



Welcome to the Winter edition of the HVDC Centre newsletter, where we invite you to the 2025 Operators' Forum, share news Conferences we have attended, project updates, training courses, and more news of our expanding team.

2025 HVDC Operators' Forum

Following last year's successful event, we are planning our annual HVDC Operators' Forum. This year's event will focus on the following themes:

- **Operation & Maintenance:** Securely operating HVDC assets as the wider system dramatically changes and new challenges and risks arise;
- **Construction & Commissioning:** Streamlining and de-risking construction and commissioning of HVDC;
- **Design & Specification:** Designing for performance and resilience of HVDC while optimising deliverability; and
- **Forward Planning:** Developing confidence in specifying future HVDC grids.

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

Date: 11-12 June 2025
Location: HVDC Centre, Cumbernauld, Scotland
Register: <https://forms.office.com/e/mgWSZpfqZh>

Please register as soon as possible (and before the closing date of 21 March 2025). As space at the event is limited by our capacity, priority will be given to people working on HVDC projects connecting to the GB Network and limited to 2 attendees from each organisation.

Linda Rowan

To find out more, please contact us to discuss or to arrange a visit:
[01236 687240](tel:01236687240) | info@hvdccentre.com | hvdccentre.com

Blade Kick-off Meeting

Adam Scott and Ben Gomersall represented the HVDC Centre at the SIF BLADE Beta Phase kick-off meeting (photographed above), marking the beginning of Beta Stage 1.

Running until the end of the year, this stage will focus on assessing technical feasibility of three restoration options for the future GB system, based on offshore wind.

The project consortium continues to expand, welcoming new partners, advisors, OEMs, and developers. Adam presented on the HVDC Centre's role in the project, reflecting on achievements in earlier phases and outlining next steps for Beta. With the groundwork laid, technical efforts are now underway.

Adam Scott

Events and Training

Please visit our website to find out about upcoming events and our training courses:

[Upcoming Events – The National HVDC Centre](#)

[Our Training Courses – The National HVDC Centre](#)

SETTLE NIA project Kicks Off!

We are pleased to announce the launch of the SETTLE project, funded under the Network Innovation Allowance (NIA). The SETTLE project aims to address some of the stability challenges posed by the increasing penetration of renewable energy.

SETTLE follows on from work delivered in the INSIGHT Strategic Innovation Fund (SIF) project and aims to develop and evaluate new methods to detect, trace and manage inverter-based oscillations to enhance the stability and reliability of our power system.

The HVDC Centre is working with colleagues from SSEN Transmission, as well as three project partners: Imperial College London, University of Strathclyde and BVM Systems.

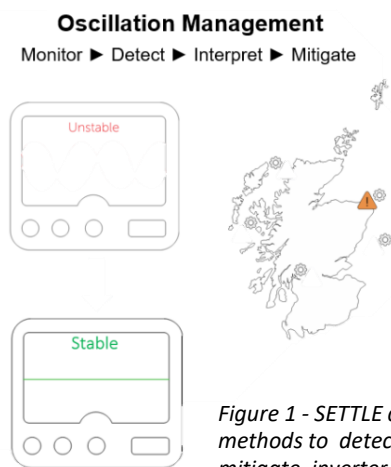


Figure 1 - SETTLE developing new methods to detect, interpret and mitigate inverter-based oscillations

For more information about the SETTLE project and its progress, please contact our project team.

Fabian Moore

UK CIGRE “Developments and Challenges in Grid Integration and Power System Stability”

Earlier this month, the Centre attended the above well regarded C4 UK session hosted by Scottish Power in Glasgow, and presented on recent significant de-risking activities, including its work on Caithness Moray Shetland commissioning and across DC networks in Project Aquila and Network DC.



Discussions were wide ranging, with increasing interest and recognition of the range of EMT studies beginning in small signal analysis, but extending to large system network analysis both offline, but increasingly complemented by real-time using replica solutions that informs power system stability.

Key topics discussed included, the range of replica discussions, the role of AI and machine learning in power system stability (likely to become the subject of a new working group and technical brochure de-risking these approaches) and a proposed role within the UK committee specifically relating to device interactions. The Centre continues to provide support and dissemination to this work group.

Ben Marshall & Dong Chen

Multi-Vendor Demonstration for Interoperability of Multi-Terminal HVDC

Dong Chen and the project team of Aquila Interoperability (Lite) have successfully simulated the operation of Multi-Vendor Multi-Terminal HVDC grid in the RTDS environment on 2 December 2024. Based on the generic model of MT-HVDC grid, black-boxed model supplied by 2 vendors (namely GE Vernova and Mitsubishi Electric) have been used to replaced 3 terminals of bipolar models and have replicated similar performance as the full-generic model in a range of steady-state operational scenarios with control architecture and essential white-boxed coordinated control proposed by the HVDC Centre.

The tested scenarios include power ramp, soft mode-switching, power sharing, pole-blocking, unbalanced operation etc. The Project team is currently using this benchmark to refine the vendor agnostic approach, patented by the Centre, to specify converters for a guaranteed steady-state stability. Further MVMT-HVDC demonstration will be presented at a dedicated workshop of IET AC/DC conference in March 2025, Birmingham.

Dong Chen

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

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SSEN Cohort Training Programme

From December 2024 to February 2025, the HVDC Centre, along with SSEN's System Performance and System Planning teams, launched a comprehensive Cohort Training Programme. This initiative aims to develop expertise in power systems analysis and prepare participants for key roles in SSEN Transmission.

The training sessions are being held across multiple locations, including the SSE Glasgow Office, HVDC Centre, and SSE Perth Office, under the guidance of former System Planning Manager Brian Punton.

Cohort Training Programme



Our HVDC Simulation Engineers Yaxing Ren, Xiaozuo Huang, Adam Scott, Ruiqi Li, Shashank Shekar, and Ben Andrews are actively participating in the programme. The training offers a mix of theoretical learning, practical exercises, and site visits to provide a well-rounded understanding of transmission power systems. Core topics include power system fundamentals, analysis techniques, and codes and standards.

In January, the HVDC Centre hosted part of the programme, focusing on advanced power systems analysis and case studies. Participants were given the opportunity to access the Real-Time Simulation environment and interact with our replica devices, providing a deeper understanding of complex systems and cutting-edge tools.

Although this programme gives participants a taste of real-world tasks performed by other teams in SSEN Transmission, it also fosters collaboration and communication across departments. This has been an invaluable opportunity to strengthen ties between the HVDC Centre and other teams, paving the way for future partnerships and projects across the organisation.

We look forward to building on this collaboration as we continue to innovate and grow together.

Xiaozuo Huang

IDCORE visits The National HVDC Centre

On 31 of January, the Centre welcomed a group of Engineering Doctorate (EngD) researchers from the InDustrial Centre for Doctoral Training in Offshore Renewable Energy (IDCORE) for a technical visit.



The visit started with a welcome, a safety moment and an introduction to the HVDC Centre by our Technology Manager, Ben Marshall. This first presentation covered The Centre's services and capabilities to set the scene for the two technical demonstrations; Caithness-Moray-Shetland replica operation and multi-vendor-multi-terminal interoperability in Project Aquila, delivered by Shangen Tian and Wasim Ahmad consecutively.



Before the end of the visit, Peach Phurappa presented the current status and future work of her EngD research hosted by the Centre, to her fellow IDCORE researchers. With the close link to Project Aquila, the ongoing research remains focused on the quantification of HVDC grid security with the consideration of coordinated control functions optimisation, the operation in real-world controllers, and cybersecurity risks.

The Centre is pleased with the continuing academic engagement. It was a pleasure to be able to exhibit both the industrial projects demonstrations and the EngD project in action as a case study for IDCORE researchers 2024 cohort who will commence their EngD projects in June 2025 across the Offshore Renewable industry. IDCORE Website.

Peach Phurappa

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EU HVDC R&D: Supporting the SET plan

On 24 January the European parliament held a workshop across regulators, EU commissioners, EU parliament representatives, European TSOs, developers and research institutions on the topic "Direct current technologies: a game-changer for the energy transition" whose purpose was to herald a new SET plan.



The European Strategic Energy Technology Plan (SET Plan) is a European initiative that launched in 2007 by the European Commission. It aims at accelerating the development and deployment of low-carbon technologies, through cooperation amongst EU countries, companies, research institutions, and the EU itself across key strategic areas; these in turn shape the focus of EU Research calls such as Horizon 2020 which supported both PROMOTiON and HVDC-Wise projects. The Centre is an active member of this committee and the drafting of a white paper seeking to achieve increased appreciation of the needs of HVDC. A short video has been produced; see link below.

[No energy transition without HVDC grid transmission on Vimeo](#)

Ben Marshall

HVDC Training

Over the last few months we have delivered two instances of our full-day 'Introduction to HVDC and Project De-risking' course, with high attendance and great feedback at both.

We also delivered a bespoke training day for SSEN Transmission graduates and new starts on the CMS HVDC link, which used the replica hosted at the Centre to provide hands-on operational experience. The next events are expected to be in the spring with another Intro to HVDC course and a redesigned course introducing real-time simulation and the use of replicas. Our approach to training continues to evolve through discussion with stakeholders and we're keen to hear from you if you have any proposals or specific requests.

Training Course Overview		The National HVDC Centre	
Title	Training Course Overview	Day One - Introduction to HVDC and Project De-risking	Day Two - Introduction to HVDC and Project De-risking
Overview	<ul style="list-style-type: none"> Introduction to HVDC and Project De-risking The National HVDC Centre (NHC) Centre Key challenges for the development of HVDC technology and the role of the HVDC Centre 	<ul style="list-style-type: none"> Introduction to HVDC <ul style="list-style-type: none"> Applications: interconnectors, offshore wind, multi-phase AC/DC converter technologies (state-of-the-art and simulation) Key project components Overview of HVDC control and protection <ul style="list-style-type: none"> Basic control: <ul style="list-style-type: none"> Currents and voltage feedback Advanced: <ul style="list-style-type: none"> Power factor, firing angle, and reactive power Control including auto-tuning Other types of HVDC and HVDC-DC, challenges, and limitations Key and emerging projects How to de-risk a project <ul style="list-style-type: none"> Challenges from HVDC <ul style="list-style-type: none"> Cost of modelling and simulation Standards from HVDC Centre experience Standards from HVDC Centre experience Further resources 	<ul style="list-style-type: none"> Introduction to HVDC and Project De-risking Overview of HVDC control and protection <ul style="list-style-type: none"> Basic control: <ul style="list-style-type: none"> Currents and voltage feedback Advanced: <ul style="list-style-type: none"> Power factor, firing angle, and reactive power Control including auto-tuning Other types of HVDC and HVDC-DC, challenges, and limitations Key and emerging projects How to de-risk a project <ul style="list-style-type: none"> Challenges from HVDC <ul style="list-style-type: none"> Cost of modelling and simulation Standards from HVDC Centre experience Standards from HVDC Centre experience Further resources
Presenter Contact	Colin Foote, Senior Sales Engineer colin.foote@hvdccentre.com		
Business Email	colin.foote@hvdccentre.com		
Summary	<ul style="list-style-type: none"> A one-day course covering: <ul style="list-style-type: none"> Introduction to HVDC technology Key challenges for the development of HVDC technology Typical HVDC engineering processes for HVDC The course will cover all the key areas of HVDC technology: <ul style="list-style-type: none"> Construction of HVDC converter stations Control of HVDC converter stations Standards from HVDC Centre experience 		
Further Information	Contact us to request a course outline with presentation materials, text and video links.		

Colin Foote

Grid Code support from The National HVDC Centre

The National HVDC Centre provides guidance and analysis to a variety of SQSS and Grid Code working groups within GB tackling relevant areas of power electronic device de-risking and operation within GB.

This includes at present; GSR030 considering HVDC related SQSS change reflecting the capabilities of HVDC converters, HND offshore code reform, Grid Forming expert working group, and GC0168 seeking to deliver legacy EMT models to support GB wide EMT modelling by TOs and NESO of whole system risks.

Workgroup Consultation

GC0168: Submission of Electro Magnetic Transient (EMT) Models

Overview: As Great Britain's (GB) power system moves towards net zero carbon operation; the number of Plants connected by Electronic Power Converters (EPC) is expected to increase and the amount of synchronous generation on the grid to decline which will significantly change the characteristics of the GB network. These changes give rise to the potential control interactions between the devices across the network leading to increased risks of oscillations and inverter stability. This modification seeks to require certain Users to provide the National Energy System Operator (NESO) with Electromagnetic Transient (EMT) models to enable the analysis of issues such as system oscillations, inverter stability and Transient Over Voltage (ToV).

Modification process & timetable

1	Proposal Form 05 March 2024
2	Workgroup Consultation 23 January 2025 - 21 February 2025
3	Workgroup Report 22 May 2025
4	Code Administrator Consultation 04 June 2025 - 04 July 2025
5	Draft Modification Report 24 July 2025
6	Final Modification Report 07 August 2025
7	Implementation 10 business days after implementation

GC0168 has now reached its first consultation stage with Centre support providing pragmatic approaches to achieve the intended outcomes.

This along with other initiatives underway which the Centre is also providing support on are enabling GB wide de-risking of power electronic interactions to mature, whether in offline simulation or real-time simulation.

Ben Marshall

HVDC Centre at UK-RT24

This year's UK-RT24 conference was held in Edinburgh, with representatives from industries and universities related to OPAL-RT real-time simulation.



Ben Marshall and Dr Colin Foote (pictured below) from the Centre were invited to give speeches at the conference. Dr Xiaozuo Huang and Dr Yaxing Ren also attended the conference as guests.



Our HVDC Technology Manager, Ben Marshall (pictured below), as a keynote speaker of the conference, delivered a speech entitled 'National HVDC Centre-Experiences of Large Scale Real-Time Simulations, and Future Outlooking GB', introduced the development of the Centre and discussed the positive impact of the Centre's work on the GB power grid.



Our Senior Simulation Engineer, Colin Foote, delivered a speech entitled 'Co-simulation Opportunities for Large Area Models with HVDC Replicas' in the sub-venue themed "HVDC, MMC & FACT", and discussed the technologies of building large system models in EMT software and project de-risking by co-simulation with replica.

The feedback from the attendees was very positive, with many participants showed their interest in the Centre and our work.

Yaxing Ren

ACDC Conference

The ACDC Global 2025 Conference will be held in Birmingham from 17 to 19 March. The Centre is actively involved in the event, with Ben Marshall serving on the organising committee and participating in various discussions throughout the conference.



On Monday, 17 March, Dong Chen and Peach Phurappa will host a tutorial to present the methodologies used in Project Aquila, a multi-terminal, multi-vendor initiative.

Colin Foote will participate in a panel discussion about the HVDC Wise project alongside other project partners. He will also present the latest updates from the Centre's innovation project, Network-DC, which focuses on options for mitigating converter blocking during the clearance of DC faults.

Shangen Tian will share the latest findings from Project INCENTIVE, offering technical insights on integrating grid-forming solutions with offshore wind farms.

If you are interested in discussing these topics further, feel free to connect with them during the conference. They will be happy to engage and answer any questions you may have.

Shangen Tian

Welcome

We are delighted to welcome our newest Power Systems Engineer to the HVDC Centre team:

Mohamed Elgenedy joins the Centre with over 10 years of experience as a researcher and assistant professor in power electronics. He brings extensive expertise in power electronics, including grid integration, modelling, stability analysis, and control design.

