

# *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	32
Question date	05/09/2013	Answer date	09/09/2013
Submission section question relates to	FSP spreadsheet		
Topic	Whole project cost, line item 6.1		
Question	Please explain the justification for a full time equivalent knowledge dissemination coordinator throughout the project, given the international experience that exists in PMU and WAMS deployment.		
Notes on question			
Answer	<p>While it is recognised that there is experience of deployment of PMUs in many countries worldwide, there is very little industrial demonstration experience of the application areas of particular interest to SPT and its partners in VISOR. It should be noted that the emphasis of the US Dept of Energy Smart Grid Investment Grand (SGIG) funding has been on infrastructure, and not on the applications and operational procedures for real-time measures.</p> <p>There is therefore considerable interest worldwide in the VISOR project, as it will demonstrate the use of WAMS for real-time risk management and stability constraints.</p> <p>The Knowledge Co-ordination function will be tasked with both inward and outward knowledge co-ordination. Inward knowledge co-ordination is important to use the experience from North America and other locations as the experience and use of extensive PMU deployments is gained over the next few years. Outward knowledge co-ordination is helpful to inform other TOs/SOs of the approaches taken here and share experience built up over the 3+ years of the project._</p> <p>As rightly pointed out in the support letters from EPRI (an USA based leading international Electrical Power engineering institute); UDE (the leading party of an FP7 project related to WAMS); and RTE (French Transmission Operator) the VISOR proposal represents</p>		

- ✓ the higher technology readiness levels (TRL) than European projects, which enabled its industrial trial;
- ✓ appropriate demonstration to address the unique characteristics of the UK transmission network;
- ✓ a timely methodology to meet the transmission innovation demand to facilitate a smarter network, the experience of which the international transmission licensees are keen to share with

In particular the key innovative parts of this project are:

1. Managing the risks of unforeseen stability issues, unstable oscillations and interactions, using PMUs and real-time analysis
2. Continuous wide-area observability of SSO beyond the PMU range, to address risks associated with new technologies introduced to the system
3. Significantly improved understanding of true (real time) stability boundaries, varying with system conditions, and applying new real-time representation

To the best knowledge of the project team, such functions have not been achieved in the industry yet.

The VISOR proposal has been developed as a genuine industrial collaborative innovation project, as stated in Supporting Letter from ENTSO-E (the European Network of Transmission Licensees). It should be further pointed out that the knowledge dissemination is one of the most significant part of the NIC projects which is flagship to facilitate the culture changes of the Transmission licensees. The challenges within TO and to the wider stakeholders should not be underestimated.

Detailed innovation points (with 13 learning points altogether) have been identified under each Work package as per section 2 in the main proforma. Examples of innovative elements of VISOR's work packages from which knowledge capture would be highly valuable include:

**Work Package 1:** Enhanced System Oscillation Monitoring - first implementation of a comprehensive situation awareness platform in the world, to cover the oscillation phenomenon at range of 0-45Hz for the transmission operator and owners. Application of innovative oscillation source location methods will also be a world-first. Integrating outputs from various monitoring devices is challenging, but feasible. This work package will apply existing software to a new application.

**Work Package 2:** System Model Validation – here, responses from the offline model will be compared with measurements. Short term outputs would include robust derivation of transmission line parameters. More complex outputs include a fully evaluated dynamic model of the network.

**Work Package 3:** Improvements for Management of Stability Constraints – an innovative dynamic measurement system is proposed. This work package will provide a unique opportunity to improve understanding of stability limits and address congestion on an integrated transmission network with changing inertia.

**Work packages 4B1** (Methodology for Optimal Placement of monitoring equipment) and **4B2** (Optimal WAMS Recommendations) which start from

	<p>the engineering decision, review the initial installation results, and generate the purpose oriented optimal PMU placement methodology. This work will be <u>led by academic partners</u>, but supported by the TOs, equipment suppliers and software developers.</p> <p><b>Work package 4C</b> (Performance Evaluation, and end-to-end testing) will have <u>direct impact on international standards of PMU manufacturing and data communication</u>, which will facilitate multi-vendor wider area monitoring, protection and control system. It will also involve testing from measurement through to end-user application and decision-making, which has not been undertaken before. This work package will also undertake a feasibility study on the WAMS national roll-out mechanism. Such learning will contribute to the standards of Wide Area Monitoring, Protection, and Control (WAMPAC).</p> <p><b><u>In addition to</u></b> facilitating the knowledge capture and dissemination of the 13 learning points highlighted in the work packages, this knowledge dissemination coordinator has important role in:</p> <ul style="list-style-type: none"> <li>➤ enduring ownership of the online portal and timely responding (1 MD per week x 45 effective weeks per year x 3.5 years funding period)</li> <li>➤ Coordinate the annual innovation conference; ( 4 times during the funding period x 15 MD each)</li> <li>➤ Coordination the five workshops identified; (5 x 10 MD each)</li> <li>➤ Project progress report (every six months) draft, review, finalise and publication; (7x 15 MD each)</li> <li>➤ Close down report draft, review, finalise and publication (50 MD)</li> </ul> <p>The above detailed task will come as over 400MD. If a reasonable assumption is used for the coordinate to spend 10MD on each of the learning points highlighted in the work package, it will make the overall commitment over 550MD, without taking into account any contingency.</p> <p>Therefore, a full-time coordinator will be justified based on its work load and should be appointed within SPT to ensure that the learning generated from the project are captured and shared among partners and other external bodies.</p>
Attachments	
Verbal Clarifications (Consultants )	