Newsletter

Issue 38: October 2024

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The National HVDC Centre

Welcome to the autumn edition of the HVDC Centre newsletter, where we share news on visits *(to and from the Centre),* **OPAL-RT, conferences** *(CIGRE and RTDS)*, **project updates** *(Aquila and BLADE),* **along with training courses, webinars and news of our expanding team.**

Visit to Auchencrosh

The HVDC Centre team (photographed above with our welcoming host Sam Gibson) visited Mutual Energy's Auchencrosh converter station during a planned outage at the end of August. The Auchencrosh converter station is located on the Scottish side of the Moyle HVDC link between Northern Ireland and Scotland.

The Moyle replica, which is hosted at the HVDC Centre in Cumbernauld, has been used to test control code updates prior to release on the operational system. A number of software enhancements which were rolled out during the outage had been tested at the HVDC Centre in the weeks before.

Sam Gibson, Moyle Operations Manager, said *"We're delighted to have our colleagues from the HVDC Centre here to site. We've built a great working relationship with them, and their hosting of our replica brings a lot of assurance to us when modifications need to be rolled out."*

Fabian Moore, HVDC Centre Simulation Engineer, replied *"It was a great opportunity to learn about Mutual Energy's maintenance work, and see all the high voltage equipment up-close. We simulate how this equipment is operated when we work with the Moyle replica at the Centre, so it is great to see it in real life."*

Fabian Moore

NESO Visits the HVDC Centre

The Centre was privileged to host a visit from NESO Chief Executive Officer Fintan Slye and Chief Operating Officer Kayte O'Neill, just 3 days into the launch of the new National Energy System Operator (NESO).

Since 2013, when the HVDC Centre was first conceived, and throughout the Centre's development and operation, the System Operator has been a firm partner supporting the Centre's de-risking objectives, through a variety of projects.

This was a fast-paced visit, with Fintan and Kayte touring the site and receiving updates on recent activities, ranging from Caithness-Moray-Shetland commissioning, multi-vendor, multi-terminal interoperability in Project Aquila, DC circuit breaker specification in Network DC and the Centre's analysis and support for offshore Holistic Network Designs. We also discussed operational training of new technologies via "flight simulators" and work we were doing together across training and interaction analysis.

Although a whistle-stop visit, it was great to have NESO here at such a senior level, and we look forward to ongoing collaborations across our organisations in the future.

Ben Marshall

To find out more, please contact us to discuss or to arrange a visit:
01236 687240 | info@hvdccentre.com | hvdccentre.com

The National HVDC Centre

New OPAL-RT Simulator

We have recently expanded our real-time simulation capability with the addition of a new platform from OPAL-RT Technologies.

This is being funded, in part, by the HVDC-WISE project, which is a collaboration of 14 partners across UK and Europe; together investigating improvements in reliability and resilience of future hybrid AC/DC transmission systems.

An early application for the new equipment will be to explore the opportunities for co-simulation with RTDS. This allows the HVDC replicas hosted at the Centre to remain interfaced with RTDS while exploiting the capabilities of OPAL-RT for wide-area modelling and interfacing to other systems. However, there are many issues to be considered, including how to determine the simulation boundary point between RTDS and OPAL-RT, and what level of detail is appropriate in modelling the wider system.

We look forward to developing new approaches using OPAL-RT and other tools to continue expanding our support for de-risking HVDC and the net zero transition. We will report on our early findings at OPAL-RT's regional conference in Edinburgh on 28-29 November.

Colin Foote

Quality Management Accreditation

The HVDC Centre is delighted to announce that our ISO 9001 Quality Management System (QMS) certification has been renewed.

This is the world's most popular quality management standard, and it provides a quality management framework that can be used to ensure that the quality of our services is consistent. Our team worked alongside our quality advisor to realise this goal.

ISO 9001 certification was chosen to demonstrate our ongoing commitment to maintain high standards of delivery. Working towards recertification has ensured we continue to improve our procedures and processes to aid organisational efficiency and increased capacity.

Linda Rowan

HVDC Centre at CIGRE 2024

This year's CIGRE conference, one of the premier engineering events in the world, was attended by Ben Marshall and Dr Colin Foote from the Centre, together with a wider technical engineering contingent from across SSEN-Transmission (pictured).

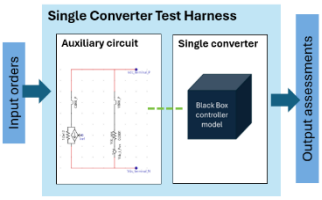
The Centre submitted/presented papers on a range of topics: HVDC-WISE related resilience of future DC systems, Network DC approaches to DC protection and DC circuit breaker specification, and a paper together with National Grid Ventures on the analysis of Multi-Purpose Interconnectors.

Colin presented at a session on HVDC resilience linked to HVDC-WISE outputs and Ben represented the Centre on the Advisory Board of InterOPERA. They also participated in a range of workgroups associated with grid forming converters and modelling of large onshore transmission systems to study interaction phenomena in EMT.

This year's CIGRE session was the largest to date, with especially dynamic special report discussions. It was great to meet many of the Centre's contacts and catch up on common areas of interest.

Ben Marshall

Single Converter Test Kit Release for Project Aquila



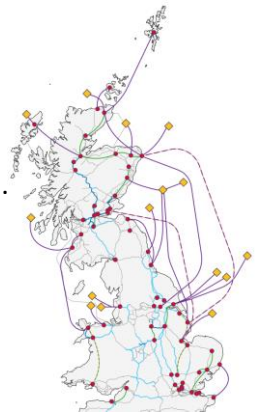
As part of our collaboration with leading vendors in Project Aquila, we are tackling the critical challenge of interoperability in multi-vendor, multi-terminal DC systems. This October, we're excited to announce the first release to our project partners of the Single Converter Test Kit.

The specifications of interoperable HVDC converters will eventually come down to detailed assessments of individual converters. This is where our new Test Kit comes in, enabling us to thoroughly evaluate each converter's performance. The kit aims to assess whether converters meet their specified input/output characteristics and maintain stability across all permissible operating points, supporting the development of reliable, interoperable HVDC systems.

More details on Project Aquila can be found here:
https://www.hvdccentre.com/our-projects/aquila-interoperability-package/

Ruiqi Li

SIF BLADE Awarded Beta Phase Funding from Ofgem



The National HVDC Centre is part of the Strategic Innovation Fund (SIF) project BLADE (Black Start Demonstration from Offshore Wind).

As the power system evolves, thermal generation, traditionally contracted to restore the power system in the event of a blackout, is being decommissioned in favour of low-carbon resources.

To address the challenge of resilience and restoration in a net zero power system the BLADE consortium, led by SP Energy Networks, aims to bring restoration capability from offshore wind farms to commercial reality in GB.

Since October 2023, the project partners have been working hard to deliver the initial technical feasibility studies and commercial case in the project's Alpha Phase. Following a successful application for the next funding stage, the project has now progressed to the Beta Phase in October 2024.

The next delivery phase for the growing project consortium will commence in January 2025, where detailed feasibility assessments will consider site specific restoration use cases in GB. The final objectives for the Beta Phase will be to perform lab-based demonstrations and develop the technical requirements, specifications, restoration controllers and control room tools, ultimately evolving the restoration market to incorporate offshore wind and other low-carbon technologies in future restoration plans.

Adam Scott

Upcoming Webinars

Title: HVDC Replicas Explained: What? Why? When? Where? How?

Date: Tuesday 19 November 2024

Start Time: 12:00 UK Time

Location: Online

Register: Register Now *[embedded link]*

Join us for a webinar looking at how The National HVDC Centre hosts HVDC replicas to support real-world projects.

Future webinar details will be posted on our website events page as follows:

Upcoming Events – The National HVDC Centre

HVDC Centre Training

On 4 September, The National HVDC Centre hosted a training course "Introduction to HVDC and Project De-risking". This training course attracted interest from across the industry – including Ofgem, various non-networks businesses, and academia – with demand for spaces exceeding capacity.

The one-day training provided a comprehensive introduction to various aspects of HVDC projects, covering the fundamental principles as well as advanced technical considerations involved in typical project lifecycle and delivery challenges, and typical simulation and testing processes. One of the highlights of the training was the live demonstrations of ongoing HVDC Centre projects, offering the participants a firsthand view of the cutting-edge technology and de-risking strategies employed in current and future developments. The interactive sessions allowed attendees to engage with experts and gain deeper insights into the practical challenges and solutions involved in HVDC project implementation.

The feedback from attendees was extremely positive, with many participants highlighting their appreciation for the depth of information provided and the opportunity to witness the live demonstrations. One attendee commented, "*Thank you for everyone's time today. I really enjoyed the slides; the morning slides introduced the elements of simulation which was a great lead into the physical aspects demonstrated in the afternoon. A really good and interesting course.*"

We will be hosting another instance of our popular "Introduction to HVDC and Project De-risking" course on Tuesday 26 November 2024. The course will be delivered in person in Cumbernauld. Availability of places will depend on the level of interest. Please register here: https://lnkd.in/e67PR5qg

See our website for further information on training and other events at the HVDC Centre: https://www.hvdccentre.com/events/

Linda Rowan ***Colin Foote***

The National HVDC Centre

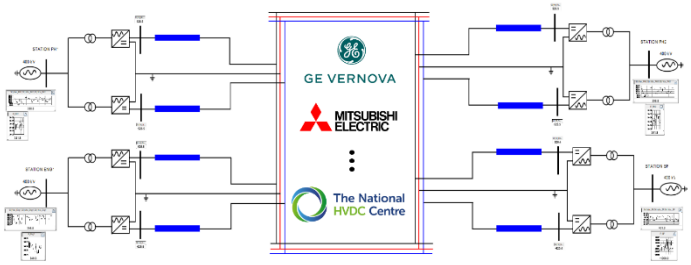
Delivery of MELCO black-box model for next phase of Aquila Interoperability testing

In the Aquila Interoperability project, The National HVDC Centre is working with leading HVDC vendors to test and demonstrate the ability of their converters to operate together in a multi-terminal HVDC (MTDC) system.

The Centre has developed an in-house suite of tests, which are being conducted in the RTDS/RSCAD simulation environment against vendor-provided black-box HVDC converter and control models.

Following the successful delivery and testing of the first vendor model, provided by GE Vernova, we are excited to announce the delivery of a second vendor model from Mitsubishi Electric Corporation (MELCO).

The National HVDC Centre is now preparing to commence the next phase of testing, which will begin with standalone converter testing with MELCO's converter model. The GE Vernova and MELCO models will then be incorporated into our 4-terminal MTDC system testbed, to undertake world-first multi-vendor multi-terminal HVDC interoperability simulations, respecting vendor control and protection IP throughout.



4-Terminal MTDC System Testbed in RTDS/RSCAD

The Centre continues to engage with leading HVDC vendors, with further demonstration of interoperability involving additional vendors expected before the end of the Aquila project.

Adam Scott

RTDS User Group Meeting

In October, Ben Gomersall represented the HVDC Centre at the European User group meeting for RTDS hosted by TU Delft in the Netherlands.

It was a great opportunity to meet other RTDS users and learn about the latest features for RTDS.

Highlights included:

- Catching up with Hitachi on the latest on HVDC replicas;
- Speaking to colleagues from Friedrich-Alexander University in Germany about setting up their equivalent of an HVDC Centre;
- Seeing a demonstration by TU Delft on using RTDS for cyber security, which we are exploring ourselves;
- Lots of great presentations on how other companies are using RTDS;
- Giving a presentation on our project on Black Start from offshore wind using RTDS; and
- RTDS Lego! *(See below).*

Thanks to RTDS for organising and TU Delft for hosting.

A small increase in our real time capability

And finally… this month we received our latest RTDS NovaCor (in Lego).

Perfect for block loading studies (RTDS Lego staff not included).

Ben Gomersall

Welcome

We are delighted to welcome three new Power Systems Engineers to the HVDC Centre team:

Ben Andrews joins the Centre as part of SSEN Transmission's Graduate Programme. He recently graduated with a BEng (Hons) in Electronic and Electrical Engineering from Robert Gordon University and is looking forward to gaining HVDC experience.

Shashank Shekar Mupparam joins the Centre with over 10 years experience in product and project development for grid control and protection for FACTS and HVDC systems. He is eager to apply his expertise in real-time modelling, integration, and testing to the Centre.

Yaxing Ren joins the Centre with over 8 years experience as a postdoctoral researcher and lecturer in Electrical Engineering and Automation. He brings expertise in real-time modelling and control system design to the Centre.

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