many organisations are already working with companies on a range of waste reduction, pollution prevention or resource conservation initiatives, continued efforts should be made to develop a more integrated approach across a range of related issues<sup>85</sup>. Resource efficiency programmes should continue to be targeted at both the internationally trading sectors to improve their ability to compete in global markets and at locally trading businesses to reduce costs and help to stimulate the domestic economy.

Continued efforts are also required to improve energy efficiency of the residential sector. Reducing domestic electricity demand will have benefits for enterprise as it will result in a reduction in peak demand which means lower prices for all. The introduction of smart metres with real time pricing has the potential to smooth peak demand and deliver energy savings for all users, as does the Better Energy: Homes programme, operated by SEAI which is designed to encourage people to improve the energy performance of their homes by incentivising the cost of installing various upgrade measures<sup>86</sup>. The Exchequer will no longer fund energy efficiency programmes after 2013<sup>87</sup>.

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84 Irish companies participating in SEAI's Energy Agreements Programme have been implementing the international standard, IS 393, since 2006 and have achieved substantial improvements in energy efficiency, as well as savings. The Irish standard was used as a blueprint for the European standard which is now being rolled out across member states.

85 The State agencies recently published a brochure providing information on where businesses can go for assistance in relation to water conservation, waste prevention, energy efficiency and clean technology: <http://www.forfas.ie/publication/search.jsp?ft=/publications/2011/title,8202,en.php>

86 For more details, see: [http://www.seai.ie/Grants/Better\\_energy\\_homes/About\\_the\\_Scheme/](http://www.seai.ie/Grants/Better_energy_homes/About_the_Scheme/)

87 Infrastructure and Capital Investment 2011-2016, Department of Public Expenditure and Reform, November 2011.

In May 2011, the all island energy regulators published its decision document on the Demand Side Vision for 2020<sup>88</sup>. The interests of electricity customers are best served where producers and providers are effective in minimising energy use during peak demand periods by promoting energy efficiency and shifting electricity demand toward off-peak periods. We need to prioritise implementation of the demand side management programmes (e.g. smart metres, day ahead pricing, heat storage) set out in the Demand Side Vision for 2020 to alleviate pressure on generation and transmission infrastructure at periods of peak demand, while making additional savings in both energy and maintenance costs.

Smart electricity metering enables electricity prices to be altered in order to align demand with system capacity and reduce supply costs. The results of the CER's pilot estimate that the rollout of smart electricity metering is likely to result in a net gain to the economy over the next 15 years of €174 million through reduced energy usage and environmental benefits<sup>89</sup>. The gas meter pilot undertaken by the CER indicates that a national rollout of gas smart meters, taking account of the costs and benefits and leveraging electricity smart meter communications infrastructure, would yield a net benefit to customers and the country of up to €59 million over the next 20 years<sup>90</sup>.

Through the implementation of demand side management measures, the system operator can manage time of day demand and incentivise the development of desired energy consumption. Unlike the regulatory approach, demand side management encompasses programmes that are not legally binding on all consumers. For example, electricity providers might target large industrial users of electricity with an incentive programme to reduce their energy consumption during peak times. The goal of such a programme would be to shift consumption towards low demand periods, thus allowing the generation and transmission assets to function in more efficient ranges.

#### *Increase renewable energy capacity*

Ireland is making good progress in meeting its electricity renewables target, however a continued focus will be required to meet the 40 per cent target by 2020. Increased efforts will be required to meet the heat and transport renewable targets. One of the biggest challenges to delivering new renewable energy are the delays in the planning process (see Section 3.2).

A further area requiring attention to deliver on the renewables target for electricity is the process by which grid connections are awarded. Currently grid connections are awarded on a first come, first served basis. While this ensures a transparent process, it does not ensure that optimal sites in terms of wind capacity and existing access to the electricity network are prioritised. It also means that the planning process and grid investment plan are not fully

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88 <http://www.cer.ie/en/electricity-retail-market-current-consultations.aspx?article=b3f0ca23-0a7d-4417-9816-71b12ed567c3>

89 Smart Metering Cost-Benefit Analysis and Trials Findings Reports, CER, 2011.

90 Smart Metering Information Paper 5 - Results of Gas Cost-Benefit Analysis, Gas Customer Behaviour Trial and Dual Fuel Technology Trial, CER, October 2011.

aligned. The process by which grid connections are awarded needs to be reviewed to ensure that optimal electricity generation sites are prioritised.

While the REFIT scheme has supported the deployment of onshore wind, it has not been successful in delivering significant levels of other technologies (e.g. biomass)<sup>91</sup>. In order to develop a diverse renewable portfolio at least cost while ensuring renewable targets are met, Ireland needs to consider other measures, such as a ways to reduce investment risks. This includes ensuring viable businesses have access to finance and reducing uncertainty around planning approvals and access to the grid.

#### *Develop a more sustainable transport system*

Global energy demand is set to continue to grow strongly over the next two decades. Peak oil will pose a particular challenge for Ireland given our high dependence on oil<sup>92</sup>. Ireland's current spatial patterns militate against the development of an efficient and effective public transport system and increase our dependence on road transport and the private car. Ireland has one of the most dispersed populations in Europe with 40 per cent of the population living in rural areas. This is further compounded by the low density of urban centres relative to other European countries. The implementation of the Department of Transport's smarter travel policy is critical to changing behaviour and reducing use of the private car<sup>93</sup>. In particular, the following actions need to be progressed:

- Improving public transport in the key urban centres is critical to move people away from their cars. A selective investment in the options (as between bus and rail) with the highest economic and social returns, based on a full cost benefit analysis, to improve public transport in the key urban centres, particularly Dublin, Cork, Galway and Limerick, is required. Promoting use of public transport and other modes of transport, such as walking and cycling, is key to reducing the reliance on the private car;
- Serious consideration needs to be given to the introduction of congestion charges in key urban centres to facilitate better use of road infrastructure and increased mobility. Charges should vary according to time of day or location, an approach that has been used successfully in London, Oslo and Stockholm<sup>94</sup>. In addition, the revenues collected from the congestion charges could be a useful source of revenue for enhancing public transport in our main urban centres; and

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91 As highlighted in Section 3.2, the new REFITs for biomass recently obtained State aid approval. These significantly higher tariffs for biomass are expected to stimulate new biomass generated renewable electricity.

92 A Baseline Assessment of Ireland's Oil Dependence, Forfás, 2006.

93 The smarter travel policy statement sets out the actions to deliver a sustainable travel and transport system by 2020. Source: SmarterTravel, A Sustainable Transport Future, Department of Transport, 2009.

94 The main purpose of charging variable fees is to ensure that road users attach a value to using the road network and consider congestion costs when making decisions. Source: Meeting infrastructure Needs in Australia, OECD, 2010.

- Ireland also needs to give consideration to developing an integrated approach to prepare for the challenges of peak oil, encompassing energy, transport, enterprise, spatial, environmental and research policy<sup>95</sup>. In particular, Ireland needs to deliver a more sustainable model of spatial development that will reduce our dependence on oil; we need to accelerate the implementation of the National Spatial Strategy.

### 3.4 Realising Enterprise Opportunities

Significant export and employment opportunities presented by Ireland's favourable wind and wave energy resources are highlighted in the report of the High Level Group on Green Enterprise. It is critical that the appropriate supports are put in place to promote and develop those enterprise opportunities - perhaps, more importantly; we need to remove barriers that are impeding their development.

Energy is an important input to the entire enterprise base. We need to find a way to support the development of the renewable energy sector without adversely affecting the competitiveness of the wider enterprise base and Ireland's attractiveness as a location to do business. Actions to support the development of the renewable energy sector and meet our targets should focus on reforming the regulatory and planning framework.

The High Level Group on Green Enterprise identified the policy actions required to realise the clean-technology opportunities for enterprise in Ireland. While some progress has been made to implement the recommendations made by the group in 2009, a number of issues remain outstanding. Some of these actions have been mentioned earlier in this chapter such as measures to reduce planning delays (see Appendix 2), improve access to the electricity grid and enhance resource efficiency. Additional actions identified by the group include:

- Progressing green R&D recommendations on pooling of research expertise, developing research alliances and developing an R&D strategy for the overall green and cleantech sector<sup>96</sup>;
- Accelerating foreshore licensing for offshore energy projects;
- Developing and marketing Ireland's potential as a Green IFSC; and
- Developing and implementing a green public procurement action plan immediately which will meet the EU target of 50 per cent green procurement by 2011.

The significant challenges facing the UK to ensure sufficient electricity generation capacity in the future and to meet its 2020 renewable targets may offer export opportunities for

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<sup>95</sup> Sharing our Future: Ireland 2025, Forfás, July 2009.

<sup>96</sup> The Government appointed Research Prioritisation Steering Group, chaired by Jim O'Hara, has prepared a report recommending priority areas of focus for publicly funded R&D together with action plans for each of the areas recommended.

Ireland<sup>97</sup>. Cooperation mechanisms under the Renewable Energy Directive allow Member States to trade the renewable energy value on the basis of bilateral agreements. Paying the additional premium for the development of offshore wind would only be attractive for the UK if it was able to count the renewable value towards its own 2020 target.

There are proposals from the private sector to develop offshore wind capacity off the Irish coast for export to Great Britain. There are concerns that these proposals may lead to higher energy costs in Ireland<sup>98</sup>. However, provided that this generation capacity is exported directly to Britain without passing through the Irish electricity grid, and that there is no subsidy paid by Irish taxpayers or consumers (either directly or indirectly, including through the tax system), then it should not adversely affect the Irish consumers or Ireland's cost competitiveness. In fact, if handled correctly from a regulatory and licensing perspective, delivering these potential electricity export opportunities could generate revenue and job opportunities for Ireland.

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97 The UK government estimates that a quarter of total electricity generation capacity will have to be replaced in the next decade.

98 The proposed REFIT price for offshore wind is €140 per MWh compared to €66 per MWh for onshore wind.

## 4. Conclusions

Energy competitiveness remains an important issue for enterprise development. Ireland's ability to maintain and grow our existing export base and to continue attracting high levels of foreign direct investment is dependent on our capacity to deliver a more secure and sustainable energy supply while ensuring a sustained improvement in cost competitiveness.

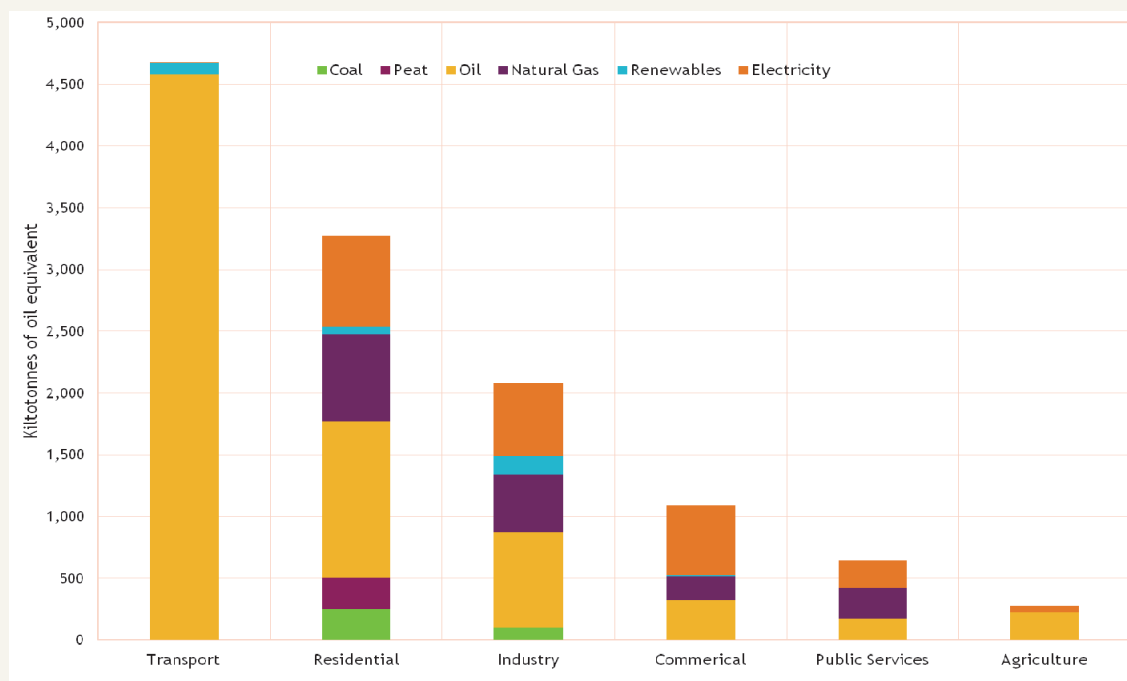
While there have been a number of important improvements in Ireland's energy competitiveness performance in recent years (e.g. establishment of the SEM, significant spare electricity generation capacity, progress on renewables capacity, increases in energy efficiency), further action is required. As highlighted by the benchmarking analysis, Ireland faces significant energy challenges; we remain relatively uncompetitive compared to competitor countries mainly due to our reliance on fossil fuels, geographical location and dispersed population patterns.

Policy coherence is critical to ensure we make the right energy policy choices today to support long term economic growth and international competitiveness. In particular, we need to align energy policy objectives and priorities with policies and priorities across energy related areas such as climate change, transport and spatial planning. The planned development of the new energy policy framework next year provides a timely opportunity to review and agree energy and energy related policy priorities. Given the interdependence between energy policy objectives (competitiveness, security and sustainability), the sequencing of the implementation of energy and energy related policy priorities and actions will be critical. A strong commitment from Government to ensure the effective and timely implementation of the new energy policy framework is required to ensure that Ireland's energy policy supports enterprise development and job creation.



# Appendix 1: Energy Performance Indicators

Figure A.1: Final Energy Consumption in Ireland, 2010 by sector (ktoe)



Source: SEAI, Provisional Energy Balance, 2010

This report focuses on the enterprise sector which consists of industry and commercial services and had a combined consumption of about 3,200 kilo tonnes of oil equivalent (ktoe) in 2010 - about 27 per cent of total Irish energy consumption (Figure A.1). This mainly consisted of electricity, oil and gas and there was a 65:35 split between the industrial sector and commercial sector.

The transport sector is also important for the enterprise sector as it includes the energy requirements for road, rail and aviation freight, and also employee commuting. In total the transport sector consumes 4,655ktoe (39 per cent of total Irish consumption) and almost exclusively uses oil and oil products.

Figure A.2: Industrial Gas Prices (excl VAT), €, H1 2008 to H1 2011<sup>99</sup>

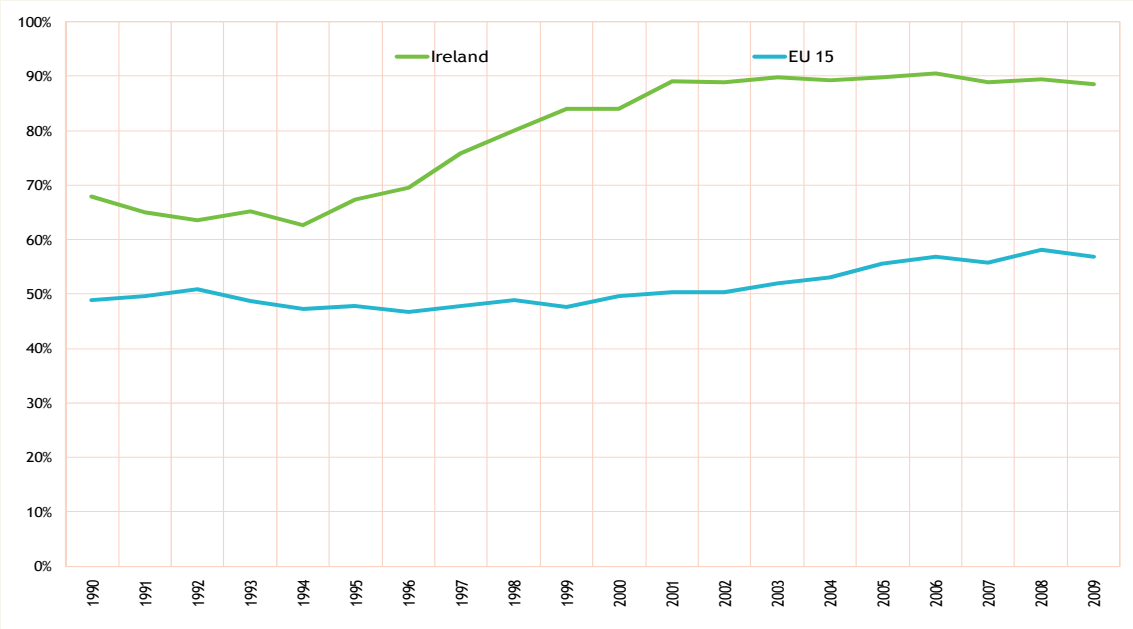


Source: Eurostat, Environment and Energy

Industrial gas prices declined by almost 20 per cent between the second half of 2008 and the second half of 2010. However, between the second half of 2010 and the first half of 2011, that decrease was reversed and gas prices increased by just over 20 per cent.

<sup>99</sup> Industrial gas prices are based on an annual consumption of 10,000-100,000 gigajoules (GJ). Prices are half-yearly and the most data available is for the first half of 2011.

Figure A.3: Energy Import Dependence of Ireland and EU-15, 1990-2009<sup>100</sup>



Source: Eurostat, Environment and Energy

Figure A.3 shows the high level of import dependency that Ireland has on both crude oil and oil products. A number of countries have a high crude oil dependency when they have no indigenous reserves of their own; however Ireland also imports oil products for over 60 per cent of its requirements. It is the only country with an oil product import dependency of over 25 per cent.

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<sup>100</sup> Import Dependency is calculated as follows: (Imports - Exports - Non Energy Consumption) / (Primary Energy Supply - Non Energy Consumption + Marine Bunkers)

## Appendix 2: Irish Academy of Engineering Planning Recommendations











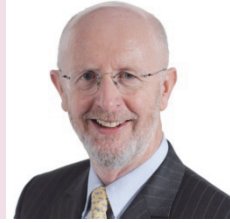

The main recommendations identified by the Irish Academy of Engineering report to reduce planning delays and improve the efficiency of planning approval system are:

- For major infrastructure projects such as those proposed under Grid 25, consent should only be required from one authority to allow construction to proceed. That authority should be responsible for managing the necessary inputs from other State bodies;
- The authority responsible for approval to construct should also be responsible for environmental impact assessments (EIAs), with all relevant parties providing their inputs to the competent authority as part of the assessment;
- The environmental impact statement process should be amended to accommodate more generic designs with appropriate conditions included to ensure that the final design and construction meets the environmental conditions attached to the approval;
- Review the approach adopted for the display of newspaper and site notices when permission is being sought for major infrastructure projects<sup>101</sup>;
- To improve the effectiveness of the planning system, an appropriate balance between the right of individual citizens and the common good is essential. Clear national guidelines or a code of practice should be established to ensure full participation of all stakeholders and consistency in the implementation of the consultation process;
- All approvals should be subject to timescales for decisions and inputs by parties and these should be adhered to; and
- Where the same controversial safety or environmental issue is raised on project after project (e.g. effects of high voltage power lines on human health), once An Bord Pleanála has made a decision, the definitive position should be stated by the Board and the matter should only be re-opened where it is clear that fresh evidence is being put forward.

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<sup>101</sup> Recently the planning application for the north-south interconnector had to be withdrawn, following an error in specifications included in the newspaper notice. This should not have been necessary. The intention of a site notice or newspaper advertisement should be to alert the public about the application, to outline the general nature of the project and to indicate how and where an interested party may obtain further information.

## Appendix 3 - Forfás Board Members

			
<b>Eoin O'Driscoll</b> Chairman, Forfás Chairman, Southwestern	<b>Martin Shanahan</b> Chief Executive, Forfás	<b>Simon Barry</b> Chief Economist ROI, Ulster Bank Capital Markets	<b>Bob Brannock</b> President, European Operations, Genworth Financial
			
<b>Timothy Dullea</b> Former Chief Executive Officer, Tipperary Co-op	<b>Miriam Magner Flynn</b> Managing Director, Career Decisions	<b>William O'Brien</b> Chief Executive, William O'Brien Plant Hire Ltd	<b>Barry O'Leary</b> Chief Executive Officer, IDA Ireland
			
<b>Paul O'Toole</b> Director General, FÁS	<b>Frank Ryan</b> Chief Executive Officer, Enterprise Ireland	<b>Dr Don Thornhill</b> Business Adviser and Company Director	
			
<b>Michael O'Leary</b> Secretary to the Board			

## Appendix 4: Recent Forfás Publications


<b>Statistics at a Glance 2011</b> Forfás	December 2011
<b>The Voice of Small Business: Report of the Advisory Group for Small Business</b> Advisory Group for Small Business	November 2011
<b>Review of the Economic Impact of the Retail Cap</b> Forfás	November 2011
<b>Business Continuity Planning In Severe Weather</b> Forfás	November 2011
<b>Intelligent Infrastructure: Delivering the Competitiveness Benefits and Employment Opportunities</b> Forfás	November 2011
<b>The Games Sector in Ireland: An Action Plan for Growth</b> Forfás	October 2011
<b>Ireland's Competitiveness Scorecard</b> National Competitiveness Council	September 2011
<b>Research and Development Funding and Performance in the State Sector 2009 - 2010</b> Forfás	August 2011
<b>Monitoring Ireland's Skills Supply 2011 - Trends in Education and Training Outputs</b> Expert Group on Future Skills Needs	August 2011
<b>Developing a Green Enterprise</b> Forfás	July 2011
<b>National Skills Bulletin 2011</b> Expert Group on Future Skills Needs	July 2011
<b>Forfás Annual Report 2010</b> Forfás	June 2011
<b>Costs of Doing Business in Ireland 2011</b> National Competitiveness Council	June 2011
<b>Annual Employment Survey 2010</b> Forfás	May 2011
<b>Response from Ireland to the European Commission Green Paper: Framework for Research and Innovation Funding</b> Advisory Science Council, Forfás, DJEI	May 2011

<b>The Expert Group on Future Skills Needs Statement of Activity 2010</b> EGFSN	May 2011
<b>Business Expenditure on R&amp;D 2009/2010</b> Forfás, CSO	April 2011
<b>Developing Recognition of Prior Learning</b> EGFSN	April 2011
<b>Vacancy Overview 2010</b> EGFSN	March 2011
<b>Statement on Competitiveness Priorities</b> NCC	March 2011
<b>Analysis of Ireland's Innovation Performance</b> Forfás	March 2011
<b>Progress Report on the implementation of the recommendations of the report of the High Level Group on Green Enterprise</b> Forfás, DETI	March 2011
<b>Staying the Course</b> Advisory Council for Science, Technology and Innovation	January 2011
<b>Research strengths in Ireland: a bibliometric study of the public research base - Extension Report: Public Research Organisations</b> Forfás, HEA	December 2010
<b>The Higher Education R&amp;D Survey 2008</b> Forfás	December 2010
<b>Profile of Public Research Activity in Ireland, 1998-2006</b> Forfás, HEA	December 2010
<b>Research and Development Activity of Irish Based Enterprise</b> Forfás, HEA	December 2010
<b>Research and Development Activity of Irish Based Enterprise - Vol 2: Data</b> Forfás, HEA	December 2010
<b>Ireland's Priorities in FP8</b> Forfás	December 2010









The publications of Forfás and the advisory groups to which it provides administrative and secretariat support are available at [www.forfas.ie](http://www.forfas.ie)

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