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	20
Question date	21 Aug 2018	Answer date	23 Aug 2018
Submission section question relates to	4		
Topic	N/A		
Question	P21 – why does 1MW need 3MW?		
Notes on question	In the base case, there is a continued reliance on gas generators, with some capability also provided by storage (almost entirely pumped storage), hydro, interconnectors and biomass. This decreases somewhat when large-scale intermittent renewables become part of the service fleet (assumed to be in 2025) – it is assumed that this is almost entirely wind, with some limited marine energy. The CBA does not include any large-scale solar PV for Black Start services. To take account of resource intermittency for renewables, we consider around 30% of installed capacity should be assessed as being available from a wind farm as a conservative assumption (e.g. ~3 MW of wind generation is needed to provide 1 MW of Black Start capability).		
Answer	In the early stages of Power Island creation, it is very sensitive to any changes in energy balance or circuit configuration. Ensuring that there is a consistent and stable supply of energy to the Power Island contributes to the probability of successful restoration. With generation, such as coal, gas and water, there is an energy source that is controllable within known operational ranges. Notionally, this means that we can assume that, if the service is available, there will be a near 100% delivery of energy aside from any short-term unavailability due to, for example, maintenance. We have represented this in the CBA through the use of de-rating factors – to meet a requirement of 100 MW from a generator with a de-rating factor of 80%, the model would procure 125 MW. This is why the total amount of capability that is procured exceeds the 18 GW national requirement that we		

	have assumed in the model. Where available, these de-rating factors have been taken from the Capacity Market. Wind Turbine Generation (and other intermittent sources) are dependent on the weather conditions. Therefore, when procuring from these intermittent sources, ESO will need to take a view on the probability of these generators being able to deliver when required – i.e. a de-rating factor for wind and other intermittent generators. For the purposes of the CBA, we have used load factors from the Digest of UK Energy Statistics as de-rating factors for these intermittent generators. This means that we have presumed that the Wind Turbine Generation would have a certainty of delivering 30% of their installed capacity. i.e. for ~3MW of installed wind capacity there would be certainty of 1MW of energy delivered into the Black Start Power Island.
Attachments	