

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.

Stakeholder's details

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

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

* Name of the stakeholder:

Bundesverband Solarwirtschaft e.V.

* Contact person:

[REDACTED]

* Contact person's email address:

[REDACTED]

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

Germany

* Type of the stakeholder:

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

Please, elaborate on your answer above, if necessary:

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

- ☒ Yes
- ☐ No

* Do you consent to the publication of provided answers?

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

Instructions

Stakeholders are invited to submit their comments to the NC 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.

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](#)

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.
-

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

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

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)	<p>ACER proposed that different technologies must be treated as separate PPMs when they have their own inverter. We see a certain risk here: balancing services are provided to TSOs at the CP. We see a huge risk for inconsistencies. The specifics of the communication behind the CP falls within the sole responsibility of the network user. Different PPMs behind one CP can only provide services at the CP if they are free in their operation behind the CP. The RfG should not interfere with the freedom to interact with each other as they see fit to provide balancing services at the CP.</p> <p>It should not make a difference whether there are different technologies behind a CP with only one inverter at the CP or if they all have their own inverter to communicate and provide the balancing service at the CP.</p> <p>It's crucial to allow use of the flexibility in hybrid installations / mixed customer sites (e.g. PV /Storage / PV/Wind). For these applications, it is important to allow them to be controlled and operated as one system, e.g. to optimize plant operation or keep a maximum power infeed limit. On the other side, it is important to allow to address independent systems separately.</p>	<p>ADD: "None-synchronously connected power-generating modules consisting of different underlying technologies, where they are collected and controlled together to form a single power-generating module and an economic unit and where they have a single connection point should be assessed as one power-generating module. The specifics of interaction between units behind the connection point is not subject of this regulation."</p>
(10)		
(**)		
(11)		
(12)		
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(17)		
(x)		
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(25)		
(**)	Voltage control capability is an important contribution of non-gridforming PPM to power system stability.	ADD: "If no grid-forming capability is provided, voltage control capabilities as well as fast and stable LFSM capability support the system robustness."
(26)		
(27)	European standardization and harmonization is crucial for a cost effective energy transition, especially with regard to mass market products; align with wording in Article 7 (3).	REPLACE should WITH shall: "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."
(28)		
(29)		

(30)		
(31)		
(32)		

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

	Text amendment proposal (if applicable)
New recital	(9 (++))"When determining the significance and the capacity of a power-generating module, system operators must take into consideration specific site limitations and grid export limitation capabilities to reflect the impact on the electricity system caused by the power-generating module."

Definitions (Article 2)

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

Includes new definitions

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 2(1)		
Article 2(2)		
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)	<p>It's crucial to allow use of the Flexibility in hybrid installations / Mixed customer sites (e.g. PV /Storage / PV/Wind). For these applications, it is important to allow them to be controlled and operated as one system.</p> <p>On the other side, it is important to allow to address independent systems separately. The definition of PPM does not reflect that. New Whereas (9) allows this separate consideration. See also suggested changes to whereas [9] and [9x]</p> <p>It should be clarified, that in case the PPM consists of units of different underlying technologies, the requirements apply in the proportion of the installed capacity of each technology and that the PPM's control may utilize the PGU's capabilities to fulfil those requirements.</p>	<p>'power park module' or 'PPM' means a unit or ensemble of units of the same underlying technology, or of different underlying technologies if they are controlled to form a single power park module that can generate electricity, 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. In case the power park module consists of different underlying technologies forming a single operational unit, the requirements apply in the proportion of the installed capacity of each technology. The power park modules control may utilize the power generation unit capabilities to fulfil those requirements;</p>
Article 2(18)		
Article 2(19)		
Article 2(20)		
Article 2(21)		
Article 2(22)		
Article 2(23)		
Article 2(24)		
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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	(76)" 'mixed costumer sites' (MCS) is a combination of demand facility and a power-generating facility at a connection point"

Please upload figures or tables if necessary

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TITLE I - General provisions

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 1		
Article 3		
Article 4	<p>The two years lead to a requirement to retrofit plants which are built fast, such as PV / Wind / Storage. In order to coordinate it with Articles 7 (4) and 71, it should be changed to at least three years. In RfG 1, this paragraph created extensive discussion and individual complicated regulations in the member states. It can be expected, that national implementation will take longer than 2 years, meaning that when manufacturing and planning, the requirements are not known. This imposes a significant risk for plant operators and manufacturers.</p> <p>The time span should be set to three years, the application date of the RfG 2.0 and a general time for implementation after requirements are specified is needed.</p>	<p>2 (b): "the power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by three years after the entry into force of the Regulation or by two years after the designated entity made and published a decision on requirement proposals according to Article 7 (6), whichever is the latest."</p>

<p>Article 4a [new]</p>	<p>2 (b) delete (b) : A deviation, especially an increase of the reactive power capability should not be a criterion for significant modernization, since it may discourage someone to replace e.g. a defect inverter by a new one if this leads to an application of the new regulation.</p> <p>new 2 (b): A change in active power management capabilities should not lead to having to comply overall with the new regulation.</p> <p>new 2 (d): In this regard, it should be mentioned that there should be a balance between the cost and the benefit of a need to fulfil the new requirements as a whole, especially when they originate in the Member States GridCode rather than in the RfG (e.g. the need to comply with new safety regulations of the switchgear, just because the PGM has more reactive power capability).</p>	<p>2 : "The definition of significant modernisation shall take into account at least the following criteria:</p> <p>(a) an increase above the existing maximum capacity of the power-generating module, whether this increase results from one modernisation or several successive modernisations, of a minimum percentage to be defined in the range 5-20 % (within this range, different percentages may be defined for different technologies depending on their constraints);</p> <p>(b) a change in frequency stability, whether this change results from one modernisation or several successive modernisations, of the power-generating module; and</p> <p>(c) a change of components/assets of a power-generating module or electricity storage module apart from maintenance and repair activities and spare parts, whether or not those parts are purchased new at the time of their incorporation in the power generating module;</p> <p>(d) Balance between modernisation costs and additional costs for applying new requirements;</p> <p>In the proposal, TSO can propose additional criteria defining a significant modernisation.</p> <p>3. For each criterion listed in paragraph 2 above, the TSO's proposal shall specify the requirements of this Regulation that shall apply to the entire modernised power-generating module or only to the modernised part of the power-generating module."</p>
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Article 5	<p>1. Align with paragraph "whereas (9)". In addition, the list of classes should be exhaustive.</p> <p>2. table 1: For the sake of requirements in mass-market products and limitation of site specific notification efforts, a lower limit of 300 kW for the threshold be proposed, resulting in a range of 100 - 500 kW for the Type A/B threshold to be defined on national level.</p>	<p>1. ADD: "The determination of significance is carried out specific to each class of power-generating module, which are photovoltaic, electricity storage, wind energy converter, thermal power installations, V2G electric vehicles or other."</p> <p>Table 1: "Limit / Range for a threshold of maximum capacity from which a power-generating module is of type B" --> 0,1 - x,x MW (x.x depends on area, amended values by ACER have to be used)</p>
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Article 6	<p>new 8:</p> <p>8 (a): In mixed customer sites, it makes sense to limit the infeed capacity and focus on selfconsumption. The most important impact parameters of a PGM to the network is related to the maximum infeed capacity to the grid, rather than installed capacity.</p> <p>8 (b): Especially in medium voltage connected existing demand facilities, a reference point at the PCC often leads to significant additional cost for measuring equipment / reconstruction of the switchgear etc. Such cost may jeopardize investments into such PGMs. A reference point within the MCS - at least for relatively small plants in relation to the connection point's capacity - is technically feasible.</p> <p>8 (c): The technical requirements with regard to a PGM of the same size should not be different if it's connected to public low voltage grid or a low voltage grid in a mixed customer site connected to the MV grid. For instance, the significance of a 200kW PGM connected to LV may be higher than if it's connected to MV Level within a large demand facility. In practice, today the latter has to fulfil more complex requirements, e.g. due to requirements being related to the connection point at MV level.</p>	<p>ADD new 8.:</p> <p>8. For mixed costumer sites the following applies:</p> <p>(a) the type classification according to table 1 does not refer to the installed capacity, but the maximum feed-in capacity as agreed with the relevant system operator;</p> <p>(b) if the mixed costumer site was taken into operation before the application date of this regulation, the requirements to the power-generating unit may apply at its connection point within the mixed costumer site;</p> <p>(c) there shall be the same requirements for the power-generating module regardless if the relevant DSO or connected to demand-dominated mixed costumer site.</p>
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Article 7	<p>3. (f): "take into consideration" is too weak. For the sake of harmonization, Functionality that is already agreed on in European Standards must be taken over and implemented, rather than implementing it nearly the same but slightly different.</p> <p>4. Shorter time periods than two years (with no limit as to how short) to implement new requirements would impose difficulties on market participants. For the development of products to be distributed within the EU's internal market it is helpful to have the same timeline in each Member State.</p>	<p>3. (f): REPLACE "take into consideration" by "apply"</p> <p>4. DELETE: "The Member State may provide for a shorter time period for all or parts of the requirements or the methodologies. In this case, the Member State shall communicate the shorter time period to the European Union Agency for the Cooperation of Energy Regulators (ACER)."</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	

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TITLE II CHAPTER 1 - General Requirements

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)	(d) For some technologies, providing the proposed dynamics is limited. It should therefore be possible to respect those limitations. The modules can stay connected, but can't guarantee a power exchange at this frequency range, as the protection of the facility/module should prevail.	(d) "the power-generating module shall be capable of remaining connected to the network and secure a limited operability, not including power exchange in case of reasonable technological limitations."

Article 13(3)	<p>(g)(ii): The relevant TSO could require the response time to be less than one second, which is not feasible for some technologies of electricity storage modules today (which will fall under this provision). Therefore it needs to be clarified that the response time can't be set to less than half a second for electricity storage modules, alternatively via an exception for electricity storage modules of specific types. Additionally, the requirements should not be established by the relevant TSO but by the relevant European entities to ensure a Single Market at least for type A power park modules.</p> <p>(h) paragraph 1: Uniform characteristic curves for the frequency response should be defined across Europe. This avoids incorrect settings in type A bulk business.</p> <p>(h) paragraph 2: What's the technical rationale behind that? It's not obvious and without further reasoning, the complexity should not be increased.</p> <p>However: another point that increases the complexity between Member state implementation, especially if storage is integrated into a PPM.</p>	<p>(g)(ii): "for power park module: between 0.7 and 2 seconds for an active power setpoint change of 50% maximum power."</p> <p>(h) paragraph 1: specify parameters for characteristic curves.</p> <p>(h) Paragraph 2: DELETE: "define a different characteristic or"</p>
Article 13(4)	References to check	<p>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.</p>

Article 13(5)		
Article 13(6)		
Article 13(7)	<p>replace "reduce" by "limit": This signal specification is ambiguous. Reduce can mean it shall reduce the power by a delta value or a setpoint. What seems to be meant it that the output power shall be limited.</p> <p>last paragraph: To establish up a level playing field for all European manufacturers in the Single European Market, one European communication standard should be established. Individual standards by TSOs would lead to extensive market fragmentation. In the US, the adoption of the IEEE 2030.5 communication standard has lead to significant harmonization and consumer benefit.</p>	<p>The power-generating module shall be equipped with a communication interface (input port) in order to limit, without undue delay, active power output following an instruction being received at the input port.</p> <p>ACER, after consultation with the relevant stakeholders shall have the right to specify requirements for equipment to make power-generating module operable remotely.</p>
Article 13(8)		
Article 13(9)	Reference to check	Within the capability defined in paragraph (8), the default settings for an autonomous connection shall be as follows:
Article 13(10)	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.	The relevant system operator shall have the right to specify the capability of a power-generating module to supply or absorb reactive power when exporting (in case of ESM also importing) active power, used by the capability as specified in Article 21 (2) (d);

Article 13(11)	<p>(a)(i): Very low droop settings may lead to instability of the grid.</p> <p>(a): It should be clarified, that an operational setpoint change of an ESM shall be neglected, once the frequency threshold is crossed, as long as the frequency returns, this is a difference in relation to FSM.</p>	<p>(a)(i): REMOVE 0.2 to 1</p> <p>(a) behind figure YY: ADD "An increase of the active power setpoint of the ESM shall not influence the active power output of the ESM, as long as the frequency is lower than the frequency threshold."</p>
Article 13(12)	<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>With regard to voltage stability, unless otherwise provided in this Regulation, the power-generating module shall be capable of staying connected to the network and operate continuously within the range of 0,85 pu - 1,1 pu at the connection point should that be at or below 400V. The actual active power does not necessarily have to be maintained. Conversely, the power-generating module shall be capable of staying connected to the network and operate continuously within the range of 0,9 pu - 1,1 pu at the connection point should that be above 400V and below 110 kV.</p>
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)	Active power may be reduced, while active current shall not be reduced.	With regard to voltage stability, a type EV1 and EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment shall be capable of staying connected to the network and operate continuously within the range of 0,85 pu - 1,1 pu at the connection point. Beyond these voltage range values, the under voltage ride through immunity limits as specified in paragraph 10 apply. Active power may be reduced when voltage decreases.
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)		
Article 14(2)[deleted]		
Article 14(2)		
Article 14(3)		
Article 14(4)		
Article 14(5)	(d)(i): There must be a uniform interface for communication in Europe.	(d)(i):power-generating facilities shall be capable of exchanging information with the relevant system operator or the relevant TSO in real time via interface. ACER, after consultation with the relevant stakeholders, shall have the right to specify the interface. The content of real-time data shall be consistent with the data exchange requirements laid down in Title 2 of Regulation (EU) 2017/1485;

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)		
Article 15(2)	<p>(c): It should be clarified, that an operational setpoint change of a PGM or ESM shall be neglected, once the frequency threshold is crossed, as long as the frequency returns, this is a difference in relation to FSM.</p> <p>(c)(v):1. the "the maximum consumption capacity at the moment the LFSM-U threshold is reached " doesn't make sense</p> <p>2. in addition: too many variables; should be limited to maximum capacity or actual capacity; just like with PPMs.</p> <p>(d) Comprehension of sentences</p>	<p>(c): "In addition to Article 13(3), the following requirements shall apply to type C power-generating modules with regard to limited frequency sensitive mode — underfrequency (LFSM-U) an increase of available primary power or the active power setpoint of the ESM shall not influence the active power output of the PGM or ESM as long as the frequency is lower than the frequency threshold:"</p> <p>(c)(v): 1. DELETE "maximum"</p> <p>2. DELETE " maximum capacity or maximum consumption"</p> <p>(d) "the actual delivery of active power frequency response depends on the operating and ambient conditions, as well as, on the underlying energy storage technology 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"</p>
Article 15(3)[deleted]		
Article 15(3)		
Article 15(4)	<p>reference to check, no existing paragraph 21 (5)</p> <p>(d)</p>	
Article 15(5)		

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

[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)		
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)		
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

[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>GFM capability is of very low Technology Readiness for Wind and PV Systems.</p> <p>In addition, making Gridforming a mandatory requirement down to Type B bears risks for DSOs, especially in terms of unintentional Islanding and potentially too much short circuit power in the distribution grid, leading to diverging requirements for plant operators /manufacturers (stabilize Island vs. destabilize Island).</p> <p>The stipulated capability to turn GF on or off bears the risk for the manufacturer, that the capabilities are implemented, tested and certified (all requirements would have to be complied with in GFM and GFL mode) with high effort in devices, but never be used.</p> <p>SPE therefore proposes the Manufacturer Draft language of ACPPM Report for Article Y.5 (open the door for GFM according to the specification, but don't make it mandatory).</p>	<p>The relevant TSO with the agreement of the relevant DSO shall have the right to allow that type A power park modules be capable of providing grid-forming capability at its connection point as defined by the following paragraphs.</p>

Article Y(6)	<p>(b) There should be a guaranteed minimum transition period of at least two years after the specification is published. It should not be the problem of the industry if the responsible entity doesn't finalize its specification within two years according to Art. 7.4 and 7.5</p> <p>In case BSW proposal for Y.5 is accepted: In case of an allowance, there is no need for a defined transition period, as this would be part of an individual contract.</p>	<p>(b) when proposal aof Y(5) is accepted: REPLACE paragraph Y(6)(b) by: "(b) The power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant for two years before the relevant TSO with the agreement of the relevant DSO has allowed to provide grid-forming capabilities at the connection point and have defined all parameters and performance (as defined in Article Y(8)(c))."</p> <p>when Y(5) is not accepted add behind actual Y (6)(b): ADD (c) (c) The power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by two years before the relevant TSO with the agreement of the relevant DSO has specified that the park module shall be capable of providing grid-forming capability at it's connection point and has defined all parameters and performance as defined in Article Y(8)(c).</p>
Article Y(7)		
		<p>If grid-forming capability is provided by the power park module it shall be provided as specified below and as agreed with the relevant system operator and the TSO.</p> <p>(a) Within the power park module's current and energy limits, the power park module shall be capable of behaving as a voltage source behind an internal impedance (Thevenin source), during normal operating conditions (non-disturbed grid conditions) and upon inception of a grid</p>

Article Y(8)

(a) & (c) in case of market based provision (comment Y.5):

It is nearly impossible on a neutral basis, to verify, to which amount the capability should be able to be provided with a given hardware. The concept of a mandatory minimum requirement within the capabilities should be replaced by market-based provision of guaranteed contributions of grid forming capabilities
In case GFM capability is provided market based, also specific contributions of a PPM can be defined. This can then be provided either by the PPM itself or dedicated storage units within the PPM.

(d) Turning on and off GFM capability means consequently, that all other requirements have to be verified in both modes. In order to minimize the interference with the DSO's protection system, there may be a current blocking capability.

disturbance (including voltage, frequency and voltage phase angle disturbance). The Thevenin source is characterized by its internal voltage amplitude, voltage phase angle, frequency and internal impedance. During normal operation, the amplitude and phase angles is not necessarily constant but can change to keep synchronism with the network voltage.

(b) Upon inception of a grid disturbance and while the power park module capabilities and current limits are not exceeded, the instantaneous AC voltage characteristics of the internal Thevenin source according to paragraph (a) shall be capable of not changing its amplitude and voltage phase angle while positive-sequence voltage phase angle steps or voltage magnitude steps are occurring at the connection point. The current exchanged between the power park module and the network shall flow naturally according to the main generating plant and converter impedances and the voltage difference between the internal Thevenin source and the voltage at the connection point.

(c) After inception of a network disturbance in voltage magnitude, frequency or voltage phase angle, the following shall apply within the power park module's capability, including current limits

(i) The relevant system operator in coordination with the TSO shall specify the temporal parameters of the dynamic performance regarding voltage control.

(ii) Where current limitation is necessary, the

relevant system operator may specify additional requirements regarding contribution of active and reactive power at the point of connection.

(iii) The power park module shall be capable of stable operation when reaching the power park module current limits, without interruption, in a continuous manner and returning to the behaviour described in paragraph (b) as soon as the limitations are no longer active. If reaching the current limit, the grid forming behaviour must be maintained for responses as specified in paragraph (b) for disturbances that require the current to vary in the opposite direction of the current limitation.

(d) If a power park module is providing grid-forming capabilities the relevant system operator may specify that there shall be no fast fault current contribution if the grid voltage is reduced to a defined value.

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)		
Article 20(2)	Fast Fault Current capability for non-gridforming plants should be kept.	keep Article 20.2(b) from RfG 1.0 for non GFM-PPM
Article 20(3)	It may be useful to introduce defined robustness against voltage phase angle changes/steps to increase synchronization robustness	ADD (c): The relevant TSO shall have the right to specify the capability of a power park module to ride through a maximum sudden voltage phase angle change capability without tripping.
Article 20(4)	Inherit market based approach from article Y	In case BSW proposal for Y(5) is accepted: With regard to grid forming capability, type B power park modules may fulfil the following additional requirements in relation to grid forming capability as agreed with the TSO in coordination with the relevant system operator: (a) The relevant, TSO in coordination with the relevant system operator and the owner may agree on the contribution to synthetic inertia. In that case the power park module shall be capable of contributing to limiting the transient frequency deviation under high frequency conditions. Additionally, the electricity storage module shall be capable of contributing to limiting the transient frequency deviation under low frequency conditions.

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)		
Article 21(2) [deleted]		
Article 21(2)		
Article 21(3)		
Article 21(4)	Inherit market based approach from article Y	<p>With regard to grid forming capability, type C power park modules may fulfil the following additional requirements in relation to grid forming capability as agreed with the TSO in coordination with the relevant system operator:</p> <p>(a) The relevant TSO, in coordination with the relevant system operator and the owner may agree on the contribution to synthetic inertia. In that case, the power park module shall be capable of contributing to limiting the transient frequency deviation under high and low frequency conditions.</p>

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)		

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		
Article 25		
Article 26		
Article 27		
Article 28		

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		

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	Text amendment proposal (if applicable)
New article	

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TITLE IV - Compliance

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

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

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	Text amendment proposal (if applicable)
New article	

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TITLE V - Derogations

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

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

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

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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	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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