

# 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')**.

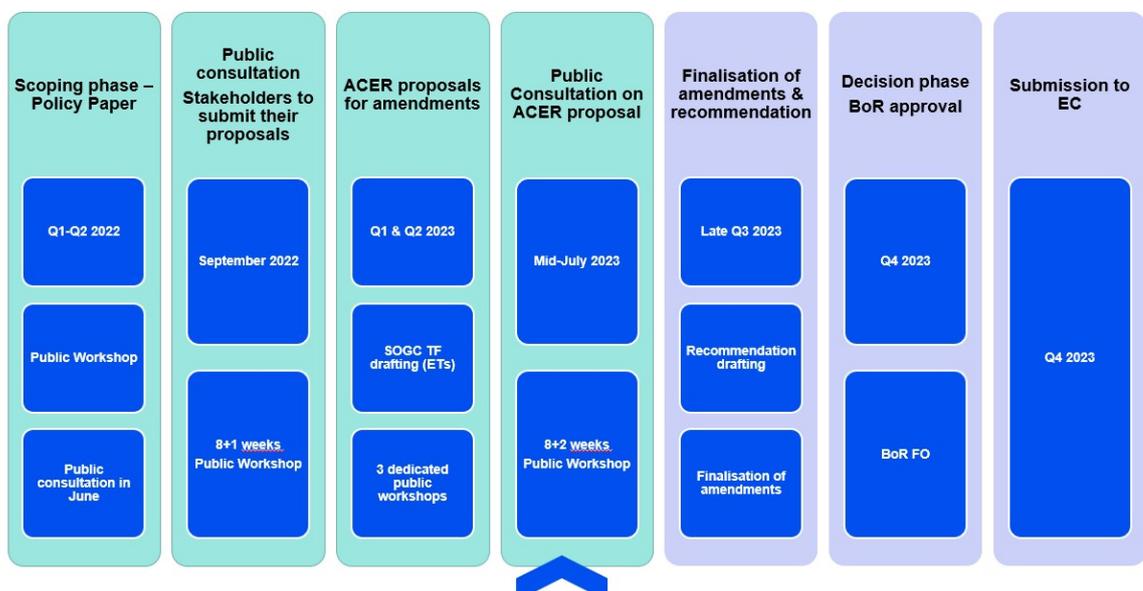
For draft amendments concerning Network Code on Demand Connection ('NC DC'), please go to the respective form: [NC DC](#).

**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:

VDE FNN

\* Contact person:

[REDACTED]

\* Contact person's email address:

[REDACTED]

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

Germany

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\* 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:

VDE FNN is the entity designated by the member state (Germany) according to Article 7 (1) RfG

\* 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	1	2
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	3

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.
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### ***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

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.

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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.

## Whereas Section

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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)	National methodologies would contradict all efforts of achieving cost efficiencies on the side PPM constructors and operators, which are regarded as market integration issues by the standard below. The aim is to achieve international solutions	add at the end of p. 1 (2) : Intension of EC grid code shall be to establish unified methodology, which is mandatory all over Europe in order to facilitate deregulation of energy market and establish single European market for tenders, services and technical products. Only implementation of methodology may be adapted to national conditions.
(3)		
(s1)		
(s2)		
(4)		
(5)		
(6)		
(7)		
(8)		
		The significance of power-generating modules should be based on their size and their effect on the overall system. Synchronous machines should be classed on the machine size and include all the components of a generating facility that normally run indivisibly. An installation containing a set of synchronous machines that cannot be operated

(9)

The original wording of only units of same underlying technology should be assessed on their aggregated capacity and the integration for storage does not harmonize well with hybrid energy systems or hybrid power plants with multiple technologies existing behind one connection point. This wording will create ambiguity regarding the requirements for such plants and create unnecessary regulatory obstacle for cost effective RES integration and therefore achieving the EU's RES targets on time.

independently from each other, such as combined-cycle gas turbine installation, should be assessed on the whole capacity of that installation.

Non-synchronously connected power-generating units of the same underlying technology, where they are collected together to form an economic unit and where they have a single connection point should be assessed on their aggregated capacity.

Moreover, to ensure an appropriate harmonisation or rules for mass-market products, capacities of units of different classes, for instance, photovoltaic, electricity storage, combined heat and power installations, or V2G electric vehicles, may be aggregated for the purpose of the determination of significance. Non-synchronously connected power-generating units and electricity storage of different underlying technology may be aggregated, where they are collected together to form an economic unit and where they have a single connection point.

The Member State or the entity designated by the Member State may set the formal and substantive conditions for the aforementioned aggregations including the definition of underlying technology.

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 capacity.
(10)		
(**)		
(11)		
(12)		
(13)		
(14)		
(15)		
(16)		
(17)		
(x)		
(18)		
(19)		
(**)		
(20)		
(21)		
(22)		
(**)		
(23)		
(24)		

(25)	<p>Converter-based is the correct word instead of RES. E.g. hydro power plants are usually designed as synchronous power generating modules. The capability to provide Synthetic Inertia from converter-based generating technologies is based on technology and product design decisions, it's not an intrinsic (natural) characteristic / limitation of such technologies</p>	<p>Synchronous power-generating modules have an inherent capability to resist or slow down frequency deviations, a characteristic which many converter-based generating modules (power park modules) do not have implemented as of today. Therefore countermeasures should be adopted, to avoid a larger rate of change of frequency during high converter-based generation periods. Synthetic inertia could facilitate further expansion of converter-based generating modules (power park modules).</p>
(**)	<p>voltage control capability and stable LFSM operation are important contributions of non-gridforming PPM to power system stability</p>	<p>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 capabilities such as grid-forming rate-of-change-of-frequency withstand requirements, voltage control capabilities and/or fast and stable LFSM capability.</p>
(26)		
(27)	<p>European standardization and harmonization is crucial for a cost effective energy transition, especially with regard to mass market products</p>	<p>Development of non-exhaustive requirements shall, to the extent possible, be carried involving European standardisation organisations; therefore, permitting the evolution of product standards and, as a consequence, the adoption of the same by the industry.</p>

(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)		

<p>Article 2(16)</p>	<p>Is Pmax the actual maximum power a PPM can produce or the agreed connection capacity? Overplanting still needs to be possible.</p>	<p>'maximum capacity' or 'Pmax' means the maximum continuous active power which a power-generating module can produce, less any demand or losses associated solely with facilitating the operation of that power-generating module as specified in the connection agreement or as agreed between the relevant system operator and the power-generating facility owner, or determined by other appropriate means, where an agreement is not required and which may differ from aggregated installed capacity of a power-generating module</p>
<p>Article 2(17)</p>	<p>On the one hand, a uniform terminology must be used, compare to NC HVDC. On the other Hand, the characteristic of the grid connection point is of great interest for the respective definition and the resulting requirements for the power park modules. Furthermore, the type of connection (HVAC or HVDC) of the power park module to the transmission grid plays an important role to determine the respective requirements.</p> <p>"Clarification to ensure that different technologies and storage can be aggregated to a PPM (e.g. but not limited to a combination of WTGs, PV-modules and BESS), a bit similar like the aggregation of gas turbines and steam turbines in a CCGT.</p>	<p>"power park module' or 'PPM' means a unit or ensemble of units that can generate or store electricity if applicable with different technologies, 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</p>

Article 2(18)	<p>On the one hand, a uniform terminology must be used, compare to NC HVDC. On the other Hand, the characteristic of the grid connection point is of great interest for the respective definition and the resulting requirements for the power park modules. Furthermore, the type of connection (HVAC or HVDC) of the power park module to the transmission grid plays an important role to determine the respective requirements.</p>	<p>‘offshore power park module’ means a power park module located offshore with an offshore connection point, which are not asynchronously connected to the synronous area.</p>
Article 2(19)		
Article 2(20)		
Article 2(21)		
Article 2(22)		
Article 2(23)		
Article 2(24)		
Article 2(25)		
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Article 2(27)		
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Article 2(59)		
Article 2(60)		
Article 2(61)		
Article 2(62)		
Article 2(63)		
Article 2(64)		
Article 2(65)		
Article 2(66)		

Article 2(67)		
Article 2(68)		
Article 2(69)		
Article 2(70)	Clarification needed that an V2G electric vehicle always requires an associated V2G electric vehicle supply equipment.	'V2G electric vehicle' means the vehicle that is powered, fully or in part, with electricity and is equipped with technology enabling the vehicle to provide electricity to the grid over a V2G electric vehicle power supply equipment.
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		
Article 4a [new]		
Article 5		
Article 6	the paragraphs referred to have changed (2 was LF5M and 4 was allowed reduction of power at low frequency)	correct the references
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	

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)	2d, table 2: implement article 13, 2d into 13 table 2 for transparent reason	2d, table 2: implement article 13, 2d into 13 table 2 for transparent reason
Article 13(3)	<p>There must be a uniform interface for communication in Europe.</p> <p>The DSO with the relevant TSO shall define the framework condition for the use of this function - not the other way around</p> <p>2nd paragraph ("The relevant TSO may define a different characteristic") What's the technical rationale behind that? However: another point that increases the complexity between Member state implementation, especially if storage is integrated into a PPM (see comment on (67))</p>	<p>(g) specify the interface "external signal"</p> <p>(g) [...] The RSO in coordination with the TSO [...]</p> <p>(h) Proposal: Delete "define a different characteristic or"</p>
Article 13(4)	Wrong references: change to "paragraphs 3 and 5 of this Article	Wrong references: change to "paragraphs 3 and 5 of this Article
Article 13(5)		
Article 13(6)		
Article 13(7)	There must be a uniform interface for communication in Europe.	specify the interface
Article 13(8)		

Article 13(9)		
Article 13(10)	<p>It's ok to stipulate reactive power capability for Type A, however, "voltage control" is not well defined. What seems to be meant is reactive power control functions.</p> <p>Voltage control (continuous fast control with fast fault current) may be stipulated as a substitute for Grid forming capability</p>	<p>change text to:</p> <p>The relevant system operator shall have the right to specify the capability of a power-generating module to supply or absorb reactive power when importing or exporting active power, used by following capabilities:</p> <ul style="list-style-type: none"> <li>(a) Reactive power control modes as specified in Article 21 (2) (d)</li> <li>(b) voltage control that can provide constant terminal voltage at a selectable setpoint without instability over the entire operating range of the power-generating module. For PPMs, this function may include the fast fault current capability as specified in Article 20 (2)(b)</li> </ul>

<p>Article 13(11)</p>	<p>Storages should also be able to block LFSM-U functionalities in order to avoid possible problems with high voltages caused by LFSM-U mode itself.</p> <p>The DSO with the relevant TSO shall define the framework condition for the use of this function - not the other way around</p> <p>During LFSM-U support, the energy content of the storage could be depleted for providing such support. If the storage is operating as generating power prior to the under-frequency event, the storage would not be able to return to its prior state of active power output.</p>	<p>(a) An electricity storage module shall be capable of activating the provision of active power frequency response from the current active power input or output automatically up to the maximum capacity according to the indicative Figure YY. The electricity storage module shall be able to receive and react on an external signal allowing the relevant system operator to block active power LFSM-U mode in real-time. The RSO in coordination with the relevant TSO shall define the framework conditions for the use of this function. The relevant TSO shall specify a frequency threshold and a droop setting:</p> <p>(b) The electricity storage module shall stay and operate stably in this specific mode as long as the frequency is below the frequency threshold according to its content of energy. If the frequency recovers the electricity storage module shall follow the same power-frequency characteristic until it is back to its prior state of active power input/output, provided that its content of energy allows such an operating state.</p>
<p>Article 13(12)</p>	<p>At least for LV installations at 400V, it should be clarified, that nominal power doesn't have to be provided down to 0.85 p.u. voltage</p>	<p>Add: [...at or below 400V.] The actual active power does not necessarily have to be maintained.</p>
<p>Article 13(13)</p>		
<p>Article 13(14)</p>		

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)	Figure YY: 1. value of droop is inconsistent to text 2. Pref is not mentioned in the text	align figure and text - Define P_ref in text
Article 13a(6)	make clear, the wording in text and figure 1X is using generation convention (increase of consumption vs. decrease of generation).	
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	<p>add at end of 13a:                      Type EV2 electric vehicles and associated V2G electric vehicle supply equipment shall fulfil the following additional requirements in relation to voltage stability:                      (a) with regard to reactive power capability, the relevant system operator shall have the right to specify the capability of a type EV2 electric vehicles and associated V2G electric vehicle supply equipment to supply and absorb reactive power;</p> <p>Comment: A contribution to voltage stability is also required from the EV2 (in Germany so far from 12 kVA, this is required).</p>

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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)	<p>Article 14(1) describes that article 13(2)(b) is not valid for Type B PGM.</p> <p>Article 13(2)(b) defines ROCOF requirements. So, no ROCOF requirements are defined or are the requirements from article 13a (EV1, EV2 V2G and V2G supply equipment) should be valid for type B PGM?</p>	Wrong reference: Change "Article 13(2)(b)" to "Article 13(3)(b)"
Article 14(2)[deleted]		
Article 14(2)	Economic and technical feasibility should be assessed with a CBA, additional cost may be shared between project partner	The power-generating facility owner shall not unreasonably withhold consent to apply wider voltage ranges or longer minimum times for operation, taking account of their technical feasibility and capability as defined by the PGFO
Article 14(3)	<p>"The last sentence says:""The relevant system operator, in coordination with the relevant TSO, shall define higher longer times for operation, if it is required to preserve or to restore system security.""</p> <p>To avoid confusion, please update this sentence to ""longer"" times or ""higher and longer times""."</p>	(c) To avoid confusion, please update this sentence to "longer times".
Article 14(4)		(b) Wrong reference: Change "Article 13(7)" to "Article 13(8)"

<p>Article 14(5)</p>	<p>There must be a uniform interface for communication in Europe.</p> <p>trilateral agreement are highly unpractical. Any agreements or contracts should be made solely between the facility owner and the relevant system operator. The communication protocol has to be set by the relevant system operator. Any data exchange to the TSO has to be agreed between the relevant system operator and the relevant TSO.</p>	<p>(d) specify the interface</p> <p>(d)(v) the facilities for quality of supply and dynamic system behaviour monitoring shall include arrangements for the power-generating facility owner and the relevant system operator to access the information. The communications protocols for recorded data shall be given by the relevant system operator.</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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**[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)	<p>Here is a specific requirement mentioned, relevant for the spanish market.</p> <p>What is the reason for this? As the NC RfG defines the minimum requirements and any national standard can define its specific requirement accordingly.</p> <p>Here is a specific requirement mentioned, relevant for the baltic market.</p> <p>What is the reason for this? As the NC RfG defines the minimum requirements and any national standard can define its specific requirement accordingly.</p> <p>fault-ride-through capabilities in case of asymmetrical faults shall be specified by the relevant system operator.</p>	<p>(b)(ii) Please add a short explanation, why such national requirement is noted here.</p> <p>(b)(v) Please add a short explanation, why such national requirement is noted here.</p> <p>(b) fault-ride-through capabilities in case of asymmetrical faults shall be specified by the relevant system operator.</p>
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)		

<p>Article 15(2)</p>	<p>Due to the changes, the threshold value for the LFSM-U is to be defined by a newly inserted parameter. This is called delta f1 and is defined for the different synchronous areas in table "X" (e.g. 0.2 Hz).</p> <p>In 15(2)(c)(i) it is stated that the threshold value results from 50 Hz "+" delta f1. In the example the threshold value results to 50.2 Hz and not correctly to 49.8 Hz for the LFSM-U.</p> <p>clarify, that FSM operates on top of active power operating points. A change (also an increase) in active power availability will effect the active power output.</p> <p>Paragraph "the actual delivery of active power frequency response depends on the operating and ambient conditions, as well as, on the underlying energy storage technology for the, of the power-generating module when this response is triggered, in particular, but not limited to, limitations on operation near maximum capacity at low frequencies according to paragraphs 4 and 5 of Article 13 and available primary energy sources" doesn't make sense</p> <p>Figure 5: 2nd bullet doesn't make sense. FSM can't have the LFSM threshold as a trigger point for Pref.</p> <p>(b)(iii): there is no 21 (5) (d)</p>	<p>(c)(i) Instead of "+" it should read 50 Hz "-" delta f1 for the LFSM-U.</p> <p>(d)(viii) Add: " A change (also an increase) in active power availability will effect the active power output."</p> <p>(d)(i) second point delete "for the"</p> <p>Figure 5: Delete 2nd bullet and add PPM to bullet 1</p> <p>(b)(iii) clarify, what this refers to</p>
<p>Article 15(3)[deleted]</p>		
<p>Article 15(3)</p>		

Article 15(4)		
Article 15(5)	<p>Below a frequency of 100 Hz the operating point has a strong influence on the converter impedance, Therefore, we suggest a starting frequency of 100 Hz.</p>	<p>'(c)(v) The impedance model of the power-generating facility shall be requested at least in the range 100 Hz - 2500Hz; As an additional requirement, the relevant system operator or the relevant TSO can extend the required applicability of the model to up to 9 000 Hz. For frequencies below 100 Hz, models other than frequency dependent impedance models may be specified by the relevant TSO.</p>

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)		
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	

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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)	unclear what articles are valid in original version as inclusions and exceptions are mixed in the sequence	Type B synchronous power-generating modules shall fulfil the requirements listed in Articles 13 and Article 14, except for Article 13(2)(b) and Article 13(8).
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)		
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)	unclear what articles are valid in original version as inclusions and exceptions are mixed in the sequence	Type D synchronous power-generating modules shall fulfil the requirements laid down in Articles 13, 14, 15, 16, 17 and 18, except for Articles 13(2)(b), 13(6), 13(7), 13(8), 14(2), 15(3) and 17(2).
Article 19(2)		
Article 19(3)	lots of power generating facilities are connected to the distribution network (110 kV). Therefore the TSO should set the parameters, but any agreement or contract with the facility owner should be made by the relevant system operator.	The relevant system operator and the power-generating facility owner shall enter into an agreement regarding technical capabilities of the power-generating module to aid angular stability under fault conditions.
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)	A PPM can't detect whether the voltage drop is caused by a disturbance in distribution network (to which most of the PPMs are connected to) or in the overlaying transmission network	The power park module shall be capable of staying connected to the network and continuing to operate stably after the power system has been disturbed by faults according to a voltage-against-time-profile in line with Figure 3 at the connection point and with the set points in Tables X.2.1 and X.2.2
Article Y(2)		
Article Y(3)		
Article Y(4)		
Article Y(5)		
Article Y(6)		
Article Y(7)		
Article Y(8)		

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)	Wrong reference: Change "Article 13(2)(b)" to "Article 13(3)(b)"	Wrong reference: Change "Article 13(2)(b)" to "Article 13(3)(b)"
Article 20(2)	(b) keep previous Text from RfG 1.0: but at the beginning of (b) add: in case grid-forming capability is not specified or not active,	(b) keep previous Text from RfG 1.0: but at the beginning of (b) add: in case grid-forming capability is not specified or not active,
Article 20(3)	(b)(i): Wrong reference? "points (b) and (c) of paragraph 2" of which article? Paragraph 2 of this article has only point (a).	(b)(i): Wrong reference? "points (b) and (c) of paragraph 2" of which article? Paragraph 2 of this article has only point (a).

<p>Article 20(4)</p>	<p>The provision of a small share of symmetrical inertia is vital for the stable operation of a grid forming power park module. This is valid during normal operation in terms of small signal stability as well as for large disturbances after which the following transient of the frequency requires this small share of symmetrical inertia to reach and hold a new stable operating point. Especially the transition from an operating point within the frequency range of 50 Hz <math>\pm</math> <math>\Delta f_1</math> to an operating point outside that region requires the initial grid-forming behavior, which particularly requires a small share of symmetrical inertia.</p> <p>This section only refers to voltage control and can't be used to influence synthetic inertia. The sentence taken from the original entso e proposal doesn't fit the ACPPM proposal</p>	<p>add (b) The relevant TSO in coordination with the relevant system operator may specify the symmetric contribution to synthetic inertia during normal operation in the frequency range of 50Hz <math>\pm</math> <math>\Delta f_1</math>. For the provision of additional energy above the inherent energy storage for this purpose, the relevant TSO may apply to the regulatory authority for the right to require the provision of additional energy beyond the inherent energy storage in coordination with the relevant system operator.</p> <p>change (b) to (c)  (c) The dynamic performance according to Article Y(8)(c)(i) shall reflect the specified contribution to synthetic inertia.</p> <p>check correctness of (b) (here according to the changes made, the new (c) is meant)</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)	If the switching option according to Article Y(8)(d) is adhered to, it should be listet here as an exception:	If the switching option according to Article Y(8)(d) is adhered to, it should be listet here as an exception: 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(2)(b), Article 13(6), Article 13 (8), Article 20(2)(a) and Article Y(8)(d)
Article 21(2) [deleted]		
Article 21(2)	active power related reactive power control mode is missing. In addition, these modes should be harmonized over all types	(d)(i) the power park module shall be capable of providing reactive power automatically by voltage control mode, reactive power control mode, power factor control mode, active power-related reactive power mode, or active power-related power factor control mode, as specified by the relevant system operator, in coordination with the relevant TSO and with the power park module owner;
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)		
Article 22(2)	lots of PPM are connected to the distribution network (110 kV). Therefore the TSO should set the parameters, but any agreement or contract with the facility owner should be made by the relevant system operator.	<p>The relevant system operator shall have the right to request and approve the tuning of the power oscillation damping by the power-generating facility owner to damp the inter-area oscillation mode based on frequency ranges specified by the relevant TSO in coordination with adjacent TSO or TSOs. The relevant system operator shall have the right to request the tuning of the power oscillation damping by power-generating facility owner to damp the local oscillation mode, in which the power park modules is oscillating against the grid.</p> <p>The proposed power oscillation damping control shall be approved by the relevant system operator.</p>

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	Seems to be a wrong reference to be corrected	AC-connected offshore power park modules shall fulfil the requirements relating to frequency stability laid down in Articles 13, 15(2) and 21 (4), except for Article 13(2)(b), (6) and (7) respectively.
Article 25		
Article 26	References to paragraphs et. al. need to be corrected in accordance with the new new index.	AC-connected offshore power park modules shall fulfil the requirements relating to robustness laid down in Articles 14(3)(b), 15(3), 16(3)(a), and 20(3) respectively.
Article 27	References to paragraphs et. al. need to be corrected in accordance with the new new index.	AC-connected offshore power park modules shall fulfil the requirements relating to system restoration laid down in Articles 14(4) and 15(4) respectively.
Article 28	References to paragraphs et. al. need to be corrected in accordance with the new new index.	AC-connected offshore power park modules shall fulfil the requirements relating to system management laid down in Articles 14(5), 15(5), 16(4) respectively.

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	In 2(f) it is required that at minimum a reference to the certificate must be provided. So how can (g) be relevant?	In 2(f) it is required that at minimum a reference to the certificate must be provided. So how can (g) be relevant?
Article 30a [new]	In 2(d) it is required that at minimum a reference to the certificate must be provided. So how can (e) be relevant?	In 2(d) it is required that at minimum a reference to the certificate must be provided. So how can (e) be relevant?
Article 30b [new]		
Article 31		
Article 32		
Article 33		
Article 34		
Article 35	Proposal: Please keep the clause (5) in order to allow an extended flexibility for both TSO and the Developer in case this is needed due to very good reasons which are not in control of either TSO or Developer.	5. An extension of the period during which the power-generating facility owner may maintain ION status, beyond the period established in paragraph 4, may be granted if a request for a derogation is made to the relevant system operator before the expiry of that period in accordance with the derogation procedure laid down in Article 60.
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		

<p>Article 42</p>	<p>Technology openness must be guaranteed. So please clarify that if compliance with the requirements of this regulation can be verified only by certification of the V2G electric vehicle supply equipment, the V2G electric vehicle is not subject to a certification requirement.</p> <p>Certification of the V2G electric vehicle as part of a electricity storage module leads to the need to store digital certificates in the V2G electric vehicle. These digital certificates must be verified (acc. to authenticity and validity) before each re-charging session within the V2G electric vehicle supply equipment. To establish such a system this, it will take years, because a chain of trust (Public Key Infrastructure (PKI)) needs to be established and operated. Beside resources it will also require the willingness of all parties involved to implement such a system.</p> <p>The more effective way is to certify only the stationary V2G electric vehicle supply equipment for being able to monitor the behavior of the inverter installed in the V2G electric vehicle in the case of AC charging and to prevent charging in the case of misbehavior by opening the V2G electric vehicle supply equipment switching-device. Beside monitoring especially the interface protection and islanding-detection part can be fully implemented and certified on V2G electric vehicle supply equipment side.</p>	<p>5. Concerning V2G electric vehicle and V2G electric vehicle supply equipment, compliance shall be based on individual type-test certificates issued as per Regulation (EC) No 765/2008 regarding the V2G electric vehicle supply equipment on one side and the V2G electric vehicle homologated platform on the other side. A certification shall include for instance the data exchange protocol, or system performance criteria, associating the V2G electric vehicle supply equipment and the V2G electric vehicle homologated platform. If compliance with the requirements of this regulation can be verified only by certification of the V2G electric vehicle supply equipment, the V2G electric vehicle must not be certified at all.</p>
<p>Article 43</p>		

Article 44		
Article 45		
Article 46		
Article 47		
Article 48		
Article 49		
Article 50		
Article 51		
Article 52		
Article 53		
Article 54		
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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		
Article 63		
Article 64		
Article 65		

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

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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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