

# ACER draft amendments to the Network Code on HVDC

Fields marked with \* are mandatory.

## Introduction

---

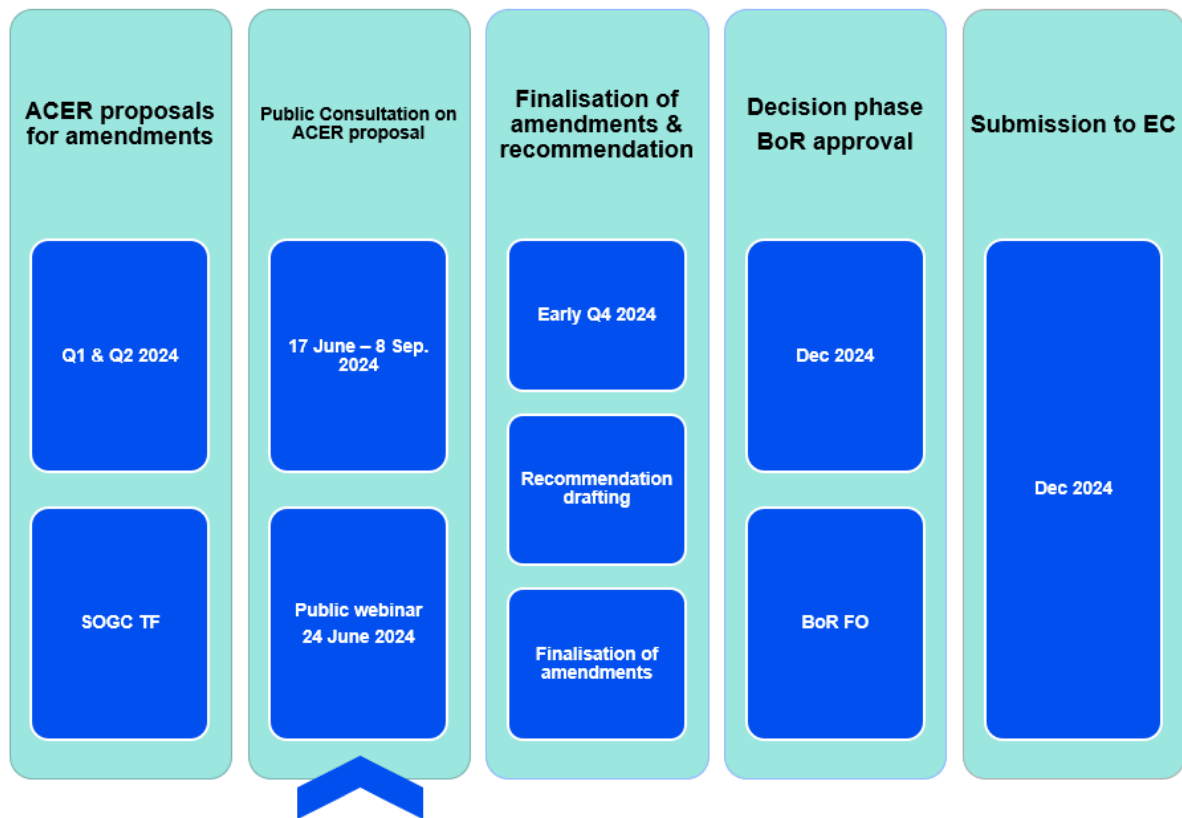
This consultation aims at presenting ACER's draft amendments to the **Commission Regulation (EU) 2016 /1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules ('NC HVDC')**.

**Responses to this consultation should be submitted by 8 September 2024.**

## Background

Important developments in the policies of decarbonisation of the European Union (EU) energy and transport sectors have taken place since the inception of the development of the first European Grid Connection Network Codes (GC NCs) in 2012.

In the framework of the [Grid Connection European Stakeholder Committee \(GC ESC\)](#), the European Commission proposed for ACER to initiate the process towards the amendment of the existing GC NCs in September 2022. The amendment process to the NC HVDC, as presented to the GC ESC is outlined in the Figure below:



In the context of [the ongoing revisions of the European grid connection network codes](#), ACER will consult with stakeholders to collect views on ACER's concrete amendment proposals to the network code on grid connection requirements for high voltage direct current systems and related power park modules ([NC HVDC](#)).

The revisions to the NC HVDC aim to:

- Enhance the existing grid connection regulatory framework.
- Align the code with the [ACER Recommendation](#) on reasoned proposals for amendments to the network codes on requirements for grid connection of generators and on demand connection.
- Ensure the interconnected system is adapted to emerging trends, such as the increasing generation capacity of offshore networks (AC hubs) and the connection of new system users (storage, demand facilities, including power-to-gas demand units).

---

## Stakeholder's details

---

ACER is highly committed in processing personal data in a lawful way.

Find out more how we process your data: <https://www.acer.europa.eu/the-agency/about-acer/data-protection>

\* Name of the stakeholder:

EU DSO ENTITY

\* Contact person:

\* Contact person's email address:

\* Country of the stakeholder's headquarters or main country of operation:

\* Type of the stakeholder:

- ☐ Generator (including association)
- ☐ Consumer (including association)
- ☐ Transmission system operator (including association)
- ☒ Distribution system operator (including association)
- ☐ Manufacturers (including association)
- ☐ Academia/research institution
- ☐ Regulatory authority
- ☐ Other (please, elaborate)

Please, elaborate on your answer above, if necessary:

\* Do you consent to the publication of the stakeholder's name?

- ☒ Yes
- ☐ No

\* Do you consent to the publication of provided answers?

- ☒ Yes
- ☐ No (please, note that your answer, without your name and organization, may be shared with the EU institutions and national authorities)

---

## Instructions

---

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

1. download the ACER draft amendments in the Word file provided below. The file could also be accessed on the right panel of the consultation form under the Background Documents;
2. comment on the ACER's draft amendments through this online consultation form and adding your alternative text proposals to the table, if any; and
3. uploading the alternative amendment proposals to the **entire NC HVDC** document using the Track Changes mode in the ACER draft amendments file downloaded from Step 1.

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

The mandatory steps for submitting the comments are listed below.

---

## ***Step 1***

Please see ACER's draft amendments in the Word file provided below. The file could also be accessed on the right panel of the consultation form under the Background Documents.

**[Download ACER draft amendments to the NC HVDC here](#)**


---

## ***Step 2***

**Kindly note that this consultation form follows the structure of the NC HVDC amended legal text provided by ACER in Step 1.**

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

Please use this form to comment on ACER draft amendments and/or to provide an alternative text proposal. The instructions are the following:


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	<b>1</b>	<b>2</b>
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)	<b>3</b>
New article		

Please upload figures or tables if necessary 

The maximum file size is 1 MB

Select file(s) to upload

**4**

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.

---

### Step 3

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 next **FILE UPLOAD** section and rename it with your stakeholder's name ("ACER\_draft\_HVDC\_stakeholder\_name"). You can also upload your justification documents, where applicable.

**In case the file size exceeds the 1MB limit**, which is a consultation tool limit, kindly send the document to the functional mailbox shown on the right panel of the consultation form. Please rename the file with your stakeholder's name as indicated above and send it with the subject "ACER draft HVDC legal text [stakeholder name]". Note that only submissions sent within the consultation deadline will be considered.

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).

## File upload

---

Please upload your file here

The maximum file size is 1 MB

Only files of the type pdf,doc,docx,odt,txt,rtf are allowed

**Kindly note that in case the file size exceeds 1MB, the file can be sent to the functional mailbox shown on the right panel of the consultation form under Contact. Please ensure that the file name and email subject are consistent with the instructions in Step 3.**

Please also upload any other document (i.e. **justifications**) below, if relevant.

Please upload your file

The maximum file size is 1 MB

**598833bd-b206-440f-9c7b-b5785f75e1d2/ACER\_draft\_HVDC\_EU\_DSO\_ENTITY.docx**

Please upload your file

The maximum file size is 1 MB

Please upload your file

The maximum file size is 1 MB

---

Due to the significant length of this survey:

- you have the possibility to edit your answer after submission. When clicking on "Submit" button, you will be given a Contribution ID which you can then use to access your answers and edit them, if necessary.
- we kindly suggest that you download the entire survey as .pdf (link on the right), prepare your answers and then upload them at once in the EU Survey Tool, to avoid a session timeout on submission.

The maximum length of each cell is 5000 characters. This is the maximum technical limit set by the EUsurvey tool, which cannot be increased.

## Whereas Section

---

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

Numbers in the first column correspond to the recitals of the amended version of NC HVDC Whereas section, including new recitals

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
(1)		
(2)	The level playing field should be for all participants, not just electricity undertakings.	Regulation (EU) 2019/943 sets out non-discriminatory rules governing access to the network for cross-border exchanges in electricity with a view to ensuring the proper functioning of the internal market in electricity. In addition Article 35 of Directive (EU) 2019/944 of the European Parliament and of the Council (2) requires that Member States shall ensure, a level playing field where all stakeholders are subject to transparent, proportionate and non-discriminatory rules, fees and treatment ....
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		
(11)		
(12)		
(13)		
(14)		
(15)		
(16)		

(17)		
(18)		
(19)		



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

	Text amendment proposal (if applicable)
New recital	

## Definitions (Article 2)

---

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

Includes new definitions

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 2(1)		
Article 2(2)[deleted]		
Article 2(2)		
Article 2(3)		
Article 2(5)[deleted]		
Article 2(6)[deleted]		
Article 2(4)		
Article 2(5)		
Article 2(6)		
Article 2(7)		
Article 2(8)[NEW]	If an island happened to be connected by a HVDC link, then the AC network on that island would be an isolated AC network.	'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 unless they are connected non-synchronously to the synchronous system of the member state;
Article 2(9)[NEW]		
Article 2(10)[NEW]		
Article 2(11)[NEW]		
Article 2(12)[NEW]		
Article 2(13)[NEW]		
Article 2(14)[NEW]		

Article 2(15)[NEW]		
Article 2(16)[NEW]		
Article 2(17)[NEW]		
Article 2(18)[NEW]		

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

	Text amendment proposal (if applicable)
New definition	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## TITLE I - GENERAL PROVISIONS

---

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		
Article 3	<p>It is not clear from Article 3.1 that the AC components of isolated AC networks are supposed to be included or not.</p> <p>Article 3.5 does help make this clear, but 3.1 in isolation could be easy to interpret</p>	<p>3.1. The requirements of this Regulation shall apply to the AC components of :</p> <p>(a) HVDC systems connecting synchronous areas or control areas, including back-to-back schemes;</p> <p>(b) connecting isolated AC networks;</p> <p>(c) HVDC systems connecting power park modules, demand facilities, power-to-gas demand units and electricity storage modules to a transmission network or a distribution network, pursuant to paragraph 2;</p> <p>(d) asynchronously connected power park modules, asynchronously connected demand facilities, asynchronously connected power-to-gas demand units and asynchronous electricity storage modules</p> <p>(e) embedded HVDC systems within one control area and connected to the transmission network;</p> <p>and</p> <p>(f) embedded HVDC systems within one control area and connected to the distribution network when a cross-border impact is demonstrated by the relevant transmission system operator (TSO). The relevant TSO shall consider the long-term development of the network in this assessment</p>
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	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## TITLE II - GENERAL REQUIREMENTS FOR HVDC CONNECTIONS

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 11		
Article 12		
		<p>1. With regard to the capability of controlling the transmitted active power:</p> <p>(a) an HVDC system shall be capable of adjusting the transmitted active power up to its maximum HVDC active power transmission capacity in each direction following an instruction from the relevant system operator.</p> <p>The relevant system operator :</p> <p>i. may specify a maximum and minimum power step size for adjusting the transmitted active power;</p> <p>ii. may specify a minimum HVDC active power transmission capacity for each direction, below which active power transmission capability is not requested; and</p> <p>iii. shall specify the maximum delay within which the HVDC system shall be capable of adjusting the transmitted active power upon receipt of request from the relevant system operator.</p> <p>(b) the relevant system operator in coordination with the relevant TSO shall specify how an HVDC system shall be capable of modifying the transmitted active power infeed in case of disturbances into one or more of the AC networks to which it is connected. If the initial delay prior to the start of the change is greater than 10 milliseconds from receiving the triggering signal sent by the relevant system operator, it shall be reasonably justified by the HVDC system owner to the relevant</p>



## Article 13

If a HV DC system is connected to a DSO's network, then that DSO should probably be determining the management of the transmitted active power, with appropriate co-ordination with the relevant TSO.

system operator and relevant TSO.

(c) the relevant system operator in co-ordination with the TSO may specify that an HVDC system be capable of fast active power reversal. The power reversal shall be possible from the maximum active power transmission capacity in one direction to the maximum active power transmission capacity in the other direction as fast as technically feasible and reasonably justified by the HVDC system owner to the relevant TSOs if greater than 2 seconds.

(d) for HVDC systems linking various control areas or synchronous areas, the HVDC system shall be equipped with control functions enabling the relevant TSOs to modify the transmitted active power for the purpose of cross-border balancing.

2. An HVDC system shall be capable of adjusting the ramping rate of active power variations within its technical capabilities in accordance with instructions sent by relevant TSOs. In case of modification of active power according to points (b) and (c) of paragraph 1, there shall be no adjustment of ramping rate.

3. If specified by a relevant system operator, in coordination with the relevant TSO and adjacent TSOs, the control functions of an HVDC system shall be capable of taking automatic remedial actions including, but not limited to, stopping the ramping and blocking FSM, LFSM-O, LFSM-U and frequency control. The triggering and blocking criteria shall be specified by relevant TSO and subject to notification to the regulatory authority. The modalities of that notification shall be

		determined in accordance with the applicable national regulatory framework.
Article 14		
Article 15		
Article 16		
Article 17		
Article 18		
Article 19		
Article 20		
Article 21		
Article 22		
Article 23		
Article 24		
Article 25		
Article 26		
Article 27		
Article 28		
Article 29		
Article 30		
Article 31		
Article 32		
Article 33		
Article 34		
Article 35		
Article 36		
Article 37		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

The maximum file size is 1 MB

TITLE III - REQUIREMENTS FOR ASYNCHRONOUSLY CONNECTED  
POWER PARK MODULES, ASYNCHRONOUSLY CONNECTED  
DEMAND FACILITIES, ASYNCHRONOUSLY CONNECTED POWER-TO-  
GAS DEMAND UNITS, ASYNCHRONOUSLY CONNECTED  
ELECTRICITY STORAGE MODULES AND REMOTE-END HVDC  
CONVERTER STATIONS

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 38		
Article 39		
Article 40		
Article 40a[NEW]		
Article 40b[NEW]		
Article 41		
Article 42		
Article 43		
Article 44		
Article 45		
Article 46		
Article 47		
Article 48		
Article 49		
Article 50		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## TITLE IV - INFORMATION EXCHANGE AND COORDINATION

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 51		
Article 52		
Article 53		

<p>Article 54</p>	<p>The rest of Art 54 makes provision for the RSO if the HVDC system is connected to a DSO, so these suggestions are just to align the text to allow for that possibility.</p>	<p>54.4 4</p> <p>For the purpose of the risk assessment of the resonance stability of the HVDC convert station, the relevant system operator in co-ordination with the relevant TSO shall have the right to request from the HVDC system owner the frequency dependent impedance model of the HVDC converter station at the AC side. Without prejudice to the Member State's rights to introduce additional requirements, the following requirements shall apply:</p> <p>(a) ...</p> <p>(b) the relevant system operator in co-ordination with the relevant TSO together with the HVDC owner shall agree if the calculation of the impedance model of the HVDC converter station will be either numerically (using the EMT model) or analytically (using transfer function) or both. In the case of numerical calculation, the relevant system operator in co-ordination with the relevant TSO shall specify the frequency steps where the impedance is provided. The number of different frequency steps shall be reasonably limited to provide acceptable results and at the same time limit the simulation effort and data storage to an acceptable amount;</p> <p>c. the relevant system operator in co-ordination with the relevant TSO shall have the right to request the impedance model of the HVDC station through the specified operating range and all control modes of operation;</p>
-------------------	--	--

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## TITLE V - OPERATIONAL NOTIFICATION PROCEDURE FOR CONNECTION

---



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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 55		
Article 56		
Article 57		
Article 58		
Article 59		
Article 60		
Article 61		
Article 62		
Article 63		
Article 64		
Article 65		
Article 66		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary  
The maximum file size is 1 MB

## TITLE VI - COMPLIANCE

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 67		
Article 68		
Article 69		
Article 70		
Article 71		
Article 72		
Article 73		
Article 74		
Article 75		
Article 76		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## TITLE VII - DEROGATIONS

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 77		
Article 78		
Article 79		
Article 80		
Article 81		
Article 82		
Article 83		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary  
The maximum file size is 1 MB

## TITLE VIII - FINAL PROVISIONS

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 84		
Article 85		
Article 85a[NEW]		
Article 86		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex I - Frequency ranges referred to in Article 11

---



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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex I		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex II - Requirements applying to frequency sensitive mode, limited frequency sensitive mode overfrequency and limited frequency sensitive mode underfrequency

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex II		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex III - Voltage ranges referred to in Article 18

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex III		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex IV - Requirements for U-Q/Pmax-profile referred to in Article 20

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex IV		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex V - Voltage-against-time-profile referred to in Article 25

---



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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex V		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex VI - Frequency ranges and time periods referred to in Article 39(2)

(a)

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex VI		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex VII - Voltage ranges and time periods referred to in Article 40

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex VII		

Please upload figures or tables if necessary

The maximum file size is 1 MB

## Annex VIII - Reactive power and voltage requirements referred to in Article 48

---

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Annex VIII		

Please upload figures or tables if necessary  
The maximum file size is 1 MB

## Other additional provisions

---

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

	Text amendment proposal (if applicable)
Other new provisions	

Please upload figures or tables if necessary  
The maximum file size is 1 MB

### Useful links

[more info on ACERs HVDC public consultation \(https://www.acer.europa.eu/documents/public-consultations/pc2024e05-public-consultation-amendments-electricity-grid-connection-network-code\)](https://www.acer.europa.eu/documents/public-consultations/pc2024e05-public-consultation-amendments-electricity-grid-connection-network-code)

### Background Documents

[ACER draft amendment proposal NC HVDC for PC 2024 E 05.docx](#)

### Contact

ACER-ELE-2022-015@acer.europa.eu