**Thermal modelling and Active Network Management**

Over the last two years, SP Energy Networks has been collaborating with a research consortium comprising of AREVA T&D, PB Power, Imass and Durham University in the design and delivery a new type of generator control system.

The proposed system uses a dynamic thermal rating system for cables, overhead lines, and transformers operating at 132kV.

The ratings given to circuits are a function of the temperature by which they operate. The thermal status of a power system component is to be determined by factors such as: current flow, meteorological conditions and component heat transfer characteristics.

A section of the SP-M 132kV network has been made available for the field trials and development of the prototype thermal controller. The site trial network will be used as a source of electrical, thermal and meteorological data using existing and new dedicated measurement equipment.

This project seeks to explore the potential benefits arising from:
- The improved utilization of power system assets through the use of real time knowledge of the thermal status of the power system
- The development of an active controller to facilitate this exploitation and to balance those issues requiring action by operational staff and those that can be dealt with by machine intelligence.

The result of this work will be a prototype active controller, using novel thermal state estimation and control techniques, installed on the network.

**Advantages:**
- Active network management and exploitation of equipment latent ratings may be a way of accommodating increased levels of renewable generation in distribution networks cost effectively.
- Improved utilisation of distribution assets resulting in deferral avoidance of reinforcement investments in distribution systems.

The IFI funding has facilitated the level of collaboration required for this project. The trial on the SP-M 132kV network will provide a live implementation in the very near future. It is anticipated that this will result in a commercial product that will provide an alternative to network reinforcement for generation connections, not just for Scottish Power but also for all national DNOs.