HOLISTIC FAULT DETECTION

FACTS

RESEARCH AREA	Network Reliability & Availability
START DATE - END DATE	Mar 2018 – Mar 2022
FUNDING MECHANISM	Network Innovation Allowance
ESTIMATED EXPENDITURE	£200,000
PROJECTS PARTNERS	EPSRC Centre for Doctoral Training in Future Power Networks & Smart Grids (University of Strathclyde and Imperial College).
MORE ON	http://www.smarternetworks.org/project/nia_npg_021

CONTEXT

Historically fault location techniques have predominantly been applied to any incidents on the network that generates fault current, both intermittently occurring faults or when the fault is permanent. This applies equally to the low voltage network and the high voltage network. The primary driver has been to protect the network's infrastructure from serious damage that can result in hazardous and unsafe conditions as a result of the continued flow of fault current. This is achieved by protection systems that interrupt fault current in as short a time as possible to limit any damage and to minimise the duration of interruptions to customers' supplies. This is an inherently reactive approach.

In the interests of improving customer service it is beneficial to try to avoid such unplanned interruptions by anticipating when a circuit's performance is rapidly degrading. Ideally we can then anticipate when a fault will occur and arrange for a live line work or a planned interruption to repair a circuit before it becomes either intermittent or permanent. This will provide both an improvement to customer service and, as a result of replacing reactive with proactive interventions should also improve operational planning and efficiency.

APPROACH

This is a programme of work which will uncover, evaluate and prototype a range of deep data analysis algorithms and techniques which could be used to provide fault anticipation functionality within a Distribution Network Operator's system. The programme will include prototype software and end user case studies, and from this an appropriate commercial development and deployment strategy will be developed for the future. Practical deployment and commissioning issues will be identified to support the move to "Business as Usual".

EXPECTED OUTCOMES

The project will identify suitable existing data sets and data analysis algorithms and techniques which could be used to provide fault anticipation functionality using operational and other datasets available within Northern Powergrid and/or other DNOs or external sources. This may include those related to previous LCNF and current NIA projects, e.g. NPg's Customer Led Network Revolution and Smart Data.

LONG TERM PRIORITIES

- Network Environmental Footprint
- **Network Reliability & Availability**
- Network Management & Flexibility
- Demand-side Response
- Network Planning & Design
- Communication & Engagement
- IT-enabled Process Improvements
- Social Responsibility