First Tier LCN Project Registration

DNO(s)
WPD

Registration date
23/03/2011

Project description	
Project title	Voltage Control System Demonstration Project
Project background	As Distributed Generators (DG) become more common, the growing number of connections to distribution lines will cause voltage problems (specifically high or low voltage) due to the variable power output of the DG (a majority of DG are weather-dependent). In turn this can affect the efficiency and capacity of the distribution network.There are several different solutions and devices available in the market that can help reduce voltage variation. However, some traditional solutions are unable to cope with the rapidly varying output of renewables such as wind turbines and photovoltaics (PV).
Scope and objectives	This project aims to address the issue of fluctuations seen in long distribution lines in a rural area with DG (in the form of Wind Turbines) connected.The objective is to determine the effectiveness of D-SVCs (Static VAr Compensator for Distribution Networks) as a system to control voltage on 11kV rural networks. Phase 1 comprises the testing of a single D-SVC will provide feed-back for the development of a D-VQC (Voltage and Reactive Power (Q) Control System) that will be utilised, subject to passing project break point sucess criteria, to Phase 2 for the networking of optimisation of multiple D-SVCs across two primary substations.
Success criteria	Success criteria for this project will be based on gaining an improved understanding of the functioning of D-SVCs and its ability to control voltage variations on rural networks: 1: Identify optimum settings for the D-SVCs for a given load and to achieve optimum voltage 2: Use changes in set points & low pass filter to expand understanding of D-SVC performance for a given set of parameters and a given network load. 3: Utilise learning gained from the above items to ensure that a D-VQC can be developed to optimise multiple networked D-SVCs over a wide distribution network.
TRL(s)	7
Predicted end date	31-Mar-14
External Collaborators and external funding	Hitachi is contributing to this project by supplying advanced developmental-stage D-SVCs, as the success of this project will lead onto further smart grid project developments. Hitachi have discounted their costs by £455k as their contribution.
Solutions	Connection of D-SVC units and a D-VQC to rural 11kV networks, located near DG (also connected to the 11kV network)

Potential for new learning	The learning gained from this project will have a direct impact on the operation of a DNO's distribution system, and will be beneficial for informing DNOs business case for alternative responses to network rebuild. The learning will also generate knowledge in power quality control and balancing technologies that can be shared amongst DNOs and other relevant stakeholders. The learning will be disseminated by way of published papers and case studies published in technical publications, as well as presentations in energy conferences, for the benefit of DNOs and stakeholders alike.
Risks	Primary risk: Inaccuracies of modelling and simulations of the distribution lines that may cause the D-SVC design to not work as expected as the D-SVCs have been sized according to these calculations. (Mitigation: Hitachi has done trialling of D-SVC in Japanese networks, and have gained valuable learning and experience from these trials. Hitachi also has a full engineering team to support this product) Secondary risks: Possible complexities around voltage of auxiliary equipment, different environment, communications and software. (Mitigation: Dedicated meetings to agree on how to adapt D-SVC to UK networks and specifications) Supply and sub-supply chain delays caused by exceptional event arising from tsunami etc.
Scale of Project	It is not possible to have a project that is smaller than 1 D-SVC. It is not possible to test a network of D-SVCs (managed by a D-VQC) that are less than 2 and ideally 3.
Geographic area	Project phase 1 is planned for WPD South West and phase 2 WPD South Wales. (Contract phases and costs are split to provide segregation across licences)
Does the Project involve customer engagement?	No

Funding	
Revenue allowed for within the DPCR5 settlement (£)	None.
Indication of the total Allowable First Tier Project Expenditure (£)	£525k

Publication	
Does the DNO provide Ofgem with consent to publish its First Tier LCN Project Registration Pro-forma in full?	Yes
If not, please justify which parts the DNO considers to be confidential	

Related Undertakings	
Payments to Related Undertakings (£)	Nil
If a payment is to be made to any Related Undertaking that is a Distribution System User, have the same terms been offered to similar Distribution System Users of the part of the network that is within the project boundary?	
Has the DNO used reasonable endeavours to make the opportunity available to similar Distribution System Users of the part of the network that is within the project boundary?	

IPR arrangements	
If IPRs are generated, will they conform to the default IPR arrangements set out in the LCN Fund Governance Document?	Yes

If no, then please provide a compelling justification for the project being approved	