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	45
Question date	30 Aug 2018	Answer date	03 Sep 2018
Submission section question relates to	Scope		
Topic	Offline testing		
Question	What will the hardware-in-the loop testing entail? (p.12 of proposal)		
Notes on question			
Answer	Offline testing will make use of test facilities such as those at the Power Networks Demonstration Centre (PNDC), or similar facilities that offer HV test facilities or hardware-in-the-loop (HIL) testing with a real time digital simulator (RTDS). The need for offline testing will be identified in the project through review of the case studies and the specific technologies involved. HIL testing may include testing of secondary systems like protection and control (either before progressing to online testing or instead of live trials on the network). For example, an RTDS may be used to simulate the behaviour of the primary plant, i.e. the DER and network in an early-stage power island, and various disturbances applied to test the behaviour of control systems like automatic voltage regulators or generator protection relays. Injection testing of the actual controller or relay hardware has a number of advantages over pure simulation. Apart from de-risking the live trials or examining the behaviour of specific equipment from the project case studies, we will also be considering what role offline testing might play on an enduring basis to support Black Start from DER. Given the potential burden of testing with many more Black Start service providers, it will be important to identify opportunities for doing things more quickly and cheaply and offline test facilities may have a role to play.		

	In the Technical workstream the performance of DER and networks in Black Start will be assessed in four ways, which represent increasing levels of detail and realism: 1. Engineering discussions and qualitative review 2. Power system studies 3. Offline testing (where required) 4. Online testing, also described in the bid document as 'live trials' This means solutions will be developed in a phased process to reduce uncertainty and manage risk. We do not anticipate a need for offline testing of primary plant – the behaviour of diesel generators and other resources that might be deployed in the project are understood well enough for use in online testing – but we remain open to the possibility depending on what is included in the final set of case studies.
Attachments	