Friends of the Earth Scotland

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Dear Professor Salter

FOES submission to SNP Energy Review

Friends of the Earth Scotland (FoES) is an independent member of the Friends of the Earth International network, with 5,000 individual members. We undertake research, advocacy and community development activities throughout Scotland in pursuit of environmental justice and sustainability. We are a Scottish charity, established in 1978.

We welcome the opportunity to comment on this review which is timely and offers a distinct Scottish contribution to the current debate on meeting future energy needs, in the context of climate change, rising prices and the opportunity to consider the best future energy infrastructure as significant generating capacity approaches the end of its functional life.

Addressing the perceived energy gap

We are convinced that the issue of an "energy-gap" has been greatly exaggerated in relation to Scotland's security of supply over the next 20 to 25 years. Scottish Power's decision to retain substantial generating capacity at Longannet through investing in measures to meet the requirements of the Large Combustion Plant directive leaves no overall risk that energy generation will fall short of demand[3]. A thorough analysis is set out in a recent briefing paper we have compiled in collaboration with the RSPB, & WWF entitled "The Power of Scotland". This suggests one practical scenario for exploiting Scotland's renewable potential and tackling energy inefficiency to allow future needs to be met in a sustainable way[4].

We are actually more concerned that the extension of life at Longannet, and proposals mooted for Hunterston and Torness, will leave Scotland facing problems of over-capacity, which will deter public and private investment in energy conservation and renewable energy.

Given Scotland's outstanding renewables resource we see the closure of existing fossil and nuclear generation capacity as an opportunity and not a threat, given the appropriate policy framework. This may well be important in driving forward measures to secure better efficiency and reduced wastage,

[3] Announcement to the Stock Exchange, by Scottish Power 3rd February 2006
[4] The Power of Scotland: Cutting Carbon with Scotland's Renewable Energy, Feb 2006, RSPB Scotland, WWF Scotland, Friends of the Earth Scotland

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whilst also making room for renewable capacity within Scotland's generation portfolio.

Whatever strategy is chosen we believe it must be built on a logical foundation based on the primary goal of addressing climate change (making an equitable contribution to global emissions cuts, recognizing historical inequity in emissions) and in doing so minimizing other negative environmental outcomes. We believe that Scotland, like other developed countries, should be seeking to cut emissions rapidly and deeply, with an 80-90% cut desirable by 2050 (if not earlier). To set us on the right path we advocate rolling reductions of 3% per annum. Sweden and Switzerland offer good examples of appropriate medium and long-term ambitions: Sweden in particular stands out as seeking to end oil-dependency and phase out nuclear power by the 2020s.

Based on current and rapidly advancing technologies we propose a hierarchy for measures to be taken to address climate change:

- BEST Avoidance and conservation
- Efficiency in use
- Micro-renewables and micro-combined heat and power (CHP)
- Macro-renewables and combined heat and power (CHP)
- Fossil fuels with carbon capture and storage (CCS)
- Measures to stimulate carbon sinks (forests, organic soils etc)
- WORST Nuclear power

With regard to meeting future energy needs, the opportunities at the top of this hierarchy are massive and critical. They include planning and other measures to promote walking and cycling rather than car use; digital communications to replace travel; public transport investments and self-monitoring ('smart') appliances that reduce their demand when the grid is overloaded; as well as long-overdue improvements in building insulation, industrial energy efficiency and product energy standards.

Such measures would not only deliver environmental outcomes, but with a strategic approach to their introduction, would also offer significant health, social and economic benefits for Scotland's people and businesses. Public transport and energy efficiency have long been demonstrated to have substantial local employment multipliers, as well as offering significant benefits for social inclusion and regeneration[5]. Energy efficiency and micro-renewables are the best energy measures to tackle fuel poverty, providing security of supply and price for those currently in fuel poverty (of course social measures will also be needed, but seeking to cut energy prices is only a short-term fix, as currently being demonstrated with large numbers of households returning to fuel poverty).

We note that most electricity scenarios predict at least a 1% annual increase in demand[6]. Such an assumption is unsustainable. Fortunately there is considerable potential to reduce demand through improvement to buildings and appliances/equipment and such investment is generally more cost effective than adding new generation capacity. There is also such inefficiency in use, generation and transmission, that there is great potential to increase the energy services delivered (heating, cooling, lighting, motive power) whilst reducing both primary energy demand and total electricity generated. In this context it is important to distinguish energy conservation (avoiding energy use, through, for example, walking rather than driving) from energy efficiency (using a more efficient car). For example, Friends of the Earth and Scottish Power have run a pilot scheme called Read for the Future, encouraging children to read rather than watch TV or play video games.

Alongside energy conservation and efficiency we would argue that future strategy must establish domestic scale-micro generation as a key part of Scotland's electricity generation capacity. Based on a recent report commissioned by the Energy Saving Trust, published in November 2005, we believe that micro-generation could deliver in the region of 2.5% (minimum intervention) to 10% (regulation) of total electricity needs[7]. This assumes that Scotland is similar in characteristics to the UK as a whole and that commercialization of the technology will be achieved towards the end of the scenario timeframe (between 2020 and 2030). This may be overly pessimistic given Scotland's enhanced potential for micro-scale biomass and wind generation.

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[5] See, for example: Jenkins and McLaren, 1994. Working Future? Jobs and the environment. Friends of the Earth, London.
[6] Scotland's Renewable Energy Potential, Future Generation Group report, Scottish Executive 2005
[7] Potential for Micro-generation Study and Analysis, Final Report, Energy Saving Trust 2005

We have some concerns about the overall efficiency of the current approach to energy generation, which is highly centralized around major thermal plants, where much of the energy is wasted in the form of heat, with further smaller losses through transmission[8]. As we approach the need to replace existing plant we believe that the scope for combined heat and power (CHP), which is more prevalent in other European countries and Scandinavia[9], should be developed and realised.

Indeed, current debate has focused far too heavily on the issues around electricity generation, which accounts for only a limited part of Scotland's energy demands. Heat and transport account for much more of our demand of fossil fuels, especially gas, and emissions of CO_2[10].

On heat the Scottish Executive has recently announced a strategy, and its intent to set a target for renewable heat. This is welcome and offers a platform for accelerated development of biomass (with more potential for local heat generation than for centralized electricity generation); and for adoption of CHP at the domestic and larger scales. However incineration of waste for heat or power remains a poor second best approach to recycling and resource recovery, as the energy generated is significantly less than the energy consumed in replacing the resources burned.

On transport Scotland's progress is very poor, with increasing emissions from road and air transport, yet continued investment in increasing road capacity, and policy stances which seek to maintain low real prices for driving in comparison with public transport, and for air travel. Despite recent increases in petrol prices, the real costs of motoring remain below 1970s levels, whilst the real costs of public transport have increased significantly. Any party's policy on energy will only be environmentally credible if it tackles energy use in transport as well as electricity and heating.

Making best use of Scotland's sustainable energy resources

We note that a market-based approach has been used to stimulate the market for renewable energy in Scotland and this has put Scotland well on course to meet renewable electricity targets of 18% by 2020[11]. We do however have concerns about the direction this is taking generation capacity, which in the medium to long-term must move beyond today's commercially mature technologies such as onshore wind and begin to foster offshore wind, tidal and wave energy as part of the renewables portfolio. This results from a policy stance which is ostensibly 'technology neutral', but thereby focuses investment on the most profitable technology at a given time. A more mature approach would recognize the different support requirements of different technologies as they move from concept to commercialization. Differential feed in tariffs as used in Portugal and Germany could address this. However any change to the current system of ROCs should only be proposed with careful consideration, as further uncertainty over support arrangements would increase risk for the Scottish renewables industry.

Grid and network issues

There are a number of issues and developments with significant implications relating to the grid. The closure of major generation plant offers some interesting possibilities to develop more efficient decentralized generation with lower transmission losses. The biggest prize in this respect is in making use of combined heat and power (CHP), with immediate opportunities to supply major industrial heat users, and longer-term potential for development of district heating. But there is also significant scope for enhanced use of micro- and community scale electricity generation. Alongside deployment of energy efficiency developments, and smart appliances, this implies that the main challenge for the grid is upgrading it for decentralized generation and the deployment of smart meters and appliances; rather than extensions and capacity upgrades.

Having said this, there are a number of important areas for capacity upgrades in the near future:

1. Central belt upgrades to allow renewable sources such as landfill gas guaranteed access to the grid.
2. Connections from the Outer Isles to the central belt to permit deployment of marine renewables (potentially via sub-sea cables)

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[8] Decentralising UK Energy: cleaner, cheaper, more secure. Energy for the 21st century application of the WADE economic model to the UK, Greenpeace 2006

[9] ibid 8

[10] Scottish Energy Study: Summary Report for the Scottish Executive, AEA technology, January 2006

[11] Renewable Energy in Scotland: Scottish Parliament Enterprise and Culture Committee 6th Report, The Scottish Parliament 2004

3. Upgrading the connection to Peterhead to permit the proposed 350MW BP/SSE Miller CCS development to displace coal capacity rather than the existing, relatively clean and efficient Peterhead CCGT
4. Upgrading the South-North capacity of the England interconnector, to enable Scottish renewables to function effectively in the UK system (this is needed to ensure adequate capacity at peak times when one or more of Scotland's major power stations is not functioning).

Such developments, as well as any upgrade necessary for appropriate deployment of onshore wind in the Northern Highlands should be debated in the context of the next National Planning Framework. We also believe that in establishing proposals for the future of the grid there should be a long-term plan and this should set within a wider energy supply strategy subject to a Strategic Environmental Assessment.

We are not yet convinced that the one-size fits all approach to access and grid connections across the UK as prescribed by OFGEM, is entirely appropriate to Scotland. Clearly, there are issues about Scotland's smaller market for electricity in terms of consumers, low population densities and longer transmission distances. Issues surrounding micro-generation and the sale of surplus output via the grid – both metering and tariff arrangements - also needs to be reviewed if existing barriers are to be overcome. The accelerated roll-out of smart meters would facilitate this.

In the longer term, localized energy storage (eg using hydrogen fuels cells) should be investigated and prioritised. This is an area that needs greater attention, rather than assumptions that we must meet future needs solely based around enhancements to the existing grid.

Developing a lead in clean carbon technologies

We are aware that Scotland has a number of leading companies in fields such as clean coal technologies and plans for a pioneering carbon sequestration project, with the potential global market for these products being huge. We believe that Scottish Enterprise should support work in this field, alongside and not at the expense of renewables, which also offers substantial export market opportunities.

All renewable energy technologies still have potential for further development and enhancement and the pace of innovation is fast. We believe more may need to be done in terms of funding and support for universities to keep pace with these changes - not least to turn patents into Scottish based manufacturing opportunities - as well as to ensure that commercial development of new technologies and the learning that accompanies it is done in Scotland. In this context, whilst Scotland can be proud of the sale of Pelamis technology to Portugal, commercial deployment there will give an advantage to Portugal in subsequent development and marketing of the technology.

We must assess the strategies of our competitors in terms of support and learn from them in reforming our support systems: finding the most imaginative ways to support renewables development. We believe that micro-wind, wave and tidal offer the best possibilities to establish market leadership, but based on current levels of support this leading edge could be lost or at least blunted, to the advantage of our competitors.

In this context the revival of the moribund nuclear industry would send the wrong signals to the market and investors and undermine and deter efforts to establish Scotland's embryonic renewables sector, costing Scottish jobs.

Security of supply and affordability

The first priority for achieving affordability for consumers is measures to reduce unnecessary wastage and usage of energy. What matters most to consumers is not the unit price of energy, but the overall bill for the energy services they use. Much efficiency and conservation can be achieved for little or no net cost – but innovative measures will be needed to deliver improvements rapidly, and to give energy suppliers stronger incentives to improve energy efficiency. The outcomes of the Energy Efficiency Obligation – with most companies exceeding their legal obligations - offer hope that even more can be achieved. The focus for efficiency should be on the thermal performance of buildings and the performance of appliances and machinery. For the latter we believe that there is not only considerable

scope for savings but also that this will deliver a positive net economic benefit for any public or private investment[12]. Such investment offers a better return than investment in new capacity.

In the short to medium term - up to at least 2020 - Scotland's energy security is not under serious threat. Firstly, we are less reliant on gas than the UK for electricity generation, although it is important to heating needs. Secondly, the proportion of renewable technology and investment in new capacity is much higher than in the rest of the UK. Thirdly, whether we like it or not Scotland will have major nuclear generation plant(s) operating up to and possibly beyond this time. Furthermore Scotland's largest coal generation plant Longannet (accounting for some 20% of generation) has had its operational life extended. It is also important to note that Scotland currently produces a net surplus of electricity for export to England[13]. However, the significance of these exports needs to be seen in the context of a pan-UK energy market and possible changes to supply capacity in England.

There are however, risks associated with our dependence on a small number of large centralised plants. The reliability of these facilities is good, but not infallible. Even if just one of the major fossil or nuclear plants is off-line at a time of peak demand, there could be temporary shortages. In the medium term a combination of decentralised generation and responsive ('smart') appliances can solve this problem. In the short term, further investment in the grid interconnector may be appropriate.

We would urge serious attention be given to the longer term issue of energy storage. Energy security could be massively enhanced if efficient storage systems for renewable electricity could be deployed. At present Scotland uses some pumped storage, and initial exploration of hydrogen as a storage medium and energy vector has begun (eg at the PURE project). In Germany compressed air storage is being developed. Although as demonstrated by Robin Wallace's recent report on Matching Energy Demand with Renewables, the 40% target – or higher – is feasible on average across the year, hour to hour matching of demand and supply will require 'load-following' plant (which could include eg biomass, or CCS fossil plant) or new techniques (responsive grid, and energy storage – ideally dispersed).

Nuclear Power

We believe that using new or replacement nuclear stations as the answer to security and affordability issues is a non-starter and must not be part of a future strategy for the following reasons:

- Foreign imports: Scotland has no commercially exploitable uranium deposits and so nuclear power is wholly reliant on imports of uranium, potentially from politically unstable countries, as world demand for uranium increases. In addition we would be buying foreign reactors probably from USA based Japanese owned Westinghouse or French EDF, companies we would then have to rely on for 30 to 40 years. In security terms replacing indigenous fossil fuels with imported uranium would be inappropriate.

- Emissions: Nuclear power is not free of carbon emissions. Estimates vary, and there is heated debate on this topic. However all parties accept that substantial quantities of energy are embedded in nuclear power stations (a range of 27-81 PetaJoules of embodied energy appears reasonable). Moreover, nuclear stations use large quantities of carbon-intensive cement in construction. There is also heated debate about the availability of high-grade uranium. Whilst it is not unusual for minerals to have an apparent 30 year supply (due to the cost of prospecting compared with the returns from exploitation), it is clear that if demand grows rapidly, the grade of uranium ore available will fall, reducing the energetic efficiency of nuclear power. Regardless of these concerns, at present nuclear remains a low-carbon, but not carbon free source of energy, with other severe limitations.

- Timescale: Even if it is accepted that nuclear power is a low carbon technology it will not be in position to meet existing carbon emissions targets. Firstly, there is a long lead in time associated with essential safety concerns in licensing and planning. Even after construction it will be some time before generation compensates for the carbon that has gone into its construction. In comparison, new renewables can be rapidly deployed.

[12] The Energy Review, Performance and innovation unit report, The Cabinet Office 2002
[13] Ibid 10

- Uncertainty/ dependability: There is considerable uncertainty about the next generation of nuclear power stations as they use as yet unlicensed designs and require private finance based on current government policy. This leaves scope for large delays in consents, financing and construction, not to mention initial teething problems. The performance of Scotland's current stations Torness and Hunterston has been patchy with major unplanned outages in recent years, some lasting several months. Given the scale and scope of the project and its overall contribution to energy supplies such factors worsen rather than improve energy security.

- Security: Nuclear power could create heightened risks of proliferation of weapons grade material , or at least the loss of materials adequate for the construction of a 'dirty bomb'. Nuclear facilities could also be a target for terrorism: at a minimum this adds to the costs and at worst creates heightened risks to society. Furthermore, the UK's adoption of nuclear power weakens the case for denying other countries (Iran for example) the same technology. Indeed, as the SDC has identified, if the UK decides that nuclear is necessary to meet obligations under the UN Framework Convention on Climate Change and the Kyoto Protocol, we cannot then deny the technology to other countries.

- Cost: Nuclear generation is not cheap. It requires substantial upfront investment and even now appears to be predicated on high wholesale electricity prices, as previously demonstrated by the near demise of British Energy only halted by a government bailout. We would anticipate that current life-cycle cost estimates will rise significantly as waste management facilities for long-term storage – as yet even unplanned - are developed.

- Resolution of waste issues: Safe storage of waste is not just a cost issue but has much wider implications for the future of nuclear. The amount of waste generated by a future generation of nuclear power stations should not be underestimated. Despite predictions of more manageable amounts of low–level waste, the volume of high-level waste, in the form of spent fuel, from any new generation of stations would add considerably to the existing inventory[14]. Moreover, it should not be assumed that any 'solution' to the management of the UK's existing waste identified by CoRWM (as required by its remit), would be appropriate or publicly acceptable for a new generation of waste.

- Inflexibility: a new generation of nuclear power will be with us for up to 50 years, swallowing up investment and reducing the potential market share for other technologies in that period. We would be left with the unfortunate situation of being saddled with outdated technology and an enforced state of uncompetitiveness. Moreover nuclear power would reinforce the inflexible, centralised grid system, undermining dispersed generation; as well as reducing the incentives faced by business and households to save energy.

For the above reasons we put nuclear at the bottom of our energy hierarchy referred to in the first section of this report. We believe a recent report by the UK Sustainable Development Commission reinforces and confirms these well-rehearsed arguments nuclear powers limitations[15].

We hope these comments useful and wish you every success with the review, which we hope will maintain and enhance the SNP's enthusiasm for exploiting Scotland's renewable energy resource. If you like to discuss these matters please do not hesitate to get in touch.

Yours sincerely

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[14] CoRWM's Radioactive Waste and Materials Inventory, July 2005 http://www.corwm.org.uk/content-728
[15] The Role of Nuclear Power in a low carbon economy, Sustainable Development Commission, March 2006