SUBMISSION FROM MARK GIBSON

Remit
“An inquiry into the achievability of the Scottish Government’s 2020 renewable energy targets, the merits of the targets and what the risks and barriers are to realising them.”

Terms of Reference

Targets

1. Are the 2020 renewables targets (for electricity and heat) achievable? If not, why not?

Almost certainly not. I attach, as appendices, papers prepared by:

- Professor Colin McInnes FREng FRSE (a particularly thoughtful article)
- The Institute of Engineers and Shipbuilders in Scotland
- The Institute of Mechanical Engineers
- Rupert Soames’ presentation to the Scottish Parliament (this presentation is particularly persuasive as his company, Aggreko, builds generators and would be first to benefit should current energy policies fail and power cuts ensue).
- The Adam Smith Institute
- The Institute for the Study of Civil Society (Civitas)
- Verso Economics
- Professor David Campbell, Professor of International Business Law at Leeds University

Please can you confirm that the above attachments will be able to be viewed on your website?

2. What contribution will achievement of the 2020 renewables targets make to meeting Scotland’s CO₂ emissions targets (a reduction of at least 42% by 2020 and an 80% reduction target for 2050) under the Climate Change (Scotland) Act 2009?

It could result in Scotland more than meeting the Climate Change (Scotland) Act target of a 42% reduction. I say ‘could’ because there is some evidence that wind farm deployment actually results in an increase in CO₂ emissions (see the paper by The Institute for the Study of Civil Society (Civitas))

3. Will increase in demand from electric heat and transport be offset by efficiencies elsewhere?

Hard to say. We waste about 60% of the energy we consume, so there is a lot of potential saving to be made from greater efficiency and insulation etc.

4. Has the Scottish Government made any estimation of the overall costs of achieving the targets, and identified which parties will bear them?

The costs should include the enormous cost to Scotland as a result of desecrating our landscape with giant turbines. Our landscape is our greatest natural asset and is at grave risk from current policies; particularly wind farms. The enormous consequent damage to tourism needs to be added to the other costs of creating the renewable energy projects.

I attach the policy of the John Muir Trust.

As to who should bear the cost of meeting targets, at the moment it is the electricity consumer. The cost of the subsidy is leading to quite large increases in electricity bills for individuals and families, affecting the poorer members of society the most.

Almost more damaging though, is the negative impact on economy and therefore jobs. The huge extra cost to industry makes us less competitive and these is a clear danger that businesses will move to countries with lower energy costs.
Other costs include the need to import electricity or replace back-up generators to cope with periods when the wind is not blowing. Both transmission lines for the former and the huge amounts for new back-up generators need to be taken into account.

Challenges
(a) Technology

5. Is the technology to meet these targets available and affordable? If not, what needs to be done?

Possibly not. The two greatest weaknesses of many renewable systems are lack of energy storage capability and intermittency of generation.

The paper by Professor McInnes is a thoughtful and very relevant one, particularly in relation to this heading.

6. Are electricity generating or heat producing technologies compatible with the need for security of energy supplies?

The response to point 5 above probably covers this question too.

7. Are our universities and research institutes fully geared up to the need for technological development, innovation and commercialisation?

Yes, I believe so.

(b) Supply chain and infrastructure

8. Is the supply chain in Scotland in place to meet the targets?

Most renewable schemes are developed by foreign owned companies. The poor are effectively taxed and the money sent away from this country.

9. What further improvements are needed to the grid infrastructure or heat supply networks both at a national and a local level? Additionally, are we confident that the necessary infrastructure can be developed and financed so that Scotland can export any excess electricity generated to the rest of the UK and/or the EU? What is the role for the Scottish Government here?

At enormous cost to the consumer and to Scotland’s landscape, the Beauly/Denny line and the new line through Ayrshire, amongst possibly others, are being built or are planned to be built soon. This in itself will lead to yet more inappropriately sited wind farms being approved to feed into these new transmission lines.

It is not just a question of whether the necessary infrastructure can be built and paid for to export electricity from Scotland. It would also be necessary to very substantially upgrade transmission lines to enable Scotland to import electricity during times when we are not producing enough (e.g. during prolonged high pressure spells, which tend to coincide with great cold).

(c) Planning and consents

10. Is the planning system adequately resourced and fit for purpose?

At very damaging cost to democracy.

There is an increasing belief that the views of individuals and communities are ignored in planning assessments of wind farm applications and that the Government overturns almost every objection by a local authority.
Historic Scotland and Scottish Natural Heritage are instructed as to which planning applications they may and may not object, making their responses worse than meaningless.

11. How can national priorities be reconciled with local interests?
   National priorities can be happily combined with local interests to create a strong Scotland, but wind power is wrong and cannot be accommodated with local interests.

(d) Access to finance

12. Will sufficient funds be available to allow investment in both the installation and the development of relevant technologies? What can the Scottish Government do to influence this?
   Possibly not while there is uncertainty about independence. Would Scottish consumers be able to shoulder the whole burden of subsidy to Scottish renewable schemes? I doubt it.
   Funds for development of technologies should be fine.

13. What will the impacts be on consumers and their bills?
   Severe, for both individuals and businesses, resulting in fuel poverty and loss of competitiveness, respectively.

(e) Skills and workforce development

14. Will Scotland have sufficient home-grown skills to attract inward investment? Are current policies producing the desired move towards Science Technology Engineering and Maths subjects at schools and universities? Is the skills transfer from the oil and gas sectors being realised?
   Yes – but not yet sufficiently developed to justify current actions. Much is made of job creation, but where are these jobs? Scottish Power employs Spanish construction workers, most turbines are built abroad and operational employment is almost zero.

(f) Energy market reform and the subsidy regime

15. Are the reforms of the energy markets and subsidy regimes at both UK and EU level sufficient to meet the challenge of the Scottish Government's renewable targets?
   Sound technology shouldn't need subsidy, as Professor McInnes argues in the attached paper.

Energy Policy should be about providing security of supply, with power produced in the most efficient and economic way possible, and with least damage to landscapes and the natural environment. That is what will make Scotland competitive.

The above should be delivered not by politicians but by engineers and technocrats. The Government's role should be restricted to encouraging innovation.

I believe that a well meaning Government has been mesmerised and 'conned' by the very powerful wind industry and its lobbyists. It is time to accept reality and the evidence of experts, as shown by the attached papers and many others.

Mark Gibson
OPINION:
NO TIME TO ABANDON ENERGY DENSITY

Policy measures to combat climate change that favour 'green' energy technologies go against the engineering principles that decoupled the costs of energy and human labour. Professor Colin McInnes FREng FRSE believes that reversing transitions to higher energy density and moving towards spatially diffuse and intermittent energy sources is a recipe for a future of energy austerity.

When James Watt's separate steam condenser began to displace Thomas Newcomen's early atmospheric engine, it did not require government targets or financial incentives to encourage the take-up of the technology. Watt's idea succeeded simply because it took less than half as much coal to deliver the same quantity of mechanical work. Watt's innovation was part of a long-term trend in energy production; it was part of a continuous move towards using fuels of greater energy density and lower carbon intensity. The beginning of the transition from wood to coal in the Elizabethian era allowed us to escape from the photosynthetic limit of diffuse biomass. This was followed much later by oil, methane (natural gas) and now uranium. Each new fuel has a higher energy density and lower carbon intensity than the last, with methane releasing about half as much carbon dioxide as coal per unit of energy produced and nuclear being essentially carbon-free.

That evolution has, so far, relied primarily on carbon-rich fuels. If we now want to displace carbon from energy production — to meet policy goals on climate change — we had better come up with something better and cheaper than coal, and ultimately oil. The answer is not, though, to abandon the pursuit of higher energy density.

As it stands, today's policies ignore the lessons of engineering history. We now seem determined to replace historical transitions toward fuels of greater energy density with diffuse energy production. This step will require vast quantities of materials, land and subsidies, misallocating economic resources that we could use more productively elsewhere. We should, therefore, treat with caution talk of a 'green energy revolution'.

Many forms of green energy are spatially diffuse and intermittent, making them inefficient and inherently expensive. There lies the need for feed-in tariffs and other support mechanisms. Green energy is set
to grow, not because it is more productive, like Watt’s separate steam condenser, but because government mandates it and provides generous incentives. An energy transition that leads to more expensive, less efficient energy production is more a regression than a revolution.

In choosing to make energy more expensive, we should remember that, with James Watt’s development of efficient steam power, hydrocarbon-fuelled machines replaced carbohydrate-fuelled human labour. In the late industrial revolution, this decoupled the costs of energy and labour for the first time in human history. Energy became cheap while human labour became more expensive and so our prosperity soared. Our entire modern economy is built on this remarkable decoupling. In contrast, our heading rush into expensive green energy risks sacrificing jobs elsewhere in the economy and also threatens large tracts of the British landscape and the pockets of those who can ill afford higher energy bills.

As engineers, we should insist that energy policy sets out to deliver lower costs, security of supply, and now a transition to lower-carbon energy. This will require greater use of methane and uranium and less use of coal and, ultimately, oil. A number of new technologies could help us to achieve these transitions. For example, while modern power stations have come a long way since Watt’s steam engine, we still generate much of the world’s electricity by heating water and then extracting useful work. A recent exciting innovation has been the demonstration of energy conversion using supercritical carbon dioxide as a working fluid, akin to a jet engine running on hot liquid. Not unlike Watt’s separate steam condenser, this offers a step change in the efficiency of turning heat into useful work in future thermal plants.

Other recent developments include China’s new national programme to develop next generation molten-salt thorium nuclear reactors. This high temperature, low pressure fuel cycle fissions all of its fertile thorium fuel and leaves only short-lived waste products with a half life of around 30 years. Again, this innovation could be on a par with Watt’s separate steam condenser. It appears that even now some producers of rare-Earth metals are storing rather than discarding thorium, as a waste product, in anticipation of its use as a future nuclear fuel.

Support for the energy sector, and in particular energy innovation, is of course essential. But we need to distinguish between supporting innovation and subsidising commercial-scale energy production. Significant subsidies for production-consumption economic resources that could help deliver future energy innovation.

As the UK drives forward with an ambitious programme to deploy various forms of green energy, it is becoming clear that a combination of energy-dense, lower-carbon methane, partly from expanding reserves of shale gas in the UK and elsewhere, together with uranium, and later thorium, can be the key fuels of the future. This combination can provide the foundations of an energy policy to deliver future abundant, clean energy from compact power plants.

The era of cheap energy is over only if we choose so. If we use technical innovation to accelerate, rather than supplant, moves towards greater energy density, we can deliver energy that is both cheaper and more abundant. And, as a useful side effect, we will help de-carbonise our economy in the process.
Appendix 2: The Institute of Engineers and Shipbuilders in Scotland

Scottish Energy 2020?
A target too far?

The analysis presented in the Institution’s latest report was undertaken in response to the Scottish Government’s declaration that by 2020, 20% of the total energy demand in Scotland would be met from renewable resources.

This exceeds the 15% target that the EU Renewable Energy Directive (2009) requires the UK to meet as a whole.

More recently the Government also announced that 100% of electricity generation will come from renewables by the same date.

The Institution’s findings suggest that the original renewable energy target split for Scotland of 50% electricity, 11% heat and 11% energy for transport, making the overall 20%, and subsequent revision of the electricity generation target to 100%, did not appear to be supported by a rigorous engineering analysis of what is physically required to achieve a successful outcome in the timescale available.

During the research for this report, First Minister Alex Salmond announced that the Scottish Government had increased the overall percentage target for energy from renewable sources to 30% by 2020. In light of this report’s analysis, this aspirational target appears to represent an ambition that cannot be justified from an engineering perspective.

In the absence of a credible publicly presented plan to deliver Scotland’s renewable energy at the scale required, the Institution of Mechanical Engineers considers here what these targets mean from an engineering viewpoint.

IMechE Scottish Energy Report

Scotland’s energy balance

In 2008, the UK’s total energy consumption was 1,695 TWh/y, split: Heat Energy, 710 TWh/y (41.9%); Energy for Transport, 598 TWh/y (35.3%); Electricity, 387 TWh/y (22.8%).
For Scotland, agreement does not exist on a set of figures for such a split, which in itself means that data for Scotland’s point of departure, against which the outcomes from its energy policy can be measured, is not defined.

However, from data reviewed by the Institution, the projected set of figures published in the Scottish Renewable Forum’s 2006 ‘Routemap’ were considered the most reliable, and these are used as the basis of this report. On a similar basis, the projections for 2020 were: Total energy 183.1 TWh/y, split: Heat, 89.7 TWh/y (49%); Transport 55.0 TWh/y (30%); Electricity 38.4 TWh/y (21%).

**Energy or Electricity?**

What the findings above illustrate is that the term ‘Energy’ is often confused with ‘Electricity’, a mistake often made in the media and in Government communications.

Electricity is actually projected to be the smallest component of Scotland’s energy demand (heat and transport energy being greater). This leads firstly to the conclusion that the focus of the nation’s energy policy on electricity is misplaced. Secondly, that even if Scotland’s electricity supply could be developed to source totally from renewables in a robust, secure and reliable manner, this would barely achieve the overall 2020 20% target.

Most of the recent renewable energy installations deployed in Scotland in the electricity sector have been based on intermittent, unpredictable resources like wind and solar. However, it is important to recognise that if a larger contribution is to be achieved through renewables, there must be a readjustment to provide more of the proportion from on-demand, predictable resources like biomass and energy-from-waste. In this regard it is vital that the differences between ‘installed generation capacity’, measured in MW or GW, and the actual amount of electricity supplied from the installations in MWh or GWh is clearly understood.

**Scotland’s 2020 commitments**

Scotland has substantial potential resources for renewable energy and, partly in recognition of this, the Government has committed itself to exceeding the UK’s 2020 commitment, primarily through the use of electricity.

In July 2009, a grouping of NGOs produced “The Power of Scotland – Renewed“ report which attempted to demonstrate that renewable resources could meet between 60% and 143% of Scotland’s projected annual electricity demand by 2030.

Subsequent policy thinking on energy appears to have been strongly influenced by this argument and the level of debate in the public domain has been somewhat limited. However, the report was based on idealistic solutions and not backed up by a detailed engineering analysis of how these targets could be practically achieved through a workable approach to delivery. In particular, consideration was not given to the need to provide large amounts of back-up generation technologies that can deliver electricity on demand, most likely from fossil fuels, to support the deployment of intermittent renewables on the scale proposed.
The greenhouse gas (GHG) emissions target that Scotland has adopted for itself is a 42% reduction below 1990 levels by 2020, with an 80% reduction by 2050 (the equivalent numbers for the UK as a whole are 34% and 80% respectively). Scottish policy thinking in this area appears to be largely based on a belief that GHG emissions will automatically be reduced if sufficient renewable energy technologies are deployed, particularly for electricity generation.

However, the provision of ‘on-demand’ energy conversion technologies needed, very likely fossil-fuelled, to back-up the intermittency inherent in deploying large amounts of wind, solar and wave technology will have an impact on net emissions saving that does not at this stage appear to have been recognised.

**Barriers to achieving the 2020 targets in Scotland**

Many of the Institution’s members work in the energy sector and are critically involved in delivering the machines, equipment and devices which are necessary to meet the 2020 targets. In reviewing the practical issues related to achieving a successful energy outcome for Scotland, the following points were identified.

**Technology**

A number of technologies used in renewable energy systems have been available for decades, but significant development work is still required to improve the efficiency of their performance and reduce the cost of maintenance, as well as simplify manufacture and reduce equipment and deployment costs. This is particularly the case for electricity generation from offshore wind, upon which much of Scotland’s energy policy is focused.

Many believe that the future of renewable energy in Scotland lies with a wide range of marine devices. Yet the fact remains that there is a great deal of expensive and time-consuming research, development, deployment and decommissioning (RDD&D) work ahead before these technologies are available for deployment in large quantities at a meaningful scale. Further, to support increased use of intermittent renewable sources, technology needs to be developed in the areas of smart metering and smart grids, and even more crucially in energy storage if large amounts of back-up on demand generation are to be avoided.

**Infrastructure**

The UK National Grid was built to connect large centralised electricity generating plant to industrial and domestic customers. However the situation has now changed significantly and the
grid is increasingly required to integrate remote power generators using local renewable sources. Furthermore, much of the Grid asset is reaching the end of its design life and requires updating. A multi-billion pound investment is needed in order to tackle both of these issues and make this infrastructure fit for purpose in the new energy regime. Further, in the case of heat energy, there is no significant, available delivery network in Scotland and little thought appears, as yet, to have been given to this issue.

Skills

Even if it were possible to resolve the technology and infrastructure issues in the short timeframe available to 2020, there are still major concerns in the engineering community regarding Scotland’s ability to provide the human resources needed to design, project-manage, install and commission the volume of equipment that will be required to meet such ambitious targets.

One strategic approach to this challenge might be to assume that appropriately-trained people from overseas will be able and willing to work in the renewable energy sector in Scotland. However, many countries across the globe are also aiming to meet challenging renewable energy targets over the next few years and it is not necessarily certain that such people could be attracted to work in the sector in Scotland rather than elsewhere.

Manufacturing capability

Although Scotland is by no means devoid of manufacturing industries, the country does not have a sufficient manufacturing base for the large volume of equipment which will be required to meet the 2020 targets.

A successful manufacturing base would be provided by a combination of large corporations and SMEs. Large corporations will only invest in new manufacturing capacity in Scotland if the market conditions are right; this is particularly true of overseas companies without current facilities in the country. SMEs, on the other hand, particularly those making specialist components as part of a supply chain, are much more likely to want to set up manufacturing facilities in the country, but in many cases find the levels of red tape they have to cope with too daunting.

Funding

In the current economic climate, SMEs are finding it particularly difficult to access the finances necessary to build their businesses to be able to provide the goods and services required to meet the 2020 targets. Large renewable energy projects, in particular offshore wind, can be funded by multi-national corporations (MNCs) from their own balance sheets, and there is often no need for them to seek external funding. Whereas SMEs, along with local communities, do not have an equivalent finance base and must obtain funding from external sources for smaller-scale projects and/or manufacturing equipment. These issues make business opportunities unattractive and therefore stifle the expansion of the renewable energy equipment manufacturing base in Scotland.

Growing Fuel Poverty in Scotland
The 2003 UK Energy White Paper made ‘fuel poverty’ one of its four main policy objectives. However, rather than improving the situation, fuel poverty has actually worsened since 2003. The Scottish Government has pledged to ensure that by November 2016, so far as is reasonably practicable, people are not living in fuel poverty in Scotland.

The reality is that the fuel poverty rate in Scotland fell from 35.6% in 1996 to 13.4% in 2002. However from that point onwards, the rate has been steadily rising year-on-year to 32.7% of households in 2009 – almost back to the 1996 levels.

Although in recent years this may be a result of increased fuel prices being only partially offset by rising incomes and energy efficiency increases, the figures reveal that fuel poverty was rising sharply well before the current economic downturn began in the UK. Scotland clearly has a particular problem in this area which is not being adequately addressed. To achieve a zero fuel poverty target by 2016 with fuel poverty forecast to continue to rise over the next few years will be a very major challenge, especially with the various market incentives for renewable energy inevitably contributing to generally higher energy costs.

**Scottish Energy 2020? Recommendations**

The Institution of Mechanical Engineers supports the aspiration of the Scottish Government to fully exploit the significant potential for renewable energy that exists in Scotland.

This must however be founded on a pragmatic engineering approach to what can actually be achieved and on what timescales. Even within the power generation sector, a relatively straightforward area compared with heat and transport energy, the ability to achieve large percentages of electricity supply from ‘intermittent’ renewable energy resources is technically challenging both in engineering and policy terms.

As a first step towards creating a successful policy for Scotland's renewable energy exploitation project, the Institution makes the following recommendations.

1) Understand and agree the starting point. The Scottish Government should, as a matter of absolute priority, establish, agree and publish the current position in TWh/y of the gross energy consumption in Scotland in the three component fields of Heat, Transport and Electricity. It should then determine its targets for 2020 (using SMART principles) in the same three fields. The inter-relationship between these three fields must be clearly understood and their relative positions in the ‘energy mix’ defined and made publicly available. Only clearly-defined measurable targets can be intentionally achieved.

2) Lay out an engineering based plan to achieve the targets. If the present target of 100% electricity from renewable energy sources by 2020 is to be maintained, then the Scottish Government should clearly state its engineering-based methodology for achieving this ambitious target. In this regard Government should consult with competent and independent engineering professionals who have knowledge and experience in the actual delivery of major
power projects. This will establish what level of electricity generation from renewable energy sources can realistically be built in Scotland and in what time period. This will also involve determining the skill levels, manufacturing capability and funding obstacles as well as the numerous outstanding technology and infrastructure issues that still need to be resolved.

3) Create policies that effectively tackle fuel poverty in Scotland. The Scottish government must prioritise the sourcing of secure, reliable energy supplies for the nation’s electricity, heat and transport requirements, while effectively tackling the growing issue of fuel poverty. The latter must be addressed within Scottish energy policy to ensure that an increasing number of people are not tipped into fuel poverty simply because of the increased cost of providing renewable based energy. Such an outcome would create an unsustainable position for the Scottish people.

IMechE Scottish Energy Report

Read the press release on Scottish Energy 2020?

Read the Energy Hierarchy Position Statement

Keep up to date

Simple ways to keep up with the latest IMechE and engineering news:

Facebook Twitter YouTube RSS

© 2011 Institution of Mechanical Engineers. IMechE is a registered charity in England and Wales number 206882
Appendix 3: The Institute of Engineers and Shipbuilders in Scotland

Web-site:  http://www.iesisenergy.org/


The IESISenergy website: www.iesisenergy.org argues that the provision of new electricity generation capacity needs to be ‘engineered’. There is too much risk in the processes being used at present. The difficulties involved in deciding on the best mix of electricity generation types are discussed and it is proposed that the way forward is to appoint a national Energy Commission made up of people who are, as far as is practical, independent of political and commercial constraints, and who have the right blend of competence. This body would recommend the best way forward for new electricity generation facilities based on a careful analysis of options.

Objectives of the Energy Strategy Group
The IESIS Energy Strategy Group is promoting the principle that, in the UK, the management of energy in general and of electricity generation in particular, is not being engineered. By ‘engineered’ we mean that all the issues that affect the situation are not being put together to reach balanced outcomes. There is a looming crisis in the production and use of energy.

News
In May 2010 we made a submission to the then new Minister for Energy and Climate change, Chris Huhne, asserting that the best way to achieve and engineered approach is to appoint an independent energy commission.

IESIS and the Royal Academy of Engineering, are working with members of the Scottish Government to seek to promote an engineered approach to energy policy in Scotland.

The Institution of Mechanical Engineers have published a very important report titled ‘Scottish Energy 2020?’. The main recommendations are:

1. Establish the current position as regards energy use and establish clearly defined measurable targets for 2020.
2. Lay out an engineering plan to achieve the targets.
3. Create policies that effectively tackle fuel poverty in Scotland.

IESIS fully supports these recommendations.

Levelised cost of electricity generation
This link gives access to a spreadsheet and a supporting document that provides estimates of levelised cost for electricity generation. The model used includes a probabilistic assessment of uncertainty in the estimates and attempts to include all cost items that will be passed on to electricity customers.
Carbon emissions as a result of wind power production
For a system perspective wind power causes carbon emissions. Information about this can be found from this [link](#).

IESIS Glasgow
The need for a UK Energy Commission

IESIS contends that the existing Government policy for electricity generation is driving the UK ship of state towards a rocky shore. The ‘rocks’ include: blackouts, fuel poverty, industrial decline, and deterioration in balance of payments situation. The error in the course of the ship of state is caused by:

- Unjustified reliance on market forces to create a satisfactory balance of electricity generation. (more)
- Lack of recognition of the extreme urgency in the need to plan for the replacement of generating facilities during the present decade. (more)
- Lack of an rational approach to the development of generating facilities. (more)
- Lack of an overall view of costs more.
- Lack of an engineered approach to the control of wind and marine power. (more)
- Deep focus on climate change to the neglect of other major issues that need to be addressed. (more)

The needed radical alteration in course cannot be achieved by actions from within the existing system. A new multidisciplinary, technocratic Energy Commission, capable of engineering the course away from the dangerous shore, must be created.

It is important to note that IESIS is:

- not proposing solutions to the problems of energy production and use. We are proposing how such solutions must be formulated.
- not proposing privatisation of the production of electricity. We are proposing that it must be planned by a national body

There is a favourable historical precedent for what is being proposed.

Main links from this page

Operation of an Energy Commission

The UK Government policy for the construction of generating facilities

Market forces - potential role for the development of electricity generating facilities

Replacement of electricity generating facilities in the UK

The engineered approach to problem solving

Cost estimates for electrical generation types

Production of electricity from wind and marine power - The need for an engineered approach

Climate change and other major risks

Historical precedent
Wind Power and Carbon Emissions

While wind power generators do not emit carbon at source, from a system viewpoint, wind power is not a zero carbon emitter. Gas and coal stations are used to allow the Grid to cope with the intermittent supply from wind power. In this balancing mode their efficiency is reduced and therefore they use more energy and produce more CO₂ than in normal generation mode.

There is evidence that this effect can be important.

The following two papers based on predictions:

http://carbon-sense.com/wp-content/uploads/2009/02/wind-power.pdf This is based on Australian generation
http://www.clepair.net/windsecret.html - based on German generation.

Both these papers indicate that as the proportion of wind in the system increases, the proportion of carbon that they cause to be produced, and extra energy that they cause to be used to control the grid, increase to a point where there is no carbon saving and energy required to balance the system becomes very significant.

The Bentek ‘Wind Power Paradox’ report (http://www.bentekenergy.com/OnlinePurchase.aspx) comes to the same conclusion for some areas of USA based on the more reliable approach of using data. The report states that: “The economics and reliability of natural gasfired generation suggest that achieving CO₂ emissions reductions through re-firing coal plants with natural gas is more favorable than using wind generation.”

The following papers are also pessimistic about the potential for wind power to reduce carbon emissions and save the use of fossil fuel energy. They both demonstrate that data needed to carry out an accurate analysis of this situation is not readily available.

http://www.clepair.net/IerlandUdo-e.html based on data from Eirgrid (Ireland)
http://www.clepair.net/windSchiphol-e-nl.html based on information from the Netherlands.

While the conclusions made in these sources should be treated with caution, they indicate that the degree to which wind power does reduce carbon emission is highly variable. It seems unlikely that extrapolation from their results to assess the performance of the UK grid in relation to this issue would give useful outcomes. A study that would seek to assess this situation for the UK grid is needed.
When, in my late twenties, I gave up political ambition and devoted myself to a career in industry, I never dreamt I would have the opportunity to speak in Parliament. What an unexpected treat, what a dream fulfilled, what a privilege it is to be able to stand and speak in Parliament, without licking a single envelope, or canvassing a single street, or doing battle with bureaucracy on behalf of a single constituent. And in recognising the privilege, let me also say to the politicians here that I salute you. When I use the word politician, as I will do during this speech, it is as a term of endearment. I recognise that many people, and businessmen in particular, do not appreciate just how bloody hard politics and public service is. For those in business who can say “go” and they goeth and say “come” and they cometh, it can be difficult to understand how hard it is to get things done when people are elected to oppose your every action, when the press peruse your every move, and people around you are volunteers rather than employees. So, as Ali G would say ..... “Respect!”

However, respect should be a 2-way thing. If businessmen are naturally inclined to believe that politicians are dozy, idle and incompetent, politicians secretly believe that businessmen are overpaid, self-interested and generally incapable of making judgements that do not accord with their immediate self-interest. So let me ask you to grant me the favour of some respect when I talk to an issue which I know something about, and to suspend your disbelief for a few moments that I might not be talking my, or my company’s, own book.

I want to talk to you about Energy, and, specifically, about Electricity supply; forgive me if I lazily use the two words interchangeably. And I do this as someone who is responsible for managing a FTSE-100 company that provides power in over 100 countries in the world. In my job, I see daily the consequences for countries whose Energy Policies have not worked as intended. Customers come to us when they have run out of power; when they have power cuts for five or six hours a day; when hospitals operate by candlelight; when traffic lights don’t work; when sewage works stop.

What I am going to say in a few moments will be unpopular in some quarters, and I will be accused of heretical beliefs. I would therefore like to get my retaliation in early, and tell you what I do believe:-

- I believe that it is a bad idea to keep on pumping billions of tonnes of CO2 into the atmosphere.
- I believe that doing so is likely to contribute to climate change. Since I own a house on the West Coast which is within a few feet of the High Water Mark, I declare a very personal interest in not seeing the ice cap melting and sea levels rising.
- I believe that Scotland is advantaged in terms of renewable resources and can use them to build long term competitive advantage.
- I believe that demand for electricity, far from declining in rich countries, will increase quite substantially as we move to de-carbonise transport.
  - I believe that in an uncertain world, it makes sense to have diverse sources of energy.

So far, so impeccably politically correct.

But.

I also believe that in many countries politicians have found that Energy Policy is an irresistible sand-pit in which to play. Talking about Energy and CO2 reduction allows them to project all sorts of appealing political characteristics; clean, caring, modern, technically-savvy, far-sighted, broad-minded; and all this could be achieved without any real consequences, no matter how bonkers the policy. So far, politicians have had the luxury of sounding good by setting targets which are so far out in time that whether they are sensible or achievable or not, nobody can possibly know. A 20% reduction in carbon emissions by 2025? Don’t be a bloody Jessie, let’s make it 34% by 2020, and for good measure, let’s make it legally binding! The problem is that
sooner or later the happy passengers on the good ship Energy Policy will meet the jagged rocks of the Three Great Truths of electricity generation and supply.

- The First Great Truth is that we cannot live without reliable and plentiful electricity. Like water, like air, like food, we cannot do without it, and even brief shortfalls would be catastrophic. So any policy has to be prudent and practical in terms of technology, engineering, resourcing and financing.
- The Second Great Truth is that everything about the equipment required to generate and distribute electricity takes a long time to build and is quite fantastically expensive. And the cleaner the source of energy, the more fantastically expensive it is.
- The Third Great Truth is that this fantastic expense has to be financed by Global Capital Markets and paid for by the consumers and businesses who use the electricity. There is no Third Way in Energy Policy.

These Great Truths mean that, in reality, Governments have much less room for manoeuvre than they like to think. For policy to work, it has to be able to convince some very hard-headed investors, for whom the UK is simply one of many countries who need to build a lot of infrastructure, that their clients and shareholders will make money if they build power stations here rather than elsewhere.

I wanted to set the background before I tell you why so concerned both for the UK as a whole and for Scotland in particular.

I am going to start by addressing UK-wide issues first, as Scotland is part of the National Grid, and Energy Regulation is set on a UK-wide basis.

Down South, the Coalition Government is in my view doing a good job getting to grips with many of the issues, and the review of future regulation by OFGEM is an important step forward. Ministers strike me as thoughtful, energetic, and seized by the difficulties we face,

But all this is happening ten years too late, and the good ship of Energy Policy is perilously close to the rocks.

Extending the nautical analogy, accidents at sea rarely happen because of a single event. It is not that the ship is close to rocks; it is that, while close to rocks, the navigator loses his bearings and then a storm blows up.

In the UK, we are already close to the rocks, because, over the next 8 years a third of our coal-fired capacity, two-thirds of our oil-fired capacity, and nearly three-quarters of our nuclear capacity will be closed down either through age or the impact of the European Large Combustion Plant Directive. Absent a massive and immediate programme of building new power stations, with concrete being poured in the next two years, we will be in serious danger of the lights going out.

At the same time, our regulatory and market system, which should be our navigator, has lost its bearings, and is using a map over which somebody has spilled coffee. It is an absolute pre-condition of attracting investment in new power infrastructure that markets be transparent, are supervised by independent regulators, and that there is trust between the investors, the government and the regulator. The UK’s wholesale market system was a beast of great beauty when first created, and was widely admired and copied in other jurisdictions. However, over recent years, it has sprouted terrible warts and pimples. The previous Government believed that it could achieve energy policy objectives by sending "signals" to the market – aka throwing bungs – at particular favoured technologies. So we had bungs for windfarms, bungs for micro-generation, bungs for solar, bungs for tidal energy, and then negative-bungs for coal and nuclear. And each bung is regularly tampered with or changed.

Each bung, in isolation, trying to achieve a laudable goal. But, in combination, these bungs produce not a symphony to delight investors and lure them to our shores, but a confusing and discordant cacophony.

And in the meantime, a storm is brewing. The storm in the market is going to be caused by the fact by 2015, 25% of the world’s power stations will be over 40 years old. This means that, from Tokyo to Timbuktu, from Sao Paulo to Seattle, utilities are going to be buying new power generation and distribution. There seems to be the view in Government that there is an orderly queue of investors wanting to pour money into UK infrastructure. Wrong. International investors who specialise in Energy infrastructure are very experienced, measure risk and reward by country very carefully, and they have choice of where to invest their money. In my experience, if you want to borrow £200 million from a bank, you have to ask quite nicely, wear a tie, and have a good business plan. If, as Britain does, you want to raise £200 billion, you have to ask very nicely indeed, and have a very good plan; at the moment we as a nation are turning up to meetings with the bank manager wearing jeans and a tee-shirt that says "Jesus Loves You".
The great danger facing the UK's Energy Policy is that the history of meddling with the markets; the persistence with which we re-iterate unachievable goals for emissions reduction; the wildly optimistic forecasts of the availability, cost and performance of new technology; all these leave the serious investors, the institutions who have the billions we need, shaking their heads. I think the UK is in danger of becoming unattractive as a place to build new infrastructure, and this at a time when we are going to lose around 30% of our generating capacity.

Is this alarmist? ...... Well let's look at what the people responsible for building the UK's power infrastructure are actually doing. In the last 12 months the construction of three major new power stations – Kingsnorth, Baglan Bay and Drakelow have all been put on hold. And of the 7,000 MW of windfarms that have planning consent, less than a third are actually under construction. Why might it be that people who have spent millions of pounds and several years getting consent to build windfarms, are not actually building them? At a time when the UK has the lowest level of gas storage in Europe (16 days, against 90 days in Germany and 122 in France), Centrica have just announced that they are putting on hold the building of the Caythorpe gas storage facility. Two days ago, E.ON, one of the UK’s largest energy suppliers, said that it was going to focus its investments in markets outside Europe, and plans to follow EDF in selling its UK power distribution business.

The evidence that something is amiss is plain before our eyes.

So what is the solution? I think one of the first things to acknowledge is that it is not easy; the problems we face are complex, and unintended consequences abound. As Lord Palmerton said of the Schleswig-Holstein question, "it is so complicated that only three men have ever understood it. One was Prince Albert, who is dead. The second is a German professor who became mad thinking about it. And the third is me, and I know the answer but have forgotten what the question was."

My prescription would be as follows.

First, as our ship heads towards the rocks, it is important that people who talk nonsense are not allowed on the bridge to distract the Captain and Navigator. Before anyone is allowed onto the bridge, they should be asked the following questions:

- Do you believe that we can de-carbonise power generation without significant amounts of nuclear power?
  - Do you believe that we can cut domestic electricity consumption by over 30% by 2020?
- Do you believe that the first new nuclear power station can brought into full production by 2018?
- Do you believe that it is feasible that we could have more than 10% of our power generation coming from wind?
  - Do you believe that tidal energy is going to make a meaningful contribution in the next fifteen years?
- Do you believe that the world is going to run short of gas in the next forty years?

If they answer yes to any of these questions, they should be banned from the bridge.

Secondly, we have to set about mobilising the finest brains in our diplomatic and civil service to either reduce the level of, or delay the dates of, our commitments to reductions in CO2 intensity in power generation. I hasten to add that I think the problem is more with the timescales associated with the targets rather than the targets themselves. Broadly, we need to add ten years to all of them.

Thirdly, I think we need to accelerate the current OFGEM work on the future regulation of the wholesale electricity market. I would favour two main actions. One would be to establish minimum pricing for hydro-carbon fuels used in power generation, with the difference between the world market price and the minimum price being a CO2 levy whose proceeds should be used to fund measures to reduce energy consumption. This would be the principle tool of encouraging use of renewables, without making choices between types of technology. Alongside this, I would encourage investors by offering them a minimum payment per megawatt of capacity they have available. This would help secure a minimum level of capacity availability to make sure we had enough to keep the lights on.

Turning to Scotland, I have a very specific analysis. And that there is a danger in some quarters of believing that if you wish things to be true, they will be true. Scotland has abundant wind resource, and one might wish that the largest offshore wind installation in Europe was being built off the East Coast of Scotland, but actually it is being built off the East coast of England, which has shallower waters and is closer to the major centres of demand. Scotland might wish to be a major exporter of renewable energy to Europe, and might wish to see an interconnector built across the North Sea, but does anyone really
believe that we can get one built in the next ten years? Scotland might wish to have an energy policy completely independent of England and Wales; but if we also want to sell energy to England and Wales, and enjoy the security of being connected to a National Grid, we should not ignore the energy needs of England and Wales. My worry is that policy-makers are so focused on the end of the road that they fail to see the large pothole 300 yards in front. In Scotland as in England, we cannot ignore the realities of what is possible in engineering and financing terms; if we persist in thinking only about 2030, we will end in deep trouble in 2018 for Scotland, and for renewables. I urge Policymakers in Scotland to more on the question of how Scotland is going to respond to the fact that the National Grid, on which we all depend, will lose 30% of its generating capacity by 2018.

We may wish the replacement to be wind; we may wish it to be tidal; but wishing isn’t going to make it happen. We need a plan B.

In conclusion: Scotland is a wonderful place to develop renewable energy but we cannot sit around dreaming of a carbon-free future that is at best many decades in the future. We need to move on and deal with the cold realities of financing, project management, power engineering to avert a very real energy crisis that will hit us in less than ten years time. And it is going to require considerable political leadership in Scotland, and more widely in the UK, to reset expectations of what is possible and help to steer the ship away from the rocks.

For further information, please contact:

Rupert Soames
Aggreko Chief Executive

Neil Bennett / George Hudson
Maitland
Scottish ministers have set a target of 100% of electricity coming from renewable sources by 2020.

Renewable energy cannot meet the UK's energy needs, according to a report from the Adam Smith Institute.

The pro-free market think tank argues solar and wind power schemes have no prospect of becoming economically viable in an "unrigged" market.

It also claims government policies to promote renewable energy will lead to higher costs for consumers.

A separate report from Reform Scotland said the country could earn £2bn a year exporting renewable electricity.

The more pessimistic assessment of the potential for green energy came in Renewable Energy: Vision or Mirage? - a report jointly released by the Adam Smith Institute and Scientific Alliance.

“Start Quote

This report comprises a selection of tired and unconvincing myths about renewables and is a distraction from our fight to reduce carbon emissions.”

Dr Richard Dixon WWF Scotland

Its key arguments were:

- Wind and solar energy schemes cannot replace gas, coal or nuclear power generation because their energy sources are intermittent and effective energy storage technology is not available.
- Wind turbines require back-up generating capacity which make any reduction in CO2 emissions quite modest.
- Current targets for wind energy by 2020 would require the installation of five turbines every day.
- The decommissioning of coal-fired power stations and nuclear over the coming decade are a threat to energy security.
- Solar and wind energy have "no prospect of becoming economically competitive in an unrigged market"
Report co-author Martin Livermore said: "For too long, we have been told that heavy investment in uneconomic renewable energy was not only necessary but would provide a secure future electricity supply.

"The facts actually show that current renewables technologies are incapable of making a major contribution to energy security and - despite claims to the contrary - have only limited potential to reduce carbon dioxide emissions.

"Consumers have a right to expect government to place high priority on a secure, affordable energy supply."

A very different picture was painted in Powering Scotland, a report from Reform Scotland.

World leader

It said Scotland could become a world leader in renewable technology and could potentially earn £2bn a year by exporting green energy.

Graeme Blackett, a trustee with the think-tank, said: "We would support the aim of a substantial increase in energy exports with a target of around half of electricity generated in Scotland being exported.

"Even using conservative assumptions on prices, this would increase Scottish exports by £2bn per annum, equivalent to around 17% of manufacturing exports to the rest of the UK.

"Given that some of the current fossil fuel and nuclear capacity will still be available in 2020, this is feasible if the 100% renewables target set by the Scottish Government is met."

The group called for all of Scotland's nuclear power stations to be phased out and for energy powers to be devolved formally to Holyrood.

The environmental group WWF Scotland claimed the assessment by the Adam Smith Institute was not backed up by research.

WWF Scotland director Dr Richard Dixon said: "This report comprises a selection of tired and unconvincing myths about renewables and is a distraction from our fight to reduce carbon emissions.

"The report's attacks on renewables just don't stack up. More renewables really do mean less fossil fuels burnt."
Wind-power: inordinately expensive and ineffective at cutting CO2 emissions

Energy experts warn that unwarranted support for wind-power is hindering genuinely cleaner energy

The focus on wind-power, driven by the renewables targets, is preventing Britain from effectively reducing CO2 emissions, while crippling energy users with additional costs, according to a new Civitas report. The report finds that wind-power is unreliable and requires back-up power stations to be available in order to maintain a consistent electricity supply to households and businesses. This means that energy users pay twice: once for the window-dressing of renewables, and again for the fossil fuels that the energy sector continues to rely on. Contrary to the implied message of the Government's approach, the analysis shows that wind-power is not a low-cost way of reducing emissions.

Electricity Costs: the folly of wind-power, by economist Ruth Lea, uses Government-commissioned estimates of the costs of electricity generation in the UK to calculate the most cost-effective technologies. When all costs are included, gas-fired power is the most cost-efficient method of generating electricity in the short-term, while nuclear power stations become the most cost-efficient in the medium-term.

All that wind takes a lot of gas

Wind-power is acknowledged to cost more than traditional fossil fuel power stations. But estimates from Government-commissioned reports suggest that, when the cost of CO2 emissions is included, onshore wind-power becomes one of the more cost-effective means of generating electricity. Offshore wind does not however. [See p. 12 - p. 23] Unfortunately, these estimates fail to factor in all the costs of wind-power. These costs are due to the fact that energy output from wind is unpredictable and rarely occurs in areas of most demand:

... wind-power is unreliable and requires conventional back-up generating capacity when wind speeds are, for example, very low or rapidly varying... [p. 14]

This means that wind farms need to be supported by conventional capacity including gas-fired power stations that can be switched on whenever the available wind fails to match demand for electricity. Lea cites research by Colin Gibson, former Power Network Director at the National Grid Group, who has produced some of the most comprehensive estimates for these 'add-on costs'.

When these add-on costs are included, the resultant levelised generating costs (� per megawatt hour) for the main electricity generating technologies are, for medium-term projects:
• Nuclear pressurised water reactors (PWR): 67.8 per MWh.
• Gas-fired combined-cycle gas turbines (CCGT): 96.5 per MWh.
• Gas CCGT with carbon capture and storage (CCS): 102.6 per MWh.
• Coal (ASC) with CCS: 111.9 per MWh.
• Advanced supercritical (ASC) coal-fired power plants: 133.2 per MWh.
• Onshore wind: 146.3 per MWh (including 'add-on costs' of 60 per MWh).
• Offshore wind: 179.4 per MWh (including 'add-on costs' of 67 per MWh).

(Note: one megawatt hour can run approximately 1000 desktop computers for 8 hours)

The most cost-effective technologies are nuclear and gas-fired. Onshore, and especially offshore, wind technologies are inordinately expensive.

### Pumping out more CO2

Besides the prohibitive costs, the report shows that wind-power, backed by conventional gas-fired generation, can emit more CO2 than the most efficient gas turbines running alone:

*In a comprehensive quantitative analysis of CO2 emissions and wind-power, Dutch physicist C. le Pair has recently shown that deploying wind turbines on "normal windy days" in the Netherlands actually increased fuel (gas) consumption, rather than saving it, when compared to electricity generation with modern high-efficiency gas turbines. Ironically and paradoxically the use of wind farms therefore actually increased CO2 emissions, compared with using efficient gas-fired combined cycle gas turbines (CCGTs) at full power.* [p. 30]

This means that the cost of having wind is not just carried by consumers but by the environment as well.

### Caught in a cross-wind

The report explains how two competing environmental policies have generated a perverse set of priorities. The renewables targets have forced the energy sector to focus on more expensive, less reliable power sources, rather than those most likely to reduce emissions while keeping costs to the rest of economy competitive:

• The Climate Change Act 2008 requires that Britain’s greenhouse gas (GHG) emissions be cut by 80 per cent by 2050 compared with the 1990 level and by 34% by around 2020.
• The EU’s Renewables Directive (2009) commits the UK to sourcing 15% of final energy consumption (FEC) from renewables by 2020. Renewable energy sources include wind, hydro and biomass, but not nuclear power. [pp. 4-5]

This means that UK legislation separately specifies an outcome (reduced CO2 emissions) and a process, more renewable energy.

The outcome itself is substantial and threatens many Britons' standard of life and employment prospects if not achieved efficiently:

* ... consultants Redpoint Energy point out "meeting these targets will mean a radical change in the way the UK produces and consumes energy over the coming decades." [p. 4]*

Unfortunately, the legislated process is ineffective at reaching its supposed outcome. The result of forcing unreliable renewables on the energy sector is higher costs to consumers as well as more
CO2 emissions than are necessary for maintaining the electricity grid.

One outcome of this micro-managed approach is that commercial and public sector energy users are, paradoxically, charged under the Climate Change Levy for their use of electricity generated by nuclear power stations (nuclear plants emit no CO2 after construction). The CCL is designed to encourage greater use of renewable energy sources even though wind-power can result in higher CO2 emissions than efficient gas turbines. [pp. 6-7]

The report concludes:

[Wind-power] is expensive and yet it is not effective in cutting CO2 emissions. If it were not for the renewables targets set by the Renewables Directive, wind-power would not even be entertained as a cost-effective way of generating electricity or cutting emissions. The renewables targets should be renegotiated with the EU. [p. 30]

For more information contact:

Ruth Lea, Director of the Manufacturing Renewal Project.
Civitas

Notes for Editors

i. **Ruth Lea** is Director of the Manufacturing Renewal Project at Civitas and an economic adviser to the Arbuthnot Banking Group.

ii. **Electricity Costs: The folly of wind-power** is available to download [here](#).

iii. **Civitas** is an independent social policy think tank. It has no links to any political party and its research programme receives no state funding.
Worth The Candle?
The Economic Impact of Renewable Energy Policy in Scotland and the UK

March 2011

Executive Summary

Verso Economics

Richard Marsh & Tom Miers
Executive Summary

I. This report examines the costs and benefits of government policy to support the renewable energy industry in Scotland and the UK. The Scottish Government in particular is promoting the renewables sector as an economic opportunity, and the purpose of this report is to assess whether this is justified. The report therefore does not investigate measures designed to reduce carbon emissions directly, nor does it consider the merits of renewable technology as part of the attempts to slow climate change.

II. The report’s key finding is that for every job created in the UK in renewable energy, 3.7 jobs are lost. In Scotland there is no net benefit from government support for the sector, and probably a small net loss of jobs.

III. The lower level of job displacement in Scotland is because of the greater concentration of renewable energy generation in Scotland. This means that electricity consumers and UK taxpayers subsidised the Scottish industry by c £330m in 2009/10 over and above subsidies paid for by Scottish taxpayers and consumers. To the extent that the Scottish industry is a success, it is reliant on the wider UK policy making framework, in particular the Renewables Obligation Certificate (ROC) scheme.

IV. The main policy tool used to promote renewable energy generation is the Renewables Obligation, which effectively raises the market price paid for electricity from renewable sources. This scheme cost electricity consumers £1.1bn in the UK and around £100m in Scotland in 2009/10. The UK government plans similar schemes to promote renewable heat and renewable fuels.

V. In addition, both the UK and Scottish Governments have introduced a wide range of grants and subsidies for the renewables industry. These are estimated at £188m UK wide and an additional £22m in Scotland in 2009/10. Further, an exemption from the Climate Change Levy for renewable generation costs HMRC £77m UK wide and £25m in Scotland in lost tax revenue.

VI. The renewable energy sector imposes other indirect costs on the economy, mainly from its impact on the local environment and landscape. While there has been some research into aspects of this, there is no conclusive data, so these costs are not included in the calculations used in this report. In total, measurable policies to promote renewable energy cost £1.4bn UK wide and £168m in Scotland in 2009/10.
VII. A number of studies have attempted to measure the wider impacts of such policies. Research in Spain, Germany and by the EU suggests that net employment effects are negative with the likely opportunity cost, or costs associated with higher energy prices, outstripping the creation of green jobs. Many of these studies cite possible localised benefits during the construction phase of renewable energy infrastructure and the potential for longer term benefits if export markets can be established.

VIII. This report uses the Scottish Government’s own macroeconomic model for Scotland to assess the impact of identified costs on jobs. A similar model was used by the Scottish Government to measure the opportunity cost of the cut in VAT implemented in 2008-09. Based on this, policy to promote renewable energy in the UK has an opportunity cost of 10,000 direct jobs in 2009/10 and 1,200 jobs in Scotland.

IX. The economic benefits that derive from the renewable energy sector are hard to assess because the industry is difficult to measure as a clearly-defined sector. However, employment figures cited by those promoting renewable energy are often greatly exaggerated, exceeding official employment figures covering the whole of the energy sector.

X. Extrapolating from wider energy industry data, and comparing this to estimates from government and industry bodies, total direct employment in renewable energy generation can be estimated at 2,700 in the UK and 1,100 in Scotland in 2009/10.

XI. In conclusion, policy to promote the renewable electricity sector in both Scotland and the UK is economically damaging. Government should not see this as an economic opportunity, therefore, but should focus debate instead on whether these costs, and the damage done to the environment, are worth the candle in terms of climate change mitigation.

XII. In Scotland, it should be recognised that the industry is reliant on UK wide support. Scottish policy making in isolation would be much more expensive. The Scottish Government, like its counterparts in the rest of the UK, should establish much more accurate figures on the extent of the industry to engender a more rational debate on the subject.
Appendix 8: Professor David Campbell, Professor of International Business Law at Leeds University

The Irrationality of Climate Change Policy

The ‘First Commitment Period’ to emissions reductions under the 1997 Kyoto Protocol ends in December 2012. Its end will be marked by an at least 40% increase in global emissions since 1990, the year selected as a baseline for reductions by developed countries under that Protocol. The discord generated by the growing awareness of this impending overwhelming failure which marked the 2009 Copenhagen Conference was avoided at the 2010 Cancun Conference only because Cancun said nothing of substance about what should be done after 2012. The public were prepared in advance for disappointment at the 2011 Durban Conference by press statements far fewer in number and completely different in tone than those which attended Copenhagen. Even so, the failure at Durban has been complete. Despite some misleading UN, EU and UK statements, nothing of importance has been agreed. It has merely been decided to continue the negotiations, though it is now claimed that these will quickly produce a positive result, despite having failed to do so for 20 years. What is the reason for this dismal position?

The general public mistakenly believe that international climate change negotiations have failed to establish ‘legally binding commitments’ about global greenhouse gas emissions. This is not so. These negotiations have indeed failed to reach a commitment to reduce those emissions. But they have reached a perfectly clear commitment to allow emissions to increase.

Climate change law is based on the 1992 United Nations Framework Convention on Climate Change. This Convention distinguished between developed and developing countries and asked both to recognise a ‘common but differentiated’ responsibility to reduce emissions. The Convention imposed no concrete reductions commitments on either set of countries, though it was anticipated that the developed countries would later enter into such
commitments. But, crucially, the Convention provided that ‘The extent to which developing country Parties will effectively implement … the Convention … will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties’. As, given foreseeable technology, sizeable emissions reductions must involve immense economic costs, this provision effectively means that there can be no significant limits placed on the emissions of developing countries. All subsequent climate change agreements, including those reached at Kyoto, Copenhagen, Cancun, have affirmed this position. Careful analysis of the major developing countries’ statements at Durban show that they will not move on this.

Kyoto imposed some reductions targets on the developed countries. It set none on the developing countries. Constraints on the design of the Kyoto Protocol mechanism that was to involve the developing countries in emissions reduction, the Clean Development Mechanism, make it logically impossible for that Mechanism to deliver any global emissions reductions whatsoever. Its operation so far has largely been an enormously costly exercise in outright waste, actually leading to the generation of more emissions than otherwise would have been made, by parties seeking manipulatively to claim Clean Development Mechanism funds. There is no chance of the Mechanism being substantially improved.

The Copenhagen Conference ended in acrimony and disappointment principally because the major developing countries would not agree to make emissions reductions and the Cancun Conference fudged the issue. Despite the misleading statements and reporting I have mentioned, this is what has happened at Durban. But, as a legal matter, it is quite wrong to criticise the diplomacy of the major developing countries at these conferences. They have merely insisted upon what was in 1992, which is that they have no concrete responsibility to reduce emissions whatsoever. Their responsibility is so differentiated that it doesn’t actually exist.
If the provision prioritising their economic growth had not been included in the Framework Convention, the major developing countries would never have agreed to the Convention at all. For, over the last thirty years, those countries, most importantly China and India, have begun to lift themselves out of the desperate poverty in which most of their people still live. Over a billion people in China and India still exist on less than US$2 per day. These countries are skilfully remaining in the climate change negotiations in order to obtain the great sums that are being desperately spent in pursuit of climate change policy, and to this end would appear to have secured at Durban the renewal of the Kyoto Protocol. However, they have no intention of making emissions reductions which would cause them to sacrifice the tremendous achievements they are making in economic growth and poverty eradication.

But these achievements are disastrous for climate change policy because, with their huge populations (40% of world total), major contributions to global emissions (30%), very low current per capita emissions (less than a fifth of the US), and extremely rapid rates of economic growth (10% per year), these countries are producing and will produce volumes of emissions that will breach any of the targets set to avoid global warming many times over. Without major reductions by these countries, it is irrelevant what the developed countries, even including the US, do.

Some perception of this immense regulatory failure has always informed US energy policy. The UK situation shows what can happen if the inevitable failure of climate change policy as it has been pursued so far is not taken onboard. The UK Government, either in denial or ignorance of the policy’s failure, is arguably the national government which is most doggedly persisting with emissions reduction. It has set extraordinarily ambitious emissions reductions targets under the Climate Change Act 2008. It is doing all it can to ensure that environmental objections to energy systems of which it approves, such as nuclear and wind,
will be unavailing. Subsidy of these systems is already very great and is projected to rise enormously. Incredibly, the cost of electricity in the UK is forecast to rise by 60% by 2020 and, of the 2020 price, almost 40% will be attributable to emissions reduction policies. The effect of this on the price of everything else, and so on UK living standards and international competitiveness, can easily be imagined.

Now, for reasons particular to itself, the UK’s climate change policy is almost certain to fail to bring down UK emissions. But even if it succeeded, that success is absolutely certain to be swamped by what is happening in the major developing countries. Even if the developed countries sustained the enormous environmental and economic costs of emissions reduction, it would do nothing whatsoever to meet global emissions reductions targets, and to persist with climate change policy in these circumstances is not merely wrong but irrational. The real issue is not how to revive this policy but to attribute responsibility for advocacy of that policy over the last 20 years when it has been absolutely bound to fail from the outset.

David Campbell

The academic paper on which this article is based may be obtained by writing to
Renewable Energy Developments Policy: an introduction

- There is an urgent need for improved protection of our most valued landscapes.
- Proposed renewable energy developments are checked against existing statutory landscape, wildlife and habitat designations and against the John Muir Trust's wild land policy.
- The Trust opposes all development proposals in areas of core wild land
- We will look carefully at potential impacts to local communities, wildlife and protected landscapes close to core wild land

In Summary

This policy sets out the John Muir Trust’s position with regards to proposals for renewable energy developments, and forms the basis of any response to planning applications.

Climate change is perhaps the most significant threat faced by the world today. As part of the response to this threat, the Trust supports the development of small-scale, sensitively-sited renewable energy schemes close to existing settlements. Such developments can demonstrate that energy can be sourced local and provide benefits to local communities without negatively impacting on wild land.

Download our Renewable Energy Developments Policy

Page Updated: 8 July 2011
RENEWABLE ENERGY DEVELOPMENTS
AS APPROVED BY TRUSTEES, 10TH OCTOBER 2004

Introduction
The widespread development of large-scale renewable energy schemes and their associated infrastructure has become highly contentious, to the cost of both proponents and opponents. In order for public confidence in the development of renewable energy to be restored, there is an urgent need for improved statutory protection of our most valued landscapes.

The John Muir Trust supports the development of small-scale, sensitively sited renewable energy schemes in areas adjacent to existing settlements, which demonstrate that renewable energy may be sourced without significantly impacting on wild land. The Trust, while in support of the development of renewable energy systems, will oppose new developments where they significantly threaten wild land.

Definition of Wild Land
Wild land is described as “Uninhabited land containing minimal evidence of human activity” and defined in detail within the Trust’s Wild Land Policy.

Response to specific developments
Proposed renewable energy developments will be checked against existing statutory landscape, wildlife and habitat designations and against the Trust’s Wild Land Policy.

Within wild land
Renewable energy developments proposed within the core of an area identified as remote, wild land will be opposed.

On the periphery of wild land
Renewable energy developments proposed away from inhabited areas and bordering on wild land will be further assessed according to design, scale and importance to the local community. The Trust may find it necessary to oppose the development if any of the following apply:

- There is a significant impact on the adjacent wild land or protected landscapes
- There is a significant threat to wildlife (especially designated habitats and species)
- The scheme and its associated infrastructure are not sympathetically designed
- The scheme is considered to be of an excessive scale
- The scheme is not supported by the local community

Outside of wild land
Renewable energy developments proposed away from an area identified as wild land, within more obviously managed landscapes are unlikely to be opposed by the John Muir Trust provided they are of an appropriate scale.