Programme Area: Energy Storage and Distribution

Project: Network Capacity

Title: One Page Summary

Abstract:

The UK's electricity transmission and distribution systems have little spare capacity to accommodate the widespread changes in volume and location of power flows arising from planned changes in generation type and characteristics, and from major changes in demand patterns. Gaining consents for the construction of new overhead lines is extremely time-consuming and costly. Without action, this will increasingly constrain the necessary changes in generation and demand.

Context:

The Network Capacity research project identified and assessed new technology solutions that could enhance transmission and distribution capacity in the UK. It assessed the feasibility and quantified the benefits of using innovative approaches and novel technologies to provide improved management of power flows and increased capacity, enabling the deployment of low carbon energy sources in the UK. The project was undertaken by the management, engineering and development consultancy Mott MacDonald and completed in 2010.

ETI Programme: Energy Storage and Distribution

Project Name: Network Capacity (FRP)

Contractor: Mott MacDonald Limited

Context

The UK's electricity transmission and distribution systems have little spare capacity to accommodate the widespread changes in volume and location of power flows arising from planned changes in generation type and characteristics, and from major changes in demand patterns. Gaining consents for the construction of new overhead lines is extremely time-consuming and costly. Without action, this will increasingly constrain the necessary changes in generation and demand.

Project

The 'Network Capacity' project has assessed the feasibility of using new technologies now emerging in the marketplace or in development, including multi-terminal HVDC systems, in novel ways in order to provide increased Transmission & Distribution system capacity and improved management of network power flows, in order to facilitate increased renewable energy installation levels in the UK.

It has identified and assessed the key challenges and potential technology solutions, and has delivered:

- an assessment of the new technologies representing credible options for providing increased network capacity and/or better management of power flows on UK T&D systems
- quantification of the benefits of deploying different technology solutions to provide increased network capacity on UK T&D systems in terms of technical performance, through-life cost, ease of implementation, impact on the installation of renewable energy systems, and environmental issues
- assessment of the technical feasibility and performance impact of onshore multi-terminal HVDC networks interconnected into existing UK AC networks
- benefits case for the conversion of existing AC lines to DC operation in terms of through-life cost, performance, CO_2 reduction potential and impact on security of supply
- understanding of the technical and non-technical barriers, including supply chain issues, that would prevent or limit the use of new technologies, and proposed solutions to these issues
- identification of technology development and demonstration opportunities for the industry, and specifically the ETI.