

# SSEN Transmission

## The National HVDC Centre

*Annual Report (for reporting period April 2025 to March 2026)*



*The HVDC Operators' Forum, June 2025*

# 1 Executive Summary

## Background

This report is the fifth annual report for The National HVDC Centre, as part of RIIO-T2; and the last report in RIIO-T2.

- The Centre's business model for RIIO-T2 can be found here:  
[https://www.ofgem.gov.uk/sites/default/files/docs/2020/07/hvdc\\_centre\\_future\\_business\\_model\\_public.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2020/07/hvdc_centre_future_business_model_public.pdf)
- Ofgem's associated determination can be found here: [www.ofgem.gov.uk/publications-and-updates/decision-future-operation-hvdc-centre-following-end-nic-funding-period](http://www.ofgem.gov.uk/publications-and-updates/decision-future-operation-hvdc-centre-following-end-nic-funding-period)
- The previous annual report, together with prior MTTE Project progress reports and can be found here: <https://www.hvdccentre.com/library-category/progress-reports/>

## Context

The National HVDC Centre is Great Britain's simulation and training facility for HVDC, supporting the integration and successful operation of all HVDC schemes connecting to the GB network.

The Centre is also the national hub for HVDC knowledge exchange, expertise and innovation.

The Centre uses state-of-the-art simulators to model and resolve potential issues in real-time before they impact on the delivery (or operation) of HVDC projects, to ensure the integrity and security of the GB network.

As described in Ofgem's determination, the HVDC Centre's RIIO-T2 activities include:

- 1) Provide real-time and offline simulation to support the development and deployment of HVDC schemes.
- 2) Provide training programmes, for example specialist training courses for GB TOs, NESO, HVDC owners, developers and manufacturers to drive value across all areas of HVDC integration from a more informed stakeholder community.

- 3) Develop academic engagement projects to address key challenges to integration of HVDC projects into AC grids in collaboration with both the TOs and NESO.
- 4) Maintain a library of updated off-line and real-time simulation models, including all network components required to support the development and deployment of HVDC equipment. This includes FACTS devices deployed on the GB network.
- 5) Maintain models to facilitate system integration studies involving multiple equipment manufacturers whilst preserving Intellectual Property (IP) arrangements.
- 6) Proactively engage with industry groups and GB academic and research institutions to support the development of DC grids.
- 7) Continue to manage the HVDC Operators' Forum and hold periodic events.
- 8) Continue to maintain the HVDC Centre website and keep it up to date.
- 9) Publish reports into the outcome of project and other analysis activities on the HVDC Centre website (subject to Intellectual Property Rights (IPRs)).
- 10) Ensure the facility is appropriately resourced.

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## Overview

This fifth year of the HVDC Centre operation within RIIO-T2 has seen the Centre deliver a wide range of projects across the industry, further establishing itself as the national centre of expertise for HVDC.

Over this time, we have expanded the team to 24 people, further expanded our training offering, hosted another successful industry-wide conference (the HVDC Operators' Forum), broadened our industry engagement, broadened our academic engagement; while delivering a wide range of industry projects and world-leading innovations projects.

Below is a list of the non-project-specific activities undertaken at the Centre over the past 12 months.

### April 2025

- **EIRGRID and GreenLink:** Engagement session with EIRGRID and GreenLink Interconnector Ltd on HVDC operation and control and the nature of interactions between systems.
- **Grid Forming Event:** Hosted a Grid Forming stakeholder event with Offshore Wind Accelerator.
- **ACDC conference:** Published our spring newsletter, a special edition focused on IET's ACDC conference: [www.hvdccentre.com/wp-content/uploads/2025/05/HVDC-Centre-Newsletter-April-2025-FINAL.pdf](http://www.hvdccentre.com/wp-content/uploads/2025/05/HVDC-Centre-Newsletter-April-2025-FINAL.pdf)
- **Blade Review meeting:** The BLADE project had a successful quarterly review meeting with UKRI.
- **Energy Island paper:** Drafted a paper based on the results of the Energy Island project for submission to the CIGRE 2025 International Symposium, Montreal.
- **HVDC-WISE general meeting:** The HVDC-WISE general meeting with all project participants was held at the Centre.
- **NESO Session:** Productive feedback session with NESO on the annual Frequency Risk & Control Report consultation.

### May 2025

- **ISG Event:** Hosted the Independent Stakeholder Group (SSEN Transmission's Independent Stakeholder Group - SSEN Transmission) at the Centre. The Group's feedback was very complimentary, with positive feedback on the Centre's T3 plans.
- **WHVDC2 Kick-off:** Western HVDC2 working group kick off meeting: with all GB TOs, to discuss specification and Aquila approach.
- **Training:** Delivered an 'Introduction to HVDC' training course to a full audience at the Centre; with notable demonstrations on Multi-Purpose-Interconnectors and Aquila; both very well received.
- **Webinar:** Delivered a webinar with 150+ attendees on Network DC delivered in collaboration with partners SuperGrid Institute and University of Edinburgh, demonstrating continued interest across the industry on this important project that is leading GB (and Europe) on the detailed technical implications of DC circuit breakers.
- **CIGRE Paper:** Project Aquila submission to CIGRE International Symposium, Montreal: The Centre submitted a paper co-authored by 3 of the 4 HVDC vendors involved in the project and the offshore engineering team of SSEN-T, providing an overview of the Aquila Methodology, its rationale, its process and industrialisation. The paper includes testimonies from the vendors to its practicality, effectiveness, protection of IP and overall success.
- **Cigre B4 UK annual meeting:** At this meeting the phased transition of responsibilities for UK lead representative to Cigre B4 was announced, with Ben Marshall from the Centre taking on the role for new activities, workgroups and commitments; a high-profile role for Ben and the Centre.
- **Paper submission:** NESO HND Project Abstract has been submitted for the Wind and Solar Energy Conference.

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- **Patents Published:** The 3 Patents on the Aquila multi-terminal control philosophies have been formally published.
- **All-Energy Conference:** Attended the All-Energy Conference (SEC, Glasgow) representing the Network DC project and the HVDC Centre on the Innovate UK/UKRI Stand.

## June 2025

- **Stakeholder Mapping:** Held a Stakeholder Mapping Workshop, bringing together the internal stakeholder for the Centre's expansion plan, to consider both internal and external stakeholders of the project.
- **Utility Week article:** The Aquila project is to feature in 'Utility Week', we hosted their reporter to discuss the project: <https://utilityweek.co.uk/high-voltage-dc-interoperability-gets-boost-from-glasgow/>
- **HVDC Operators' Forum:** A successful event with 60 participants from across the industry. The feedback from the Operators' Forum has been overwhelmingly positive—a reflection of the passion, dedication, and collaboration that went into making it a success.
- **HVDC Centre Newsletter:** The HVDC Centre published its quarterly newsletter; focused on the Operators' Forum; available here: <https://www.hvdccentre.com/wp-content/uploads/2025/06/HVDC-Centre-Newsletter-June-2025-FINAL.pdf>
- **RTDS Workshop:** Held a ½ day working with RTDS on technical topics: received good insights on conversion tools which can be used in system performance projects.
- **Aquila:** Successful public demonstration of the Aquila MVMT-HVDC model during the Operators' Forum; positive feedbacks from all stakeholders.

## July 2025

- **OTPP Visit:** OTPP (Ontario Teachers' Pension Plan) visited the Centre to understand the Centre's role de-risking projects.
- **German TSO's engagement:** Held a workshop with the 4 German TSO's on matters relating to the Aquila methodology.

## August 2025

- **T3 Business Plan:** The Centre's Steering Group convened to review and approve the Centre's T3 Business Plan.
- **TAB meeting:** Held the quarterly 'TAB' (Technical Advisory board) meeting, with SPEN, NGET and NESO, reviewing our work to date and future plans.
- **Summer Placement presentations:** The Centre's Summer Placement Engineers both presented their experience to the team; both made very valuable contributions over the summer.

## September 2025

- **HVDC Centre Newsletter:** The HVDC Centre published its quarterly newsletter; available here: <https://www.hvdccentre.com/wp-content/uploads/2025/09/HVDC-Centre-Newsletter-Sept-2025-FINAL.pdf>
- **Visit to the Moyle Converter Station:** 6 members of the HVDC Centre Team visited the Moyle Auchencrosh Converter Station.
- **Consultation Response:** Submitted a response to OFGEM's consultation on NESO's FRCR report; supportive but highlighted improvements for consideration.
- **Training:** Hosted another successful "Introduction to HVDC and Project De-risking" training course with attendees from Ofgem, all three TOs and NESO. Feedback is overwhelmingly positive.

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## October 2025

- **Project LENS Use Cases Finalised:** Successfully finalised the use cases for Project LENS with all Transmission Owners and NESO.
- **Hat-trick of shortlisting for Awards:** Following last week's "Best Innovation New Technology" shortlisting for Aquila, and Arpan's shortlisting at the "Young Energy Professionals"; this week the HVDC Centre were shortlisted for "Team of the Year" at the Utility Week Awards.
- **CMS Replica hosting review:** The HVDC Centre issued the quarterly CMS Replica hosting report and held an update meeting with stakeholders.
- **DESNZ Engagement:** The Centre was requested to attend DESNZ's inaugural Sector Growth plan: Supply chain work group.
- **LENS Project Engagement:** The Centre completed engagement with all Transmission Owners (TOs) and NESO for Project LENS, working with stakeholders to understand the functionality they require, and drafting needs cases to define the project's objectives.
- **IEEE: eGrid conference:** The HVDC Centre welcomed over 40 delegates from the eGrid Conference for a Technical visit to the HVDC Centre.

## November 2025

- **CRESYM general meeting:** Our first attendance at the CRESYM general meeting has identified work on fault level modelling and system strength modelling which will be useful to progress.
- **HVDC Training:** Another successful training course was delivered by the Centre "Introduction to HVDC and Project De-Risking" for SPEN and NGET staff.
- **HVDC-Wise General Meeting:** Attended the six-monthly general meeting of the HVDC-WISE project in Aachen, Germany. Project partners presented their latest results and discussed ongoing activities as the consortium works towards completion of the main technical tasks in early 2026 and dissemination of outputs through to project end in autumn 2026.

The HVDC Centre shared our latest progress on real-time simulation with a model based on the GB grid.

- **PSCAD Training:** Attended a 3-day 'Applications of PSCAD & Transient Studies' training session.
- **New HVDC Interactive Workshop:** Developed and test-ran a new interactive HVDC design game with the team, which will be used in future training, a creative and entertaining way to illustrate the challenges of designing an offshore transmission system.
- **CIGRE UK Technical Conference:** Attended the CIGRE UK Technical Conference in Birmingham; and gave a talk showcasing the advanced modelling and simulation tools at The National HVDC Centre, receiving very positive feedback.
- **SIF Success:** Ofgem announced the success of the SIF application for SPRINT (Superconducting fault current limiters) discovery phase.
- **Horizon Consortiums:** The Centre is in discussion with a number of potential consortiums for the Horizon 2026/27 round of EU funded research collaborations.
- **Ofgem Visit:** The Centre hosted a team from Ofgem, receiving good feedback.

## December 2025

- **HVDC-Wind Connect gets SIF Funding:** Ofgem have confirmed that HVDC-Wind Connect has successfully received SIF funding, and will be formally kicking-off its Alpha phase in the new year.
- **Horizon Innovation Funding:** The Centre is part of an Horizon D3-02 consortia for "HORIZON-CL5-2026-04-Two-Stage-D3-02: Next generation of renewable energy technologies." Call, which plans to submit the bid for stage 1 by 31 March 2026.
- **Best Innovation Award:** Continuing the good news, the Aquila project was awarded the Best Innovation Award for New Technology Products at this week's Scottish Green Energy Awards for its groundbreaking Aquila Lite project: <https://www.scottishrenewables.com/events/276-sgea25/categories>

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## January 2026

- **HVDC Centre Newsletter:** Published the winter edition of our newsletter: <https://www.hvdccentre.com/wp-content/uploads/2026/02/HVDC-Centre-Newsletter-Jan-2026-FINAL.pdf>
- **Tennet Engagement:** Kicked-off of an engagement with Tennet (Netherlands and Germany) on DC network components.
- **New NESO Project:** Kicked-off of a project with NESO to identify key considerations and next steps in de-risking the first use of a Grid Forming control on a GB interconnector project.
- **SPRINT kicked-off:** Following our successful SIF application, the SPRINT project (Superconducting fault current limiters) discovery phase, was kicked-off.
- **Upgraded Fire Protection:** The Centre's fire alarm system has been upgraded with switchable automatic electrical cut-offs for both current and future replica rooms.
- **Western Link 2 Kick-off:** We kicked-off our project supporting Western Link 2, with SPT and NGET.
- **BLADE Phase 2:** As BLADE Beta stage 1 draws to a close, a stage 2 scoping workshop was held between the main delivery partners. The work packages come together on proposals for what's needed in the next stage: <https://www.hvdccentre.com/innovation-projects/blade/>

## February 2026

- **FAST-DC Approved:** SSEN-T's Innovation Governing Board signed off the FAST-DC project, the Edinburgh University DCCB continuation project.
- **Successful re-election to CIGRE:** Ben Marshall has been successfully re-elected as the UK CIGRE B4 regular member for the further 2026-2028 period; a recognition of the excellent contribution he is making to this national role.
- **Horizon Project:** EU Horizon proposal for D3.19 "EXPAND-HVDC" has confirmed Centre involvement across key simulation tasks. The project has

endorsed its objective to introduce the Aquila approach into European projects.

- **NESO Control Room Training:** Delivered a training session to the NESO control room engineers, supported by SSEN Transmission control room engineers.

## March 2026

- **Horizon Europe:** Our Two Horizon Europe proposals- SURE-DC-SHIELD (superconducting fault current limiters) and EXPAND HVDC (aquila for Europe, vendor agnostic DC protection & DCCB MTDC systems capable of expansion) are now both submitted proposals on the EU funding portal.
- **UoE Collaboration:** The HVDC Centre hosted successful hardware-in-loop testing in collaboration with University of Edinburgh. This proof of concept demonstrated DC circuit breaker current-limiting functionality developed by the University and provides a firm basis for further work in the FAST DC project.
- **More Training Delivered:** Another successful run of the popular 'Introduction to HVDC and Project De-risking' course (incl CMS demo), the new improved experience was well received with excellent feedback.
- **Guest lecture:** Delivered a guest lecture at the University of Glasgow as part of the Centre's academic engagement activities.

## 2 Update on Project Delivery

### Project Delivery

The Centre has delivered projects to internal and external clients as listed below.

| Project                            | Description  | Link  | Client(s)     |
|------------------------------------|--|---|---------------|
| <b>Shetland Support</b>            | De-risking the first multi-terminal VSC-HVDC connection in Europe. A number of different activities undertaken in support of the new HVDC connection to Shetland.  | <a href="https://www.hvdccentre.com/our-projects/support-for-the-shetland-extension-of-the-caithness-moray-hvdc-link/">https://www.hvdccentre.com/our-projects/support-for-the-shetland-extension-of-the-caithness-moray-hvdc-link/</a>   | SSEN-T        |
| <b>CMS PowerOn Installation</b>    | Implementation of PowerOn, as used in the Control Centre, into the simulator setup at the HVDC Centre.   | <a href="https://www.hvdccentre.com/our-projects/scada-system-implementation/">https://www.hvdccentre.com/our-projects/scada-system-implementation/</a>   | SSEN-T        |
| <b>CMS Replica Hosting</b>         | As the CM scheme is extended to multi-terminal operation, the HVDC Centre supports the operation of the multi-terminal controls, using the replicas of all three terminals.  | <a href="https://www.hvdccentre.com/our-projects/caithness-moray-project-support/">https://www.hvdccentre.com/our-projects/caithness-moray-project-support/</a>   | SSEN-T        |
| <b>Offshore Operations</b>         | NESO requested the HVDC Centre to model the HND offshore networks in real-time EMT simulation.   | <a href="https://www.hvdccentre.com/our-projects/eso-offshore-network-operation-performance-and-technical-code-impact/">https://www.hvdccentre.com/our-projects/eso-offshore-network-operation-performance-and-technical-code-impact/</a> | NESO          |
| <b>Western Link Analysis</b>       | NESO commissioned the HVDC Centre to derive a model of Western Link in the PSCAD software to support investigation of system disturbance events.   | <a href="https://www.hvdccentre.com/our-projects/neso-western-hvdc-link-performance-analysis/">https://www.hvdccentre.com/our-projects/neso-western-hvdc-link-performance-analysis/</a>   | NESO          |
| <b>System Performance Support</b>  | Supporting SSEN-T's System Performance team in the construction of real time AC system models of the Scottish system for use with CMS and future ASTI projects.  | <a href="https://www.hvdccentre.com/our-projects/system-performance-support/">https://www.hvdccentre.com/our-projects/system-performance-support/</a>   | SSEN-T        |
| <b>Core Industry Support</b>       | A variety of activities to support the four core partners (TOs & NESO) as a group, including development and support of small signal analysis tools, and supporting early-stage planning for replica hosting.                                    | <a href="https://www.hvdccentre.com/our-projects/core-industry-support/">https://www.hvdccentre.com/our-projects/core-industry-support/</a>   | Core partners |
| <b>Academic Engagement</b>         | Strengthening ties with UK academic institutions to foster a pipeline of HVDC engineers and promote awareness of HVDC technologies to future professionals in the sector.  | <a href="https://www.hvdccentre.com/academic-engagement/">https://www.hvdccentre.com/academic-engagement/</a>   | Various       |
| <b>HVDC-WISE</b>                   | The Horizon Europe HVDC-WISE project aims to support further development of HVDC-based transmission grids by developing new reliability and resilience (R&R) oriented planning and analysis tools.   | <a href="https://www.hvdccentre.com/innovation-projects/horizon-europe-hvdc-wise-project">https://www.hvdccentre.com/innovation-projects/horizon-europe-hvdc-wise-project</a>   | UKRI          |
| <b>Aquila</b>                      | Aquila is a world-leading project developing Multi-Terminal, Multi-Vendor DC-hubs, establishing the foundations for DC-Grids in GB. DC-hubs reduce the need for onshore converter stations, thereby minimising costs, and environmental impacts. | <a href="https://www.hvdccentre.com/our-projects/aquila-interoperability-package/">https://www.hvdccentre.com/our-projects/aquila-interoperability-package/</a>   | SSEN-T        |
| <b>Network DC SIF - Beta phase</b> | The Network DC project aims to advance the readiness for use of DC Circuit Breakers (DCCBs) on the GB system, to enable the development of offshore DC networks that require DCCBs.  | <a href="https://www.hvdccentre.com/innovation-projects/network-dc-circuit-breakers/">https://www.hvdccentre.com/innovation-projects/network-dc-circuit-breakers/</a>   | SSEN-T        |

## 2 Update on Project Delivery

| Project  | Description   | Link  | Client(s)                    |
|--|---|---|------------------------------|
| <b>Incentive SIF – Beta phase</b>                                      | Incentive aims to de-risk the integration of increasing offshore wind capacity onto the GB network, by ensuring system stability is maintained as traditional synchronous generators are displaced from the system.   | <a href="https://www.hvdccentre.com/innovation-projects/incentive-innovative-control-and-energy-storage-for-ancillary-services-in-offshore-wind/">https://www.hvdccentre.com/innovation-projects/incentive-innovative-control-and-energy-storage-for-ancillary-services-in-offshore-wind/</a> | SSEN-T                       |
| <b>BLADE SIF – Beta phase</b>  | The Black Start Demonstrator (BLADE) project aims to bring black start and electricity system restoration from offshore wind to commercial reality by building the necessary cross-industry understanding. BLADE is enabling TO, NESO, offshore wind farm developer and OEM interaction to clarify the role of wind farms in restoration processes. | <a href="https://www.hvdccentre.com/innovation-projects/blade/">https://www.hvdccentre.com/innovation-projects/blade/</a>   | SSEN-T                       |
| <b>SETTLE - NIA</b>  | The SETTLE project follows on from the INSIGHT alpha phase SIF project and aims to deliver a real-time alert and control system that could monitor and mitigate different types of oscillation events experienced on the network.   | <a href="https://www.hvdccentre.com/innovation-projects/settle/">https://www.hvdccentre.com/innovation-projects/settle/</a>   | SSEN-T                       |
| <b>Moyle Interconnector Replica Hosting</b>                            | The HVDC Centre is hosting replica control and protection cubicles on behalf of Mutual Energy, enabling us to support the upgrade and ongoing operation of the Moyle Interconnector.  | <a href="https://www.hvdccentre.com/our-projects/moyle-interconnector/">https://www.hvdccentre.com/our-projects/moyle-interconnector/</a>   | Mutual Energy                |
| <b>Impact of Grid Forming Capabilities on OWF Design and Operation</b> | Investigating the practical capabilities and physical implications of designing and operating grid forming offshore wind farms.   | <a href="https://www.hvdccentre.com/our-projects/grid-forming-support-for-offshore-wind/">https://www.hvdccentre.com/our-projects/grid-forming-support-for-offshore-wind/</a>   | OWF Developers               |
| <b>Energy Island</b>   | Investigate the performance of energy islands employing multiple half-bridge modular multilevel converter (MMC) based HVDC technology, in conjunction with offshore windfarms connected to several AC grids with varying short circuit level (SCL).   | <a href="https://www.hvdccentre.com/our-projects/performance-analysis-of-energy-islands-with-multiple-interconnections/">https://www.hvdccentre.com/our-projects/performance-analysis-of-energy-islands-with-multiple-interconnections/</a>   | National Grid Ventures (NGV) |
| <b>Offshore Coordination Project</b>                                   | Working to provide a coordinated offshore design for wind and network reinforcement for an international TSO.   | <a href="https://www.hvdccentre.com/our-projects/coordinated-offshore-design-for-wind-and-network-reinforcement-for-an-international-tso/">https://www.hvdccentre.com/our-projects/coordinated-offshore-design-for-wind-and-network-reinforcement-for-an-international-tso/</a>               | An international TSO         |
| <b>HansaLink Feasibility Study</b>                                     | Working with WindGrid to conduct a detailed feasibility study for a multi-purpose HVDC interconnector between Germany and the UK.   | <a href="https://www.hvdccentre.com/our-projects/feasibility-study-for-multiterminal-rigid-bipole/">https://www.hvdccentre.com/our-projects/feasibility-study-for-multiterminal-rigid-bipole/</a>   | WindGrid                     |
| <b>GIL-GB Voltage Interaction Analysis</b>                             | Analysis to support commissioning of the Greenlink interconnector. This includes time domain and frequency domain analysis of performance.  | <a href="https://www.hvdccentre.com/our-projects/analysis-support-for-hvdc-interconnector/">https://www.hvdccentre.com/our-projects/analysis-support-for-hvdc-interconnector/</a>   | Greenlink Interconnector Ltd |

## 2 Update on Project Delivery

| Project                       | Description  | Link  | Client(s)        |
|-------------------------------|--|---|------------------|
| <b>Energy Island 2</b>        | Building on the insights from a previous project, ' <a href="#">Performance Analysis of Energy Islands with Multiple Interconnections</a> ', the HVDC Centre has been contracted by National Grid Ventures to explore solutions to enhance the resilience and operational stability of HVDC-connected offshore wind farms.   | <a href="https://www.hvdccentre.com/our-projects/performance-analysis-of-energy-islands-with-multiple-interconnections-2/">https://www.hvdccentre.com/our-projects/performance-analysis-of-energy-islands-with-multiple-interconnections-2/</a>   | NGV              |
| <b>HND NWR Multi-Terminal</b> | The National HVDC Centre, in collaboration with NESO, is undertaking an initial investigation to assess the impact of the multi-terminal HVDC design on the onshore network.   | <a href="https://www.hvdccentre.com/our-projects/holistic-network-design-northwest-region-multi-terminal-hvdc-link-studies/">https://www.hvdccentre.com/our-projects/holistic-network-design-northwest-region-multi-terminal-hvdc-link-studies/</a>   | NESO             |
| <b>LENS</b>                   | The Large Electricity Network Simulation (LENS) project is a pioneering initiative aimed at enhancing the stability and reliability of the Great Britain (GB) transmission system. By developing a real-time simulation platform that encompasses the entire transmission network, LENS will significantly de-risk investments in HVDC and converter-based assets. | <a href="https://www.hvdccentre.com/innovation-projects/project-lens-large-electricity-network-simulator/">https://www.hvdccentre.com/innovation-projects/project-lens-large-electricity-network-simulator/</a>   | TOs              |
| <b>INCENTIVE Phase 4</b>      | Based on the positive outcomes from the previous phase — Project INCENTIVE Beta. The Carbon Trust, acting on behalf of the Offshore Wind Accelerator (OWA) group, is now progressing the INCENTIVE-related study to Phase 4. This phase aims to investigate whether the INCENTIVE solution can contribute to future stability of the GB onshore network.           | <a href="https://www.hvdccentre.com/innovation-projects/incentive-innovative-control-and-energy-storage-for-ancillary-services-in-offshore-wind/">https://www.hvdccentre.com/innovation-projects/incentive-innovative-control-and-energy-storage-for-ancillary-services-in-offshore-wind/</a> | The Carbon Trust |
| <b>SIF HVDC Wind Connect</b>  | The HVDC Wind Connect project aims to develop, validate, and de-risk a set of HVDC multi-terminal arrangements that reduce the complexity and cost of future offshore transmission systems.  | <a href="https://www.hvdccentre.com/innovation-projects/sif-hvdc-wind-connect-project/">https://www.hvdccentre.com/innovation-projects/sif-hvdc-wind-connect-project/</a>   | UKRI             |
| <b>SIF SPRINT</b>             | SPRINT (Superconducting Fault Current Limiters Potential to Limit Reactor Implementation within DC Network Topologies) is an innovative project aimed at enhancing the protection and efficiency of High Voltage Direct Current (HVDC) networks by integrating Superconducting Fault Current Limiters (SFCLs)  | <a href="https://www.hvdccentre.com/innovation-projects/sif-sprint-project/">https://www.hvdccentre.com/innovation-projects/sif-sprint-project/</a>   | UKRI             |
| <b>FAST DC (SSEN-T)</b>       | FAST DC (Framework for Advanced Studies of DC Grids) is a Network Innovation Allowance (NIA) project to develop a vendor-agnostic framework for studying multi-terminal HVDC grids, with a particular focus on modelling and assessing advanced DC circuit breaker (DCCB) functionality.   | <a href="https://smarter.energynetworks.org/projects/nia_shet_0059/">https://smarter.energynetworks.org/projects/nia_shet_0059/</a>   | SSEN-T           |

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## 3 Update on Activities

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### Dissemination Activity

A continual key focus of the HVDC Centre is on knowledge dissemination.

The Centre undertakes extensive engagement/ dissemination activity to ensure that we:

- Keep potential users of the Centre informed of our capabilities;
- Ensure that the work we undertake is developed in collaboration with relevant stakeholders; and
- Effectively disseminate the knowledge gained at the Centre to the right people.

We do this through a range of engagement activities:

- Workshops and hybrid events for the industry around specific topics and techniques developed at the Centre;
- Actively disseminated information, experience, and developed consensus, to interoperability through our Advisory Board roles in READY4DC and INTEROPERA work and contributions to their publications;
- Disseminated across the SIF projects and HVDC-WISE projects our outputs and learnings;
- Hosted a range of technical visits; and
- Supported Grid Code initiatives relevant to HVDC.

Our dissemination events are discussed further below.

### Films

The Centre has produced a range of short films to communicate project learning in an accessible format, including recordings of all webinars hosted this year: <https://www.hvdccentre.com/films-list/>

### Website

The Centre's website continues to be updated to support knowledge dissemination.

The website contains details of all the technical projects the Centre has undertaken, our innovation programme, and library of publications.

<https://www.hvdccentre.com/>

### Newsletter

This year the Centre produced 4 quarterly newsletters and distributed to all our stakeholders, shared with our Linked-In followers, and published on our website.

<https://www.hvdccentre.com/library-category/newsletters/>

### Linked-In

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## 3 Update on Activities

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The Centre uses Linked-In to share key outputs with a wide range of interested parties, with over 4,900 followers (up from 4,400 last year).

<https://www.linkedin.com/company/the-national-hvdc-centre>

### **HVDC Operators' Forum (annual)**

The Centre has established this forum as a regular annual event, where HVDC projects in GB, relevant TOs and the NESO come together to share experience and lessons learnt.

The Centre's annual HVDC Operators' Forum was held on 11-12 June 2025; details of the event can be found in our special edition newsletter: <https://www.hvdccentre.com/wp-content/uploads/2025/06/HVDC-Centre-Newsletter-June-2025-FINAL.pdf>

This year's HVDC Operators' Forum is planned for 10-11 June 2026.

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## 3 Update on Activities

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### Dissemination Events

The Centre's events, webinars and training inform and facilitate knowledge exchange on a variety of HVDC-related topics.

These events and webinars have been very well attended from across the industry and have been well received, the events include:

- NeuConnect Visit/Meeting (04/04/2025)
- HVDC-WISE General Meeting (Glasgow) (23-24/04/2025)
- HVDC-WISE Period 2 Review Meeting (25/04/2025)
- BLADE Beta consortium update Meeting (13/05/2025)
- Attendance at All-Energy Exhibition and Conference 2025 (14/05/2025)
- Webinar: Network DC – Innovations in DCCBs and HVDC Grid Technologies (20/05/2025)
- HVDC Centre Training: HVDC Centre Training: Introduction to HVDC and Project De-risking (27/05/2025)
- SSE Net Zero Stakeholder Board Visit (29/05/2025)
- Development of a learning framework for renewable energy-based battery swapping station (05/06/2025)
- Visit by SSE Group Innovation & Academic Partnerships (10/06/2025)
- Visit by Elia (10/06/2025)
- HVDC Centre Operators Forum (11-12/06/2025)
- RTDS Technologies Workshop (13/06/2025)
- Visit by Ayrshire College and XLCC (16/06/2025)
- IEEE PES DLP: The Role of HVDC and Power Electronics in the Future Smart Electric Grid (18/06/2025)
- Visit by EPRI (19/06/2025)
- HVDC Expansion Stakeholder Mapping Workshop (23/06/2025)
- Poster presentation at IEEE PESGM 2025 (28/07/2025)
- Editorial Board meeting of IEEE Transactions on Power Delivery at IEEE PESGM 2025 (30/07/2025)
- Panel presentation at IEEE PESGM 2025 (31/07/2025)
- Technical Advisory Board meeting (15/08/2025)
- HVDC Centre Training: Introduction to HVDC and Project De-risking (04/09/2025)
- BLADE Beta consortium interim update September (09/09/2025)

### 3 Update on Activities

- Visit by XLCC Head of Special Projects (15/09/2025)
- Visit by German TSOs, Universities and OEMs (16/09/2025)
- Attendance at Energy Innovation Forum 2025 (17/09/2025)
- INTEROPERA technical liaison meeting (22/09/2025)
- Visit by Mitsubishi Electric UK Power Systems Group (23/09/2025)
- SETTLE face-to-face meeting with project Partners (26/09/2025)
- Attendance at 10th IEEE Workshop on the Electronic Grid (eGrid 2025) (30/9-02/10/2025)
- Attendance at 24th International Wind and Solar Integration Workshop (07-10/10/2025)
- UK & France Horizon Europe Brokerage Visit, UKRI/Innovate UK (Paris) (21-23/10/2025)
- Site visit to Blackhillock HVDC Converter Station (28/10/2025)
- Attendance at Energy Innovation Summit (05-06/11/2025)
- Attendance at Energy UK Young Energy Professionals (YEP) Awards (06/11/2025)
- EGL Projects System Integration Meeting (11/11/2025)
- Technical Advisory Board meeting (12/11/2025)
- Attendance at CIGRE UK Technical Conference 2025 (20/11/2025)
- Applications of PSCAD & Transient Studies training (25/11/2025)
- HVDC-WISE General Meeting (25-26/11/2025)
- Guest Lecture at Glasgow Caledonian University (24/11/2025)
- HVDC Centre Training: Introduction to HVDC and Project De-risking (27/11/2025)
- Utility Week Awards 2025 (02/12/2025)
- HVDC Centre Training: Introduction to HVDC and Project De-risking (04/12/2025)
- The Scottish Green Energy Awards 2025 (won Best Innovation Award for Aquila!) (04/12/2025)
- BLADE Stage 2 scoping workshop (09/01/2026)
- Guest Lecture at University of Strathclyde (19/01/2026)
- NESO Control Room Visit - CMS Replica Familiarisation Session (10/02/2026)
- DESNZ sponsored visit by TEPCO and Mitsubishi Research Institute (20/02/2026)

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## 3 Update on Activities

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- Toshiba visit (18/02/2026)
- CIGRE B4 SC workshop planning for CIGRE Paris (16-17/02/2026)
- DESNZ & ENA Supply chain workshop (17/02/2026)
- Network Directorate Knowledge Sharing Event (19/02/2026)
- HVDC Centre Training: Introduction to HVDC and Project De-risking (24/02/2026)
- HVDC Centre Training: Introduction to Real-Time Simulation and CMS Replica (25/02/2026)
- CMS Replica Annual Meeting - Y2026 (03/03/2026)
- Attendance at Ofgem's SIF Community Forum 2026 (03/03/2026)
- HVDC Centre's Annual Academic Day Event (2nd) (04/03/2026)
- Webinar: Multi-terminal HVDC, Part 1: Introduction and Energisation (03/03/2026)
- Moyle Replica Project - Annual Meeting (09/03/2026)
- GreenLink and Mutual Energy Replica Knowledge Sharing meeting (09/03/2026)
- Guest Lecture at University of Glasgow (10/03/2026)
- Visit by National Grid Ventures (13/03/2026)
- Flexible Research Grant 2026 launch (26/03/2026)
- HVDC Centre Training: Introduction to HVDC and Project De-risking (26/03/2026)
- HVDC Centre visit to the Power Networks Demonstration Centre (PNDC) (31/03/2026)

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## 4 Financial Report

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The table below details the spend (& revenue), against each category.

**Removed in public version.**

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## 5) TAB Update

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### Overview of the Technical Advisory Board (TAB) Meetings

TAB meetings across 2025/26 were held with an informal meeting at the HVDC Operators Forum (11-12 June 2025) and further meetings on 15 August 2025 and 17 April 2026, with informal meetings across TAB partners across Jan/feb 2026. TAB meetings are a mixture of hybrid physical and virtual attendance. Meetings are normally 2.5-3.5 hours long and a typical agenda is:

- Introductions, actions from last meeting;
- Overview of past 6 months of activity (highs and lows);
- Centre resourcing and current commitments;
- Specific project updates;
- Specific topics for discussion needing new innovation/ new focus;
- R&D activities; and
- Actions, Recommendations, AOB.

The meetings serve as a strategic discussion to more routine project focussed discussions across the TAB organisations over the year. These are complemented with company-specific bilateral meetings on work planning with each partner, identifying and scoping new work and providing dissemination of best practice. This includes planned training which in the last year has included:

- Further training on centre-developed small-signal analysis approaches;
- Further Training on centre-developed approaches to multi-terminal DC network control, Project Aquila related learning and how operation of such networks can be simulated and understood across a range of situations, including new Western HVDC 2 and EGL6 project applications;
- Modelling of future operational considerations, for example HND related offshore systems, new functions such as grid forming, AC protection relay testing approaches and resilience testing;
- Training on “Introduction to HVDC and project de-risking” (one session with NESO included 37 of their staff in a single 1-day course); and
- Webinars on key projects and their de-risking (for example on work related to DC circuit breaker analysis within Network DC, HVDC-WISE project on resilience, BLADE project on blackstart, project Aquila and HND analysis).

Some key areas in which TAB moved the Centre’s work forward over 2024/25 include:

- Agreeing to the scope of activities informing the Centres 2026-2031 plans;
- Discussing and agreeing SIF and NIA application focus (HVDC windconnect and SPRINT new projects together with continuing phases of existing SIF and NIA activities); EU Horizon applications relating to Horizon- CL5- 2026-03 – D3.19 “Affordable and sustainable primary equipment for Future – Ready multi-terminal HVDC systems”
- Discussing and further agreeing scope and direction for Centre expansion, including the Large Electricity Network Simulation environment (LENS) and its delivery
- Developing plans bilaterally for the support of ASTI and taking related transmission classified HND work forward.

Relevant to the above, the Centre is now supporting all ASTI and HND transmission activities with technical advice, defined support analysis and replica specification, which in turn has informed the direction of Centre expansion needs. The Centre is

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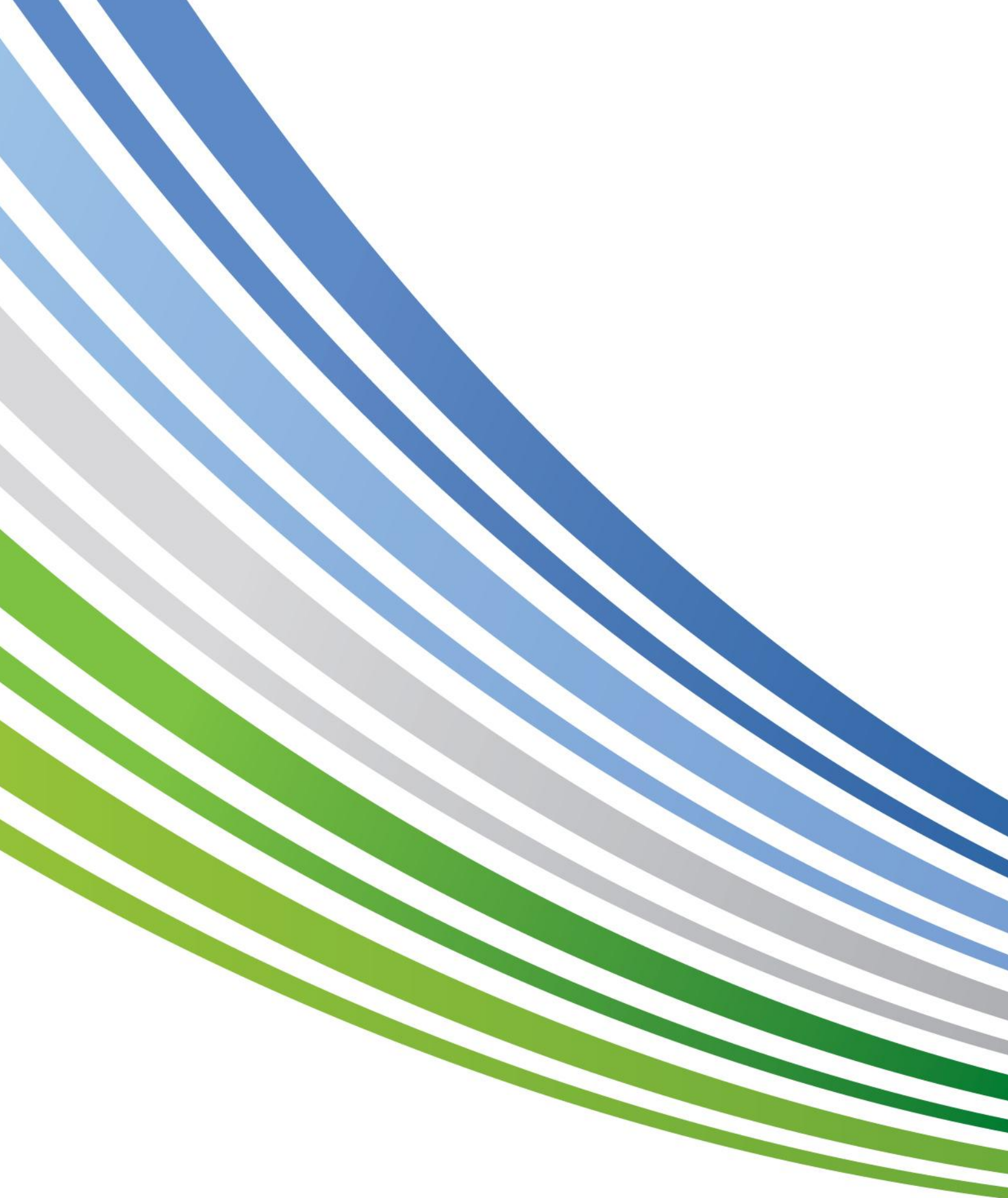
## 5) TAB Update

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also undertaking support to HVDC related innovation projects in NGET relating to HVDC overhead line design and onshore HVDC overlay (volt-expense NIA led by NGET), SPT in relation to black start (SIF-BLADE), SSEN-T and NESO in relation to system strength measures and oscillation analysis (SIF project SYSMET and SIF/NIA work under INSIGHT/ SETTLE, respectively), and has commenced moving beyond the support of the offline PSCAD environment of TOTEM to the design of plans for a whole system real time digital twin, included in the Centre's agreed expansion activity. The Centre has supported ESO/NESO in the analysis of the original HND proposals and their refinement, together with supporting the analysis of the beyond 2030 proposals now published. Project Aquila has developed and patented 3 key areas of multi-terminal control, operation and stability assessment to support and protect the environment for multi-terminal multi-vendor DC networks to emerge and is now actively supporting a range of GB HVDC projects involving our TO partners seeking to use its approach.

### **Non-Networks Representative**

Professor Mike Barnes, University of Manchester, continues to tack on this role across 2025/26 and now into 2026/27. His support, particularly around understanding GB's engineering skills gaps, and GBs research focus has proved insightful; with Mike actively supporting both areas of common interest across the centre and TSOs (for example the NextNet collective centre of doctural expertise in future power systems and the launch of the centres new flexible academic grant programme).



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