



NEWSLETTER October 2023

Third edition

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.

Joint READY4DC InterOPERA event



On 13 September InterOPERA held its first dissemination event in Vienna and online. The event was hosted by the CIGRE B4 Colloquium, an international conference on DC systems and power electronics and was jointly organised alongside the final event of the sister project READY4DC.

Almost 100 grid experts and stakeholders came together in person and online to discuss the future of HVDC technology and its role in the energy transition. InterOPERA experts showcased ongoing project activities across the different workstreams and the first findings on the work tasked with defining a demonstrator.

Prior to the event, the InterOPERA project coordinator, the SuperGrid Institute, presented the project to the Study Committee B4 in a closed door meeting, and then to the audience of the CIGRE Colloquium on 11 and 12 September respectively.

UPDATES FROM WORK PACKAGES

Work Package 1 "Development of standardised interaction study processes and interfaces"

Work Package 1 is tasked with laying out the steps and processes for the interaction studies, both offline and real-time. Experts will define studies to be completed, which parameters to run, the number of iterations, and other relevant aspects.

Since June, Work Package 1 work has focused on the first step of the process for offline simulation. Before carrying out the interaction studies, experts must ensure that the EMT models provided by the vendors have been correctly prepared. For example, Work Package 1 experts should ensure that there is no numerical conflict between the models provided by different vendors. This is important as such conflicts would bias the behaviour of the models during simulation and would prevent the use of these models in performing interaction studies. Also, the experts will make sure it is possible to run simulations which include all the models at the same time.

Once this process for offline simulation is defined, the labs will then get going with the simulations. In order to perform these simulations in the best possible way, ensuring the repeatability and traceability of the tests and a high-quality process, Work Package 1 experts will draft special test sheets to be used by the labs. Then, once they have completed all this work for offline simulation, they will repeat and adapt it for the real-time simulations.

Work Package 2 "Requirements and assessment of interoperability for multi-vendor multi-terminal HVDC systems"

Work Package 2 experts are working on formulating grid-forming functional requirements for a multi-vendor HVDC system. They also provide corresponding recommendations to Network Code HVDC, the EU regulation specifying technical requirements for HVDC systems, and with which HVDC projects in the EU have to comply.

From July to September, Work Package 2 has worked on and finished an internal draft report in which common understanding of grid-forming control is aligned and grid-forming functionality is formulated.

The report also includes information on how the grid-forming functionality could be applied in a HVDC system with different control modes on different components and different possibilities for the extra energy source. This is important because it investigates feasibility and puts forward solutions for implementing grid-forming control in a HVDC system, which aims to support stability in the onshore power system.

Based on the report, Work Package 2 experts will publish the final deliverable on the grid-forming functional requirements for HVDC systems with DC-connected Power Park Modules (PPMs) and recommendations to Network Code HVDC by the end of 2023.

Work Package 2 experts are also working on aggregating and assigning functions for the HVDC network subsystems, taking the Network Code on High Voltage Direct Current Connections (NC HVDC) and the IEC/CENELEC standard as an initial basis. More specifically, DC grid protection aspects have been integrated into the functional framework which is under development.

Work Package 3 "Multi-vendor multi-terminal demonstrator project"

Last August, Work Package 3 experts agreed on the demonstrator topology and grid configuration of the demonstration project. The demonstrator is the centrepiece of the InterOPERA project, since it is the infrastructure that will allow interoperability between technologies from different manufacturers to be tested.

Work Package 3 opted for a simple demonstrator design without including a range of technologies – to avoid over-complicating the preliminary studies. This decision also covers all real projects in the existing pipeline of several TSOs.

But project partners agreed to reconsider the possibility of a more complex demonstrator design, including several technologies, once the manufacturers prove and confirm their interoperability based on this first, simple design.

Work Package 3 experts have also selected the number of terminals onshore and offshore for the chosen topology. Manufacturers have granted the full interchangeability of their equipment, thus making it possible to plan insightful tests, among others, about system adequacy, multi-purpose functionality, and droop concepts.

The first report of Work Package 3 on defining the demonstrator will be put out in late October. At the same time, Work Package 3 experts are also working on an internal, second report on the preliminary description of the sub-system functionalities.

Work Package 4 "Cooperation framework and governance"

Last July Work Package 4 finalised the **Preliminary Multi-Vendor Cooperation Framework**, an internal framework that helps partners handle complex multi-stakeholder engagement across InterOPERA's lifespan. It covers the sharing of data and models that are important for project activities, intellectual property rights, competition etc.

At the same time, Work Package 4 experts have started work on the second cooperation framework, the **Generalised Multi-Party Cooperation Framework**. This framework will drive cooperation in future multi-vendor multi-terminal HVDC projects while clearly defining the roles, duties, and responsibilities of the different parties. The generic framework will also enable future expandability and dynamic system studies at early planning stages, and detailed control and protection development.

During August and September, Work Package 4 carried out stakeholder interviews with all 21 InterOPERA parties to gather insight on different legal and practical concerns that the generic framework aims to address.

InterOPERA partners were able to examine and discuss the results of these interviews, the so-called 'consolidated stakeholder insights' in Pulheim from 26 to 28 September where partners met to discuss developments in Work Packages 4 and 5.

Work Package 5 "Procurement Strategy and Future Projects Preparation"

Work Package 5 officially launched its activities this September.

Work Package 5 aims to establish procurement strategies and robust processes to facilitate technical and contractual interoperability across a multifaceted landscape of HVDC projects. These strategies and processes will help to accelerate the move from concept to realisation of multi-terminal, multi-vendor HVDC projects owned and tendered by different entities.

Work Package 5 has three main objectives. First, to assist TSOs and developers in creating procurement strategies that ensure interoperability in these projects, addressing responsibilities and liabilities. Second, to draft technical specifications, which can be used by TSOs and developers, enabling immediate tendering for such projects post-InterOPERA. Third, to develop effective tendering and project execution procedures, addressing topics such as pre-qualification, system integration, and interaction studies and commission while adhering to EU Procurement Directives.

On 26-28 September, the leader of Work Package 5, Amprion, hosted the kick-off meeting at the offices of its System Operation Center in Pulheim. Being in proximity to Amprion's real-time replica systems of HVDC and STATCOM systems already in operation, this kick-off helped to align partners' efforts, sharing valuable insights, and collectively paving the way to achieving the ambitious objectives set out.

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Do you want to learn more about InterOPERA or have questions on our work?
Get in touch at info@interopera.eu

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