SUBMISSION FROM DEREK G BIRKETT

Introduction

My name is Derek George Birkett resident in Highland Perthshire. I am a chartered electrical engineer having had extensive experience in the Electricity Supply Industry on installation, commissioning and operation. For twenty years before retirement my employment was as a grid control engineer on shift at Pitlochry with the North of Scotland Hydro Electric Board, becoming Scottish Hydro Electric on privatisation, subsequently Scottish and Southern and now SSE.

Since retirement I have made a number of submissions to official bodies relating to renewable energy, acted as a witness at three public inquiries, two for wind farm applications and for the Beauly/Denny Transmission line application where I was an independent witness against the proposal. In July 2010 I had a book published by Stacey International titled ‘When will the lights go out?’ warning of the risks being taken with energy supply by UK government policy on renewable energy.

Observations

My working experience has been entirely ‘hands on’. I have been dismayed by the absence of technical consultation over Government policy and where sought has been given by commercial organisations. Expertise with grid operation rests with a few score of individuals within utilities that are invariably run by accountants. Such individuals are constrained to speak out unless retired. Policy has been politically driven, expropriating the time honoured practice of economic viability. Sufficient information has been made available from reports in the public domain, the problem rests with comprehension within the structures of government to implement sound policy.

Questions to be Addressed

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

The most authoritative source to answer this question comes from the House of Lords Select Committee on Economic Affairs in their 2008 Report on the Economics of Renewable Energy who were sceptical such targets could be met. The niche issue within my own expertise is the ability of the grid system to absorb the level of intermittence announced in policy documents. Only one source of significance has addressed this issue being the UKERC 2006 report into the Costs and Impacts of Intermittency from Imperial College, London. The quagmire that arises from this issue are the costs involved towards mitigation of this problem. The 2005 ‘Freds’ report gave ample evidence of the largesse required to sustain this 2020 target.

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

Security of Supply has a number of facets, generation provision and intermittence will be elaborated. National Grid have produced two reports ‘Operating in 2020’, the first in June 2009 and the second update two years later detailing likely scenarios of
generation provision. These reveal the scale of plant retirement through age and regulation and in so doing highlight the scale of imbalance between thermal technologies where since privatisation only gas generation has been installed.

The deficiencies of wind resource are only now becoming apparent to the public mind, the most glaring of which is load factor promoted at 35% but realising a value approaching 25%. This has three serious repercussions. Reduced production and lower investment returns, increased installation to meet targets (defined in capacity terms by the Scottish Government but required in production terms by the EU) and finally much reduced capacity credit. This latter is the level at which a percentage allocation is made for firm capacity. Initially promoted at 20%, evidence by a major utility now indicates 8%. Experience over two winters reveal derisory contributions from wind at times of peak demand. The verdict of wind resource is being ‘additional to’ not ‘replacement for’ other controllable power generation.

But the presence of wind resource is not benign where dedicated fossil capacity must be available to cope with almost complete substitution. This level of standby capacity by 2020 is expected to reach a fifth of current maximum demand on the GB Grid System.

Only fossil fired plant has the versatility to cope with this scale of intermittence where the use of gas generation wastes half of its heat content in conversion to electrical power that otherwise could be used as heat provision directly.

The scale of plant replacement is expected to equal if not exceed the rate of fifty years ago when demand doubled over seven years. At that time we had a manufacturing industry which no longer exists and the UK is also reliant upon foreign technology and expertise.

The gestation of essential nuclear development will take over a decade to materialise. The priority for new replacement capacity should be coal, the existing stock rapidly being withdrawn over this coming decade. Further gas generation exacerbates price volatility as well as reducing security of supply.

Turning to intermittence, my prediction is very soon wind resource will become destabilising on the grid system. Mitigation can only really come from interconnection to Europe and there are constraints, not least economic. National Grid indicate by the end of the decade, meeting peak demand will be reliant upon power supplies from interconnection. Energy supply will become import dependent not just for fuel but for instantaneous electrical import.

Insufficient public attention has been given to the consequences arising from failure of electrical supply. The UK has become complacent having had so much continuity of electrical supply over decades.

*What further improvements are needed to the grid infrastructure or heat supply networks both at a national and local level?*

An absurd level of transmission resources are being committed to accommodate renewable generation that itself is significantly uneconomic and will remain so.
Development of the UK Grid System has to be considered on the whole, of which the Scottish component is only a part. It makes little sense to make provision for transporting power considerable distances across the grid system to the demand centre of the south east when the availability of renewable power in production terms is only approaching a quarter of capacity. Further inefficiency arises when connecting such widespread and dispersed locations with associated losses to their point of use.

Given the scale of intended renewable development, further enhanced transmission capability will be needed to export power from Scotland. Significant modification will be required across Northern England, so much so a ‘bootstrap’ solution is being promoted for a west and east coast undersea cable to mid England from Scotland’s demand centres. The uprating of existing interconnection has led to very significant sums having to be paid out for constrained off payments on a scale comparable to payments for developer subsidy promoting wind resource. Well before these ‘bootstrap’ developments are launched I would expect technical limitations to arise curtailing further wind development on the GB Grid System.

Proposals have been aired for an undersea connection to Norway to absorb surplus renewable production from Scotland at pumped storage facilities in Norway. This would become part of an expanding North Sea grid network being promoted by the European Union. Curiously this facility would not connect into Shetland where significant development is already being promoted with a separate undersea cable to the Scottish mainland. Even more curious is why pumped storage facilities could not be developed in Scotland.

During the Beauly/Denny public inquiry it was envisaged a five year construction period would be required. Recent press reports indicate completion for 2014. The southern end of this line has a transformer rating well beneath the line capacity at 400kV which suggests the purpose of the development is not so much to transmit power from the far north as to enable exploitation of wind resource along the route of the line, being collected at 275kV on this dual voltage project. Further significant transmission development will be needed to connect Denny into the Central Belt main 400kV network.

Conclusions

Very considerable sums are needed to develop a transmission network capable of absorbing the intended scale of renewable development across the UK. So far 47GW has been proposed with 33GW by 2020. Of necessity such expenditure has to run in tandem with wind resource development. The economic consequences of technical limitations preventing this target would be horrendous, enhanced by the sudden realisation of a problem. This scenario bears comparison with the banking collapse of 2008 when institutions were making so much money as to be unconcerned with growing instability in a loosely regulated system, a situation mirrored in UK Electrical Supply where no one institution is in charge.

Grid instability whether through intermittence or inadequate generation provision has not been adequately addressed by government either through its economic effects or inherent risks with the consequences of failure. Whilst awareness of blackouts is a problem the real concern is the cost of mitigating measures to ensure this does not
happen. This position is a consequence of not having any defined responsibility for security of supply and a structural failure of energy policy by government.

Cognisance needs to be given to developing conditions not envisaged when such targets were initiated. World temperatures stabilising, credibility of the scientific process, international deadlock with reduction of emissions and the self immolation experienced by western economies since the banking crisis. The governing establishment is hypnotised by the 2008 Climate Change Act and by making EU emission targets a statutory requirement. Recent backtracking by the EU over the Emissions Trading Scheme with air travel should point the way forward for the repeal of 2020 targets that are crippling the UK economy and whose costs are unfairly borne by the most vulnerable in society.

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13th February 2012