

Network Innovation Competition Full Submission

Supplementary Answer Form

Tick if this answer is Confidential: ☐

Tick if this answer has been provided verbally: ☐

Project code:	SPT EN 01	Question Number	10
Question date	20-08-2013	Answer date	21-08-2013
Submission section question relates to	Section 2.5		
Topic	Technical Description of project		
Question	Please confirm that investigations of both SSO and changes in transient stability margins on the England-Scotland interconnections are envisaged as part of the project, and explain the extent to which each is likely to contribute to enhanced transfer capacity on constrained transmission routes.		
Notes on question			
Answer	<p>We confirm that investigations of both SSO and changes in transient stability margins on the England-Scotland interconnections will be undertaken as part of VISOR.</p> <p><u>Sub-Synchronous Oscillations (SSO)</u></p> <p>SSO monitoring is covered in WP1.1, and is primarily intended as a risk mitigation measure – to provide visibility and understanding of GB SSO behaviour, and the potential SSO risk associated with the installation of Series Compensation. The series compensation project relieves the B6 transient stability constraint by about 1100MW, and this project aims to safeguard this investment by addressing risks that may delay the project implementation, or cause a reduction in the benefit derived. To this end, reports on SSO activity will be produced before and after the connection of series compensation on the Scotland-England boundary in 2015, and again after the commissioning of the Western HVDC Link in 2016.</p> <p>Other international experience has shown that network capacity can be enhanced through the use of monitoring of SSO phenomenon. This is possible in cases where the SSO risk is only heightened under certain network loading and configurations but the majority of scenarios can be safely run at high network loading. SSO also often needs an initiating event and so while the system may be in a risk condition, it may still be safe.</p>		

	<p>Therefore provided that the SSO can be “seen” if it materialises, then the system can be run at higher levels than if the SSO was not observable. This is the operational experience in Australia and it is this that we seek to determine if it is applicable to the GB transmission network.</p> <p><u>England-Scotland (B6) Transient Stability</u></p> <p>With respect to Transient Stability limits on B6, VISOR will assess the existing uncertainties surrounding the transient limit and operation close to it, as well as demonstrate and evaluate methods to reduce these uncertainties.</p> <p>WP3.1 will focus on assessing the influence of uncertainties in measurements, models and generation on the Transient Stability margin. Investigations on the B6 boundary (England-Scotland interconnections) will be undertaken to quantify the effect that improved confidence in network parameters and simulation models may have on the appropriate safety margins to be applied under different operating scenarios.</p> <p>This will combine with the outputs from other tasks and work packages described below to give system operators better understanding of the physical system limits and improved real-time knowledge and visualisation of the actual system operating point. This will give operators greater confidence to drive the system closer to those limits:</p> <ul style="list-style-type: none"> • The validation and accuracy evaluation of generator and network models carried out in WP2 will address the model uncertainties topic. These investigations will include extensive transient stability simulations using Powerfactory and model verification against observed system variations using data gathered from the VISOR WAMS. • Improved accuracy of measurement through Hybrid State Estimation and the associated study work in WP3.2 will address measurement uncertainties topic. • Use of Angle Difference in addition to power flow to present the operating point of the system in WP3.3 will address some of the uncertainties associated with generation volatility, noting that Angle Difference is a more direct measurement of the proximity to the stability limit than power flow. Some studies have shown that there can be an increase in the stability limit under high wind conditions if the other synchronous generators are in a lower loading condition, thereby increasing their individual stability. This is subjective and as such needs to be quantified in detail to understand the application to the B6 boundary stability limit.
Attachments	
Verbal Clarifications (Consultants)	