North Wales Wind Farm Connection

Response by Robin Barlow to SP Manweb's

"Response to Relevant Representations Document" September 2015

where in section 8.4 they respond to my original Written Representation (numbered 15 by them) to their Application for an Order Granting Development Consent for the North Wales Wind Farms Connection (PINS Ref EN020014)

In my original WR I pointed out that SP Manweb had been economical with the truth, and pointed out that a counterpoised connection, in which only the ground connector was undergrounded would lead to a lighter load on the pylons and a possible use of a Trident like structure instead of the HDWP. This representing a second best option to undergrounding. SPM's response to this was "...The double wood pole design is required to support the 300mm2 conductor **and** carry the earth wire as the weight and tension of the conductor is such to require double poles. Accordingly, it is not just the earth wire that necessitates the double wood poles, but the conductors.". Of course they do not answer the counterpoising proposal as that would have reduced the weight and load by around 25%. It is worth noting that the HDWP incorporates both heavy duty wood poles (2) and a massive steel superstructure. A Trident solution has a minimal steel superstructure and usually 1 pole.

With this response SP Manweb imply that the power capacity to be delivered necessitates use of the 300mm2 UPAS connectors (an AAAC technology), and that the weight and associated tension from these require the HDWP solution. As a point of reference for a less intrusive 132KV solution we have SP Manweb's own Legacy to Oswestry Reinforcement project which (in its revised version following objections to its HDWP solution) is based on a single pole Trident structure carrying the 200mm2 Poplar connector (also an AAAC technology). In the revised version this line carried no earth as SP Manweb had realised that the 2 lines it was reinforcing already carried earths between the same endpoints. The Poplar is also lighter (at 680kg/km) than UPAS (998 kg/km) but carries less current.

Question P1: following the withdrawal of Vattenfall would the 250mm2 Sycamore connector (also AAAC technology) not be sufficient, its lower weight (835 kg/km) enough to tip the scales to the "lighter" trident solution ? As far as I can see the Sycamore can carry 10% less current than UPAS but Vattenfall's exit reduces the capacity need from 176 MW to 147MW ie more than 10%. Or is the Sycamore not stocked in SP Manwebs stores ?

Question P2: could not SP Manweb apply the DTR (Dynamic Thermal Rating) technology that it has, with Ofgen support, so successfully trialled on its 132KV network (including St Asaph to Rhyl)? See https://www.ofgem.gov.uk/ofgem-publications/84214/finalclosedownreport09-10-2013.pdf and I quote "..Dynamic Thermal Rating of 132KV overhead circuit in North Wales demonstrated the ability to increase the circuit capacity and thus defer the need to construct further circuits....It was found that the average uplifts ranged from 1.24 to 1.55 times the static summer rating. ...This project has given SP Energy Networks confidence that there are significant rating uplifts achievable through RTTR and that such schemes could be utilised to facilitate the connection of onshore wind farms". Actually, the rating increase would allow them to use the Poplar connector as used on Trident. This was back in 2009-2013.

Question P3: could the award winning (wooden spoon) steel superstructure of the HDWP not be redesigned with higher specification materials and tolerances so that this morphs into a (near) single bar. I am sure that engineers can solve this. At a price of course, but at what price is our landscape

valued. And certainly cheaper than undergrounding. Has this been investigated ?

Question P4: the UPAS connector dates back 25 years and has been a trusted bit of kit for a long time. But, time moves on and even Ofgem is now promoting the use of High Temperature Low Sag (HTLS) connections based on ACCC and ACCR technology - at least in refurbishment projects where the power must be increased and the old pylons reused. These connectors offer at least twice the current capacity for the same diameter and also sag less. Alternatively they offer the same current for less diameter and weight, and still sag less. For example the 150mm2 ACCC conductor weights in at 500kg/km (significantly less than Poplar) but is rated at over 600 amps (significantly more than UPAS). Has SP Manweb considered this option ? What are the cost differences?

Question P5: Local people were shocked when the average span between the poles was reduced from the 100 meters value of the statuatory consultations to the 79m of the final ES. Has SP Manweb considered and costed the use of HTLS connectors in order to reduce the number of poles? By what % could the number of poles be reduced?

The problem of the earth connector. It certainly does not need to go by the same poles (as Legacy shows) or even be above ground.

Question E1: Counterpoising the earth connector ie laying it underground is a potential solution (as stated by me in my first response). What would it cost ? Possibly <1/6 of the cost of undergrounding the conductors but of course additional to the reduced OHL costs.

Question E2: Can the earth be carried on a Trident solution ? If not why not or where are the limits (mechanical and electrical)? Actually the answer from SP Manweb is YES, it can be carried on Trident. SP Manweb has in several documents shown diagrams of a Trident carrying an earth connector, see for example http://www.spenergynetworks.co.uk/userfiles/file/OHL-03-099_Issue1_ForInternet.pdf (albeit for 33 KV connections, but the weights and tensions must be similar). More recently (August 2015) and more importantly SP Energy Networks has published the the Loch Urr Routeing Consultation Document for a 132KV connection for three wind farms (85,59 and 59 MW capacity) in Scotland. I quote from the section Overhead Line Design starting at R3.3.5 “The 'Trident' wood pole 132KV overhead line design utilises two standard pole types, as illustrated on Figure 3; a 'single' pole and an ‘H’ pole configuration..... . The spacing between the poles will vary but will generally be 100m ..... The proposed wood pole will support three conductors (wires) in a horizontal flat formation as shown in Figure 3. In addition, there is an earth conductor suspended beneath the main conductors in order to provide lightning protection. This also includes fibre optic cores for communication purposes”. A single sometime double pole Trident with a single bar superstructure, and carrying an earth.
See http://www.spenergynetworks.co.uk/userfiles/file/Loch_Urr_Phase_A_Routeing.pdf

In summary it seems that there are a number of viable engineering solutions to significantly reducing the visual impact of the proposed 132KV overhead connection while carrying the required power. They need to be considered and costed.