



## Welcome to this special edition of the HVDC Centre newsletter which focusses on the HVDC Operators' Forum 2024.

From the ambitions of the Net Zero transition at our last event, focussing on the “how” to do it, to this year’s session on the “what” we have been doing, the Operators’ Forum remains a centrepiece event for us in the year. Once again, we had a packed agenda and a packed attendance across TSOs (GB and EU), developers, vendors, generators, interconnector companies, and the Dept Energy Security & Net Zero. We thank all who attended and helped contribute to the stimulating discussions over the two days. Looking forward to catching up with you all at the next one!



### Introductory Presentations (Note: all underlined text have embedded links to the presentations):

- [Welcome and Overview of the Event](#)

*Event Chair: Ben Marshall*

## Session 1: HVDC Development in GB

Our first session of the day covered the latest developments in HVDC in Great Britain. We asked four speakers to give an update on the state of the industry since the last Operators’ Forum in June 2023. They were chosen to cover a strategic view of GB, the transmission projects, HVDC connected offshore wind and commercial HVDC projects.

The first presentation was from **Graham Stein from National Grid ESO** who gave an overview of their Holistic Network Design (HND) work. This covered the recommendation to design the network to cope with the growth in offshore wind including several HVDC links.

The second presentation was from **Richard Wallis from National Grid Electricity Transmission**. He talked us through their experience on designing and delivering HVDC projects to support transmission reinforcements under the ASTI regime.



The third presentation was from **Kaushik Hore and Akshay Prajapati from Ørsted** giving the perspective of offshore wind developers. They gave an overview of the latest Ørsted HVDC projects including Hornsea 3 in GB.

- [Ørsted’s journey & learnings of HVDC Connected Offshore Windfarms](#)

The final presentation from Session 1 was from **Jonathan Ruddy from Greenlink**. Jonathan gave his experience from a commercial company building an HVDC link from Ireland to GB and shared some practical learning from the project delivery.

- [The Greenlink Interconnector](#)

*Session Chair: Ben Gomersall*

To find out more, please contact us to discuss or to arrange a visit:  
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## Session 2: HVDC Development in the Rest of the World

The afternoon of day one saw invited speakers deliver presentations on HVDC developments around the world.

[Donaël Muret from Super Grid Institute](#) provided summaries of two big European projects.

- **HVDC-WISE**, in which the Centre is a partner, is concerned with reliability and resilience of future hybrid AC/DC systems; and
- **InterOPERA**, which is focused on interoperability in multi-vendor DC systems.

Moving eastwards, **Grain Philip Adam of ENOWA.NEOM** described the use of HVDC for an all-renewables power system in part of Saudi Arabia. He explained how the chosen design provides flexibility and extensibility.

To the far east, and **Frederick Page of Mitsubishi Electric** highlighted how the NEDO project in Japan has implemented multi-terminal control. He also gave an update on the development of DC circuit breakers.

Crossing the Pacific, we had a summary of HVDC in the US from [Geoff Love of EPRI](#). This highlighted that while there has been no new HVDC projects commissioned in recent years, there are several now in development.

In the second half of the afternoon, delegates were invited to tour the HVDC Centre and hear seven short presentations from the team. To make it more interactive, delegates were asked to answer [questions on each topic](#) so we could identify the most widely held views. The answers from all delegates were then “scored” to see who was most in tune with the group. Three people matched six out of seven, then a tiebreaker question was used to pick a winner, who received some tasty treats. Congratulations to Spyros Karamitsos of SP Renewables for having his finger on the pulse of the HVDC industry.



The first day was wrapped up with a panel of speakers from earlier in the day discussing some of the hot topics and taking questions from other delegates.

*Session Chair: Colin Foote*

## Session 3: Standardisation and Strategic Contracts

The morning session of the second day focused on the practical experiences within Europe and GB in standardising and specifying new DC equipment, focussing on the 2 GW HVDC standard.

**Nadew Adisu Belda, Asset Specialist for TenneT** described the extent of analysis, specification both electrical and civil and supply chain development was required to achieve this.



This was followed by a presentation on GB's experience of standardisation building on the volume of work of TenneT on the 2 GW programme that preceded it by **Perry Hofbauer, SME HVDC Engineering, SSEN-Transmission**.

Perry highlighted the importance of specifications that are not constraining but rather enabling of innovation by suppliers.



Perry ended by noting that standards still needed adaptation to recognise regional differences and specific considerations

- [Technical Standardisation of HVDC Systems](#)



Finally, within this session, Daniel Hill, Amprion, joined the stage to form with Nadew and Perry a panel to discuss HVDC standardisation, fielding questions from the audience. This included the sensible extent of standardisation, e.g. should different vendors get contracted to supply converter transformers to a given site, where the next areas of standardisation would come from and how to maintain and sustain the supply chain; and how to find and develop the people needed.

*Session Chair: Ben Marshall*

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## HVDC Centre Expansion

In addition to Session 3, the HVDC Centre Manager, **Simon Marshall**, gave a talk about the Centre's intended expansion which is scheduled to take place during the RIIO T3 period across 2026-2027. He discussed the future scope of activity being assumed for the Centre and how this translates to more people, more space for HVDC replicas, simulation environment and testing infrastructure.

- [The National HVDC Centre – Summary of Planned Expansion](#)
- [Centre Expansion Questionnaire](#)

### The National HVDC Centre is expected to expand by 2026:

- Its building space will increase from about 1,000 square metres to a minimum of 3,500 square metres;
- This effectively triples the space, significantly increasing the hosting and testing capabilities of the Centre, keep up with new developments in the industry.

### The Centre also needs to expand its simulation infrastructure:

- The Centre plans to increase its simulation equipment to support coincident de-risking activities across more projects across a wider range of regional network analysis;
- This will help handle more work and support project operation across a broader range of current and future HVDC projects.

We released a questionnaire on these plans, both in terms of the specifics of the expansion, but also concerning the question of the Centre operating model moving into 2026 and beyond that supports it. We invite industry readers of this newsletter to further comment via the link to the questionnaire below.

- [Expansion Feedback Form](#)



*Session Chair: Simon Marshall*

## Session 4: HVDC and Interoperability (Part A)

This session focussed on practical aspects of deploying new, interoperable designs of HVDC networks. The session included a presentation from **Viktor Rudan (RTEi)** on interoperability analysis conducted for the Sofia and Dogger Bank projects. Viktor identified that they were acting in an “integrator” role supporting the two developers, with no direct interface to Electricity System Operator or National Grid Electricity Transmission. Hundreds of off-line PSCAD time domain tests had been conducted ahead of hosting replica control and protection for each HVDC link, together with “virtual replicas” of windfarm turbine models within a GTSOC device representing the offshore windfarms they connect. Viktor went onto explain how they would only release simulation information to restricted developer/vendors who in turn had access to the relevant data/models to which it pertained.



Viktor's presentation sparked a range of questions on the techniques used, how they fitted into compliance or other processes and the relevant roles and responsibilities across the work. It was noted that this work was valuable and both informing future interaction analysis work, and the role of similar integrators within projects such as InterOPERA.

- [SOFIA/DBC Interaction Study](#)

*Session Chair: Dong Chen*

## Upcoming Webinar

**Thursday, 22nd August, (11am – 12pm UK Time)**

**Webinar Title:** AC Protection in a low strength network.

Hosted by the HVDC Centre and UoS (University of Strathclyde)

[Click Here to Register](#)

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## Session 4: HVDC and interoperability (Part B)

The final session of the forum focused on making HVDC interoperability real; delivering it, specifying it and testing it.

Kicking off these presentations, our Senior Simulation Engineer and Project Aquila lead **Dong Chen, National HVDC Centre** took the audience through a real-time simulation of the Aquila multi-terminal network due for delivery and demonstration in the early 2030s based on the co-ordinated offshore pathfinder, approved in July 2021. This simulation demonstrated a network, including a GE provided replica of the 2GW 525kV bipole running in simulation alongside other Centre generated detailed converter models simulating the replicas. In essence two different vendor approaches operating side by side without either compromising or opening vendor IP. Over the rest of the year the Centre will include other vendors and complete a range of tests to demonstrate robust interoperability and security of operation for multi-vendor DC networks ahead of doing it for real via a DC switching station near Peterhead, NE Scotland.

- [Context Update of Aquila Interoperability Package \(Aquila Lite\) – Control Architecture and Philosophies](#)
- [Real Time Black Box Modelling of Vendor Proprietary Controls](#)
- [HVDC and Interoperability](#)



This was followed by **Sumek Elliban from RTDS Ltd**, taking the audience through the development and application of the GTSOC and related toolboxes used for black-boxed vendor simulation and analysis.

Carl Barker then followed this in presentation of the experience and activity that drives practical interoperability, emphasising the need for TSOs to be clear on requirements and responsibilities, noting in turn the role of regulators and governments in this area.

**Christian Wikstrom (Hitachi Energy)** and **Frederick Page (Mitsubishi)** followed with presentations emphasising key technologies requiring delivery and the need for initiatives in interoperability to collaborate with one-another to establish best practice and avoid “reinventing the wheel”.

*Session Chair: Ben Marshall*

## Welcome



We are delighted to welcome a new person to the HVDC Centre team:

**Imogen Crozier** has joined the team on a twelve-week summer internship with SSEN Transmission.

She has recently completed her 4th year at the university of Aberdeen as she studies for her MEng in Electrical and Electronic Engineering. She will be learning about the work carried out at the Centre and supporting various team members on different projects.

## Thank you

Thank you to everyone who attended, for your active participation and engagement, which made for a very collaborative event.

We are already looking forward to, and planning, the HVDC Operators’ Forum 2025!



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