



The last 3 months have been packed with events, training and project delivery; which we are excited to tell you about. Our Caithness-Moray knowledge sharing event in March, disseminated learning from one of the latest HVDC schemes to be commissioned in GB; and we are looking forward to our next major event, the HVDC Operators’ Forum, over 26<sup>th</sup> and 27<sup>th</sup> of June where we host all the key parties in the GB HVDC sector.

## Future Impact of HVDC in GB

Within the last year, the number of operational HVDC schemes connecting to the GB Network has jumped from four to seven, including the introduction for the first time in GB, of embedded links as well as another interconnector to Europe.

Looking forward to schemes in delivery, development or which are planned, the GB Network is becoming increasingly dependant on HVDC technology, with a potential tripling (from 7 to 21) of HVDC schemes in the next ten or so years. New projects will include applications of HVDC that are new to GB: island connections, a multi-terminal scheme, co-located converter stations and offshore wind connections.



As well as meeting the primary objective of low loss power transmission over distance to support the connection of remote renewable generation, and interconnection with the European network; more HVDC also brings beneficial opportunities for the GB Electricity Network, e.g. improved control of active and reactive power (and therefore system stability), as well as black-start and system restoration services.

However, wider deployment of HVDC also brings a number of system integration challenges; control co-ordination to manage an increasingly finely tuned, low inertia GB system, and integrating different HVDC technologies from different suppliers.

We are excited to be part of this significant transition by helping to de-risk the integration of HVDC schemes into the GB system; and thereby supporting the connection of renewable generation, and enabling the security, economic and green benefits of European interconnection.

*Simon Marshall*

To find our more, please contact us to discuss or to arrange a visit:  
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## HVDC Operators' Forum 2019

On 26-27<sup>th</sup> June 2019, The National HVDC Centre is hosting the 5<sup>th</sup> annual HVDC Operators' Forum. Day one focuses on bringing together owners and operators of HVDC schemes in GB to share knowledge and experiences, while day two showcases HVDC innovations.

With the collective experience in the room, of deploying three new HVDC schemes over the last year, along with significant HVDC innovations, and the context of the future of HVDC in GB, this year's forum provides an important opportunity to foster co-operation and knowledge sharing.



*Oluwole Daniel Adeuyi*

## PROMOTiON WP9 – Project Update

The goal of the PROMOTiON project is to advance innovation and technologies relevant to the deployment of meshed off-shore HVDC grids ([www.promotion-offshore.net](http://www.promotion-offshore.net)). The objective of WP9 (Work Package 9) is to demonstrate the operation of the DC grid protection systems developed in the project using hardware-in-the-loop real-time methods.



During 15-17<sup>th</sup> April, The National HVDC Centre held a face-to-face event for PROMOTiON WP9 (led by the Centre for SHE Transmission). This meeting included attendees from Japan, Sweden, Belgium and the UK, representing both industry and academic partners who are directly contributing to the delivery of WP9.

Key decisions on the scope, expectations, timelines and collaborations opportunities for WP9 were set during this meeting, while also providing an opportunity for the delivery and handover of the IED (Intelligent Electronic Device – pictured) developed in WP4 for use in the testing and demonstrations here at the Centre.

From 11–13<sup>th</sup> June, we attended the half-yearly PROMOTiON consortium event; which included meetings and progress updates from all of the consortium members. This event was kindly hosted by consortium member RWTH, in Aachen Germany, and included a tour of its newly established MMC test facility. This includes a full PHIL (Power Hardware In the Loop) setup combining real time simulation and physical valves.

*Ian Cowan*

## Testing of AC Protection Relay with Grid simulation in RTDS®

The National HVDC Centre is expanding its capabilities to meet the demands of testing the coordination of AC protection relays in a simulated AC network with HVDC connections. The Centre has demonstrated the feasibility of testing AC relays in a simulated grid (using RTDS®).



This was achieved by amplifying the current and voltage signals from RTDS® I/O cards using an amplifier which was further injected to the AC Protection relay. Such a setup will be used in the innovation project which the Centre is sponsoring with EPRI. The power amplifier setup (with RTDS®) will also be used to support future testing of protection relays in collaboration with transmission operators for the upcoming HVDC projects in the GB Network.

Testing of the AC Protection relays that are in operation in the GB Grid supports the Centre's strategy to mitigate risks of integration and operation of existing and upcoming HVDC projects connecting to the GB network.

*Bharath Ponnalagan*

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