Contribution ID: 4d5e631b-62d1-4b35-a25b-3fa2962dbfda
Date: 16/11/2022 16:45:54

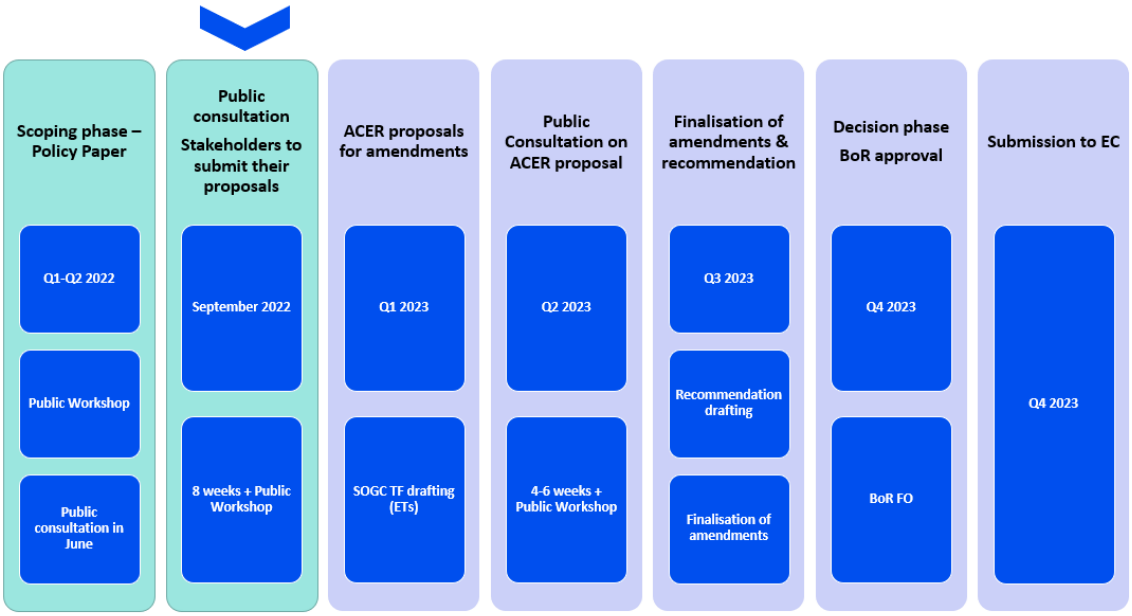
Proposals for amendments to the Requirements for Generators

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 21 November 2022 23:59 CET.

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:

Enercon

* Contact person:

[redacted]

* Contact person's email address:

[redacted]

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

Germany

* Type of the stakeholder:

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

Please, elaborate on your answer above, if necessary:

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

- ◉ Yes
- ○ No

* Do you consent to the publication of provided answers?

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

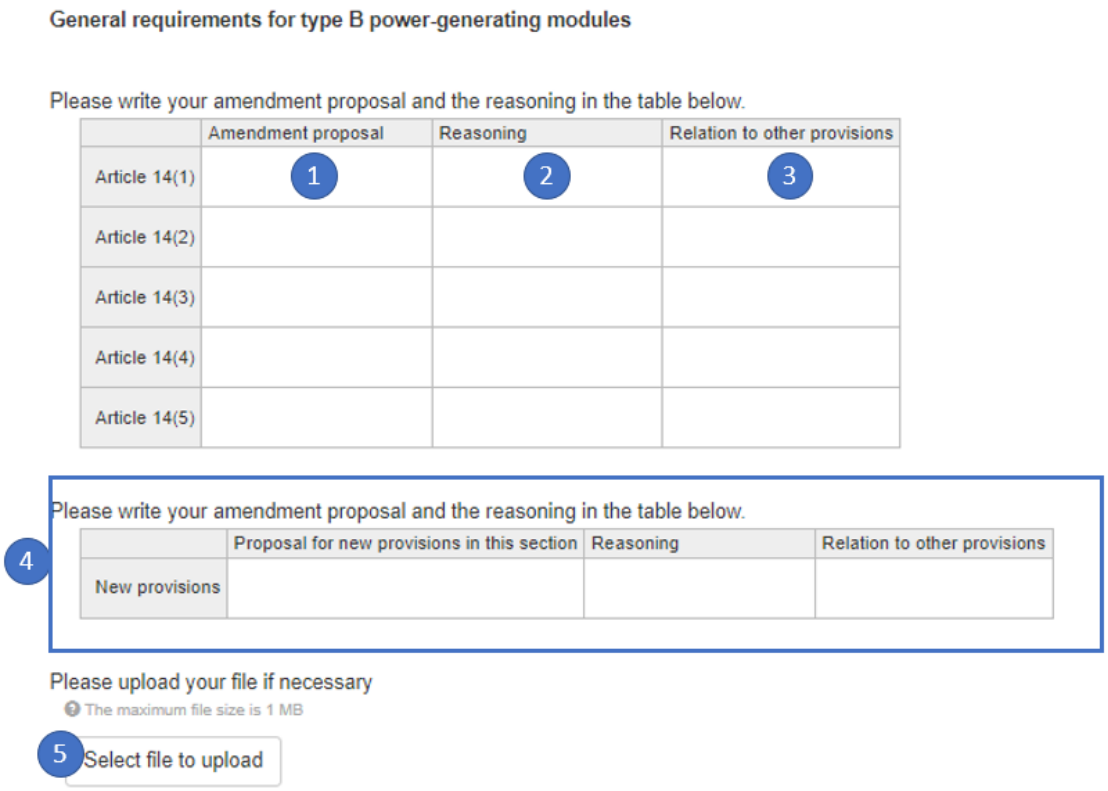
Step 1

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

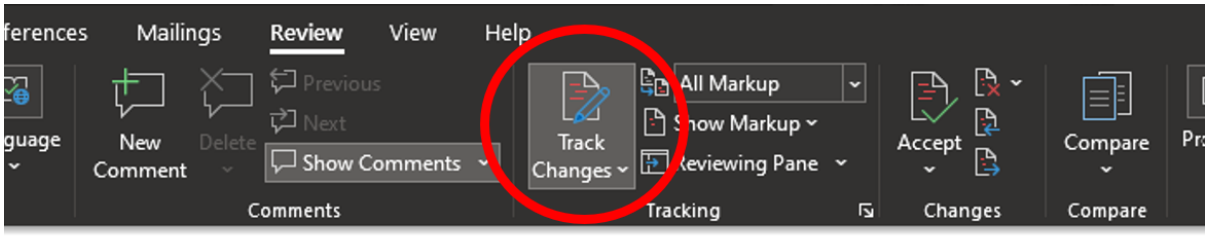
In addition, please use this form to motivate/reason your proposals, following the instructions:



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

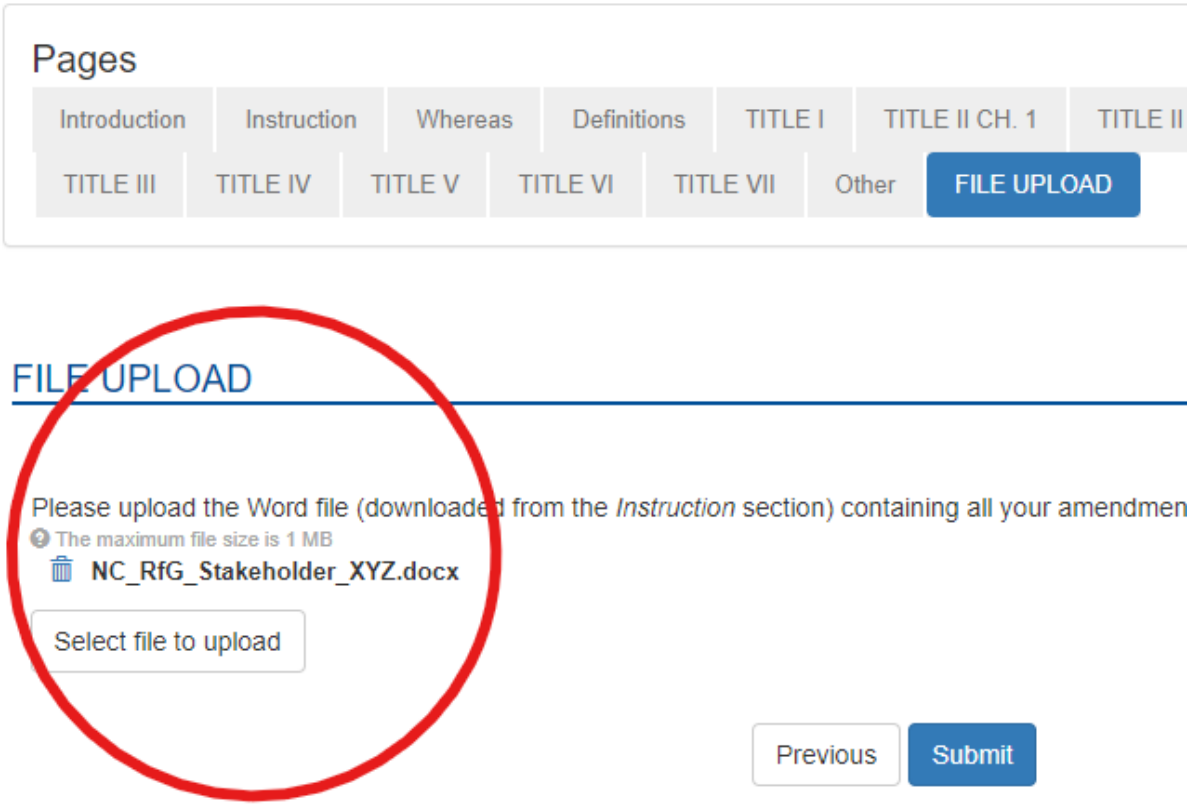
The system restoration requirements laid down ~~respectively~~ in Article 14(4) and Article 15(5) shall apply to AC-connected offshore power park modules types B and C, respectively.

Article 28

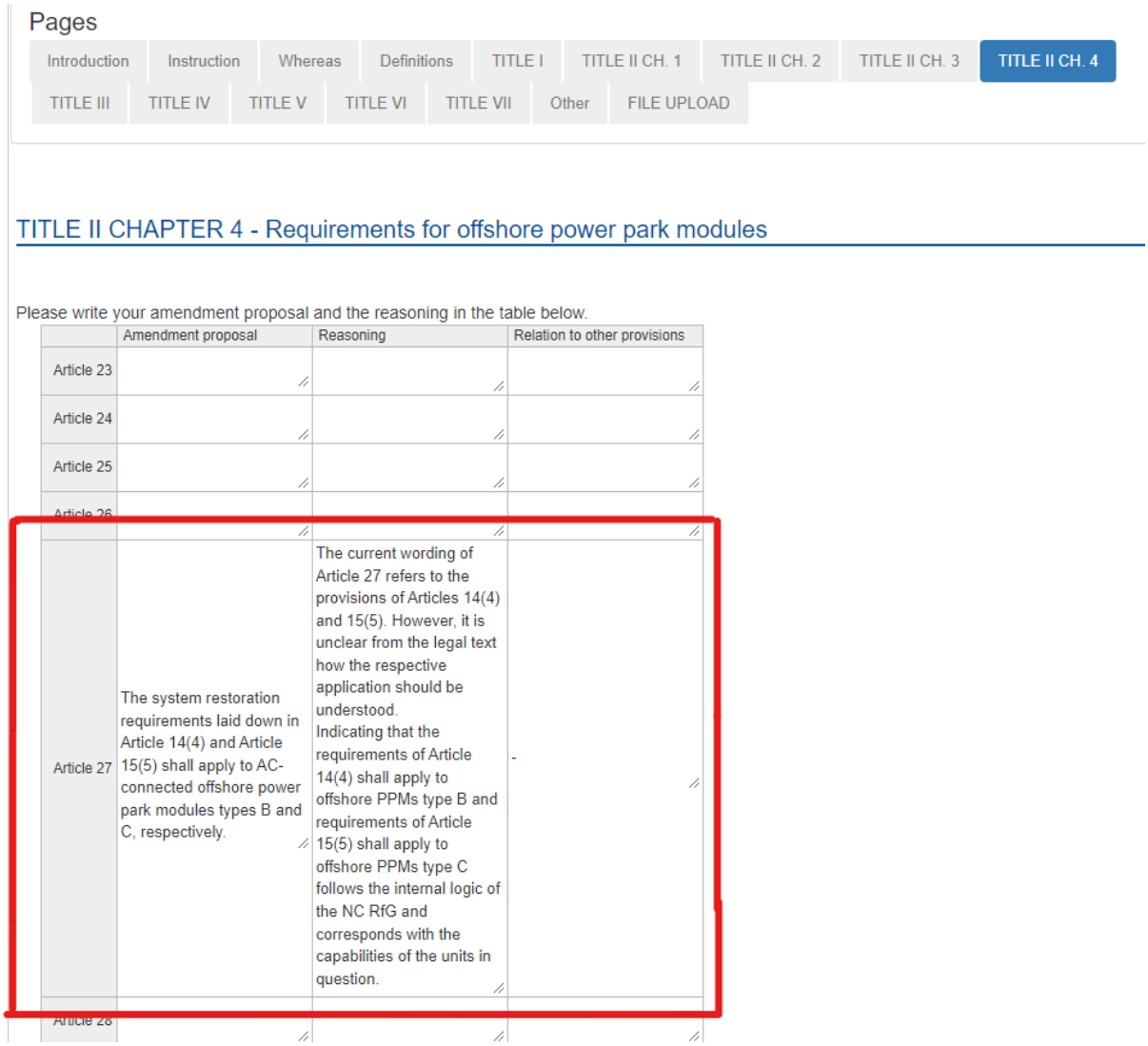
General system management requirements applicable to AC-connected offshore power park modules

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.



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.



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)			
(10)			
(11)			
(12)			
(13)			
(14)			
(15)			
(16)			
(17)			
(18)			
(19)			
(20)			
(21)			
(22)			
(23)			
(24)			
(25)			

(26)			
(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			

Definitions (Article 2)

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)			
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)			
		The so far written "electric frequency of the system" is a crucial basis for any connected entity. The present definition has no value for an technical requirement related to the "electric	

Article 2(22)	‘frequency’ means the root mean square value of the 50 Hz component of a sinusoidal physical quantity, which is calculated based on the measurement of this physical quantity over a gliding 200 ms time window.	frequency of the system", or any physical value. However, there are exhaustive and non-exhaustive requirements related to it (e.g. FSM, frequency operation ranges). Moreover frequency is a europe-wide, almost uniform indicator for the current system condition. There shall be one uniform definition of how the frequency shall be calculated based on measured physical quantities, so that any party, and any grid connected device, can be judged in its performance against this well defined criteria. Measuring a physical quantities (e. g. a ruoghly sinusoidal voltage, or a current) over a defined time window and calculating from there, is the most accepted way to determine the frequency of this physical quantity. The time window used for this shall be uniform across a synchronous area, because the frequency is a system wide key state indicator. A time window signifantly shorter than 200ms would allow for a faster frequency determination, but leads to incorrect values on the short term. These could lead to inappropriate actions of a connected party. A time window	the definition of Rate of Change of frequency, which so far is missing and is added as proposal further below.

		signifantly longer than 200ms would delay the frequency determination, lead to long term useful values, but would inhibit quick responses, which may also be relevant to maintain system stability. Accuracy and speed are conflicting aims. On European level a default balance between these aim must be defined.	
Article 2(23)			
Article 2(24)			
Article 2(25)			
Article 2(26)			
Article 2(27)			
Article 2(28)			
Article 2(29)			
Article 2(30)			
Article 2(31)			
Article 2(32)			
Article 2(33)			
Article 2(34)			
Article 2(35)			
Article 2(36)			
Article 2(37)			
Article 2(38)			
Article 2(39)			
Article 2(40)			
Article 2(41)			
Article 2(42)			

Article 2(43)			
Article 2(44)			
Article 2(45)			
Article 2(46)			
Article 2(47)	‘equipment certificate’ means a document issued by an authorised certifier for equipment used by a power- generating module, demand unit, distribution system, demand facility or HVDC system. The equipment certificate follows the test- and certification procedure harmonized among the EU member states and 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;	The present degree of freedom in the RfG, that every member state can decide individually how tests and certification shall happen, leads to numerous different certification procedures across Europe. Examples are: Germany, Spain, Netherlands, Poland, Portugal. Each have their own certification process. This leads to a highly inefficient effort for the supplying industry. Even for a very small number of units or components sold in a country, the usually very complex, costly and time consuming national certification process has to be completed. In future it shall be sufficient that a unit is tested and certified once against the envelope of the technically most demanding requirements. If physical tests are part of this process, their concept shall respect physics. A full-scale (!) test of the frequency ranges according to the national implementation of Table 2 in Art. 13 1., with e.g. a Type C or D	many, e.g. Art. 30 (2) f) and Art. 47 (1)

		power generating unit (or a complete wind energy converter), is out of a physical, reasonable scope. This harmonization among the EU member states for the test- and certification-procedure is hardly possible in this definition. It may be worth a separate action package.	
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)			
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
New definitions	"rate of change of frequency" (RoCoF) means, unless defined differently by the relevant power system operator, the calculated change of the frequency of a physical quantity, based on the definition (22) of the 'frequency", over a gliding 500 ms time window.	RoCoF can be a key indicator of the power system state. Giving a default definition for RoCof is needed to be uniform across a synchronous area, in order to achieve meaningful, predictable and reliable results, amongst other for the system state, but also to judge the performance of a connected party, e.g. a PGM. RoCoF being a derivative of the frequency has to be based on the definition (22) of the 'frequency". To harmonize zthe understanding, impact and implications of 'frequency' as well as 'RoCoF' values across the synchronous area, it is crucial that the basis of freqeuncy, as well as the RoCoF, refer to a specified gliding time window. This time window shall not be up to the judgement of each TSO, or (worse) completely undefined.	Definition number 22

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			
Article 4			
Article 5			
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
		The system frequency is a key indicator of the quality of supply. Without an measurable objective how accurate the 50 Hz shall be achieved for what percentage of the time, any measures to "maintain" or even "improve" system stability are void. A probability density function as a way to quantify and illustrate the frequency objective, in comparision with the probability density function of the measured frequency, tells how far the objective was met. It furthermore indicates which, and to what extend, additional measures are needed to achieve the frequency-quality objective. To that aim the freqeuncy must be	

New articles	The relevant TSO, in coordination with the national regulatory authority and at least the neighbouring TSOs, defines quantitative quality objectives for the power system frequency. These objectives are the basis for the subsequently determined system needs in order to achieve the desired frequency quality. This process includes a stakeholder involvement. The quality criteria cover how accurate the nominal value 50 Hz frequency shall be achieved, on a yearly and monthly average, as well as probability density distribution as of the power system frequency for both time periods, as summarized frequency-quality objective. The power system frequency shall be assessed for that purpose based on the voltage measured in time intervals of 1 second, at a constant location, chosen by the TSO within the TSO area. The achieved probability distribution of the power system frequency is published monthly by the relevant TSO.	assessed in a rather short time window, such as 1 second. Classic 15 minute average values are not useful. The severe freqeuncy excursions almost at each full hour (due to trading and generation-schedules in 1h blocks) show the urgency of a valid frequency objective. The incidents per month and per year, during which such frequency excursions absorb for seconds, or even for some minutes, the vast part of FCR are increasing significantly in the last decades. Please see the attached file with a probability density function of 1sec frequency measurements. (source regelleistung.net)	The topic might be covered as well in the Synchronous Area Framework Agreement (SAFA), the System Operations Guidelines, or similar provisions. Crucial is that such quality criteria cant be seen independently from the identification of technical system needs, and the requirements towards generators and controllable loads.

Please upload figures or tables if necessary

The maximum file size is 1 MB

867e57c5-021c-4d04-ba0a-4fb7f84130ce/Prob.density_function_of_system_frequency.docx

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)			
Article 13(2)			
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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)			
Article 14(3)		So far the robustness requirement for FRT according to art. 14 3. applies 24/7, no matter what has been the active power operating level prior to the event. This is maybe OK for power generating units (PGU) working between an agreed minimum and its maximum power all the time. For a PGU based on volatile sources, such as wind and solar, the operation varies permanently between zero kW and the nominal power of the unit. Maintaining the operation despite an FRT-event below a level of roughly 5% of the nominal power of the PGU, would require to build in an energy storage. Bottleneck is to supply the internal auxiliaries during such an FRT event. This leads to significant additional cost, althougt the system relevance of the PGU with such a low power is negligible. At this moment other plants will be relevant for the power provision. For wind- and solar-based PGM typically no minimum stable	If the requirement regarding robustness against FRT shall be applied in future from Type A onwards, the here proposed exception also needs to apply from Type A onwards.

	The requirement according to Art 14 (3) i) and vi) does not apply, if the average active power of the power-generating module in a 10 second interval directly prior to the start of the grid-fault incident was - below the agreed minimum stable operating level, or - below 5% of the nominal power of the power-generating module, for those using volatile renewable energy sources (b) fault-ride-through capabilities in case of asymmetrical faults shall be specified by each TSO. To that aim, the TSO shall use as reference the positive and negative sequence of the voltage.	operating level is agreed. It is widely assumed that this is zero kilowatt. The FRT profile applies at the PGM connection point, and this shall be maintained for consistency. Hence the exception from the FRT robustness requirement shall also apply to the PGM connection point and the active power level there. Relevant is the active power only few seconds prior to the FRT event. Any longer average power values (e.g. 15 Min) are not useful.	
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
New provisions			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)	New section (d)(viii) : the relevant TSO has the right to request a stability compliance for the FSM control in a closed loop operation setup of the PGM. When doing so, the network operator is obliged to define the compliance verification setup, the scenarios, and the success criteria.	ACER should work towards European coordination of the verification setup, the scenarios and the success criteria (e.g. IGD). All PGMs must contribute adequately to the stability of the interconnected system. A closed loop setup for a PGM with a defined contingency is suitable to reproduce conditions relevant for the contribution of the PGM to power system stability (e.g. LFSM and others). If setup, scenario and precise success criteria are not defined in detail on EU level, the individual member states may create lots of different ones, which will lead to very costly specific solutions.	
Article 15(3)			
		After the fault clearance, there will be voltage transients exceeding the fault duration due to the dynamic interactions between power generating plant and network. Overvoltage and undervoltage events may then occur in no chronological order but	

Article 15(4)	(d) The relevant system operator shall have the right to define a voltage-time-profile for robustness against overvoltage events (OVRT), equivalent to the voltage-time-profile for overvoltage events (UVRT). If doing so, the relevant system operator shall define the reference voltage precisely. The robustness requirement against overvoltage does not need to be met, if an occurring short-term voltage rise leads to a relative overvoltage at the connection point, exceeding the limit curve expressed in the following Figure	may have the same cause. So far there is no requirement for robustness against overvoltage events, hence PGM can disconnect due to these. This may lead to system critical loss of generation, especially after fault clearance. In conjunction with a new introduced limiting voltage-time-profile for overvoltage events: An exception has to be made for Type C and Type D connected PGM, which are typically connected with an On Load Tap Changer (OLTC): A voltage step change upwards may happen in the EHV or HV system within the steady state voltage limites as defined by the relevant system operator. (e.g. from 0,9 up to 1.1 pu) For a PGM behind an OLTC this can lead to temporary extreme overvoltage conditions. Prior to the incident the OLTC had adjusted the PGM-internal voltage such, that it is very close to 1.0pu (typically on the MV side in a substation) The voltage step change upwards will lead to the same relative change upwards inside the PGM, until the OLTC has re-adjusted. Such OLTC	If FRT becomes mandatory also for Type A and B, the absolute overvoltage-time-limits may be introduced in Art 13 and 14. However, the exception for relative voltage changes upwards only need to be made for PGM which are connected through an OLTC.

		stepping takes typically up to one minute. The equipment in the PGM would have to be designed such, that it can withstand such extreme overvoltage conditions for up to one minute. This is not reasonable, it would cause significant additional cost (especially for power electronics). Therefore: An exception for OVRT events with certain time limits shall be defined.	
Article 15(5)			
Article 15(6)			

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

	Proposal for new provisions in this section	Reasoning	Relation to other provisions
	7. If a system operator deems it necessary that certain, or all, new connected PGM shall have the electrical performance similar to a voltage source behind an impedance (also called “grid forming”), then the system operator shall have the right to define and require this, given the following preparing steps had been executed in a public stakeholder process: (a) Process and need case identification: (i) The relevant system operator shall study and publish, as to what extend his power sys-tem has which physical needs, and under which circumstances, which lead to that desire to have (more) PGM with a performance like “voltage source behind an imped-ance”. This shall include steady state and especially system critical transient operation conditions of the power system. (ii) The relevant system operator shall provide a technical assessment regarding the most effective voltage level, to which such “voltage source behind an impedance”-PGM shall be connected. This shall have		

	considered at least their desired system stabilization im-pact, as well as the risk of unintentional islanding and controller interaction, which have been identified as potential drawbacks of “voltage source behind an impedance” performance. (b) Technical expression of requirements: The relevant system operator shall provide a technology agnostic, quantitative definition what is expected from a PGM as a performance like a “voltage source behind an impedance”. This shall cover steady state and transient operation conditions at the connection point of the PGM to the power system. This includes, but is not limited to: (i) A technology agnostic definition of the used terms (voltage, current, frequency, power etc.) which are unequivocally and quantifiable. They may be different in RMS- and in time domain. These definitions are the precondition for a quantification of the re-quirements, as well as a verification by measurements and subsequent calculations. (ii) Minimum expected increase (or decrease) of active power exchange between the PGM and the power	(i) Requirements in that matter are not black/white, but shades of grey. Depending on the extend of the requirement thy cause more or less cost. If a system operator thinks to need such performance requirement, there is no other way than justifying precisely why, and defining accurately what. (ii) Achieving a capability to perform with aspects of a “voltage source behind an impedance” leads to

New provisions	system, facing a vector shift of the grid voltage angle, the maximum permitted rise time (ms) and minimum expected duration (ms) of such increased (or decreased) active power exchange. Particular emphasis shall be given to the separated provision of an increase versus a decrease of active power exchange in comparison to the pre-incident situation. (iii) Minimum expected increase (or decrease) of active power exchange between the PGM and the power system, facing a vector shift of the grid voltage angle, the maximum permitted rise time (ms) and duration (ms) of such increased (or decreased) active power exchange. Particular emphasis shall be given to the separated provision of an increase versus a decrease of active power exchange in comparison to the pre-incident situation. (iv) An exact definition of the timely instant, as of which any timely requirement counts in the context of performance like a “voltage source behind an impedance”. If any re-quirement addresses the sub-cycle time domain of the fundamental frequency, then the definition of the aforementioned staring instant shall be quantified in time domain, so that	significant cost, depending on the specific generation technology. This addresses mainly development and investment cost. For the wind industry such requirements are expected to cause significant cost. (Re-design of the products, implementation of an energy storage, new hardware and software, new certification.) Additionally, the actual provision of such performance can lead to further operational cost. Before making this a requirement, the national regulator shall have assessed the benefit and the cost. (iii) Studies have shown (e.g. "Netzregelung2.0", Germany 2022) that such "grid forming" performance has severe undesired effects in MV and LV grids. Specifically the non-detection zone (preventing PGMs from undesired islanding) and oscillatory interaction between PGMs are observed. These can be avoided by specific measures and detailed studies, but such effort is not practicable in LV and MV mass installations. The situation may be different in HV and EHV grids. (iv) To obtain the desired grid stabilizing effect it is crucial to use a well-defined, quantifiable terminology. General, non-quantifiable terms shall not be used (like “grid forming”,	many! IF such a requirement is introduced, or only possible with a "door-opener" for the relevant system operator, this has significant interaction with: - Fast Fault Current - Inertia and synthetic inertia - Islanding, resp. anti-islanding measures - frequency control (FMS, LFSM) - regional or local oscillations between different PGM

	sinusoidal quantities of the fundamental frequency can be used for its deter-mination and its verification. (v) Minimum expected contribution of the PGM to the power system damping; specifying at least quantitatively the damping requirement, the frequency range in which such damping is expected, and the way how damping shall be determined. (vi) The expected control dynamics on the PGM in order to contribute to the stability of temporary electrical islands (if desired). (vii) Specifically for PPM: Facing the grid transients named above, PPM will reach at some point the physical current limits and/or the energy buffer limits. The responsible sys-tem operator shall give a technology agnostic description of the permitted phase out of the performance of the “voltage source behind an impedance”, once such limits are approached. (viii) The technology agnostic description of the required performance in case of the simul-taneous occurrence of system disturbances, which would require a specific PPM per-formance to support voltage and frequency. A priority	“virtual synchronous machine”, “inherent”, “undelayed”, “instantaneous”). Also frequently used physical terms need an exact definition, which is so far typically not given in the NC RfG for the subcycle time domain, which is key for anything around "grid forming". “Voltage” is not an unambiguous term in a 3 phase power system context. There are many voltages that could be meant. “Frequency” is not an unambiguous term as soon as a requirement is given with a performance criteria <<1 sec. (v) Any requirement, which can’t be verified by measurement of physical quantities and properly defined calculations therewith is void.		

order may be needed.

In addition, the relevant system operator shall define how such performance as a “voltage source behind an impedance” shall be
(ix) Tested, simulated or verified in any way, which may include also a PPM-certification
(x) Reflected in simulation models

(c) Commercial:
The national regulator in coordination with the relevant system operator shall define how such a capability as a “voltage source behind an impedance” shall be
(i) Remunerated to the PGM, or
(ii) be included in the national schemes of ancillary services based on the DIRECTIVE (EU) 2019/94413, or
(iii) if the aforementioned capabilities of a “voltage source behind an impedance” are planned to be a minimum requirement for any PGM or PPM of a certain type (A/B/C/D), then a public Cost Benefit Analysis (CBA according to Article 39 NC RfG) shall prove that this is the overall best approach, balancing system stability needs and economical effort for the implementation. This CBA shall cover the provision of the capabilities, as

	well as the actual provision of the performance under steady state and transient circumstances.		

Please upload figures or tables if necessary

The maximum file size is 1 MB

841c19b4-2556-4f0b-9362-769a2c6e21b0/U_ovrt_relative__graph_from_VDE-AR_4120.pdf

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)			
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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)			
Article 18(2)			

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)	(b) the relevant system operator in coordination with the relevant TSO shall have the right to specify that a power park module be capable of providing fast fault current at the connection point in case of symmetrical (3-phase) faults, only under the following conditions:	Even though the relevant system operator in coordination with the relevant TSO has the right to specify something, the condition given in the RfG for the usage of this right is not respected. Hardly any system operator in Europe is defining the details as given in Art. 20 2. (b) (i) and (ii)	
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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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)	New section (2)(c): the relevant TSO shall have the right to request a stability compliance for the voltage control mode in a closed loop operation setup of the PPM. When doing so, the network operator is obliged to define the compliance verification setup, the scenarios and the success criteria.	ACER should work towards European coordination of the verification setup, the scenarios and the success criteria (e.g. IGD). All PGMs must contribute adequately to the stability of the interconnected system. A closed loop setup for a PGM with a defined contingency is suitable to reproduce conditions relevant for the contribution of the PGM to power system stability (e.g. LFSM and others).	
Article 21(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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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	The relevant system operator shall clarify and make publicly available the details of the operational notification procedure. If the procedure includes equipment certificates issued by an authorised certifier as a mandatory document, the relevant system operator, in coordination with the national regulatory authority, shall have established a rule for prototypes. Such prototype rule shall define the conditions, under which new types of power generating units can be installed, be tested, operated under a ION and are allowed to submit equipment certificates within two years. The same prototype rule applies for a transition time, not shorter than two years, after a revision of the national implementation of the network code on requirements for grid connection of generators.	Experience from Germany, Netherlands, Spain, Poland and Portugal show that the present wording of (2), creates major problems: a. when a PGU-type is installed for the first time in this country and no test and certification was done specifically for this national implementation of the RfG, and b) when the technical requirements from the system operator change. A new equipment certificate has to be made. Basically ok, but this is not done overnight. As an example, for wind energy converters: The process for such a new unit certification typically takes 2 years. The concept of the derogation request, doesnt work in the aforementioned countries. Also the status as "emerging technology" is not applicable for e.g. a wind turbine, which is installed for the first time in a member state.	
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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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

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

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

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

TITLE V - Derogations

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

	Amendment proposal	Reasoning	Relation to other provisions
Article 60			
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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

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			

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

Please upload figures or tables if necessary

The maximum file size is 1 MB

FILE UPLOAD

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

The maximum file size is 1 MB

757ae76f-37e0-4c38-a304-2e317e3da61f/NC_RfG_ENERCON_Quitmann.docx

Contact

Contact Form