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## NEWSLETTER November 2024

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.

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### InterOPERA at IEEE Power & Energy Society General Meeting and CIGRE 2024



This summer InterOPERA took part in the 2024 IEEE Power and Energy Society General Meeting in Seattle. The event was a significant opportunity to demonstrate the project's progress and to discuss the future of HVDC (High Voltage Direct Current) offshore grids and their interoperability.

InterOPERA hosted a panel at the event, where experts presented the latest project results and discussed the key topics in detail.

InterOPERA also attended CIGRE 2024 in Paris. CIGRE is a global energy sector event, bringing industry leaders, engineers, researchers, and policymakers together to discuss the latest advances in high-voltage electricity transmission. InterOPERA presented its approach to advancing multi-vendor HVDC grids, a key component in the large-scale transition of the European energy sector.

More information about these events can be found [here](#).

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## Updates from Work Packages

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

The successful development of multi-vendor, multi-terminal HVDC grids hinges on having robust HVDC and wind power plant models and replicas that ensure seamless interoperability.

In September, Work Package 1 published a report outlining the minimum requirements for models and replicas that vendors should provide. System owners will use this report as a basis for future calls for tender. The report is available [here](#).

Work Package 1 is also continuing the work on the interaction studies process. The focus is now on model benchmarking, fault ride through studies, and Large-Disturbances in DC systems.

Work Package 1 experts presented and analysed the preliminary results in a panel session at the CIGRE B4 and at the 2<sup>nd</sup> technical workshop with the project Stakeholder Committee earlier this year.

This autumn the RTE lab installed replicas from two partners. And a number of offline models have also been delivered to TU Delft and RTE laboratories, which meant a smooth start to the dry-run phase. The first single vendor tests are already underway. In the next few months, more replicas will be installed at both RTE and TU Delft.

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

Work Package 2 has kept up the work on the basic functional requirements for multi-vendor HVDC grid systems and subsystems, which should be completed by January 2025. The focus now is on consolidating the functional requirements for the DC grid controller within a multi-TSO framework. This means addressing technical constraints, such as securing a robust system architecture and ensuring effective grid control to manage system behaviour, along with non-technical considerations, such as regulatory requirements for system control.

Significant progress has been made in developing a performance checking sheet for standalone compliance tests of HVDC converter units, with the goal of ensuring

continuous control. Recent efforts have concentrated on refining the characteristics of the DC grid equivalent used in these compliance tests.

When it comes to grid protection, work has focused on defining standalone tests of converters and DC switching stations. These tests looked at two converter designs – those with and without temporary blocking. The first test results will come in during 2025.

Work Package 2 experts are also preparing the launch of a new task: “Multi-vendor HVDC grid system integration tests - execution of interaction studies at AC and DC connection points”. The TU Delft laboratory, designated for HVDC manufacturers, is preparing to host the first replicas. Project experts are working with TSO laboratories to develop test protocols. These will be ready in the coming months.

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

By the end of the year, Work Package 3 will finish the network studies needed to characterise the behavior of the demonstrator project. These studies are necessary to predict the static, quasi-stationary, and dynamic response of the network to specific events that may occur on a real network with the same topology. With these studies, it is also possible to characterise the fundamental parameters of the network (resistances, reactances, and capacitances) and the subsystems. This will allow us to verify whether the chosen values are compatible with commercial standards and will allow the network to function smoothly once it is put into service.

HVDC manufacturers will develop detailed functional specifications for the demonstrator’s subsystems based on the studies’ simulations and the conceptual functional specifications finalised in July 2024.

**The first batch** of specifications will feature the ones for testing a demonstrator in a reduced format, with only three nodes and two offshore wind generation modules. This reduced configuration is very important since it makes the demonstrator replicable on both a software (simulations) and hardware (models) level. This will allow for the launch of the first interfacing studies between the different subsystems, both offline (software simulations) and online (also using hardware models).

The next series of specifications will cover the complete demonstrator configuration.

The project is also refining the list of functionalities and use cases that require testing to optimise the scope of the testing and develop an efficient work plan for the next phase. These tests will validate the interoperability of the HVDC transmission assets, ensuring the subsystems can effectively exchange information and perform as an integrated system.

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

Work Package 4 is focused on fostering multi-party cooperation within and beyond InterOPERA. And the Multi-Party Cooperation Framework is key to achieving that.

The Multi-Party Cooperation Framework aims to guide future multi-vendor, multi-terminal HVDC projects by clearly defining the roles, duties, and responsibilities of all relevant parties. Over the last few months, the first draft of the Multi-Party Cooperation Framework has been thoroughly reviewed by all partners. The revised document should be ready by the end of 2024.

Work Package 4 experts are also working on how to govern access to models and replicas in laboratories to ensure that the interaction studies for other Work Packages can be completed. Through this governance document, relevant partners can share models, replicas etc. whilst making sure that information distribution is controlled through a set out process without the need for additional NDAs.

Lastly, participants in the Patent Risk Task Force are moving ahead with their work on screening patents within the functional requirements. Specifically, the work on the mitigation process in case reference to patents are part of the functional requirements is ongoing. This should ensure that risks are minimised while a new version of the functional requirements will be published.

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

Work Package 5 organised a joint session with Work Package 4 during the last InterOPERA General Assembly in Oslo. Hosted at the Statnett Office, the workshop focused on the upcoming work on roles, responsibilities and processes in multi-terminal, multi-vendor (MTMV) grids as well as possible procedures on how to test these within InterOPERA.

Work Package 5 experts made significant headway in identifying critical components to be procured separately for MTMV grids. They started a comprehensive market screening to identify potential suppliers and assess the technology readiness of these components, ensuring that solutions meet the demand of future MTMV projects.

Work Package 5 has also started working on the legal basis for the procurement procedure, focusing on creating the legal and contractual preparations to ensure compliance, risk management, and sound collaboration between stakeholders within multi-vendor HVDC systems. The physical kick-off was hosted by Terna in Rome, and the objective was to identify essential contractual clauses and define the best tender procedures to procure the goods needed to deliver HVDC MTMV systems.



## Get in touch with us:

Do you want to learn more about InterOPERA or have questions on our work?

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

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