InterOPERA 2nd dissemination event

"Towards the interoperability of multi-vendor HVDC grids"

InterOPERA
Enabling multi-vendor HVDC grids

22 October 2025, 15.00 – 16.00 CEST

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AGENDA

15.00 – 15.05	**Welcome** • Sébastien Silvant, Supergrid Institute
15.05 – 15.15	**Keynote speech** • Eric Lecomte, DG Energy, European Commission
15.15 – 15.35	**InterOPERA Phase I – What we've achieved so far** • Patrick Düllmann, Siemens Energy • Carmen Cardozo, RTE
15.35 – 15.55	**InterOPERA Phase II – What's coming next** • Oliver Pohl, Amprion • René Lindeboom, Ørsted
15.55 – 16.00	**Closing remarks** • Riccardo Longo, WindEurope

Questions?

Contact us at
info@interopera.eu

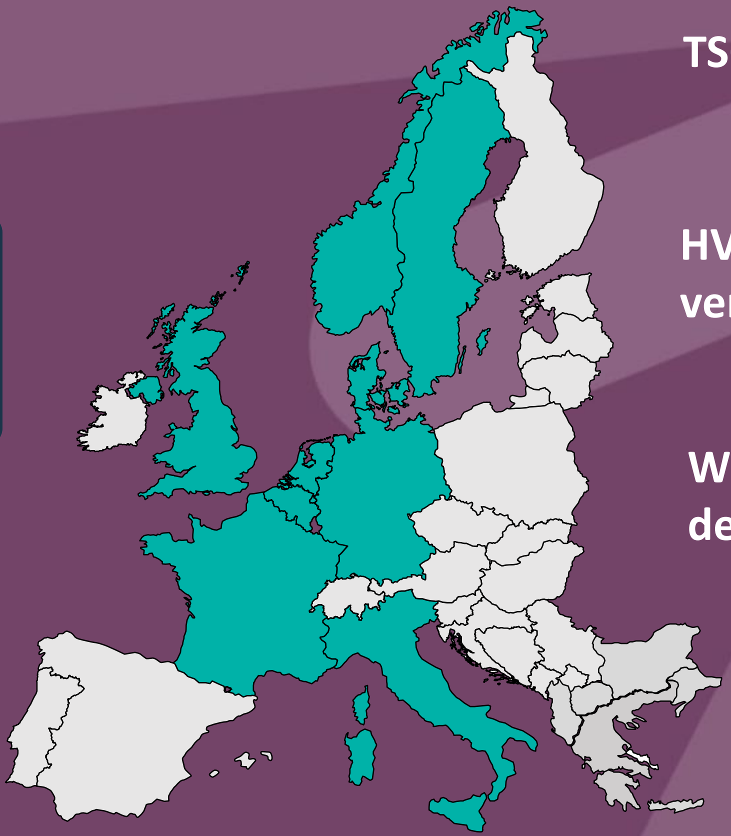
Start date
1 January 2023

End date
30 April 2027

Main target:
To enable multi-vendor HVDC grids in Europe

70 M€ budget

EU contribution
~ 50 M€



TSOs
amprion, Rte, ENERGINET, TenneT, 50hertz, Terna Driving Energy, Statnett

HVDC vendors
SIEMENS energy, GE, T&D europe, Scibreak, Hitachi Energy, MITSUBISHI ELECTRIC

Wind developers
Wind EUROPE, Ørsted, equinor, VATTENFALL

WTG vendors
Vestas, SIEMENS Gamesa

Research & innovation
university of groningen, SuperGrid Institute Shaping power transmission, TU Delft

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Technical frameworks *(functional specs, grid design, Demonstrator)*
+ **Non-technical frameworks** *(procurement, cooperation, regulation)*
= **Real-world deployment** of multi-vendor HVDC grids in Europe.

Coordinated by
SuperGrid Institute (France)
Grant Agreement 101095874

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InterOPERA Phase I
What we've achieved so far

WP3 – Multi-Terminal Multi-Vendor Demonstrator project

Task 3.3 – Demonstrator detailed functional specifications

Task 3.6 – Demonstrator HVDC grid design studies

Enabling multi-vendor HVDC grids

Patrick Düllmann, Siemens Energy

Carmen Cardozo, RTE

22 October 2025

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1

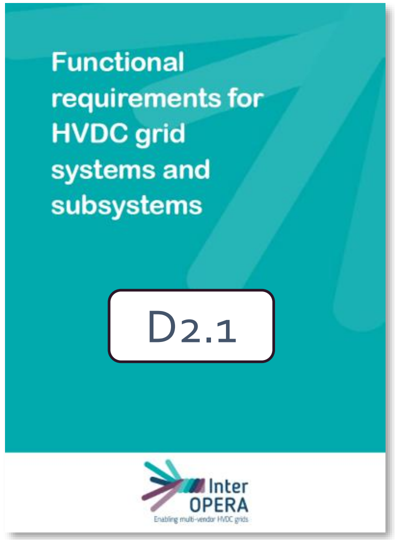
Demonstrator detailed functional specifications

Applying the InterOPERA functional framework to the demonstrator

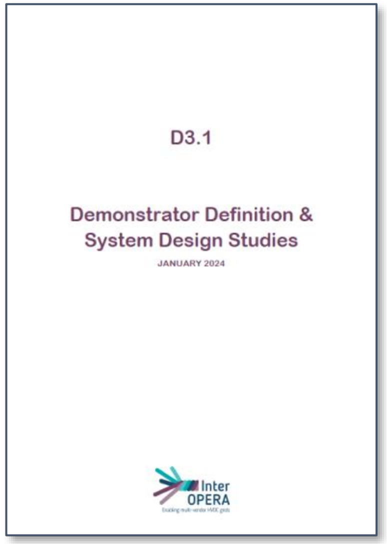
From a functional framework → detailed specifications

Functional framework
Basic subsystems requirements

Demonstrator definition & system objectives



Assign functions & capabilities to subsystems



Detailed subsystems specifications
at DC-POC (high voltage interfaces), incl. DC grid equivalents
at communication interface (signal list)

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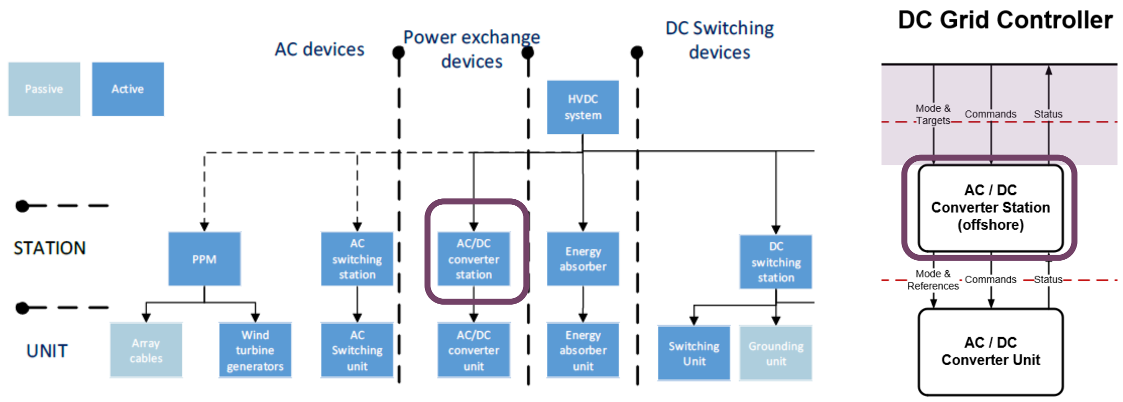
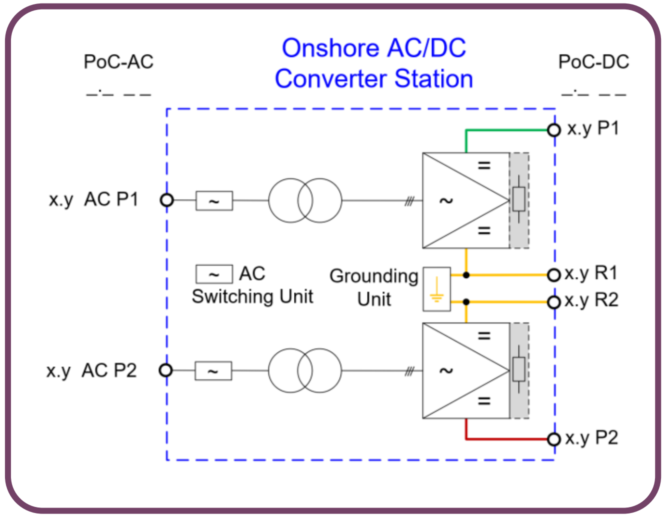
Subsystem definition & InterOPERA Demonstrator (3T)

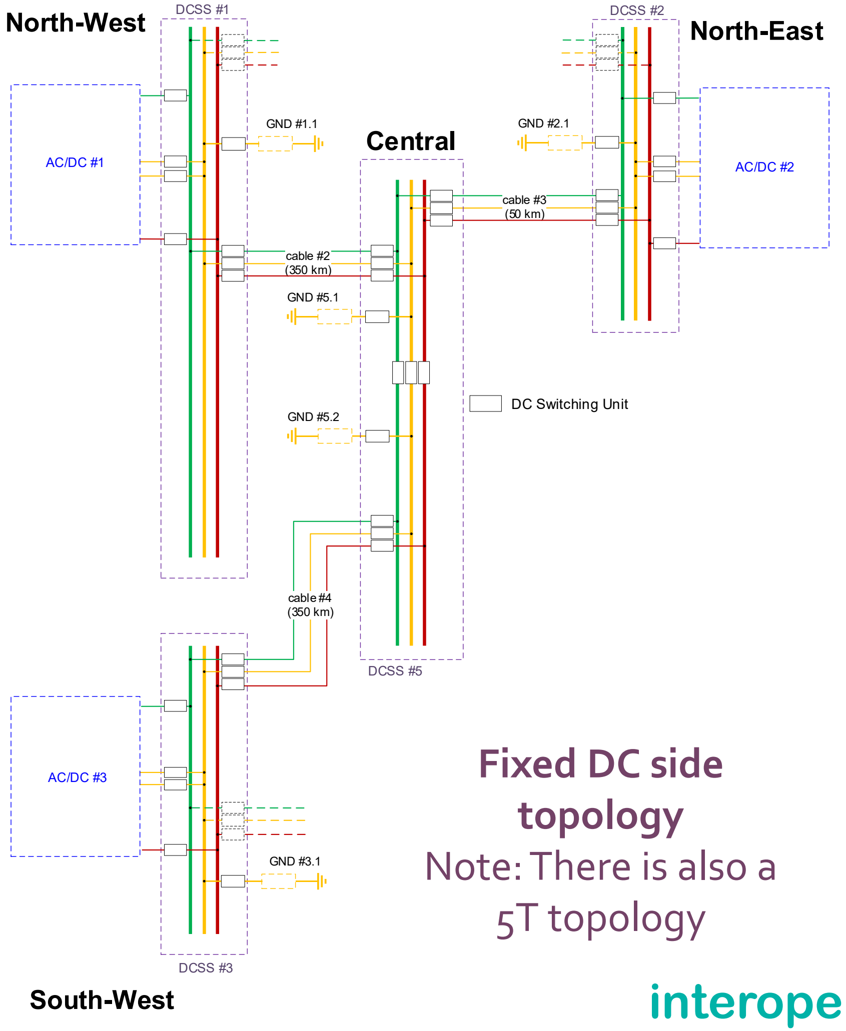
Functional framework / architecture



Example:



Demonstrator definition



Fixed DC side topology

Note: There is also a 5T topology

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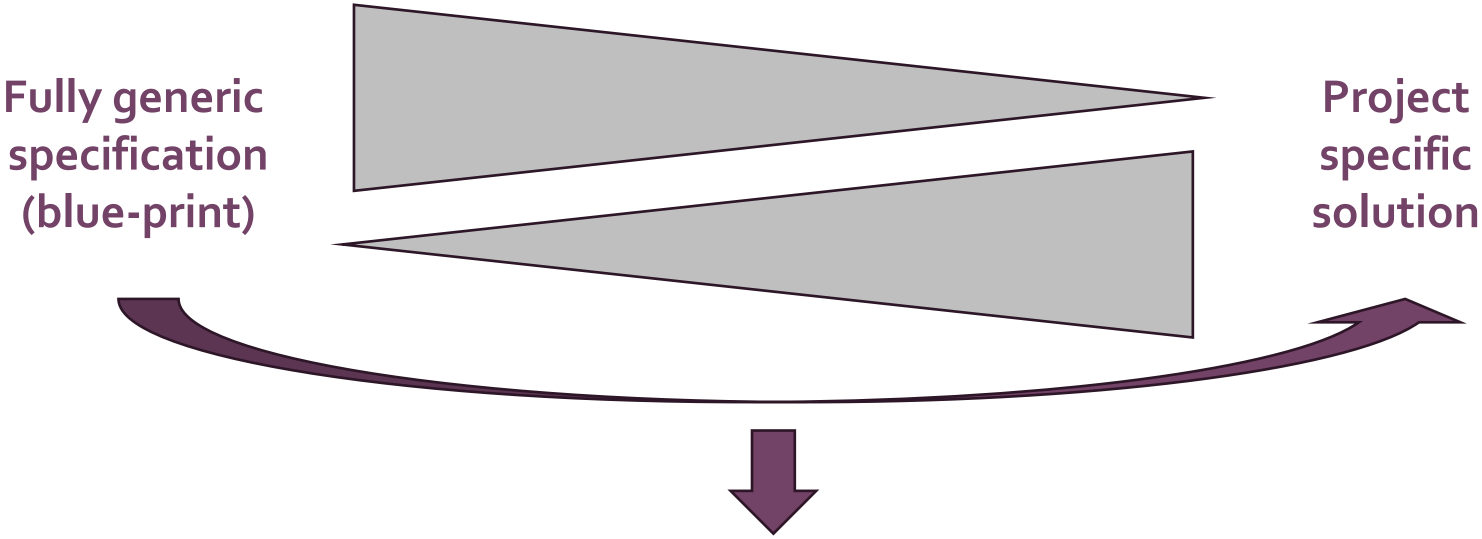
From a functional framework → detailed specifications

Needed: Detailed subsystem specification

- ❖ Includes specification of behaviour at the interfaces

Challenges to be addressed:

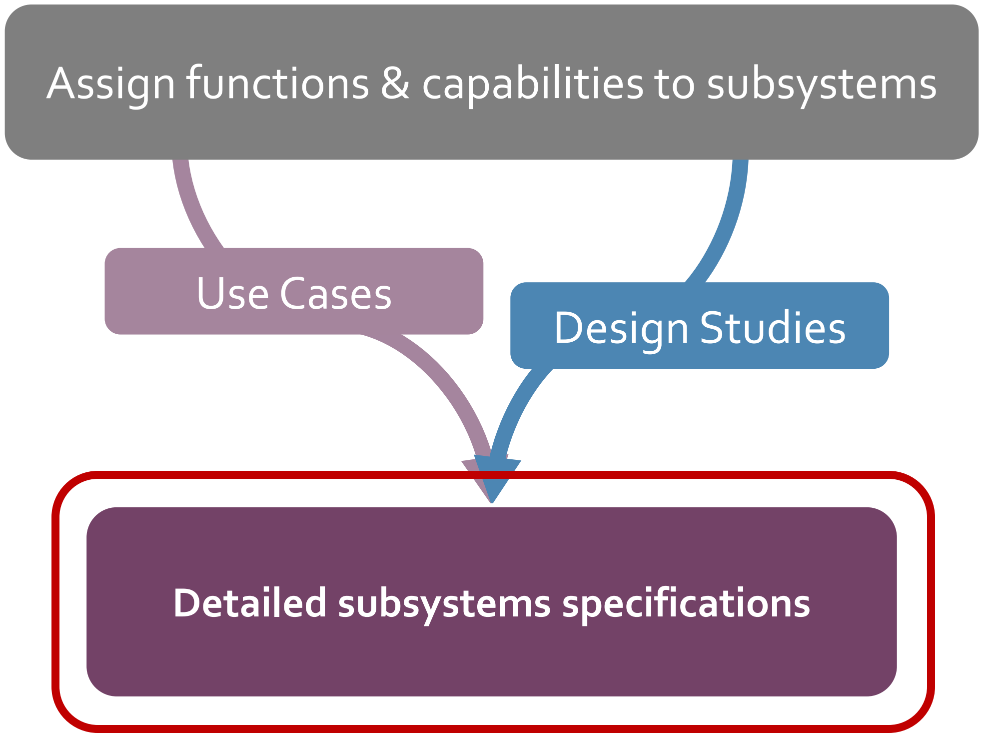
- ❖ New and exploratory functionalities
- ❖ Realisation / development of technical solutions in a given time frame



Approach followed in InterOPERA : Close the gap

- ➢ Trade-off: As generic as possible, as specific to demo as needed
- ➢ Derive & Describe methodologies to create „system-specific“ specifications in line with the generic functional framework
- ➢ Allow updates to specifications after demonstrator studies

Refine use cases & design parameters to close the gap!



- **We defined** use cases to break down the InterOPERA project objectives into a functional framework

- **We carried out System-Level Design Studies** to specify the necessary design parameters e.g. voltage & current bands, operational limits, network control parameters & grid protection settings

☞ **Second part of this presentation ☺**

Detailed Functional Specifications: Overview

Overall Demonstrator Definition

- Topology
- Grid Characteristics
- Control Philosophy
- Protection Philosophy

Annex 01
Demonstrator
Use Cases & Features

Annex 02
DC
Cable Data

Annex 3.3.2
DC
Grid Controller

Annex 3.3.3
AC/DC
Converter Station
(onshore / offshore)

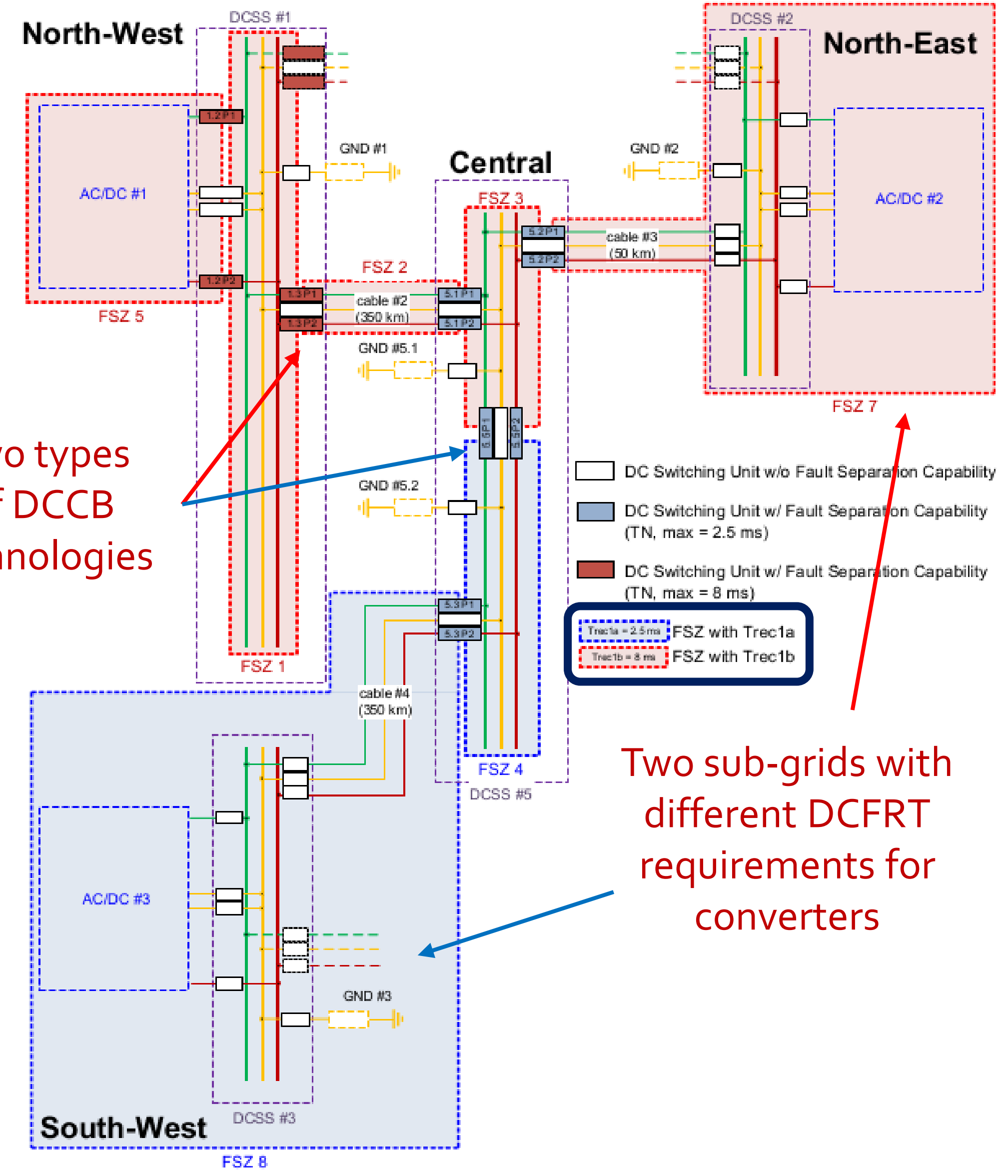
Annex 3.3.4
DC
Switching Station

Annex 3.3.5
AC
Onshore Testbench

Annex 3.3.6
AC
Offshore Testbench
&
Power Park Modules (PPM)

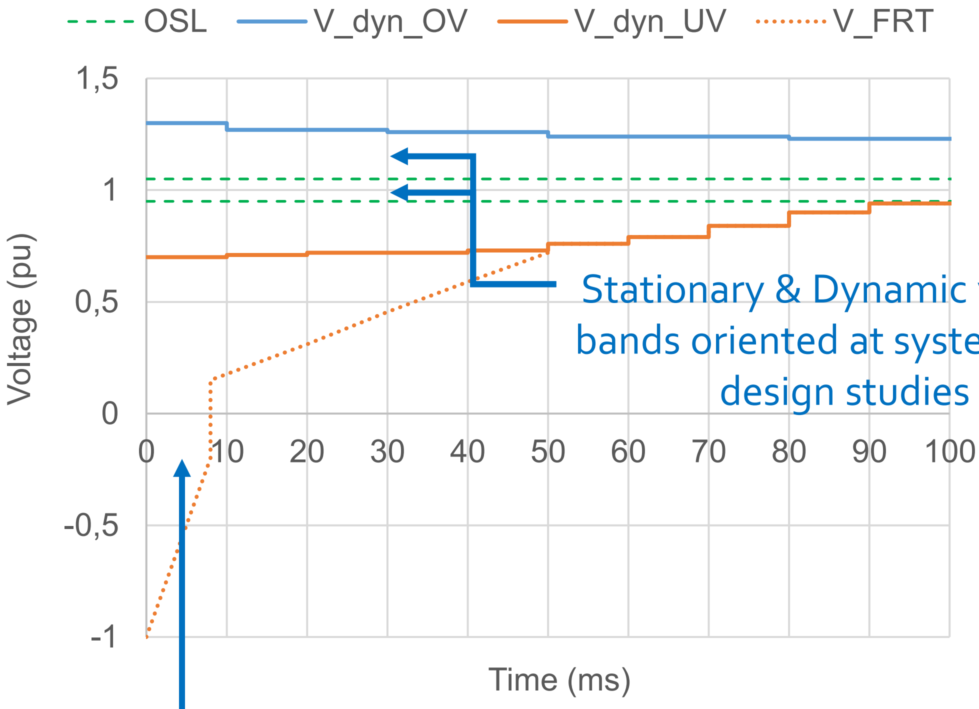
Example in the following

Example: Specification of DC fault reactions



Two types of DCCB technologies

Two sub-grids with different DCFRT requirements for converters



Stationary & Dynamic voltage bands oriented at system-level design studies

Converter DC-FRT: Quantification of specification from framework

Functionally split specifications for subsystems

AC/DC converter station

DC switching station

Detailed specifications

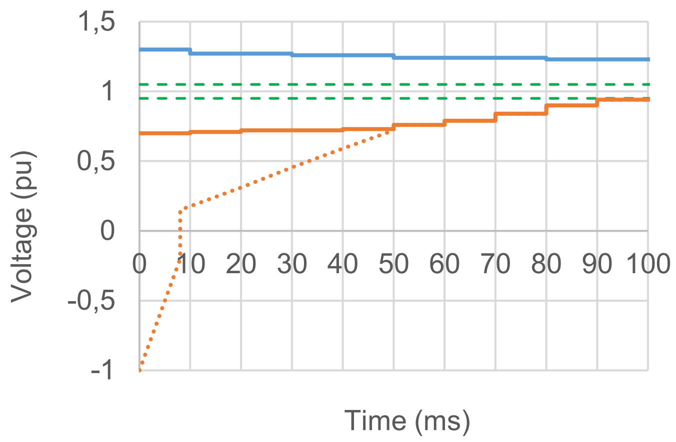
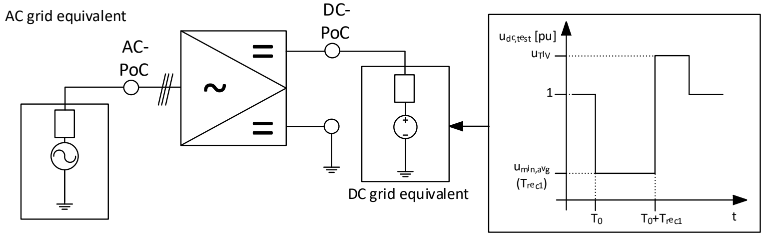
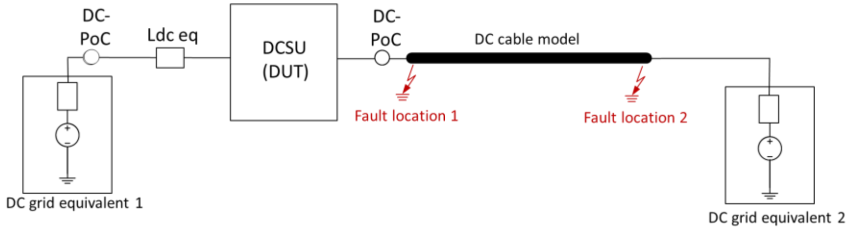


Table 4-1: DC switching unit functions (preliminary specifications)

Item #	Function	High voltage DC system (P_n)	Neutral DC system (R_n)
1	Maintenance earthing*	X	X
2	Transmission unit earthed**	X	X
3	Voltage isolation	X	X
4	Current making	X	X
5	Peak current suppression	X	
6	Residual current breaking	X	X
7	Fault separation	X	
8	On-load switching	X	
9	DC voltage measurement	X	X
10	DC current measurement	X	X
11	Fault zone identification	X	

Standalone conformity tests





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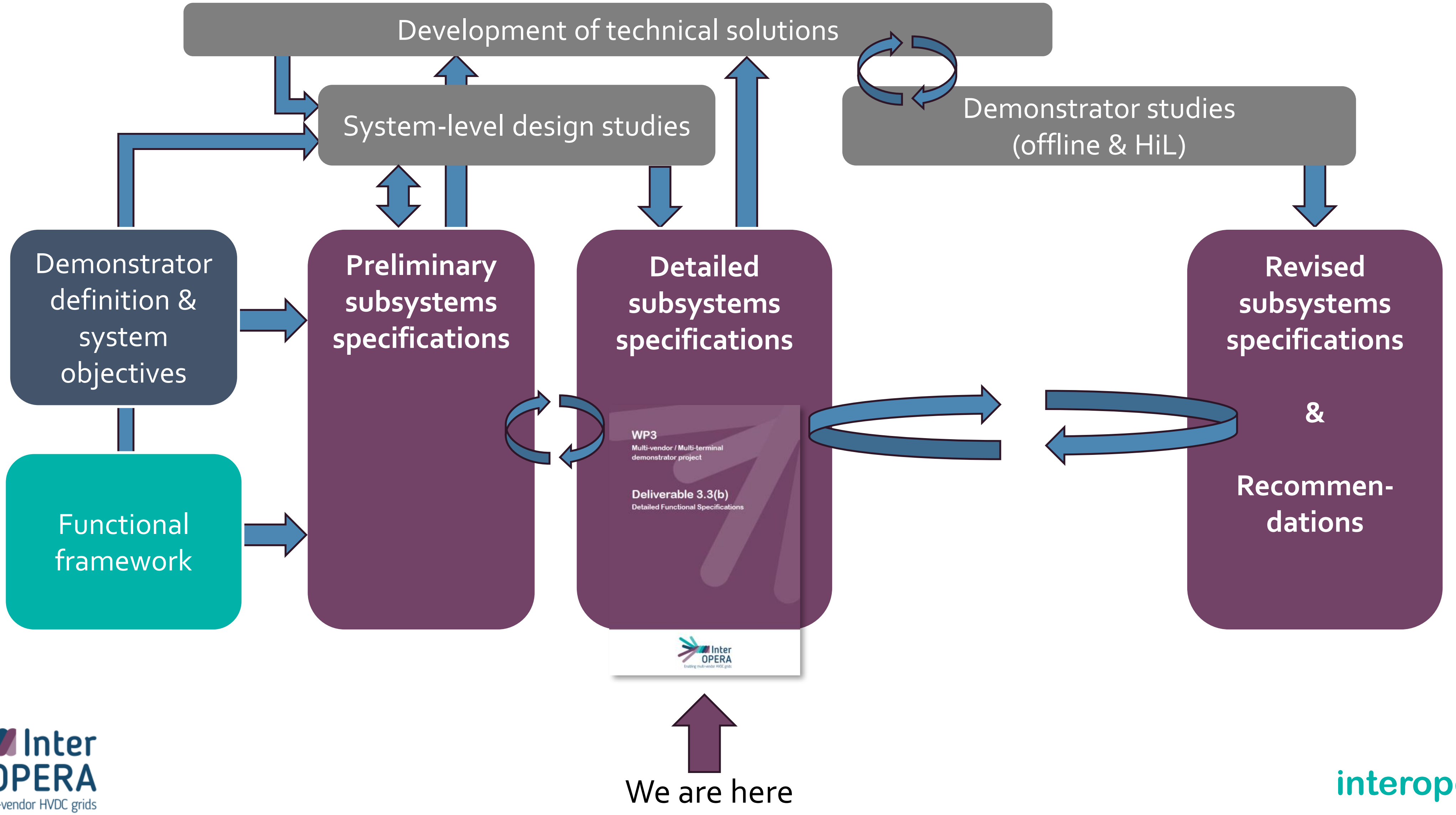
Functional specification is an ongoing process



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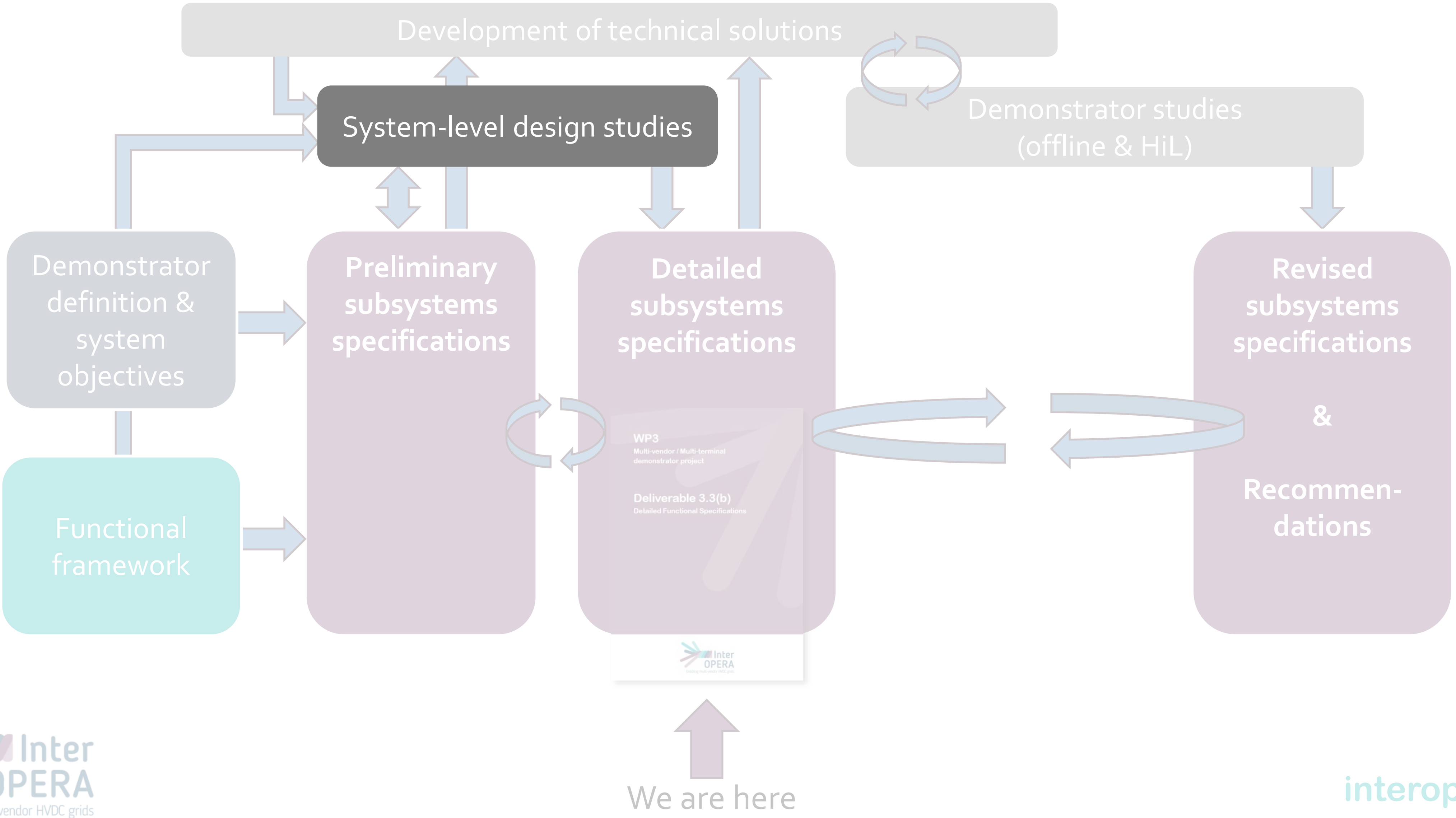


2

Demonstrator HVDC grid design studies

Quantifying electrical stress during contingencies to ensure demo reliable operation

What are HVDC grid design studies about?

Early-stage, system-level studies, based on **generic models** aimed to support detailed subsystem specifications, focusing on informing primary design decisions.

Why do we need them?

New design constraints as we move from point-to-point links to multi-terminal grids

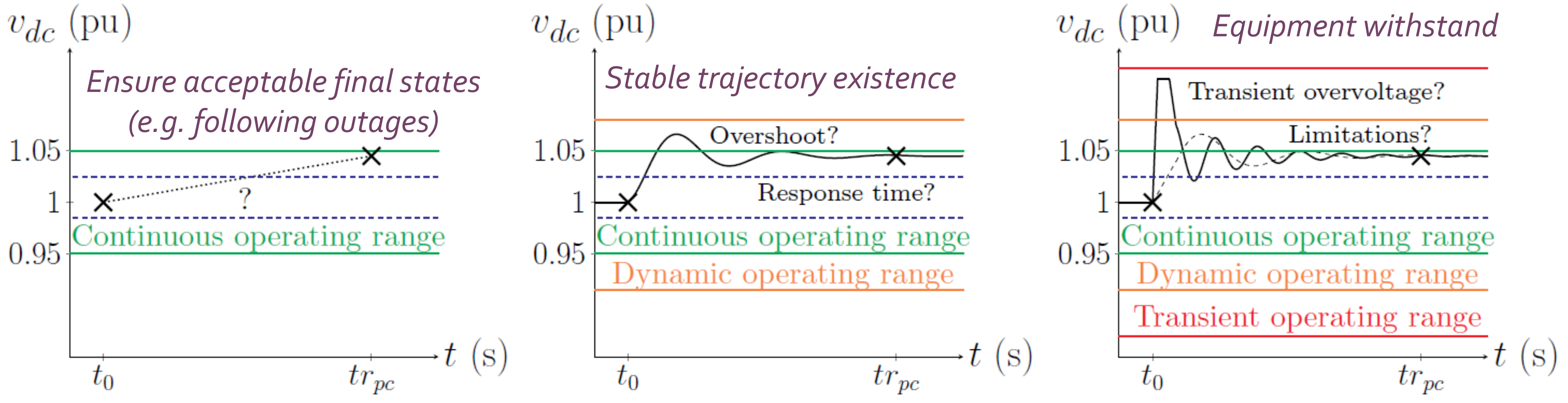
- P2P HVDC links have two states: operational (e.g., AC-FRT) & blackout (e.g., DC fault)
- MT HVDC systems, parts of the grid must survive terminal outages & DC disturbances

The system must be *designed* for it!

How?

A three-level study package

1. DC Load flow study & contingency analysis
2. Dynamic Study
3. Transient Study



Challenge: outcomes strongly depend on **key assumptions**, which must be technology-inclusive, conservative, yet reasonable.

Insufficient design space: incompatibilities

Risk of overdesign & technology exclusion

Conservatism Level

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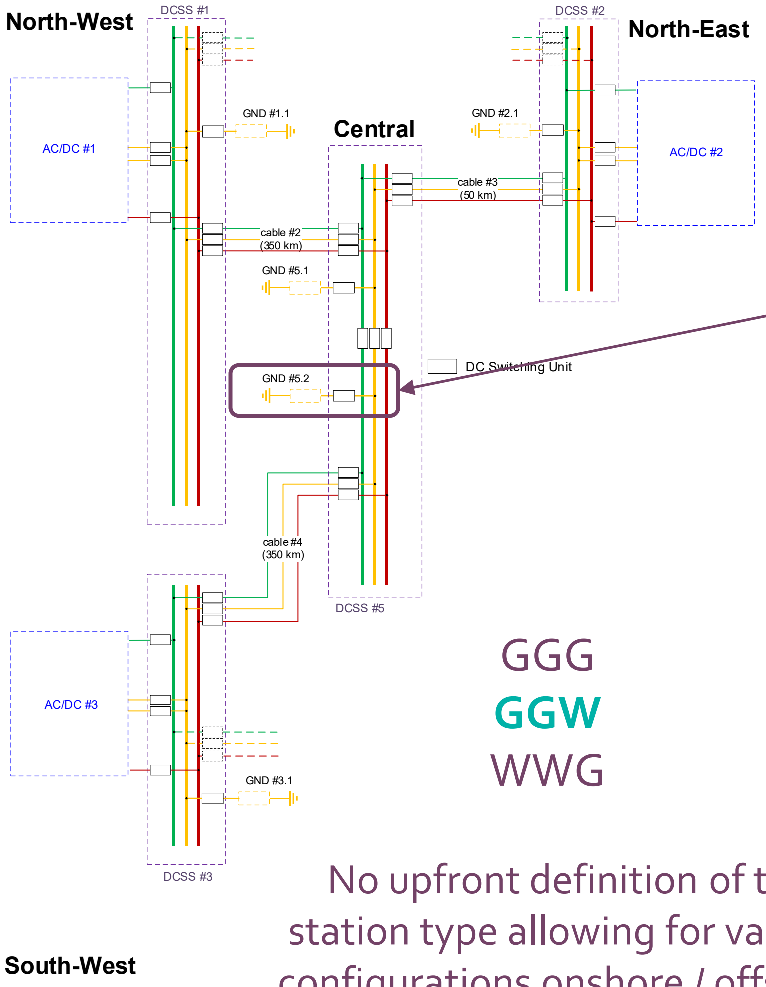
→ We started with an assumption alignment phase



GGG
GGW
WWG

No upfront definition of the station type allowing for various configurations onshore / offshore

E.g. Continuous operating range [475 525] kV ([0.95 1.05] pu)

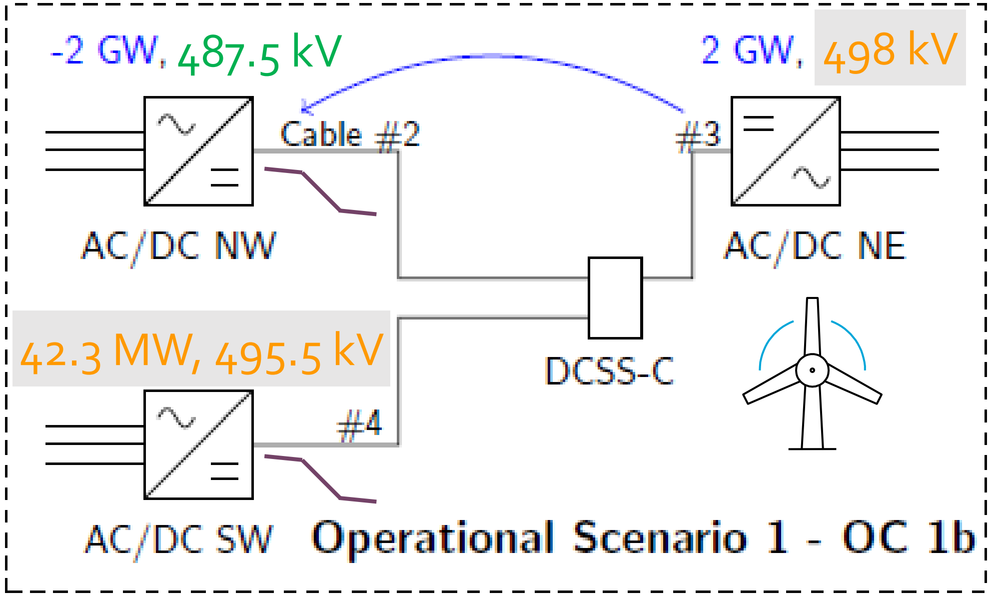
1. Agreement on **system-level parameters** and DC cable data[1]
2. Neutral system grounding at DCSS #5
3. AC grid connection assumptions
4. AC/DC converter capabilities (e.g. control)
5. DCCB capabilities (fault neutralisation time)
6. Fault separation zones & subgrid definition
7. Consideration of DC-FRT requirements

[1] Enhanced Modelling and Parameter Determination of HVDC Cables Using Practice-Oriented Methodology | CSE

1 – DC Load Flow-based design study process

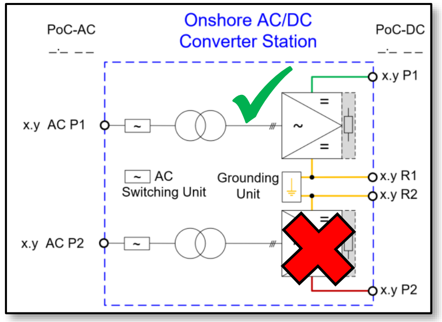
1. Define relevant scenarios, covering worst-case operating conditions
2. Compute DC voltage and power in missing nodes (through load-flow calculations)
3. Assign DC voltage control capabilities (e.g. multi-segment pole-wise droop on onshore stations)

E.g. GGW

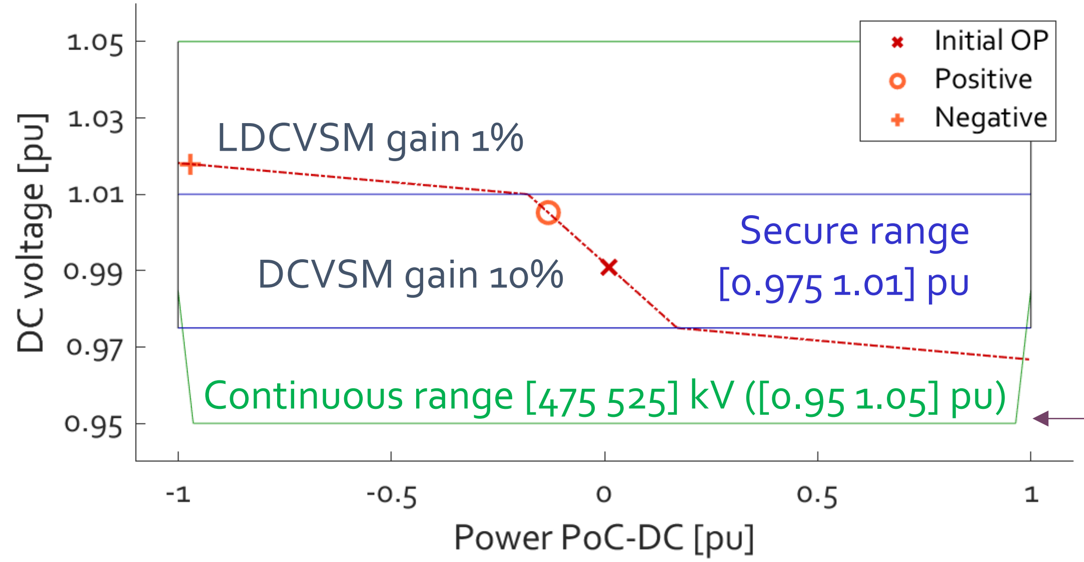


1 – DC Load Flow-based design study process

Criteria (N-1 rule): *the system must remain with the continuous range after outages*

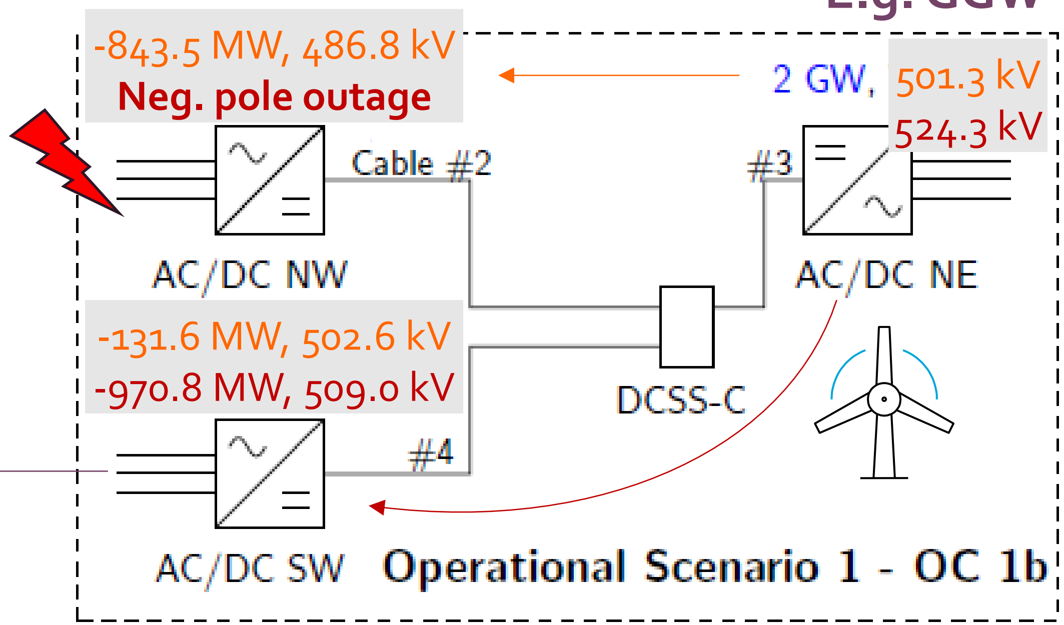


1. Define relevant scenarios, covering worst-case operating conditions
2. Compute DC voltage and power in missing nodes (through load-flow calculations)
3. Assign DC voltage control capabilities (e.g. multi-segment pole-wise droop)
4. **Conduct contingency analysis** (propose *operational* settings: secure range & droop gains)

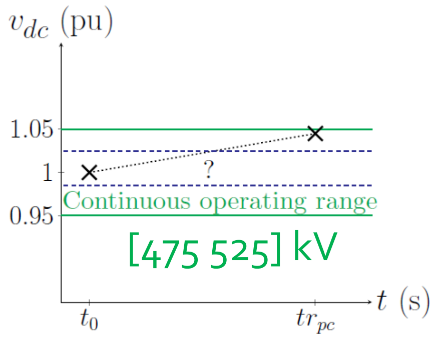


SW

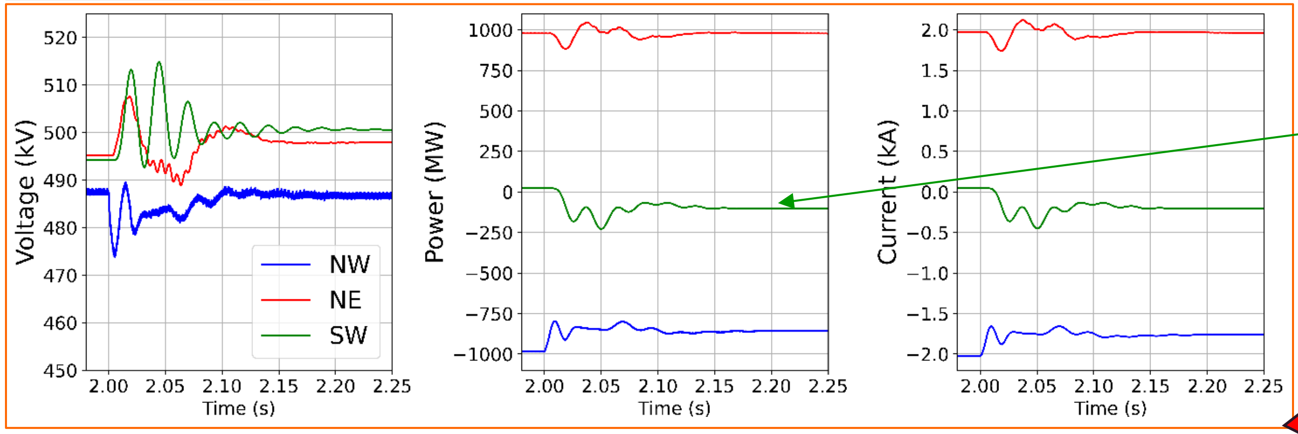
E.g. GGW

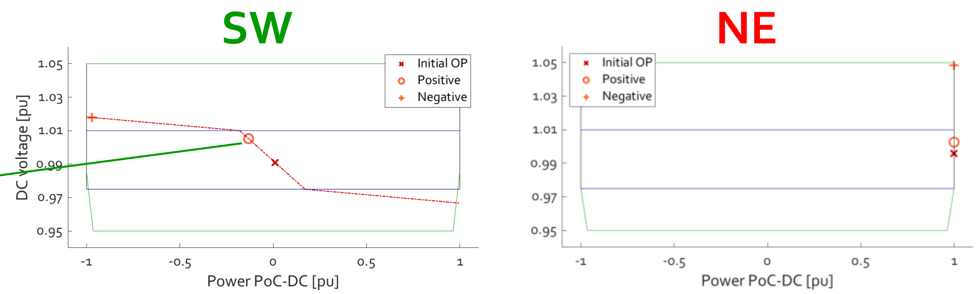


Final states ✓
Trajectory?

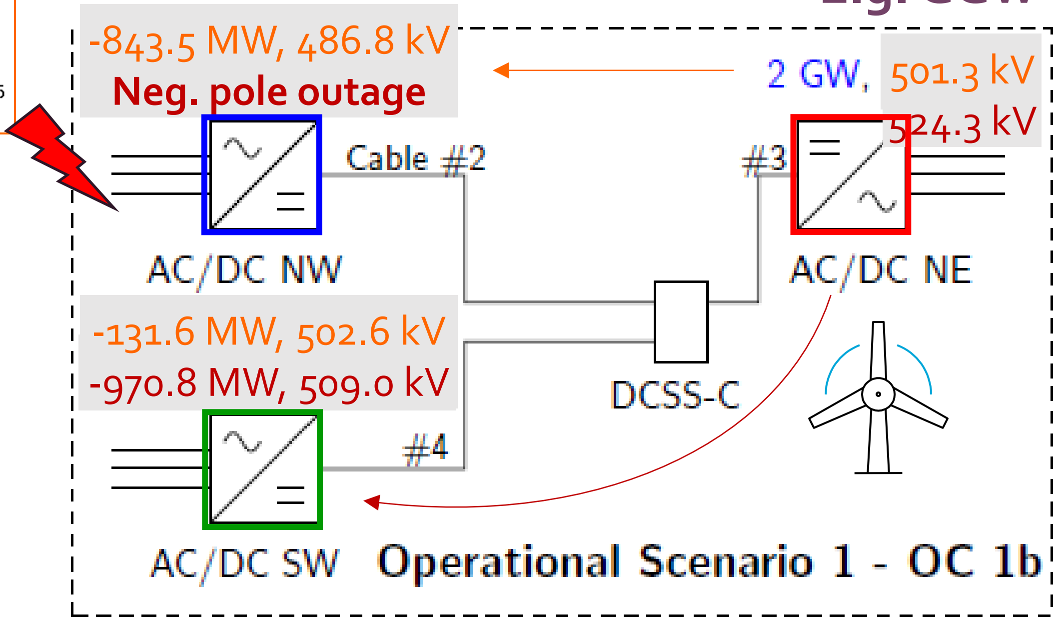


Healthy pole mild disturbance

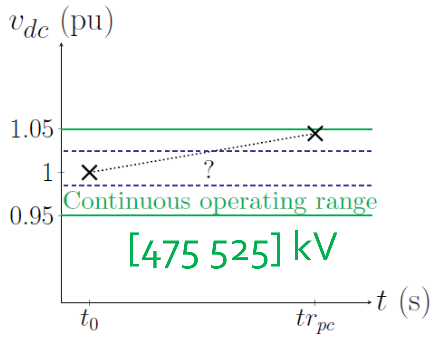




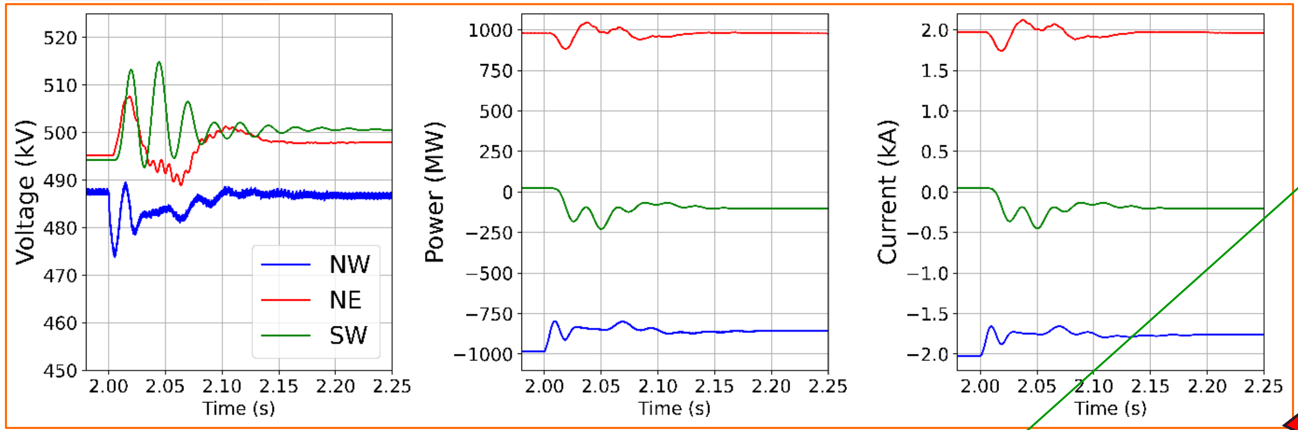
E.g. GGW

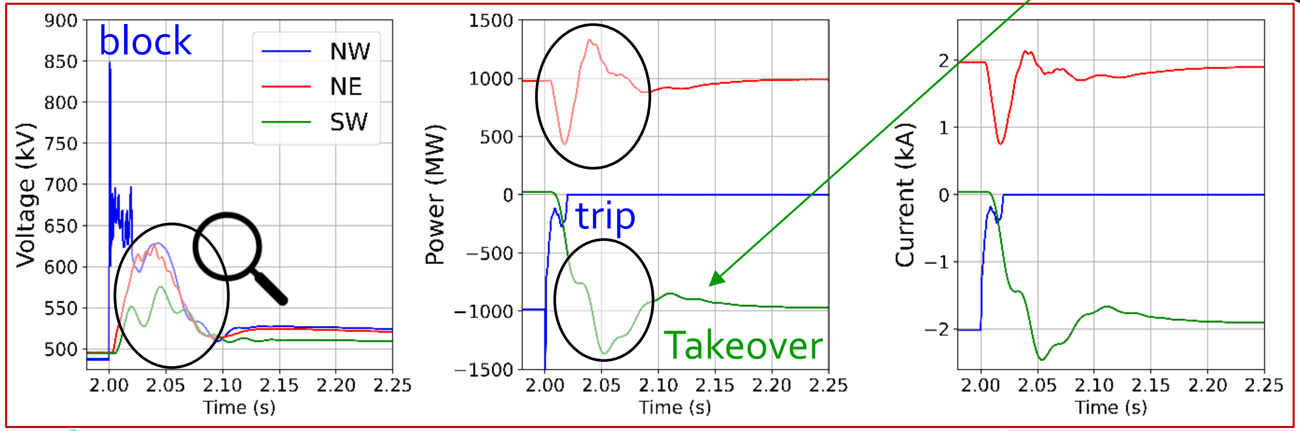


Final states ✓ Trajectory?



Healthy pole mild disturbance

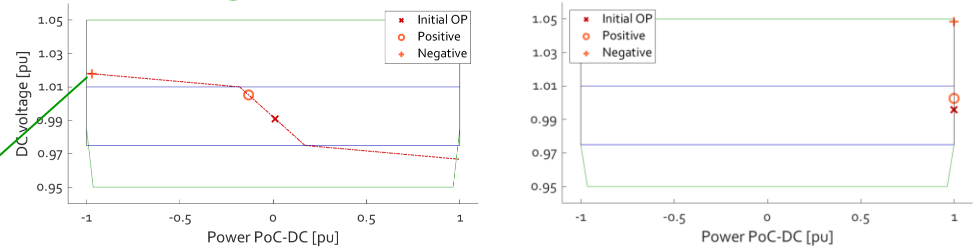




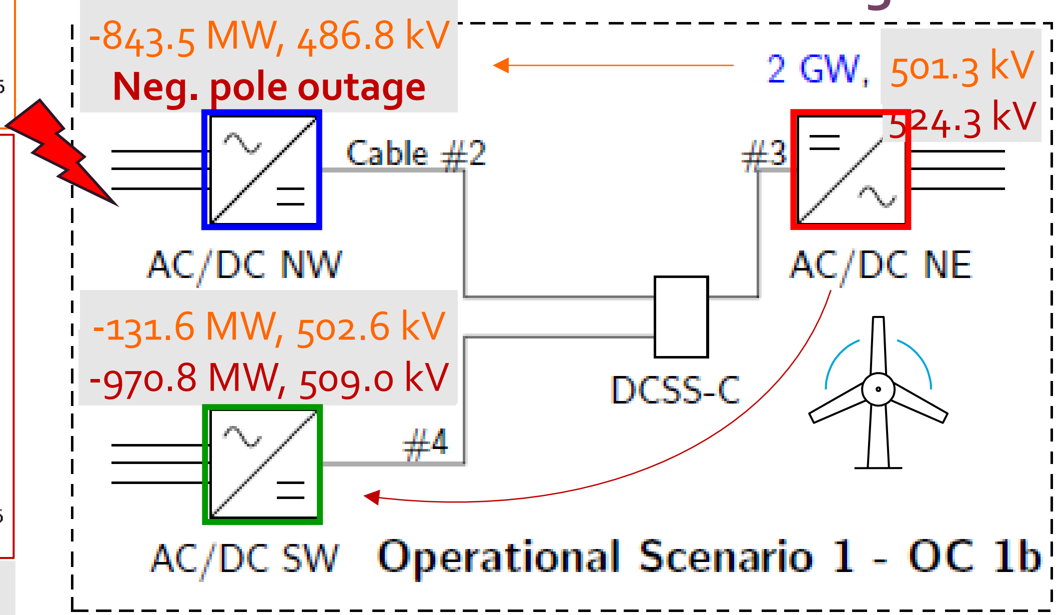
Affected pole

≈ hundreds of ms

2 – Dynamic design study! E.g., NW block & trip event



E.g. GGW



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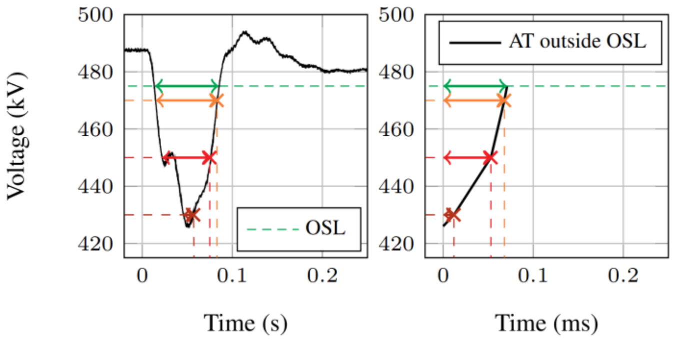
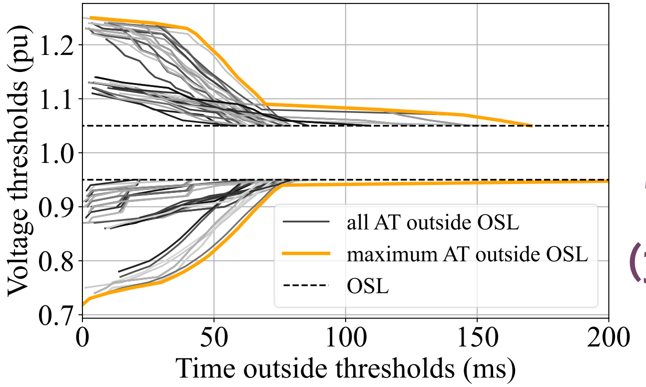
2 – Dynamic design study process

Characterising stress as a function of subsystem design parameters

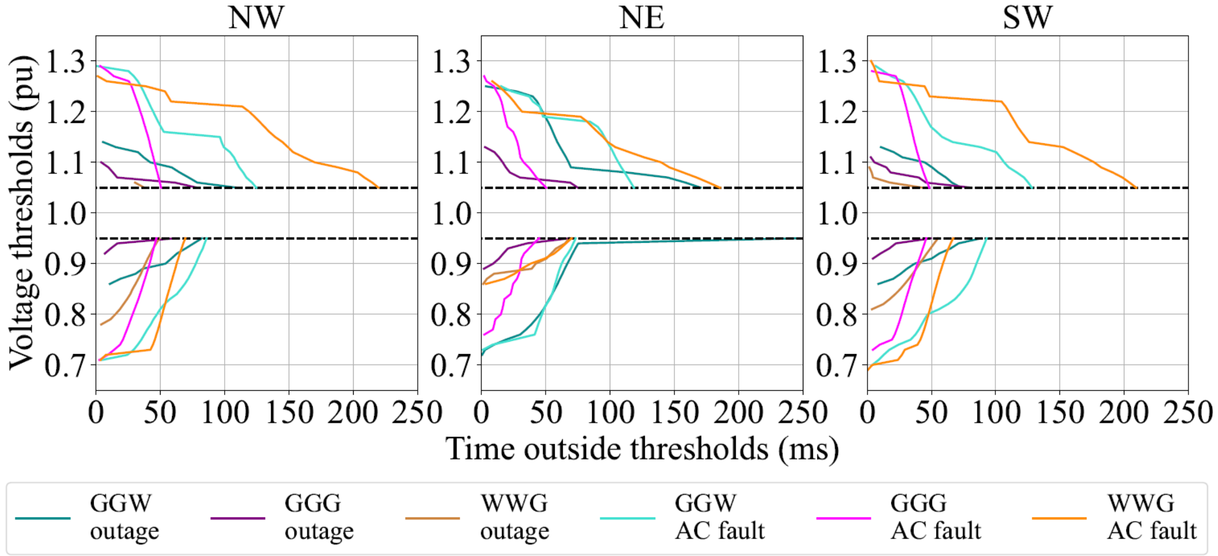


(1) Absolute Time (AT) outside OSL computed for each simulations

All scenarios



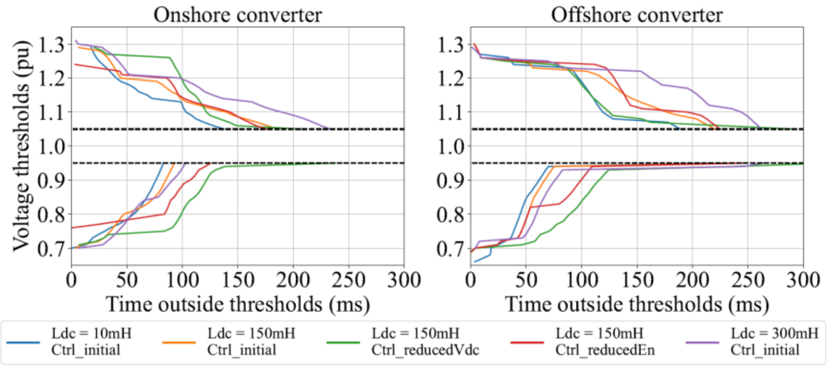
(2) Results are aggregated, retaining the **envelope**



Outages &

AC faults

(3) Envelopes are computed for each converter, event & configuration



(4) Normal operation within obtained dynamic bands is specified by **station type (onshore / offshore)**

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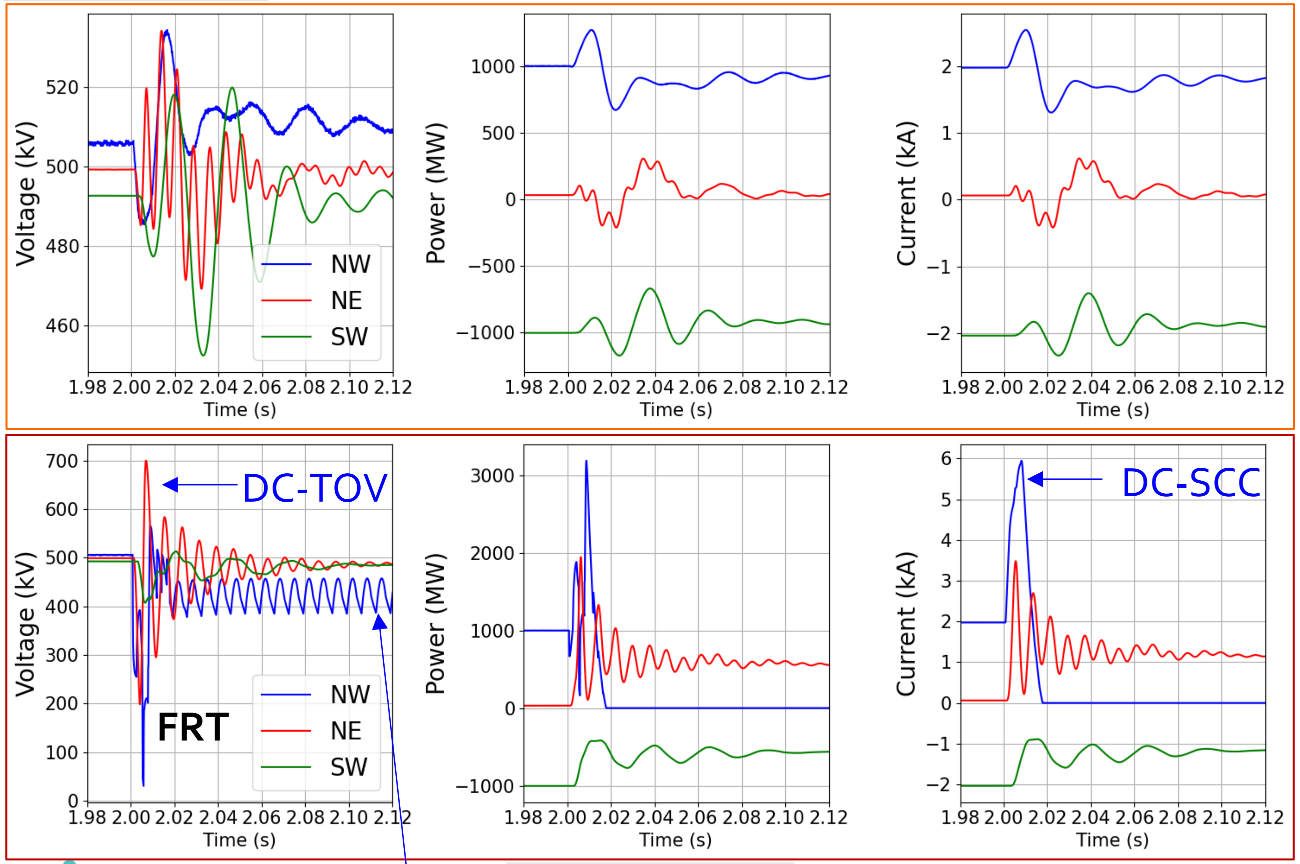
3 – Transient design study process: e.g. DC faults

Compute of maximum DC short-circuit currents & overvoltages

Healthy pole   Limited disturbance



Affected pole

≈ few ms

Converter (temporary) blocking

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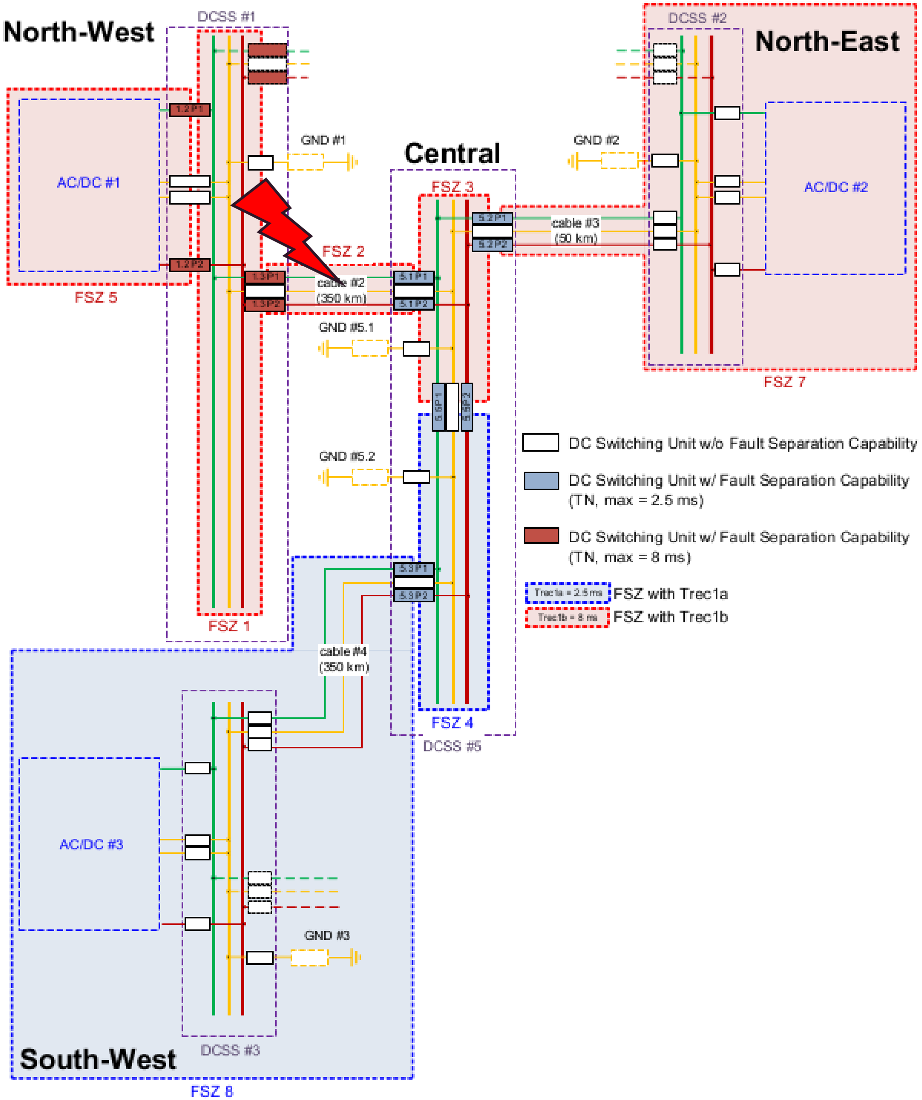
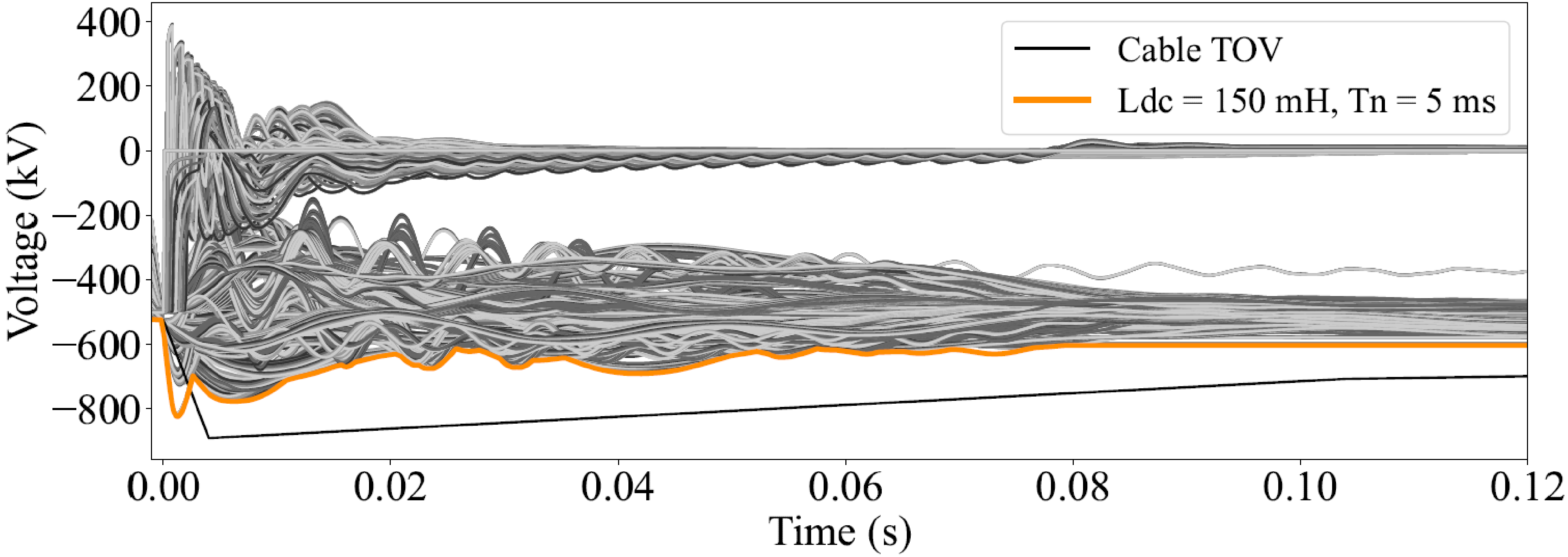
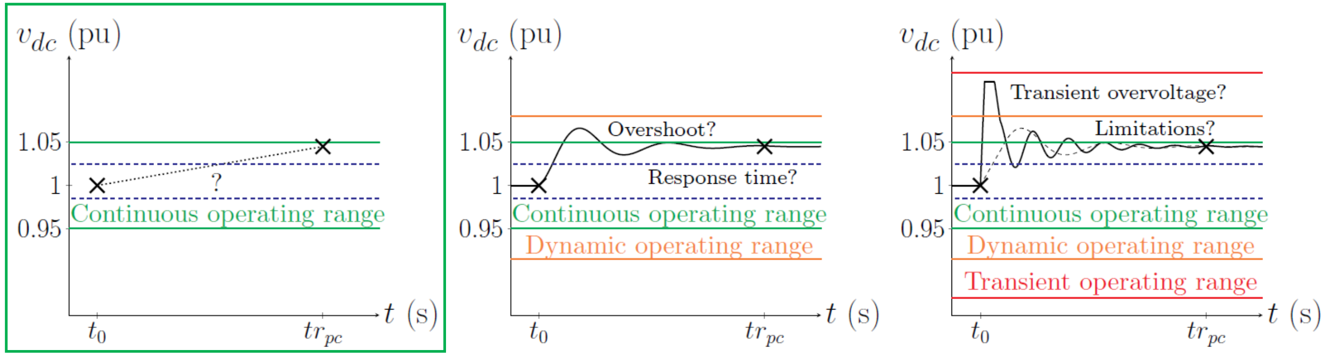


3 – Transient design study process: e.g. DC faults
Verify compliance with the DC-TOV profile assigned to the pole cables

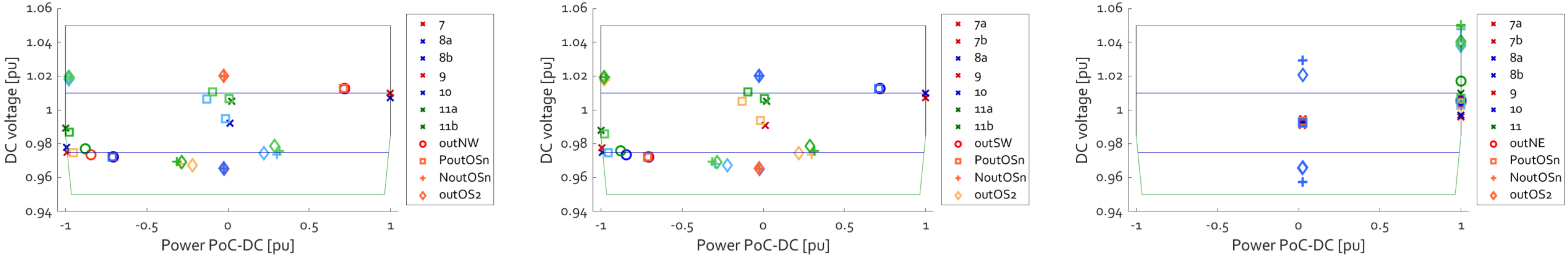


And much more…

Takeaways



1. A general methodology for conducting HVDC grid design studies is proposed.
2. Demonstration of compatibility of **continuous operating ranges**, defined based on the ratings of currently available equipment, with the intended operational principle of the **3T InterOPERA base case** (N-1 rule).



NW (onshore) **SW** (onshore) **NE** (offshore)

E.g. GGW

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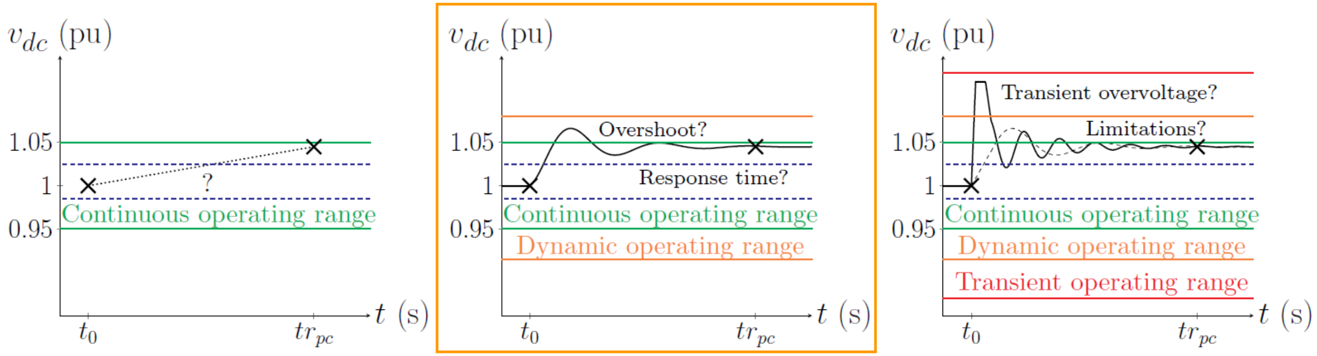
Takeaways



1. A general methodology for conducting HVDC grid design studies is proposed.
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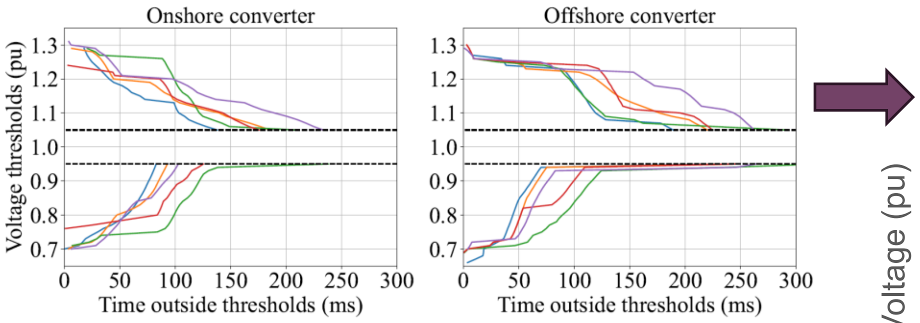
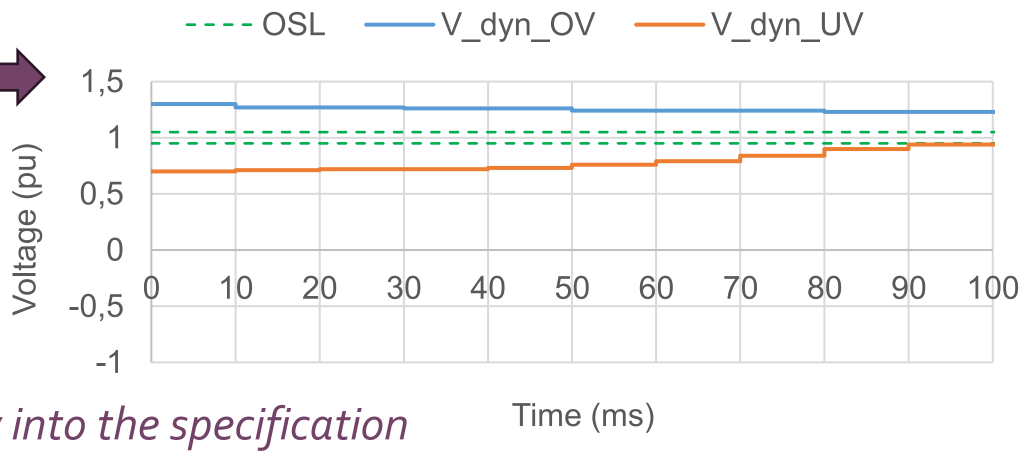
3. **Demo-specific** requirements on DC voltage **dynamic operating ranges** (no block & no trip) were defined based to the excursions observed in the design studies.





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From the design study, directly into the specification

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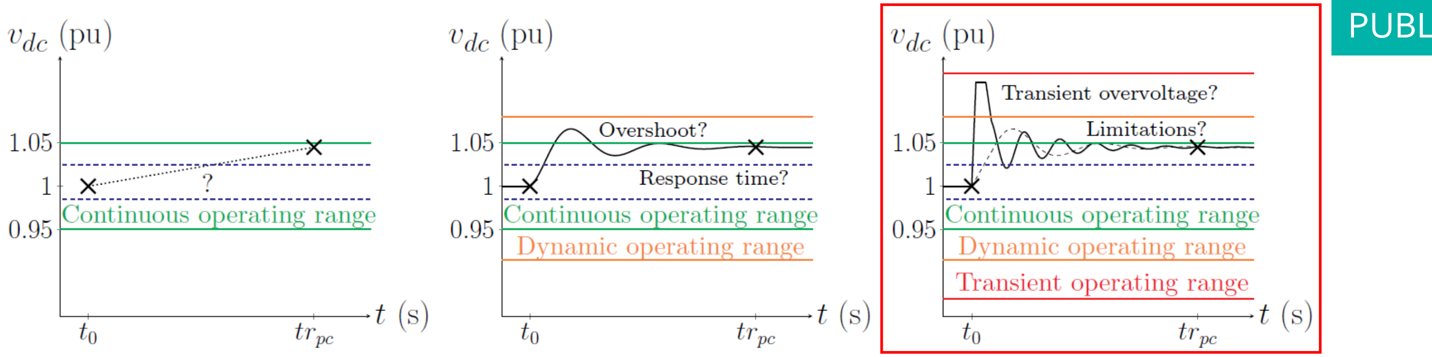
Takeaways



1. A general methodology for conducting HVDC grid design studies is proposed.
2. Demonstration of compatibility of **continuous operating ranges**, defined based on the ratings of currently available equipment, with the intended operational principle of the **3T InterOPERA base case** (N-1 rule).
3. **Demo-specific** requirements on DC voltage **dynamic operating ranges** (no block & no trip) were defined based to the excursions observed in the design studies.
4. Validation of the proposed **withstand voltage** requirements for the InterOPERA demonstrator subsystems.

Disclaimer: a few open questions remain…

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24th Wind & Solar Integration Workshop | Berlin, Germany | 07-10 October 2025

MULTI-TERMINAL MULTI VENDOR HVDC GRID DESIGN STUDIES – PART I: LOAD FLOW STUDY AND CONTINGENCY ANALYSIS

Carmen Cardozo[1], Julien Pouget[1], Hélène Clémot[1], Benoît de Foucaud[1], Pierre Rault[1], Sébastien Dennetière[1]*

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Keywords: MULTI-TERMINAL HVDC, BIPOLE, DC VOLTAGE DROOP, DC LOAD FLOW

Abstract

Multi-Terminal (MT) HVDC networks have been studied for over a decade, with recent efforts increasingly focusing on enabling multi-vendor interoperability to support a competitive and scalable deployment framework. Concurrently, protection selectivity is receiving renewed attention in the context of large-scale offshore connections based on 2 GW bipolar building blocks, where the maximum loss of infeed has become a critical planning constraint. This three-part series addresses early-stage system-level studies of MT HVDC grids using generic models, which are essential to support primary design. As part of the InterOPERA project, involving HVDC vendors traditionally responsible for DC-side design in point-to-point schemes, a methodology is proposed to instantiate project-specific technical requirements at subsystem DC point-of-connection. This first part focuses on steady-state studies to determine *secure* DC voltage ranges and primary control settings, ensuring N-1 compliance. For the considered three-terminal topology, different configurations of converter station connections (to onshore grids and offshore wind farms) are analysed. The case with two onshore and one offshore station exhibited the narrowest margins, prompting the definition of configuration-specific settings for the InterOPERA demonstrator. The same approach is shown to be relevant for degraded modes arising from permanent asset unavailability, with particular attention to pole-to-ground voltages under asymmetrical operation.

24th Wind & Solar Integration Workshop | Berlin, Germany | 07-10 October 2025

MULTI-TERMINAL MULTI VENDOR HVDC GRID DESIGN STUDIES - PART II: DYNAMIC STUDY

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**julien.pouget@rte-france.com*

Keywords: MULTI-TERMINAL HVDC, BIPOLE, DC VOLTAGE DROOP, DC-TOV

Abstract

Multi-Terminal (MT) HVDC networks have been studied for over a decade, with recent efforts increasingly focusing on enabling multi-vendor interoperability to support a competitive and scalable deployment framework. Concurrently, protection selectivity is receiving renewed attention in the context of large-scale offshore connections based on 2 GW bipolar building blocks, where the maximum loss of infeed has become a critical planning constraint. This three-part series addresses early-stage system-level studies of MT HVDC grids using generic models, which are essential to support primary design. As part of the InterOPERA project, involving HVDC vendors traditionally responsible for DC-side design in point-to-point schemes, a methodology is proposed to refine, and eventually instantiate, project-specific technical requirements at the DC point of connection of AC/DC converters. This second part focuses on dynamic studies, quantifying maximum DC voltage excursions resulting from single and bipole outages, as well as temporary loss of power caused by converter blocking and grid-side AC faults. The variability of these excursions is examined as a function of two key design parameters: AC/DC converter reactor sizing and control settings. Time-domain simulations reveal that relatively higher stresses observed at one location are caused by large oscillations triggered by a specific blocking event. Frequency-domain assessment provides further insight into the underlying resonance phenomena.

24th Wind & Solar Integration Workshop | Berlin, Germany | 07-10 October 2025

MULTI-TERMINAL MULTI VENDOR HVDC GRID DESIGN STUDIES – PART III: TRANSIENT STUDY

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Keywords: MULTI-TERMINAL HVDC, BIPOLE, DCCBs, DC-TOV, DC SHORT-CIRCUIT CURRENT

Abstract

Multi-Terminal (MT) HVDC networks have been studied for over a decade, with recent efforts increasingly focusing on enabling multi-vendor interoperability to support a competitive and scalable deployment framework. Concurrently, protection selectivity is receiving renewed attention in the context of large-scale offshore connections based on 2 GW bipolar building blocks, where the maximum loss of infeed has become a critical planning constraint. This three-part series addresses early-stage system-level studies of MT HVDC grids using generic models, which are essential to support primary design. As part of the InterOPERA project, involving HVDC vendors traditionally responsible for DC-side design in point-to-point schemes, a methodology is proposed to refine, and eventually instantiate, project-specific technical requirements at subsystem DC point-of-connection. This third part focuses on transient studies, quantifying maximum DC short-circuit currents and overvoltages induced by pole-to-ground faults throughout the fault separation process. The variability of system-level electrical stress is assessed as a function of two key design parameters: AC/DC converter reactor sizes and DC circuit breaker's maximum fault neutralisation times. Broader discussions on insulation coordination considerations and DC fault ride-through requirements are also provided.

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Closing remarks:

How InterOPERA is contributing to the EU's energy goals

Supporting frameworks for a more integrated European energy market

InterOPERA

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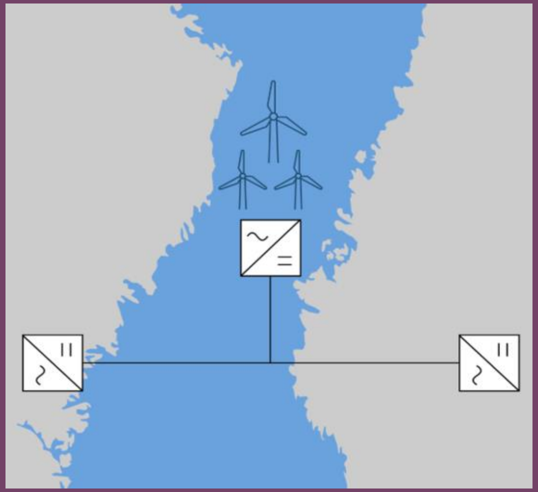
Context & what InterOPERA Delivers for Europe

Today

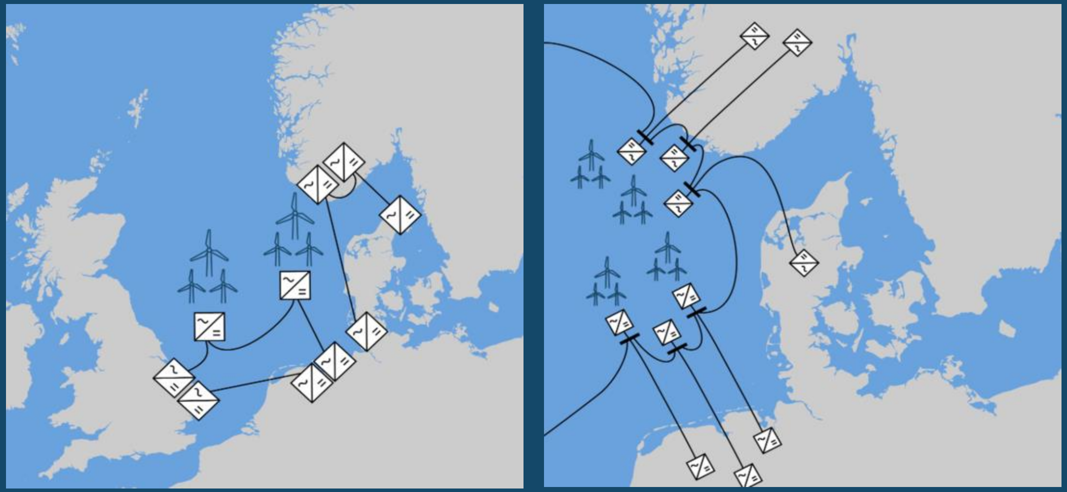


HVDC projects bespoke and fragmented

Risk in developing multi-vendor systems

Need for Interoperable HVDC Grids

Tomorrow



Common functional requirements and standards

Multi-vendor & multi-terminal Interoperability

Delivers frameworks for procurement, IP, fair competition

Impact on Policy and Market Readiness

Standardization and Harmonization

Contributes to harmonizing connection codes and procurement practices across European and international standards bodies.

Market Readiness and Competition

Harmonized standards enable a competitive multi-vendor market, reducing project risks and accelerating deployment.

Regulatory Support and Policy Integration

Provides validated methodologies that support regulatory uptake and integration into EU and national frameworks.

Facilitating HVDC Tenders

Common standards and procurement frameworks enable the launch of HVDC multi-terminal system tenders.

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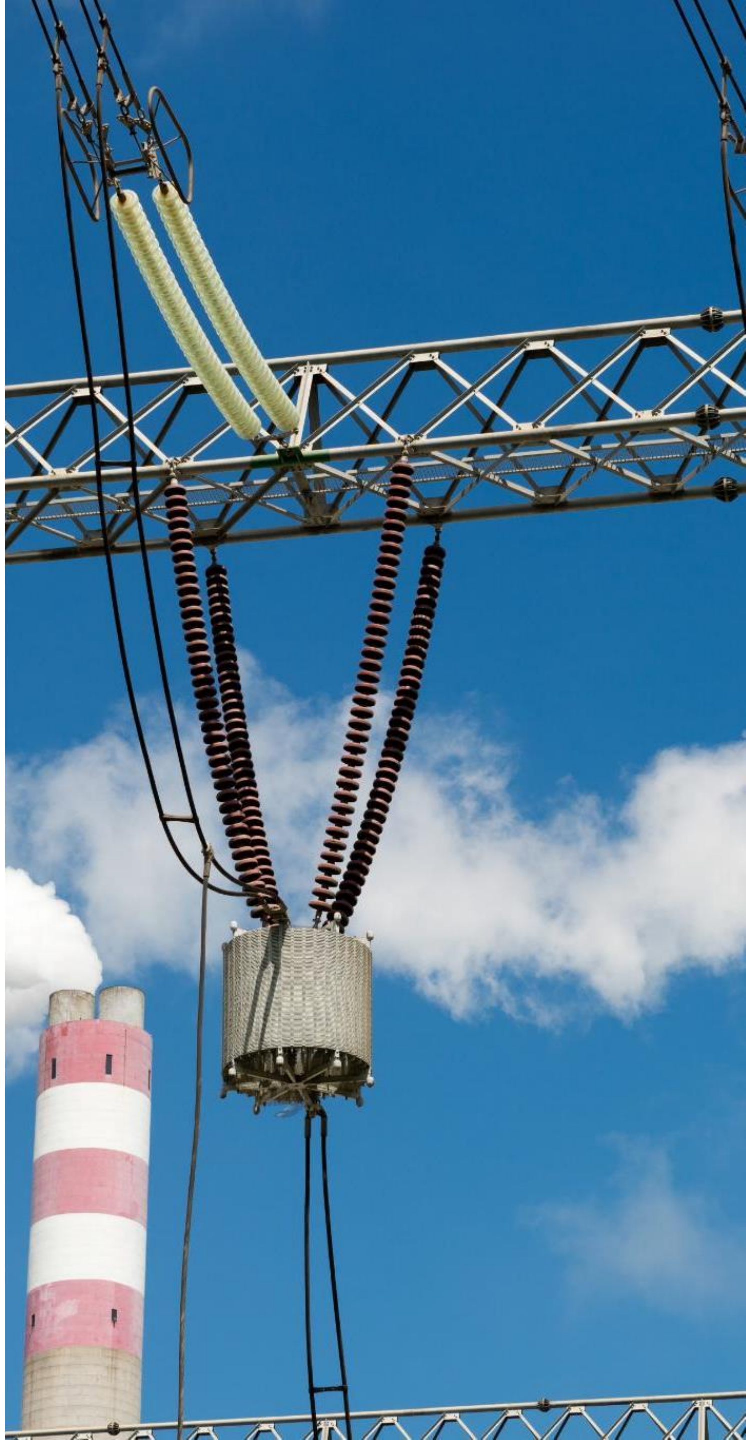

The Exploitation Plan
Heritage of InterOPERA

Ensuring Continuity and Adoption

The plan guarantees continuity through adoption of standards, procurement processes, and regulatory frameworks.

Integration into Commercial and Policy Sectors

Strategies focus on embedding InterOPERA's outputs into future commercial projects and policy instruments.

Intellectual Property Protection and Fair Competition

Promoting multi-party cooperation while protecting intellectual property.

Supporting Sustainability and Scalability

Transforms project innovations into deployable solutions for a sustainable and scalable HVDC infrastructure across Europe.

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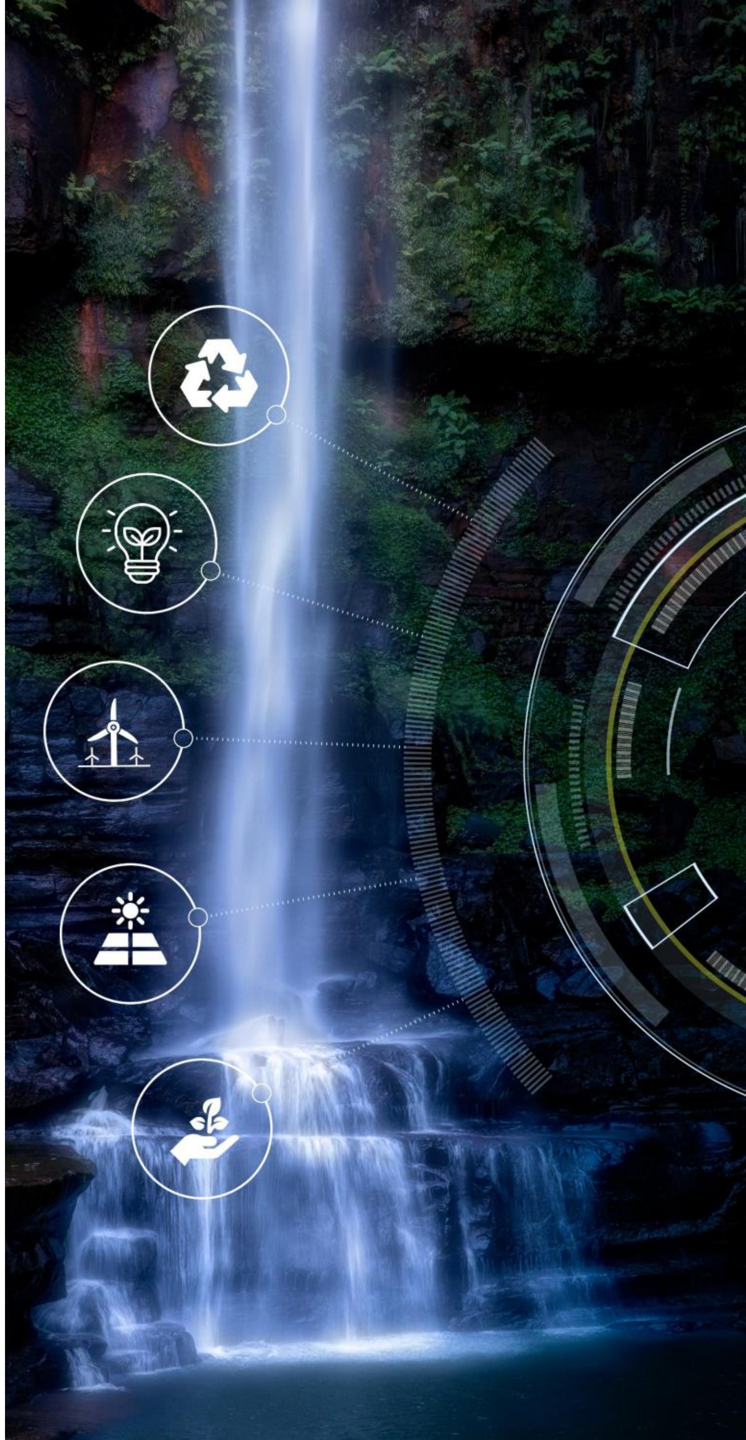

A Lasting Legacy for Europe’s Offshore Grid

Legacy of Collaboration

InterOPERA promotes shared standards and open collaboration to support Europe's energy transition.

Interoperability and Infrastructure

Enabling interoperability across HVDC systems creates scalable and efficient offshore grid infrastructure.

Policy and Market Readiness

Contributions to policy and market readiness ensure Europe meets climate goals while securing energy resilience.

Driving Systemic Change

Collaborative innovation drives systemic change, positioning InterOPERA as a cornerstone of future energy.

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InterOPERA Phase II
What‘s coming next

Launching real-world testing with a physical demonstrator to prove system interoperability

Supporting future commercial deployment of multi-vendor offshore energy systems in Europe

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Oliver Pohl (Amprion)

René Lindeboom (Ørsted)

22 October 2025

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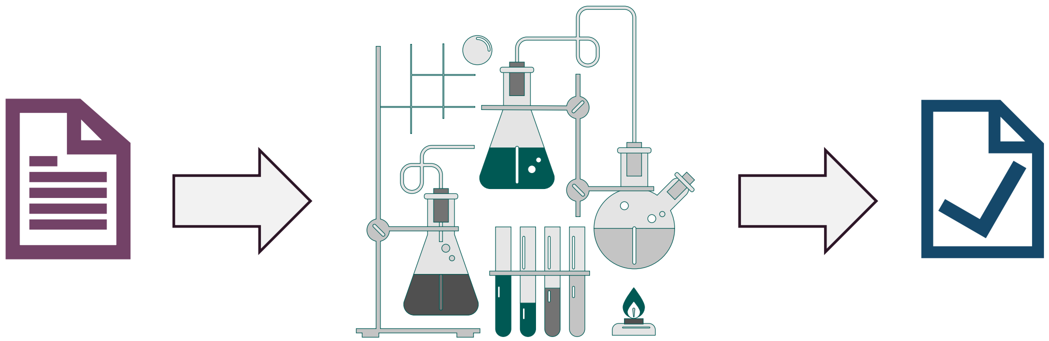
1

Launching real-world testing with a physical demonstrator to prove system interoperability

Why Use a Demonstrator?

- Phase I:
  - **Defined functional requirements** for multi-vendor interoperability
- Phase II:
  - Can **real vendor hardware** meet those requirements under **realistic conditions**?
  - Put **verifiable requirements** into **template specification** to be used in future tenders

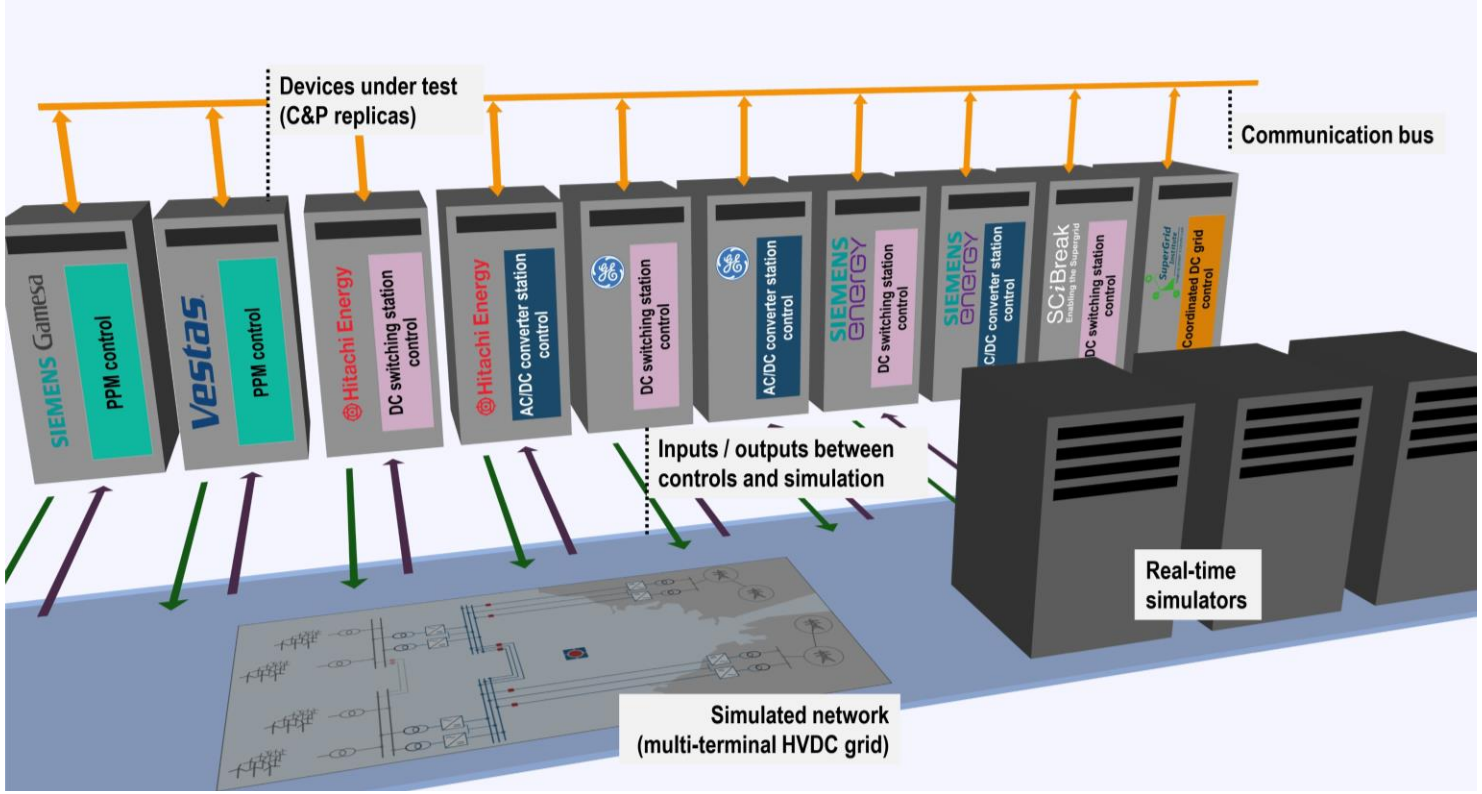
➢ **De-risk future multi-vendor projects**



Multi-Terminal Multi-Vendor HVDC Real-Time Demonstrator (Overview)

- Validation for Control & Protection System Interoperability
- Laboratories:
  - RTE (FR)
  - TU Delft (NL)
- Goal: One coherent DC grid controlled by independent vendors' equipment

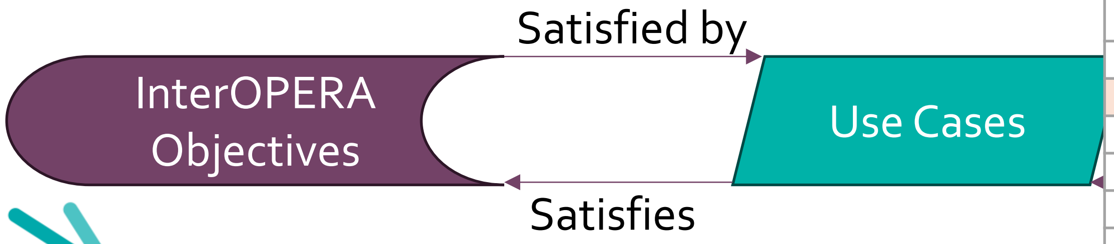
➢ **What will we test with it?**



*Mitsubishi to provide DC protection for the DCCB

Demonstrator Use Cases

- Use Case definition template
  - Category & priority rating
  - Preliminary or final specs (D3.3)
  - Description
  - Min. required grid topology, config or equipment
  - Minimum D3.1 subset
  - Simulation environment (testing method)
  - Pre-Condition → Trigger → Post-Condition
  - Primary / Alternative / Failure flow
  - Actors / involved subsystems



Grid Operation and Reconfiguration
Start-up from 1 onshore station and shut-down
Transition from one power flow schedule to another (only set points)
Transition to new control modes and control parameters
Basic switching operations and grid reconfiguration sequences
Secondary control - automatic transition to a new power flow schedule after a severe contingency
Planned subgrids merge - on load switching
Planned grid split - on load switching
Continuous Controls
Power disturbance with 1 converter station in Vdc control mode, the others in power control mode
Power disturbance with converter stations in Vdc-droop control modes
Asymmetrical pole operation due to one transmission pole outage
Asymmetrical pole operation due to difference in power injection in positive and negative poles
Vdc-droop converters connected to the same DC-bus, to the same DC switching station
DC Protection
DC fault within all selective fault separation zones
DC fault within the fault separation zone including non-selective zones
Offshore AC Performance
Offshore grid energization from 1 offshore HVDC station ("soft start")
PPMs from two different vendors connected to the same busbar (steady-state small-signal operation validation)
Reconfiguration of the offshore AC network, energizing one part from the other by closing a switch ("hard start")
Ride through offshore HVDC converter temporary blocking with WTGs in GFL control mode
HVDC converter permanent blocking with WTGs in GFL control mode
DC-side contingency leading, after energy absorber activation, to a coordinated emergency offshore wind ramp-down or curtailment
Offshore AC fault ride through capability with GFL WTGs - Post fault active power recovery
Onshore AC Performance
Onshore AC fault ride through capability - Post fault active power recovery
Reactive power control, including priority management with active power control
Inertia support (GFM control scheme with inertia support from one asynchronous area to another)
Exploration of HVDC system stability and interoperability with interconnected AC areas (no design requirements)

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How To Test Interoperability

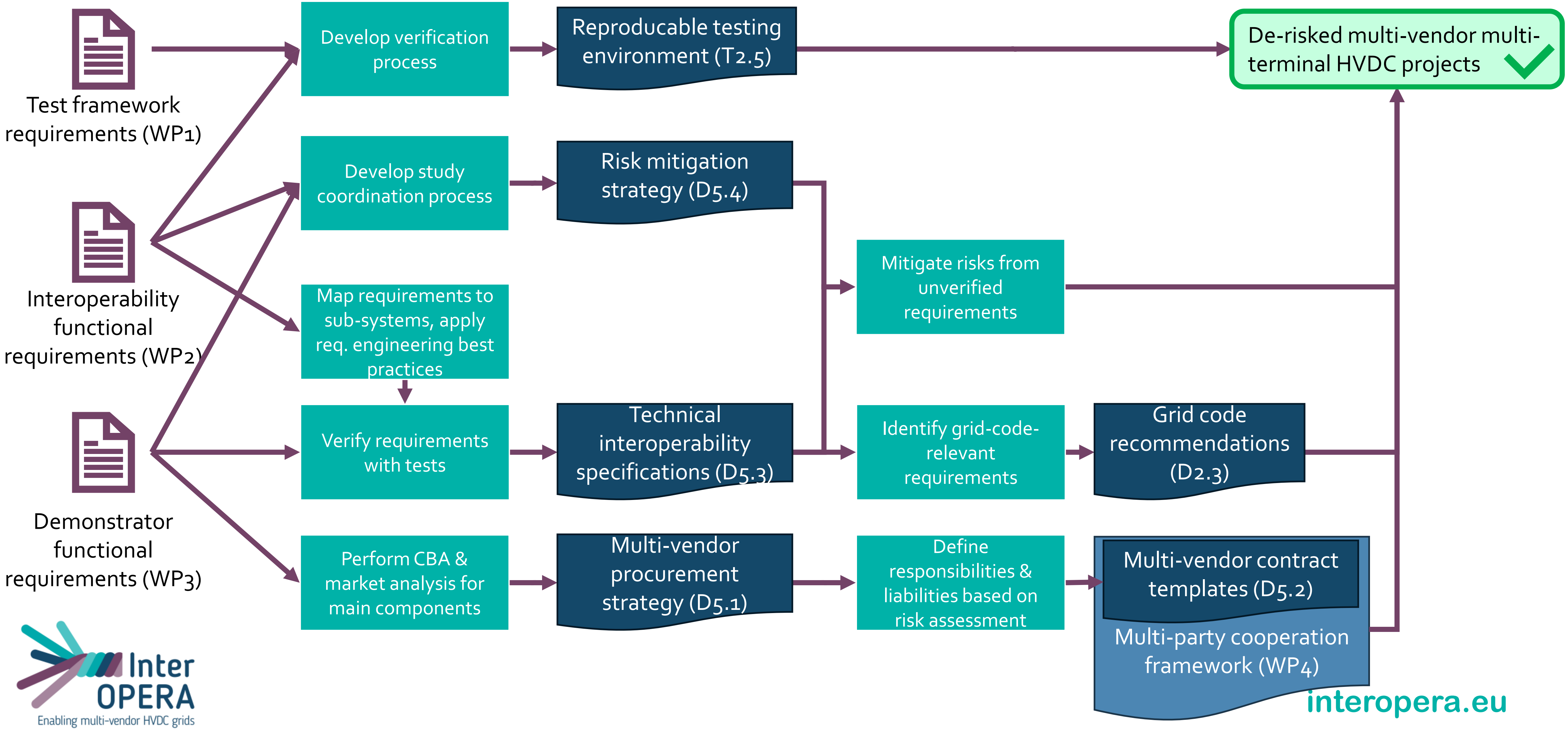
- "Dry-run" tests
  - Check vendor **models' consistency** with defined requirements
  - Describe **how to provide** models & replicas (IEEE/Cigré DLL)
  - **No** focus on dynamic behaviour
  - Expected to finish by end of 2025

- Interaction tests
  - **Define tests** covering the use cases
  - **Test requirements** developed in the project
  - Assess if requirements (and corresponding standalone tests) are sufficient for guaranteeing **interoperability by design**
  - **Offline EMT** models validate steady-state & fault calculations
  - **Hardware-in-the-Loop** runs the actual control cubicles in real-time for key scenarios

2

Supporting future commercial deployment of multi-vendor offshore energy systems in Europe

Developing a multi-vendor tender template



Multi-Party Cooperation Framework
The road to successful MTMV HVDC projects

The aim of the Multi Party Cooperation Framework is to facilitate the cooperation with regards to;

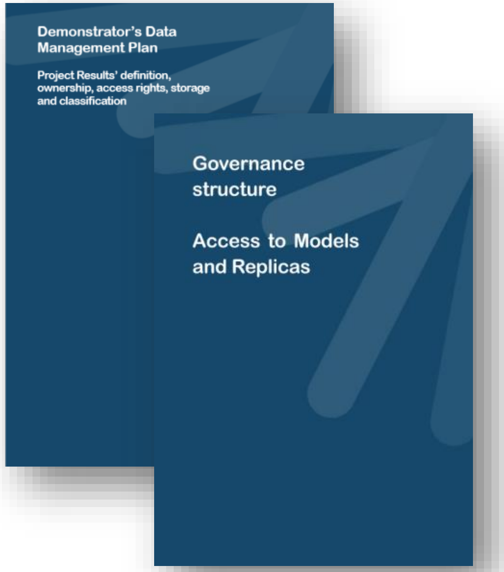
the development and operation of multi-vendor, multi-terminal high-voltage direct-current grids (MVMT HVDC grids).

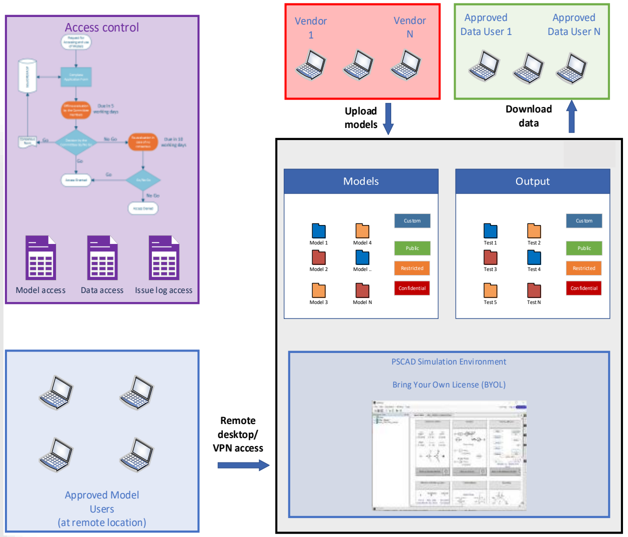
- Ensure the first MTMV HVDC project has the right setup for multi party collaboration
- Ensure that the Multi Party Cooperation Framework can support the chosen tender process.
- Enable pre-tender and post contract award collaboration through the multi-party collaboration framework
- Allow for collaboration on a detailed engineering level to de-risk the project from conception phase onwards
- Confidentiality provisions are taken into account
- Ensure European competition law is adhered to
- Protect Intellectual Property of vendors adequately

Multi-Party Cooperation Framework

The current aim, as formulated in the draft MPCF is to facilitate the cooperation of the Parties and other stakeholders in connection with the development and/or operation of multi-vendor, multi-terminal high-voltage direct-current grids (MVMT HVDC grids).

Within InterOpera





Post InterOpera

Phases	Lead	Competitive dialogue	Restricted procedure
Concept design	TSO	Required	
Pre-qualification – definition of pre-qualification requirements – MPCF as a requirement to pre-qualify?			
Pre-FEED/Feasibility study (applicable in restricted procedure)	TSO	Required with input from pre-qualified parties	
Basis for design, lot allocation, functional requirements	TSO	Required with input from pre-FEED basis	
Competitive dialogue – coordination studies	TSO + Bidders	Required	Not Applicable
Publication of contract notice / ITT			
Tender	Bidders	**Required**	
Contract Award (conditional to investment decision after FEED)			
FEED study	TSO + contractors		
Financial Investment Decision (which is linked to OFW tender)			
Detailed Engineering	Contractors		
Procurement	Contractors		
Construction	Contractors		
Installation	Contractors		
Commissioning	Contractors + TSO		
Take-over			
Operation and maintenance	TSO		
Infrastructure extension/lifetime ext./decommissioning			

Learnings

InterOpera demonstrator

Accelerated learning, unlocking the essential collaborative setup

- First draft of the Multi Party Cooperation Framework was published end '24.
- Maximize learning from implementation of the demonstrator
- Continuous learning to improve the collaboration framework and taking these learnings into new versions of the MPCF
- Ensuring that the MPCF will support future MTMV HVDC projects in the best possible way
- Coupling the framework to the lifecycle of an MTMV HVDC project

Phases	Lead	Competitive dialogue	Restricted procedure
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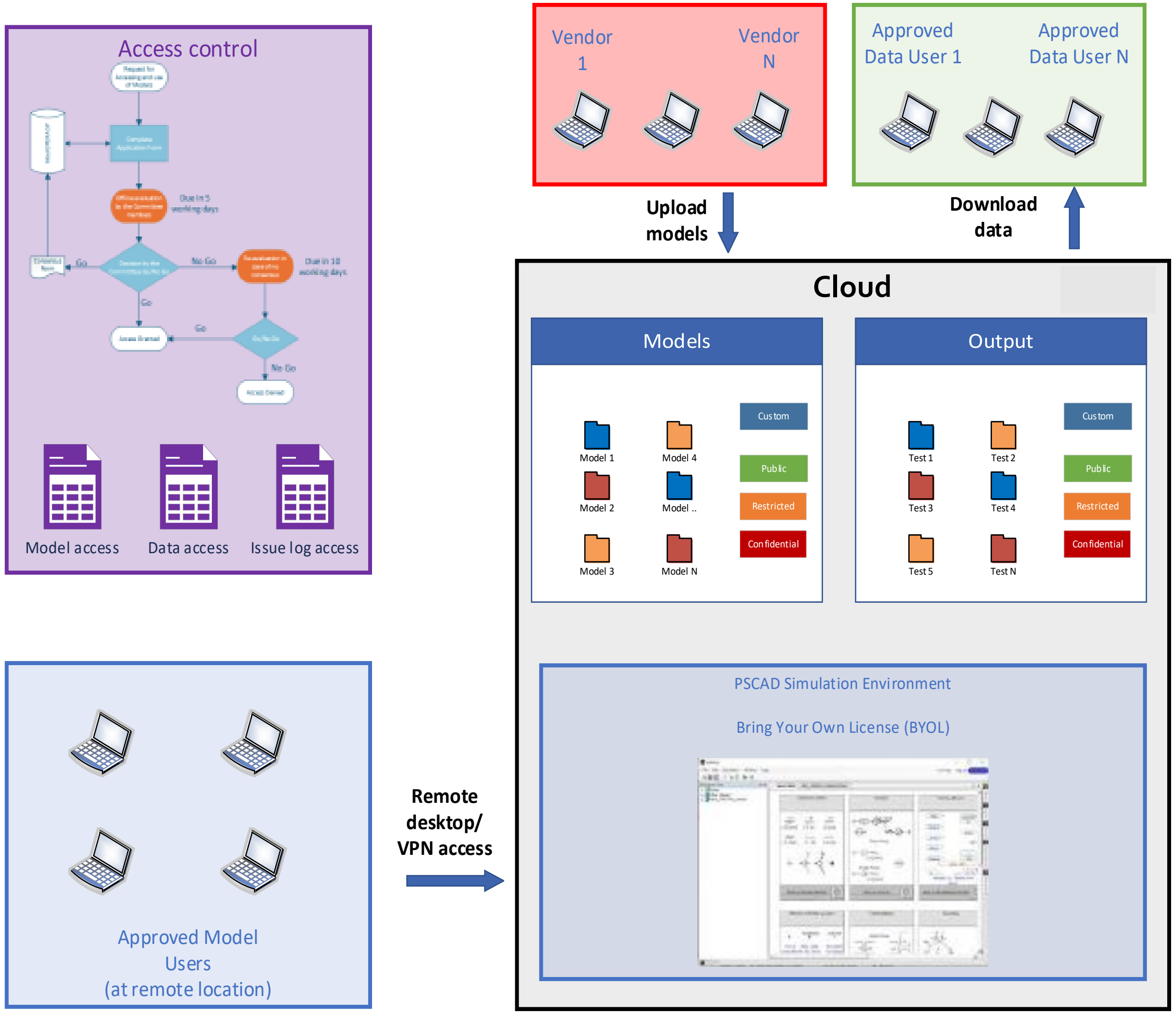
Post InterOpera outlook

A hosted collaboration platform for pre-tender coordination studies

Target is to develop a system where MTMV coordination studies can be executed optimally whilst ensuring confidentiality, without the need for elaborate bi-lateral legal provisions

- Storage of models, data and other information will be in the cloud
- Decentralised access control, ensuring all parties are in control of access to their own models and data
- TSOs, vendors and other approved users can log in to a dedicated cloud computer to jointly perform simulations which would not require any download of models or sensitive information.
- Limiting legal agreements to be in place with governance ideally treated within agreed MPCF.
- General development and maintenance cost of such a collaboration platform is cost heavy and requires dedicated governance and secure hosting.



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Concluding remarks

- Learnings on the demonstrator are beyond the technical understanding of the system alone.
- Learnings from the demonstrator on the collaboration will be key to successful implementation of a collaboration framework for the first MTMV HVDC project.
- A combination of legal and practical implementations will enable successful MTMV HVDC collaboration
- With InterOpera we are on a steep learning curve, where phase 2 of the project will bring essential experience for the realisation of the first MTMV HVDC project.

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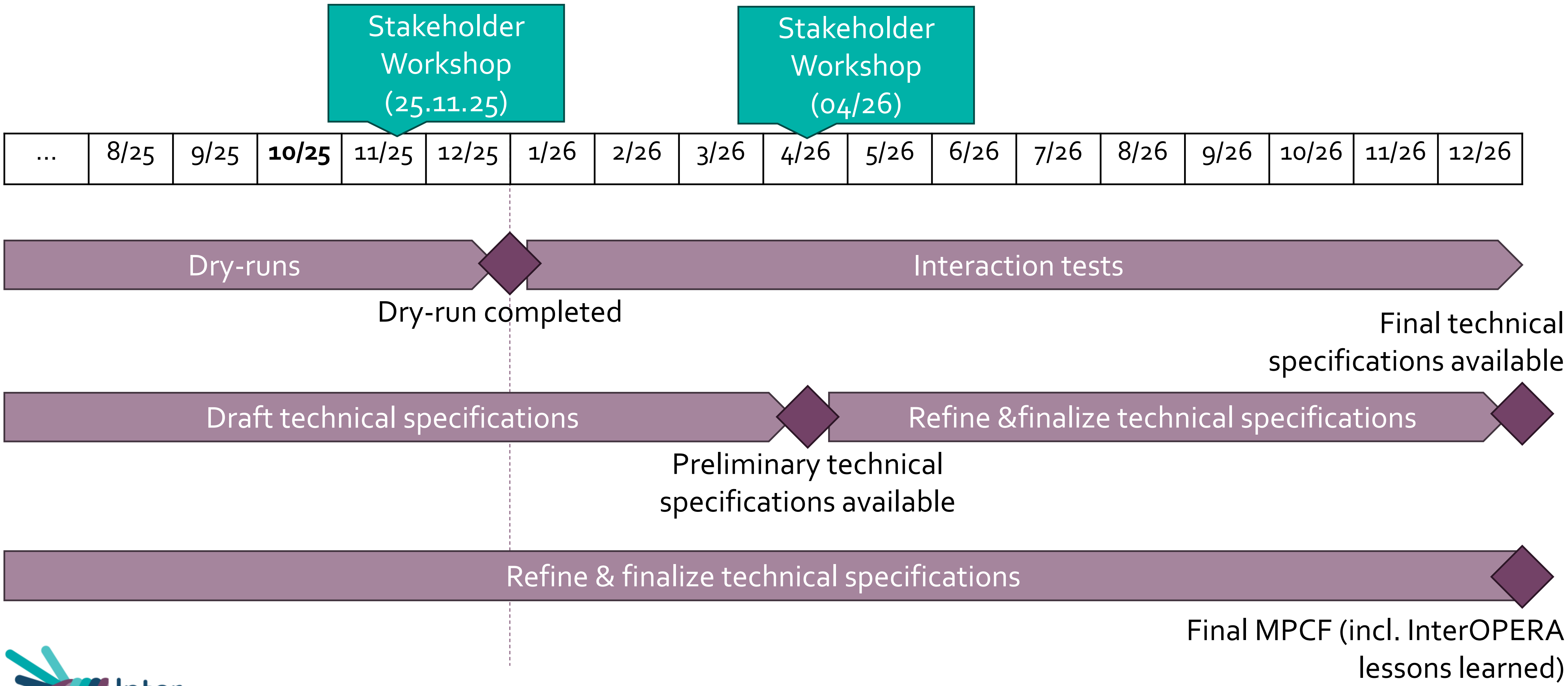
Timeline & Next Milestones



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