

## SUMMARY OF RESPONSES TO “BEYOND CCGTS, THE NEXT CARBON REDUCTION STRATEGY”

Responses have been received from 9 sources, namely:

Northern Ireland Housing Executive (NIHE)

Energy Savings Trust (EST)

The Carbon Trust

AES Kilroot

General Consumer Council (GCC)

Phoenix Natural Gas (PNG)

Energia

I Cross

Northern Ireland Electricity (NIE)

### GENERAL

<b>Northern Ireland Housing Executive</b>	<p><b>Natural Gas</b> - will continue to install where available but subject to review if gas prices increase significantly vs. other fuels. To date 40,000 gas heating systems installed and support given to many installations in the private sector through grants and cash backs.</p> <p><b>Heat Pumps</b> - offer a potential solution to rural dwellings off the gas network. Use slightly more electricity, but displace the need for other forms of heating. If combined with PV funds or micro-wind systems they can be considered renewable – NIHE has done this in one of its rural cottages. If however these systems are to be widely rolled out, capital costs need to reduce.</p> <p><b>Renewables in Rural Areas</b> - Many of the technologies referred to have been installed in NIHE rural cottages in partnership with NIE and others (solar water heating, PV, small scale wind turbines and ground source heat pumps). Except for the heat pump, none of these technologies displace conventional heating but complement or, to an extent, reduce the reliance on conventional heating systems. The electricity generating technologies only supply part of the dwellings total electricity requirements and are unlikely to be more widely applied unless adequate financial support is in place to help meet capital costs of installation.</p> <p><b>dCHP</b> - pleased with progress to date on the dCHP field trial with 7 NIHE installations complete and 3 more to be installed. However, if this technology is to be more widely applied, the capital costs would need to either reduce or be subsidised in some way when it comes to selling it to the wider market.</p>
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	<p><b>Street Lighting</b> - Are there any strategies to install low energy light systems in the street lighting networks throughout NI which must consume a considerable amount of energy, especially in winter?</p> <p><b>Micro Renewables</b> - Reference is made to NIE paying 4.5 p/kWh for electricity spilled onto the grid. Is this available to householders? A number of NIHE houses have PV panels but tenants are not receiving this payment, NIHE understood there were no import/export meters that could measure spillage. Whilst tenants are encouraged to use what they generate, there is some spillage onto the grid. NIHE request contact about this; would not consider installing any more electricity generating technologies until this issue is resolved.</p> <p><b>Wood Pellet Boilers</b> - One of the main barriers to this is the lack of space to accommodate the sizeable wood pellet boiler (for central heating) and for storage of the pellets themselves. Also scepticism among NIHE tenants.</p> <p><b>Wider use of solar water heating in rural areas</b> - Not all dwellings suitable with south facing roofs and they do not displace the need for an oil or coal fired system (they may reduce the amount of time it is used).</p> <p><b>Questions</b> - What currently happens to waste from local power stations? Could this be recycled to provide heat and hot water to neighbouring buildings? If so, this would reduce considerably CO<sub>2</sub> emissions in these areas.</p> <p><b>Other</b> - only became aware of this consultation through a third party. Although on the website, consultees may miss out unless they log on regularly.</p>
<b>EST</b>	<p>Support the UK Govt's target to reduce CO<sub>2</sub> emissions by 20% by 2010, and by 60% by 2050, and the NI contribution to the national drive. Targets will not be achieved without the introduction of additional and innovative policy measures. Targets are achievable if the right policy framework is developed and implemented. Believe that further policies and strengthening of existing policies is required to reduce emissions, particularly in household and transport sectors. Greater potential for emission reductions in the NI household sector as average household CO<sub>2</sub> emissions are higher than the UK average. Downstream action in household sector must be the main priority for NI moving forward, particularly given the beneficial impact on fuel poverty that will also result. The 3 key mechanisms required to address household CO<sub>2</sub> emissions in NI are:</p> <ol style="list-style-type: none"> <li>1. Extension of the EE Levy combined with setting more challenging targets and a move to a more independent and market based approach.</li> <li>2. Increasing consumer and public sector engagement by raising awareness and the provision of best practice information on EE and low carbon solutions and products including micro-chip and small-scale renewables. NI Projects Fund is a key vehicle in demonstrating the value of sustainable and EE projects.</li> <li>3. Extension of EE Advice Centres, which in GB focus on EE advice to a permanent Sustainable Energy Centre (SEC) by building upon the existing infrastructure to provide info and advice to encourage EE and the use of renewable energy in homes and transport. This is being currently provided in NI following the successful bid to run a pilot SEC with effect from</li> </ol>

	1 Apr 05.
<b>The Carbon Trust</b>	<p>The CCGTs were instrumental in reducing the carbon intensity of the NI grid from ~0.77 kg of CO<sub>2</sub>/kWh in 2000, to ~0.5 kg CO<sub>2</sub>/kWh in 2005; a reduction of over 36%.</p> <p>The Carbon Trust was established to deliver carbon savings in industrial, commercial and public sectors and to develop low carbon industry sectors in the UK; also seeks to help govt identify and develop policies to significantly accelerate the rate of deployment of existing EE technologies, and develop low carbon industry sectors.</p> <p>In 2003 the Carbon Trust, with Invest NI, sponsored a project to develop an action plan for NI that would realise the deep reductions in CO<sub>2</sub> emissions needed to achieve the Royal Commission on Environmental Pollution's (RCEP) recommendation of a 60% reduction in CO<sub>2</sub> emissions by 2050. This 'NI Vision Study' started early in 2003.</p> <p>The aims and objectives of the project were to:</p> <ul style="list-style-type: none"> <li>• Explore how the RCEP's recommendation of a 60% reduction in carbon emissions can be met and to assess the potential contributions of different low carbon measures</li> <li>• Define what a 'low carbon' NI economy might look like in 2050 and to establish a vision to help stimulate future policy and programme development</li> <li>• Identify issues that need to be addressed to turn this vision into reality and specific actions that could stimulate reductions in CO<sub>2</sub> emissions.</li> </ul> <p>The study adapted the four scenarios developed by the UK Foresight Programme to NI. An initial conclusion from this scenario work was that, if the NI economy continued to grow in real-terms at the current average rate of &gt;2% p.a., CO<sub>2</sub> in 2050 could easily exceed the 2000 level, unless major initiatives are undertaken to decouple economic activity and lifestyles from the consumption of high carbon fuels. The scenario modelling indicates that by 2050 electricity consumption in NI could be as high as 22,300 GWh (with a required system capacity of 4,300 MW) or as low as 6,450 GWh (with a required system capacity of 1,245 MW) depending on the intervening economic, political and social developments.</p> <p>The Vision Study steering committee concluded that it would be possible to realise a 60% reduction in NI's carbon emissions by 2050, and that it would be sensible to take early action to ensure all sectors of the economy adopt a sustainable approach to energy use and to encourage the development of low carbon lifestyles.</p> <p>Recognising the importance of the electricity supply sector in delivering a low carbon economy in NI, the Vision Study dedicated significant resource towards modelling possible outcomes to 2050 and the outcome of this work is reflected in Annex E to the main Vision Study report. This Annex forms the main basis of our response to NIAER's consultation paper and is attached in a separate document. In addition, we offer below the following commentary addressing several key issues raised in the consultation paper.</p>

**Policy drivers and support mechanisms** - Achieving deep emission reductions will require a sustained change in the direction of corporate investment and behaviour; requires a combination of policy drivers and support mechanisms to both induce a change in attitudes and to support new investments. Successful approaches need to pull three distinct ‘levers’ that determine corporate behaviour and can address the core issue of transferring risk from low carbon to high carbon investments:

- *Regulatory levers* that address specific market failures and barriers whilst minimising the complexity and cost of compliance;
- *Reputational and awareness levers* that make business aware of the risks and highlight the opportunities posed by climate change and give them confidence that low carbon investments will be good business for the future; and
- *Cost levers* that affect the direct cost/benefit of business investment, again with an eye to the durability of the mechanisms to support business confidence in low carbon investments.

Whilst many practicalities may differ between sectors and technologies, and between the goals of delivering near-term efficiency improvements and of stimulating low-carbon innovation, these core principles are common to all.

**Business energy efficiency economics and policy**

Whilst the domestic sector is assessed as having the greatest potential for EE improvement compared with all other demand sectors, our work in NI indicates substantial scope for improving the energy performance in the business and public sectors.

Table 1 shows the potential energy, CO<sub>2</sub> and cost savings identified in Carbon Trust energy surveys conducted in NI during 2003-2005.

Year	Identified annual savings			Total investment cost (£m)	Simple payback (years)
	£m	GWh	tCO <sub>2</sub>		
2003-04	12.55	273	122,136	28.51	2.27
2004-05	20.41	483	231,167	43.06	2.11
<b>Total</b>	<b>32.96</b>	<b>756</b>	<b>353,303</b>	<b>71.57</b>	<b>2.17</b>

**Table 1 Summary of CTNI energy surveys 2003-05**

Assuming an average persistence rate of 10 years across all identified opportunities, the ~500 energy surveys conducted in NI businesses and public sector organisations during 2003-05 offer potential lifetime energy and CO<sub>2</sub> savings of over £329m and 3.5

mtCO<sub>2</sub>.

In certain sectors and in certain technology areas Carbon Trust surveys are identifying cost effective energy saving of around 30%. During 2003-05 we conducted around 70 specialist energy surveys looking solely at compressed air systems in local businesses. Between them, the businesses surveyed were spending ~£7.6m pa on electricity to generate, treat and distribute compressed air. Savings of £2.3m pa (31%) and 26,400 tCO<sub>2</sub> were identified for a total one-off investment cost of £3m; an overall simple payback period of 16 months. Within 12 months of receipt of the survey reports, the businesses had implemented recommendations saving a total of £1.5m pa (17,000 tCO<sub>2</sub>) with many planning for further investment to realise additional savings. Findings from similar initiatives focussing on a variety of engineering systems e.g. lighting, HVAC (heating, ventilation and air-conditioning), refrigeration and boiler house management all indicate cost effective energy saving potential in the region of 20-30%.

Survey findings also indicate that around 1/3 of savings identified offer payback periods in under 12 months which clearly provides compelling economic justification for embracing EE. Experience with large energy users (>£1m pa energy spend) suggests that just over 40% of energy savings identified are implemented within a 2 year period and this acknowledges the often considerable time-lag associated with some energy projects as business cases need to be prepared, capital expenditure secured and projects designed and tendered etc.

Carbon Trust can provide numerous case studies of companies that have benefited from strengthened action on EE. Analysis indicates that such progress has so far tapped only a modest fraction of the available EE potential.

Debate on the economics of EE should now move from the analysis of engineering costs, economic theory, and market barriers, to the practical experience of measures, surveys and case studies.

Carbon Trust has conducted extensive interviews with business and public sector customers to understand what measures would be needed to accelerate the take-up of EE. The rate of uptake of EE potential depends upon a wide variety of factors, but the general finding is that policy measures have to provide the driver for change, whilst support is provided to help companies implement responses to these drivers. Overall suggestions from this work are summarised below:

Key measures suggested for business and the public sector

***Regulation / targets / fiscal measures include:***

- Effective implementation of the EU Emissions Trading Scheme;
- Extend sectors and targets for Climate Change Agreements;
- Set buildings standards at upper cost-effective end of range and enforce them rigorously; and
- Effective billing (suppliers to provide timely and accurate metering data).

***Support measures include:***

- Effective building labels and public display on all buildings;
- Improved product standards;
- Direct support from the Carbon Trust for delivery of targets (against EU ETS, building regulations etc); and
- Public Sector leadership for buildings

In the UK-wide context, the existing measures in the Climate Change Programme (CCP) aim to deliver about half of the techno-economic potential to 2010 of ~29 mtCO<sub>2</sub>. The main component policies are the Climate Change Agreements (CCA), Climate Change Levy (CCL), the UK and EU Emissions Trading Schemes, Building Regulations and the Public Sector Targets. The majority of the measures target reductions from the energy intensive sectors through the CCA-CCL mechanism and emissions trading. There is very little in the existing CCP to target further emissions reduction from the public and commercial sectors, despite the significant potential to reduce emissions from heating and lighting in these sectors.

Carbon Trust analysis found that the CCL/CCA package is an important driver across heavy industry; this mechanism has appeared to be successful at raising the importance of EE within organisations and in achieving real reductions in carbon emissions within the participating industries. The companies involved in CCAs have collectively gone ‘beyond compliance’ – there has been substantial over-achievement compared to the original targets. At least some of this can be attributed to the effects of the organisational and monitoring changes being more important than just the need to comply. Companies within CCAs have taken far more action than those outside, even though they face a far lower rate of levy.

The Carbon Trust at a national level, is undertaking a more detailed analysis of options for reform of the UK CCP instruments in the business and public sectors, to identify packages that may both simplify the mix and increase its economic efficiency and CO<sub>2</sub> impact. In the energy intensive sectors, an emerging conclusion is that whilst there could be considerable duplication in principle between the CCA instrument and the EU ETS, CCAs should only be abandoned in overlapping sectors if, and when, it is clear that problems surrounding weak allocation and prices in the EU ETS have been resolved. We will be delighted to present our findings relating to optimal reform of instruments and the actions that would be required to deliver the UK government’s 20% CO<sub>2</sub> goal to NIAER later in the year, if requested.

#### **Tackling Building energy use**

Emissions from non-domestic buildings represent around 19% of the UK total. Average emission reductions of 15-20% are widely believed to be cost-effective in existing buildings, and up to at least 50% in new buildings. Although the potential is large, policy measures directed towards improving energy performance in non-domestic buildings are both few and weak.

Traditionally, building regulations have been the primary policy instrument for improving performance in new build. The recent review of Part F of the NI Building Regulations provided an opportunity to ratchet up standards over time and in a way that will not

come as a surprise to the buildings market. In our submission to the Part F consultation process, we advocated a 40%+ improvement target for energy performance of new buildings and those undergoing major refurbishment. To deliver such improvements, we point-up that Govt must also take steps to ensure that Building Regulations are properly enforced. Building regulations are only able to address new buildings and major refurbishment; cannot be used to set EE and carbon reduction standards for the vast majority of existing buildings. The Carbon Trust nationally has recently committed £4.5m over 4 years to a programme to look specifically at ways of improving energy performance in existing buildings through the refurbishment and retrofit cycle. Evidence gathered in preparing this programme indicates that considerable improvements in energy performance could be gained during refurbishment at modest or no cost. We are currently in discussion with a number of interested parties to ensure that NI has strong participation in this initiative.

Locally since 2003, the Carbon Trust in NI have been managing the Low Carbon Design Initiative (LCDI) which seeks to ensure that the next generation of buildings in NI are of world class standard with respect to their carbon performance. By developing a comprehensive suite of design guidance and contract documentation to support 'informed' clients and – concurrently - transferring to construction professionals the low carbon skills and knowledge necessary to deliver low carbon buildings, we have been able to reduce the carbon footprint of many new buildings in NI from the current 'good practice' figure of ~20kg CO<sub>2</sub>/m<sup>2</sup>/year to under 10 kg CO<sub>2</sub>/m<sup>2</sup>/year. The main techniques used to deliver this include: a careful holistic design approach based on whole-life costing principles; exploiting ambient environmental energy conditions (e.g. air & ground-water heating / cooling, passive solar); high daylight factors; super-insulation and heavyweight internal fabric and wood-burning boilers. With commitments to use LCDI to procure >£500m of new buildings in NI we are confident that this initiative will contribute substantial lifetime carbon and energy cost savings in the years ahead.

The Energy Performance of Buildings Directive (EPBD) addresses both new and existing buildings. The introduction of energy performance certificates and public display of this information in as wide a range of buildings as possible, presents an unprecedented opportunity to raise awareness of energy performance and measures to improve it in all buildings. Current plans for implementation of the EPBD in the UK are likely to limit the public display of certificates (at least initially) to public buildings over 1,000m<sup>2</sup>. To secure maximum benefit, the definition of 'public' must be kept as wide as possible, and a very strong signal must be sent that the requirement will be expanded to all buildings visited by the public by 2009 and beyond this that all buildings more than 1,000 m<sup>2</sup> will also be required to display labels.

The key weakness of the EPBD is that in itself it does not require building owners or occupants to take any energy saving action. There is a clear opportunity here for the UK to take a lead in requiring action, perhaps in the form of requiring a percentage improvement in energy performance between successive certifications (currently expected to be every 10 years, but this could be shortened).

The inspection of boilers and air conditioning systems required by the Directive could be usefully linked to improvements in metering, since inadequate metering remains an impediment to effective action.

In summary, the following govt actions would help make the most of the opportunity presented by the EU Energy Performance of Buildings Directive:

1. Announce its full commitment to the Directive and its prompt implementation next January;
2. Make a firm commitment to public display of the energy performance certificate for all buildings >1,000 m<sup>2</sup> floor area; and
3. Encourage or require building owners and occupiers to take action to implement the recommendations arising from building inspections required under the Directive, including installation of advanced metering.

The govt's commitment in the EE Action Plan (published in April 2004) to procure only top-quartile energy performance buildings is an excellent signal to the market that poor performing buildings must be improved. Progress has been slow to date; more rapid progress in implementing this commitment is needed to impact the building market.

#### **Innovation, electricity and renewables**

New technology will be central to delivering long-run solutions to climate change. However, innovation is not just about public research and development (R&D); energy-consuming choices and most supply investments are now made by private entities, and major innovations have to traverse a long and risky 'innovation chain' to get from basic R&D to market diffusion.

Properly implemented, policies for innovation can have large benefit-cost potential. Technology studies highlight enormous scope for both carbon and cost savings. Successful development of low carbon industry sectors could improve UK industrial competitiveness as carbon constraints extend internationally.

Low carbon innovation needs to address a wide range of technologies and systems at different stages of development. Energy-related CO<sub>2</sub> emissions arise from three broad categories of end use (buildings, industry and transport) and two major conversion sectors (electricity generation, and fuels refining). Each involves diverse activities, and low-carbon solutions are likely to involve a range of technologies within each. Many low-carbon technologies are already developed, but insufficiently deployed. Energy innovation strategies must thus be broad-based, must encompass both end-use and conversion systems, must connect innovation and deployment, and must harness ongoing private investment. There is no evidence that EE technologies have any less potential for innovation than supply technologies; it is just that current practice is further from the best of existing technologies and the incentives for deeper innovation are therefore even weaker than in supply technologies.

The energy sector, and in particular utilities, has exceptionally low inherent innovation with the utility industries being less than a tenth as R&D-intensive as sectors like IT or pharmaceuticals. Lower-carbon technologies do not offer the marketing incentive of product differentiation (insulation, or new generation technology, does not change the product that final consumers see). We are



	<p>seeking radical innovation in sectors which have been dominated by the same basic set of technologies for at least half a century. Practical policies to deliver low carbon innovation at scale must combine R&amp;D with targeted market-based instruments that move ongoing private investment towards low carbon technologies. The investment required to dramatically accelerate low carbon innovation is likely to be a small fraction of existing ongoing investment, but it needs to be targeted differently. Measures like the UK Renewables Obligations can divert increasing amounts of this towards low carbon innovation, financial instruments (like grants and subsidised loans) can contribute earlier in the innovation chain, whilst additional instruments may be required e.g. to foster effective spin-outs from university research. The appropriate mix, balance, and cost-effectiveness of instruments to foster low-carbon innovation is not well understood, policy needs to encourage a diversity of approaches domestically and internationally. Defining cost-effectiveness purely in terms of £ per tonne of CO<sub>2</sub> saved discriminates against innovation. Innovation involves taking risks, investing for the long term, investing in or buying technologies which are currently higher cost than the norm because they lack economies of scale and / or because the financial sector considers them more risky. To an important degree, innovation is a public good that emerges from those bearing the risks of doing something new. None of these benefits are taken into account by just measuring £/tCO<sub>2</sub> saved – it is a measure which intrinsically discriminates against the innovation and risk-taking that could open new ways of addressing the carbon problem, when we all know that such innovation is central to finding long-term solutions. The use of appropriate technology for CHP in the right applications has the potential to reduce carbon emissions and operating costs. Given the current ‘spark gap’, CHP is not considered economic in many applications. The potential and policy measures to support CHP need to be reviewed to ensure that the potential of CHP is captured in a cost effective manner over the medium term and the Carbon Trust is presently working with DETI to review and examine the potential for good quality CHP ahead of the introduction of the EU Directive on CHP.</p> <p>The consultation paper makes specific reference to domestic CHP (aka micro-CHP). This is an emerging technology which may be offered for sale commercially in a few years time for heating /powering homes. There are several technologies and all have different performance characteristics and different price premiums compared to boilers. It is too early to say how successful the technology might be.</p> <p>Carbon savings from fossil fuelled micro-CHP cannot be guaranteed. Emerging trials data shows that carbon emissions from micro-CHP can be higher or lower than alternative supplies of heat and power. Even if carbon emissions reductions from fossil fuelled micro-CHP are shown to be gained now, they may decline to zero as grid carbon intensity falls in the next few decades. As the life of micro-CHP units is probably around 10 to 15 years this is an important consideration in the design of support mechanisms. Units installed in large numbers in, say, 2008 to 2010 may not be saving carbon at the ends of their economic life.</p>
<b>GCC</b>	In short, the Council takes the view that the objective should be a market that is cost-competitive, secure, diverse, and efficient.

	<p>Having regard to the desirability of environmental sustainability and integration with other systems where the pursuit of these is consistent with the need to reduce the high cost of energy in NI.</p> <p>The Council is aware that due to the current European Emissions Trading Scheme, carbon now has a tangible financial cost in addition to an environmental cost. With this in mind the Council has responded to the questions set out in the consultation paper.</p> <p>Does the Authority have a view on the future of Lignite in NI within a CO<sub>2</sub> reduction strategy given that the recently published Northern Area Plan has stated that it will ensure that 'brown coal' reserves remain exploitable?</p> <p>What impact will the Single Electricity Market have on NI CO<sub>2</sub> targets?</p>
<b>Phoenix Natural Gas</b>	<p>Committed to maximising carbon reduction. Recognise the significant impact that NI gas consumers have on the environment and determined to keep driving up the carbon savings. The calculated annual saving from gas customers of ¼ m tonnes is due to displacement only, takes no account of EE savings. The savings would be 1/3 m tonnes assuming each customer sector reduced its energy by 10%, rising to 0.4m tonnes if they made 20% energy savings. Gas customers have saved 1m tonnes of CO<sub>2</sub> since gas became available and we forecast the annual savings from gas customers will increase by 25,000 tonnes in 2005.</p> <p>Expect the dCHP project will make gas attractive to a new range of potential customers. The project should generate the marginal savings of generating electricity as well as heat, as well as the additional savings of attracting a greater number of gas customers than would otherwise have been the case.</p> <p>Will continue to work with our partners to encourage new gas customers, EE schemes and innovative technologies. Believe the natural gas industry needs stability; can only be delivered through long-term partnership between all stakeholders: the Authority, the GCC, DETI, boiler manufacturers, installers, NIHE, and so on. General public needs to have confidence in an integrated, customer-focused industry.</p> <p>Oil consumers have no consumer representation and therefore little public scrutiny, public analyses of the gas industry are not balanced by similar analyses of the oil industry. This undoubtedly affects consumer confidence and discourages oil users from changing to the cleaner, efficient and regulated alternative, gas. Ultimately impacts on the ability of this strategy to meet its targets.</p> <p>Phoenix will continue to work with the stakeholders of the gas industry to build confidence in the industry and prevent damaging public disagreements. With a stable, co-ordinated, united gas industry, the current annual carbon savings from gas can be doubled, and more, when efficiency savings are taken into account.</p>
<b>Energia</b>	<p>Govt targets adopted currently do not put the UK on a trajectory to meet target and radical change is needed if this target is to be considered seriously.</p> <p>The demise of CCGT technology has been heralded for some time yet all the major plans for new development in the UK, Ireland</p>

and across Europe are dominated by CCGT technology. The main reasons are:

- CCGTs have a low capital cost and short delivery time
- CCGTs (fired on natural gas) have the lowest carbon emissions of any large scale fossil fuel technologies widely used today
- Gas fired technology sets the majority of electricity prices and thus a new entrant CCGT has minimal fuel price risk against its competitors.
- Gas fired generation continues to be competitive against coal because of rising carbon prices
- Clean coal (i.e. with no carbon emissions) and nuclear are not currently supported by the market.
- Wind requires generation as a back-up because of its intermittency and is not supported on its own by the market.

It is difficult to perceive a change in the above approach unless there is significant market intervention by govts, and this does not sit comfortably with the concept of liberalising energy markets.

If CO<sub>2</sub> emission reduction is a key objective of govt, and intervention in or modification of existing markets is deemed acceptable to meet this objective, then the following approaches will achieve significant CO<sub>2</sub> emission reductions:

- **More Renewables** - significant wind penetration requires contingent back-up supplies in the system. Other renewable energy forms have been slow to develop but could become more attractive if the stimulus of high fossil fuel and carbon prices continues.
- **Clean Coal** - development of clean coal technology where resultant CO<sub>2</sub> is sequestered in depleted gas fields or other sinks is being investigated internationally. Typically this technology uses a coal gasification process where CO<sub>2</sub> is separated from the gasification products and remaining hydrogen is combusted in a CCGT. There will be a significant infrastructure necessary to sequester the separated CO<sub>2</sub> in depleted gas fields or other geological features.
- **Nuclear** - electricity generation from nuclear process is well established if somewhat controversial because of safety concerns and fuel disposal. The current Pressurised Water Reactor (PWR) technology is not suitable for the island of Ireland because of the large unit size (typically 1200MW). Newer technology such as the Westinghouse AP600 is still 600MW in size and would pose challenges to be accommodated on the island of Ireland electricity system.
- **More interconnection** - if GB invests heavily in any or all of the above technologies then energy could be purchased through further interconnection. A similar argument may be valid for an interconnector with France (as well as providing further diversity).
- **EE** - has been a significant drive over the last couple of years to improve the efficiency of energy consuming devices but has been a corresponding trend for increased consumption. Current high energy prices may help to curtail this, but energy is still at a low price historically. Major behavioural change by energy consumers could be instigated by high taxes on energy but unlikely to be a politically attractive option for govts. Changes in metering technology and more accurate price signals could contribute

	<p>to greater consumer awareness of energy.</p> <ul style="list-style-type: none"> <li>▪ <b>Distributed Generation</b> - the distributed use of micro-CHP and other distributed technologies will only occur if there is a clear price advantage and a 'commoditisation' of the technology that would allow easier customer acceptance.</li> <li>▪ <b>Non-domestic action</b> - arguably the cheapest way to reduce global emissions is to participate in international schemes where the cost of emissions reduction is lowest (eg. India or China). Using the JI and CDM mechanisms set out under the Kyoto protocol, NI could purchase compliance and support cost effective abatement of CO<sub>2</sub> in areas in the world where carbon reduction is cheapest.</li> </ul> <p>All of the above needs to be considered in the context of the electricity costs to consumers in NI. Energia is keen to see the economy of NI energised through continuing reduction in electricity prices to ensure that the competitiveness of the economy is increased.</p>
<b>I Cross</b>	<p>Misleading to state that Kilroot is one of 'an old collection of coal and oil fired power stations'. It was commissioned on coal in 1989 following investment by Govt of over £100m. Kilroot is the youngest of all UK's operational coal fired power stations and currently produces the lowest cost electricity in NI. A strategy that proposes to sideline this asset towards a low load factor plant sees rather naïve and not in the Consumer's best interests.</p> <p>Why should NI customers be penalised for the CO<sub>2</sub> emissions related to the generation of electricity that is exported outside the National Boundary? The CCGT at Coolkeeragh has planned on the basis that a significant proportion of its output would supply consumers 'across the border'. Should these 'lost' units not be held against UK plc rather than NI, it certainly disadvantages the NI consumer if CO<sub>2</sub> is accounted for as outlined in the CD?</p> <p>The forecast of continued electricity demand growth at 1.8% year on year is neither sustainable nor realistic. Plans MUST go forwards on a more stable demand for electricity. Measures outlined in the Govt's White Paper put great stress on improved EE and it would be sensible to plan on a more stable electricity demand. The electricity generation sector has already made the biggest contribution to CO<sub>2</sub> emissions reductions. Reductions by other sectors should surely be assumed to stabilise electricity demand and GDP growth be de-coupled from electricity demand growth.</p>
<b>AES Kilroot</b>	<p>Surprised the Authority, rather than the DOE or DETI, is consulting on this issue. Setting policy on CO<sub>2</sub> emissions is not an Authority responsibility and this area of work is not in the approved 2005-2006 Work Programme. CO<sub>2</sub> limits for industry, including the electricity supply industry (ESI) are set in accordance with the EU ETS Directive. In NI, the DOE are responsible for ensuring the ESI complies with these CO<sub>2</sub> emission limits.</p> <p>Disappointed by the analysis presented, and suggestions made by the Authority. If adopted, suggestions will increase costs for consumers beyond what is necessary and reduce security of supply. Approach also appears to be in sharp contrast to the arguments made by the Authority in their submission to DETI's consultation on an energy policy for NI. In this response the Authority argued</p>

strongly for burden sharing and against the introduction of environmental targets on a regional basis. Authority's analysis in this paper is based on the Energy White Paper 2002 goal of reducing CO<sub>2</sub> emissions by 60% by 2050. The UK Govt has also committed under the Kyoto Protocol to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008-12. Under the 2000 UK Climate Change Programme (under review), the Govt's national goal is to move towards a 20% reduction in CO<sub>2</sub> emissions below 1990 levels by 2010. This latter target, when extrapolated, gives a similar outcome as the 60% reduction target in the White Paper of around 65mts of CO<sub>2</sub> in 2050.

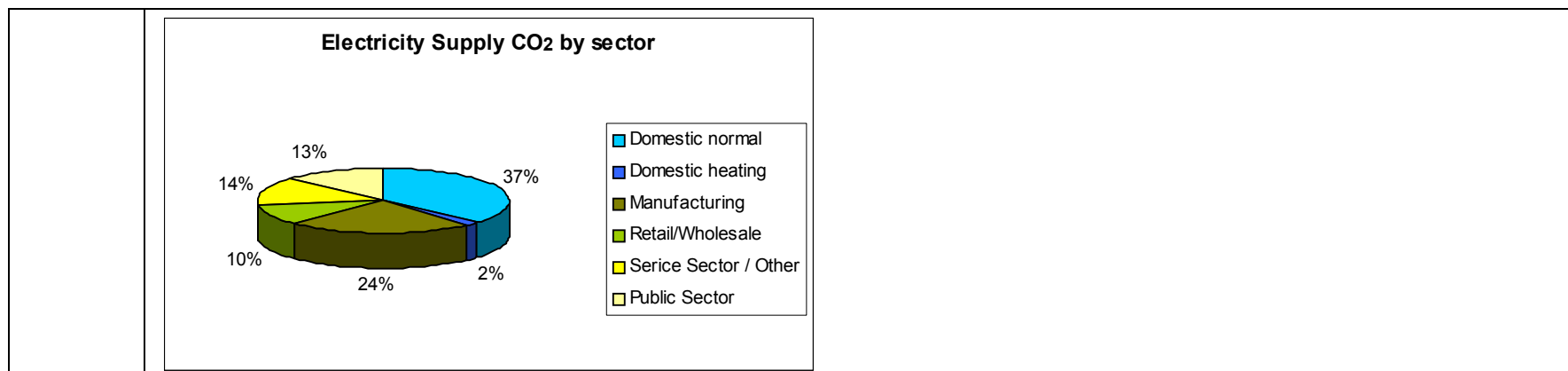
Given that CO<sub>2</sub> emissions in NI have already reduced significantly since 1990 with the intro of 2 new CCGT's, working from 1990 base year in the Climate Change Programme would give a much more favourable outcome for NI than shown on Graph 2. Using 2002 as base year loses the significant improvement achieved with the introduction of the first CCGT at Ballylumford. Since 1990 the NI ESI has contributed disproportionately to the UK's CO<sub>2</sub> reduction targets. Recommend the Authority plot Graph 2 using 1990 as base year, and both DOE and DETI should use this as a basis for negotiation in the present review of the Climate Change Programme and in the allocation of allowances for phase II of the EU ETS.

UK accounts for about 2% of global CO<sub>2</sub> emissions and the NI ESI industry accounts for about 0.8% of UK CO<sub>2</sub> emissions. Clear that the real emphasis needs to be directed via foreign policy to seek the commitment of other countries to combat climate change. By 2004, the ESI in the UK had reduced CO<sub>2</sub> emissions by 15.5% from 1990 levels; for all other sectors increased by 1.5%. Despite this, the UK Govt decided the ESI would take all the burden of the CO<sub>2</sub> reductions required under phase 1 of the EU ETS, whilst it remained "business as usual" for other industry in the EU ETS and for all other CO<sub>2</sub> producers. Pressure for further reductions from the UK ESI will have limited benefit on a global scale and is likely to have an adverse effect on the international competitiveness of industry and risk the security of electricity supply. Particularly true for NI and it is disappointing that the Authority's analysis is based on the ESI in NI continuing to burden share with no reference to other policy goals like reliability and competitive pricing.

The Authority has responsibility to promote the efficient use of electricity and the development of the gas industry. Success in these areas would result in reduced demand for electricity and hence reduced CO<sub>2</sub> emissions. Does not appear to be consistent with the Authority's assumption in Graph 2 that demand growth will continue at 1.8% pa until 2050.

Introducing specific targets for NI ESI, as suggested by the Authority would not be in electricity consumers best interests, mainly because of reduced flexibility. CO<sub>2</sub> is a trans-boundary pollutant and should be addressed globally. The cap and trade mechanism in the EU ETS provides such flexibility to ensure least cost abatement across the EU. The imposition of targets for the NI ESI would distort efficient abatement at the cost of customers. May be that it is better for NI to comply (at least partially) with CO<sub>2</sub> limits economically by buying credits rather than by physically fuel switching. May be particularly relevant in a scenario of high gas prices, given that 2 of our 3 power stations are gas-fired and given our security of supply requirements on this small island. The

	<p>suggestion by the Authority that the market may need to be adjusted to allow CCGTs to run base load is concerning; this would increase prices to customers beyond what is necessary. Furthermore, it is not true to say that plants like Kilroot will be shoulder or peaking plants. If the marginal cost of Kilroot (including the cost of CO<sub>2</sub>) is less than the marginal cost of CCGTs, then Kilroot will run base load. This is in the economic interests of electricity customers and is exactly what is happening at present, with 2 CCGTs in the market and CO<sub>2</sub> costs included in dispatch decisions.</p> <p>It is possible that UK policy makers will bite the nuclear bullet to address their longer-term CO<sub>2</sub> reduction targets. NI should not rule itself out from this gain, by adopting specific NI targets as suggested by the Authority, especially as we have already made a disproportionate contribution to the UK Climate Change Programme.</p> <p>Authority assumes for the next 45 years, NI will export about 14% of electricity generated on a net basis. The CO<sub>2</sub> emissions associated with these exports should be netted off because customers in neighbouring regions would be paying for the cost of CO<sub>2</sub> credits in their electricity price and CO<sub>2</sub> emissions would be reduced in those regions. The analysis should be based on the CO<sub>2</sub> associated with electricity consumption in NI.</p>
<b>NIE</b>	<p>In suggesting a very challenging target for the electricity sector to reduce its CO<sub>2</sub> emissions by about 80,000 tonnes per annum for the next 45 years, the consultation paper notes that the very dramatic reductions attributable to the recent introduction of the new CCGTs at Ballylumford and Coolkeeragh are unlikely to be readily repeatable.</p> <p>In addition to the CCGTs there is already a wide range of carbon reduction initiatives within the electricity industry and NIE is contributing to most of them. These include the EE programme, Green tariffs, Supply price control (EE and micro renewables), T&amp;D price control (Smart), ROF, Climate change levy, Emissions trading, and Renewables obligation.</p> <p>However, the overall approach is somewhat piecemeal at present and NIE supports NIAER's attempt to stimulate discussion that will lead to a more coherent carbon reduction strategy which prioritises the most cost effective measures.</p> <p>Offsetting the beneficial effects of many of these activities, there remains an annual increase in electricity usage of approx 1.5% p.a. although this has reduced in recent years from previous annual increases of circa 2.5% p.a. Important that practical measures focusing on the efficient use of electricity in all sectors of the NI customer base are further developed. It is suggested that some of those programmes which have a track record of successfully delivering carbon reduction, such as the EE Programme, be extended.</p> <p>The key focus of NIE's carbon reduction activities is the domestic sector which accounts for 39% of NI's electricity use (as shown in the following chart). On average, each household is responsible for 3.6 tonnes of CO<sub>2</sub> p.a. NIE's response tends to focus on activities targeted on this sector.</p>



## **RESPONSES TO CONSULTATION QUESTIONS.**

### **1. To what extent should the approach to carbon saving change following the introduction of CCGT for electricity production?**

<b>EST</b>	<p>Focus on carbon has to increase across all sectors, particularly in household &amp; transport. Further develop and refine the EEL combined with the provision of EE and sustainable energy advice. Address new build housing through strengthened Building Regulations. Continued expansion of gas network important but must be accompanied by EE measures and advice to minimise demand. For areas off the gas network, a combination of EE measures and increased use of small-scale renewables required.</p> <p>The public concern and debate surrounding climate change needs to be converted into a far greater appetite for action in every day life. This is the real climate change challenge and requires the awareness, support and action of NI citizens to meet the target. A 'low carbon economy' can only be built on a 'low carbon society'. Govt and regulatory authorities need to 'help people help climate change' by making solutions simpler, easier and cheaper for consumers. EST can help do this.</p> <p>Maximum impact will come only with whole-hearted commitment of Govt through leadership, regulation, taxation, and spending policies. Regulatory authorities have a major role to play in delivering climate change objectives.</p> <p>Cost effective measures that can contribute to EE improvements are dominated by improvements in building fabric, boiler</p>
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efficiency, high efficiency lights and appliances. Free markets have failed to deliver the necessary investment for a number of reasons that reflect the fact that EE is very low on the list of priorities for people. Believe a range of additional policy instruments required to deliver the potential residential EE savings as part of an overall EE strategy. Many of these, including fiscal incentives are outside the gift of Ofreg. EST have identified the non-fiscal instruments that are most relevant to Ofreg in relation to raising awareness, increasing EE and sustainable energy action and alleviating fuel poverty. These are:

**Customer engagement by raising consumer awareness and provision of information**

Key to supporting existing policies and overcoming market barriers is raising consumer awareness through the provision of info and advice, whilst establishing the links between climate change and consumer behaviour. All opportunities and support for action should be used to access and influence consumers in a consistent manner; should take place at each point in the consumer chain, and important to ensure comprehensive training of sales people and installers, e.g. through accreditation programmes. Consumers need to be able to identify EE appliances (e.g. through the EE recommended (EER) logo); can only be achieved through the proper accreditation process. The continued development and implementation of accreditation mechanisms for installers, energy efficient and 'green' products are essential to provide consumer confidence. With products, accreditation processes will need to be refined to reflect technology improvements.

EST is piloting the concept of a Sustainable Energy Centre (SEC) in NI, by building upon the existing infrastructure provided by the two EE Advice Centres (EEACs). These previously focused on EE advice; the SEC model will extend this to supplying info and advice to encourage EE and the use of renewable energy in homes and road transport. The NI SEC will have a strong regional and local emphasis and will focus on delivery as well as providing info and advice. EST believes the SEC approach is likely to prove more cost effective than separate initiatives.

Whilst aware of the schools programmes being run by Action Renewables and the NIHE, EST believe it is important to educate tomorrow's consumers via information services to the education sector. EST runs an Energy Certification Programme for schools in England, which takes a holistic approach between EE, the school curriculum and encouraging efficient use of school energy resources. It raises the levels of environmental awareness of pupils, teachers and parents and translates into behaviours of individuals in the home and bill-payers in the future. EST believe that developing the scheme in NI would benefit schools by enhancing what is currently being delivered, but also help improve home efficiency and raise climate change awareness. It has the potential to become a key tool under the proposed UK Climate Change Communications Programme. EST believes it is important to ensure clarity and consistency of climate change messages by building upon existing infrastructure and delivery mechanisms. Also suggest giving consideration to the introduction of a concept similar to Environment Direct, which is in the early stages of development by DEFRA.

**Development of the EE Levy (EEL)**



Believe EEL should be extended beyond 2006/07 and expanded more in line with the EEC in GB. As the electricity market opens, it will not be appropriate for NIE to manage the fund and if the EEL continues it should be managed by an independent body to avoid potential competition issues. Perhaps the Levy can be extended to gas also. Over time, if the number and size of suppliers warrant it, consideration should be given to the implementation of an obligation on suppliers similar to EEC, but incorporating a more market based approach that includes a buy out and recycling option, as implemented under the Renewables Obligation.

EEL should be widened to include non-supplier programmes to improve cost-effectiveness. Direct accreditation of third party schemes by an independent scheme administrator would allow a more diverse range of participants with additional cost effective EE projects. This should help maximise value for money, particularly as EST note that supplier's true costs are unclear under EEC. Accredited third party activity would require a standard format that would demonstrate EE delivery as part of EEL, namely a 'white certificate' detailing energy/emission savings.

If obligation on suppliers were introduced, white certificates could be traded with and between suppliers for compliance. This should improve cost-effectiveness and the range of projects by increasing market liquidity although a range of issues would need to be considered including the legal basis, property rights, accreditation, transaction costs, costs to consumers, impact on priority group, supplier market power, settlement periods, market deadweight. White certificate trading is being progressed in France and Italy and is worthy of further consideration for NI; could include the small business and commercial sectors. EST will undertake research into this later in the year and will share its findings with Ofreg.

As gas rollout continues, and the number of households in fuel poverty decrease, we suggest the minimum percentage of measures delivered to the priority group should be reduced over time. Work is needed to determine the appropriate level and should consider an increasing need to tackle the most carbon intensive homes. Consideration also necessary as to whether separate targets should be given to businesses and households.

**Interface between EE and Fuel Poverty Schemes**

Improvements in interaction between fuel poverty programmes, such as the Warm Homes, Warm Homes Plus and other fuel poverty programmes, are desirable and warrant further investigation. This could include the use of EST's Home EE Database (HEED) as an information repository to help achieve better co-ordination.

EST would support a more radical approach, through the mandatory extension of the Dept for Social Development's Design Standard Guide, to vulnerable households in the private rented sector, to drive the investment to raise building standards.

**Increased funding of the NI Projects Fund (NIPF)**

Launched late last year by EST, receiving 16 applications from 10 organisations, ranging from small scale renewables to feasibility studies on demand side management and embedded generation, which demonstrated that there was a real interest and demand for developing sustainable energy projects. The second round was launched in April 2005 with a similar response. We believe the

expansion of the scheme should be considered accordingly and could receive funding through EEL.

**Low Carbon Building Programme (LCBP)**

In GB the DTI is considering proposals for a LCBP. Such a programme should be developed for NI; could be focused on new build while an improved NI PF could address existing properties.

**Role of the public sector**

Vital role to play, particularly in leading by example on climate change and EE issues. The Central EE Fund (CEEF) has helped improve the emission performance in this sector.

A further step would be to require public sector bodies to develop and implement sustainable development strategies. These should include minimum procurement standards for vehicles, buildings energy efficient products and appliances based on Executive guidelines. Public sector bodies have a major role to play in helping change consumer behaviours.

All public sector procurement including new buildings and vehicles should take environmental issues into consideration, and should result in the purchase of the most energy efficient products. This should include installing renewables and CHP where practicable, a commitment to meeting EE Best Practice (EEBP) standards, the purchase of top rated EE appliances and the procurement of low carbon vehicles. These issues need to be taken seriously throughout the procurement process, i.e. are not optional extras in calls for tenders and post-tender negotiations, which seems to be what often happens at the moment.

The draft European Directive on Energy Services proposes a 1.5% pa energy performance improvement target for public sector buildings. We believe the Govt Office Estate should demonstrate its commitment by voluntarily adopting this target prior to EU legislation. The Public Sector has a role in delivering staff awareness training, encouraging car share schemes, cycling, walking and the use of public transport etc., and facilitating the greater use of videoconferencing and home working.

**Home Energy Conservation Act (HECA) Activities**

EST welcomes the requirement of the NIHE to achieve a 34% improvement in the EE of its housing stock by 2006 and has supported these activities through funding and support from the NI EEACs. We would like to see similar longer-term EE objectives for the Registered Housing Associations (RHAs). Regulation might be the most effective approach for private landlords.

**Tightening of Building Regulations**

Building Regulations should be strengthened so all new build homes achieve higher SAP ratings than current requirements. Building Regulations should be reviewed every 5 years on the basis of achieving a 25% improvement upon existing standards. Recommend proactive promotion of EEBP standards in homes that go beyond Building Regulations. All new build social homes could be required to achieve EEBP standards.

More radical approach would be to require existing social and privately rented homes to make EE improvements, perhaps based on a minimum SAP level. Could be applied upon change of tenancy based on a Home EE Report that will be required in the future

	<p>under the Energy Performance in Buildings Directive. Need to consider how this might be applied to hard-to-heat homes.</p> <p><b><u>Home EE Report</u></b></p> <p>EST welcomes the requirement (under the EU Energy Performance in Buildings Directive) for a valid home EE report to be produced upon sale or change of tenancy, which needs to be introduced in a timely and effective manner. If implemented should prove valuable in stimulating the uptake of EE measures in NI.</p> <p>Tax incentives for landlords for EE measures may not prove as effective as hoped. A regulatory approach requiring landlords to undertake and implement EE measures identified in a home EE report would be more effective.</p>
<b>The Carbon Trust</b>	<p>Grid electricity remains a relatively ‘high carbon’ energy source compared to other commonly available fuels i.e. carbon intensity per kWh: NI grid electricity ~0.5 kg CO<sub>2</sub>; natural gas ~0.19 kg CO<sub>2</sub>; oil (various grades) 0.25-0.3 kg CO<sub>2</sub>. Interpreting the question more broadly, if govt is to achieve the declared medium and long-term carbon reduction targets, we need to develop and deliver policies and mechanisms that will affect a step-change in historical EE implementation rates.</p>
<b>GCC</b>	<p>CCGT’s have been a major contributor to reducing CO<sub>2</sub> emissions, full impact will not be known until Coolkeeragh has been running for a significant period to monitor the change. Interested to learn what further CO<sub>2</sub> reductions could be achieved if CCGT’s became the base load plant for NI, and what the impact would be on energy prices in the short, medium and long term. European and UK targets for the reduction of CO<sub>2</sub> emissions govern the Northern Ireland energy market. Currently, we are doing well but ultimately there will come a period when we are no longer doing enough. Alternative approaches to reduce carbon emissions should be researched and a cost benefit analysis produced to ensure the most appropriate measures are implemented for NI consumer.</p>
<b>Energia</b>	<p>No. of methods by which NI can continue to significantly reduce emissions in the short to medium term by ensuring an efficient market design:</p> <ul style="list-style-type: none"> <li>a) Efficient use of existing CCGTs, running at baseload rather than the lower efficiency of running at part load</li> <li>b) Ensure an efficient market environment on the island of Ireland in the context of both emissions trading and the all-island pool that will result in the optimal load factor for Kilroot and which may include its closure and replacement with either CCGT or other low carbon technologies</li> <li>c) Reduce customer demand</li> </ul> <p>Beyond this any shortfalls in emissions targets can be met by purchasing credits from areas in the world where much cheaper reductions in CO<sub>2</sub> emissions can be met.</p>
<b>I Cross</b>	<p>Intro of 2 CCGTs in NI has replicated the ‘dash for gas’ seen in GB during 1990’s. The lower carbon content of natural gas when compared to coal and oil (the displaced fuel) and the improved thermal conversion efficiency possible with the ‘combined’ (Brayton</p>

	<p>&amp; Rankin) thermodynamic cycles allowed associated CO<sub>2</sub> emissions to fall significantly. This was NOT the commercial driver of the change, but a result largely of the lower plant capital costs of CCGT's, the private finance involvement an associated requirement for low risk for such investments and the requirement to have inherently low emissions (SO<sub>2</sub>, NO<sub>x</sub> &amp; particulate) to minimise the associated risks resulting from legislation such as the EU Large Combustion Plant Directive.</p> <p>This 'carbon saving' is a one-off, unable to be replicated in the short to medium term without either further significant investment in renewable technology or introduction of new nuclear technology.</p> <p>The real challenge in this context is to maintain fuel diversity and not to rely too heavily on a single fuel (gas). NI was in the position in the 1970's of being 90% dependent on heavy fuel oil; this error cannot be allowed to be repeated. Kilroot is required to maintain fuel diversity and limit the effect of rising gas prices and provide some flexibility to 'hedge' fuel costs.</p>
<b>NIE</b>	<p>The combination of natural gas and the introduction of CCGT technology as the primary means of electricity generation in NI have made the most significant contribution to NI's carbon saving targets. It will be difficult to achieve such major savings again now that the "low hanging fruit" has been harvested. Indeed in repowering two of its power stations, NI could be viewed as having been an early mover in advance of the EU Emissions Trading Scheme. However, a concerted, adequately resourced and well-planned effort will be required to continue to deliver major year on year carbon savings. The EUETS will provide an economic stimulus to minimise carbon production and the "cap and trade" regime should deliver reductions in a least cost manner, providing for example, that the full opportunity cost of carbon is included in the marginal or avoidable costs that determine the least cost means of electricity generation. The economic signals from the EUETS along with further investment in renewables and interconnection (on both an all-island and GB basis) should continue to reduce the load factor (and therefore carbon production) at Kilroot in the shorter term and should be a factor in the decision on the technology that replaces Kilroot in future.</p> <p>The introduction of more efficient CCGTs has changed the value stack for other carbon reduction measures by reducing the value of energy displacement. However while this changes the value, providing decisions on the appropriateness of other carbon reduction programmes take the carbon displacement into account and that all such programmes continue to follow a least cost approach then the impact of the "CCGT paradox" should be captured through a re-focus on those schemes that give the greatest carbon reduction per unit of investment.</p>

**2. Is the target of reducing electricity emissions by about 80,000 tonnes per annum on average either reasonable or attainable? Should we have published CO<sub>2</sub> target caps for the Electricity Supply industry in Northern Ireland for each year from now to 2050?**

<b>EST</b>	Target is both reasonable and attainable, will require a combination of clear and well-structured policies to be implemented. The main driver for controlling CO <sub>2</sub> emissions in the power sector should be through the allocation process of the EU Emissions Trading Scheme (EU ETS) whilst it remains in existence. Future allocation methodologies should be based on benchmarking whilst utilising the option of auctioning. It would be helpful to send clear messages to the power sector in relation to future longer-term requirements beyond the current EU ETS timescales.
<b>The Carbon Trust</b>	There are grounds for believing that – in the short term at least – the implementation of cost effective EE measures alone could deliver emissions reductions of this magnitude. For example, assuming just one third of the savings identified in Table 1 (Page 4) result from electricity saving measures (a conservative figure), then the ~250 Carbon Trust energy surveys pa of local businesses and public sector organisations identified potential savings of 40,000 tCO <sub>2</sub> in 2003-04 and 76,000 tCO <sub>2</sub> in 2004-05. Factoring in that these surveys represent a relatively small percentage of the total potential within the industrial, commercial and public sectors in NI and - more significantly – the fact that electricity usage and efficiency improvement potential is significantly greater in the domestic sector, we believe the 80,000 tCO <sub>2</sub> reduction target is attainable, and would encourage and support consideration of a more challenging target. Consideration of publishing long terms CO <sub>2</sub> caps for the electricity supply sector in NI as a whole should take cognisance of the carbon caps imposed on eligible power generators vis-à-vis the EU-ETS.
<b>GCC</b>	Not in a position to advise on this, but recommend any target caps for the Electricity Supply industry should be based on what is reasonable for the industry to achieve and on what the customer can afford to pay.
<b>Energia</b>	Target technically attainable but may impose significant costs to NI customers. Cost imposed is a function of prevailing world energy and carbon prices. If these continue to rise the targets may be met with no further costs to consumers beyond the underlying energy costs. If however world energy prices drop back to the level seen only a couple of years ago then there will be major subvention needed to support further electricity emission reductions. Energia is concerned about the concept of specific caps on CO <sub>2</sub> production in NI in that this could have a distorting effect on the EU and JI/CDM mechanisms and result in higher costs for electricity customers.
<b>I Cross</b>	Target is not reasonable or practicable. Locally imposed CO <sub>2</sub> caps will result in a very different industry structure in NI to the rest of the UK. CO <sub>2</sub> can only be reduced on existing fossil fired plant by reducing load factor. This will clearly interact with the economic merit order of dispatch – who pays, the consumer? Surely it is for Govt to set the overall framework for CO <sub>2</sub> reduction? Within the electricity generation sector, carbon emissions allocation and trading is the already chosen method of compliance. A role of the Authority is to ensure that the Govt's 4 Energy Policy Goal aims are facilitated, i.e. environmental acceptability, reliability, affordable energy for the poor, competitive markets. A prescriptive plant merit order to achieve one objective will impact others.
<b>NIE</b>	The electricity industry in NI should <u>not</u> have a regional cap imposed on it since to do so would distort the functioning of the trading

mechanism and lead to an inefficient outcome that imposes a disproportionate cost on NI customers. NI has been disadvantaged by a lack of economy of scale in generation terms and a specific NI carbon cap would extend this disadvantage into the arena of carbon abatement. The ethos of measures such as the EUETS is to set a cap at a macro (i.e. member state) level and to allow participants to meet this target through least cost abatement and emissions trading on a European and potentially worldwide basis. Specific NI cap would impinge on the efficient functioning of such a mechanism.

Does not mean NI should not seek to be innovative in its approaches to minimise the cost for NI customers since any displacement of carbon production will release value at the macro level (i.e. opportunity cost of carbon), either through having to purchase fewer compliance permits or while there remains a free allocation of CO<sub>2</sub> permits, releasing some for sale.

On average, each household is responsible for approximately 3.6 tonnes of CO<sub>2</sub> pa due to their electricity use. Space and water heating will be responsible for an estimated additional 7 tonnes p.a. As emissions from space and water heating are primarily accounted for by fuels other than electricity, the focus to reduce emissions associated with electricity consumption will be directed on lighting and appliances. If overall target reduction for the electricity industry is 80,000 tonnes p.a., on a pro rata basis by consumption, the domestic sector should deliver 31,200 tonnes reduction p.a.

Installing 1 energy saving bulb in a light that will be on for a typical 4 hours each day will deliver CO<sub>2</sub> saving of 58 kg p.a. To achieve 31,200 tonnes saving would require over 0.5 million energy saving bulbs to be fitted each year. Due to factors such as unsuitability for modern light fittings, and the limited number of lights per house, this is clearly not a practical solution to achieve the entire target. An increased focus will be required to reduce other electrical uses in the home i.e. major appliances and electrical water heating.

EST estimates the annual savings gained from replacing an old fridge or fridge freezer with a modern version are approx 250kWh p.a. or 525kWh p.a., equating to 125 kg or 262 kg of CO<sub>2</sub> respectively; would require 161,000 appliances to be replaced on an annual basis to achieve the domestic target.

Micro renewables, whilst still expensive, have potential to reduce CO<sub>2</sub> emissions through self-generation. A modest household scale wind turbine or PV installation could save between 500 kg and 750 kg CO<sub>2</sub> p.a. However, whilst making a significant contribution to an individual home's CO<sub>2</sub> reduction, to achieve 31,200 tonnes p.a. would require 50,000 installations p.a. It would be ambitious to achieve such a target by 2050 based on current technology costs without significant subsidy. Many micro renewable technologies are based on thermal rather than electrical energy however they are not acknowledged within the Renewable Obligation framework. Developing a provision for "hot ROCs" would help stimulate this equally valuable form of micro renewables.

Should dCHP technology develop suitably, it has the potential to save 750kg p.a. through self generation; would take 41,600 new units to be installed pa to achieve the target through this means.

An expansion of Eco Energy similarly is not feasible – 9,000 new customers would be required p.a. Major issue would be securing

	<p>appropriately priced renewable capacity to meet their requirements when the majority of current Eco Energy customers are unlikely to pay more for their electricity.</p> <p>It is clear that any one initiative alone is not capable of delivering the necessary reductions. A sea change will be required, combining a mixture of incentives, subsidies and legislation to deliver a mix of measures. New technologies will emerge over the time frame (e.g. fuel cells) and it is vital that these are considered early. In addition, with over 10,000 new homes being built in NI each year, if building regulations were reformed to make it mandatory to include renewables in any new development then this step would make an important contribution.</p> <p>The EE Programme is predicted to deliver annual carbon savings of around 5,000 tonnes (equating to 18,000 tonnes of CO<sub>2</sub>) from activity during 2004/05. An increased EEP, combined with a mix of the measures above and delivered through an ESCo framework, would appear to be an effective solution to achieving the domestic portion of the carbon reduction target.</p> <p>The domestic target will be very challenging, however, as NIE Supply have experienced, social and economic factors which are beyond the control of an energy retailer to influence the underlying electricity demand in a home. It would therefore seem unreasonable to go beyond the requirements currently on suppliers relating to fuel mix disclosure requirements and the renewables obligation by setting a supplier cap on CO<sub>2</sub>.</p>
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**3. The target reduction of 60% for emissions, excluding electricity generation and transport, would imply a target reduction in CO<sub>2</sub> emissions from 4.851 m/tones in 2002 to 1.94 m/tonnes in 2050. This has to be achieved while at the same time meeting the energy needs of a growing population and economy. How should this reduction be disaggregated across sectors, planned and delivered?**

<b>EST</b>	<p>Whilst welcoming the publication of the Strategic Framework for NI Energy in June 2004 by DETI, it is necessary to develop a comprehensive EE Strategy similar to approach proposed in Scotland. Recommend that this includes specific sectoral targets, which must deliver substantial carbon reductions and reflect the required progression to longer-term climate change goals.</p> <p>Refer to response to question 5 for more detailed comment on targets.</p>
<b>The Carbon Trust</b>	<p>This was an area explored in some depth in the NI Vision Study which concluded that in order to meet the target 60% reduction against the likely backdrop of a growing population and economic growth the following actions will be required:</p> <p><u>Immediate actions</u></p> <ul style="list-style-type: none"> <li>(a) Encourage improvements in EE in all sectors of the economy by developing additional support mechanisms for smaller organisations and by setting up a capital fund to support major investment in new buildings and industrial plant.</li> <li>(b) Improve building EE via improved standards, efficiency labelling and compliance monitoring by, for example, requiring all</li> </ul>

	<p>buildings over 1,000 m<sup>2</sup> to display a building energy performance certificate that complies with the EU Energy Performance of Buildings Directive. Also support moves towards zero emission buildings.</p> <p>(c) Change public procurement procedures to promote the highest EE standards and to demonstrate public sector leadership in reducing carbon emissions. This should include only procuring space in buildings within the top quartile of energy performance, a Govt commitment announced in its EE Action Plan.</p> <p>(d) Improve the quality of data collected on energy use, and make it more readily available to consumers to facilitate better targeting of support for EE measures and to enable progress to be monitored and publicised.</p> <p><u>Developing options for the future</u></p> <p>(e) Support the exploitation of local renewable resources such as wind and bio-energy by increasing renewable obligations on energy suppliers.</p> <p>(f) Modify the regulatory scheme to encourage the uptake of good quality CHP and discourage the use of inefficient local generators during peak periods.</p> <p>(g) Encourage investment in the fledgling low carbon technology sector and take the lead on developing new technologies where NI could obtain commercial advantage.</p> <p><u>Cross-cutting actions</u></p> <p>(h) Develop planning procedures that have the minimisation of energy demand and transport use as prime criteria and explore the options for a transport efficiency programme.</p> <p>(i) Plan and execute sustainability marketing campaigns to capture the ‘hearts and minds’ of the population and seek to build up the skills base in application of low carbon technologies.</p> <p>(j) Keep a watching brief on international developments in low carbon technologies and position Northern Ireland to become an early adopter of emerging technologies, such as low/zero emission vehicles.</p> <p>It is highly likely that some sectors will be able to achieve target carbon reductions more cost effectively than others and hence it unlikely that all sectors will be required to achieve a 60% cut by 2050. Nonetheless, as part of the NI Vision Study we did model likely pathways across all demand sectors.</p>
<b>GCC</b>	Reduction should be disaggregated across sectors based on what is reasonably attainable and to minimise impact on final consumer costs. Electricity industry should not subsidise other sectors’ share of CO <sub>2</sub> target, as this would put an unfair additional burden on the industry.
<b>Energia</b>	By disaggregating across sectors carbon reductions are not targeted at the areas that can be achieved at lowest cost – this means that



	the customer ends up paying more on average. This has already been demonstrated under EU ETS where the traded sector has been burdened with the most significant reductions and penalties and thus electricity customers have shouldered a disproportionate proportion of the emission reductions. Would prefer an approach where the reduction is not targeted at specific sectors but based on the lowest cost of carbon emissions reduction. This will allow transport, for example, to play a more active role in emissions reduction.
<b>I Cross</b>	Electricity generation has already made a disproportionate reduction and virtually single handedly reduced the UK's emissions to meet the Kyoto commitment. It is not realistic, practicable or sensible to expect reductions of the same order of magnitude proposed without nuclear generation. (Nuclear currently represents around 20% of generation in GB; has fallen from 26% in the mid 1990's and will be 3% by 2025 if no new plants are built to replace the existing Magnox and AGR stations). Renewals will be limited due to their (higher) cost and wind in particular by intermittency and the associated requirement for back-up plant. No policy yet exists as to how the overall 60% reduction should be disaggregated across sectors; surely this direction should come from central Govt as fundamental issues such as the future of nuclear power will need to be debated. Heroic optimism will clearly be required for renewables to fill the gap at an acceptable cost.
<b>NIE</b>	Assuming a pro rata split of CO <sub>2</sub> reduction between sectors, NIE suggests that in the domestic sector, the key players (EST, NIHE and NIE) develop and cost a plan for delivering that aspect of the target. The Carbon Trust should address the public and private sectors. Govt then needs to provide adequate support, both financial and through legislation if required to translate the plan into carbon reducing actions.

**4. Should resources be allocated on the basis of the carbon saving impact of the measures in order to maximise the cost effectiveness of programs?**

<b>EST</b>	Yes, but priorities should also take account of the actual size of sectoral emissions and the drive to eradicate fuel poverty. All sectors need to contribute to reducing carbon emissions. Household and transport sectors should be addressed as a priority.
<b>The Carbon Trust</b>	Clearly, cost-effectiveness is an important indicator for all carbon abatement programmes, however as stated in section 5 above, defining cost-effectiveness purely in terms of £ per tonne of CO <sub>2</sub> saved discriminates against innovation and as innovation is central to finding long-term solutions to climate change we would caution against an inflexible policy or regulatory framework.
<b>GCC</b>	Would not advocate this, in many instances it is the cost effectiveness of the investment to the individual households that should be

	the main focus of programs. Re the example of whether or not it would be more effective to save CO <sub>2</sub> by insulating a coal heated home rather than a gas heated home, if both homes fuel poor, it is a matter of some debate as to whether it is right to choose one home over another because one delivers greater CO <sub>2</sub> reductions. Council would urge that resources allocated on basis of consumer need rather than environmental benefit.
<b>Energia</b>	Favour a process by which the lowest cost carbon saving measures are adopted and these measures should correspondingly attract with greatest allocation of resource.
<b>I Cross</b>	Over ½ total energy consumed is used in buildings. Whilst part ‘F’ of NI Building Regulations will be changed and offer improvements of around 35% from next year, there is a huge amount of further work that can be done. Surely effort should be directed where it can have the greatest impact? dCHP will eventually have an impact and is a much better use of natural gas than conversion at only 50% thermal efficiency in a CCGT. Unfortunately costs are presently an order of magnitude away from being economic and seem unlikely to reduce by the amount required in the short to medium term. Simple measures such as installing and commissioning condensing gas boilers in a way that they actually condense are much more important and relevant.
<b>NIE</b>	<p>Yes – the target will be costly to achieve; makes sense that the most cost effective mix of measures is employed to achieve the savings. It is likely that the EE measures initially will provide the most cost effective options.</p> <p>It is suggested that current mechanisms which have already demonstrated success at carbon reduction be further developed. NIE Supply Business has demonstrated its ability to deliver significant savings cost effectively through both EE and, more recently, small scale renewables. This has been achieved through innovative price control agreements (both Supply Business and T&amp;D’s Smart programme) that have established the basis of a framework for an ESCo business. It is suggested that there would be further opportunity to deliver significant carbon reductions through enhancing such regulatory agreements as the Supply Business moves forward into more competitive markets.</p> <p>NIE Supply Business is currently examining further opportunities to develop a sustainable ESCo business building upon its proven track record of stimulating the market for sustainable energy technologies. Creating the appropriate regulatory support to enable this carbon reduction business to thrive and deliver both the necessary environmental benefits as well as adequate returns will be vital. An example of such regulatory support is featured within the current draft of the Supply Licence modifications, recently forwarded to Ofreg for consideration. The modifications make reference to a suggested mechanism for customers and the Supply Business to share in the benefits of Supply complying with the NI Renewable Obligation more economically than the full buy-out pass-through cost via cost effectively sourcing ROCs from small scale renewable schemes.</p>

**5. Should we seek the most cost effective way of reducing CO<sub>2</sub> emissions overall or should there be firm arbitrary targets for - for example - CHP, EE and renewables without any analysis of the costs and benefits?**

EST	<p>Adopt firm targets for key sectors. Suggest separate EE targets for households, business and public sectors; should be based on a percentage improvement in EE or equivalent carbon reduction. The latter could be based on specific carbon weighting factors in an approach similar to that used in EEL, which is required to overcome the complexities of establishing a baseline, generation fuel mix etc.</p> <p>Targets should be based upon expert modelling, risk impact assessments and stakeholder consultation. Setting targets that are either too low or too high would be unhelpful; however the additional work required to produce robust targets is likely to result in better data and improved understanding of the issues; would allow development of more cost effective delivery programmes. NIHE and DUKES data sources quoted in the consultation document for the household sector differ by 20% and that 0.823 Mt of carbon remain unaccounted. Better data is required to identify and implement effective CO<sub>2</sub> mitigation policies.</p> <p>Urge the setting of clear long-term EE targets for each sector that include interim milestones. Targets need to be able to show the level of real emission reductions (or increases) and must be underpinned by effective policies to deliver the objectives. Regular monitoring and reporting against targets required to assess progress and refine policy if required. Comments on EE targets are generic and apply equally to other sector targets.</p> <p><u>Renewable Targets</u></p> <p>Support 12% target in DETI's Strategic Energy Framework for the proportion of NI electricity produced from indigenous renewables by 2012. We note that the level of the NI Renewable Obligation is only set at 6.3% of total supplies in 2012/13.</p> <p>It would be helpful to have a sub-target for small-scale renewables that could be used to help make up the shortfall; could be based upon the number of installations, total installed capacity below a certain de minimis (e.g. 50kWe), or electricity generated from installations below this de minimis. This would provide further incentives for NIE, under the Action Renewables programme, to pioneer renewables for rural areas and would demonstrate real commitment to this market that would encourage long-term investment. We support the Renewable Energy Action plans that are proposed for each of the counties in NI and urge that strong emphasis is placed on small-scale renewables, particularly for off-gas network consumers.</p> <p>EST believes renewables heat can make a sizeable contribution to emission reduction goals, particularly in off gas network areas where it can also be effective in reducing Fuel Poverty. A recent CHP report identified significant potential for modern biomass heating in the UK, perhaps close to 8,000 MW of boiler capacity using currently available wood fuel resources, and double that where a significant proportion of 'set-aside' land is used for energy crops.</p> <p>EST is a partner of the Renewable Energy Action (REACT) project (<a href="http://www.react.novem.org">www.react.novem.org</a>) that has analysed the relationship</p>
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	<p>between the actual deployment of renewable energy based and the applied policies. The key finding was that the EC target for renewables could only be met with a substantial increase in renewable heat projects; will require the introduction of a renewable heat directive with targets. We welcome the efforts of the Authority to create a framework that would stimulate a wood based rural economy and recommend the introduction of a specific renewables heat target that would further facilitate the development of market structures, including renewable heat supply chains, which will be required to deliver market growth.</p> <p>Biomass and heat pump technologies are much more predictable than other renewable technologies and do not suffer from the intermittency of wind or the dependence on precipitation that hydro does; warrant increased attention, compared to wind or hydro, in bringing them to the market and ongoing project development.</p> <p><u>CHP Target</u></p> <p>EST would advocate a CHP target based on installed electrical capacity. Again, there could be a separate target for dCHP based on installed capacity or the number of units installed. EST supports the trialling of dCHP in NI and is providing funding from its Innovation Programme to support the commercial demonstration of dCHP. With the rollout of natural gas NI has a good opportunity to increase the amount of CHP capacity. EST's Community Energy programme has a key role to play here if 'bolt-on' local funds could be sourced in NI.</p>
<b>The Carbon Trust</b>	<p>A strong policy framework that supports and rewards local businesses to achieve target emissions reductions and innovation will create the right environment necessary to encourage investment in low carbon technologies over the short, medium and long-term horizons. Specific attention should be paid to determine the policies required to encourage investment in the fledgling low carbon technology sector in NI and especially to nurture new technologies where NI could obtain significant commercial advantage e.g. biomass, active solar and marine. Imposing arbitrary targets for the adoption for specific energy technologies irrespective of cost/benefit considerations is unlikely to be supported by large sections of the business community. However, local businesses have shown a ready willingness to invest in low carbon technologies where there is a strong business case for doing so and it is our experience that many companies in NI are further down the 'EE implementation road' than similar companies elsewhere in the UK. A significant factor for this observation is the significantly higher energy costs imposed on local businesses. Although significant savings have already been made by NI business and public sectors, we believe future savings can be encouraged by the Authority - and by govt more broadly – sending a strong, long-term signal to energy users that they are expected to make prudent and efficient use of the energy they are consuming by, for example, availing of the free energy surveys and financial support schemes provided by the Carbon Trust.</p>
<b>GCC</b>	<p>Recommend most cost effective methods that put least risk on energy costs to NI consumers. Recommend cost benefit analysis of all policy proposals.</p>

<b>Energia</b>	The most cost effective way of reducing CO <sub>2</sub> emissions overall should be adopted. Setting arbitrary targets will distort allocation of resources, increase abatement costs and result in higher costs being imposed on citizens.
<b>I Cross</b>	Costs and benefits must be examined. Climate Change Levy and Carbon Trading should be used without radical change until they have had time to establish. Business requires evolution, not revolution so that long term investments can be made with manageable risk elements. Confused and overlapping fiscal and licensing measures should not be introduced.
<b>NIE</b>	CO <sub>2</sub> reduction should be achieved in the most cost effective way possible. However, some measures may need additional support at the outset in order to improve their cost effectiveness through scale economies (developing installer skills etc) in the longer term and these should be considered for inclusion.

**6. At what point should reliance on gas as the principal way of achieving CO<sub>2</sub> reductions over the next 10 years give way to other measures? How should this be achieved?**

<b>EST</b>	Now. Changing consumer behaviour is vital to the success of climate reduction strategies, particularly in the key sectors of household and transport emissions; cannot be achieved overnight. NI needs to make emission reductions as soon as possible. We understand the concerns on electricity prices arising from the expensive legacy contracts inherited from privatisation, however, emission reductions are required to be made before the impact of these contracts begin to diminish from 2010. Improvements in EE reduce carbon emissions, lower consumer's energy consumption and bills, and reduce Fuel Poverty. This can be achieved through a combination of policy initiatives to deliver clearly defined targets. A comprehensive EE strategy is vital, should include the potential initiatives outlined above plus the use of fiscal mechanisms. EST can provide details of potential fiscal instruments that could be employed.
<b>The Carbon Trust</b>	The arrival of piped natural gas in NI in the 1990's and plans for the roll-out of the network beyond the greater Belfast area, has afforded NI an excellent opportunity to avail of a lower carbon fossil fuel and has also served as a strong catalyst for local businesses and public sector organisation to invest in new, modern higher efficiency plant and equipment i.e. carbon savings have – and will continue – to be made not only through fuel-switching but through improved EE. Natural gas is likely to be a key fuel in the long-term energy mix for NI.
<b>GCC</b>	No reason why other measures cannot be researched and implemented alongside gas. Cannot provide a definite date when we should give way to other measures, except for when it becomes clear that CCGTs in NI will not achieve the necessary CO <sub>2</sub> reductions. At this point, energy industry should work on other measures of electricity generation that will be ready on or before that time.

<b>Energia</b>	A market driven approach will ensure the lowest cost of achieving the objective of lower carbon emissions. If the govt or regulator is prescriptive about what technology or fuel should be adopted it will result in higher costs to consumers. We do recognize however the value of carefully crafted pilot programs to help commercialisation of appropriate technologies.
<b>I Cross</b>	<p>Low cost gas has gone forever. Gas is a premium fuel that is now linked to the price of oil. When used at point of use, conversion efficiencies of over 80% are easily achievable in both CHP and boilers. Use in CCGT's at only 50% is wasteful and when these plants operate at part load their conversion efficiencies drop dramatically. The future will rely on a combination of renewables, nuclear and 'clean' fossil fuels with carbon capture/re-injection. Clearly NI is too small to support this range and even an all Ireland market will rely on significant electricity imports if nuclear power is rejected.</p> <p>Ireland (North &amp; South) will need to retain the two existing coal fired power stations for fuel diversity and economic reasons in the medium term. These plants can purchase fuel world wide and provide stability to the system, economically and electrically. Renewables are likely to be wind based for at least the next 10-15 years and full standby for this capacity will be needed (the coldest Winter days occur under areas of high pressure with little or no wind, geographic diversity even across the whole of Ireland cannot be relied upon).</p>
<b>NIE</b>	It is unlikely that gas will deliver all of our CO <sub>2</sub> savings. The renewable sector has also specific targets although the continued dependency on intermittent resources places a ceiling that requires further technological advances for its removal. It is therefore important to start work now on the other aspects of the mix (e.g. non-wind renewables, EE programmes (both retrospective and building regulations), CHP, etc.) that will deliver carbon reductions now.