From: <email address redacted>
Sent: 23 November 2015 13:14
To: EnergyEvidence Infrastructure-Commission
Subject: Energy

Dear Sirs,

As a professional in the energy field (primarily buildings and transport) I write to offer my comments to the commission.

The concentration on electricity is perhaps the most disturbing aspect of this evidence request; electricity is not a source of energy but a means of transmission, and only one of several available in theory. It is not even the largest energy 'market' in the UK; that is and seems likely to remain the provision of space heating (primarily natural gas), and transport fuel (petrol and diesel plus kerosene). The 70TWh or so of energy that gets transformed into electricity and shoved around the existing grid at some point in its use, annually in the UK, seems rather small beer in comparison to the picture as a whole. And is probably not the biggest energy problem we face as a nation.

So the narrowness of the energy issues placed up for debate must be the prime concern.

I will assume therefore that the person or persons who decided on a title for this commission, simply got things mixed up; what was meant was electricity supply via the national grid, not energy.

That being the case, there are a number of issues that the National Grid, a device set up over eighty years ago, now fails to address, of which the idea of an energy 'market' is probably the least relevant, even if it obsesses politicians. Briefly, they can be defined as 'fitness for purpose', 'long term usefulness', and 'thermal efficiency'.

Since the issue of efficiency - thermal that is - is probably the biggest one, I will deal with it first.

Overall thermal efficiency of the current grid, that is the energy outputs (as useful heat, light and power) compared to the energy inputs at the generators, is probably no more than about 30% overall. So the current energy supply via the grid contrives, in the doubtful guise of convenience, to throw away 70% of the - mostly fossil - fuels that it uses. That is on a par with the open coal fires of yesteryear, and rather worse than the town gasworks of my youth. On this basis the Grid is unsustainable. The only way to address this is to specify a minimal thermal efficiency - say 75% - for any new entrant wishing to put electricity in.

In terms of fitness for purpose, it has been clear for some time that the Grid is predicated upon large thermal power stations; it was designed for them and does not readily serve any other form of generation. Artificial, and potentially crippling, restrictions are in place to prevent the use of the grid for renewables, especially micro-renewables, where the Grid is not so much a long distance transmission system, but a local balancer of voltage and frequency, with the outputs being supplied to - and used - within the 33kV sub-grids of local extent. A major shift is required immediately to permit more renewable inputs, whose thermal efficiency is compromised from a very high base (90%+) by this archaic system. Many people wish to simply lean on the Grid's ability to balance voltages, not be dependent upon it for large numbers of amps, and simply want to swap a few kWh with their neighbours as convenient. Currently, the government see the 'market' as being for the 21st century equivalent of the 'Grand Allies' - where fortunes can continue to be made, by fair means or foul, as they were when coal was the only king of the castle. That attitude, in my view, needs to change.

The other principle heading under fitness for purpose is to address the issue of moving the grid from a national monopoly sucking the blood out of the users, to one where it serves everyone, not just the big battalions. A grid that sees everyone as a potential supplier and consumer, and whose prime purpose is to balance out those many millions

of small supplies with the almost equal number of small users (even though 'small' may mean a factory using 2MW or more, and feeding it back in the right conditions). In short, a Grid where equality of access and benefit are its prime concern alongside security of supply. Perhaps key to this is the issue of storage.

Currently the grid has, de facto, almost zero storage. A couple of small hydro schemes, some capacity in the Scottish Highlands, a small hydraulic press in Tower Bridge. How the Grid develops a programme of energy stores (and bear in mind almost every dock installation in the UK had one in 1914), in terms of size and location, is one of the great challenges of the twenty first century. Which we needed a decade ago as part of the move to renewables, and which we presently have neither got nor look like getting any time soon.

The question of long term usefulness must, inevitably, be tied up with plans for the Grid. The issue of making people responsible for the energy they use is a key one; have your own micro-hydraulic accumulator in the garden or a shed at the back of the factory and you are acutely aware of how much it costs you and how much juice you have to run with. Pass the responsibility to the Grid and you can do what the rail industry in the UK does; use it without a care for how much or when. If HS2 had to build the 500MW station it will need to run it, then it would think very hard before letting 18MW into each TGV. That sort of responsibility would change fundamentally the electricity supply industry in the UK. The Grid as a supplier of big power may be a dinosaur about to meet a meteorite shower. As a supplier of balanced 220, 440 or higher voltage single and three phase AC its days may well be numbered; there are already ways of dealing with this on the scale that gives consumers power and responsibility for what they do.

At its best the Grid can only take energy made in one place and move it to another; allowing a completely safe nuclear station to be located a long way away from the customers, instead of at Battersea, for example, and knocking 5% off its thermal efficiency. On the other hand it could move onshore wind to the cities, or solar PV from schools after going home time, when their site stores are full. What you want the Grid to do depends on what you think its for; everyone, or only those with power to master it to their own ends.

That, in essence is a political, not an energy transmission, issue.

Yours Sincerely,

<name redacted>

<address redacted>