

# THE ROYAL SOCIETY OF EDINBURGH ENERGY INQUIRY – STAKEHOLDER CONSULTATION QUESTIONS DUMFRIES AND GALLOWAY COUNCIL : RESPONSE

## General

### 1. How should Scotland provide for its energy needs over the next 5, 15, 30, 45 years, in the context of the likely UK, European and global energy environment?

The UK short to medium (next 5 to 10 years) trends in electricity production and supply are based around the reductions in output of Magnox and Advance Gas Reactor (AGR) nuclear stations and pulverised coal fired plants with the deficit being made up from new Combined Cycle Gas Turbine (CCGT) generation and renewable energy principally onshore and offshore wind and biomass. It is difficult to predict the trends beyond this period as there are various emerging technologies which are highly dependent on policy and fiscal decisions and support from the Government i.e. Integrated Gasification Combined Cycle (IGCC), Combined Heat and Power (CHP), CO<sub>2</sub> capture, thermal treatment of waste, fuel cells, low carbon biofuels and offshore windfarms.

When the Energy White Paper was issued in 2003 it highlighted that the UK may be dependent on importing up to 75% of our total primary energy needs by 2010. The White Paper also stated that the Government will not set targets for the share of total energy from different fuels and instead will deliver long term policies to allow investors to find a balance that will meet our overall goal of becoming a low carbon economy. This mix may also include new nuclear build despite the overwhelming pressures against it if the Kyoto targets are to be met. Technological innovation is a key element for making a successful transition to a low carbon energy system. Long-term technology forecasting involves too much uncertainty to identify specific technologies, but it is clear that five families of technologies could make major contributions, namely end-use energy efficiency, renewable energy, carbon capture and storage, hydrogen and nuclear power. All of these options should be maintained.

Scotland is expected to lead the development of renewables especially in windfarms as it has the highest wind resource in Europe. Development of biomass schemes are also planned such as the Lockerbie and Tullis Russell plants.

Latest demand forecasts by Transco, the UK's natural gas transmission system operator, indicate a 15% increase in annual gas demand by 2013/14, with forecast peak demand growing slightly faster at 17% over the period. Import of gas is likely to commence in 2006 and requirements are set to reach 46% by 2010 and 67% by 2013/14. This predicted increase of gas usage will potentially meet Scotland's energy needs but making Scotland more dependent on external providers. Such provision is less likely to be fully beneficial to Dumfries and Galloway due to transmission constraints in the County.

Renewable energy should be expanded more effectively into other areas. Wind energy has been focused on a great deal and appears to have developed a negative reputation amongst some communities. Other types of renewable energy need to be more thoroughly researched and developed.

As well as a greater diversity of renewable energy, any future energy policy needs to be led by a greater emphasis on energy conservation/energy efficiency.

The full range of energy sources requires investigation, outlining benefits and risks and including those particularly relevant to Scotland.

## **2. Should Scotland aim to be self-sufficient in energy in general, and in electricity in particular, despite trends towards interdependence within Europe?**

Scotland has the unique ability to supply a large amount of its energy by utilising natural resources such as forestry, coal, wind, tidal and hydro. At present Scotland has two large coal fired plants in Longannet and Cogenzie and several nuclear plants, (including Chapelcross) which are closing or are likely to be closed over the next decade as European policies such as the Large Combustion Plant Directive (LCPD) impacts to minimize environmental pollution. This capacity will need to be replaced by an alternative energy source to maintain a sufficient safety margin via a capacity factor of between 15 and 20%.

Renewable energy policy framework (Renewable's Obligation Scotland Order) has been put in place to incentivise producers of renewable energy until 2027 to meet specific increasing targets. In order to realise these national targets it would appear that a more widespread distribution of onshore windfarms will be required.

Energy efficiency has a large role to play in reducing emissions and energy usage and should be incentivised through building regulations and grants for homeowners.

Interdependence is inevitable, given that the UK will become a net importer of natural gas and liquefied natural gas from Europe and the Middle East which have the potential for political unrest and war.

While much might be made of the growing inter-dependence of energy supplies across Europe, Scotland is on the periphery of Europe and may well need to look to its own resources. Surpluses could of course be exported to the benefit of Scotland.

From a Civil Contingency Planning point of view it is vital that we are not caught up in a chain of supply whereby incidents in other parts of the world determine our supply.

**3. What are the possible implications and consequences for Scotland, and the UK, of becoming increasingly reliant on imported oil and gas for their energy needs?**

There are obvious implications such as long term expense and unpredictable nature of future oil imports and availability. Also global implications for the environment. Such a dependence would appear not to be sustainable.

The power base held by those who can control oil and gas supplies is such that over-reliance on imported supplies would place this country in a very vulnerable position.

Of the world's leading industrial nations only the UK and Canada are net energy exporters. The others have all achieved economic growth as energy importers. In order for Scotland to do the same, just as before North Sea oil and gas, reliability will be through energy diversity. Many sources of energy, many suppliers and many supply routes are required to safeguard security of supply and achieve sufficient capacity. Renewables and smaller-scale, distributed energy sources – e.g. micro-Combined Heat and Power (micro-CHP) and fuel cells - will help avoid over-dependence on imports and can make Scotland less vulnerable to supply threats. Trade in energy will involve relationships of mutual dependence with their energy being as important to the UK as their income from it. To facilitate securing reliable supplies of energy it is imperative that foreign and European policy are tailored accordingly.

### **Energy Supply**

**4. What are the feasibility, availability, reliability, sustainability, efficiency, capacity and risks of the different energy generation technologies?**

The location of future generation technologies needs to be carefully chosen to address environmental, planning and access concerns.

As previously stated the short to medium term energy generation technologies which are being invested in include CCGT, CHP, windfarms, biomass and waste thermal treatment plants. The majority of these plants require natural gas to operate, which going forward will require consideration of security of supply which has been covered in question 3. These technologies are all feasible with biomass generation, depending on the fuel, being borderline feasible. There are several biomass fired generating plants in the Scotland such as the Fife Energy chicken litter plant and the co-firing of Waste Derived Fuel (WDF) at Longannet power station which are economically attractive due to the renewable obligation scheme. Windfarms are the most attractive of the renewable technologies due to its zero CO<sub>2</sub> release and comparatively low installation cost of £700/kW although non-renewable such as CCGT can be as low as £450/kW. The thermal generation plants are all reliable and sustainable and have relatively good capacity factors and are all proven technology. Windfarms are reliable and sustainable however the capacity factor and

availability are relatively low as they tend to cover a large area and only produce energy at full output for around 30% of the year. In order to embrace this range of technologies which are emerging, the UK is investing significant sums of money (£800M/annum) on strengthening and upgrading the electricity transmission and distribution networks to accept this generation. This may have implications for transport infrastructure.

**5. What are the likely trends, and uncertainties, in the availability and cost of energy sources over the next 20/45 years?**

Trends - Growing global demand for energy with increased competition for primary energy from countries such as China and India against a backdrop of global warming. There will be increased pressure to use energy more efficiently coupled with a growing use of energy generated from renewable sources, initially incentivised by governments as a means of bringing them to commercial viability.

In the UK, Electricity demand is forecast by National Grid Transco (NGT) to grow at around 1% per year over the next 10 years. Supply will be affected by closure of the majority of our existing nuclear capacity stations, coupled with limited running of coal plants constrained by the Large Combustion Plant Directive (LCPD). In the longer term, demand growth rate will be affected by price and the success in application of energy saving measures. More immediately, there is expected to be a CCGT build programme in order to ensure there is sufficient generation to meet peak demand from around 2009. In the medium term, it is expected that new nuclear plant will be built once licensing and funding issues have been resolved.

Gas demand is also expected to rise at around 1.6% per year. In the UK, our self-sufficiency in gas is coming to an end prompting the need for increased import capability (pipeline and (Liquefied Natural Gas) LNG). This reliance on imports introduces potential supply interruption risks to gas supplies sourced from politically unstable regions (or for pipelines which pass through such regions).

Prices are likely to increase. Demand may outstrip a failing finite source. Greener equivalents such as solar, wind and hydro are likely to be more constant as would nuclear energy.

Biomass Low Pressure Hot Water (LPH) plants may become more common, with either increased forestry extraction or the possible creation of dedicated forestry planting to supply power plants.

**6. What are the economic issues of capital investment in the supply and distribution of energy that need to be considered?**

Supply - Capital investment in electricity generation projects is subject to normal commercial drivers - certainty of development and construction costs balanced against certainty of revenue generation. Large scale power generation in the UK now lies with suppliers who are seeking to cover their demand - hence the market has become vertically integrated.

Renewable generation is still reliant on capital subsidy hence long term investment is at risk from changes in government policy which could affect the supply of capital to renewable generation projects.

Power distribution (gas and electricity) are both monopoly activities hence investment and the rates of return on those assets are regulated by Ofgem. Transmission and distribution companies are faced with the challenges of the accommodation of new patterns of generation into an ageing asset base. High levels of investment in transmission and distribution networks are therefore required over the next 10 years.

It should also be noted that major electricity generating plants are likely to be classified as “National Development” and as such control for the consenting of such proposals could fall to the Scottish Ministers under the “Modernising the Planning System,” echoing existing Section 36 consenting policy.

Increasing costs will eventually force a reduction in usage or, at least, further economy measures in local usage of supplies.

Supply and distribution companies need to be aware of the long-term picture and have long-term sustainable strategies not just short-term business plans. Long-term planning beyond the life span of any particular government is crucial to the economic development and survival of this country.

There may be a need to invest in the transport infrastructure to facilitate the capital investment required.

## **7. What are the key issues surrounding the development of Scotland’s bulk electricity transmission and local distribution systems?**

Scotland has significant renewable energy resources, particularly in northern and western Scotland, including Dumfries and Galloway. Initially, this is likely to be harnessed through onshore wind farms but in the medium term, offshore wind and wave/tidal energy resources will also be of key importance.

The problem is that these sources of energy are remote from the main demand centres and hence significant investment in the HV transmission infrastructure is necessary to deliver this power to where it is needed. The key issue which the network owners will need to address, however, is how to deliver these transmission upgrades whilst also minimising environmental impact. Significant public opposition to transmission upgrade schemes can therefore be expected which is likely to introduce significant delay. This will have a knock-on effect on the development of renewable generation projects. Undergrounding may offer a partial solution to these problems but at significant additional cost (which would ultimately be met by electricity users) although it must be noted that there are significant environmental impacts in undergrounding such cables.

From a Civil Contingencies point of view distribution systems should go underground creating a more resilient network in respect of the effects of the weather and other potential disruptions. All indications are that weather trends will become more extreme in both summer and winter. In North America for example freezing rain can knock down cables and pylons; this may become a factor in Scotland.

Local distribution networks use the local road network as a distribution medium. The Scottish Executive concentration on congestion and the control of utility roadworks makes it more difficult to undertake work on those Local distribution networks. (Transport (Scotland) Bill).

## **Energy Demand**

### **8. What will the impact of energy availability and price be on the demand for energy by commerce and industry in Scotland?**

This may involve decline in some industries. If Scotland does not secure its own reasonably priced sources of power, it will be at a disadvantage over other competing countries.

Steep price rises have the potential to impact adversely on economic regeneration, and on community safety.

High energy prices will impact on energy demand and will apply commercial pressure toward the use of energy efficient technologies. In the longer term, however, it is unclear how the commercial landscape might change. (For example, advances in communications may facilitate a significant increase in the use of telecommuting making the traditional office redundant) (home working). This may be particularly applicable to Dumfries and Galloway.

### **9. What are the likely trends in the domestic demand for energy for space heating and other purposes? What would need to be done to achieve major savings? What are the investment costs?**

The majority of the England, southern, eastern and central Scotland are connected to the national transmission system for natural gas which is the main source of space and water heating in the UK. By 2020 and 2050 the change in average cost per household is likely to rise by 5% and 20% respectively based on the increase in natural gas prices. Other domestic energy is provided by solid fuel, oil and electricity which, in comparison to natural gas are more expensive at present.

In general, current trends in domestic demand continue to rise. More homes (lower household sizes), using more energy, and there are no significant efforts being made to investigate / utilise more energy efficient materials and processes.

There is a need to promote small scale and one-off examples such as existing woodchip burning community heating systems – Argyle and Bute example, Lochgilphead. This has been costed and can be used as an example/comparator for future promotion.

Other opportunities are examples of expanding thermal energy / heat exchange systems currently used in single properties around the country and such innovative ideas could be promoted through relevant Local Plan policies.

An aging population may increase the demand.

Building regulations need to be more demanding on insulation and factor in climate change. There will be significant costs in building premises to cope with the extremes of temperature and weather types but energy savings would offset this.

**10. What are the likely trends in the demand for energy for transportation in Scotland? What is the likely time-scale and scope for substituting other power sources for fossil fuels? What are the likely investment costs?**

Personal transport will see trends for 2 fuel vehicles – petrol/diesel & hydrogen (electric). Dumfries & Galloway is a rural area with dispersed communities and a higher reliance on personal transport. Consequently mass transportation public transport is not as valid an option in this region.

Fossil fuels will continue to provide the base load for both electricity production and transportation for the foreseeable future. It is difficult to predict accurate timescales for conversion to other systems and this would be reliant, to a degree, on technical advances in battery efficiencies, energy storage etc.

Perhaps the most important trend is for home working to become the norm in time for a large portion of the workforce, which in turn could significantly reduce the need to travel.

As energy becomes more expensive rural economies may falter as public transport cannot meet all the journey needs. Rural depopulation is a likely outcome. Oil companies will attempt to keep fossil fuel as the fuel of choice as long as they can. There are technologies, for example petrol/electric motors, which already reduce fuel consumption and emissions and these should not be seen as a way to 'head-off' research and development of alternative fuels. Hydrogen for example is a clean alternative fuel but currently expensive. Unless the oil companies are forced to release their grip on the fuel economy it will be decades before any meaningful change takes place. The costs will be very high but the alternative is real disruption and hardship in the future due to fuel shortages and price rises. In addition if we do not reduce our fuel emissions massively the effects of global warming will actually require us to use more energy and resources to maintain our lifestyles.

Solid Recovered Fuel (SRF), derived from municipal solid waste, may provide a sustainable fuel source for the future.

Investment costs are likely to be substantial.

## **Environmental and Social Issues**

### **11. What are the environmental concerns that need to be taken into account, in terms of the impact on ecological and other natural resources, as well as waste management and impacts on the landscape?**

This issue is perhaps the most emotive and significant concern for Scotland, bearing in mind the current political climate and the willingness for Scotland to be seen to be taking a lead in environmental issues. The environmental concerns that need to be taken into account apply to both the generation processes as well as the issue of increasing energy demand with increased growth in the production of green house gases. The impact on ecological and natural resources could be profound. Climate change effects including rise in sea water temperatures, reduction in the effect of the gulf stream and local impact increasing the frequent and severity of flooding events could have repercussions on a range of environmental issues as well as on farming practices. It is also evident that demand for energy is increasing and commercial pressures in the consumer lead society will continue to impact on the need for energy. It is also the case that as long as there is available cheap energy householders will not consider the consequences of domestic demand to be significant. It is important, however, to realise that energy efficiency, waste prevention and minimisation and thermal treatment of waste and the raising of standards in new build insulation and efficiency would help address potential environmental concerns for energy supply. The issue of impacting on the landscape of the country is more difficult to quantify in general terms but through the use of such techniques as Strategic Environmental Assessment (SEA) and the continued protection of significant environmental and landscape features and the promotion and consideration of smaller scale sustainable energy processes, the negative impacts on the landscape can be minimised.

All types of energy generation will have some biodiversity impact and generally the bigger the scheme the greater the impact (e.g. small scale tidal generator might have virtually no biodiversity impact whereas a tidal barrage across an estuary could be disastrous for biodiversity).

Most types of energy generation will also have landscape impacts. Particular care is required in relation to minimising impacts on locally and nationally important landscapes as well as the local built and cultural heritage. The cumulative impacts of energy generation projects is an important consideration.

**12. Can the objectives of environment improvement and economic growth both be met without a major increase in energy costs? What steps should be taken to enable an informed debate on the issue?**

The response to this issue depends primarily on the nature of the economic growth that has been proposed. The era of uncontrolled unsustainable growth for growth sake is over and significant new developments will need to be assessed against criteria eg Water Framework Directive (WFD), Strategic Environmental Assessment (SEA), National Planning Framework etc. can help assess the balance between economic growth and environmental protection. It is the case that there has been a separation of energy use from economic growth and that due to such factors as greater energy efficiency, increased energy use is not required to increase economic growth. Smaller scale localised sustainable energy production could assist economic growth and minimise environmental impact but it is accepted that an informed debate is required on this issue. The fact that there are increasing regulations being imposed to protect and enhance the environment indicates that this debate is already underway but that there is a need to ensure that any derived national energy policy has such wider issues addressed in the fullest sense.

In a country the size of Scotland there should be an inclusive debate on this important issue, including all areas of Scotland, and using a variety of communication methods.

It is likely that significant investment will be required to deliver energy efficient transport and construction of facilities.

**13. What are the social values and consequences of energy generation and distribution on employment opportunities, health, and energy affordability?**

It is evident that employment opportunities, health and energy affordability are interrelated and that energy generation and distribution do have social impacts, more importantly though the social impacts would be more severe without the provision of appropriate energy generation and distribution. The Scottish Executive in publication of its recent green job strategy has recognised that a green energy model will have impacts on employment throughout Scotland but it is also evident that the growth of renewable energy and research into renewable energy processes can distribute employment opportunities throughout the country. Conversely any policy framework for future energy generation and distribution will also require to take cognisance of job losses associated with the closure of existing power stations with the impacts of unemployment on such locations (eg Chapelcross). As usual all of these issues required careful consideration and a balanced response as there are positive and negative attributes to each of these issues.

In the broadest of terms, the Council's interest would be in ensuring a policy is developed that enhances the potential for increased investment in social and low cost homes whilst minimising fuel costs. If there was any proposals within the emerging policy that, for example, insisted that particular developments must link to locally based energy generation/distribution, there may be a danger in building in extra costs that would be difficult to meet under Communities Scotland's national benchmarks for new build. Communities Scotland, as the agency responsible for procurement and funding of new build social and low cost homes, would therefore be a key consultee.

A general point would be that the increase in the number of people living in their own homes as opposed to moving into institutional care will increase the overall number of households in the region. There will be a reduction in the economy of scale achieved as a result of group/institutional living.

There needs to be some element of small scale/community generation within any policy.

There is a continued need for public education on the need for energy conservation and acceptance of the need for renewable projects.

It is well documented that fuel poverty (not being able to heat a home to an acceptable standard within reasonable cost) is caused by a number of factors including household income, the cost of fuel, and energy efficiency of the home. In an area like Dumfries and Galloway, access to different types of fuel is limited with many areas reliant upon calor gas or equivalent and generally fuel costs tend to be higher in rural areas.

Fuel poverty can have a negative impact on both individuals and households, and on wider society. For individuals and households, the main negative impact of fuel poverty is its damaging effects on quality of life and health and effects. For example illnesses such as influenza, heart disease and strokes are all exacerbated by cold, and cold homes can promote the growth of fungi and dust mites which are often linked to conditions such as asthma.

Households that have to spend a high proportion of their income on fuel have to compensate in other parts of their family budgets. This can lead to poor diet, or reduced participation in social and leisure activities, both of which can also impact on health and quality of life. These negative effects of fuel poverty can be particularly significant for vulnerable groups.

There are a number of different groups who are particularly vulnerable to the effects of fuel poverty, for example unemployed people may be particularly vulnerable to the effects of poverty generally, and may spend longer in their homes than those who are working. Older people, people with a disability or long-term illness are also vulnerable to the effects of fuel poverty, as are young people and children. Cold homes can increase the time taken to recover from other illnesses, and this can affect a child's

education, leading to them taking more time off school. Overcrowding, causing families having to remain in heated areas of the home can also adversely affect the education of young people.

The Dumfries and Galloway Local Housing Strategy 2004-09 has objectives aimed at reducing fuel poverty mainly through raising the condition of houses to a better standard and the Tackling Poverty Working Group, a multi-agency group, is addressing maximising income. However the availability of fuel at reasonable cost remains an issue which has to be tackled at a national level.

Decisions taken now will affect this country and its citizens for years to come, therefore it is important that all such decisions are taken carefully and with a great deal of thought and discussion.

Increased production may be a benefit to the country as a whole, if we can rise to the challenge and produce more than we can use and export the surplus. In addition moving away from fossil fuel would make the atmosphere healthier. However it may already be too late to avoid weather changes in the long term.

Alistair M. Speedie  
Group Manager Strategic Planning and Transportation  
Planning and Environment  
Dumfries and Galloway Council  
E:mail: [alistair.speedie@dumgal.gov.uk](mailto:alistair.speedie@dumgal.gov.uk)

Thursday 14 July 2005