



Welcome to the Autumn edition of our newsletter. It has been a busy three months here at the Centre, and in this newsletter we share the highlights of our progress. Also, please visit us on the SSEN stand at the LCNI conference (30-31 October, 2019), or join us on the 'Introduction to RTDS®' training course we are running (5-7 November, 2019).

Expanding our team

We are delighted to welcome Ben Marshall to the team. Ben joins us from National Grid ESO where he focused on analysing the operation and design of the AC and DC transmission systems, dynamic stability performance and HVDC converter specification. He will be our technical lead at the Centre.



RTDS® Training: New Dates

We are running the 'Introduction to RTDS®' course on 5-7 November 2019 at the Centre; for more details and to register, please visit:

<https://www.ssen.co.uk/StakeholderEvent/Registration/?EventId=443>

Demonstrating the Protection of DC Grids (PROMOTion WP9)

On 22 August 2019, The National HVDC Centre was pleased to lead the demonstration of how multi-terminal HVDC Grids can be protected. The event brought together project partners to demonstrate HVDC protection by integrating protection hardware within a simulated model of an HVDC Grid, combined with direct current circuit breaker (DCCB) real-time simulation models.



The DC circuit protection hardware were two intelligent electronic devices (IEDs): one was developed in Work Package 4; and the other provided by Mitsubishi Electric Europe. Further testing will be undertaken to assess the performance of the protection system and to investigate the interoperability of the different components. This will culminate in a public demonstration event next year, at The National HVDC Centre.

Ian Cowan

OFTO Working Group Paper

The Offshore Wind Industry Council (OWIC) set-up a working group to review 'Future Transmission and Grid-access Technologies for the GB offshore wind industry'. The Centre was pleased to participate in this group, which produced a report that highlights the state-of-the-art electricity transmission technologies for offshore wind farms, identifies key enabling electricity infrastructures and outlines opportunities for coordinated development of future offshore transmission networks in GB. A final version of this report is expected to be issued in early November.

Oluwole Daniel Adeuyi



To find out more, please contact us to discuss or to arrange a visit:

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North Sea Link Protection Coordination

The North Sea Link (NSL) is a new HVDC interconnector connecting Blyth in the north east of England, to Kvittdal in Norway.

To be confident that the AC protection operates correctly, the HVDC Centre has been commissioned by Scottish Power Energy Networks (SPEN) and National Grid Electricity Transmission (NGET) to test the AC protection relays in a Real-Time (Hardware-in-the-Loop) simulation environment.



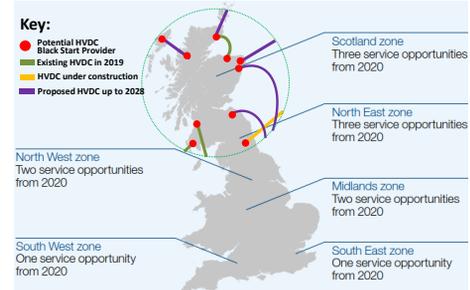
The HVDC Centre sees such validation studies as becoming increasingly important to ensure the security and resilience of the GB electricity network as more HVDC links are connected.

Bharath Ponnalagan

Maximising HVDC for Black Start

In the unlikely event of a total or partial shutdown of the electricity transmission network, System Operators use Black Start services to restore power to the grid as quickly as possible.

Commissioned by the Scottish Government, and supported by specialists from SHE Transmission, Scottish Power and National Grid, The HVDC Centre technical experts carried out an in-depth study of how HVDC schemes can support Black Start and system restoration, the study included:



- Review of Black Start arrangements alongside analysis of HVDC Black Start capabilities;
- Evaluation of global HVDC Black Start experience and global black-out events;
- Mapping these findings against GB's current and future HVDC schemes to identify practical opportunities; and
- Developing specific recommendations, in consultation with Stakeholders, to maximise the use of HVDC schemes to improve GB's Black Start arrangements.



On 17 September 2019 a stakeholder consultation workshop was held at the HVDC Centre to review and agree the recommendations of the report. These recommendations will help to maximise the contribution of HVDC schemes to GB black start, hence improving system stability, minimising restoration times and reducing costs to consumers of black start services.

When finalised, this report will be published on the Centre's website.

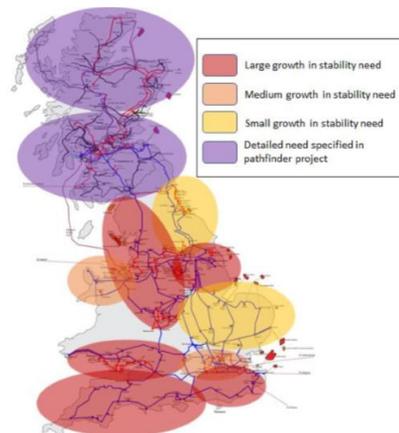
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Stability Pathfinder

The National Grid Electricity System Operator (ESO) collaborated with the HVDC Centre to investigate the impact of declining system strength on the stability of HVDC links and other low-Carbon technologies that are connected through power electronic converters.

The Centre used power system simulation tools to model HVDC links and different low-Carbon technologies (including wind farms and battery inverters), to test their stability performance across a range of different system conditions on the electricity grid.

The project outputs will inform the ESO on the fundamental principles of devices in HVDC links and low-Carbon technologies that could interact adversely with the electricity grid, to provide insights on system specifications and opportunities for improving system stability.



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