

ABERDEENSHIRE COUNCIL'S SUBMISSION TO THE ROYAL SOCIETY OF EDINBURGH INQUIRY INTO ENERGY ISSUES FOR SCOTLAND.

As almost half the electricity consumed in Scotland is used for heating, Aberdeenshire Council believes that the Government's definition of energy should be expanded to include heat as well as electricity so that a more holistic view of energy strategy and policy can be taken. The Council has lobbied and continues to lobby the Government and the Scottish Executive on this matter as opportunities arise.

As a domestic boiler now routinely operates with a thermal efficiency of 80% to 85% and in some cases can exceed 90% compared to around 50% for a conventional power station, the case for using electricity for space heating is difficult to make.

In terms of capital cost, electric heating is currently the cheapest form of equipment to install, but as it is amongst the most expensive to operate, its use in poorer households can mean the earlier onset of fuel poverty than if an alternative form of heating was used using a cheaper fuel source.

Scotland is rich in forest resource but lacks a market for small roundwood or thinnings.

Consequences of this are that many forests are not managed effectively through thinning because it is not always economical to do so.

This can result in poorer quality timber being grown.

The country currently has available for harvesting, some 5-6 million tonnes of timber annually in excess of what is produced.

Aberdeenshire Council has lobbied for timber or timber derived fuels from managed woodlands, irrespective of the date of planting, to be included within the definition of energy crops, to help promote timber as a fuel, particularly for heating and has also lobbied for the introduction of heat Renewable Obligation Certificates (ROCs), to open up the renewable generation marketplace and to recognise heat as a form of energy.

Advantages of timber for fuel include:-

Carbon neutrality

Low emissions of other products of combustion

Labour intensive so a good source of rural employment

Cost competitiveness will increase with time against fossil fuels

Availability in rural and remote areas where there is no mains gas and the price of heating oil is high because of distance from the terminal and/or because of volume of delivery

Availability in several forms – logs, chips, pellets and charcoal - each form having widespread applicability.

Aberdeenshire Council has produced a Renewable Energy Strategy which embodies the points made in the preceding paragraphs.

The Strategy recognises the need for a mix of renewable generation technologies together with the need for a mix of scales of generation to reflect local factors. This is particularly relevant when account is taken of the fact that

some 48 settlements in Aberdeenshire have no access to mains gas and there are around 150 rural households with no mains electricity - an interesting reflection on Aberdeenshire, which contains St. Fergus Gas Terminal, which processes around 15% of the UK's gas requirements and the Peterhead Power Stations which can produce considerably more power than the area consumes.

Responses to consultation questions

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 nation's first priority must be to reduce the need for energy through more efficient design and construction and through a reduction in the unnecessary use of transport – this will become increasingly important as energy costs continue to rise relative to others and as energy costs increasingly influence profitability and competitiveness.

Greater priority must be given to investment in research and development in renewable and energy storage technologies and the planning process must be able to accommodate and handle proposed renewable energy developments expeditiously.

The Country's Energy Strategy must be more holistic than at present and recognise heat as a form of energy in the same way that it recognises electricity.

The finite nature of fossil fuel supplies must also be recognised in the strategy with the likelihood that in the absence of replacement fuels, oil and gas may, at some future time, be reserved for petrochemical production and aviation and possibly some land transportation applications.

The Energy Strategy should reflect what resources Scotland has and can exploit on a sustainable basis and it is clear that so far, wind generation opportunities are being widely recognised and significant effort is being devoted to wave and tidal devices.

Hydrogen power has received a huge fillip through the recently announced initiative at Peterhead and the potential to safely store hydrogen is being supported by the Intermediary Technology Institute energy (ITIE), in one of their early funded projects.

In rural areas in particular, there should be greater encouragement to install ground source heat pumps which offer a reliable and secure form of heating with excellent efficiency credentials and the use of solar heating should be better encouraged everywhere.

In much of Scotland, biomass remains the opportunity which is the least developed but which is one of the most available and sustainable and in terms of plant uptime, one of the most reliable sources of energy.

Biomass, particularly wood biomass, is widely available in Scotland and more work should be done to develop wood fuel supply chains, as recommended in the Forum for Renewable Energy Development in Scotland (FREDS), Biomass Energy Group Report to the Scottish Executive.

Aberdeenshire Council supports a mix of conventional and renewable energy generation technologies, with oil, gas and (clean) coal being displaced by renewable technologies as these develop, though it is recognised that no single current non-nuclear renewable technology has the ability to meet existing demand for electricity, making the development of a holistic strategy even more crucial to ensure an optimised mix, taking account of the environment, sustainability, the economy and the value of energy.

Aberdeenshire Council is leading a study on the production of bio diesel in Scotland using oil seed rape as the feedstock. It is accepted that the Country cannot produce enough rape seed to be self sufficient in diesel but the Common Agricultural Policy permits the growth of energy crops on set aside land and encourages it through a supplementary payment.

Studies suggest that bio ethanol production in Scotland would not be economically viable at present because of the low price of bio ethanol produced in Brazil and the high costs of production of the necessary crops in Scotland. However, the potential for the use of agricultural crops as an energy source should not be discounted as future energy prices may make this viable.

Should Scotland aim to be self – sufficient in energy in general and in electricity in particular, despite trends towards interdependence within Europe?

Scotland already has many economic challenges to face within the UK and global economies – these include remoteness from large markets and relatively poor transportation infrastructure for goods movements.

Improving competitiveness in other areas to offset these disadvantages will help producers remain viable and as energy is an increasingly significant cost to businesses, better control of energy prices through self sufficiency appears an attractive proposition.

If energy production is considered to have significant strategic value, the case for self sufficiency becomes compelling, particularly in the cases of heat and electricity, where production of both to meet national need is possible in a Scottish context, with significant export potential for electricity.

As the relative value of energy increases, the value to the Scottish economy of exported energy sales will also increase, increasing its contribution to GDP.

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?

Increased reliance on imports decreases a Country's ability to negotiate on price and so in the contexts of scarcity, strategic importance and value, it would be advisable for the country to adopt a strategy which embodied as much energy production from local and national resources as is sustainable.

High energy prices, particularly in relation to freight transport costs, are effectively a tax on remote locations and within the context of the UK, Aberdeenshire is a significant producer (around 20% of Scotland's output), of livestock, cereals and vegetable crops, accounts for around 40% of Scotland's fish landings and also includes papermaking and processed food and drink production amongst its large employment clusters.

Whilst much effort is applied to adding value to locally produced goods, there is still a significant body of "commodity" goods production which is price sensitive. As freight charges are becoming an increasingly large component of the delivered price of goods, it will be in the interests of the Scottish economy as a whole to ensure that access to markets in the south of England remains competitive – diesel is already around 20% dearer in the UK than on most of continental Europe and at the date of writing, fuel costs alone for a 44 tonne truck travelling from Peterhead to London amount to some £299 (excluding VAT), which is equivalent to £13 per tonne for a typical 23 tonne payload of saleable goods.

Two thirds of the UK population live below the Humber /Mersey line, so if road transport costs rise relative to those of competitors' and this major market for area food and paper producers cannot be accessed economically, the viability of many North east businesses will end.

Energy Supply

What is the feasibility, availability, reliability, sustainability, efficiency, capacity and risks of the different energy generation technologies?

As it is likely that the various industry / technology groupings will respond to this question in relation to their own interests, Aberdeenshire Council will comment on biomass/biofuels.

Aberdeenshire contains around 25% of the arable land in Scotland and so is sensitive to any influences on costs of production such as the rising cost of fertiliser as a result of increased oil prices.

With the move within the Common Agricultural Policy from subsidies linked to production to a single farm payment, the sector is now more exposed to market forces in relation to the link between costs of production and selling price. This is generating a greater awareness of and buy - in to, forward selling of crops as a mechanism which at worst, establishes a floor to the market for a given product, but also provides a level of stability in what might be a volatile market.

With the steady real time fall in current and predicted cereal prices, farmers are increasingly looking at other cash crops. Climatic and soil conditions

mean that the eastern seaboard of Scotland is well suited to growing oil seed rape, with parts of Aberdeenshire producing particularly high yielding crops.

A study is currently being conducted, led by Aberdeenshire Council, in partnership with Scottish Enterprise Energy, Highlands and Islands Enterprise, Highland Council, Moray Council, Angus Council, Perth and Kinross Council and Fife Council into the viability of utilising oil seed rape for the production of oil or bio diesel through the creation of processing plant in the study area, which extends from Easter Ross to the North of the Forth, encompassing some 75% of rape seed growing land in Scotland.

A copy of the study output will be made available to the Inquiry team, though this will not be finalised until September 2005.

What is already recognised is that Scotland will be unable to grow sufficient oil seed rape (based on current yields), to be self sufficient in bio diesel and the fiscal regime (or some other incentive) must be made more attractive/available to stimulate economically viable bio diesel production in Scotland if the Country is to avoid a scenario where it becomes over dependent on imports at the same time as prices (for oil seed), rise and demand increases in the face of a rising oil price.

Bio diesel is extensively used in Europe and most diesel engines currently produced will run on a 5% blend of bio diesel without any adjustment and without invalidating the manufacturer's warranty.

In terms of current availability and low cost resource, wood fuels offer an excellent opportunity for the country.

The FREDS study identified the potential to generate around 450 Mw of electricity from wood on a sustainable basis and although the Group's remit did not extend to considering heat generation, the Report did refer to the significant potential in Scotland to use wood for heating and recommended that the Group was reconvened to further investigate this potential.

A further benefit of increased local heat generation (from boilers serving one building, heating networks or district heating schemes), is reduced loading on the electricity grid.

A national energy strategy which takes this factor into account would be better able to determine the required grid capacity and cater for a more orderly access to the grid for renewable electricity generators .

The major problem in introducing wood fuel schemes is the high capital cost of the burning equipment when compared to oil and gas equivalents.

Introducing wood biomass to the public sector is also difficult because at present, there is no compulsion to attach a value to environmental benefit in the context of best value, though the Treasury has produced a document, "Estimating the Social Cost of Carbon Emissions", Government Economic Service Working Paper 140, (authors, Richard Clarkson and Kathryn Deyes), which addresses this issue. It is understood that some Government departments are assessing projects using a figure of £70 per tonne and if this methodology was to become mandatory, the payback on wood fuel schemes would be significantly enhanced because wood is considered carbon neutral.

Heating oil (which with electricity is the main form of heating in rural areas) is also less heavily taxed in the UK than in much of Europe – in the UK, heating

oil is between 25% and 30% of the retail price of diesel, in Austria it is nearer 50% and in Sweden around 80%.

The degree of intervention or incentive required to convert from oil, whilst high in the UK, is non-existent in Sweden, where a householder will enjoy a pay back period of around 2 years if they convert an oil boiler to burn wood pellets, without any grant aid.

The FREDS report identified the long term sustainability of wood as an energy fuel. Given the potential for timber production in Scotland, it should be considered seriously as a key element in a national energy strategy and within local and regional economic development strategies where appropriate.

An excellent exemplar of this can be found in Styria in Austria where an audit and a review of the regional economy produced a simple energy strategy which has stimulated the forestry sector, the biomass boiler industry and the area economy as a whole, whilst not increasing its dependence on fossil fuels.

The four elements of Styria's energy strategy are:

1. Reduce demand through efficient design.
2. Minimise impact on the environment.
3. A presumption against the use of electricity and fossil fuels for heating.
4. Local solutions to energy supply should be considered before national or international options.

Two significant benefits realised from this strategy are an enhanced level of retained wealth in the area (through a reduction in dependence on fossil fuels) and a world class forest industries sector, embracing all elements of the supply chain.

Given the long term availability and sustainability of timber from managed forests, up time of heat and electricity generating plant of around 95%, low emissions, fuel price competitiveness, the potential to grow timber as a cash crop on a widespread basis and the social benefits of competitively priced locally resourced fuel being available, there is a strong case for supporting the development of wood fuel use in Scotland.

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

Aberdeenshire Council's Renewable Energy Strategy is based on the likelihood of fossil fuel prices increasing relative to other fuels and in particular with wood, where there are large existing and potential capacities to increase production. The Forestry Commission owns a significant part of Scotland's forests and could promote the use of wood fuel more vigorously.

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

Electricity grid capacity, access and cost issues are well documented, particularly for renewable electricity generators located remotely from large population clusters.

The upgrading of the grid should take into account the desirability of removing as much heat load from the grid as is practical and in that context, the national energy strategy should consider both heat and electricity demands and how these should be managed through a holistic energy strategy.

The need to reconcile environmental benefit with higher capital cost must also be addressed more meaningfully in terms of carbon emissions and the economy of the country if we are to encourage the manufacture of capital goods for energy production in Scotland.

Reference is again made to the need to set a price on carbon production or a value on not creating carbon emissions for estimating the payback on renewable energy projects.

What are the key issues surrounding the development of Scotland's bulk electricity transmission and local distribution systems?

The following factors have been identified in this context:

1. The need to reduce individual demand through more efficient design
2. The need to consider both heat and electricity as energy forms and the need to displace heat load from the grid as part of any long term consideration of capacity issues.
3. The need to facilitate access to the local network for micro or small generators.
4. The need to reconcile grid access and transmission costs with an electricity generation policy which encourages wind farms and other power stations (for example Peterhead), in areas remote from large centres of population.
5. The need to develop a holistic energy strategy which identifies locations for future generation facilities using a range of technologies which would allow optimised planning of the future grid.

Energy Demand

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

There will be a link between energy price and the sustainability of Scotland's business sectors which require high energy inputs to production processes and are dependent on remote markets.

Aberdeenshire Council is not aware of any studies embracing these issues.

A more fundamental question to be addressed in scenarios where energy use is prioritised or rationed or where energy is relatively expensive is the sustainability of the global economy and global supply chains and whether certain business sectors have to be considered as supplying local, regional or national needs.

This would clearly have a major impact on companies in the food and drink sectors in the North East, which are major employers and exporters from the area and which are frequently structured on a scale which requires high volumes for profitability.

Whilst no firm views are expressed about impacts, the need for clarity on the ability to meet the increasing demands for energy is vital for long term planning of the economy.

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 erosion of seasonal boundaries and the move towards a wetter climate, combined with lifestyle changes which emphasise convenience, amenity and comfort all contribute to increased demand for energy for heating and electrical appliances.

Whilst the efficiency of appliances is improving, demand for electricity is increasing through a larger number of single person households, ownership of a larger number of appliances, with refrigerators, freezers, tumble driers, computers multiple televisions, video recorders, games consoles, food processors, higher levels of lighting and central heating circulation pumps all being additional to a typical household inventory of 40 years ago.

Standards of building insulation in Scotland remain poor overall and whilst incoming Building Regulations are set to improve this position, the country has a large stock of older houses whose thermal performance must be enhanced if widespread fuel poverty or a disproportionate spend on energy are to be avoided.

Although energy charges have a high degree of political sensitivity, it remains the case that compared to much of Europe, electricity charges and the price of heating oil are low in the UK, so the financial consequences of profligate consumption are not felt as keenly by UK consumers.

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

Individual transport needs remain focused on the car and the political cost of altering this behaviour could be high in the short term.

Car journeys accounted for almost 80% of UK road miles in 2004, compared to 4.3% for trucks and around 1% for buses and coaches. The total distance covered in all UK road journeys by vehicles was almost 312 billion miles in the year.

Cars and trucks covered more miles in 2004 than in 1999 whilst bus and coach mileages had reduced, the figures being +5.5%, +4.3% and -2% respectively.

In the same period, the population of articulated vehicles registered in Scotland rose by 13.5% but the equivalent rise in North East Scotland was only 2% (17 vehicles), suggesting a decline in work available in the area relative to other parts of Scotland.

Modern (Euro 4) diesel engines are much more fuel efficient than their predecessors of 20 years ago, a typical 44 tonne truck returning better fuel consumption today than its 32 tonne predecessor of the 1980s.

Despite this, diesel fuel is an increasingly large component of haulage charges now accounting for up to 40% of overall costs depending on the nature of the operation.

Displacement of fossil fuels for road vehicles will be dependent on the development of new technology –for instance, if hydrogen can be produced economically and stored safely (a project ITI energy is involved in), the replacement of fossil fuels may be accelerated for road fuel applications.

The potential to move goods onto the railway in North East Scotland is inhibited by gauge, network, service and track problems which need significant investment to resolve.

Scotland could benefit from greater use of its ports if “just in time” methodologies in the supply chain were abandoned.

The movement of goods in sub optimal quantities (a characteristic of just in time is little and often), is increasingly difficult to justify in environmental terms and in cost terms when interest rates are low, reducing inventory holding costs, whilst transport charges are simultaneously increasing in relative terms. Goods could be moved by fast ferries, by container or conventional ship, depending on value and transshipment concerns and costs.

Environmental and Social Issues

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?

The requirement for Strategic Environmental Assessment (SEA) to be carried out on plans, and programmes (EU Directive 2001/42/EC) was transposed into Scots Law on 20 July 2004. The Scottish regulations require that formal environmental assessment is undertaken of certain public sector plans, policies and programmes (referred to as Strategic Environmental Assessment or SEA.) These regulations will help to ensure that wherever renewable energy strategies are proposed e.g. within development plans, or as supplementary planning guidance environmental impacts will be fully explored, and mitigation addressed where necessary. Likely significant effect on the environment, including biodiversity, fauna, flora, soil, water and landscape, will require to be taken into account.

For concerns relating to forestry, attention is drawn to the “Forestry and Woodland Strategy for Aberdeenshire and Aberdeen City (July 2005)” where renewable energy issues are outlined and concerns identified.

***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?***

No. Anyone who advises that there will not be real prices to be paid, both in terms of increases in energy costs, or constraints on individual life-style choices (in terms of how we consume) is likely to be raising unattainable expectations.

What steps should be taken to enable an informed debate on the issue?

Regular forums such as the RSE Energy Inquiry would be useful; an annual follow up(s) to this RSE inquiry may be appropriate.

Less formal ways of raising awareness locally should be progressed in parallel to this. Different local authorities will have different solutions, but one that is available is to use Community Planning as the main vehicle to raise awareness of issues relating to Scotland’s energy supplies. A forum for dialogue already exists within Community Planning. Similarly, Area Plans, operating within a local framework but still under the Community Planning umbrella, could help raise awareness of energy supply issues amongst communities.

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

Changes to building regulations will, over time have the potential, to reduce the incidence of fuel poverty in Scotland, and associated health issues.

A new approach to the design and layout of settlements, through the development plan system, could have positive effects in terms of reducing congestion and pollution within urban areas, as well as encouraging more sustainable forms of transport (including walking and cycling), with associated health benefits. To achieve this, however, planning solutions need to do more than tinker at the margins of current suburban layouts e.g. through incorporation of affordable housing or pedestrian links. Continued efforts are needed to encourage innovative solutions to local retail and employment facilities, and higher density living patterns.

With regard to affordability, it is likely that within this initial phase of delivering energy through alternative sources, prices will remain high; but as alternative technologies develop and improve, competitiveness will increase, and the

price come down. A critical driver will be the affordability of energy from renewable sources relative to the price of oil.

It should be noted that a key characteristic of energy in contemporary society is that of being a “positional good”. Around the middle of the last century, the West has seen the rise of a society where status is marked by levels of consumption, not by ownership of truly durable goods, and energy use has had an increasingly positional character. (For example, the ownership of a large car is still seen to reflect status, and someone who takes the bus might be assumed to be doing so for financial reasons. However, with a 2⁰C rise in global temperatures by 2030, energy consumption's positional status is likely to be challenged. It is likely that the market will pull in innovations that spend this positional premium on avoiding conspicuous emissions and tasteless consumption.