



FINAL NEWSLETTER

DECEMBER 2023

READY4DC came to an end in November 2023 after 20 months of hard work, laying the groundwork for the development of the first multi-terminal, multi-vendor HVDC project in Europe.

The READY4DC project, supported by Horizon Europe, established a community of experts to exchange views and give recommendations on the major technical and legal aspects of designing and building an interoperable multi-vendor DC grid.

Through the work of four different Working Groups with open participation, READY4DC experts drew up targeted whitepapers consolidating the perspectives and views of all relevant sectors on the various technical, long-term planning and legal aspects.

READY4DC project partners would like to thank the experts who joined the Working Groups and shared their valuable input!

But, before saying goodbye...

READY4DC final dissemination event



READY4DC held its last event on 13 September 2023, in person 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 InterOPERA's first dissemination event.

READY4DC experts presented the key findings from the final READY4DC whitepapers to an audience of almost 100 grid experts and stakeholders – who came together to discuss the future of HVDC technology and its role in the energy transition.

Read more on the final event and take a look at the presentations [here](#).

The final whitepapers are out!

During the closing months of the project, our Working Group experts worked on the final versions of the READY4DC whitepapers, incorporating feedback and final input from the established community of HVDC experts – as well as the CIGRE experts that attended the READY4DC final event.

Whitepaper: Modelling, Simulation Framework and Data Sharing For Multi-Terminal Multi-Vendor HVDC Interaction Studies And Large-scale EMT Simulations

This whitepaper looks at how to manage interactions in Multi-Terminal Multi-Vendor (MTMV) HVDC systems. It shows how important it is to have a comprehensive understanding and to follow strategic approaches in carrying out interaction studies. The whitepaper also discusses the existing network codes and T&D Europe guidelines, encouraging further development on these bases.

Main Findings:

- Understanding interaction phenomena in hybrid AC/DC grids is key to optimal design and operation. The whitepaper backs the use of Electromagnetic Transient (EMT) simulation tools for interaction analysis due to their wide frequency spectrum coverage. It also stresses the need to extend the interaction analysis over the DC side of MTMV HVDC grids.
- A structured workflow is introduced for carrying out interaction studies in MTMV HVDC projects. The focus is on validating system interoperability through stakeholder collaboration, effective model integration, meticulous testing, and insightful analysis.
- Converter openness has an impact on methodological considerations and stakeholder responsibilities.
- The choice of simulation tools is vital for accuracy and performance in interaction studies.

Read the full document [here](#).

Whitepaper: Legal and Regulatory Aspects of a Multi-Vendor Multi-Terminal HVDC Grid

This report gives a comprehensive overview of key legal and regulatory considerations. Here are some of the main takeaways:

- Governance Adaptations: Discover how the governance framework requires tailored adjustments for Multi-Vendor Multi-Terminal (MVMT) HVDC grids. The whitepaper zeros in on specific challenges.
- Vendor Collaboration: Cooperation among vendors is not only possible, but crucial. Learn how to navigate this space while sticking to competition law principles.
- Shifting Risks and Liabilities: Moving from turnkey systems to a MVMT scenario alters the risk landscape. The white paper gives insight on how TSOs can effectively manage these changes.

Read the full document [here](#).

Whitepaper: Multi-Vendor Interoperability Process and Demonstration Definition

The report covers three main topics:

1. First, guidelines for placing the demonstration project in the European transmission grid. This covers selection criteria for the first MTMV demonstrator as well as the proposal of candidate projects. Additionally, a procedure for selecting functional specifications is put forward.
2. Secondly, it spells out the key milestones in implementing the first MTMV demonstrator.
3. Finally, a roadmap for future expansion beyond the demonstration project is presented.

Read the full document [here](#).

Whitepaper: Long-term View for HVDC Technology

This whitepaper considers the long-term prospects for HVDC technology, including state-of-the-art technology, a summary of the other READY4DC Working Group outcomes, socio-economic aspects with regard to circular economy, and most importantly an analysis of views in the READY4DC community about HVDC R&D priorities in the short and long term – for example HVDC system expansion. The main findings of the whitepaper are as follows:

- HVDC technology has become crucial in the evolving energy landscape, addressing renewable energy demands and transforming markets.
- Socio-economic considerations, including job creation and economic growth, highlight the importance of HVDC investment.
- The end-of-life phase needs careful planning, and insights from sectors like Offshore Oil and Gas for effective decommissioning.
- Aligning R&D with efficient deployment is important. Priorities include expandability, standardisation, interoperability, and efficient infrastructure operation.

Read the full document [here](#).

Whitepaper: Framing the European Energy System

This whitepaper looks at the role of HVDC onshore and offshore, HVDC grids as part of overall infrastructure, a vision for sustainable DC grids, as well as aspects beyond HVDC, such as MVDC and superconducting technology. The report found that:

- The North Sea countries' offshore wind target of at least 300 GW by 2050 will require a 10-fold increase in generation capacity from now to 2050. In the meantime, HVDC cable transmission is expected to be the main technology used to bring offshore wind power to shore.
- HVDC has several purposes onshore and offshore, and helps us to reach our renewable energy targets, keeping security of power supply under control, and reducing the overall cost of electricity.
- Based on current growth rates, projected future deployment shows an exponential rise in HVDC-based transmission capacity between now and 2050.
- As we see the first multi-terminal HVDC systems appearing that may be extended piece-by-piece, an incremental approach appears to be the most realistic way of building meshed MTMV HVDC grids in Europe, rather than through top-down planning and construction of a supergrid.
- Significant AC transmission grid reinforcements will be needed to distribute the power transmitted by the high amount of HVDC projects in the future.
- Meshed HVDC grids have the potential to cut costs and to consume less raw material since they need fewer converter stations compared with equivalent infrastructure which uses several point-to-point links.

Read the full document [here](#).

And don't forget to take a look at the whitepaper "How to unlock investments for the first full-scale multivendor HVDC systems demonstration", published earlier this year.

The report tackles the barriers to investments, puts forward solutions to overcome them and gives an overview of potential funding mechanisms. The aim is to help create the right climate for investments in MTMV HVDC demonstration projects.

Read more [here](#).

Read here all the READY4DC publications!

Goodbye READY4DC...and hello Inter-OPERA!

Where one chapter ends, another begins!

For the last 20 months, we've been laying the groundwork for InterOPERA ("Enabling interoperability of multi-vendor high-voltage direct current (HVDC) grids"). This will be READY4DC's sister project, looking to build on the work done by READY4DC, paving the way for the first HVDC multi-terminal, multi-vendor, multi-purpose real-life projects in Europe.

To get the latest updates and learn how InterOPERA will make future multi-vendor HVDC grids interoperable, sign up to the project newsletter [here](#).

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