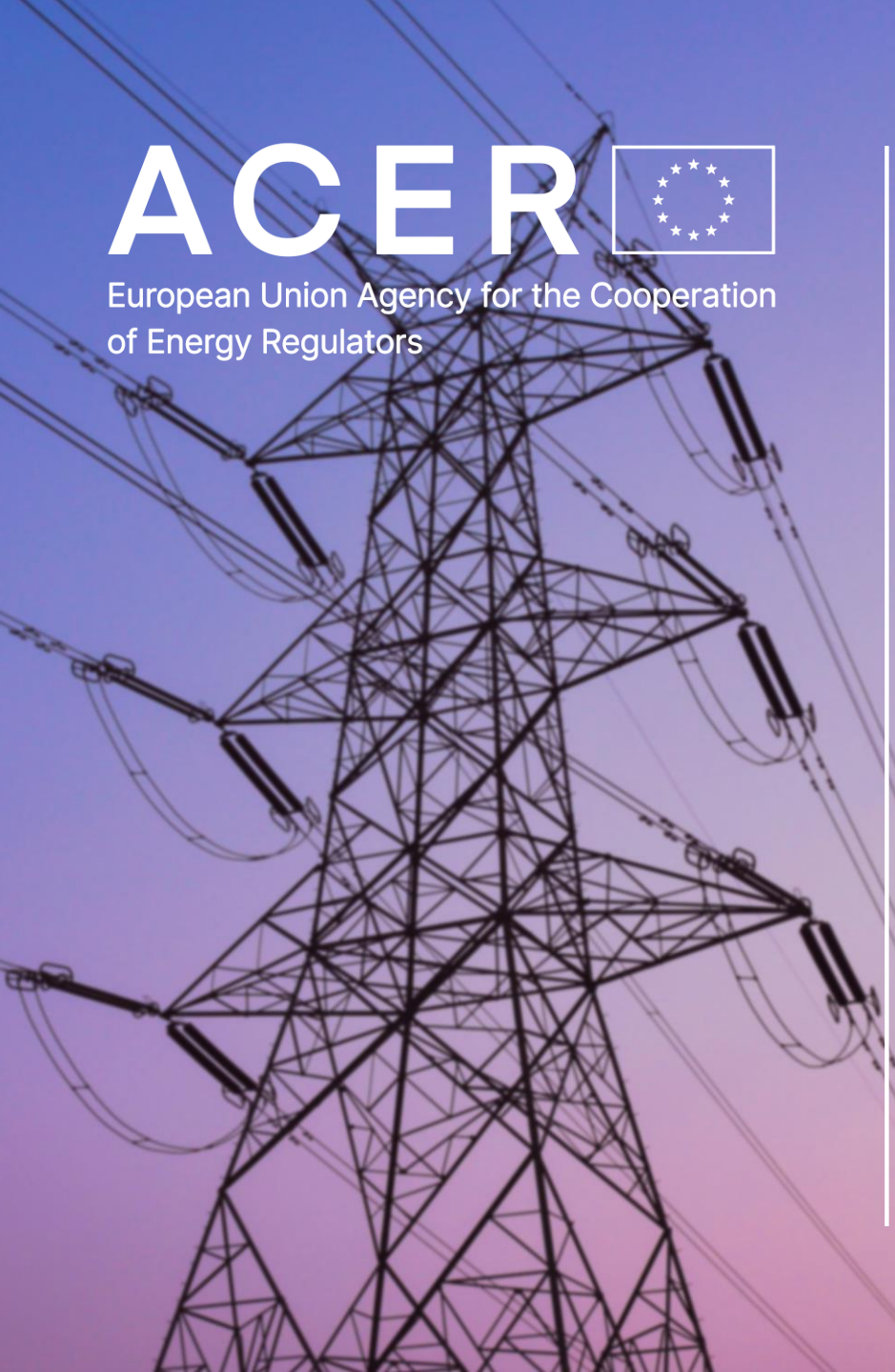

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Amendments to the electricity grid connection network code

ACER webinar

24 June 2024

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Agenda

Time	Webinar items	
09:15 - 09:30	Webinar open for log-in	Starts promptly at 09:30
09:30 - 09:35	**Opening remarks** Uros GABRIJEL, ACER	
09:35 - 09:45	**Process for submitting responses to the public consultation and timeline for amendments to the NC HVDC** Christian VINKLER, ACER	
09:45 - 10:20	**ACER's proposed amendments to the grid connection network code** Georgios ANTONOPOULOS, ACER	
10:20 - 10:55	Q&A Evangelia VASILAKI, ACER	
10:55 - 11:00	**Closing Remarks** Uros GABRIJEL, ACER	

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Housekeeping

Raise your hand for questions and comments, optionally indicating your affiliation

Keep your microphone muted unless the chair gives you the floor

Substance-related questions will be moved to the Q&A session; minor queries will be tackled during the presentation

Slides from this webinar will be uploaded to ACER website

Questions and comments will be addressed in the Q&A session at the end of the webinar

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Process for submitting responses to the public consultation and timeline for amendments

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Process for submitting responses to the PC

Stakeholders are invited to submit their comments to the NC HVDC articles amended by ACER in three mandatory steps:

STEP 1: by downloading ACER draft amendments in the **Word file** provided in the consultation form;

STEP 2: by commenting on ACER's draft amendments through the consultation form and adding alternative text proposals to the table, if any; and

STEP 3: by uploading the alterative amendment proposals to the **entire NC HVDC** using the track changes mode in the ACER draft amendments file downloaded from Step 1.

Process for submitting responses to the PC

Please write your comments on the ACER draft amendments and your alternative text proposals, if any, in the table below

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 1	1	2
Article 3		
Article 4		
Article 5		
Article 6		
Article 7		
Article 8		
Article 9		
Article 10		

Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New article	3

Please upload figures or tables if necessary

The maximum file size is 1 MB

Select file(s) to upload 4

Kindly note that consultation forms follow the structure of the NC HVDC amended legal text provided by ACER.

The paragraph numbering in the form reflects paragraph numbers in the amended legal text. Stakeholders can comment on the deleted paragraphs/articles/titles, which are marked as [deleted]. New articles and titles are marked as [new].

Please use the consultation form to comment on ACER draft amendments and/or to provide an alternative text proposal as follows:

1. Leave comments on the ACER draft amendment proposals.
2. Propose (if any) alternative wording of the relevant provision, **as you provided in the Word file**.
3. Provide (if any) your proposals for adding new provisions to the relevant section of the NC HVDC, **as you provided in the Word file**.
4. Upload figures or tables if necessary; text inputs should be provided directly in the consultation form.

Where the stakeholder does not have any comments regarding the amendments, the relevant cells in the consultation form can be left blank.

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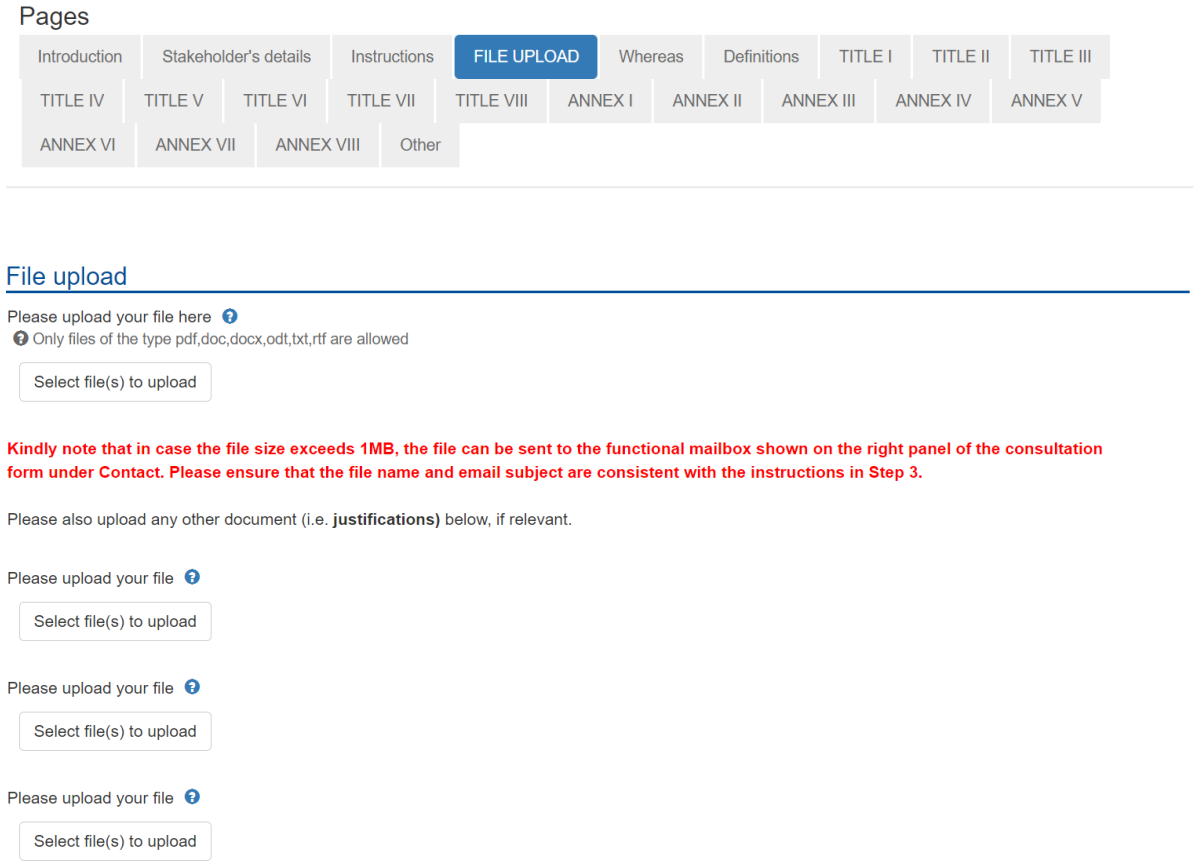
Process for submitting responses to the PC



Where the stakeholder would like to propose an alternative amendment to the **entire NC HVDC**, please upload the Word file (downloaded from Step 1) containing all your alternative amendment proposals in the Track Changes mode to the **FILE UPLOAD section** *and rename it with your stakeholder's name* ('ACER_draft_HVDC_stakeholder_name').

Additional justification documents could also be uploaded, where applicable.

To facilitate the process, please, **make sure that the alternative text proposals provided in this consultation form are consistent**, to the extent possible, **with those in the Word file you are uploading**, taking into account the character limitations of each cell (max 5000 characters).

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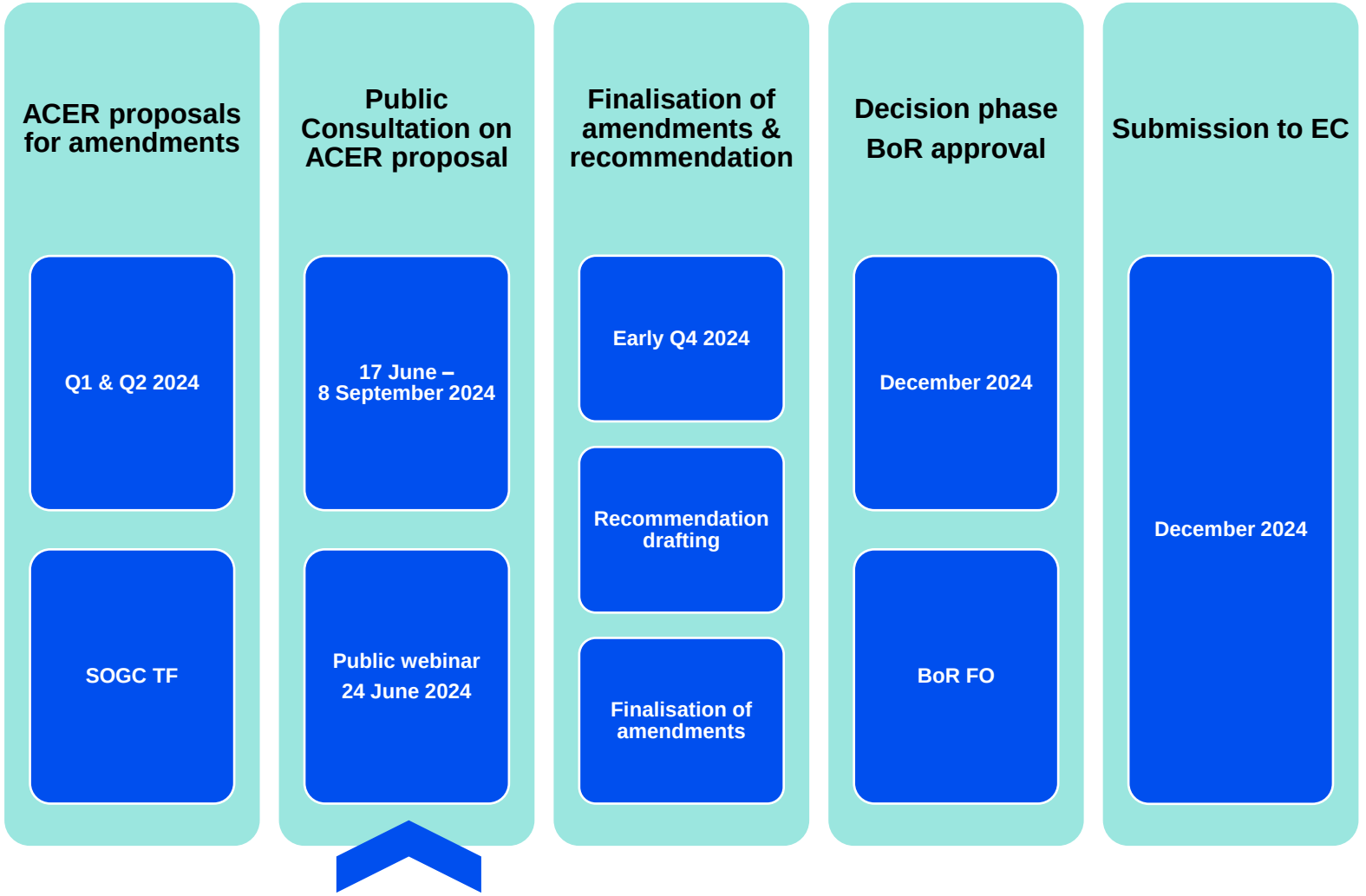
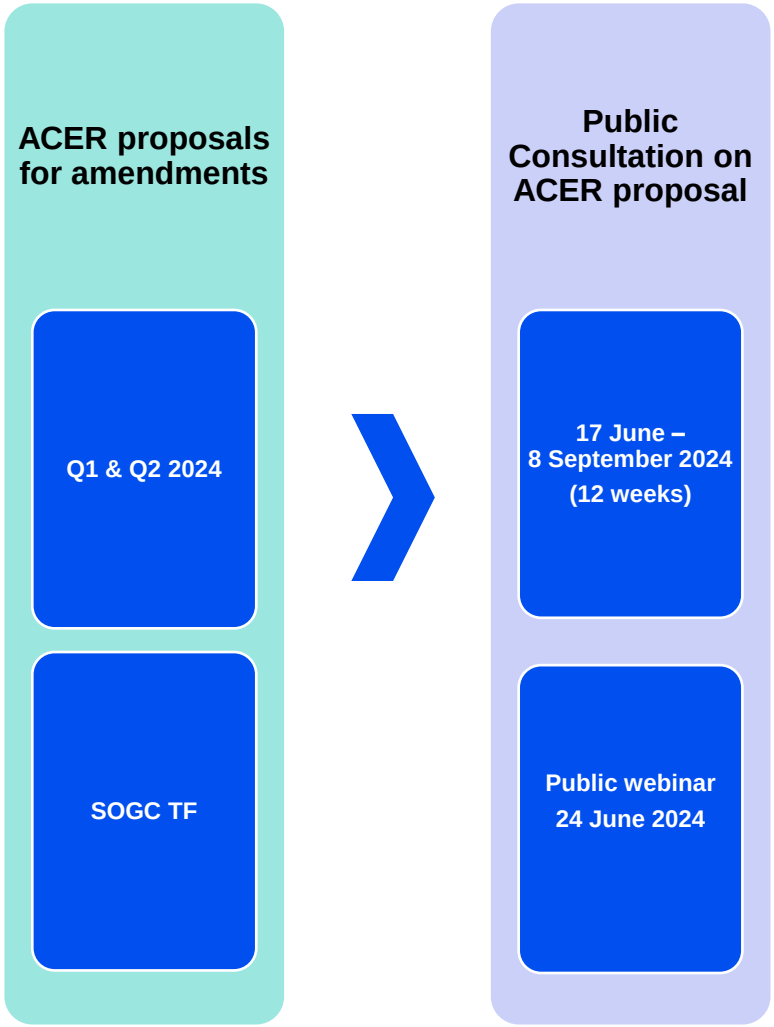
NC HVDC amendments - timeline



Public consultation on ACER draft proposal



- 12-week long public consultation.
- Launched on 17 June 2024.
- Stakeholders to comment on ACER draft amendment proposals.
- The Grid Connection European Stakeholder Committee's (GC ESC) Expert Group's on Connection Requirements for Offshore Systems (EG CROSS) proposal forms the basis for ACER's draft amendment proposal.
- On 24 June public webinar to present key proposals.

NC HVDC

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Proposed amendments to the grid connection network code

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ACER main draft proposals for NC HVDC amendment

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What is the aim of NC HVDC revision?

Motivation for the proposed amendments:

- Safeguard future system needs in the EU while ensuring that rules are well defined and harmonised to the necessary degree considering proportionality and subsidiarity principles.
- Substantial growth in generation capacity of isolated offshore AC networks (AC hubs) is expected in the near future. These AC hubs will connect large scale (tens of GW) offshore wind power generation and large-scale industrial demand (electrolysers) along with storage and other demand.
- High penetration of HVDC systems as well as converter-based Power Park Modules create new system needs. These needs will be catered for by appropriate system users' capabilities.
- Maintain system security, reliability and cost-effective system design and system operation also in meshed offshore HVDC systems.
- Ensure consistency with ACER recommendation for NCs RfG/DC 2.0.

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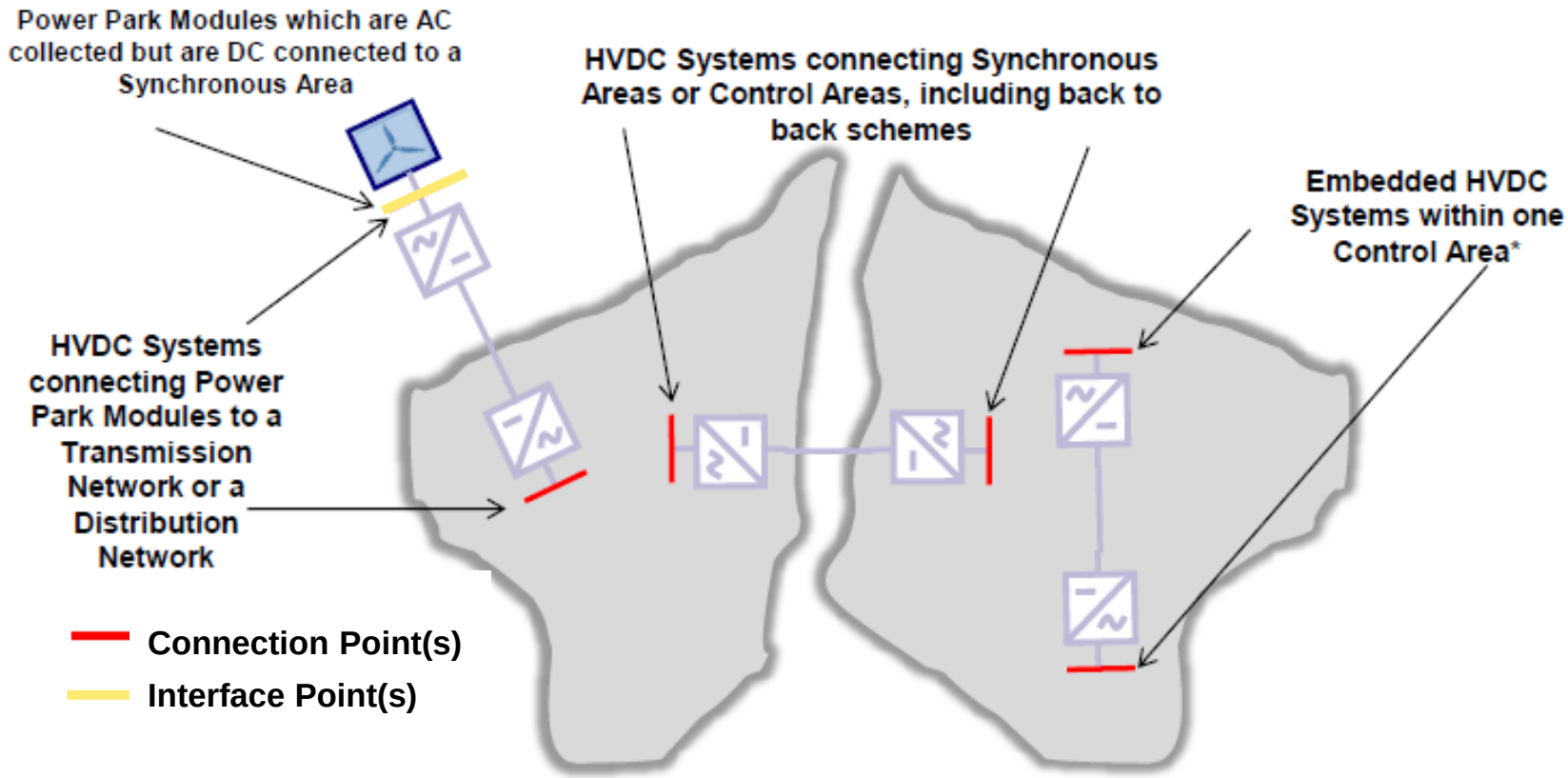
What is the scope of NC HVDC 1.0?

Scope of NC HVDC 1.0 and the Connection Points and Interface Points at which the requirements apply.



Source: ENTSO-E Network Code for HVDC Connections and DC-connected Power Park Modules – Frequently Asked Questions, 30 April 2014

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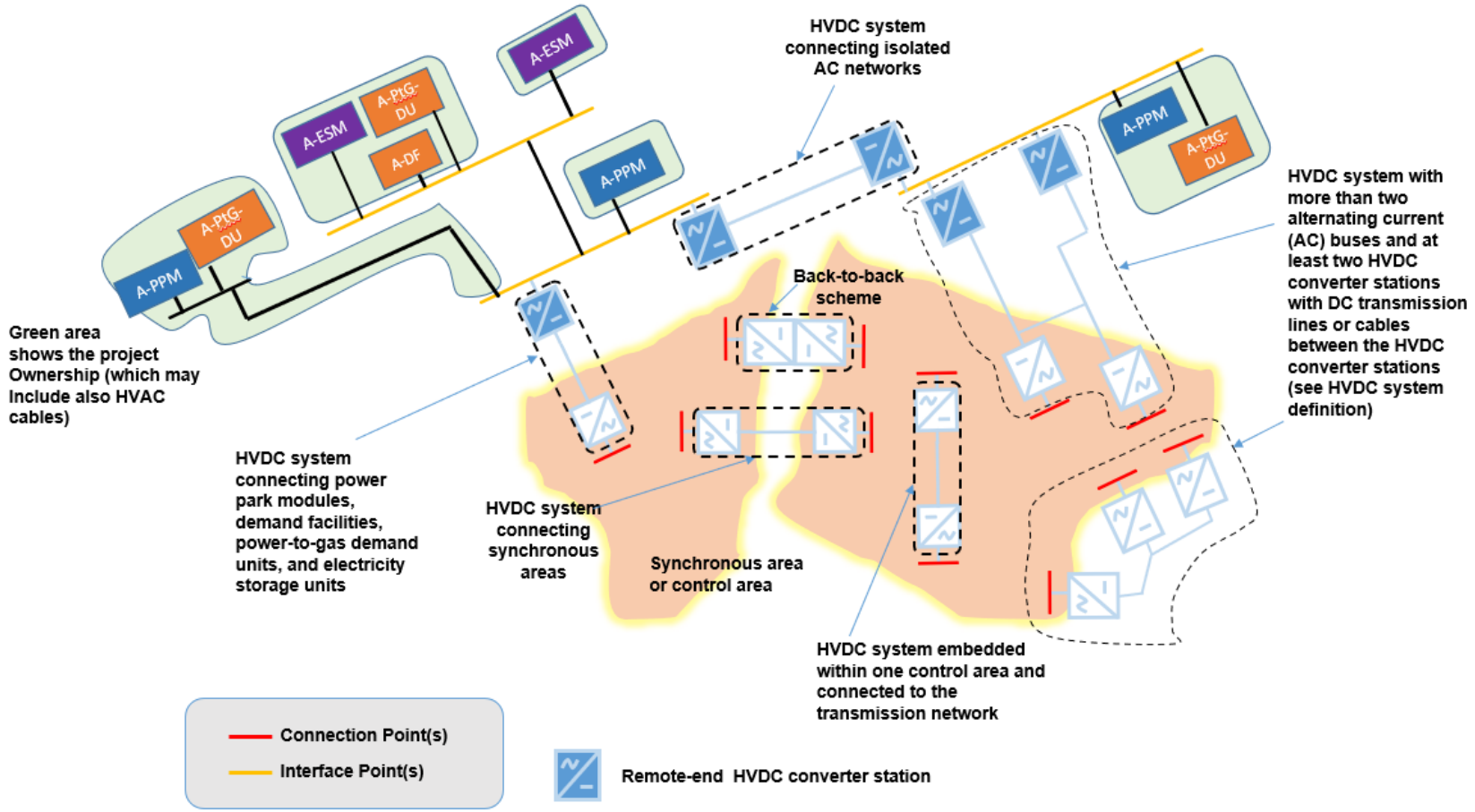
Proposed scope of NC HVDC 2.0

Proposed scope of NC HVDC 2.0 and the Connection Points and Interface Points at which the requirements apply.

A-PPM: Asynchronously connected Power Park Module
A-ESM*:* Asynchronously connected Electricity Storage Module
A-DF*:* Asynchronously connected Demand Facility
A-PtG DU*:* Asynchronously connected Power-to-Gas Demand Unit



Source: Expert Group on Connection Requirements for Offshore Systems – Phase II (Proposal for the NC HVDC amendment), 10.11.2023

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Introduction of new system users

P2G

New legal definitions

Asynchronously connected power-to-gas demand unit or ‘A-PtG-DU’ means a power-to-gas demand unit that is connected via an interface point to one or more remote end HVDC converter stations

Asynchronously connected electricity storage module or ‘A-ESM’ means an electricity storage module that is connected via an interface point to one or more remote end HVDC converter stations

Asynchronously connected demand facility or ‘A-DF’ means a facility which consumes electrical energy and is connected via an interface point to one or more remote end HVDC converter stations

‘DC-connected power park module’ becomes ‘asynchronously connected power park module’

PPM

Legal definition

Asynchronously connected power park module or ‘A-PPM’ means a power park module that is connected via an interface point to one or more remote-end HVDC converter stations

Improvement following NRAs proposal

Clarifying the notion of 'isolated AC network' in Article 2(8) of NC HVDC

- The EG CROS proposed definition: 'isolated AC network' means an AC network which is not part of a synchronous area, which is connected to a synchronous area via one or more HVDC systems;'.

  This definition could be misunderstood to include islands of Member States, which are **not in scope** of NC HVDC, in accordance with Article 3(7)(b).

  Therefore, the following text in red has been added in Article 2(8) to provide legal clarity:

  ➢ *'isolated AC network' means an AC network which is not part of a synchronous area, which is connected to a synchronous area via one or more HVDC systems. This definition does not include the transmission and distribution systems or their parts, of islands of Member States of which the systems are not operated synchronously with either the Continental Europe, Nordic, Ireland and Northern Ireland or Baltic synchronous area.'*

ACER draft proposals (NC HVDC)

Significant modernisation

- Proposal based on the Final Report by the EG CROS.
- To aid the harmonisation of the criteria that define a significant modernisation, ACER also proposes to include a fixed percentage for each of the criteria, above which the A-PPM, A-DF, A-PtG-DU or A-ESM is considered significantly modernised.
- Stakeholders are invited to propose a suitable value.

RoCoF withstand capability of HVDC systems

- Proposal based on the Final Report by the EG CROS.
- Rate-of-change-of-frequency (RoCoF) requirements for HVDC systems following the requirements in ACER Recommendation for NC RfG 2.0.

Grid forming capability

- Proposal based on the Final Report by the EG CROS.
- Inclusion of grid forming technical requirements for HVDC systems, asynchronously connected power park modules and asynchronously connected electricity storage modules.
- Providing technical requirements as well as the control chain starting from the connection point of the HVDC station down to the remote-end HVDC station and the A-PPM and A-ESM.

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ACER draft proposals (NC HVDC)

Technical requirements for system users

- Asynchronously connected Power Park Modules, asynchronously connected electricity storage modules, asynchronously connected demand facilities and asynchronously connected power-to-gas demand units mainly follow requirements from ACER Recommendation on NCs RfG/DC 2.0 unless specific requirements are provided in the proposed amendments for NC HVDC 2.0.

Forced oscillations

- Inclusion of requirements for A-PPMs for forced oscillations from ACER Recommendation on NC RfG 2.0.
- Reference to relevant Article for offshore power park modules from the ACER Recommendation on NC RfG 2.0.

P2G

Power-to-Gas demand units

Limited frequency sensitive mode — underfrequency consumption (LFSM-UC)

- Technical capability for limited frequency sensitive mode — underfrequency consumption (LFSM-UC) for an asynchronously connected power-to-gas demand unit.
- Proposal based on the Final Report by the EG CROS.

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ACER draft proposals (NC HVDC)

P2G

Power-to-Gas demand units

Fault-ride-through capability

- Fault-ride-through capability for an asynchronously connected power-to-gas demand unit.
- Proposal based on the Final Report by the EG CROS.

Simulation models

- Proposed amendments to the simulation models that properly reflect the behaviour of the HVDC system.
- Proposal based on the Final Report by ISSM Expert Group established under GC ESC.

Voltage ranges

- Voltage ranges for HVDC systems, asynchronously connected power park modules, asynchronously connected electricity storage modules, asynchronously connected demand facilities and asynchronously connected power-to-gas demand units amended to reflect the rated voltage.
- Proposal based on the Final Report by the EG CROS.

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Q&A session

10:20 – 10:55

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Closing remarks

Thank you.
Any questions?

The contents of this document do not necessarily reflect the position or opinion of the Agency.

ACER
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info@acer.europa.eu
acer.europa.eu
@eu_acer
linkedin.com/company/EU-ACER/