Electricity Network Innovation Competition Full Submission

Supplementary Answer Form

Project: Black Start from Distributed Energy Resources

Tick if this answer has been provided verbally: ☑

Project code	ESOEN01	Question Number	69
Question date	2 Oct 2018	Answer date	4 Oct 2018
Submission section question relates to			
Topic			
Question	What learning do you need to gain from the Case Studies to be confident that you can undertake a trial that will, at a minimum, be able to back energise a 132kV line? Please give the Panel confidence that if you are going to undertake a live trial you will commit to a practical demonstration of such a minimum arrangement.		
Notes on question			
Answer	We commit to delivering two live trials within the project, which will be developed from the case studies we use for detailed assessment and development of solutions across all workstreams. This is supported by our project plan and budget, although there is likely to be some flexing of costs between the trials as the details are confirmed. It is our intention to energise a section of dead transmission system within the trials, as a minimum on the 132 kV network in Scotland but, if possible, on 275 or 400 kV in both the SPT and NGET areas. We believe that such a demonstration would be of international significance and would serve to highlight the importance and value of NIC funding. Our preliminary list of 10 case studies includes locations with opportunities to energise up on to the transmission system. When we review and select case studies in the project, this will be one of the criteria. For a case study to be progressed to a trial that includes energisation of a transmission line, the technical analysis in the Development phase would have to confirm the following: • Sufficient reactive range, and associated fast-acting voltage control, is available to absorb the capacitive gain from the unloaded circuit (from the aggregate capability of the DER and any DNO reactive compensation		

	in the Power Island); • There is acceptably low risk of transient over-voltages that may damage equipment or trigger protection, which will be a function of Power Island 'strength', appropriate control before the critical energisation step, insulation coordination and protection settings; • Harmonic resonances are of frequency and magnitude that do not present an unacceptable risk; • Protection for all energised equipment is sensitive enough to detect a fault condition given the low short circuit level; • Earthing on the Power Island is adequate to ensure safe operation including acceptably low rise of earth potential and step voltages on affected equipment; and • Measurement equipment is suitable, and available, to adequately record test behaviour. Other issues to be addressed include the organisational capability and readiness within the participating DERs to prepare for and deliver a successful trial. It will also clearly be necessary to arrange network outages as appropriate to the proposed trial. We recognise the need to plan in advance for trials of this nature. The project team including the ESO as well as a potential host DNO and TO will ensure we consider all factors. Given our responsible and measured approach to this project, however, it is important to highlight that achieving successful trials will depend on many factors that are hard to predict or control. We have identified a number of risks that will be explored in the Development phase. We may find barriers that cannot be overcome within the timescales of the project, or ultimately DER owners may not consent to participate in a trial. Also, as with all tests on the live network, the timing and scope may have to adapt according to the circumstances.
Attachments	