

# ACER draft amendments to the Network Code on Requirements for Generators

Fields marked with \* are mandatory.

## Introduction

This consultation aims to present ACER's draft amendments to the Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a **Network Code on Requirements for Grid Connection of Generators ('NC RfG')**.

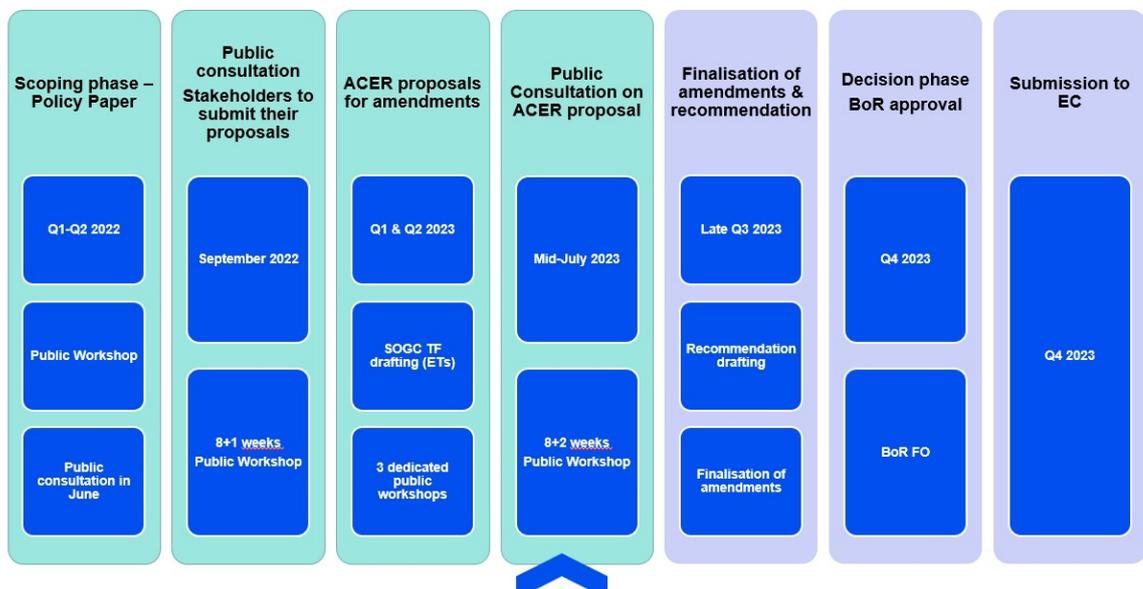
For draft amendments concerning Network Code on Demand Connection ('NC DC'), please go to the respective form: [NC DC](#).

**Responses to this consultation should be submitted by 25 September 2023.**

## 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, as presented to the GC ESC is outlined in the Figure below:



Following the scoping phase, ACER published the Policy Paper on the revision of the network code on requirements for grid connection of generators and the network code on demand connection in September 2022. The Policy Paper aimed to transparently indicate to stakeholders the key policy areas in which amendments were to be expected.

[Access the ACER Policy Paper on the revision of the NC RfG and NC DC.](#)

As a next step, ACER launched the Public Consultation to gather stakeholders' views and concrete amendment proposals regarding the GC NCs. The stakeholders could submit their inputs by 21 November 2022.

[Access the results of the Public Consultation on the amendments to the grid connection network codes.](#)

Additionally, in the preparation of the draft amendment proposals, ACER organised three dedicated public workshops, namely:

- [electromobility, power-to-gas demand units and heat-pumps](#) (held on 17 April 2023);
- [rate of change of frequency and grid forming capabilities](#) (held on 10 May 2023); and
- [electricity storage](#) (held on 11 May 2023).

After the evaluation of stakeholders' inputs, ACER has formulated its own proposal for the amendments of the GC NCs which is subject to this public consultation.

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## Stakeholder's details

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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:

RES Group

\* Contact person:

[REDACTED]

\* Contact person's email address:

[REDACTED]

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

Outside the EEA (please, specify)

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Please, specify the country:

UK headquarters but active in EU

\* 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:

Developer, constructor and asset manager of renewable energy generation

\* 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)

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## Instructions

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

1. by downloading the ACER draft amendments in the Word file provided below. The file can also be accessed on the right panel of the consultation form under the Background Documents;
2. by commenting on the ACER's draft amendments through this online consultation form and adding their alternative text proposals to the table, if any; and
3. by uploading the alternative amendment proposals to the **entire NC RfG** 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.

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## ***Step 1***

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

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

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## ***Step 2***

**Kindly note that this consultation form follows the structure of the NC RfG 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 4a [new]		
Article 5		
Article 6		
Article 7		
Article 8		
Article 9		
Article 10		
Article 11		
Article 12		

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

	Text amendment proposal (if applicable)
New article	<b>3</b>

Please upload figures or tables if necessary

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Select file 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 RfG, 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 RfG**, 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\_RfG\_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 RfG 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

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Please upload your file here

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

**d416dc78-6a17-4f57-a539-5433a451086b/TFGC\_Response\_Table\_NC\_RfG\_ACER\_Survey.docx**

**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.

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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.



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 RfG Whereas section, including new recitals

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
(1)		
(2)		
(3)		
(s1)		
(s2)		
(4)		
(5)		
(6)		
(7)		
(8)		
(9)	Use of "capacity" is ambiguous. Defined terms are preferred.	...Electricity storage integrated to a power-generating module, where module is either non-synchronously connected to the network or connected through power electronics, used solely for the purpose of meeting the requirements of this Regulation should be considered as part of such module while its capacity should not count towards the power-generating module maximum capacity.
(10)		
(**)		
(11)		
(12)		
(13)		
(14)		

(15)		
(16)		
(17)		
(x)		
(18)		
(19)		
(**)		
(20)		
(21)		
(22)		
(**)		
(23)		
(24)		
(25)	<p>“RES” is undefined and even the commonly understood “Renewable Energy sources” does not fully encompass all the forms of non-synchronous generators.</p>	<p>Synchronous power-generating modules have an inherent capability to resist or slow down frequency deviations, a characteristic which many non-synchronous technologies (including some renewable energy technologies) do not have. Therefore countermeasures should be adopted, to avoid a larger rate of change of frequency during high non-synchronous production. Synthetic inertia could facilitate further expansion of non-synchronous renewable energy technologies, which do not naturally contribute to inertia.</p>

(**)	Typo, should be converter-based	Rapidly increasing penetration of dispersed generation and converter-based technologies into European networks has presented new challenges in ensuring overall system security. To the extent that an adequate contribution to the dynamically transforming system depends partly on advanced capabilities, power-generating modules should be able to support the system robustness by fulfilling appropriate grid-forming and rate-of-change-of-frequency withstand requirements.
(26)		
(27)		
(28)		
(29)		
(30)		
(31)		
(32)		

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

	Text amendment proposal (if applicable)
New recital	

## Definitions (Article 2)

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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)		
Article 2(3)		
Article 2(4)		
Article 2(5)		
Article 2(6)		
Article 2(7)		
Article 2(8)		
Article 2(9)		
Article 2(10)		
Article 2(10a)		
Article 2(11)		
Article 2(12)		
Article 2(13)		
Article 2(14)		
Article 2(15)		
Article 2(16)		

Article 2(17)	Care is needed to ensure that Electricity Storage PPMs are included. Some might argue that Electricity Storage PPMs do not generate but merely discharge electrical energy. "Export" is a more clear word in this context	'power park module' or 'PPM' means a unit or ensemble of units that can export electrical energy, which is not a synchronous power-generating module and which is either non-synchronously connected to the network or connected through power electronics, and that also has a single connection point to a transmission system, distribution system including closed distribution system or HVDC system
Article 2(18)		
Article 2(19)		
Article 2(20)		
Article 2(21)		
Article 2(22)		
Article 2(23)		
Article 2(24)		
Article 2(25)		
Article 2(26)		
Article 2(27)		
Article 2(28)		
Article 2(29)		
Article 2(30)		
Article 2(31)		
Article 2(32)		
Article 2(33)		
Article 2(34)		
Article 2(35)		
Article 2(36)		

Article 2(37)		
Article 2(38)		
Article 2(39)		
Article 2(40)		
Article 2(41)		
Article 2(42)		
Article 2(43)		
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Article 2(46)		
Article 2(47)		
Article 2(48)		
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Article 2(61)		
Article 2(62)		
Article 2(63)		
Article 2(64)		
Article 2(65)		

Article 2(66)		
Article 2(67)		
Article 2(68)	<p>The proposed text “less any demand or losses associated solely with facilitating the operation of that demand unit or electricity storage module” will cause confusion. It should be deleted.</p> <p>The above exclusion text makes sense where it is used in the definition of "maximum capacity or Pmax", particularly as Pmax is used for determining the significance of a PGM (i.e. type A, B, C or D). However, it makes no sense and serves no purpose to copy this text over to the definition of "maximum consumption capacity"</p>	<p>'maximum consumption capacity' means the maximum continuous active power which a demand unit or electricity storage module can consume, as specified in the connection agreement or as agreed between the relevant system operator and the demand facility owner or power-generating facility owner, or determined by other appropriate means, where an agreement is not required.</p>
Article 2(69)		
Article 2(70)		
Article 2(71)		
Article 2(72)		
Article 2(73)		
Article 2(74)		
Article 2(75)		

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

	Text amendment proposal (if applicable)
New definition	

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## TITLE I - General provisions

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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		
Article 4		

<p>Article 4a [new]</p>	<p>We propose that article 4a(2)(b) should be deleted.</p> <p>If plant changes increase reactive power capability, this is a benefit to system operation. Therefore, there is no justification to require application of new RfG requirements. Introducing such requirements could discourage such increase in reactive power capability and there would be no benefit to the system.</p> <p>If plant changes decrease reactive power capability, this should be acceptable provided the reactive power requirements of RfG 2016/631 are still satisfied. If the reactive power requirements of RfG 2016/631 are no longer satisfied, then the Limited Operational Notification procedure should be invoked. Therefore, there is no justification to require application of new RfG requirements.</p> <p>I also propose that article 4a(2)(d) should be deleted.</p> <p>Replacement of components/assets should not trigger application of new RfG requirements if the replacement is for the purpose of retaining /restoring the original functions. E.g. replacement of a PV inverter with an identical item or one of substantially equivalent performance</p>	<p>Delete Articles 4a(2)(b) and 4a(2)(d)</p>
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Article 5	<p>Original text referred to “the capacity of the power-generating module” but “capacity” is undefined</p> <p>New Article 5(4) is welcome</p> <p>New article 5(6) leaves the significance of V2G <math>\geq 1</math>MW undefined</p>	<p>Article 5(2)(b) “Where the maximum capacity of the power generating module...”</p> <p>Article 5(2)(c) “Where the maximum capacity of the power generating module...”</p>
Article 6		
Article 7	<p>Article 7(3)(f) introduces the unacceptable risk that additional requirements could be introduced via IGDs without the scrutiny and consultation applied to this Regulation. Delete reference to IGDs because they should only guide and not specify.</p>	<p>Article 7(3)(f) take into consideration agreed European standards, technical specifications, and relevant nuclear safety rules;</p>
Article 8		
Article 9		
Article 10		
Article 11		
Article 12		

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

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## TITLE II CHAPTER 1 - General Requirements

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### General requirements for type A power-generating modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 13(1)		
Article 13(2)	Incorrect reference	Article 13(2)(c) Protection schemes, other than those specifically referred in paragraph b(iv) above, shall not jeopardise frequency-ride-through performance specified in paragraph (b).
Article 13(3)	<p>Article 13(3)(c) says “The frequency threshold shall be <math>50\text{Hz}+\Delta f_1</math>” but should be <math>50\text{Hz}-\Delta f_1</math> for LFSM-U. Seems like a copy/paste error from LFSM-O.</p> <p>Article 13(3)(g) refers to an undefined acronym “RSO” which should be relevant system operator</p> <p>Article 13(3)(g) refers to “...Tresp in Figure XX, for active power decrease...” however this figure XX illustrates active power increase</p> <p>The subscripts in figure 1 are practically illegible</p>	<p>Article 13(3)(c) The frequency threshold shall be <math>50\text{Hz}-\Delta f_1</math>...</p> <p>Article 13(3)(g) ... The TSO in coordination with the relevant system operator shall define the framework conditions for the use of this function...</p> <p>Article 13(3)(g) Insert a new figure similar to XX but illustrating active power decrease</p> <p>Please include a more legible version of figure 1</p>
Article 13(4)	Update paragraph references following the insertion of new paragraph 2	The power-generating module shall be capable of maintaining constant output at its target active power value regardless of changes in frequency, except where output follows the changes specified in the context of paragraphs 3 and 5 of this Article or points (c) and (d) of Article 15(2) as applicable.

Article 13(5)		
Article 13(6)		
Article 13(7)		
Article 13(8)	Amend for clarity	(d) Adjustable limitation of the gradient of active power increase $\leq 20\%$ of Pmax per minute; and,
Article 13(9)	Update paragraph references following the insertion of new paragraph 2	Within the capability defined in paragraph (8), the default settings for an autonomous connection shall be as follows:...
Article 13(10)		
Article 13(11)	Section (e) includes undefined acronym. I assume SPGM means Synchronous Power Generation Module	for synchronous power generating modules: less or equal to 8 s for an active power setpoint change of 1 pu of capacity excluding the time for switching from consumption to generation or vice versa.
Article 13(12)		
Article 13(13)		
Article 13(14)		

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

	Text amendment proposal (if applicable)
New provision	

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**[NEW] General requirements for type EV1 and EV2 V2G electric vehicles and associated V2G electric vehicle supply equipment**

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 13a(1)		
Article 13a(2)		
Article 13a(3)		
Article 13a(4)		
Article 13a(5)		
Article 13a(6)		
Article 13a(7)		
Article 13a(8)		
Article 13a(9)		
Article 13a(10)		
Article 13a(11)		

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

	Text amendment proposal (if applicable)
New provision	

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**General requirements for type B power-generating modules**

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 14(1)	The exclusion of article 13(2)(b) is incorrectly numbered because a new article 13(2) was inserted.	Type B power-generating modules shall fulfil the requirements for type A power-generating modules set out in Article 13, except for Article 13(3)(b) and Article 13(9).
Article 14(2)[deleted]		
Article 14(2)	<p>According to Article 5, a Type B PGM is not connected to voltage levels of 110 kV or above.</p> <p>Article 14, Paragraph (2) defining requirements for Type B PGMs introduces requirements in section (a) for connecting at voltages levels of 110 kV or above. These are by definition out of scope for Type B PGMs.</p> <p>How shall this inconsistency please be understood? Could for instance a consistent paragraph (2) be provided for commenting that is in line with the definition of Type B PGMs?</p>	

<p>Article 14(3)</p>	<p>Article 14(3)(c) describes high voltage ride through requirements for PGMs connected at voltages defined relative to U<sub>ref</sub> which “is the maximum voltage specified in paragraph 2”. However, as discussed above, paragraph 2 defines these maximum voltages for systems with rated voltage 110kV and above which are not applicable to Type B PGMs according to Article 5.</p> <p>It is not clear how the requirements of this section would or would not apply to Type B PGMs connected at less than 110kV.</p> <p>This article 14(3)(c) should be moved to Article 16 general requirements for Type D PGMs.</p>	
<p>Article 14(4)</p>	<p>The ACER new text incorrectly refers to Article 13(7) as defining the capability for autonomous reconnection.</p> <p>Since the introduction of a new Article 13(2) and consequent renumbering of subsequent sections, the reference should be amended to Article 13(8)</p>	<p>Article 14(4)(b) “within the capability defined in Article 13(8)...”</p>
<p>Article 14(5)</p>		

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

	Text amendment proposal (if applicable)
New provision	

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**[NEW] Requirements for type EV3 electric vehicles and associated V2G electric vehicle supply equipment and V2G electrical charging parks**

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 14a(1)		
Article 14a(2)		
Article 14a(3)		
Article 14a(4)		
Article 14a(5)		
Article 14a(6)		
Article 14a(7)		
Article 14a(8)		

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

	Text amendment proposal (if applicable)
New provision	

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### General requirements for type C power-generating modules

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 15(1)	The exclusions of articles 13(2)(b) and 13(6) are incorrectly numbered because a new article 13(2) was inserted.	Type C power-generating modules shall fulfil the requirements laid down in Articles 13 and 14, except for Article 13(3)(b) and (7) and Article 14(5)(d)(iii).
Article 15(2)	<p>The droop range in FSM (table 4) has been increased to 2 – 27(?)%. Maybe it's a typo.</p> <p>t2 is said to be 5 seconds for Ireland (table 5), but it should be 15s.</p> <p>Table 5. In SA Ireland, POR (Primary Operating Reserve) is fully activated in 15 seconds. Other frequency response products are fully activated over longer times.</p> <p>Article 15(2)(d)(v) included a full stop which makes the second sentence an incomplete fragment.</p>	Article 15(2)(d)(v) “the power-generating module shall be capable of providing full active power frequency response for a period of between 15 and 30 minutes as specified by the relevant TSO in coordination with the TSOs of the same synchronous area unless, where agreed between the relevant TSO and the power-generating facility owner, contribution is limited only by the maximum energy content of the electricity storage module or primary energy source of the power-generating module;”

<p>Article 15(3)[deleted]</p>	<p>The deleted section allowed distribution system operators to specify over and under voltage protection settings which helped to disconnect generators contained in inadvertently islanded sections of a distribution system where their persistent operation might cause danger from:</p> <ul style="list-style-type: none"> <li>(a) unearthed energization of part of the island, or;</li> <li>(b) operation of the island at frequencies or voltages which are outside the required standard, or;</li> <li>(c) might result in inadvertent out-of-phase closure of switches when one side was expected to be dead, with consequent over-currents and transient loads on motors and generators within the reconnected island</li> </ul> <p>We recommend that this proposed deletion is discussed with distribution network operators and their representative organisation</p>	
<p>Article 15(3)</p>		
<p>Article 15(4)</p>		
	<p>Article 15(5)(c)(i) requires PGFO to provide EMT simulation model if requested. This is a significant increase in requirements and will incur extra costs and project delay of up to 1 year and should therefore be justified in every case it is requested. It is unlikely that Type C PGMs will require EMT simulation. Unless justified this requirement for EMT simulation models should be removed from Type C PGMs and applied to Type D PGMs.</p> <p>Article 15(5)(c)(i) “properly” seems like an unsuitable word. We suggest that “adequately” better describes</p>	

Article 15(5)

the intent to model with sufficient fidelity to reality, but acknowledging that all models are imperfect.

The same section requires that “The simulation model requirements and data provided shall not violate manufactures intellectual property” but this can only occur if the relevant TSO enters into a suitable non-disclosure agreement.

Acceptance criteria for the verification requirements are needed. The RSO shall define the verification standards and acceptance criteria.

Article 15(5)(c)(iv) 2500Hz is much higher than the frequencies typically observed in control system interactions (i.e. up to 200Hz). I recommend that an upper limit of 1000Hz is sufficient and the text should be amended accordingly to avoid unnecessary processing and effects dominated by passive components.

The requirements for EMT models and frequency domain simulations Article 15 5. (c)(iv) and (v) is very extensive, especially for Type C. Suggestion is that this shall only be required for Type D and that (iv) shall only be provided if requested by the DSO or TSO with justification. Is there even a CIM model standard for these types of models? Unless there is a standard for the performance of the models then it would be challenging to achieve a level of consistency with the development of the models.

Accurate EMT models and plant data can only be provided after equipment FAT commissioning and

Article 15(5)(c)(i) “at the request of the relevant system operator or the relevant TSO and supported by their statement of justification, the power-generating facility owner shall provide simulation models which adequately reflect the behaviour of the power-generating module ... The simulation model requirements and data provided shall be subject to a suitable non-disclosure agreement between the relevant TSO and the power-generating module manufacturer.”

final control tuning. At this stage we can much easier just measure the actual dynamic performance instead of simulating it with high uncertainties.

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

	Text amendment proposal (if applicable)
New provision	

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## General requirements for type D power-generating modules

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 16(1)	<p>The exclusions of articles 13(2)(b), (6) and (7) are incorrectly numbered because a new article 13(2) was inserted.</p> <p>Original article 15(3) has been proposed by ACER to be deleted, therefore its exclusion here should also be deleted (except that I suggest above that ACER should not delete article 15(3)).</p>	Type D power-generating modules shall fulfil the requirements laid down in Articles 13, 14 and 15, except for Article 13(3)(b), (7) and (8), and Article 14(5)(d)(iii).
Article 16(2)		
Article 16(3)		
Article 16(4)		

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

	Text amendment proposal (if applicable)
New provision	

Please upload figures or tables if necessary

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## TITLE II CHAPTER 2 - Requirements for synchronous power-generating modules

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**[NEW]** Requirements for type A synchronous power-generating modules

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 X		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type B synchronous power-generating modules

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 17(1)	<p>The exclusions of articles 13(2)(b), and (8) are incorrectly numbered because new paragraphs were inserted.</p> <p>The placement of Article 14 at the end of the sentence makes it ambiguous whether article 14 is included or excluded. The original text clearly included reference to Article 14 and therefore I recommend that it is moved adjacent to the inclusion of Article 13.</p>	<p>Type B synchronous power-generating modules shall fulfil the requirements listed in Articles 13 and Article 14, except for Article 13(3)(b), Article 13(10),</p>
Article 17(2)		
Article 17(3)		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type C synchronous power-generating modules

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 18(1)	<p>The exclusions of articles 13(2)(b) and 13(6) are incorrectly numbered because a new article 13 (2) was inserted.</p> <p>Please consider whether Article 13(8) is correctly excluded, renumbering might refer to 13 (9) or 13(10)</p>	<p>Type C synchronous power-generating modules shall fulfil the requirements laid down in Articles 13, 14, 15 and 17, except for Article 13(3)(b), Article 13(7), Article 13(??), and Article 17(2)(a).</p>
Article 18(2)		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type D synchronous power-generating modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 19(1)	<p>The exclusions of articles 13(2)(b), 13(6) and 13(7) are incorrectly numbered because a new article 13(2) was inserted.</p> <p>Please consider whether Article 13(8) is correctly excluded, renumbering might refer to 13(9) or 13(10)</p> <p>Article 15(3) has been deleted and therefore need not be excluded.</p>	<p>Type D synchronous power-generating modules shall fulfil the requirements laid down in Article 13, except for Article 13(3)(b), Article 13(7), Article 13(8) and Article 13(?), Article 14, Article 15, Article 16, Article 17, except for Article 17(2) and Article 18.</p>
Article 19(2)		
Article 19(3)		
Article 19(4)		

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

	Text amendment proposal (if applicable)
New provision	

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## TITLE II CHAPTER 3 - Requirements for power park modules

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**[NEW]** Requirements for type A power park modules

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 Y(1)		
Article Y(2)		
Article Y(3)		
Article Y(4)		
Article Y(5)	<p>This section is not coordinated with article Y(8)</p> <p>This section states “The relevant TSO in coordination with the relevant system operator may specify that type A power park modules shall be capable of providing grid forming capability at the connection point.”</p> <p>Article Y(8) states “A power park module shall be capable of providing grid forming capability at the connection point as listed below.”</p> <p>Is grid forming capability mandatory in all circumstances or only when specified by the relevant TSO in coordination with the relevant system operator? This should be made clear in the text.</p>	
Article Y(6)		
Article Y(7)		

<p>Article Y(8)</p>	<p>A power park’s limits might be more extensive than current and energy e.g. mechanical limits</p> <p>Adequate grid forming performance at the connection point should be sufficient, mandating grid forming performance by every individual unit is overly restrictive</p> <p>“Affecting” seems to be the correct verb in this context, not “effecting”.</p> <p>In addition to the proposed editorial amendment, this section is not coordinated with article Y(5)</p> <p>Article Y(5) states “The relevant TSO in coordination with the relevant system operator may specify that type A power park modules shall be capable of providing grid forming capability at the connection point.”</p> <p>This section states states “A power park module shall be capable of providing grid forming capability at the connection point as listed below.”</p> <p>Is grid forming capability mandatory in all circumstances or only when specified by the relevant TSO in coordination with the relevant system operator? This should be made clear in the text.</p> <p>Y(8)(d) is likely to cause significant costs and if it is retained must be subject to a robust cost benefit analysis</p>	<p>All instances of grid disturbance should be clarified to mean “a disturbance of positive phase sequence voltage magnitude or phase angle”</p> <p>Article Y(8)(a)  “Within the power park module’s technical limits, the power park module shall be capable of behaving at the terminals of the individual unit(s) or at the connection point as defined in the PGFO as a voltage source behind an internal impedance (Thevenin source), during normal operating conditions (non-disturbed grid conditions) and upon inception of a disturbance of positive phase sequence voltage magnitude or phase angle. The Thevenin source is characterized by its internal voltage amplitude, voltage phase angle, frequency and internal impedance.</p> <p>“...Inherent energy storage means an energy reserve available in physical components of a power park module, which has not been designed to suit the grid forming requirements of this article, but may be used for such purposes, without affecting the design of the physical components of individual units.”</p> <p>Delete Y(8)(d)</p>
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type B power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 20(1)	<p>The exclusions of articles 13(2)(b) is incorrectly numbered because a new article 13(2) was inserted.</p> <p>Please consider whether Article 13(8) is correctly excluded, renumbering might refer to 13(9) or 13(10)</p> <p>Will grid forming (GFM) requirements only be applicable to PPMs smaller than 10 MW? OR does it mean GFM will still be required from all PPMs, but the capability of activating and deactivating grid forming mode will not be required by PPMs greater than 10 MW?</p> <p>If the latter is correct, does this mean that for PPMs <math>\geq 10</math> MW, grid forming mode must be permanently activated or permanently deactivated? Please amend the text to make this clear.</p>	<p>Type B power park modules shall fulfil the requirements laid down in Article 13, Article 14, and Article Y(6), (7) and (8), except for Article 13(3)(b) and Article 13(8). Requirement laid down in Article Y(8)(d) shall not apply to power park modules with maximum capacity larger than or equal to 10 MW.</p>
Article 20(2)		
Article 20(3)		

Article 20(4)	<p>This paragraph seems to require mandatory grid forming capability despite the questions raised above about Article 20(1) and the uncertainty about whether grid forming capability is required / not required for PPMs <math>\geq 10\text{MW}</math>.</p> <p>Please redraft more clearly.</p>	
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type C power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 21(1)	<p>The exclusions of articles 13(2)(b) and 13(6) are incorrectly numbered because a new article 13(2) was inserted.</p> <p>Please consider whether Article 13(8) is correctly excluded, renumbering might refer to 13(9) or 13(10)</p>	Type C power park modules shall fulfil the requirements listed in Article 13, Article 14, Article 15, Article Y(6), and (8) and Article 20, except for Article 13(3)(b) Article 13(7) and Article 13(8) and Article 20(2)(a), unless referred to otherwise in point (v) of paragraph 3(d).
Article 21(2) [deleted]		
Article 21(2)	<p>This addition leaves more options open to find solutions for stable voltage control. A technical solution for stable operation can otherwise be hindered by this very paragraph.</p> <p>For example, moving the control point to each turbine as has been done in Australia to prevent interactions with nearby windfarms and assure stable operation with significant improvement. In Australia this is even a requirement that the turbines have both options for voltage control.</p> <p>Another example is if the connection point is on the LV side of a tap changing transformer. For voltage dips with long duration the tap changer can then regulate the voltage on the LV side and the generating facility can provide support at the HV side.</p>	for the purposes of voltage control mode, the power park module shall be capable of contributing to voltage control at the connection point by provision of reactive power exchange with the network with a setpoint voltage covering 0,95 pu to 1,05 pu in steps no greater than 0,01 pu, with a slope having a range of at least 2 % to 7 % in steps no greater than 0,5 %. The reactive power output shall be zero when the grid voltage value at the connection point equals the voltage setpoint. Stable operation in voltage control mode operation shall be ensured. A control point other than the connection point can be chosen if the relevant system operator and the power-generating facility owner both agree to this.
Article 21(3)		
Article 21(4)		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type D power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 22(1)	<p>The exclusions of articles 13(2)(b), 13(6) and 13(7) are incorrectly numbered because a new article 13(2) was inserted.</p> <p>Please consider whether Article 13(8) is correctly excluded, renumbering might refer to 13(9) or 13(10)</p>	<p>Type D power park modules shall fulfil the requirements listed in Article 13, Article 14, Article 15, Article Y(6) and (8), Article 20, and Article 21, except for Article 13(3)(b), Article 13(7), Article 13(8), Article 13(?), Article 15(3), Article Y(8)(d) and Article 20(2)(a).</p>
Article 22(2)		

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

	Text amendment proposal (if applicable)
New provision	

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## TITLE II CHAPTER 4 - Requirements for offshore power park modules

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 23		
Article 24	The exclusions of articles 13(2)(b), 13(6) and 13(7) are incorrectly numbered because a new article 13(2) was inserted.	AC-connected offshore power park modules shall fulfil the requirements relating to frequency stability laid down in Articles 13, 15(2) and 21(2), except for Article 13(3)(b), (7) and (8) respectively.
Article 25	Article 25(4) AC-connected offshore power park modules shall fulfil the requirements relating to voltage stability laid down in Article 21(3).	Articles 20(2)(b) and (c) have been deleted and should not be referenced.
Article 26	<p>Considering the changes in Article 14: Is the reference to 14(3)(a) still correct or should it be e.g., 14(3)(b) instead?</p> <p>Considering the changes in Article 15: Is the reference to 15(4) still correct or should it be e.g., 15(3) instead?</p>	
Article 27	Considering the changes in Article 15: Is the reference to 15(5) still correct or should it be e.g., 15(4) instead?	
Article 28	Considering the changes in Article 15: Is the reference to 15(6) still correct or should it be e.g., 15(5) instead?	

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

	Text amendment proposal (if applicable)
New article	

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## TITLE III - 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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 29		
Article 30		
Article 30a [new]		
Article 30b [new]		
Article 31		
Article 32		
Article 33		
Article 34		
Article 35		
Article 36		
Article 37		
Article 38		
Article 39		

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

	Text amendment proposal (if applicable)
New article	

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## TITLE IV - Compliance

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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 40		
Article 41		
Article 42		
Article 43		
Article 44		
Article 45		
Article 46		
Article 47		
Article 48		
Article 49		
Article 50		
Article 51		
Article 52		
Article 53		
Article 54		
Article 55		
Article 56		
Article 57		
Article 58		
Article 59		

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

	Text amendment proposal (if applicable)
New article	

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## TITLE V - Derogations

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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 60		
Article 61		
Article 62	Originally referred to “the Agency”, but this definition has been deleted from Article 11 and references to “the Agency” have been changed to “ACER” throughout most of the document.	Delete “the Agency” and substitute “ACER”
Article 63	Originally referred to “the Agency”, but this definition has been deleted from Article 11 and references to “the Agency” have been changed to “ACER” throughout most of the document.	Delete “the Agency” and substitute “ACER”
Article 64	Originally referred to “the Agency”, but this definition has been deleted from Article 11 and references to “the Agency” have been changed to “ACER” throughout most of the document.	Delete “the Agency” and substitute “ACER”
Article 65	Originally referred to “the Agency”, but this definition has been deleted from Article 11 and references to “the Agency” have been changed to “ACER” throughout most of the document.	Delete “the Agency” and substitute “ACER”

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

	Text amendment proposal (if applicable)
New article	

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## **[DELETED]** TITLE VI - Transitional arrangements for emerging technologies

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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)
Title VI [deleted]		



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 70a [new]		

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

	Text amendment proposal (if applicable)
New article	

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## TITLE VII - Final provisions

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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 71		
Article 71a [new]		
Article 72		

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

	Text amendment proposal (if applicable)
New article	

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## Other additional provisions

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

	Text amendment proposal (if applicable)
Other new provisions	

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## Background Documents

[NC\\_RfG\\_ACER\\_draft\\_amendments\\_for\\_PC\\_2023\\_E\\_07.docx](#)

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