Dear Anna,

D.E. CONSULTATION RESPONSE - 1

I always try to do a job justice but this is quite a big challenge. While I am of the opinion I understand most of the global resources; how to achieve zero carbon housing now, and how to try to drive a Town to zero carbon – you have asked me to get into the electricity industry and be constructive. It is my pleasure to do this and luckily while researching and trying to understand 'energy' I had already taken on board all the various forms of generation with their associated costs of generation and the implications for 'The Grid' of radically changing the demand and supply patterns. I therefore again perhaps take a wider perspective than most respondents, so would like to try to cover my thoughts and suggestions in more than one way.

I hope you have read my article on Climate, so you understand I am considering a fully zero carbon economy rather than some level of reduction in some somewhat distant time horizon. This clearly puts a different perspective on acceptable solutions, but Anna I am given to making predictions and will suggest that by 2015 we will all be taking a very different view on climate and what has to be done, and I give you this date with a 90% confidence level! From this time we are going to be struggling and even panicking so we need to be looking for solutions that will be viable then. I am deeply troubled that UK Ltd might create industries that will be history before they have even started operating, and then we will rue the day we wasted all that capital and intellectual ability chasing the wrong solutions. Our economy is already littered with such examples.

Anna, you will find that the Stroud Renewable Energy Cooperative is not being driven in isolation based on some local financial benefit created by this project, but by the notion that it forms part of a national plan to take us from where we are to where I believe we need to be, so all that follows IS the logic that caused me to embark on this project.

I would like first though to encourage consideration of some facts that in my opinion need to be taken on board as these fundamentally focussed my attention on those solutions likely to succeed – and defined those that are unlikely to:

A. It is a matter of fact that the actual cost of generating electricity is in the range 2.5p to about 4.5p.The mean was about 3.1p before the oil and gas price increases.
B. In the retail market we are paying about 13p + about £125 standing charges (covers all administration? which can therefore be excluded from other considerations)
C. There is an enormous gap between cost and end user price that cannot be explained by the activities in between – given admin should be covered by those standing charges.
D. Nearly all these activities involve only the major players in the energy markets – virtually all being in foreign ownership certainly when considering England. Therefore nearly all this income/profit is going outside the UK and the very high prices are disadvantaging the UK both domestically and industrially. Not satisfied with owning our water and airport industries they need to own our crucial energy markets too.
E. I now learn that many of our Banks and Financial Institutions are busy 'trading' in the energy market where they simply buy and sell electricity (and undoubtedly gas) in order to generate a

profit. Our energy has become a commodity, which from my perspective is decidedly against the public interest.

It therefore seems right to work to bring power to as many as possible at an affordable price, so the notion that large numbers of DG schemes - hopefully in community ownership - could be brought into the market is a great idea.

From my perspective it is crucially important to consider the macro problems first from which we can develop the macro and long term solutions and then to develop the micro from the macro and not the other way round.

So can we first consider the slightly longer term future of electricity generation? I apologise if this is slightly repetitive but these are the crucial determinants of the course that in my opinion we must follow.

- **We need somewhere between all and nearly all our generation to be renewable or zero carbon.**
- **We must create a UK energy mix using the lowest cost forms of generation that are possible and practical.**
- We need a mix of technologies unless we can find one that fulfils all our needs and has a supply profile that can be variable to match whatever demand we have! Do not know of one so a mix it is.
- On-shore wind is the cheapest currently available AND it can be embedded AND it has the lowest carbon footprint of all the major renewable sources. There is also about 8 times the resource necessary to provide all our current demand – so there is a lot available.
- Tidal current should mature at about the same cost as on-shore wind, but has a totally different production profile and is absolutely predictable. In most instances it cannot embed as most available capacity is peripheral to the market (like off-shore wind) – but properly located it can provide a 'base load'.
- We will need to use the other available (though less voluminous) sources most of which can embed such as:
    - Hydro
    - Biogas
    - Pyrolysis
    - Possibly waste
- We absolutely need to reduce our energy consumption as fast as possible so while renewable generation rises our demand drops back to meet it. For me this is a non-negotiable 'given'.

If we agree this is a good premise then we urgently need to generate a lot of electricity from wind, and this will have to happen <u>before</u> we produce a lot from A. N. Other resource as other technologies are not yet as advanced. We need simultaneously to address the issues of energy reduction **and** matching demand to supply (both of which the Stroud project is intended to address) but for now we need to consider the implications of generating a great deal more from on-shore wind. This means:

- We are therefore going to **start** creating a significant share of our supply from a variable source.
- This will (unless we can be seriously good at demand management) increase the load on the Grid in terms of the need to have plants that can be switched in and out to balance the supply.
- In the next year or two we are going to have a limited number of wind farms located in almost random places but the national impact will not be significant for some time as total generation cannot expand rapidly – apart from anything else the global demand: supply of turbines is hugely out of balance. This will therefore not upset anything for some time.
- As the penetration of locally produced wind energy increases – so its overall share of UK generation will increase – but so will the geographic spread of these generation facilities. In this way the load will constantly be being taken off The Grid and placed into the Local Distribution Networks reducing transmission losses and the need for Grid upgrading [with a singular major exception which is the lack of a 400KV line through Scotland].
- AS the geographic area spreads so the variability of supply does reduce BUT this could involve **some** of this power needing to be moved some distance – so some might need to be transformed up to move it across the higher voltage lines. There is no technical issue here as transformers work both ways – all we need is modern switch gear that allows electricity flows to go both ways (I consider an insignificant expense).
- However, as this all happens so, if we don't start matching demand to supply and reducing demand itself, the 'Grid Balancing Requirement' will increase so there might need to be more centrally controlled on/off capacity WHICH is a direct result of generating a higher % of our power from variable resources.
- Now if we charge this penalty on those creating the problem (an easily argued case that will be argued by the central generators) we specifically disincentivise the very thing we are trying to encourage – so that is a bad idea.
- It is a fact that the BSC mechanism [while perhaps logical in a world of central generation without climate change] is no longer logical when we are dealing with the problems we now understand. It is also totally illogical to penalise renewables that are trying to help the climate problem while not penalising the carbon emitters for the cost of their carbon, which is a cost I will address as/when I can discuss the issues with you all directly. The EU ETS doesn't define the cost of carbon!
    - Interestingly this mechanism favours generators that can easily vary their output – like gas turbines - all of which are substantial carbon emitters.
    - Second and close up are those that have constant output – being coal and nuclear.
    - Least favoured are the variable output generators!
- This raises another very important issue which we can also consider as a balancing one as variable output renewables, while being potentially quite variable taken individually, will not be very variable taken as a whole. Why would we penalise any particular generator simply because IT is out of balance when others are supplying while it isn't? Let me give a working example I have had to consider (based on Stroud but could be anywhere):
    - We install one turbine by the M5

    - As another there would have to same wind profile as the first one – we install the next one in the Faroes – and the next in Norfolk – the next in Cornwall – the next in Russia - and you have the idea. However this enormously ridiculous situation would put us much more 'in balance' and reduce our costs.
    - Now to improve things further (as I intend) we install one tidal current turbine in the Severn Estuary (subject to it not being ruined by a barrage) where it gives us base load probably for over 50% of each 24 hours.
    - And another off the Clyde – another off The Forth – another in the Solent – and now we have 24 hour power (I promise I can do that)!
    - As setting up single turbines is economically ridiculous, other coops also set up alongside ours so we have maybe 20 of them all with one turbine in each place so all can claim minimal balancing. The output now meets regulations but the amount of hassle means that even I probably cannot drive it – so UK Ltd suffers.
- The function of the BSC is effectively to transfer funds from the generators we want to those we don't! Ultimately The Grid has to perform the final balancing by taking capacity in and out of the system and there is a cost of this – so who should pay for the vagaries of the small generator renewable DG industry and how?

It is clearly irrational to penalise zero carbon energy generators while not penalising high carbon generators for creating the problem the zero carbon ones are trying to solve so this is not easy. DG operators are by definition going to be small unless spawned by the 'majors' who are essentially already controlling the market - one problem I am trying to address.

It would therefore seem entirely logical to land this (very small until we have an **enormous** increase in on-shore wind) balancing cost on the industry as a whole so:

- It would seem to me that this balancing could be a requirement, at least to cover the smaller generators, which could be placed on the Grid. This would result in the greatest possible increase in such generation in the shortest possible time but is unlikely to curry favour at least with the majors and maybe not with Europe!!
- If the cost has to be borne by those who create the problem then:
    - This could be done by a levy raised by the Grid on the generators concerned – defined as those governed by a new specific License – and charged as a fixed fee on the total power generated. This fee could be based on the mean of the 'system buy price' and 'system sell price' given a formula to estimate the amount being sold and bought across the period, given the known intermittency of the source which can be measured. This would allow for any surplus or shortfall of generation over consumption, which would necessarily favour those who 'over-generate'.
    - This would have the effect of removing the substantial risk element put on small generators by balancing it between all of them. High impact risk is something we should all insure against, so this could be considered to be the insurance premium to cover that

risk and those buy/sell transactions. In effect this removes the potentially high risk of trading in the ½ hr market while charging the Supplier the mean cost of doing so.
    - I think this would have a major impact on potential new renewable Suppliers.
    - We have to recognise that industry evolves to maximise profit and to make 'super profits' if that can be achieved. To fulfil this objective industry tries to organise itself into the closest thing it can manage to a monopoly which may be an oligopoly with a manageable number of players. Additionally it tries to remove itself from the clutches of National regulation in order to allow itself the freedom to operate without constraint – to further maximise profit. Corporations perceive it their right to make large amounts of profit (note how the banks behaved when told to reduce their charges for unauthorised overdrafts – they 'recovered' the revenue they lost by charging extra in other areas. They were unable to recognise they had been charging illegally in the first place). Expecting major Corporations to fulfil a national or moral need is whistling in the wind. They will not do it.
    - The notion therefore that this activity should be put through the existing Licensed Suppliers – who can then take the risk and recover the total income they 'require' - simply fails to remove this generation activity from the grasp of the major players.
- My alternative proposition here is to use the services of a dedicated 'Licensed Supplier' for the small generation industry, which will carry the risks and disseminate them among all the players and provide all the other services that are required. This could potentially be a Consolidator but so far I have found that project profitability reduces markedly when others become involved, and as a Cooperative the principle is that 'The Members benefit'.
  It is a matter of fact that certain Suppliers have set up and prospered as new Licensed Suppliers, so you may already have understood from my earlier mails that I may well be prepared to set up just such an operation. It is clear that there is enormous potential to create a substantial industry around small scale DG – so long as the very considerable difficulties are removed. This would mean operating in support of potential DG projects for:
    - Planning Applications
    - Acting as a full Licensed Supplier
    - Obtaining the necessary Certificates and trading both them and any excess generation.

If it is the only way to circumvent the difficulties surrounding the very restrictive regulations that clearly favour the status quo (that I am fully aware you are also trying to resolve) – then that may well happen. The world needs action fast and we will all be the losers if we don't achieve that, so one way or another this proposition will succeed.

Mike (Hillard).