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## NEWSLETTER

### March 2025

Co-funded by the European Commission's Horizon Europe programme, "Enabling interoperability of multi-vendor high-voltage direct current (HVDC) grids" (InterOPERA) brings 21 European partners together to unlock the potential of HVDC grids and to enable the large-scale transition of the European energy sector.

## 23rd Wind & Solar Integration workshop

InterOPERA participated in the 23rd Wind & Solar Integration Workshop, held from 8 to 11 October in Helsinki. The event was organised by Energynautics and brought industry experts together from around the world to discuss large-scale renewable energy integration.

On 9 October, Sulav Ghimire (Siemens Gamesa) set out the InterOPERA project's main objectives, the challenges faced, and the latest updates on the real-time demonstrator. The presentation was followed by an interdisciplinary discussion on critical issues related to HVDC technology.



## Upcoming events

- [ACDC Global 2025](#) (17 - 19 March 2025, Birmingham, UK) - InterOPERA will give an overview of the most recent updates at the 22nd IET International Conference on AC and DC Power Transmission on 19 March at 14:15 (GMT).
  - [CIGRE Symposium 2025](#) (12 – 15 May 2025, Trondheim, Norway) - InterOPERA will host a dedicated HVDC session on 12 May at 13:30 (CEST).
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## Updates from Work Packages

### **Work Package 1 “Development of standardised interaction study processes and interfaces”**

Work Package 1 has published a report outlining the minimum requirements for platform preparation. It provides essential guidelines for system integrators on how to prepare the platforms to carry out interaction studies. And for ElectroMagnetic Transients (EMT) tool developers to understand the key features of these platforms.

The team also finalised the document outlining the interaction study process in detail. The report is now under review and is expected to be published before April.

At the end of 2024, RTE and TU Delft laboratories focused on the dry-run tests, both in real-time and offline. A crucial milestone was the delivery of the offline models by all vendors in November 2024. The first real-time replica was also installed at the TU Delft facility.

RTE and TU Delft are now carrying out single-vendor tests, exchanging feedback with vendors to address any problems detected. In the coming months, the remaining replicas will be delivered to both laboratories. Single vendor iterations will update the models before the labs are able to start the multi-vendor tests.

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### **Work Package 2 “Requirements and assessment of interoperability for multi-vendor multi-terminal HVDC systems”**

During this period, project partners finalised the second version of the "*Functional requirements for HVDC grid systems and subsystems*" report and compiled their feedback into a review protocol. The final version will be published soon.

This updated report further refines key functional requirements, ensuring that they are well-defined and verifiable through specific methods and parameters. It provides an in-depth examination of DC-Fault Ride Through (FRT) and dynamic control requirements for HVDC systems, aiming to establish recommended parameter ranges. It also introduces preliminary definitions of standalone tests and proposals for compliance evaluation criteria using equivalent circuits at DC-Point of Connection. The report also includes a review of the state of the art and existing standards with regards to insulation coordination.

A new analysis on control architecture is nearly complete and will appear as an Annex in the next update to this report. The annex covers the DC Grid Controller (DCGC) concept and compares it to DC Hub Controllers in a multi-TSO context. It analyses compliance with technical and non-technical constraints.

With this deliverable, Work Package 2 will conclude the first phase of the InterOPERA project. Meanwhile, the team has made significant progress in preparing the second phase, focusing on multi-vendor HVDC grid interaction tests. The project partners prepared and reviewed test protocols for 2- and 3- Terminal subsystems of the demonstrator, covering all critical steps for interoperability. In early 2025, experts are continuing to refine the test protocols, aligning them with the vendors, and finalising the time plan.

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### **Work Package 3 “Multi-vendor multi-terminal demonstrator project”**

The team is finalising the detailed specifications for all subsystems, a crucial reference point that will enable the vendors to begin their in-house engineering work. This milestone sets the foundation for the next steps, ensuring all stakeholders have a shared, clear technical framework to move forward.

The experts involved in HVDC grid system design studies have started dynamic system studies to complete the characterisation of the demonstrator’s behaviour. These studies will validate the demonstrator’s robustness and performance, ensuring it operates reliably under real-world conditions.

Meanwhile, the team has begun preparations for the test phase, working closely with TSOs and testing laboratories to monitor and control the testing process. This coordinated approach will ensure that all testing activities are aligned with project goals and executed under strict supervision.

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### **Work Package 4 “Cooperation framework and governance”**

Work Package 4 has published an updated Multi-Party Cooperation Framework based on input from the project partners. The report was sent to the European Commission and it is [now available](#) on the InterOPERA website.

The first version of the document on ‘governance structure – access to models and replicas’ has been sent for feedback to all project partners. This important document will give confidence to the partners to share their models without the need of NDAs. The next phase will be to put the process into practice under the InterOPERA project. The goal is to see where the processes could be improved to ultimately serve future commercial projects on this aspect.

In addition, during the final months of 2024, InterOPERA partners carried out a screening for patents within the functional requirements. Now the team is determining whether the functional requirements refer to any patents that could pose a risk for industry-wide adoption.

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## Work Package 5 “Procurement Strategy and Future Projects Preparation”

Work Package 5 has helped the project identify potential suppliers and assess the readiness of critical components needed for multi-terminal, multi-vendor grids. Based on these insights, they have also issued selected procurement options for the InterOPERA test grid and a cost-benefit analysis (CBA) model for review and contribution from all participants.

On the legal and contractual preparations, the team has formalised the necessary sub-tasks to achieve the project goals, the key contractual clauses and topics to focus on. They have also started work on risk management, responsibilities and integrating the multi-party cooperation framework (MPCF). Additionally, the team assessed the tendering procedures best suited for procuring multi-vendor, multi-terminal HVDC systems, highlighting their strengths and weaknesses.

Looking ahead, Work Package 5 will start defining technical specifications for multi-terminal multi-vendor systems as well as for coordination studies to mitigating inherent risks among parties associated with multi-vendor interoperability (e.g., project delays or cost overruns). These procedures will address the issues highlighted by previous InterOPERA reports and will be continuously updated until the end of 2026. Aside from tackling technical issues, the team aims to develop realistic and pragmatic procedures to foster the growth of multi-vendor schemes, thereby increasing the flexibility of network development for renewables.

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### Get in touch with us:

Want to learn more about InterOpera? Or have any questions about our work?

Get in touch at [info@interopera.eu](mailto:info@interopera.eu)

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