SUBMISSION FROM W K BURNS

My relevant background is 45 years in the electricity generation industry in design, construction, operation and regulation. My response to Question 1.1 is a generic response to many of the other questions. This is to challenge the credibility and fitness-for-purpose of the (non-devolved) energy policy making process within the Scottish Government Energy Markets Division and the Office of the Scottish Government Chief Scientist.

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

Opinion from many diverse sources suggests that they are not.

Scottish Govt. cannot possess an unbiased objective view because the Scottish civil service does not appear have the internal intelligent customer capability to advise them. Scottish Government has received many submissions from various interest groups over the past few years. It is clearly very important that the civil service in Scotland is able to act as intelligent customer on behalf of Scottish Government policy makers (albeit for a non-devolved issue). Without such a capability, Scottish Government is vulnerable to the potential distortions of evidence that are always a risk when that evidence comes from vested interest groups (e.g. particular operators in the generation industry, green lobby groups etc.). In a meeting I had with the Deputy Head of the Energy Markets Division in May 2009, I asked how many of the 100+ strong staff of the Energy Markets Division had appropriate numerate expertise that would provide the needed intelligent customer capability. It was explained to me that such expertise was not needed because it could be provided by the Government Chief Scientist and (her) staff on the Science Advisory Committee. The Scottish Government Energy Markets Division does not have the internal customer capability needed to assess the analysis and recommendations from external submissions during consultation stages, or from external appointed consultants. The Scottish Government Chief Scientist does not possess this capability. The Science Advisory Committee is compromised by potential conflicts of interest. Without competent civil service objectivity supported by the civil service code the political process is fundamentally flawed. Correction is needed as a priority.

1.2. 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?

Current over-emphasis on wind generation will greatly increase the cost and reduce the probability of success. Because of the intermittency of renewables, it will create the need for greater provision of balancing power through rapid response fossil-sourced generation which will require carbon capture and storage (CCS). Having provided CCS the provision of wind generation becomes superfluous since the balancing fossil
generation can be operated at higher load factor, greater thermal cycle efficiency, and equivalent freedom from CO2 emissions without the prior need for wind generation. Fossil generation with full CCS does not require wind generation to reduce carbon emissions. Therefore CCS and wind generation are mutually exclusive components for a Scottish generation strategy. Renewables intermittency will also need greatly expanded grid connectivity that will significantly add to the cost per kWh of renewables generation. As evidence of the consequences of overemphasis on renewables we should look to Germany, where dramatic increase in wind generation and closure of nuclear plant has had the direct consequence of increasing the use of brown coal (indigenous) and oil (from Austrian generation). German CO2 emissions are rising as a direct result.

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

No. Energy transformation efficiency will be poorer because most of the electrically-sourced heat must come from schedulable generation (to match varying demand) and will therefore incur thermodynamic cycle efficiency losses at the generation source. This will mean that roughly 2.5 times the fuel will be needed to provide the electrically-sourced heat than would have been necessary if the heat had been directly sourced from fossil fuel.

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

Yes. However, the cost per kWh will be so high as to inhibit inward industrial investment into Scotland, and will further exacerbate fuel poverty. The principal limitation of wind generation is its intermittency and the impossibility of scheduling generation to match need on the grid. Wind generation can be engineered to be schedulable to match grid management requirements by enforcing the provision of frequency control at the wind generator itself. Such capability is being developed in Denmark. It is not being adequately developed or investigated in the UK. There is inadequate market incentive for wind generation operators to provide frequency control because it further increases the cost per installed kW and reduces the operating profit by reducing load factor.

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

No. The very high proportion of electricity sourced from wind generation makes grid stability more precarious due to its intermittency and the need for greater bulk transportation of energy over large distances.

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

No, except by relying on foreign sources of technology and equipment.
1.9. 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?

Due to the high proportion of wind generation, the grid network must be reinforced to provide the capability to move both wind-sourced power and balancing power (mainly from fossil generation) to where it is needed. This reinforcement work is not being given enough priority or lead time. Export of any excess generation from Scotland to England will also be at times when electricity prices are depressed due to excess supply over demand in England (with power available from European mainland interconnectors).

2.2. How can national priorities be reconciled with local interests?

By ascribing a much higher value to landscape as an amenity, especially in a nation where tourism is a dominant industry; and by removing regressive charges on all electricity consumers which currently finance subsidies for renewables.

(d) Access to finance

2.3. 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?

Not for renewables in the foreseeable economic climate. Scottish Govt. must pursue least cost sources of generation commensurate with meeting reasonable emission constraints.

2.4. What will the impacts be on consumers and their bills?

Fuel poverty will increase significantly due to unnecessarily high generation costs and the regressive taxation effect of renewables subsidies passed on to all electricity consumers. Inward industrial investment by high energy-use industries will be discouraged from coming to Scotland and potential job creation will be inhibited with greater impact than the jobs created by the renewables industry.

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28 February 2012

References