

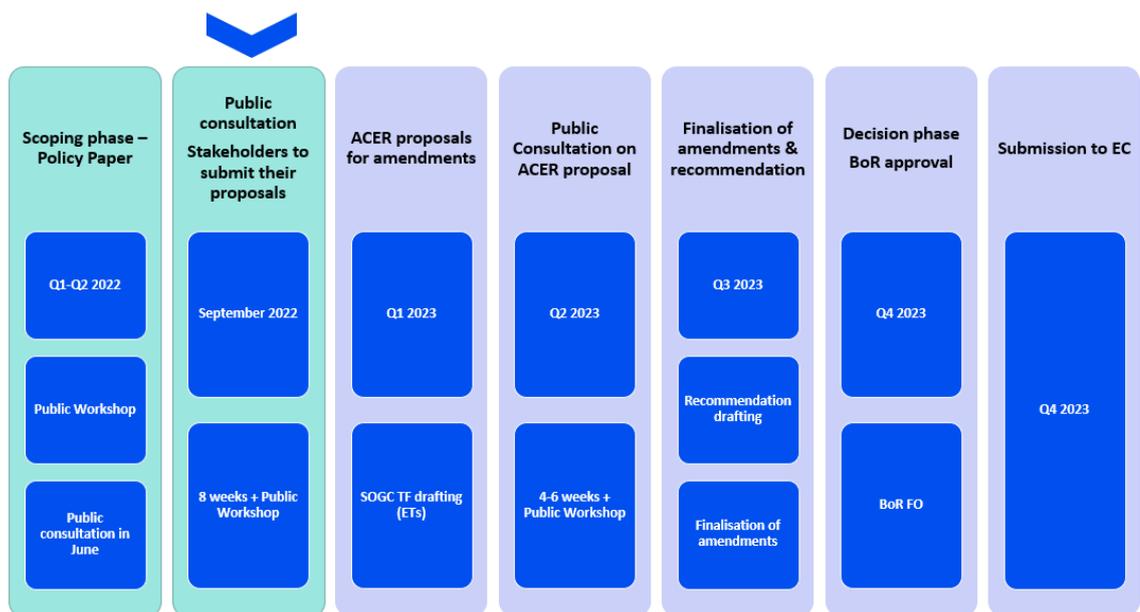
Proposals for amendments to the Requirements for Generators

Fields marked with * are mandatory.

Introduction

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 aims to transparently indicate to stakeholders the key policy areas in which amendments are to be expected. Moreover, the Paper draws on the alternative policy options and provides recommendations and proposed actions for the amendment process.

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

This consultation aims at gathering, from all interested stakeholders, concrete proposals for 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 amendment proposals concerning Network Code on Demand Connection, please go to the form: [NC DC](#).

Responses to this consultation should be submitted by 28 November 2022 23:59 CET.

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* Name of the stakeholder:

EUROPGEN

* Contact person:

[REDACTED]

* Contact person's email address:

[REDACTED]

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

France

* 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:

EUROPGEN is the association for the European Generating Set Industry. The Grid Codes Working Group monitors updates to grid codes and related standards and communicates any changes and their effects to generator manufacturers.

* 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, drafting team members, and other persons or entities involved in the European Grid Connection Network Codes amendment process)

Instructions

Stakeholders are invited to submit their amendment proposals to the RfG articles that they consider should be revised in a two-step process:

1. by inserting the proposed amendments in the provided Word file
2. by motivating/reasoning the proposed amendments through this online consultation form.

Both steps are mandatory for all amendment proposals.

(Where no amendment is proposed, the article text in the word file can be left unaltered and the cells in the consultation form can be left blank.)

The mandatory steps for submitting amendment proposals are detailed below. At the end of this section, you can find an example showing how to submit your proposals.

Step 1

Please include all your amendment proposals in the **Word file provided below using the Track Changes mode**. Once you edit the file and rename it with your stakeholder's name ("NC_RfG_stakeholder_name"), please upload it in the last section of this form (FILE UPLOAD)

[Download the Word file \(NC RfG\)](#)

Step 2

In addition, please use this form to motivate/reason your proposals, following the instructions:

General requirements for type B power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 14(1)	1	2	3
Article 14(2)			
Article 14(3)			
Article 14(4)			
Article 14(5)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
4	New provisions		

Please upload your file if necessary

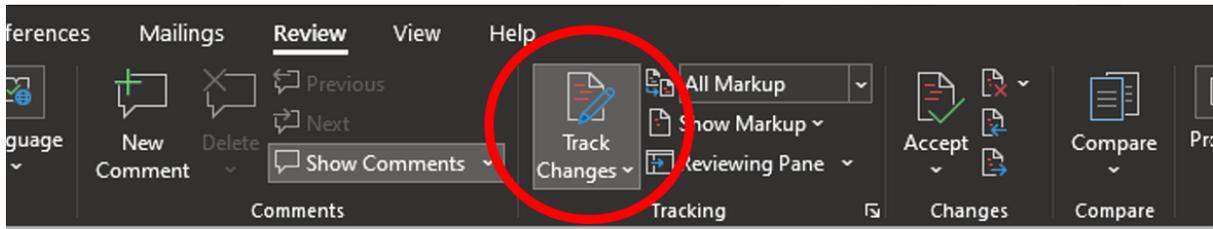
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1. Propose an amended wording of the relevant provision, as you provided in the Word file.
2. Provide the motivation/reasoning behind your proposal.
3. Indicate (if any) which other provisions of the NC RfG are impacted and may need to be amended following your proposal.
4. Provide (if any) your proposals for adding new provisions to the relevant section of the Regulation, as you provided in the Word file.
5. Upload figures or tables if necessary; text inputs should be provided directly in the consultation form.

Example

Stakeholder XYZ would like to propose an amendment to Article 27 of NC RfG. In their view, the meaning of the word "respectively" in this article is not clear. Following a two-step process, the stakeholder downloads the Word file from the **Instruction** section, turns on the Track Changes mode and edits the text (first step).



Article 27

System restoration requirements applicable to AC-connected offshore power park modules

The system restoration requirements laid down respectively in Article 14(4) and Article 15(5) shall apply to AC-connected offshore power park modules types B and C, respectively.

Article 28

General system management requirements applicable to AC-connected offshore power park modules

The general system management requirements laid down in Article 14(5), Article 15(6) and Article 16(4) shall apply to AC-connected offshore power park modules.

After saving the edited file on their device under the name "NC_RfG_Stakeholder_XYZ", the stakeholder uploads it in the **FILE UPLOAD** section.



FILE UPLOAD

Please upload the Word file (downloaded from the *Instruction* section) containing all your amendments

The maximum file size is 1 MB

NC_RfG_Stakeholder_XYZ.docx

Select file to upload

Previous

Submit

The stakeholder proceeds to motivate/reason their proposal. As they would like to propose an amendment to Article 27 of NC RfG, they enter **TITLE II CHAPTER 4** Section and insert the proposed amended wording and the reasoning (second step). As the proposed amendment of Article 27 does not affect other provisions, they leave the last column blank.

Pages

Introduction	Instruction	Whereas	Definitions	TITLE I	TITLE II CH. 1	TITLE II CH. 2	TITLE II CH. 3	TITLE II CH. 4
TITLE III	TITLE IV	TITLE V	TITLE VI	TITLE VII	Other	FILE UPLOAD		

TITLE II CHAPTER 4 - Requirements for offshore power park modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 23	//	//	//
Article 24	//	//	//
Article 25	//	//	//
Article 26	//	//	//
Article 27	The system restoration requirements laid down in Article 14(4) and Article 15(5) shall apply to AC-connected offshore power park modules types B and C, respectively.	The current wording of Article 27 refers to the provisions of Articles 14(4) and 15(5). However, it is unclear from the legal text how the respective application should be understood. Indicating that the requirements of Article 14(4) shall apply to offshore PPMs type B and requirements of Article 15(5) shall apply to offshore PPMs type C follows the internal logic of the NC RfG and corresponds with the capabilities of the units in question.	//
Article 28	//	//	//

As the survey is long,

1. you have the possibility to edit your answer after submission. When clicking on "submit", you will be given a contribution ID, which you can then use to access your contribution here. This allows you to proceed in steps.
2. 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 amendment proposal and the reasoning in the table below.

Numbers in the first column correspond with the recitals of the NC RfG Whereas section

	Amendment proposal	Reasoning	Relation to other provisions
(1)			
(2)			
(3)			
(4)			
(5)			
(6)			
(7)			
(8)			

(9)	<p>The significance of power-generating modules should be based on their size and their effect on the overall system.</p> <p>Synchronous machines should be classed on the machine size and include all the components of a generating facility that normally run indivisibly. For a facility including several synchronous power generating units, each should be assessed on the individual unit size, and not on the whole capacity of the facility; therefore, for the purpose of determining significance, each individual synchronous power generating unit shall be considered a synchronous power generating module. 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>	<p>There is significant inconsistency on how determination of significance is defined for SPGMs. In some national implementations the type classification is defined based on the individual unit rating, whereas in others it is defined based on the aggregated capacity of the facility. This results in disproportionate requirements for SPGMs relative to their individual effect on the overall system.</p> <p>The proposed amendment is intended to clarify that that individually run synchronous units must be classed on the machine size, and not the aggregated capacity of the facility.</p>	
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(10)	In view of the maximum generating capacity, this Regulation should make a distinction between different types of generators by establishing different levels of requirements. This Regulation does not set the rules to determine the voltage level of the connection point to which the power-generating module shall be connected.	Proposal to align with removal of voltage criteria in Article 5 (see Article 5 proposal for justification)	
(11)			
(12)			
(13)			
(14)			
(15)			
(16)			
(17)			
(18)			
(19)			
(20)			
(21)			
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(27)			
(28)			

(29)			
(30)			
(31)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new recitals	Reasoning	Relation to other provisions
New recitals			

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
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)	<p>'synchronous power-generating module' means an indivisible set of installations components which can generate electrical energy such that the frequency of the generated voltage, the generator speed and the frequency of network voltage are in a constant ratio and thus in synchronism; each synchronous power generating unit (SPGU) shall be considered a synchronous power generating module (SPGM), therefore the terms SPGU and SPGM shall be used interchangeably.</p>	<p>Further clarification of the SPGM definition is required to ensure the type classification is defined based on the individual unit rating. The term SPGU is introduced here, which is considered interchangeable with SPGM.</p>	
Article 2(10)			
Article 2(11)			
Article 2(12)			
Article 2(13)			

Article 2(14)			
Article 2(15)			
Article 2(16)			
Article 2(17)			
Article 2(18)			
Article 2(19)			
Article 2(20)			
Article 2(21)			
Article 2(22)			
Article 2(23)			
Article 2(24)			
Article 2(25)			
Article 2(26)			
Article 2(27)			
Article 2(28)			
Article 2(29)			
Article 2(30)			
Article 2(31)			
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Article 2(58)			
Article 2(59)			
Article 2(60)			
Article 2(61)			
Article 2(62)			
Article 2(63)			
Article 2(64)			
Article 2(65)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new definitions	Reasoning	Relation to other provisions
	<p>'Power generating unit' or 'PGU' means a unit generating electricity, which is either synchronously or non-synchronously connected to the network or connected through power electronics.</p> <p>'Synchronous power generating unit' or 'SPGU' shall be used interchangeably with 'synchronous generating module' or 'SPGM'</p> <p>'Power generating unit family' or 'PGU family' means a group of power generating units (SPGU or PPM) with the same technology and similar behaviour and design including controllers with</p>		

New definitions

equivalent software but with different nominal power and/or different voltage

'Power generating unit family certificate' or 'PGU family certificate' means a document issued by an authorised certifier for a PGU family based on the analysis of a representative PGU. The family 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 family certificate may include simulation models that have been verified against actual test results;

New definition for 'power generating unit' is required to support later proposals related to product family grouping and harmonised certification.

New definition for 'synchronous power generating unit' is required as the term SPGU is introduced in proposal for amendment to Article 2 (9).

New definition for 'power generating unit family' is required to support later proposals related to product family grouping and harmonised certification. This definition was provided by the Expert Group on Harmonized Certification and Family Grouping.

New definition for 'power generating unit family certificate' is required to support later proposals related to product family grouping and harmonised certification. This definition was provided by the Expert Group on Harmonized Certification and Family Grouping.

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TITLE I - General provisions

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 1			
Article 3	<p>Article 3(2), new sub-paragraph (e):</p> <p>power-generating modules that are part of a power generating facility, where the power-generating facility under normal conditions is only absorbing active power from the connection point. Such a power-generating facility shall;</p> <p>(i) be capable of switching to island operation during disturbances in the relevant system operator’s network;</p> <p>(ii) limit the amount of power exported into the relevant system operator network. This limit shall not exceed 30 % of the maximum capacity of the power-generating facility and is agreed between the power generating facility owner and the relevant system operator;</p> <p>(iii) include a protection device at the connection point interface for rapid disconnection of the power generating facility from the relevant system operator network. The required protection features and settings are agreed between the power generating facility owner and the relevant system operator.</p>	<p>Article 3(2), new sub-paragraph (e):</p> <p>Mixed sites which have power generating assets intended for the sites own use and are typically, under normal conditions, consuming power from the network should not be considered to impact the network as a generator and therefore should be exempt from the requirements of NC RfG. Such an exemption on which this proposal is based is provided in the Italian grid code CEI 0-16:2022-03 (section 8.8.5.2)</p> <p>Article 3, new paragraph (3): The recommendations of the Expert Group on Harmonised Certification and Family Grouping (EG HCF) should be considered for amendments to Article 3 so the scope of application is clearly defined. No text proposal will be made by EUROPGEN at this time – we strongly support the work of the expert group and defer to the EG report which will be published</p>	

	<p>Article 3, new paragraph (3): <placeholder for family definition scope of application – refer to EG HCF recommendations></p> <p>Article 3, new paragraph (4): The documents defining the requirements and verification of compliance as defined by each Member State and system operators shall be made available in English within three months of publication. Unless English is the official language of the Member State, the version translated into English shall bear the words “Translation of the original document”.</p>	<p>in December 2022.</p> <p>Article 3, new paragraph (4): Grid code requirements and compliance documents should be published in a common language (English is proposed). The aim is to place responsibility on the relevant system operator to publish a translation of the original document in English to avoid risk of misinterpretation of requirements due to incorrect translation. A reasonable time constraint for the translation to be available should be defined (3 months is proposed here).</p>	
Article 4	<p>Article 4(2)(b): ...the power-generating facility owner has concluded a final and binding contract for the purchase of the main generating unit after the entry into force of the Regulation but before entry into force of the national implementation. The power-generating facility owner must notify the relevant system operator and relevant TSO of conclusion of the contract after the entry into force of the Regulation.</p>	<p>Article 4(2)(b): The power generating facility owner may only design a new installation based on the existing national implementation. Since NC RfG is a general framework, it is not possible to predict the exact timeline of national level implementation and announce compliance to future guidelines. Based on experience with NC RfG, the duration of national implementation is diverse among EU countries.</p>	

Article 5(1):

The power-generating modules shall comply with the requirements on the basis of their maximum capacity according to the categories set out in paragraph 2.

The maximum capacity shall be considered as:

- (a) for a synchronous power-generating module the nominal rated capacity of each unit individually;
- (b) for a power park module consisting of PV and/or wind, the aggregated total capacity of the individual units sharing a single connection point, excluding energy storage units; and
- (c) for an energy storage unit, the maximum active power rating of each unit individually.

Article 5(2):

Power-generating modules within the following categories shall be considered as significant:

- (a) maximum capacity from 0,8 kW to 100 kW (type A);
- (b) maximum capacity at or above a threshold proposed by each relevant TSO in accordance with the procedure laid out in paragraph

Article 5(1):

Following on from the proposals made in “Whereas (9)”, clarification is further needed in Article 5 (1) to ensure the determination of significance is applied correctly for SPGM/SPGU and PPMs.

Regarding sub-paragraph (c), it is proposed that energy storage units which can operate independently should also be considered individually. There are many large battery energy storage systems on the market, in the order of $\geq 1\text{MW}$ which can be operated independently from one another. This proposal aligns with an approach defined in the Netherlands – refer to Netcode Elektriciteit Article 2.16(3)(a).

Article 5(2):

Changes proposed in this Article and sub-paragraphs are related to the removal of the voltage criteria for determination of significance. The cumulative character of the capacity and voltage criteria in their present form can lead to disproportionate technical requirements for PGMs compared to their actual impact on the system. The voltage criteria used to determine the type of a PGM

Article 5

3 (type B). This threshold shall not be above the limits for type B power-generating modules contained in Table 1;
(c) 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
(d) maximum capacity at or above a threshold specified in accordance with paragraph 3 (type D). This threshold shall not be above the limit for type D power-generating modules contained in Table 1.

Article 5(2), Table 1:
See Table 1 in MS Word file - harmonisation of the limit for “maximum capacity threshold from which a power-generating module is of type B” to 0,1 MW, aligning with the minimum as defined in Ireland is proposed.

Article 5(3):
Proposals for maximum capacity thresholds for types C and D power-generating modules shall be subject to approval by the relevant regulatory authority or, where

means that small PGMs are considered Type D if the connection point voltage is ≥ 110 kV.

EUROPGEN preference is to remove the voltage criteria completely for determining significance, thereby making the assessment of type based on (unit /module) MW size and its relative impact on the grid. Technical requirements would then depend only on the MW capacity (see Article 5(1) proposal).

Article 5(2), Table 1:
This proposal supports harmonisation of requirements and certification for smaller SPGMs /PPMs which are within the scope of EN50549. Manufacturers of high-volume standardised products may therefore offer the same product into all member states. It is recognized that harmonising the Type B/C and C/D thresholds would be a larger challenge, but these products tend to be lower volume and represent more customized solutions.

Article 5(3):
Editorial change to align with the proposal to fix the threshold for

	applicable, the Member State.	Type B to 100kW.	
Article 6			
Article 7			
Article 8			
Article 9			
Article 10			
Article 11			
Article 12			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles	<p>Article 3, new paragraph (3): <placeholder for family definition scope of application – refer to EG HCF recommendations></p> <p>Article 3, new paragraph (4): The documents defining the requirements and verification of compliance as defined by each Member State and system operators shall be made available in English within three months of publication. Unless English is the official language of the Member State, the version translated into English shall bear the words “Translation of the original document”.</p>	<p>Article 3, new paragraph (3): The recommendations of the Expert Group on Harmonised Certification and Family Grouping (EG HCF) should be considered for amendments to Article 3 so the scope of application is clearly defined. No text proposal will be made by EUROPGEN at this time – we strongly support the work of the expert group and defer to the EG report which will be published in December 2022.</p> <p>Article 3, new paragraph (4): Grid code requirements and compliance documents should be published in a common language (English is proposed). The aim is to place responsibility on the relevant system operator to publish a translation of the original document in English to avoid risk of misinterpretation of requirements due to incorrect translation. A reasonable time constraint for the translation to be available should be defined (3 months is proposed here).</p>	

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TITLE II CHAPTER 1 - General Requirements

General requirements for type A power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 13(1)	<p>Article 13(1)(b): With regard to the rate of change of frequency withstand capability, a power-generating module shall be capable of staying connected to the network and operate at rates of change of frequency up to a value specified by the relevant TSO, not to exceed 2.0 Hz/s measured over a period of 500ms, unless disconnection was triggered by rate-of-change-of-frequency-type loss of mains protection. The relevant system operator, in coordination with the relevant TSO, shall specify this rate-of-change-of-frequency-type loss of mains protection.</p> <p>Article 13(1), Table 2: See Table 1 in MS Word file – amendments to include an upper limit of time duration for under-frequency operation where it is left to the system operator to define.</p>	<p>Article 13(1)(b): The proposal is to specify a maximum limit within the capabilities of Type B PGMs. A limit is needed to improve harmonization and avoid the system operator setting a value which is beyond the capability of a Type B PGM. A value of 2.0 Hz/s measured over a period of 500ms is proposed as a reasonable requirement within the capability of Type B PGMs aligned with EN50549-2.</p> <p>Article 13(1), Table 2: Boundary conditions are proposed for frequency operation, aligning with EN 50549-2.</p>	

<p>Article 13(2)</p>	<p>Article 13(2), new paragraph (h): Power-generating modules shall be capable of activating this provision with a power decrease response time as specified by the relevant system operator, in coordination with the relevant TSO, but always limited by the capabilities inherent to the PGM technology.</p> <p>Article 13(2), new paragraph (i): The increasing and decreasing active power ramp rate shall consider the technical constraints of power generating module technologies as defined in Table Y. If the technology is capable of achieving a faster response than defined in Table Y this shall be permitted in agreement with the relevant system operator; however, the relevant system operator shall not define such a requirement that exceeds the maximum value given in Table Y.</p>	<p>Article 13(2), new paragraph (h): Some member states have introduced active power response times which translate to ramp rates that are beyond the capabilities of certain technologies. An amendment is proposed to limit the requirement to the capabilities inherent to the PGM technology, which are defined in the next (new) paragraph.</p> <p>Article 13(2), new paragraph (i): A new table (Y) is proposed which defines the maximum increasing and decreasing active power ramp rate by technology, aligned with the recommendations stated in the IGD on limited frequency sensitive mode (January 2018). A specific exclusion has been proposed for gas reciprocating engine-driven SPGUs as some natural gas and hydrogen engines cannot fulfil the SPGM requirement defined in the IGD for active power decrease. See MS Word file, Table Y for detailed information. Note that the maximum ramp rates have been defined in terms of “%Pmax per second” to avoid system operators setting a response time value that exceeds the technology capabilities.</p>	<p>Article 15(2)(c) - see new sub-paragraph proposed</p>
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Article 13(3)			
Article 13(4)			
Article 13(5)			
Article 13(6)			
Article 13(7)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions	<p>New article in Chapter 1 (propose to insert before Article 13): <Placeholder for a new article defining minimum cyber security requirements for PGMs.></p>	<p>Distributed Energy Resources (DERs) and de-centralized power plants are an increasingly important part of the energy infrastructure. As one would expect, the attacks to these sites are increasing in number and severity. With system operators requiring an increased use of connectivity (local infrastructures or cloud systems), the exposure of these sites to attack vectors is unavoidable. It is therefore imperative to detect and protect against the most exploited attack vectors.</p> <p>A minimum set of requirements to be met by all PGMs should be defined, aligning with existing standards and industry best practice.</p> <p>EUROPGEN are still working on a proposal for a new article and will forward this to ACER in due course (estimate by December 16th).</p>	

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General requirements for type B power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 14(1)			
Article 14(2)	<p>Article 14(2)(b): the relevant system operator shall have the right to specify the requirements for further equipment to allow active power output to be remotely reduced.</p>	<p>Article 14(2)(b): Article 14(2)(a) requires active power reduction, therefore a minor wording change for clarification is proposed.</p>	

Article 14(3)

Article 14(3)(a)(iv):
each TSO shall specify and make publicly available the pre-fault and post-fault conditions for the fault-ride-through capability in terms of:
— the calculation of the pre-fault minimum short circuit capacity at the connection point,
— voltage at the connection point, and
— calculation of the post-fault minimum short circuit capacity at the connection point;

Article 14(3)(a) new sub-paragraph (following iv):
each TSO shall specify and make publicly available the pre-fault active and reactive power operating point of the power-generating module at the connection point, which shall not exceed the reactive power limits of 0.484 P_{max} in over-excited operation and 0.484 P_{max} in under-excited operation;

Article 14(3)(b):
fault-ride-through capabilities in case of asymmetrical faults shall be specified by each TSO but shall not exceed the limits imposed under Article 14(3)(a) for symmetrical faults.

Article 14(3)(a)(iv):
Boundary conditions for FRT pre-fault active and reactive power operation points are needed – some text is removed from this sub-paragraph and a new sub-paragraph is proposed to add more detail.

Article 14(3)(a) new sub-paragraph (following iv):
Boundary conditions for FRT pre-fault active and reactive power operation points are needed to support harmonization across member states, and the possibility of harmonized certification. The values proposed align with EN 50549-2 reactive power capability (most stringent) requirements.

Article 14(3)(b):
Boundary conditions for FRT asymmetric fault requirements are needed to support harmonization of requirements across member states, and the possibility of harmonized certification.

<p>Article 14(4)</p>	<p>Article 14(4)(b): with regard to electrical protection schemes and settings at the connection point:</p>	<p>Article 14(4)(b): It should be clarified what protection requirements apply to power-generating unit-level (SPGU /PPM) vs power-generating facility level (at the connection point) thereby allowing protection requirements to be considered within the scope of unit certification, or excluded if protection requirements are only to be considered applicable at the facility level.</p>	
<p>Article 14(5)</p>			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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General requirements for type C power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 15(1)			
Article 15(2)	<p>Article 15(2)(c), new sub-paragraph: Power-generating modules shall be capable of activating this provision with a power increase response time as specified by the relevant system operator, in coordination with the relevant TSO, but always limited by the capabilities inherent to the PGM technology. The increasing and decreasing active power ramp rate shall consider the technical constraints of power generating module technologies as defined in Table Y, Article 13(2)(h). If the technology is capable of achieving a faster response than defined in Table Y this shall be permitted in agreement with the relevant system operator; however, the relevant system operator shall not define such a requirement that exceeds the maximum value given in Table Y.</p>	<p>Article 15(2)(c), new sub-paragraph: Similar to LFSM-O, some countries have introduced active power response times for LFSM-U which translate to ramp rates that are beyond the capabilities of certain technologies. Therefore, referring to the proposal for Article 13(2), a reference to the earlier table is proposed which defines the maximum increasing and decreasing active power ramp rate by technology, aligned with the recommendations stated in the IGD on limited frequency sensitive mode (January 2018).</p>	<p>Article 13(2) – see new paragraph proposed</p>
Article 15(3)			
Article 15(4)			
Article 15(5)			

<p>Article 15(6)</p>	<p>Article 15(6)(c)(i): at the request of the relevant system operator or the relevant TSO, the power-generating facility owner shall provide simulation models which properly reflect the behaviour of the power-generating module in both steady-state and dynamic simulations (50 Hz component)</p>	<p>Article 15(6)(c)(i): Proposal that SPGM simulations should be restricted to RMS - given the time constants of synchronous machines, RMS simulations should be sufficient and EMT simulations are not applicable.</p>	
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Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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General requirements for type D power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 16(1)			
Article 16(2)			
Article 16(3)			
Article 16(4)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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

Requirements for type B synchronous power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 17(1)			
Article 17(2)	<p>Article 17(2)(a): with regard to reactive power capability, the relevant system operator shall have the right to specify the capability of a synchronous power-generating module to provide reactive power within the limits of 0.484 Pmax in over-excited operation and 0.484 Pmax in under-excited operation;</p>	<p>Article 17(2)(a): Proposal to define boundary conditions of reactive power capability for Type B SPGMs aligned with EN50549-2 (most stringent) profile.</p>	
Article 17(3)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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Requirements for type C synchronous power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 18(1)	<p>Article 18(2)(b), Figure 7: See MS Word document for proposed modification to Figure 7 (system is blocking upload).</p>	<p>Article 18(2)(b), Figure 7: A modified U-Q/Pmax profile is proposed for Type C&D SPGMs. The outer envelope aligns with VDE 4120 and the inner envelope aligns with VDE 4110. Justification for this proposal:</p> <ol style="list-style-type: none"> 1. Rotor angle stability of synchronous generators is constrained when operating under-excited and in particular during under-voltage conditions. 2. A highly under-excited operation at voltages lower than the nominal grid voltage and vice-versa acts against stabilizing the grid voltage profile. 3. The proposal is based on the German VDE 4110 and VDE 4120 U-Q profiles. 4. The outer profile is wider than the “most stringent” requirements defined in EN 50549-2. 	
		<p>Article 18(2)(b), Figure 7: A modified U-Q/Pmax profile is proposed for Type C&D SPGMs. The outer envelope aligns with VDE 4120 and the inner envelope aligns with VDE 4110. Justification for this proposal:</p>	

Article 18(2)

Article 18(2)(b), Figure 7:
See MS Word document and
uploaded file for proposed
modification to Figure 7.

Article 18(2)(b)(iv):
the synchronous power-generating
module shall be capable of moving
to any operating point within its U-Q
/Pmax profile to a target value
requested by the relevant system
operator. The response time to
reach 90% of the target value for a
0.5 Pmax reactive power change
shall be at least 10 seconds. A
shorter response time for smaller
reactive power changes may be
specified by the relevant system
operator considering network
conditions;

1. Rotor angle stability of synchronous generators is constrained when operating under-excited and in particular during under-voltage conditions.
2. A highly under-excited operation at voltages lower than the nominal grid voltage and vice-versa acts against stabilizing the grid voltage profile.
3. The proposal is based on the German VDE 4110 and VDE 4120 U-Q profiles.
4. The outer profile is wider than the “most stringent” requirements defined in EN 50549-2.

Article 18(2)(b)(iv):
Proposal to define a boundary
condition for minimum rise time.
The default setting defined in VDE
4110 (10 s) is a proposed
reasonable value within the
capability of Type C SPGMs.
Reactive power response is also
dependent on the local grid
conditions (grid strength,
connected loads, etc.)

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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Requirements for type D synchronous power-generating modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 19(1)			
Article 19(2)			
Article 19(3)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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TITLE II CHAPTER 3 - Requirements for power park modules

Requirements for type B power park modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 20(1)			
Article 20(2)	<p>Article 20(2)(a): with regard to reactive power capability, the relevant system operator shall have the right to specify the capability of a power park module to provide reactive power within the limits of 0.484 Pmax in over-excited operation and 0.484 Pmax in under-excited operation;</p>	<p>Article 20(2)(a): Propose to define boundary conditions of reactive power capability for Type B PPMs aligned with EN50549-2 (most stringent) profile.</p>	
Article 20(3)			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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Requirements for type C power park modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 21(1)			
Article 21(2)			
Article 21(3)	<p>Article 21(3)(b), Figure 8: See MS Word document and uploaded file for proposed modification to Figure 8</p>	<p>Article 21(3)(b), Figure 8: Modified U-Q/Pmax profile proposed for PPMs. Justification for this proposal: 1. A highly under-excited operation at voltages lower than the nominal grid voltage and vice-versa acts against stabilizing the grid voltage profile. 2. The outer profile is wider than the “most stringent” requirements defined in EN 50549-2.</p>	

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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Requirements for type D power park modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 22			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
New provisions			

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TITLE II CHAPTER 4 - Requirements for offshore power park modules

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 23			
Article 24			
Article 25			
Article 26			
Article 27			
Article 28			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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TITLE III - Operational notification procedure for connection

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 29			
Article 30			
Article 31			
Article 32			
Article 33			
Article 34			
Article 35			
Article 36			
Article 37			
Article 38			
Article 39			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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TITLE IV - Compliance

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 40			
Article 41			
Article 42	<placeholder for amendments related to harmonized certificate acceptance>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	

<p>Article 43</p>	<p>Article 43(1): <placeholder for amendments related to harmonized simulation modelling requirements, and use of simulation to reduce or eliminate testing></p> <p>Article 43(4): The relevant system operator shall have the right to check that a power-generating module complies with the requirements of this Regulation by carrying out its own compliance simulations based on the provided simulation reports, simulation models and compliance test measurements. If a simulation model is required, then the relevant system operator should:</p> <ul style="list-style-type: none"> a) accept a neutral model description in the form of a generic model block diagram and mathematical representation published in a document format, or; b) provide options for accepting multiple simulation software packages which are commonly used in the industry. 	<p>Article 43(1): No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.</p> <p>Article 43(4): Proposal that generic model block diagram or multiple simulation software formats should be accepted.</p>	
<p>Article 44</p>	<p><placeholder for amendments related to harmonized compliance testing of SPGMs></p>	<p>No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.</p>	

Article 45	<placeholder for amendments related to harmonized compliance testing of SPGMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 46	<placeholder for amendments related to harmonized compliance testing of SPGMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 47	<placeholder for amendments related to harmonized compliance testing of PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 48	<placeholder for amendments related to harmonized compliance testing of PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 49	<placeholder for amendments related to harmonized compliance testing of PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 50			
Article 51	<placeholder for amendments related to harmonized compliance simulations for SPGMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	

Article 52	<placeholder for amendments related to harmonized compliance simulations for SPGMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 53	<placeholder for amendments related to harmonized compliance simulations for SPGMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 54	<placeholder for amendments related to harmonized compliance simulations for PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 55	<placeholder for amendments related to harmonized compliance simulations for PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 56	<placeholder for amendments related to harmonized compliance simulations for PPMs>	No formal text proposal provided. EUROPGEN supports the EG HCF recommendations for proposed changes in this Article.	
Article 57			
Article 58			
Article 59			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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TITLE V - Derogations

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 60	<p>Article 61(1): Each regulatory authority shall specify, after consulting relevant system operators and power-generating facility owners and other stakeholders whom it deems affected by this Regulation, the criteria for granting derogations pursuant to Articles 62 and 63. It shall publish those criteria on its website, including information regarding how and to whom a derogation request should be submitted, and notify them to the Commission within nine months of the entry into force of this Regulation.</p>	<p>Article 61(1): Proposal that regulatory authorities should publish information on how to submit a derogation request.</p>	
Article 61			
Article 62			
Article 63			
Article 64			
Article 65			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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TITLE VI - Transitional arrangements for emerging technologies

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 66			
Article 67			
Article 68			
Article 69			
Article 70			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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TITLE VII - Final provisions

Please write your amendment proposal and the reasoning in the table below.

	Amendment proposal	Reasoning	Relation to other provisions
Article 71			
Article 72			

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new articles in this section	Reasoning	Relation to other provisions
New articles			

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Other additional provisions

Please write your amendment proposal and the reasoning in the table below.

	Proposal for new provisions	Reasoning	Relation to other provisions
Other new provisions			

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Please upload the Word file (downloaded from the **Instruction** section) containing all your amendment proposals in the Track Changes mode.

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