

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:

EU DSO Entity

* Contact person:

[REDACTED]

* Contact person's email address:

[REDACTED]

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

Belgium

* 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

 The maximum file size is 1 MB

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

Please upload your file here

The maximum file size is 1 MB

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

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

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

Please upload your file

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Please upload your file

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The maximum file size is 1 MB

Due to the significant length of this survey:

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

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

Whereas Section

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

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
(1)		
(2)		
(3)		
(s1)		
(s2)	The EU DSO Entity, in agreement with ENTSO-e is proposing that V2G EVs are divided into AC connected, with their own exhaustive requirements, and DC connected which are to be treated identically to electricity storage modules. This recital should reflect that.	For the purpose of this regulation, electricity storage includes DC connected electric vehicles and associated supply equipment that comply with the definition of electricity storage. Nevertheless, fully harmonised rules for grid connection for AC connected electric vehicles and associated supply equipment are set out to provide for a free movement of electric vehicles across the EU.
(4)		
(5)		
(6)		
(7)		
(8)		

(9)	<p>The EU DSO entity does not agree that asynchronous generating units of all types should not be aggregated. This reverses all network operators' practices since the RfG was introduced in 2019. It also allows facility owners to game the classification of PPMs to avoid having to comply with a higher type, and is particularly inappropriate when storage is added to existing solar or wind farms. The EU DSO Entity recommends following the recommendations of the ESC Expert Group on storage more closely.</p> <p>Also we suggest that the word "installation" in relation to part of a facility is confusing, since installation is often used interchangeably with facility. This also requires consequential changes in Article 2(9).</p>	<p>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. A set of synchronous generating units that cannot be operated independently from each other, such as those forming a combined-cycle gas turbine, comprise a power generating module and should be assessed on the whole collective capacity of those generating units. Non-synchronously connected power-generating units, 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</p>
(10)		
(**)		
(11)		
(12)		
(13)		
(14)		
(15)		
(16)		
(17)		
(x)		

(18)	It is important to recognize that fault ride through is a requirement in relation to faults on the transmission system only. The EU DSO Entity recommends that this distinction is made clear from the first opportunity in the RfG both in this recital and in Article 29 (definition of FRT).	This Regulation should provide for ranges of parameters for national choices for fault-ride-through capability for transmission faults in order to maintain a proportionate approach reflecting varying system needs such as the level of renewable energy sources ('RES') and existing network protection schemes, both transmission and distribution. In view of the configuration of some networks, the upper limit for fault-ride-through requirements should be 250 milliseconds. However, given that the most common fault clearing time in Europe is currently 150 milliseconds it leaves scope for the entity, as designated by the Member State to approve the requirements of this Regulation, to verify that a longer requirement is necessary before approving it.
(19)		
(**)		
(20)		
(21)		
(22)		
(**)		
(23)		
(24)		
(25)		
(**)		
(26)		

(27)	English language correction - there seems to be words missing in the final sentence. " be carried ...out by...."	<p>The regulatory authorities, Member States and system operators should ensure that, in the process of developing and approving the requirements for network connection, they are harmonised to the extent possible, in order to ensure full market integration. Established technical standards should be taken into particular consideration in the development of connection requirements.</p> <p>Development of non-exhaustive requirements should, to the extent possible, be carried out by 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)	<p>This recital is welcome and appropriate.</p> <p>However the EU DSO Entity is concerned that in spite of it being agreed in the Entity's interaction with ACER on the need to make the legal text clear and unambiguous, there is no legal text yet implement this. The EU DSO Entity does not believe that Article 71a is appropriate, sufficient or legally secure. Given the legal complexity of this, the Entity has not offered any draft legal text at this time.</p>	

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

	Text amendment proposal (if applicable)
New recital	

Definitions (Article 2)

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

Includes new definitions

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 2(1)		
Article 2(2)		
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)	<p>The Entity's proposal for EVs means that this Definition is not required. Furthermore it is only used once and is adequately defined at the point of use in article 30b.</p> <p>It should therefore be deleted.</p>	
Article 2(11)		
Article 2(12)		
Article 2(13)		

<p>Article 2(14)</p>	<p>The EU DSO Entity is aware of significant confusion that occurs where facility owners, and sometime network operators, become confused between the Pmax of one or more PGMs in a facility, and the maximum power transfer capacity at the facilities connection point. There need be no direct connection between these two numbers.</p> <p>The Entity suggests that the proposed additional sentence here, along with the modification to definition 16 should help dispel confusion.</p>	<p>‘connection agreement’ means a contract between the relevant system operator and either the power-generating facility owner, demand facility owner, distribution system operator or HVDC system owner, which includes the relevant site and specific technical requirements for the power-generating facility, demand facility, distribution system, distribution system connection or HVDC system.</p> <p>The full contents of a connection agreement for a facility are defined in national legislation and can record separately the Pmax values of each PGM within the facility as well as the maximum import and maximum export capacities of the facility;</p>
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Article 2(15)	<p>The RfG does not deal with demand so demand facility owner should be deleted.</p> <p>Member states have existing laws regarding connection agreement, and in general a connection agreement can never be not required, noting the use of deemed agreements in some member states.</p> <p>Therefore, proposal for deleting the ACER proposal text:</p> <p>1. demand facility, distribution system 2....."or as agreed between the relevant system operator and the demand facility owner, power-generating facility owner or HVDC system owner, or determined by other appropriate means, where an agreement is not required"</p>	<p>Connection point' means the interface at which the power-generating module, or HVDC system is connected to a transmission system, offshore network, distribution system, including closed distribution systems, or HVDC system, as identified in the connection agreement ;</p>
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Article 2(16)	<p>In line with definition 14 above, these suggested changes should help avoid confusion in the interpretation of Pmax and its relation to the facility capacities. DSOs are aware that many manufacturers and developers are confused by the need to allow for reactive power production, which is particularly a problem for power electronic converters, where the VA output is limited by the current ratings of the converter as opposed to the power of the prime mover.</p> <p>Member states have existing laws regarding connection agreement, and in general a connection agreement can never be not required, noting the use of deemed agreements in some member states.</p>	<p>maximum capacity' or 'Pmax' means the normal maximum continuous active power which a power-generating module can produce at the same time as producing the maximum required reactive power, less any demand and losses associated solely with facilitating the operation of that power-generating module, as recorded in the connection agreement</p>
Article 2(17)	<p>Attention point!!!</p> <p>Storage is not limited to PPMs; synchronous storage systems exist. The note to the text is therefore wrong or misleading, although the proposed change to the RfG itself is OK.</p>	
Article 2(18)		
Article 2(19)		
Article 2(20)		
Article 2(21)		
Article 2(22)		
Article 2(23)		
Article 2(24)		
Article 2(25)		

Article 2(26)		
Article 2(27)		
Article 2(28)		
Article 2(29)	As with Recital 18, it is important to clarify that all fault ride through requirements relate only to faults on the transmission system.	fault-ride-through' means the capability of electrical devices to be able to remain connected to the network and operate through periods of low voltage at the connection point caused by secured faults on the transmission system;
Article 2(30)		
Article 2(31)		
Article 2(32)		
Article 2(33)		
Article 2(34)		
Article 2(35)		
Article 2(36)		
Article 2(37)		
Article 2(38)		
Article 2(39)		
Article 2(40)		
Article 2(41)		
Article 2(42)		
Article 2(43)		
Article 2(44)		
Article 2(45)		
Article 2(46)		

Article 2(47)	Delete “demand unit”. The legal text does not refer to demand units	equipment certificate’ means a document issued by an authorized certifier for equipment used by a power-generating module, distribution system, demand facility or HVDC system. The equipment certificate defines the scope of its validity at a national or other level at which a specific value is selected from the range allowed at a European level. For the purpose of replacing specific parts of the compliance process, the equipment certificate may include models that have been verified against actual test results
Article 2(48)		
Article 2(49)		
Article 2(50)		
Article 2(51)		
Article 2(52)		
Article 2(53)		
Article 2(54)		
Article 2(55)		
Article 2(56)		
Article 2(57)		
Article 2(58)		
Article 2(59)		
Article 2(60)	Deleted demand unit as the RfG does not refer to demand units.	“installation document’ means a simple structured document containing information about a type A power -generating module connected below 1 000 V, and confirming its compliance with the relevant requirements

Article 2(61)		
Article 2(62)		
Article 2(63)		
Article 2(64)		
Article 2(65)		
Article 2(66)		

Article 2(67)	<p>Here the definition is modified to recognize the DSO Entity's proposition (supported by ENTSO-e) that DC connected EVs should be treated exactly as ESMs are treated.</p> <p>However, the EU DSO Entity believes that this definition should be deleted, and every instance of ESM should be replaced with "SPGM incorporating electricity storage" or "PPM incorporating electricity storage" as appropriate. This avoids confusion with some mixes of technologies – particularly those which are DC, rather than AC, coupled (eg battery and PV sharing the same inverter).</p> <p>We have marked up a clean version of the 17 July ACER text with just these changes and will submit these separately (NC_RfG_ACER_draft_amendments_for_PC_2023_E_07 ESM elimination version.docx).. The Entity believes that this much more reflects the recommendations of the Expert Group on Storage.</p> <p>This suggested treatment also aligns perfectly with the comments on Recital 9 in relation to the aggregation of PPU's into PGMs.</p>	<p>'electricity storage module' or 'ESM' means a synchronous power-generating module or a power park module which can inject and consume active power to and from the network for electricity storage, excluding pump-storage power-generating modules. A DC V2G electric vehicle and associated DC V2G electric vehicle supply equipment with a bidirectional functionality is defined as an electricity storage module;</p>
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Article 2(68)	<p>The RfG only deals with PGMs, which include ESMs in both import and export mode. There is therefore no need to mention demand units or demand facilities. Those terms should be confined to the NC DC.</p>	<p>'maximum consumption capacity' means the maximum continuous active power which a electricity storage module can consume, less any demand or losses associated solely with facilitating the operation of that electricity storage 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.</p>
Article 2(69)	<p>It is inappropriate to include V1G in the definitions. Especially as the term is not used in the legal text. It should be deleted.</p> <p>As V1G is deleted, the definition of V2G EV becomes 2.69</p>	
Article 2(70)	<p>A new definition 2.70 is proposed.</p> <p>A new definition required to support the DSO Entity's suggestion (supported by ENTSO-e) for the treatment of EVs in the RfG.</p> <p>New (text) proposal for Art. 2.70.</p>	<p>Proposal:</p> <p>(70) 'AC V2G electric vehicle' means V2G electric vehicle where the bidirectional power converter is on-board the electric vehicle and hence the AC V2G electricity vehicle has an AC connection to its charging point.</p>

Article 2(71)	<p>It is inappropriate to include V1G in the definitions. Especially as the term is not used in the legal text. Also this definition is not needed for the DSO Entity's suggested treatment of EVs</p> <p>A new definition required to support the DSO Entity's suggestion (supported by ENTSO-e) for the treatment of EVs in the RfG.</p>	<p>Proposal:</p> <p>(71) 'DC V2G electric vehicle' means a V2G electric vehicle which can be connected to a bidirectional power converter that is incorporated in the fixed V2G electric vehicle supply equipment and hence there is a direct current connection between the V2G electric vehicle and its V2G electric vehicle supply equipment. DC V2G electric vehicles are defined as electricity storage modules.</p>
Article 2(72)	<p>It is inappropriate to include the facility wiring in the definition. In this regard an V2G EV is no different from any other PGM installed within a customer's property. We have suggested a clarification to the definition in relation the electricity supply equipment being of a fixed nature.</p> <p>If ACER decides to retain wiring, then it should be wiring singular. Wiring is a mass noun and doesn't take an s.</p>	<p>Proposal:</p> <p>(72) 'V2G electric vehicle supply equipment' means the infrastructure necessary to conduct electrical energy safely from the electricity supply grid to the electric vehicle and from the electric vehicle to the electricity supply grid with both generation and demand behaviour.</p> <p>V2G electric vehicle supply equipment is fixed equipment, either within a facility with a single connection point or standalone and directly connected to the network.</p>
Article 2(73)	<p>It is inappropriate to include V1G in the definitions. Especially as the term is not used in the legal text. Also this definition is not needed for the DSO Entity's suggested treatment of EVs</p>	
Article 2(74)	<p>This definition is not required for the DSO Entity's suggestion (supported by ENTSO-e) for the treatment of EVs in the RfG.</p>	

Article 2(75)	This definition is not required for the DSO Entity's suggestion (supported by ENTSO-e) for the treatment of EVs in the RfG.	
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New definition	

Please upload figures or tables if necessary

The maximum file size is 1 MB

TITLE I - General provisions

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 1		

<p>Article 3</p>	<p>On Art. 3.1.</p> <p>The EU DSO Entity is aware of the difficulties in some member states with enforcing compliance over the lifetime of a PGM. The Entity recommends that an obligation is placed on members states to ensure there is a legal framework for enforcing compliance. The current RfG in Art 3.1 allows non-compliant PGMs to be refused initial connection, but does not give RSOs the rights to force the compliance of PGMs throughout their lifetime.</p> <p>- new sentence added.</p>	<p>Proposal Art. 3.1</p> <p>1. This Regulation shall apply to new power-generating modules, which are considered significant in accordance with Article 5, unless otherwise provided.</p> <p>The relevant system operator shall refuse to allow the connection of a power-generating module which does not comply with the requirements set out in this Regulation and which is not covered by a derogation granted by the regulatory authority, or other authority where applicable in a Member State pursuant to Article 60. The relevant system operator shall communicate such refusal, by means of a reasoned statement in writing, to the power-generating facility owner and, unless specified otherwise by the regulatory authority, to the regulatory authority.</p> <p>Member States shall ensure that within 1 year of entry into force of this Regulation provisions exist for the resolution, or ultimate disconnection, of any power generating model found to be non-compliant with the requirements of this Regulation throughout the life of that power generating module.</p>
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<p>Article 4</p>	<p>On Art. 4.1</p> <p>The EU DSO Entity remains very concerned that there is no clarity about how the compliance requirements associated with PGM commissioned after the entry into force of EU 2016/631, but before RfG 2.0 enters into force, will be dealt with in the legal text. The DSO Entity believes that Recital 32 and Article 71a are inadequate.</p> <p>The EU DSO Entity is concerned that in spite of it being agreed in the Entity's interaction with ACER that there is a need to make the legal text clear and unambiguous, there is no legal text yet implement this. The EU DSO Entity does not believe that Article 71a is appropriate, sufficient or legally secure. Given the legal complexity of this, the Entity has not offered any draft legal text at this time.</p> <p>The Entity also believes that the RfG will be easier to interpret if the order of 4.1 and 4.2 are reversed. There are two consequential references to change in Article Y and Article 71 to point to revised numbering of 4.1 and 4.2.</p>	<p>On Art.4.1 on 4.2.</p> <p>1. For the purposes of this Regulation, a power-generating module shall be considered existing if:</p> <p>(a) it is already connected to the network on the date of entry into force of this Regulation; or</p> <p>(b) the power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by two years after the entry into force of the Regulation. A Member State may provide that in specified circumstances the regulatory authority may determine whether the power-generating module is to be considered an existing power-generating module or a new power-generating module.</p> <p>2. Existing power-generating modules are not subject to the requirements of this Regulation, except where:</p> <p>(a) the existing power-generating module has been subject to a significant modernisation in accordance with the proposal developed according to Article 4a; or</p> <p>(b) a regulatory authority or, where applicable, a Member State decides to make an existing power-generating module subject to all or some of the requirements of this Regulation, following a proposal from the relevant TSO in accordance with paragraphs 3, 4 and 5.</p>
		<p>For 4a1.</p> <p>1. Proposals for defining significant modernisation of power-generating modules and the requirements applicable in those cases shall</p>

Article 4a [new]

be subject to approval by the relevant regulatory authority or, where applicable, the Member State. The TSO shall agree the proposals with relevant DSOs and conduct a public consultation in accordance with Article 10.

For 4a2.

2. The definition of significant modernisation shall take into account at least the following criteria:

- (a) an increase above the existing maximum capacity of the power-generating module, whether this increase results from one modernisation or cumulatively from 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);
- (b) a deviation from the reactive power capability of the power-generating module, whether this deviation results from one modernisation or cumulatively from several successive modernisations, of a minimum percentage to be proposed by the TSO; and
- (c) a change in frequency stability and active power management capabilities, whether this change results from one modernisation or cumulatively from several successive modernisations, of the power-generating module.

3. Where component parts or units of an existing power generating module are replaced or new

	<p>For 4a1.</p> <p>The majority of PGMs, in terms of numbers and administrative burden, are connected to DSOs' networks, and therefore dealing with significant modernization will be a material workload for DSOs. Therefore the national rules should be agreed with DSOs.</p> <p>For 4a2.</p> <p>Paragraphs (a), (b) and (c) need "cumulatively" adding to ensure that the changes over time are assessed from the original installation.</p> <p>The DSO Entity does not see it as necessary for a range of reactive capability to be specified in the RfG.</p> <p>The DSO Entity believes that the draft legal text is not as clear in its treatment of replacement parts as the recommendations of the ESC Expert Group on Significant Modernization and is suggesting some changes that are more aligned with those recommendations.</p> <p>In particular the DSO Entity believes that the treatment of maintenance activities and "spare" parts, and also the capabilities or replacement parts, are better specified in the ESC's recommendations.</p>	<p>parts or units added to an existing power generating module, those new or replacement parts or units should, to the extent applicable:</p> <p>(a) be compliant with the requirements of this Regulation</p> <p>(b) not be a limitation on the eventual compliance of the power generating module should compliance be required with this Regulation in accordance with this article; and</p> <p>(c) Immediately contribute the requirements of this Regulation pro rata compared to the power generating module as appropriate (e.g. reactive power, frequency response etc). to the future compliance of that power generating module for the possibility that compliance with this Regulation is required in the future.</p> <p>4. The definition of significant modernisation in paragraph 2 shall exclude any any change of components/assets of a power-generating module or electricity storage module from maintenance and repair activities and not include the use of spare parts, whether or not those parts are purchased new at the time of their incorporation in the power generating module.</p>
	<p>For Art. 5.2</p> <p>The addition of AC in front of V2G to implement</p>	<p>For Art. 5.2</p>

the EU DSO Entity's recommendations for the treatment of EVs (and supported by ENTSO-e.)

The Entity also recommends deleting the first few words of paragraph (b) to make the text flow better from the first paragraph of 5.2.

Related to Table 1:

In Table 1 the EU DSO Entity does not agree with the reduction of the A/B threshold in continental Europe to 0,5MW. It should remain at the 1,0MW threshold as currently.

For those countries with a boundary higher than this, it causes more costs for those customers, and more administration for DSOs.

This will also have an effect on SOGL in terms of SGUs, ie will create many additional Type B PGMs which will also be SGUs – and will make it complicated to have different size boundaries over time from a SOGL perspective. How will the SOGL work with retrospective changes to the A /B threshold (noting that the SOGL IS retrospective).

The Expert Group BftA considered the interaction of the thresholds and the specification of the requirements, and concluded that it was better to retain the exiting thresholds and consider how the requirements could be appropriately harmonized and specified based on the existing

2. Power-generating modules, excluding AC V2G electric vehicles and any associated AC V2G electric vehicle supply equipment below 1 MW maximum capacity, within the following categories shall be considered as significant:

(a) maximum capacity of 0,8 kW or more (type A);

(b) below the threshold specified in accordance with the procedure laid out in paragraph 4;

(i) maximum capacity at or above a threshold specified by each relevant TSO in accordance with paragraph 3 (type B). This threshold shall not be above the limits for type B power generating modules contained in Table 1;

(ii) maximum capacity at or above a threshold specified by each relevant TSO in accordance with paragraph 3 (type C). This threshold shall not be above the limits for type C power generating modules contained in Table 1; or

(iii) maximum capacity at or above a threshold specified by each relevant TSO in accordance with paragraph 3 (type D). This threshold shall not be above the limits for type D power generating modules contained in Table 1;

Related to Table 1.

a. As wording for the column titles:

Limit for a threshold of maximum capacity

b. We propose to replace the 0,5 MW with 1,0 MW for Continental Europe

c. delete Great Britain from the table

thresholds. We continue to believe that EG BftA's report is a useful reference for this issue.

We have noticed that the legal text is inconsistent in its use of commas or raised points to signify decimals. The text should be checked for consistency.

For Art. 5.6.

The EU DSO Entity proposes modification to paragraph 5.6 to implement the Entity's recommendations for the treatment of electric vehicles, and to make clear that those electric vehicles where the power converter is in the fixed equipment shall be treated as electricity storage modules.

For Art. 5.8.

The EU DSO Entity believes this paragraph is unnecessary and is contributing to the overall length and complexity of the RfG. It is also inaccurate because the requirements for B, C D are additive from the previous type.

The Entity believes this paragraph should be deleted and the deleted text first paragraphs in Articles X & Y should be restored.

The Entity believes it will be easier for those readers less familiar with the RfG to see the paragraph about the addition of requirements at the start of each relevant article.

For Art 5.6

V2G electric vehicles and associated V2G electric vehicle supply equipment, within the following categories shall be considered as significant:

(a) maximum capacity larger than or equal to 0,8 kW and connected with alternating current (type AC V2G);

(b) maximum capacity larger than or equal to 0.8 kW and connected with direct current (type DC V2G);

Requirements applicable to AC V2G electric vehicles and associated AC V2G electric vehicle supply equipment are set out exhaustively in Article 13a. Type AC V2G and Type DC V2G electric vehicles and associated V2G electric vehicle supply equipment shall possess equipment certificates, proving compliance with this regulation. Type AC V2G electric vehicles and associated AC V2G electric vehicle supply equipment follow compliance provisions of Article 30a only, whereas requirements applicable to type DC V2G electric vehicles and associated DC V2G electric vehicle supply equipment are those applying to electricity storage modules.

For Art. 5.8.

Proposal for deletion of ACER text

	<p>a. Wording - suggest adding "of this Regulation" in the initial phrase of the article</p> <p>b. Art. 6.6.</p> <p>This article is too open ended and unclear. Where ENTSO-e has thought through the implications of storage contributing to frequency control, ENTSO-e has drafted detailed requirements in Article 13 for LFSM-U, and has specified these quite separately to the general requirements for PGMs. Conversely for other requirements, notably reactive power and reactive power control, there is just the glib requirement of Art6.6 for full compliance with these articles when interpreted for negative active power flows and uncertain sign convention on reactive power flows. Whilst the requirements might be appropriate, many stakeholders will really struggle to interpret the requirements without more direct guidance. In the absence of such necessary detail this paragraph is unworkable and should be deleted.</p> <p>The list below is of those RfG requirements which are hard to unambiguously interpret when applied to importing ESMs.</p> <p>17(b)(i) & (ii) Are these appropriate terms for the control of excitation whilst motoring?</p> <p>18.2(a) Does this imply a different reactive power compensation for import?</p>	

Article 6

18.2(b)(i) Is this appropriate for when the ESM is importing? Or is all of 18.2(b) turned off because importing cannot occur at P_{max} ?

18.2(c) Does this apply when importing active power? What does “below maximum capacity” mean? Any value between P_{max} and maximum consumption capacity? Can the diagrams of Fig 7 be used for negative active power?

Y.8 Do these requirements work when importing? Does the legal text need to say that these characteristics are only to be met when exporting active power?

20.2(a) As this is for RSO specification we assume the RSO can simply choose not to specify anything for active power import?

20.3 The TSO shall do this – and presumably this means specifying the behaviour during import.

21.2(a) Does this imply a different reactive power compensation for import?

21.2(b)(i) Is this appropriate for when the ESM is importing? Or is all of 21.3(b) turned off because importing cannot occur at P_{max} ?

21.2(c) Does this apply when importing active power? What does “below maximum capacity” mean? Any value between P_{max} and maximum consumption capacity? Does compliance therefore require two version of Fig 9 – one for each direction of active power?

21.2(d) Does all this work without additional interpretation when the ESM is importing active power?

21.2(e) Is this meaningful when importing

a. Application of this Regulation to offshore power-generating modules,]

b. Art. 6.6 -proposal for deletion

c. Art. 6.7

Notwithstanding paragraph 2, the technical design of power-generating modules shall not limit the time that the power generating module can operate in synchronous compensation mode. Synchronous compensation operation of non-synchronous power park modules can be performed by appropriately designed converters. The relevant system operators in co-ordination with the relevant TSO shall specify appropriate technical requirements applicable to these modules operating in synchronous compensation mode.

	<p>active power?</p> <p>Title IV, Chapters 2 – 7 Presumably all of this might need to reflect any clarification to the articles above?</p> <p>45.7 Does this need any interpretation when applied to ESMs? Which direction is active power?</p> <p>48.6 Does this need any interpretation when applied to ESMs? Which direction is active power?</p> <p>C. Art 6.7</p> <p>The DSO Entity is proposing some amendments that go to the readability, and also proposed that the RSO co-ordinates technical requirements with the TSO (as compensation is of significant interest to TSOs).</p>	
Article 7	<p>Art 7.9</p> <p>The EU DSO Entity believes that this paragraph should be deleted. The requirement was probably appropriate in 2016 as the RfG was being originally implemented. However the RfG has been in force for several years and is well established. In addition it is also inappropriate for TSOs to develop those requirements which DSOs should develop, given DSOs' legal duties under Regulation (EU) 2019/943.</p>	
Article 8		
Article 9		

Article 10		
Article 11	EU DSO added into the article for the purposes of the responsibility for stakeholder engagement now being shared between ENTSO-e and the EU DSO Entity	The European Union Agency for the Cooperation of Energy Regulators (ACER), in close cooperation with the European Network of Transmission System Operators for Electricity (ENTSO for Electricity) and the entity of Distribution System Operator in the Union (the EU DSO Entity), shall organise stakeholder involvement regarding the requirements for grid connection of power-generating facilities, and other aspects of the implementation of this Regulation. This shall include regular meetings with stakeholders to identify problems and propose improvements notably related to the requirements for grid connection of power-generating facilities.
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)		
	<p>Point. 1</p> <p>The Entity suggests that Table 2 is promoted further up the document in 13.2. Paragraph 13.2 (d) would become 13.2(a)(ii) with the existing 13.2(a)(ii) becoming 13.2(a)(iii).</p> <p>There is an issue in the new 13.2(a)(ii) (ie the original 13.2(d)) for some member states where an operating period of 10s for 52,5Hz it</p>	<p>Point 1.</p> <p>The following requirements relating to frequency stability apply:</p> <p>(a) With regard to frequency ranges:</p> <p>(i) a power-generating module shall be capable of remaining connected to the network and operate stably within the frequency ranges and time periods specified in Table 2;</p> <p>(ii) the power-generating module shall be capable of remaining connected to the network and operate at the frequency between 51,5 Hz – 52,5 Hz for 5 seconds .</p> <p>(iii) the relevant system operator, in coordination with the relevant TSO, and the power-generating facility owner may agree on wider frequency ranges, longer minimum times for operation or specific requirements for combined frequency and voltage deviations to ensure the best use of the technical capabilities of a power-generating module, if it is required to preserve or to restore system security;</p> <p>(iv) the power-generating facility owner shall not unreasonably withhold consent to apply wider frequency ranges or longer minimum times for operation, taking account of their economic and</p>

Article 13(2)

interferes with the arrangements for controlling DSOs' standby power supplies. Changing this to 5s would avoid this and obviate the need for these control schemes to be reengineered.

Point 2.

On Art. 13.2.b

A small number of editorial issues in 13.2(b)(iii) and (iv). The initial letters of these subparagraphs should not be capitalized; ie without rather than Without and if rather than If. Some of minor textual change suggestions for clarity have been proposed.

To ensure that DSOs' anti-islanding protection is not compromised, the words "anti-islanding schemes" have been added to paragraphs 13.2 (c).

Table 2 - the Entity suggest that this is moved up to be immediately under 13.2(a)(i).

The Entity suggests that the time period for operation for the frequency range 47,5Hz to 48,5 Hz is standardized at 90 mins. This is in line with EN 50549-10 and would be more consistent for manufacturers and RSOs.

technical feasibility.

Point 2.

On Art. 13.2.b

with regard to the rate-of-change-of-frequency withstand capability: (i) a synchronous power-generating module shall be capable of staying connected to the network and operate at rates-of-change-of-frequency up to the following values:

- $\pm 2,0$ Hz/s over a period of 0,5 s,
- $\pm 1,5$ Hz/s over a period of 1 s, and
- $\pm 1,25$ Hz/s over a period of 2 s;

(ii) a power park module shall be capable of staying connected to the network and operate at rates-of-change-of-frequency up to the following values:

- $\pm 4,0$ Hz/s over a period of 0,25 s,
- $\pm 2,0$ Hz/s over a period of 0,5 s,
- $\pm 1,5$ Hz/s over a period of 1 s, and
- $\pm 1,25$ Hz/s over a period of 2 s;

(iii) without prejudice to paragraph (ii), a power park module shall also be capable of staying connected to the network and operate through the sequence of rates-of-change-of-frequencies which are defined by the over frequency against time profiles given in Figure XX.a and the underfrequency against time profiles given in Figure XX.b;

(iv) If rate-of-change-of-frequency is used for loss of mains protection, the relevant system operator, in coordination with the relevant TSO, shall specify the setting threshold of this rate-of-change-of-frequency loss of mains protection.

		<p>(c) Protection schemes, other than anti-islanding schemes and those specifically referred in paragraph b(iii) above, shall not jeopardize frequency-ride-through performance specified in paragraph (b).</p>
<p>Article 13(3)</p>		<p>Point 2. Rewarding</p> <p>(g) the power-generating module shall be capable of operating stably during LFSM-O operation. When LFSM-O is triggered, the LFSM-O setpoint will prevail over any other active power setpoints which would tend to an increase of active power above the LFSM-O setpoint. The power generating module shall be able to receive and react on an external signal allowing the relevant system operator to block active power LFSM-O mode in real-time. The relevant system operator in coordination with the relevant TSO shall define the framework conditions for the use of this function.</p> <p>The response time, T_{resp} in Figure XX, for active power decrease in case of increasing frequency, shall be as fast as technically feasible and as described below:</p> <p>(i) for synchronous power-generating module: less or equal to 8 seconds for an active power setpoint change of 45% maximum power.</p> <p>(ii) for power park module: less or equal to 2</p>

	<p>Point 1. Proposal.</p> <p>The table from Article 15(2)(d) has been moved up here from Article 15, and references in Art 15 have been updated to point to it here. There are consequential updates in 13.11(a)(ii), 15.2(c)(i) and 15.2(d)(i)</p> <p>Point 2.</p> <p>The EU DSO Entity is aware of technologies which have struggled to meet the LFSM-O timings proposed in this paragraph and therefore DSOs need to TSO to react to the information provided in these cases so the DSO can take the appropriate action. A sentence is proposed to be added to provide this obligation.</p> <p>The Entity is also proposing some minor wording changes to increase the clarity of the paragraph.</p> <p>Point.3</p> <p>In the consultation draft it appears that Figure 1 is part of subsection 13.2.h – but it isn't. Also some of the text under the figure is marked as new text – but it isn't – it's existing.</p>	<p>seconds for an active power setpoint change of 50% maximum power. If the response time is greater than stated above, the power-generating facility owner shall justify the delay, providing technical evidence to the relevant TSO. The relevant TSO shall confirm whether or not the relevant system operator can accept the technical evidence as appropriate grounds for allowing the connection of the power generating module.</p>
Article 13(4)	<p>The references to paras 2 and 4 are incorrect – they should be 3 and 5</p>	<p>4. 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>The EU DSO Entity believes that it was the intention of the ESC Baseline for Type A Expert Group that the signal to a Type A PGM would be for the modulation of active power output – as the control cannot just be one way, ie for when the restriction on active power output is removed. Changing “reduce” to “modulate” would then make this sentence essentially identical to the ESM sentence, which could then be deleted because an ESM is defined as being a PGM.</p>	<p>The power-generating module shall be equipped with a communication interface (input port) in order to modulate, without undue delay, active power output following an instruction being received at the input port.</p> <p>The relevant system operator shall have the right to specify requirements for equipment to make power-generating module operable remotely.</p>
Article 13(8)		

<p>Article 13(9)</p>	<p>The EU DSO Entity is proposing some changes to this paragraph because DSOs need to be able to change the default settings. Apart from operational needs of local networks, some countries have or plan to have in place stricter ranges that need to be reflected in order to be in coherence with the National regulation. For example, in Spain DSOs must comply with Royal Decree 1955/2000 and maintain voltage within the range of $\pm 7\%$, which will not be possible if PGMs are allowed to work outside of this range.</p> <p>There is also no need to specify spurious detail such as circuit breakers, especially as the relevant switchgear might not be circuit breakers.</p>	<p>9. Within the capability defined in paragraph (8), the default settings for an autonomous connection shall be as in (a) to (g) below. The relevant system operator in co-ordination with the relevant TSO may specify other settings. follows:</p> <p>(a) Voltage range: $0.9 \text{ pu} \leq U \leq 1.1 \text{ pu}$;</p> <p>(b) Frequency range: — Continental Europe: $47.5 \text{ Hz} \leq f \leq 50.1 \text{ Hz}$ — Other synchronous areas $47.5 \text{ Hz} \leq f \leq 50.5 \text{ Hz}$</p> <p>(c) Minimum observation time: 60 s;</p> <p>(d) Maximum gradient of active power increase $\leq 20 \%$ of $P_{\text{max/min}}$</p> <p>(e) Condition on voltage phase angle difference : $\Delta\theta < 10^\circ$</p> <p>(f) Condition on the voltage magnitude difference : $\Delta U < 0.04 \text{ pu}$; and</p> <p>(g) Condition on the frequency difference: $\Delta f < 0,2 \text{ Hz}$</p> <p>Autonomous connection is allowed unless specified otherwise by the relevant system operator in coordination with the relevant TSO.</p>
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<p>Article 13(10)</p>	<p>DSOs are grateful for these additional requirements for reactive power production and control. Following review by the EU DSO Entity, it is proposed to add a little more detail to make clear what is required (and although not stated, is specified in EN 50549).</p> <p>Because of the additive nature of the RfG, Articles 17.1 and 20.1 have been modified to exclude Article 13.10 because Articles 17 and Articles 20 have their own detailed requirements.</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 both when importing or exporting active power over its operating range.</p> <p>The power generating module shall be capable of providing reactive power automatically by voltage control mode, reactive power control mode, power factor control mode or active power-related power factor control mode, as specified by the relevant system operator.</p> <p>The power generating module shall be able to receive and react to an external signal allowing the relevant system operator to transmit reactive power or voltage control mode set points.</p> <p>The power generating module controls shall implement any revised set points without delay;</p>
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Article 13(11)	<p>Point 1. 13.11(d) – the first word “The” should take a capital letter.</p> <p>Point 2. It would be better here to refer to synchronous and non-synchronous ESMs rather than SPGM and PPMs.</p> <p>Point 3. DSOs agree that the facility to block LFSM may be important for local network management reasons. ACER has proposed it for LFSM-O for PGMs in Art 13 and LFSM-U for PGMS in Art 15. DSOs believe it is appropriate to add this for PGMs incorporating storage in Art 13.</p>	<p>Point 1. 13.11(d) – the first word “The” should take a capital letter.</p> <p>Point 2. (e) The response time Tresp (Figure xx in Article 13.2) for LFSM-U-ESM shall be as described below: — for synchronous ESMs: less or equal to 8 s for an active power setpoint change of 1 pu of capacity excluding the time for switching from consumption to generation or vice versa. — for non-synchronous ESMs: less or equal to 0,5 s for an active power setpoint change of 1 pu of capacity excluding the time for switching from consumption to generation or vice versa. Switching from consumption to generation and vice versa should be as fast as technically feasible. The relevant system operator has the right to request the demonstration of technical evidence of the required switching time.</p> <p>Point 3. (f) 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.</p>
Article 13(12)		
Article 13(13)		

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)	<p>Point 1.</p> <p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>A small number of editorial changes have been made for clarity</p> <p>Point 2. Table XY</p>	<p>Point.1</p> <p>1. Type AC V2G electric vehicles (and any associated AC V2G electric vehicle supply equipment) shall fulfil the following requirements relating to frequency stability:</p> <p>(a) With regard to frequency ranges, type AC V2G electric vehicle and associated AC V2G electric vehicle supply equipment shall be capable of remaining connected to the network and operate within the frequency ranges and time periods specified in Table XY;</p> <p>(b) With regard to the rate-of-change-of-frequency withstand capability:</p> <p>(i) A type AC V2G electric vehicle and associated AC Without prejudice to paragraph (1)(a), type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall be capable of staying connected to the network and operate at the sequence of rates-of-change-of-frequencies which are defined considering the over frequency against time profiles given in figure XX.a and the underfrequency against time profiles given in figure XX.b;</p> <p>(iii) If the rate-of-change-of-frequency is used for loss of mains protection, the rate-of-change-of-frequency threshold shall be set to be less sensitive than any values defined in (i) above;</p> <p>(c) The protection schemes shall not jeopardise frequency-ride-through performance specified in</p>

		<p>paragraph (b).</p> <p>Point 2. Table XY Minimum time periods for which a type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall be capable of operating on different frequencies, deviating from a nominal value, without disconnecting from the network</p>
Article 13a(2)	<p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>A small number of editorial changes have been made for clarity</p>	<p>An AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall be equipped with a cyber-protected data exchange interface in order to modulate, without undue delay, active power output and input following an instruction being received at the input port. The relevant system operator shall have the right to specify requirements for equipment to make this facility operable remotely.</p>
Article 13a(3)	<p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>The EU DSO Entity believes that it is important to prevent EVs from reconnecting if the network voltages are outside of the allowable range. A voltage range identical to that for Article 13 is proposed.</p>	<p>.A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment may autonomously connect to the network under the following conditions:</p> <p>(a) Voltage range: $0.9 \text{ pu} \leq U \leq 1.1 \text{ pu}$;</p> <p>(b) Frequency range $49.8 \text{ Hz} \leq f \leq 50.2 \text{ Hz}$;</p> <p>(c) Minimum observation time: 5 s.</p>

Article 13a(4)	<p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>The EU DSO Entity believes that it is important to prevent EVs from reconnecting if the network voltages are outside of the allowable range. A voltage range identical to that for Article 13 is proposed.</p>	<p>A type AC V2G electric vehicle and associated AC V2G electric vehicle supply equipment may autonomously reconnect to the network after tripping due to a system disturbance under the following conditions:</p> <ul style="list-style-type: none"> (a) Voltage range: $0.9 \text{ pu} \leq U \leq 1.1 \text{ pu}$; (b) Frequency range $49.8 \text{ Hz} \leq f \leq 50.2 \text{ Hz}$; (c) Minimum observation time: 60 s.
Article 13a(5)		<p>Point 1.</p> <p>With regard to the limited frequency sensitive mode – underfrequency (LFSM-U-EV):</p> <ul style="list-style-type: none"> (a) A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment 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 at a frequency threshold and with the droop setting; (b) The droop setting shall be 5%; (c) The frequency threshold Δf_1 shall be 49,8 Hz inclusive, except for synchronous area IE where the frequency threshold shall be 49,5 Hz inclusive; (d) A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall stay and operate stably in this specific mode as long as the frequency is below the frequency threshold and according to its content of energy. If the frequency recovers, the

	<p>Point 1.</p> <p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>A small number of editorial changes have been made for clarity</p> <p>Point 2. Figure YY</p> <p>For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p>	<p>AC V2G electric vehicle and associated AC V2G electric vehicle supply equipment (if present) shall follow the same power-frequency characteristic until it is restored to its prior state of active power input/output;</p> <p>(e) The response time, T_{resp} in Figure XX, shall be less or equal to 0,5 s for an active power setpoint change of 1 pu of P_{max} excluding the time for switching from consumption to generation or vice versa;</p> <p>(f) Switching from consumption to generation and vice versa should be as fast as technically feasible.</p> <p>Point 2. Figure YY</p> <p>Active power frequency response capability of type AC V2G electric vehicles and any associated AC V2G electric vehicle supply equipment in LFSM-U-EV</p>
		<p>Point 1.</p> <p>With regard to limited frequency sensitive mode – over frequency (LFSM-O-EV):</p> <p>(a) A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment which is consuming active power during an overfrequency event shall increase the level of active power consumed according to the LFSM-O characteristic, to the extent that is technically feasible. The type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall consume power up to filling the maximum energy that it is able to</p>

Article 13a(6)

Point 1

For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.

Point 2.

For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.

store, then it may cease consumption.

(b) A Type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment, which is injecting active power during an overfrequency event, shall activate the provision of active power frequency response according to Figure 1X at the frequency threshold Δf_1 equal to 50,2 Hz (inclusive), except for synchronous area IE where Δf_1 shall be 50,5 Hz (inclusive);

(c) The droop setting shall be 5%;

(d) Any unintentional delay shall be as short as possible;

(e) The type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall be capable of operating stably during LFSM-O operation. When LFSM-O is active, the LFSM-O setpoint will prevail over any other active power setpoints which would result in an increase of power above the LFSM-O setpoint;

(f) The response time T_{resp} (Figure XX) for active power decrease in case of increasing frequency, shall be as fast a technically feasible and less or equal to 2 seconds for an active power setpoint change of 50% maximum power

Point 2.

Figure 1X

Active power frequency response capability of type AC V2G electric vehicles and any associated AC V2G electric vehicle supply equipment in LFSM-O-EV

Article 13a(7)	For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.	A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment 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 2 and 4 of this Article.
Article 13a(8)	For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.	With regard to voltage stability, a type AC V2G electric vehicle and any associated AC 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.

<p>Article 13a(9)</p>	<p>Point 1. For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p> <p>Point.2 - Tables For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.</p>	<p>Point 1. A type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment, when operating above the minimum stable operating level, shall be capable of staying connected to the network and continuing to operate stably after the power system has been disturbed by faults in the transmission network according to a voltage-against-time-profile in line with Figure 3 at the connection point and with the set points in Tables X.1.1 and X.1.2.</p> <p>Point 2- Tables Table x.1.1 Voltage parameters for Figure 3 for fault-ride-through capability of type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment</p> <p>Table X.1.2 Time parameters for Figure 3 for fault-ride-through capability of type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment</p>
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Article 13a(10)	For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.	The voltage-against-time-profile expresses a lower limit of the profile of the phase-to-phase voltages (or single phase to neutral voltages for single phase type AC V2G electric vehicles and any associated AC V2G electric vehicle supply equipment) on the network voltage level during a symmetrical fault, as a function of time before, during and after the fault.
Article 13a(11)	For Article 13a, the EU DSO Entity proposes using Article 13a to define the requirements for AC connected V2G EVs. Therefore throughout 13a EV2 has been eliminated and EV1 has been changed to AC V2G.	When the network voltage resumes, after the fault has been cleared, to a value within the voltage range of 0,85 pu – 1,1 pu, a type AC V2G electric vehicle and any associated AC V2G electric vehicle supply equipment shall recover its active power output level to its pre-fault value. The recovery time shall not exceed a maximum of 1s.

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)	<p>Point 1 (art 14.2)</p> <p>The EU DSO Entity is proposing a minor change to make clear that the voltage range is at the connexion point. And (a) as a bullet is superfluous – there is no (b)</p> <p>Point 2 - art 14.2 (iii)</p> <p>The EU DSO Entity is suggesting that it is made clear that this subparagraph refers to PGMs connected to the transmission network.</p>	<p>Point 1</p> <p>2 Type B power generating modules with connection points' voltage ranges of 110 kV and above shall fulfil the following requirements relating to voltage stability:</p> <p>(i) unless otherwise provided in this Regulation, a power-generating module shall be capable of staying connected to the network and operating within the ranges of the network voltage at the</p> <p>Point 2</p> <p>iii) notwithstanding the provisions of paragraph (i), the relevant TSO in Spain may require power-generating modules connected to the transmission network to be capable of remaining connected to the network in the voltage range between 1,05 pu and 1,0875 pu for an unlimited period;</p>

Article 14(3)	The EU DSO Entity is proposing a modification to the last sentence for clarity.	(vii) without prejudice to point (vi) of paragraph 3(a), undervoltage protection (either fault-ride-through capability or minimum voltage specified at the connection point voltage) shall be set by the power-generating facility owner according to the widest possible technical capability of the power-generating module, unless the relevant system operator requires narrower settings in accordance with point (b) of paragraph 5. The relevant settings shall be justified by the power-generating facility owner in accordance with the principle of ensuring the widest possible technical capability of the power-generating module;
Article 14(4)	14.4 a and c are not clear. We have suggested a rewording for clarity.	<p>(a) the use of autonomous connection function shall be subject to prior authorisation by the system relevant operator and to the reconnection conditions specified by the relevant RSO in co-ordination with the relevant TSO;</p> <p>(c) in the case of changes in the network leading to the minimum short-circuit level as defined in the connection agreement, the PGM shall remain connected and without reduction in its active power output.</p>
		<p>Point 1</p> <p>i) the relevant system operator shall specify the schemes and settings necessary to protect the network, taking into account the characteristics of the power-generating module. The protection schemes needed for the power- generating module and the network as well as the settings relevant to</p>

Article 14(5)

Point 1 - art 14.5 (b)

14.5(b) we suggest reversing the proposed wording changes.

Protection settings have no effect on the capabilities of the unit, only on its performance

Point 2 - art 14.5 (d)(i)

The Entity does not understand how real time data can exist without some form of time stamping, nor why this phrase has been deleted.

Point 3 - art 14.5 d (v)

The EU DSO Entity believes that trilateral agreements are highly impractical. 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.

the power-generating module shall be coordinated and agreed between the relevant system operator and the power-generating facility owner. The protection schemes and settings for internal electrical faults must not jeopardise the performance of a power- generating module, in line with the requirements set out in this Regulation;

(ii) electrical protection of the power-generating module shall take precedence over operational controls, taking into account the security of the system and the health and safety of staff and of the public, as well as mitigating any damage to the power-generating module;

(iii) protection schemes may cover the following aspects:

- external and internal short circuit,
- asymmetric load (negative phase sequence),
- stator and rotor overload,
- over-/underexcitation,
- over-/undervoltage at the connection point,
- over-/undervoltage at the alternator terminals,
- inter-area oscillations,
- inrush current,

Point 2

d) power-generating facilities shall be capable of exchanging information with the relevant system operator or the relevant TSO in real time or periodically with time stamping, as specified by the relevant system operator or the relevant TSO. The content of real-time data shall be consistent with the data exchange requirements laid down in Title 2 of Regulation (EU) 2017/1485/

Point 3

(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 defined by the relevant system operator.

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)	Paragraph to be deleted	
Article 14a(2)	<p>Point 1 - 14a.2(a)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that the minimum voltage in 14a.2(a) should be 1000V</p> <p>Point 2 - Art 14a.2(b)(iii)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that the minimum voltage in 14a.2(b)(iii) should include the words “connected to the transmission network” for clarity.</p>	<p>Point 1</p> <p>A type EV3 electric vehicle and associated V2G electric vehicle supply equipment shall fulfil the following requirements relating to voltage stability:</p> <p>a) With regard to voltage stability, a type EV3 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 0,9 pu - 1,1 pu at the connection point should that be above 1000V and below 110 kV. Beyond these voltage range values, the under and over voltage ride through immunity limits, as specified in Article 14 (3)(a) and (c) apply;</p> <p>Point 2</p> <p>(iii) notwithstanding the provisions of paragraph (i), the relevant TSO in Spain may require type EV3 electric vehicles and associated V2G electric vehicle supply equipment connected to the transmission network to be capable of remaining connected to the network in the voltage range between 1,05 pu and 1,0875 pu for an unlimited period;</p>

Article 14a(3)	<p>Point 1 - 14a.3(a)(ii)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that the minimum voltage in 14a.3(a)(ii) and 14a.3(a)(vi) must include the words “(or single phase to neutral voltages for single phase type EV3 electric vehicles)”</p> <p>Point 2 - Art 14a.3(b)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that 14a.3(b) should contain the word “transmission” for clarity</p>	<p>Point 1</p> <p>(ii) the voltage-against-time-profile shall express a lower limit of the actual course of the phase-to-phase voltages (or single phase to neutral voltages for single phase type EV3 electric vehicles) on the network voltage level at the connection point during a symmetrical fault, as a function of time before, during and after the fault;</p> <p>Point 2</p> <p>(b) Fault-ride-through capabilities in case of asymmetrical transmission faults shall be specified by each TSO.</p>
Article 14a(4)		
	<p>Point 1 - art 14a.5(b)(iii)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that art 14a.5(b)(iii) should be deleted. It does not seem appropriate to include this list for individual electric vehicles. This is a generic list for transmission connected plant.</p> <p>Point 2 - Art 14a.5(b)(iv)</p> <p>“electric vehicles and associated” 14a.5(b)(iv) should also be deleted. EV3 are mass produced and so these features would (a) need to be manufactured into them or the charging</p>	<p>Point 2</p> <p>(iv) changes to the protection schemes needed for the type EV3 V2G electric vehicle supply equipment and the network and to the settings relevant to the type EV3 electric vehicles and associated V2G electric vehicle supply equipment shall be agreed between the system operator and the electrical charging park owner, and agreement shall be reached before any changes are made ;</p> <p>Point 3</p> <p>(c) the electrical charging park owner shall organise its protection and control devices in</p>

<p>Article 14a(5)</p>	<p>equipment – and cannot be sensibly be applied to mobile devices.</p> <p>Point 3 - Art 4a.5(c)(iii) and 14a.5(c)(iv)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that 14a.5(c)(iii) and 14a.5(c)(iv) should be swapped round as power restriction is of higher importance to local networks.</p> <p>Point 4 - Art 14a.5(d)(i)</p> <p>14a.5(d)(i) should include “or periodically with time stamping”.</p> <p>Point 5 - Art 14a.5(d)(iii) and 14a.5(d)(iv) 14a.5(d)(iii) and 14a.5(d)(iv) should be deleted. These were included for Type B on the expectation that the connexion would be at MV and hence there would be protection equipment with this capability. That is not the case here.</p>	<p>accordance with the following priority ranking (from highest to lowest):</p> <ul style="list-style-type: none"> (i) network and EV3 electric vehicles and associated V2G electric vehicle supply equipment protection; (ii) synthetic inertia, if applicable; (iii) power restriction; (iv) frequency control (active power adjustment); and (v) power gradient constraint; <p>Point 4</p> <ul style="list-style-type: none"> (i) V2G electrical charging parks shall be capable of exchanging information with the relevant system operator or the relevant TSO in real time, or periodically with date stamping, as specified by the relevant system operator or the relevant TSO. The content of real-time data shall be consistent with the data exchange requirements laid down in Title 2 of Regulation (EU) 2017/1485;
		<p>Point 1</p> <ul style="list-style-type: none"> (a) with regard to reactive power capability, the relevant system operator shall have the right to specify the capability of a type EV3 electric vehicles and associated V2G electric vehicle supply equipment to supply and absorb reactive power over its operating range. The type EV3 electric vehicle and associated V2G electric vehicle supply equipment shall be capable of

Article 14a(6)	<p>Point 1 - Art 14a.6(a)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe should include reactive power requirements to match those of Type A PGMs.</p> <p>Point 2 - Art.14a.6(b)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that 14a.6(b) should include the words “on the transmission system” for clarity.</p> <p>Point 3 - Point 2 - Art.14a.6(c)</p> <p>The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe that In 14a.6(c) the word “transmission “ should be inserted in front of “faults” to make it clear that this requirement is only in relation to faults on the transmission system.”</p>	<p>providing reactive power automatically by voltage control mode, reactive power control mode, power factor control mode or active power-related power factor control mode, as specified by the relevant system operator. The type EV3 electric vehicle and associated V2G electric vehicle supply equipment shall be able to receive and react to an external signal allowing the relevant system operator to transmit reactive power or voltage control mode set points. The type EV3 electric vehicle and associated V2G electric vehicle supply equipment controls shall implement any revised set points without delay;</p> <p>Point 2</p> <p>(b) the relevant system operator in coordination with the relevant TSO shall have the right to specify that a type EV3 electric vehicles and associated V2G electric vehicle supply equipment be capable of providing fast fault current at the connection point in case of symmetrical (3-phase) faults on the transmission system, regarding the following:</p> <p>Point 3</p> <p>(c) with regard to the supply of fast fault current in case of asymmetrical (1-phase or 2-phase) transmission faults, the relevant system operator in coordination with the relevant TSO shall have the right to specify a requirement for asymmetrical current injection.</p>
Article 14a(7)		

Article 14a(8)	The EU DSO Entity believes that the entirety of 14a should be deleted. However if it is to be retained we believe should the last sentenced should be reworded for clarity.	8. The relevant TSO shall have the right to request grid forming capability at its connection point from type EV3 electric vehicles and associated V2G electric vehicle supply equipment in accordance with the requirements of Article Y.
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	Text amendment proposal (if applicable)
New provision	

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General requirements for type C power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 15(1)	The EU DSO Entity believes that LFSM-U blocking is a useful feature that should be added to Article 13.11(f). To avoid confusion for Type C PGMs, and conflict with Art 15.2(c)(ii), the Art 13.11(f) requirement should be turned off for Type C in Art 15.1	1. Type C power-generating modules shall fulfil the requirements laid down in Articles 13 and 14, except for Article 13(2)(b) and (6) and 13.11(f) and Article 14(5)(d)(iii).
		<p>Point 1</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):</p> <p>(i) the power-generating module shall be capable of activating the provision of active power frequency response at a frequency threshold and with a droop specified by the relevant TSO in coordination with the TSOs of the same synchronous area as follows:</p> <p>—the frequency threshold shall be $50\text{Hz} + \Delta f_1$, where Δf_1 is defined in Table X of Article 13.3(c),</p> <p>—the droop settings shall be in the range 2-12 %.</p> <p>This is represented graphically in Figure 4;</p> <p>(ii) the actual delivery of active power frequency response in LFSM-U mode shall be capable of taking into account, if applicable:</p> <p>—ambient conditions when the response is to be triggered,</p> <p>—the operating conditions of the power-generating module, in particular limitations on operation near maximum capacity at low frequencies and the</p>

respective impact of ambient conditions according to paragraphs 4 and 5 of Article 13, and

- the availability of the primary energy sources.
- an external signal allowing the relevant system operator to block the LFSM-U mode in real-time.

Point 2

Pref is the reference active power to which ΔP is related. ΔP is the change in active power output from the power-generating module. F_n is the nominal frequency (50 Hz) in the network and Δf is the frequency deviation in the network. At underfrequencies where Δf is below Δf_1 the power-generating module has to provide a positive active power output change according to the droop S2. In the case of electricity storage modules, Pref could be the actual active power output or the actual active power import at the moment the FSM threshold is reached or the maximum capacity or maximum consumption capacity as agreed with the relevant system operator

Point 3

(d) in addition to point I of paragraph 2, the following shall apply cumulatively when frequency sensitive mode ('FSM') is operating :

(i) the power-generating module shall be capable of providing active power frequency response in accordance with the parameters specified by each relevant TSO within the ranges shown in Table 4 and Table X of Article 13.3(c). In specifying those parameters, the relevant TSO shall take account of the following facts:

Article 15(2)

Point 1 - Art 15.2 (c)

The EU DSO Entity believes that the RfG will be easier to assimilate if Table X is relocated in Art 13; there are small number of consequential amended references in Art 15.2.

Point 2 - Art 15.2.c (V)

The last sentence of Art 15.2(c)(ii) is incorrect – it needs adjusting and citing the instantaneous active power to replace one instance of maximum capacity and maximum consumption capacity.

Point 3 - Art 15.2.d

Article 15.2(d)(i) has a mistake in the text associated with Figure 5 referring to “maximum capacity” twice rather than “maximum capacity” and “actual active import power”.

There are a couple of minor editorial changes to improve the English.

Point 4 - Art 15.2.f

The EU DSO Entity does not believe it is necessarily correct to for new PGMs incorporating storage to disconnect their demand because they should be compliant with 13.11.

—in the case of overfrequency, the active power frequency response is limited by the minimum regulating level. In the case of electricity storage modules, the active power frequency response is limited by the minimum regulating level or maximum consumption capacity, or the maximum energy content (as declared by the manufacturer) that the electricity storage module can store in its operative condition or as agreed between the power generating facility and the relevant TSO irrespective to whether the electricity storage module is independently connected to the transmission or distribution network or within a power park module sharing a single network connection with other power generating modules of lower energy content or of lower export power capacity,
—in the case of underfrequency, the active power frequency response is limited by maximum capacity, and, in case of electricity storage modules, also by the maximum consumption capacity or maximum energy content of the electricity storage module in its operative condition (as declared by manufacturer) or as agreed between the power generating facility and the relevant TSO irrespective to whether the electricity storage module is independently connected to the transmission or distribution network or within a power park module sharing a single network connection with other power generating modules or demand of lower energy content or maximum consumption capacity ,
—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

		<p>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> <p>-the TSO shall take into account the time needed for some technologies of electricity storage modules to switch from consumption mode to generating mode or vice versa and also the fact that the droop primary frequency control characteristic in consumption and generating mode could be different ;</p> <p>Pref is the reference active power to which ΔP is related. ΔP is the change in active power output from the power-generating module. F_n is the nominal frequency (50 Hz) in the network and Δf is the frequency deviation in the network. In the case of electricity storage module, Pref could be the actual active power output or the actual active power import at the moment the FSM threshold is reached or the maximum capacity or maximum consumption capacity as agreed with the relevant system operator</p> <p>Point 4</p> <p>(f) with regard to disconnection due to underfrequency, power-generating facilities capable of acting as a load, including pump-storage power-generating modules, shall be capable of disconnecting their load in case of underfrequency. The requirement referred to in this point does not extend to auxiliary supply;</p>
Article 15(3)[deleted]		

Article 15(3)		
Article 15(4)	<p>Point 1 - Art 15.4.b The EU DSO Entity remains perplexed as to how island situations can be reliably detected without recourse to knowing the physical disposition of relevant switchgear.</p> <p>Point 2 - Art 15.4.c (ii) The EU DSO Entity remains perplexed as to how island situations can be reliably detected without recourse to knowing the physical disposition of relevant switchgear.</p>	<p>Point 1 the power-generating module control schemes, including FSM, LFSM-O, LFSM-U and voltage control system (synchronous power-generating modules) or voltage control mode (power park modules) shall be able to continuously and stably operate during the transition from interconnected system operation to island operation. Information on how robustness is achieved during the transition from interconnected system operation to island operation shall be with shared with the relevant system operator or TSO.</p> <p>Point 2 (c)(ii) a power-generating module with a minimum re-synchronisation time greater than 15 minutes after its disconnection from any external power supply must be designed to trip to houseload from any operating point in its P-Q-capability diagram.;</p>
Article 15(5)		

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	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		<p>Point 2</p> <p>each relevant system operator in coordination with the relevant TSO shall specify and make publicly available the pre-fault and post-fault conditions for the fault-ride-through capability in terms of :</p> <p>Point 3</p> <p>(d) the synchronous power-generating module shall be capable of remaining connected to the network and continuing to operate stably when the actual course of the phase-to-phase voltages (or phase to neutral voltage for a single phase power generating module) on the network voltage level at the connection point during a symmetrical transmission fault, given the pre-fault and post-fault conditions in points (c) of paragraph 2, remain above the lower limit specified in point (a) of paragraph 2, unless the protection scheme for internal electrical faults requires the disconnection of the power-generating module from the network. The protection schemes and settings for internal electrical faults must not jeopardise fault-ride-through performance;</p> <p>(e) without prejudice to point (c) of paragraph 2, undervoltage protection (either fault-ride-through capability or minimum voltage specified at the connection point voltage) shall be set by the power-generating facility owner</p>

	<p>Point 1 Art X.1 should be restored as Art 5.8 has been deleted.</p> <p>Point 2 - Art X.1.c The EU DSO believes that in this paragraph the system operators are the wrong way round, it must be the RSO in consultation with the TSO. The TSO cannot specify the pre and post fault conditions on a DSO's network. The DSO will need to publish this to</p> <p>Point 3 - Art X.1.d&e The EU DSO Entity believes that paragraph (d) needs a clause about single phase PGMs and the word Transmission adding.</p> <p>(e)The last sentence needs rewriting to be clear and to mean what is intended.</p> <p>There are a number of incorrect references in (d) and (e) which are corrected in our draft text.</p>	<p>according to the widest possible technical capability of the power-generating module, unless the relevant system operator requires narrower settings in accordance with point (b) of paragraph 5 of Article 14. The relevant settings shall be justified by the power-generating facility owner in accordance with the principle of ensuring the widest possible technical capability of the power-generating module.</p>
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New provision	

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Requirements for type B 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)	Based on the EU DSO's recommendations, Article 13.10 should be added to the exclusions of 17.1 as the requirements of 13.10 are covered in 17.2	1. Type B synchronous power-generating modules shall fulfill the requirements listed in Articles 13 and Article 14, except for Article 13(2) (b), Article 13(8), Article 13(10).
Article 17(2)	The EU DSO Entity suggests two additional paragraph consistent with the approach taken in Art 13 for appropriately specifying voltage and reactive power control	<p>(c) The power generating module shall be capable of providing reactive power automatically by reactive power control mode, power factor control mode or active power-related power factor control mode, as specified by the relevant system operator.</p> <p>(d) The power generating module shall be able to receive and react to an external signal allowing the relevant system operator to transmit reactive power or voltage control mode set points. The power generating module controls shall implement any revised set points without delay;</p>
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)	The EU DSO Entity notes that the diagram has changed and although the flexibility is welcome the Entity thinks that it will be appropriate to add a note to the legal text to indicate that the shape in the text is only indicative.	The diagram represents boundaries of a U-Q /Pmax-profile by the voltage at the connection point, expressed by the ratio of its actual value and the reference 1 pu value, against the ratio of the reactive power (Q) and the maximum capacity (Pmax). Note that the envelope shape shown above is for indicative purposes only and does not in and of itself, constitute an exhaustive requirement of this code.

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)	<p>The EU DSO Entity observes that many power generating facilities are connected to the distribution network (at 110 kV or above). 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>	<p>3. The relevant system operator, in co-ordination with the relevant TSO, 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.</p>
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)	Art Y.1 should be restored as Art 5.8 has been deleted.	
Article Y(2)		
Article Y(3)	Art Y.3 The EU DSO believes that in this paragraph the system operators are the wrong way round, it must be the RSO in consultation with the TSO. The TSO cannot specify the pre and post fault conditions on a DSO's network. The DSO will need to publish this to connectees.	3. Each relevant system operator, in coordination with the relevant TSO, shall specify and make publicly available the pre-fault and post-fault conditions for the fault-ride-through capability in terms of:
Article Y(4)	The EU DSO Entity notes that some countries have or plan to have in place stricter ranges that need to be reflected in order to be in coherence with the National regulation. For example, in Spain DSOs must comply with Royal Decree 1955/2000 and maintain voltage within the range of $\pm 7\%$, which will be very difficult to achieve if PGMs are allowed to work outside this range for an unlimited time	5. When the network voltage resumes, after the fault has been cleared to a value within the voltage range of 0,85pu – 1,1pu (or other range specified by the relevant system operator in coordination with the relevant TSO) , the power park module shall recover its active power output level to its pre-fault value. The recovery time shall not exceed a maximum of 1s.
Article Y(5)		

Article Y(6)	<p>The EU DSO Entity believes that derogation is the wrong concept here – this is not a derogation, this is an exclusion from the application of the regulation. A derogation is a separate legal process. Also – this just repeats Art 4.1 and is therefore not necessary and Y.7 could be deleted.</p>	<p>7. By way of exemption from Article 4(1), a power park module shall be considered existing if</p> <p>(a) it is already connected to the network on the date of entry into force of this Regulation; or</p> <p>(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.</p>
Article Y(7)		

Article Y(8)	<p>Point 1</p> <p>The EU DSO Entity does not have detailed comments to make on Grid Forming on 25 September. The Entity has been working with ENTSO-e to find an accommodation on the Grid Forming requirements, but this work has not yet concluded. Broadly the Entity's members believe that an approach based on ACER's drafting, with minor amendments, would work, and similarly that an approach favoured by ENTSO-e, where activation/deactivation is not used, would also work. However a minority of DSOs are very concerned about the negative effects of both of these approaches. The Entity will continue to engage with ACER and ENTSO-e to seek a resolution.</p> <p>Point 2 - Art Y8 (c)</p> <p>There is a typo in the last line of Y.8(c) – effect should be change to affect.</p>	<p>Point 2</p> <p>Inherent energy storage means an energy reserve available in physical components of a power park module, which has not necessarily been designed to suit the grid forming requirements of this article, but may be used for such purposes, without affecting the design of the physical components of individual units</p>
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New provision	

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Requirements for type B power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 20(1)		
Article 20(2)		
Article 20(3)		
Article 20(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 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]		
		<p>Point 1</p> <p>The diagram represents boundaries of a U-Q/Pmax-profile by the voltage at the connection point, expressed by the ratio of its actual value and the reference 1 pu value, against the ratio of the reactive power (Q) and the maximum capacity (Pmax). Note that the envelope shape shown above is for indicative purposes only and does not in and of itself, constitute an exhaustive requirement of this code.</p> <p>Point 2</p> <p>(vi) for the purpose of power factor control mode, the power park module shall be capable of controlling the power factor at the connection point within the required reactive power range, specified by the relevant system operator according to point (a) of Article 20(2) or specified by points (a) and (b) of Article 21(2), with a target power factor in steps no greater than 0,01. The relevant system operator shall specify the target power factor value, its tolerance and the period of time to achieve the target power factor following a sudden change of active power output. (vi) for the purpose of power factor control mode, the power park module shall be capable of controlling the power factor at the</p>

Article 21(2)	<p>Point 1 - Art 21.2.(b) Figure 8</p> <p>The diagram has been changed from a simple rectangle to the new shape shown. Readers could interpret this as a clear signal that this shape is to be adopted. The deleted sentence does say that it is indicative. The proposed replacement makes this point stronger and explicitly states that it is not to be read as a new requirement.</p> <p>Point 2 - Art 21.2(d)(vi)</p> <p>There are a couple of incorrect references to correct in this sub paragraph.</p>	<p>connection point within the required reactive power range, specified by the relevant system operator according to point (a) of Article 20(2) or specified by points (a) and (b) of Article 21(32), with a target power factor in steps no greater than 0,01. The relevant system operator shall specify the target power factor value, its tolerance and the period of time to achieve the target power factor following a sudden change of active power output. The tolerance of the target power factor shall be expressed through the tolerance of its corresponding reactive power. This reactive power tolerance shall be expressed by either an absolute value or by a percentage of the maximum reactive power of the power park module. The relevant system operator shall consider the appropriate requirements when specifying power factor control at operation close to zero active power;</p> <p>(vii) for the purpose of active power-related power factor control mode, the power park module shall be capable of controlling the power factor at the connection point within the required reactive power range, specified by the relevant system operator according to point (a) of Article 20(2) or specified by points (a) and (b) of Article 21(32). The relevant system operator shall specify power factor set point resulting from a change in active power output. The relevant system operator shall specify its tolerance and the period of time to achieve the setpoint;</p>
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)	<p>The EU DSO Entity observes that many power generating facilities are connected to the distribution network (at 110 kV or above). 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>	<p>2. With regard to power oscillations damping control, type D power park modules shall have a power oscillation damping function which helps to attenuate the power oscillations, through the control of the active power, reactive power, or both. The power oscillation damping shall be able to damp inter-area oscillations in the range of, at least, 0,1 Hz – 1,0 Hz. The relevant TSO in co-ordination with 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 TSO 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 TSO.</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		
Article 25		
Article 26	comments on subpoints. III	
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	<p>Art 30.2</p> <p>As there is no emerging technology allowed for in the proposed revised RfG, this provision (30.2(e)) can be deleted.</p>	<p>2. The relevant system operator shall specify the content of the installation document, which shall have at least the following information:</p> <p>(a) the location at which the connection is made;</p> <p>(b) the date of the connection;</p> <p>(c) the maximum capacity of the installation in kW;</p> <p>(d) the type of primary energy source;</p> <p>(e) reference to equipment certificates issued by an authorised certifier used for equipment that is in the site installation;</p> <p>(f) as regards equipment used, for which an equipment certificate has not been received, information shall be provided as directed by the relevant system operator; and</p> <p>(g) the contact details of the power-generating facility owner and the installer and their signatures.</p>
		<p>Point 1</p> <p>1. The relevant system operator may specify an operational notification procedure for the connexion of any AC V2G electric vehicle. The relevant system operator may set an active power threshold below which no operational notification is required.</p> <p>2. The operational notification procedure for connection of each new type AC V2G electric</p>

Article 30a [new]	<p>Point 1 - Art 30a (addition of a new par1)</p> <p>The EU DSO Entity believes it is essential to include a new paragraph explaining DSOs needs (in line with national laws and regulations) to be notified in some cases in advance of the connexion of any new load or generation to the DSO's network. This is a quite separate requirement from compliance notification. Minor editorial changes: replace "filled in" with "provided" as been proposed by ACER in art 30.1</p> <p>Point 2 - Art 30a.2 (to become Art 30a.3 for EU DSO Entity)</p> <p>Minor changes consequent on the DSO Entity's proposal for AC V2G and DC V2G.</p>	<p>vehicle supply equipment shall consist of submitting an installation document. The facility owner shall ensure that the required information is provided in an installation document obtained from the relevant system operator and is submitted to the system operator.</p> <p>The relevant system operator shall ensure that the required information can be submitted by third parties on behalf of the facility owner.</p> <p>Point 2</p> <p>2. The relevant system operator shall specify the content of the installation document, which shall have at least the following information:</p> <ul style="list-style-type: none"> (a) the location at which the connection is made; (b) the date of the connection; (c) the maximum capacity of the associated AC V2G electric vehicle supply equipment in kW; (d) reference to equipment certificates issued by an authorised certifier used for equipment that is connected in the facility; (e) as regards equipment used, for which an equipment certificate has not been received, information shall be provided as directed by the relevant system operator; and (f) the contact details of the electrical charging park owner and the installer, and their signatures.
Article 30b [new]	The EU DSO Entity believes that the entirety of 30b should be deleted.	

Article 31		
Article 32		
Article 33		
Article 34		
Article 35		
Article 36		
Article 37		
Article 38		
Article 39		

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

	Text amendment proposal (if applicable)
New article	

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TITLE IV - Compliance

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	<p>Point 1 - Art 51.2.d</p> <p>The EU DSO Entity believes that the TSO's right here should be tempered with "in co-ordination with the RSO</p> <p>Point 2 - Art 51.6</p> <p>The EU DSO Entity is not convinced that this should be mandatory, and also that where required, it will generally be specified by the TSO.</p>	<p>Point 1</p> <p>(d) The relevant RSO in co-ordination with the TSO has the right to request a stability compliance for the LFSM-O control in a close loop operation set up of the synchronous power-generating module.</p> <p>Point 2</p> <p>. With regard to the simulations on the system restoration requirement in paragraph (c) of Article 14(4), the power-generating module may be required to demonstrate its technical capability to operate stably in case of a step change of external short-circuit power at the connection point specified by the TSO in co-ordination with the relevant system operator.</p>

Article 52		
Article 53		
Article 54	<p>Art 54.2.d</p> <p>The EU DSO Entity believes that the TSO's right here should be tempered with "in co-ordination with the RSO</p>	<p>(d) the relevant RSO in co-ordination with the TSO may request a stability compliance for the LFSM-O control in a close loop operation set up of the power park module.</p>
Article 55	<p>Point 1 - Art. 55.2.d</p> <p>The EU DSO Entity believes that the TSO's right here should be tempered with "in co-ordination with the RSO</p> <p>Point 2 - Art 55.4</p> <p>The EU DSO Entity believes it is the RSO to specify fault levels on the RSO's system.</p> <p>Point 3 - Art 55.7.c</p> <p>The EU DSO Entity believes that the TSO's right here should be tempered with "in co-ordination with the RSO</p>	<p>Point 1</p> <p>(d) The relevant RSO in co-ordination with the TSO has the right to request a stability compliance for the LFSM-U control in a close loop operation set up of the power park module.</p> <p>Point 2</p> <p>(c) for the simulations of point (a) of Article 55(4) the relevant RSO in co-ordination with the relevant TSO should specify an external short-circuit power and inertia to supplement the island scenario at the connection point.</p> <p>Point 3</p> <p>(c) The relevant RSO in co-ordination with the TSO has the right to request a stability compliance for reactive power capability control in a close loop operation set up of the power park module.</p>
Article 56		
Article 57		

Article 58	<p>Art 58.1</p> <p>The EU DSO Entity believes that given the legal requirement for the Entity to provide strategic input into the development of the EU's energy systems it is appropriate that IGDs, where relevant, are co-ordinated with the EU DSO Entity.</p>	<p>No later than six months after the entry into force of this Regulation, the ENTSO for Electricity shall, in co-ordination with the EU DSO Entity, prepare and thereafter every two years provide non-binding written guidance to its members and other system operators concerning the elements of this Regulation requiring national decisions. The ENTSO for Electricity shall publish this guidance on its website.</p> <p>2. ENTSO for Electricity shall consult stakeholders when providing non-binding guidance.</p> <p>3. The non-binding guidance shall explain the technical issues, conditions and interdependencies which need to be considered when complying with the requirements of this Regulation at national level</p>
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

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]	As noted against Recital 32, the EU DSO Entity is concerned that the legal compliance rules for pre RfG, RfG 1.0 and RfG 2.0 generation are not yet clear. Given the legal complexity of capturing the requirements applying to different ages of generation, the EU DSO Entity has not attempted draft legal text for this issue at this time.	

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

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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