



Welcome to our Winter Newsletter (with a suitably snowy photo of the Centre). In this edition we highlight both our own HVDC Operators' Forum and the IET's ACDC Conference, along with RTDS® training, innovation projects, and the installation of Moyle Interconnector Replicas.

2023 HVDC Operators' Forum

Following on from last year's successful event we are planning our annual HVDC Operators' Forum. The theme of the event is 'how to use HVDC to unlock net-zero'.

This event is intended for TOs, manufacturers and anyone involved in the specification and delivery of HVDC projects.

The link to the registration form is given below. If you wish to attend, please register soon as due to space limitations there is a limit of 2 people per organisation.

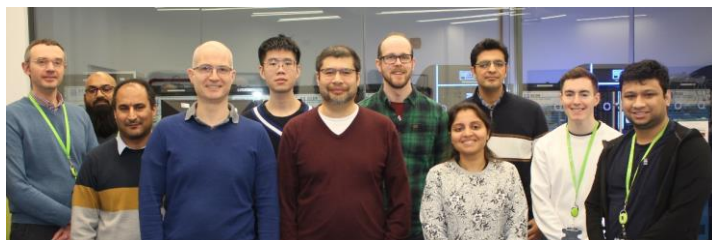
- Dates: Wednesday-Thursday; 14-15 June 2023
- Register: <https://forms.office.com/e/XJ6Usrx1Ue>

Full details of the event will be posted here:
www.hvdccentre.com/events/

Linda Rowan

RTDS® Real-Time Simulation Training Course

As part of our remit to support and expand the use of advanced simulation capabilities in the GB electricity sector, we delivered a three-day training course in January 2023 introducing the RTDS® hardware and the RSCAD software. The course enabled new users to perform their own real-time network simulation studies, and use various input/output cards for external interfacing.



We are organising further training courses to enhance understanding of HVDC technologies and the use of different simulation hardware and software. For updates, please follow our website and LinkedIn page.

Md Asif Uddin Khan

IET's ACDC Conference



The 19th International Conference on AC and DC Power Transmission (ACDC) will be held at the TIC Building, University of Strathclyde, from 1–3 March.

ACDC is a great meeting point for power transmission engineers and researchers to learn about new challenges in the energy industry.

The Centre is highly engaged in this conference:

- The Centre will host a technical visit on 1 March;
- Ben Marshall, as a steering committee chair, organised this conference with academic and industrial partners;
- Dr Colin Foote will join a panel discussion on our Horizon Europe Project, HVDC WISE: HVDC-based grid architectures for reliable and resilient WIdeSprEad hybrid AC/DC transmission systems;
- Dr Dong Chen will present a technical paper on 3 March – Towards HVDC Interoperability - Assessing Existence of Equilibrium with Reference to Converter Terminal Behaviour;
- Nikhil Sharma and Shangen Tian will deliver a poster presentation: Impedance Assessment of Offshore Wind Farms.

We look forward to meeting you at this conference and discussing the opportunities and challenges of HVDC with the attendees from academia and industry.

Shangen Tian

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

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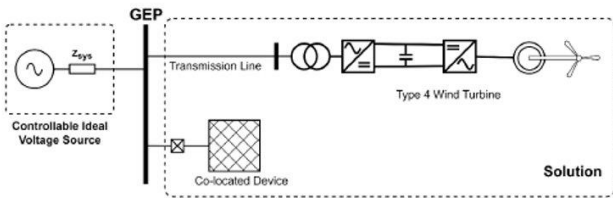
Strategic Innovation Fund (SIF) Projects

At The National HVDC Centre we are currently involved in two SIF projects: INCENTIVE and Network DC. The SIF aims to find and fund ambitious, innovative projects with the potential to accelerate the transition to net zero. These projects help shape the future of the electricity networks (and succeed commercially where possible).

Both our projects are currently in their 'Alpha Phases' which run August '22 to February '23. They are therefore reaching conclusions of their work and looking ahead to the submission of bids to continue the learning in their 'Beta Phases' of the SIF.

INCENTIVE Project

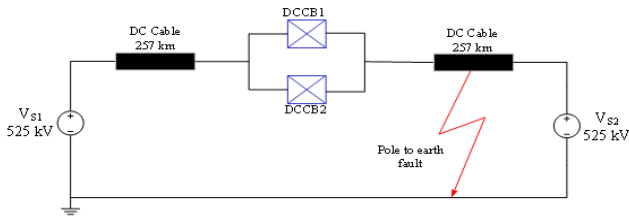
INCENTIVE is exploring whether it is possible and economic to get stability support from co-location of grid forming devices with offshore wind connections.



The work at the HVDC Centre has focused on RSCAD simulations to show the technical feasibility of different technologies to provide stability support.

Network-DC Project

The Network-DC project aims to advance the readiness for implementation of DC circuit breakers on the GB system, to enable the development of more flexible and capable offshore DC networks.



The work at the HVDC Centre has focused on RSCAD studies of the different DC circuit breaker technologies.

Looking ahead to later this year we are planning to be involved in two additional SIF projects, as well as supporting Beta applications for both of our inflight SIF projects, we are in progress of supporting Discovery phase applications for projects on black start from offshore wind and on controller interaction. We will share more on these new projects in future newsletters.

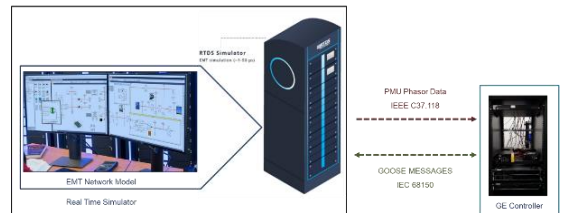
Ben Gomersall

Distributed ReStart Test Day

The HVDC Centre hosted a demo day for the Distributed ReStart project in December, with project partners GE Digital, SP Energy Networks and National Grid ESO. The project explored how distributed energy resources (DER) can be used to restore power to the network in the unlikely event of a blackout.

The day was an opportunity to conclude recent hardware-in-loop testing of the project's Distribution Restoration Zone Controller (DRZC) at the HVDC Centre. The prototype controller, developed by GE Digital, is designed to manage the re-energisation of a 33 kV network using embedded generation in the event of a black start event.

Tests included communications delay tests where a network emulator was used to insert delays in communications paths used by the controller. The test demonstrations led to some valuable discussions between the project partners, and improvements in the controller design.



Overview of the HVDC Centre Hardware-in-Loop Test System for Distributed ReStart

www.nationalgrideso.com/future-energy/projects/distributed-restart

Fabian Moore

First HVDC-WISE Outputs Due Soon

Following kick-off in October, the HVDC-WISE project partners have been busy with the initial tasks and preparing the early deliverables.



We are leading Work Package 2, which is due to deliver a report in March on "Resilience Needs and Objectives". This will set the course for the work to be done over the remaining three years of the project. Project deliverables and other useful information will be shared through the new project website: <https://hvdc-wise.eu>.

We will also be participating in an HVDC-WISE panel session at the IET ACDC Conference in Glasgow on 2 March. This is the first project SEN Transmission has been involved in under the new Horizon Europe Guarantee scheme run by Innovate UK, part of UK Research and Innovation.

Colin Foote

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

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SuperGrid Institute and RTEi Visit

HVDC Centre colleagues visited the SuperGrid Institute and RTE international Campus in Lyon in November.



At the SuperGrid Institute campus we were hosted by William and Audrey who showed us around the campus and helped us understand SuperGrid Institute's research and innovation projects. Discussions were held regarding the various projects that the HVDC Centre is doing in collaboration with the SuperGrid Institute.

At RTE international, the team participated in a project workshop along with the Carbon Trust and The Offshore Wind Accelerator – Electrical systems (TWG-E) Group members. Discussions were held regarding HVDC-connected offshore wind farms and the controller interaction and grid stability project of which the HVDC Centre is a project partner. RTE international colleagues gave a tour of the HVDC replicas they are hosting for various projects from different vendors.

Overall, it was great to meet industry colleagues and work together on various projects, collaboratively working towards our Net Zero Targets.

Nikhil Sharma

HND Offshore Hubs Options Assessment

As part of their Holistic Network Design (HND), National Grid ESO have been coordinating with SSEN Transmission to deliver an 'offshore hub' off the east coast of Scotland (identified as SW_E1a in the HND). The offshore hub, which will act as an offshore node to collect wind power and provide a bootstrap for north to south power delivery between SSEN's and NGET's transmission networks, will be one of many as part of NGESO's plan to take a holistic approach for the growing integration of offshore assets. The National HVDC Centre is working with SSEN-T to finalise options for the hub design. The objective has been to assess whether alternative configurations are favourable in terms of deliverability, operability, and environmental impact. SSEN-T and The National HVDC Centre have reviewed technologies such as full bipole HVDC converters, a DC switching station, and various wind farm connection arrangements that can offer greater resilience against offshore faults and facilitate future hub connections. Further information about NGESO's Pathway to 2030 Holistic Network Design can be found here: www.nationalgrideso.com/future-energy/the-pathway-2030-holistic-network-design

Adam Scott

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Moyle Replica Installation

The HVDC Centre now hosts a replica of the control and protection system for the 500 MW Moyle HVDC link between Scotland and Northern Ireland. This is the first HVDC replica at The HVDC Centre to be hosted on behalf of an external customer.

The equipment was installed by Siemens Energy on behalf of Mutual Energy in December '22. It follows on from Mutual Energy's refurbishment of the protection and control equipment on-site at the HVDC link itself earlier in 2022.

The replica equipment allows for hardware-in-the-loop testing with the real-time simulation equipment at the Centre. The replica will allow Mutual Energy to carry out testing and training in a simulated environment. It provides the facility to test and develop new control updates or to look at the impact of changes in the surrounding transmission systems on their HVDC link.

Wasim Ahmad & Fabian Moore

Patent Filed towards HVDC Interoperability

The HVDC Centre has filed a patent on December 2022. This patent is one outcome of the project of Offshore Functional Design funded by Ofgem and BEIS. It will serve as a stepstone of Aquila project, which is going to be the first multi-vendor-multi-terminal HVDC project outside China. The invention provides an explicit assessment approach on the impact of HVDC converter control in terms of power transfer capability without opening up vendor's intellectual property. It is the 1st patent filed by the HVDC Centre as well as SSEN Transmission.

Dong Chen

Welcome to the Team

We are delighted to welcome Ruiqi Li and Adam Scott to our team.



Ruiqi joined the team as a Simulation Engineer, with a wealth of experience in the simulation of AC/DC systems, using offline, real-time and hardware-in-the-loop technologies, with a particular focus on converter-protection system interactions.

Adam has recently joined the team as a Simulation Engineer, bringing a broad range of experience from consultancy, the offshore wind sector, and in offline modelling and simulation of AC/DC systems with a focus on stability aspects.

