

SUBMISSION FROM INSTITUTION OF MECHANICAL ENGINEERS

Remit

Scotland's energy needs in a changing UK electricity market - an inquiry into security of supply. The four themes will be: supply, demand, the transmission network and market functioning." [This statement confuses 'energy' and 'electricity'; the two must be clearly differentiated. According to the Scottish Government's own figures, electricity only supplies 19% of Scotland's energy demand, while heat accounts for a huge 55% (the balance is for the transport sector). Security of supply is of vital importance to both heat and electricity and trying to address the issue in one area but not the others is not helpful.]

Background

Ensuring that there is enough generation to meet energy demand in Scotland is a function of the availability and flexibility of domestic generating plants, as well as the capability of the UK transmission network. [Again, there is confusion of 'energy' and 'electricity'; (power) generation can only meet electricity demand, not energy demand. Even considering electricity alone, the demand is met by a combination of generating plant in Scotland, generating plant in England, interconnectors to other countries and by energy storage for electricity, e.g. Pumped Hydro. All of this was made clear in IMechE's report "Scottish Energy 2020?" (Nov 2011) with which we assume the Committee is familiar.]

Terms of Reference

In conducting this inquiry the Committee is interested in receiving views about:

- Supply and whether there is sufficient generation to meet demand, in particular to the end of the decade. *What role will new generation that is under construction, or has been consented, play?* [Because most of the 'new generation' capacity consists of intermittent or variable power outputs, it self-evidently cannot 'meet demand'; therefore, it has to have adequate 'back-up', which can be provided only by fossil fuel and/or biomass generation plants, or by interconnectors, or by energy storage schemes (see IMechE's Report "Energy Storage: the missing link" – April 2014), none of which is being built at an adequate rate.] The Scottish Government aims to have a "largely decarbonised electricity system by 2030". *What does this mean in practice, and are there sufficient tools in place to bridge the move from fossil fuels to renewables?* [The lack of definition of a non-technical term, such as 'decarbonisation', means that no-one is very sure what it means! If it means the transition from fossil fuels to renewables, as suggested here, then the subject has not been logically thought-through in Scotland and the 'tools in place' are inadequate (see again, IMechE's 'Scottish Energy 2020?' Report). As a consequence, the continuing use of fossil fuels in Scotland beyond 2050 appears inescapable.]
- How predictable peak demand is at present, and how is this likely to change in the coming decade? *In particular, what impact will the development of demand side response have? What could be done to improve developments in this area?* [This question again demonstrates the danger of considering 'electricity' demand in isolation. At best, 'peak demand' is only one measure of how an electricity system operates and

in any case, has been falling slightly over recent years (for unconfirmed reasons). In future, DSR might well play a significant role in managing the demand side but this is not the primary factor. If the Government's oft-repeated desire for much more 'electrification of heat' and 'electrification of transport' are achieved, then these will cause a massive increase in peak electricity demand, without any means of supplying that demand. The whole energy system must be considered at the same time, with particular focus on CHP; thinking only of electricity creates more problems than it solves.]

- A number of new transmission network projects are currently under construction or being planned. *What role will these have in securing electricity supplies, and where should future investment be directed? What role might the distribution network, and a single European electricity market play in securing supplies?* [Electricity transmission systems have been of vital importance over the past seven decades (the IMechE's Sir Christopher Hinton was one of the main architects of the National Grid) but are likely to play a diminishing role in future energy systems as more and more distributed energy systems come on line. However, a significant move towards distributed 'integrated' energy supply and demand systems will require a major shift in Government thinking and prioritisation.]
- A number of significant changes to the electricity market have recently been finalised and are being put in place to ensure competition and cost reflective prices for consumers. *Are policies such as the Capacity Mechanism under Electricity Market Reform adequate, and what other long term signals might be necessary to ensure security of supply?* [EMR is yet another example of considering the electricity market in isolation, while ignoring the much larger heat and transport markets. As noted above, the increasing electrification of heat and transport are likely to have a seriously destabilising effect on the electricity market which will seriously undermine issues such as competition and prices for consumers.]
- Any other matters concerning security of supply that you would like to bring to the Committee's attention. ['Security of supply' can either mean the rather simplistic notion of 'keeping the lights on' (a rather lesser issue than 'keeping people adequately heated'), or 'national security', i.e. making best use of indigenous resources. It is not clear which is intended here and the solutions are very different. Most of Scotland's increasingly imported fossil fuel supplies are used in the heat (55%) and transport (26%) sectors, not in electricity generation. Even if 100% of electricity were to be generated from renewables, it would make little impact on reducing fossil fuel imports/consumption. Integrated, whole-system thinking (as practised in Denmark) is essential in Scotland, is needed immediately and will include the need for considerably more energy storage both for electricity and for the heat and transport sectors.]

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