

# Network Innovation Competition Full Submission

## Supplementary Answer Form

Tick if this answer is Confidential: ☐

Tick if this answer has been provided verbally: ☐

Project code:	SSEEN01	Question Number	18				
Question date	3 September 2013	Answer date	5 September 2013				
Submission section question relates to	Section 2						
Topic	Project description						
Question	Please provide some typical scenarios illustrating the anticipated use of the facility in terms of users, types of equipment modelled, real-time vs. offline simulations, etc.						
Notes on question							
Answer	<p>The attachment provides an indicative list of the studies which could be performed at the MTTE.</p> <p>The table below highlights the typical use of the MTTE for each stakeholder group:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 45%;">Stakeholder</th><th style="width: 55%;">Use of the MTTE</th></tr> </thead> <tbody> <tr> <td>Transmission Licensees (SP Transmission, National Grid Electricity Transmission &amp; SHE Transmission)</td><td> <p>Enhanced transmission planning for complex HVDC schemes.</p> <p>Model and assess new HVDC technologies.</p> <p>Train and develop Transmission Planning and Operational Engineers.</p> <p>The MTTE is expected to be used throughout project development lifecycles, including:</p> <ul style="list-style-type: none"> <li>Evaluating development options in complex HVDC scenarios;</li> <li>Specification of HVDC schemes;</li> <li>Facilitating multi-terminal solutions;</li> <li>De-risking control interactions between multi-terminal and electrically connected converters, and with other active controlled equipment;</li> </ul> </td></tr> </tbody> </table>			Stakeholder	Use of the MTTE	Transmission Licensees (SP Transmission, National Grid Electricity Transmission & SHE Transmission)	<p>Enhanced transmission planning for complex HVDC schemes.</p> <p>Model and assess new HVDC technologies.</p> <p>Train and develop Transmission Planning and Operational Engineers.</p> <p>The MTTE is expected to be used throughout project development lifecycles, including:</p> <ul style="list-style-type: none"> <li>Evaluating development options in complex HVDC scenarios;</li> <li>Specification of HVDC schemes;</li> <li>Facilitating multi-terminal solutions;</li> <li>De-risking control interactions between multi-terminal and electrically connected converters, and with other active controlled equipment;</li> </ul>
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	<ul style="list-style-type: none"> <li>• Facilitating competition and multi-vendor HVDC schemes;</li> <li>• Undertaking post-commissioning scenario planning and operational optimisation; and</li> <li>• Validating solutions as part of tender process.</li> </ul>
OFTOs	<p>Train and develop Transmission Planning and Operational Engineers.</p> <p>Undertaking post-commissioning scenario planning and operational optimisation.</p>
National Grid National Electricity Transmission System Operator (NETSO)	Able to commission studies, including grid development scenarios.
Interconnector owners	Inter-connector owners will be able to commission studies, in order to optimise the management of their assets.
Renewable energy generation developers (Particularly those developing offshore project, dependent on HVDC technology and/or future OFTOs.)	<p>Supply details of planned projects so that impacts of different project development scenarios can be assessed.</p> <p>Supply replica panel or their 'actual' control &amp; protection panels prior to installation, or software models to the MTTE for testing to demonstrate that their project is compliant and will not adversely impact on the GB network.</p> <p>Can use MTTE to investigate interactions of generation equipment with different transmission system options, and therefore make more informed decisions.</p>

### Balance of Real-time and Off-line Studies

- Digital models, as developed in the off-line studies, are by their nature "perfect", but are often found wanting when confronted by the reality of the physical implementation in a control cubicle as tested in a laboratory or ultimately in the field, hence the need for real-time Factory System Testing (FST).
- The MTTE will be able to perform FST on multiple HVDC controllers, sourced from multiple vendors. However, this does not preclude the need for off-line studies to be performed, either within the MTTE or in the owner's planning department, to provide checks on the results achieved in the testing of replica control panels.
- It is normal practice to create a reduced model of the AC transmission network, using off-line study tools, to minimise the computation duty on the real-time computer processors.
- Validation studies need to be performed to ensure that the dynamic response of the reduced network as implemented on the RTS facility give the same results as achieved in full system off-line studies. This level of confidence is required prior to the start of a significant system study on the RTS facility.

Attachments	Attachment to Q18.docx
Verbal Clarifications (Consultants)	N/A