



Deliverable 5.4

Report on stakeholder engagement event

WindEurope
July 2022



ABOUT READY4DC

The future electricity network envisioned by READY4DC will be characterized by a growing role of multi-terminal multi-vendor (MTMV) HVDC solutions within the current AC transmission networks both onshore and offshore. READY4DC is contributing to this synergistic process by enabling commonly agreed definitions of interoperable modelling tools, model sharing platforms, clear processes for ensuring interoperability, and an appropriate legal and political framework.



DISCLAIMER:

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AUTHORS:

Maria Kotofolou, Manager – Offshore System Integration, WindEurope

Vasiliki Klonari, Head of Energy System Integration, WindEurope

Capucine Vannoorenberghe, Project Manager, WindEurope

REVIEWERS:

Ilka Jahn, READY4DC Coordinator, RWTH Aachen University

Antonello Monti, READY4DC Coordinator, RWTH Aachen University



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1 CONTEXT

1.1 THE READY4DC FIRST DISSEMINATION EVENT

On 13 July 2022 the READY4DC project consortium organised the first dissemination event of the project.

The high-level objective of the event was to present the ongoing activities of the READY4DC EU-funded project to a wide audience of relevant stakeholders and to create awareness about the work performed in each Working Group within the project. Furthermore, the event aimed to steer the discussion on the challenges of an interoperable, multi-vendor HVDC system and to facilitate the creation of a community of experts that will develop recommendations for an interoperable and expandable DC grid in Europe.

The specific objectives of the event were to:

- Inform participants of the scope, objectives and progresses achieved by each Working Group;
- Engage experts from various sectors e.g. HVDC technology manufacturers, Transmission System Operators, the wind energy industry, policymakers, system integrators, other relevant technology providers, academia further in the discussion on interoperability, DC technology and the future of the European grid; and
- Dig deeper into the technical, planning and legal challenges in the development of an HVDC grid.

This report on this first stakeholder engagement event is deliverable D5.4 described in Work Package 5, task 5.2. The objective of this report is to summarise the discussions that took place during the event, to comment on the engagement of relevant stakeholders, to reflect comments and questions posed by the audience and to recommend how the outcomes of the discussions can be used by the READY4DC consortium and its Working Groups.

1.1 THE AGENDA OF THE READY4DC DISSEMINATION EVENT

READY4DC First Dissemination Event	
10:00 – 10:05	Introduction <ul style="list-style-type: none">• Antonello Monti, RWTH Aachen
10:05 – 10:15	Feedback by the European Commission <ul style="list-style-type: none">• Mark Van Stiphout, DG Energy
10:15 – 10:30	Overview of the READY4DC project <ul style="list-style-type: none">• Ilka Jahn, RWTH Aachen
10:30 – 11:05	WP1: Modelling, simulation framework and data sharing for multi-vendor HVDC interaction studies and large-scale EMT simulation <ul style="list-style-type: none">• Louis Filliot, SuperGrid Institut• Presentation & open discussion
11:05 – 11:40	WP2: Legal Framework for the Realization of a Multi-vendor HVDC Network

	<ul style="list-style-type: none"> • Vincent Lakerink, University of Groningen • Presentation & open discussion
11:40 – 11:45	Break
11:45 – 12:20	WP3: Multi-vendor Interoperability Process and Demonstration Definition <ul style="list-style-type: none"> • Nico Klötzl, Tennet • Presentation & open discussion
12:20 – 12:55	WP4: Framing the future European Energy System <ul style="list-style-type: none"> • Ilka Jahn, RWTH Aachen • Presentation & open discussion
12:55 – 13:00	General Q&A and closing <ul style="list-style-type: none"> • Antonello Monti, RWTH Aachen

1.2 OVERVIEW OF STAKEHOLDERS' PARTICIPATION

The first READY4DC dissemination event took place online and was open for participation to all interested stakeholders. WindEurope and other Consortium partners communicated about the event in social media and announced it on the project's website and their networks of experts.

To be able to participate, interested stakeholders had to subscribe to the project's dissemination list which currently counts for 352 experts. This list includes experts that represent the TSO industry, HVDC and many other grid technology suppliers, wind turbine manufacturers and wind farm developers and operators, policymakers, academia, consultants from the EU, the UK, the United States, Canada and other regions globally. Additionally to this list of experts, all the experts currently participating in the READY4DC Working Groups were invited.

In total 90 participants joined the online event with a very active engagement throughout its duration. Experts from the dissemination list located in the United States or Canada did not manage to participate due time zone issues.

The presentations shared during the event and the recoding of the event have been uploaded in the project's website and are publicly available [here](#).

2 SUMMARY OF THE DISCUSSION

2.1 INTRODUCTION

Antonello Monti (RTWH Aachen) opened the event. He welcomed all the participants and introduced himself as the coordinator of the meeting. Mr Monti explained that READY4DC is a Coordination and Support Action (CSA) project and thus, its main target is creating an 'ecosystem' of people interacting and contributing to fulfil the ambition for the project. He made a brief review of the agenda before giving the

floor to Mark Van Stiphout to give the European Commission's perspective and expectations from the project and the overall research activity around multi-terminal, multi-vendor HVDC grids.

2.2 FEEDBACK BY THE EUROPEAN COMMISSION

Mark Van Stiphout (DG Energy) highlighted that READY4DC is a very important CSA, as it creates a community engaged in DC grid technologies that will be crucial for the offshore wind system of the future. He also stressed the fact that the **targets** of the European Commission to both tackle the climate change and reduce EU's dependency on Russian gas are the driving force for renewable energy investments, accelerating the developments of the last years.

Especially in the case of offshore wind, the speed of developments is unprecedented. This is facilitated by the fact that there is huge expertise and a growing community of experts in Europe that can address the significant technical challenges entailed in building an integrated DC grid.

Furthermore, Mr Van Stiphout made specific reference to the fact that READY4DC is a major step towards InterOPERA, a demonstration project that has recently been selected for receiving an important Horizon Europe grant. Many of the engaged stakeholders are common between the READY4DC and InterOPERA project. These projects are part of the wider policy framework that EU has started with the Green Deal and the RePowerEU programme and with the Offshore Renewable Energy Strategy communicated in November 2020.

Mr Van Stiphout underlined the need to ensure that the experience, specifications, and standards being developed in READY4DC and later tested in InterOPERA will be followed and supported across the EU. He also highlighted the importance of the success of READY4DC project as it is paving the way for other HVDC projects that are being set up under Horizon Europe. Finally, he stated the determination of the European Commission to create supporting structures to ensure that the READY4DC project partners and Working Groups can work in the best way possible.

2.3 OVERVIEW OF THE READY4DC PROJECT

Dr **Ilka Jahn** (RWTH Aachen) gave an overview of the READY4DC project by explaining its structure and general vision. She gave the general characteristics of the project (type, budget, duration) and explained that the expected outcome is to deliver support for all the HVDC community stakeholders (HVDC manufacturers, TSOs, wind turbine manufacturers and wind farm developers, other relevant technology suppliers and academia) during all the preparatory phases that should lead to a demonstration project for de-risking the technology and enabling the installation of the first Multi-Vendor, Multi-Terminal HVDC system with Grid Forming Capability in Europe.

Dr Jahn also presented the partners and the operational concept of the project. She talked about how different tasks are distributed among the project partners and how these tasks will result in white papers produced by all the experts participating in its four Working Groups (WGs).

Finally, she explained the Working Group governance structure and stressed that the number of Working Group members is unlimited so all interested stakeholders are invited to join by subscribing to its dissemination [list](#).

Susanna Onyemauwa (Ofgem) asked about the members and the countries represented in the steering group WG 4 Framing the future European Energy System. Mr Monti replied that the whitepapers produced by WG 4 will be reviewed by all the project partners and WG participating experts. He also stressed that as all for WGs participation to WG 4 is open to all interested stakeholders.

Ms Onyemauwa asked for a further clarification on how the whitepapers will be accessed by the participants. Mr Monti replied that each WG has a mailing list open for everyone to subscribe and all the relevant information will be distributed via the mailing list.

2.4 WP1: MODELLING, SIMULATION FRAMEWORK AND DATA SHARING FOR MULTI-VENDOR HVDC INTERACTION STUDIES AND LARGE-SCALE EMT SIMULATION

Louis Filliot (SuperGrid Institut) presented the Work Package 1 (WP 1) covering the modelling, simulation framework and data sharing for multi-vendor HVDC interaction studies and large-scale EMT simulation. He focused on the need to validate in simulation a multi-vendor, multi-terminal HVDC project at each stage of its whole life cycle. In this context, several models from different stakeholders must be integrated and different simulation tools will be used. The process includes sharing models and data between different entities but without disclosing any content that has IP value, is sensitive or confidential.

The objectives of the WP are to:

- a) Propose a modelling and simulation framework analysing the technical barriers as well as legal and methodological aspects;
- b) Identify all issues and challenges to perform such modelling and simulation studies; and
- c) Analyse some possible solutions to overcome these issues.

The experts participating in WG1 are the ones to deliver the tasks of WP 1. WG 1 will produce a whitepaper offering technical advice on modelling approaches and data exchange but producing specific technical guidance and conclusions. The whitepaper will focus on a state-of-art approach, listing ideas, possible solutions to challenges, while analysing advantages and disadvantages.

Mr Filliot also explained the organisational details and structure of WG1. WG1 has approximately 30 members (3 vendors, 9 TSOs, 4 software suppliers, 4 research laboratories, 4 academics and 4 consultants, among others). The specificity of WG1 is that it also has software suppliers as members.

Mr Filliot also presented the main issues that arise in the process of the simulation validation at each stage including modelling and process issues as well as legal aspects of data sharing. He also gave an example of a specific question that was discussed extensively during the last WG meeting that is '*Which methodology/organisation to perform multi-vendor studies?*'.

Frank Martin (Siemens Gamesa Renewable Energy) expressed his concern on whether it is feasible all these topics to be addressed in a one-year timeframe. Mr Filliot replied that the scope of the study is not to provide proof for a specific recommendation but rather provide a set of high-level recommendations. This will be feasible considering the already significant feedback by WG 1 experts.

The READY4DC project partners have already started working on these topics together with the future InterOPERA project partners thus a significant amount of work that has already been done and can be reused. He complemented that there are various issues included in the project and the level of contribution by the members will define how detailed the approach of each topic will be. Mr Monti added that READY4DC is a CSA project and as such it will not deliver new R&D work. It will mostly rely on what experts will contribute from their current knowledge and experience.

Mr Monti also asked Mr Filliot to elaborate on the overlaps around legal aspects between the work performed in WG1 and WG2. Mr Filliot replied that WG1 deals mainly with giving technical recommendations on how to exchange data without being exposed to reverse engineering. On the other hand, WG2 works on the topic of legal protection during this data exchange.

2.5 WP2: LEGAL FRAMEWORK FOR THE REALIZATION OF A MULTI-VENDOR HVDC NETWORK

Vincent Lakerink (University of Groningen) presented the WP 2 analysing the legal framework for the realisation of a multi-vendor HVDC network. WG 2 has been analysing the state-of-art of regulation and legislation relevant to the READY4DC topics. After identifying the regulatory and legislative gaps, WG 2 will identify guidelines for the creation of a legal framework to support the coordination and governance of multi-vendor HVDC projects. The results of this work will be presented in a whitepaper.

Mr Lakerink focused on two main topics: standardisation and IP law concerns. Standardisation is a very broad term that includes interoperability and is governed by the European Competition Law. As standardisation entails vague terms, WG2 will attempt to fill in the context by gathering input from all relevant stakeholders to determine how risky interoperability standards are in terms of competition. Regarding IP law concerns, there are three types of IP that are of interest for the WG: patents, trade secrets and know-how.

To identify industry concerns surrounding IP associated with multi-terminal, multi-vendor HVDC systems, WG2 created and distributed a questionnaire to all relevant stakeholders. This includes various questions regarding IP law concerns that a stakeholder might have. WG2 will analyse these concerns and legal risks to identify gaps in regulation and legislation. Subsequently, recommendations on improving the legal framework will be formed.

Mr Lakerink also presented the topic of guidelines on the legal framework of coordination and governance. This topic is also part of WG2's focus area although there has not been much work done on that yet. WG 2 aims to define and suggest a Governments' board that might adequately determine the roles, responsibilities, liabilities, and procurements.

At present WG 2 engages around thirty experts representing technology vendors, TSOs, SuperGrid Institut and WindEurope.

Susanna Onyemanwa (Ofgem) asked whether there are specific risks or challenges already identified regarding a potential cooperation between EU and UK entities developing together a multi-terminal multi-vendor HVDC project. Mr Monti commented that this is an issue that has not been discussed yet. Mr Lakerink added that there might have been changes in the UK law after BREXIT which could pose challenges but he will investigate it and follow up in more detail.

Ms Onyemanwa also highlighted that, working on a Multi-Purpose Interconnector (MPI) pilot scheme in the UK, they can foresee potential regulatory issues especially with certain assets within the MPI depending on whether the MPIs are in GB or EU waters. Mr Lakerink suggested to follow up and investigate the topic further.

Gen Li (Cardiff University) stressed that there is a reference for the first multi-terminal HVDC grid in the project description. Mr Monti replied that the project itself does not refer to a specific grid but it attempts to identify and address challenges regarding the whole framework of a multi-terminal HVDC. He also referred to the InterOPERA project that has recently been selected and most of the READY4DC partners will follow closely and will quite possibly be the first such demonstrator in the EU.

John Moore (Independent adviser) highlighted the regulatory challenges that a multi-terminal grid crossing borders or having multiple grid owners even within the same country might pose.

Mr Lakerink responded that standardisation, governed by the EU Competition Law, has been the means for resolving such issues for several decades and is widely accepted in the EU. When it comes to trade secrets and IP law, there has been generally fragmentation among the Member States compared to the implementation of the EU Competition Law. Procurement has been partly harmonised but also in this case legislation and regulation are fragmented regarding liability. Mr Lakerink also stressed that there is some common regulation and legislation among Member States but this requires further investigation in particular for a new type of system as the one discussed in READY4DC.

2.6 WP3: MULTI-VENDOR INTEROPERABILITY PROCESS AND DEMONSTRATION DEFINITION

Nico Klötzl (TenneT) stated the objectives of WG 3 which are:

- a) To define a planning process for multi-vendor HVDC demonstration projects;
- b) To work on the relevant political, legal and regulatory frameworks (e.g. grid connection codes) and standards;
- c) To define guidelines for bringing such demonstration projects in the European transmission grid into the TYNDP process; and
- d) To define a roadmap for the future beyond demonstration projects.

A whitepaper will be produced by WG3 to address these objectives. In this context, the whitepaper will define:

- a) A path for agreement among various involved stakeholders in multi-terminal multi-vendor HVDC projects;
- b) Roles, responsibilities and recommendations for overcoming all the barriers; and
- c) A procedure for selecting functional specifications for such projects

Work Package 3 is split into tasks which include the planning of the first multi-terminal multi-vendor HVDC demonstration project, a framework for placing demonstrators across the European grid and a strategy for going beyond demonstration projects and escalating the deployment of such commercial projects. The first two tasks have already started and their outcomes will be used to follow with the third task.

Mr Klötzl presented the progress of WG3 which has already collected a few ideas and questions to resolve about planning multi-terminal multi-vendor HVDC demonstration projects. Mr Klötzl gave two examples of such questions to be investigated by WG 3.

WG3 has around 16 participants on a regular basis per meeting who represent mostly TSOs, research institutes, vendors and wind farm developers.

Kaushuk Hore (Orsted) asked whether the task on placing a demonstration project in the European grid aims to approach relevant stakeholders and encourage them to move forward with such a project or to look for stakeholders that already have such projects in preparation or development. Mr Klötzl stressed that the main idea is to define elements that will make multi-terminal multi-vendor HVDC projects beneficial for the European grid. In this context, a high-level discussion has already begun in the WG and a collection of ideas on what is needed and what is beneficial for the European grid.

Mr Hore also asked whether the WP refers to a physical project or only to simulations. Mr Klötzl Klotz replied that there will be neither a physical demonstrator nor a simulation performed in this context and the WP will limit to a high-level specification.

Susanna Onyemauwa (Ofgem) commented that according to her understanding the WGtask will address how such a project could run and be regulated. Mr KlötzlKlotz confirmed while and Mr Monti stressed that the findings of the READY4DC project will be used to develop the InterOPERA project.

Peter Jan Randewijk (Energinet) asked how the READY4DC is supposed to provide questions to be addressed in InterOPERA since the two projects will run in parallel for some time. Mr Monti replied that InterOPERA will start later this year or at the beginning of 2023. The READY4DC project will aims to gather all the available knowledge on the issue and form a hub of information for InterOPERA. He also highlighted that that a continuous dialogue between the two projects is foreseen while they will both be running.

Daniel Thielking (Ampt) asked if the project focuses exclusively on the integration of wind energy or if it also considers the possibility for the DC grid to integrate other renewable energy sources. Mr Monti highlighted that READY4DC focuses on wind energy because it is connected to other projects that the European Commission connects with wind energy. Nevertheless, the interoperability of the HVDC grid does not depend on what is connected on the other side. On the same point Dr Jahn stressed that more general topics such as long-term planning and **long-term** view on DC technology are covered in WG4.

2.7 WP4: FRAMING THE FUTURE EUROPEAN ENERGY SYSTEM

Dr Jahn presented the project structure and highlighted that WG4 extracts information from the other WGs to shape a vision for the future HVDC system in Europe. Therefore WG4 will provide a framework for the exploitation of the project outcomes.

Three whitepapers will be produced by WG4 on the following topics:

- a) How to unlock investments for the first full-scale multi-terminal multi-vendor HVDC system demonstration
- b) Long-term view for HVDC technology
- c) Framing the European energy system (on- and offshore) architecture and topology: future role of meshed DC structures and barriers.

Dr Jahn mentioned that WG4 is also involved in the BRIDGE and SetPlan activities supporting the creation of an HVDC community that will be providing input to InterOPERA. Typically 16-18 persons attend the bi-weekly meetings of the WG4 mainly representing TSOs, technology vendors, wind farm developers, consultancies, universities and research institutes.

Maria O’neill (Supernode) asked how open the project is towards innovation for example if DC-connected wind turbines could be part of the discussion at this point. Mr Monti replied that READY4DC is open to different technologies as the main purpose of the project is to collect as much information as possible to present the current situation in the field to the European Commission. As a result, there is no exclusion of any kind if the contribution refers to the “DC culture” which is the core of the project.

Dan (Unknown affiliation) highlighted that China has already built 40,000 km of HVDC and has developed many relevant tenders so there might be interested information to be shared with the READY4DC project. Mr Monti stressed that any knowledge that can be brought to the group is welcome. He also highlighted that the situation in Europe is slightly more complicated at a political level for developing multi-terminal multi-vendor projects. Nevertheless, technical lessons from relevant initiatives globally can be very helpful.

Peter Jan Randewijk (Energinet) highlighted that China has already a multi-terminal HVDC system running but a single-vendor one. In his affiliation they are looking for information coming from China in this regard. Mr Monti highlighted that the greatest challenge of the READY4DC project is achieving interoperability in multi-terminal multi-vendor DC grids that also connect multiple countries with different relevant regulations in place.

2.8 GENERAL Q&A AND CLOSING

Mr Monti highlighted the continuous and active engagement by the participants during the discussion. He invited everyone to continue the discussion through the READY4DC WGs by subscribing [here](#). He also stated that the purpose of the consortium is to ensure that the outcomes of the project will constitute an overarching comprehensive picture and that the READY4DC project will really unlock the future of DC grids in Europe and beyond.

3 CONCLUSIONS

The participants in the first dissemination event of the READY4DC project engaged in very interesting and helpful discussions for the next steps of the project. Among the discussed questions, the following ones should be addressed by the READY4DC Working Groups:

- Does the consortium foresee specific legal and regulatory challenges in case of a multi-vendor multi-terminal HVDC project developed by a cooperation of EU and UK entities depending on whether the asset is in British or EU waters?
- How can the consortium make sure that the READY4DC findings cover not only the integration of wind energy with DC grids but also of other renewable energy technologies?
- Will the READY4DC project also consider DC-connected wind turbines in terms of interoperability?