

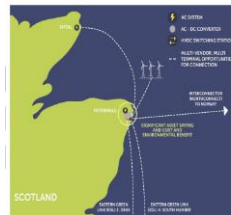
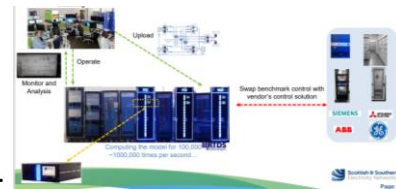


Welcome to our Autumn Newsletter, in this edition we highlight protection testing, RTDS® training, interaction studies, our new high-power PSCAD PCs and the Energy Innovation Summit.

The photograph above is of the Kergord converter station on Shetland, under construction.

Delivering Interoperability and Growth of HVDC networks

The last few months have been busy ones at the Centre on interoperability. We established the 'HVDC Interoperability Workgroup', and in September we hosted a hybrid event where we discussed and demonstrated the proposed approach to multi-terminal multi-vendor HVDC control (which forms the basis of Project Aquila).



We also held mid-term progress disseminations for both INCENTIVE and Network-DC project; enabling the next stages of onshore stability support and DCCBs and therefore the growth of HVDC networks at scale.

Beyond that we are supporting HND and HND-follow up exercise delivery. Interesting times.

Ben Marshall

Best Practice in Protection Testing at Braco

Members of the HVDC Centre team visited the Development & Training Centre for Protection in Braco. The Braco site is a 132/33 kV substation that has been decommissioned and repurposed into a workshop for testing protection relays.



Nikhil with Protection Relays

We were hosted there by Mohemmed Mohseen (SSEN Transmission), who showed us around the workshop and helped us understand their equipment set up.

The aim of the visit was to understand best practice for testing protection relays.



The team outside the Braco workshop with Mohemmed Mohseen.

This is of particular interest to us as we are setting up our own protection and control workshop at the HVDC Centre for testing hardware in real time with the RTDS. Our protection and control workshop is located in the new extension to the HVDC Centre, which was officially opened in July this year.

Fabian Moore

Introduction to RTDS® Real-Time Simulation (25 – 27 January 2023)

We are planning to run a 3-day 'Introduction to RTDS®' training course in January, in-person, at the Centre.

If you are interested in attending, please register your interest as soon as possible, or contact us for more information, as there are a limited number of places.

Course details:

- Title: Introduction to RTDS® Real-Time Simulation
- Dates: 25 - 27 January 2023
- Register: <https://forms.office.com/r/QMmFj3xiQa>

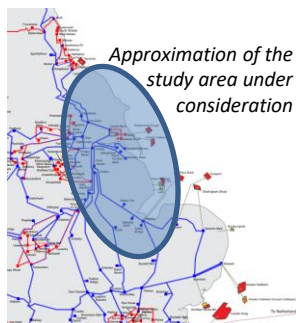
To find our more, please contact us to discuss or to arrange a visit:

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East Coast Interaction Study

The HVDC Centre has performed a wide-area interaction study around the coast of Yorkshire, where many power electronic resources (both existing and planned) are expected to arise; these include a range of offshore, potentially coordinated HVDC connections and at least one of the east coast interconnections at Drax 400kV substation. As Great Britain (GB) transitions to net zero, existing conventional generation resources, lending this area network stability, may operate with lower availability presenting a greater potential of interaction within a more convertor dominated area of the network. This study, therefore, seeks to inform:

- The impact of different technology options for offshore wind farm connection on potential network interaction risks; and
- The nature of the types of interactions across projects in this area of the network.



The HVDC Centre is working with the onshore Transmission Owner (TO) and the Electricity System Operator (ESO) to understand the range of operating states of this area of the network to be considered within the work.

The Centre's analysis will make use of "cutting edge" approaches from its previous research work, and de-risking projects.; covering the following stages:

- 1) Network reduction modelling;
- 2) Network build modelling;
- 3) Frequency dependent screening techniques;
- 4) Other screening techniques;
- 5) Dynamic simulation; and
- 6) Report on Results, Key Findings and Considerations.

We have recently completed Stage 5 and are currently progressing Stage 6.

Nikhil Sharma

TOTEM High-Powered PC Hosting

The National HVDC Centre is now the host of two new high-powered PCs that have been set up as part of the TOTEM (Transmission Owner Tools for EMT Modelling) project. The TOTEM project is set up to develop the capability in EMT modeling for all the GB Transmission Owners and the ESO. The project is building full GB system models in PSCAD to allow better understanding of the power system challenges that we expect with the growth of convertor-based generation.

These two 64 core machines allow PSCAD EMT studies to be run with a model of the whole of the Scottish system and allow SP Energy Networks and SSEN Transmission engineers to de-risk the system design.

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

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HVDC-WISE Kick-off

The National HVDC Centre is one of 14 partners contributing to the Horizon Europe HVDC-WISE project, which was launched with a kick-off meeting on 10 October in Lyon, France hosted by SuperGrid Institute (the project coordinator).



This new project, running over 42 months, will support further development of HVDC-based transmission grids by developing new reliability and resilience (R&R) oriented planning and analysis tools; while identifying HVDC-based grid architectures and technologies that can be readily deployed to improve system performance and facilitate the integration of new renewable sources.

Delegates from all partners, including Colin Foote from the HVDC Centre, met in Lyon for the kick-off meeting and initial project workshops, as well as visiting SuperGrid Institute's facilities. The other project partners are SuperGrid Institute, TenneT TSO, Universidad Pontificia Comillas, University of Strathclyde, RWTH Aachen, EPRI Europe, TU Delft, Engie Impact, University of Cyprus, RSE, Energinet, Amprion and Statnett.

At the HVDC Centre we are excited to be part of this major new, pan-European initiative that will help drive developments in cross-border, multi-purpose interconnectors in the North Sea and elsewhere.

HVDC-WISE is supported by the European Unions' Horizon Europe program under agreement 101075424. In the UK funding is being provided through the UK Research and Innovation Horizon Europe Guarantee scheme. The project can be followed here: <https://www.linkedin.com/company/hvdc-wise/>

Colin Foote



We were so impressed by these high-powered PCs capabilities, that we bought a third PC for the team at the HVDC Centre to use for our own studies. We have been making use of this new capability in some convertor interaction analysis which we hope to present in an upcoming conference.

Ben Gomersall

The Energy Innovation Summit (28-29 September 2022)

The Energy Innovation Summit (www.energynetworks.org/events/energy-innovation-summit) is the main annual gathering of network companies, their partners and stakeholders to discuss innovation projects and strategic direction for the electricity and gas industries. The National HVDC Centre was represented through the SSE Networks stand in the exhibition where we delivered five short presentations over the two days of the conference:

- Dong Chen spoke about offshore functional designs to support project Aquila;
- Nikhil Sharma presented work on AC protection with low short circuit level;
- Ben Gomersall provided a summary of the INCENTIVE project on new solutions for stability services;
- Suresh Rangasamy summarised the Network DC project that is concerned with the introduction of DC circuit breakers; and
- Asif Khan introduced the HVDC-WISE project that will develop new approaches to reliability and resilience in hybrid AC-DC networks.



*Suresh Rangasamy on
Network-DC*

On the National Grid ESO stand, Colin Foote from the Centre assisted with a series of meetings discussing the outcomes of the Distributed ReStart project, which has investigated the use of distributed energy resources in system restoration, with support from the Centre on real-time simulation for testing of a prototype control system.



Dong Chen presenting offshore functional designs

The conference provided a great opportunity for the team to meet others from across the industry, learn more about the challenges faced and initiatives under way, and promote the Centre and its role in de-risking HVDC development. Useful discussions were had with existing project partners and new contacts established.



Asif Khan on HVDC-WISE

This has already resulted in visits to the Centre to view our facilities and discussions on future collaboration, all of which will further the Centre's activities in supporting HVDC projects across GB.

For a complete set of all these presentations, please visit our library: www.hvdccentre.com/library/2022-energy-innovation-summit/

Colin Foote

Utility Week Awards Finalist

We are delighted to be selected as a finalist in the 'Innovation Award' category of this year's Utility Week Awards: "Cementing the UK's leadership position in HVDC technology to deliver a network for net zero".

Simon Marshall



Welcome to the Team

We are delighted to welcome: Ben Gomersall and Wasim Ahmed to our expanding team of HVDC experts at the Centre.



As a Senior Simulation Engineer, Ben brings a range of experience from over 10 years in National Grid in both the System Operator and the Transmission Owner areas.

Wasim joins the team of Simulation Engineers, bringing a decade of experience in the Power Transmission Sector; including the development, testing and validation of HVDC and FACTS control and protection system with Siemens.



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