

Network Innovation Allowance Progress Report

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form.

Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

Project Progress

Project Title

HVDC Nanocomposite Insulation

Project Reference

NIA_SHET_0008

Project Licensee(s)

National Grid Electricity Transmission, Scottish Hydro Electric Transmission, Scottish Power Energy Networks

Project Start Date

Jun 2012

Project Duration

3 Years 6 Months

Nominated Project Contact(s)

Andrew Robertson (SHET)

Scope

A new method will be created that will allow reproducible results for the distribution of nano scale fillers into polymeric insulation material. Scalability of the techniques will be demonstrated through the creation and testing of prototype full size bushings. To do this a new manufacturing method will be developed.

Objective(s)

Assess whether nanocomposites can be dispersed in polymeric insulation material in a reproducible fashion.

Assess whether a new improved insulation material can be created and used to construct full size products such as bushings.

Evaluate the potential of the new material to allow the reduction in size of insulators in HVDC systems.

Success Criteria

Demonstration of a manufactured component which passes electrical and mechanical testing.

Demonstration component demonstrates enhanced properties which make its use attractive.

Performance Compared to the Original Project Aims, Objectives and Success Criteria

Objective: Assess whether nanocomposites can be dispersed in polymeric insulation material in a reproducible fashion

A method to disperse nanoscale fillers using planetary mixing techniques has been developed and is now being optimised. Some challenges have been encountered in scaling up the dispersal method; supply chain engagement is ongoing to resolve these issues in parallel with continuing dispersion studies. Different nanoscale fillers have been found to exhibit different electrical and thermal properties in polymeric insulation material.

Objective: Assess whether a new improved insulation material can be created and used to construct full size products such as bushings

Demonstration products have been cast by Mekufa in order to prove that the polymeric insulation material can be used to construct full size products. The construction process is being developed and improved. Further product samples are being produced for testing.

Objective: Evaluate the potential of the new material to allow the reduction in size of insulators in HVDC systems

Assessment of the resulting products' characteristics in areas such as thermal conductivity, electrical stress, and resistance to partial discharge in HVDC systems will be undertaken following the conclusion of work under the preceding objectives above.

In general terms, this project is targeted at reducing the size and improving the reliability of the insulation associated with such converter stations. This should result in a reduction in cost which has been conservatively assumed as 1%.

Required Modifications to the Planned Approach During the Course of the Project

None.

Lessons Learnt for Future Projects

A six month delay has occurred during the project, largely due to human resource constraints in the project's academic partners. Greater contingency should be incorporated into future R&D projects involving academic partners.