

# ACER draft amendments to the Network Code on Requirements for Generators

Fields marked with \* are mandatory.

## Introduction

This consultation aims to present ACER's draft amendments to the Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a **Network Code on Requirements for Grid Connection of Generators ('NC RfG')**.

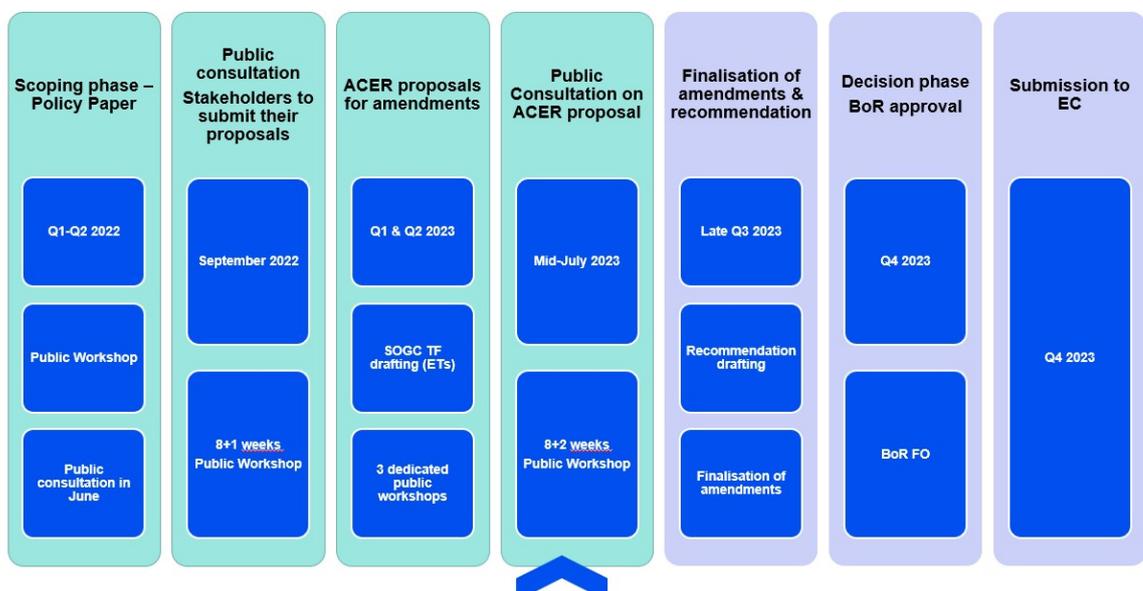
For draft amendments concerning Network Code on Demand Connection ('NC DC'), please go to the respective form: [NC DC](#).

**Responses to this consultation should be submitted by 25 September 2023.**

## Background

Important developments in the policies of decarbonisation of the European Union (EU) energy and transport sectors have taken place since the inception of the development of the first European Grid Connection Network Codes (GC NCs) in 2012.

In the framework of the Grid Connection European Stakeholder Committee (GC ESC), the European Commission proposed for ACER to initiate the process towards the amendment of the existing GC NCs in September 2022. The amendment process, as presented to the GC ESC is outlined in the Figure below:



Following the scoping phase, ACER published the Policy Paper on the revision of the network code on requirements for grid connection of generators and the network code on demand connection in September 2022. The Policy Paper aimed to transparently indicate to stakeholders the key policy areas in which amendments were to be expected.

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

As a next step, ACER launched the Public Consultation to gather stakeholders' views and concrete amendment proposals regarding the GC NCs. The stakeholders could submit their inputs by 21 November 2022.

[Access the results of the Public Consultation on the amendments to the grid connection network codes.](#)

Additionally, in the preparation of the draft amendment proposals, ACER organised three dedicated public workshops, namely:

- [electromobility, power-to-gas demand units and heat-pumps](#) (held on 17 April 2023);
- [rate of change of frequency and grid forming capabilities](#) (held on 10 May 2023); and
- [electricity storage](#) (held on 11 May 2023).

After the evaluation of stakeholders' inputs, ACER has formulated its own proposal for the amendments of the GC NCs which is subject to this public consultation.

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## Stakeholder's details

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

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

\* Name of the stakeholder:

EDF

\* Contact person:

[REDACTED]

\* Contact person's email address:

[REDACTED]

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

France

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\* Type of the stakeholder:

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

Please, elaborate on your answer above, if necessary:

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

- Yes
- No

\* Do you consent to the publication of provided answers?

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

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## Instructions

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Stakeholders are invited to submit their comments to the NC RfG articles amended by ACER in three mandatory steps:

1. by downloading the ACER draft amendments in the Word file provided below. The file can also be accessed on the right panel of the consultation form under the Background Documents;
2. by commenting on the ACER's draft amendments through this online consultation form and adding their alternative text proposals to the table, if any; and
3. by uploading the alternative amendment proposals to the **entire NC RfG** using the Track Changes mode in the ACER draft amendments file downloaded from **Step 1**.

Where the stakeholder does not have any comments regarding the amendments, the relevant cells in the consultation form can be left blank.

The mandatory steps for submitting the comments are listed below.

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### ***Step 1***

Please see ACER's draft amendments in the Word file provided below. The file can also be accessed on the right panel of the consultation form under the Background Documents.

## [Download ACER draft amendments to the NC RfG here](#)

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### *Step 2*

**Kindly note that this consultation form follows the structure of the NC RfG amended legal text provided by ACER in Step 1.**

The paragraph numbering in the form reflects paragraph numbers in the amended legal text. Nevertheless, stakeholders can comment on the deleted paragraphs/articles/titles, which are marked as [deleted]. New articles and titles are marked as [new].

Please use this form to comment on ACER draft amendments and/or to provide an alternative text proposal. The instructions are the following:

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 1	1	2
Article 3		
Article 4		
Article 4a [new]		
Article 5		
Article 6		
Article 7		
Article 8		
Article 9		
Article 10		
Article 11		
Article 12		

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

	Text amendment proposal (if applicable)
New article	3

Please upload figures or tables if necessary

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Select file to upload 4

1. Leave comments on the ACER draft amendment proposals.
  2. Propose (if any) alternative wording of the relevant provision, as you provided in the Word file.
  3. Provide (if any) your proposals for adding new provisions to the relevant section of the NC RfG, as you provided in the Word file.
  4. Upload figures or tables if necessary; text inputs should be provided directly in the consultation form.
- 

### ***Step 3***

Where the stakeholder would like to propose an alternative amendment to the **entire NC RfG**, please upload the Word file (**downloaded from Step 1**) containing all your alternative amendment proposals in the Track Changes mode to the next **FILE UPLOAD** section and rename it with your stakeholder's name ("ACER\_draft\_RfG\_stakeholder\_name"). You can also upload your justification documents, where applicable.

**In case the file size exceeds the 1MB limit**, which is a consultation tool limit, kindly send the document to the functional mailbox shown on the right panel of the consultation form. Please rename the file with your stakeholder's name as indicated above and send it with the subject "ACER draft RfG legal text [stakeholder name]". Note that only submissions sent within the consultation deadline will be considered.

To facilitate the process, please, make sure that the **alternative text proposals provided in this consultation form are consistent**, to the extent possible, **with those in the Word file** you are uploading, taking into account the character limitations of each cell (max 5000 characters).

## **FILE UPLOAD**

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Please upload your file here

The maximum file size is 1 MB

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

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

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

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Due to the significant length of this survey:

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

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

## Whereas Section

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

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
(1)		
(2)		
(3)		
(s1)		
(s2)		
(4)		
(5)		
(6)		
(7)		
(8)		
	<p>This recital shall include the possibility to aggregate a synchronous PGM and a battery, not only PPMs and battery.</p> <p>It is likely that some SPGMs will be hybridized in the future with batteries.</p> <p>Because of the mobile nature of the V2G electric vehicles, it is key - for allowing the power system to fully benefit of their flexibilities and to allow their mass-market development - that the rules applying to each V2G electric vehicle and associated V2G EVSE are harmonized at European level and do not depend, in a same country, on the location of the EVSE to which the EV is connected (residential home, enterprise parking lot, etc.). The same car model shall indeed be useable for providing V2G</p>	

(9)	<p>services if it is sold to a residential customer as well as if it is integrated in an enterprise fleet. In the same way, the same car, of a private individual or of an enterprise's fleet, shall allow the provision of V2G services wherever it is connected to its charging point (employee car parked at home or at work, fleet car parked on business site or at home, etc.).</p> <p>As a consequence, and as stated by ACER in the electromobility workshop and in our bilateral meeting, the set of requirements applying to an EV and its supply equipment (as defined in article 13a and 14a) shall depend on its individual capacity in regard to a few harmonized categories applicable throughout Europe, and not on the aggregated capacity of the electrical charging park.</p> <p>EDF considers essential to make this point very clear in the code, including in the Whereas section (9).</p>	<p>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. To ensure an appropriate harmonisation of rules for V2G electric vehicles and associated V2G electric vehicle supply equipment, required by their mobile nature, the individual capacities of the V2G electric vehicles and associated V2G electric vehicle supply equipment, below 1 MW capacity, shall not be aggregated for the purpose of the determination of significance. Moreover, to ensure an appropriate harmonisation of rules for mass-market products, capacities of units of different classes, for instance, photovoltaic, electricity storage, combined heat and power installations, or V2G electric vehicles, shall not be aggregated for the purpose of the determination of significance.”</p>
(10)	<p>A fully autonomous energy community shall not be allowed to join the main continental Europe synchronous network if it does not comply with the RfG code, even if this connection happens years after the creation of this community, to ensure the level-playing field expected. (equity principle).</p>	<p>Add as a last sentence:  “A fully autonomous energy community will have to comply with the RfG network code as soon as it is connected to the European main electrical system”.</p>
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New recital	(33) This Regulation establishes new requirements for V2G electric vehicles and associated electric vehicle supply equipment that may not be compatible with already existing equipment. Thus, those requirements shall not apply to existing equipment at the entry into force of this Regulation.

## Definitions (Article 2)

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

Includes new definitions

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 2(1)		
Article 2(2)		
Article 2(3)		
Article 2(4)		
Article 2(5)		
Article 2(6)		
Article 2(7)		
Article 2(8)		
Article 2(9)		
Article 2(10)		
Article 2(10a)		
Article 2(11)		
Article 2(12)		
Article 2(13)		
Article 2(14)		
Article 2(15)		
Article 2(16)	<p>Maximum capacity should be understood “at the connection point”.</p> <p>It should also be clarified how the initial Pmax is defined (as it is used as a reference to define whether an active power increase is significant or not, for instance).</p>	<p>maximum capacity’ or ‘Pmax’ means the maximum continuous active power which a power-generating module can produce, less any demand or losses associated solely with facilitating the operation of that power-generating module, measured at the connection point as specified in the connection agreement</p>

Article 2(17)	Editorial modification in the definition of “power park module”	‘power park module’ or ‘PPM’ means a unit or ensemble of units that can generate electricity, which is not a synchronous power-generating module and which is either non-synchronously connected to the network or connected through power electronics, and that also has a single connection point to a transmission system, or to a distribution system including closed distribution system or HVDC system;
Article 2(18)		
Article 2(19)		
Article 2(20)		
Article 2(21)		
Article 2(22)		
Article 2(23)		
Article 2(24)		
Article 2(25)		
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Article 2(72)		
Article 2(73)		
Article 2(74)		
Article 2(75)		

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

	Text amendment proposal (if applicable)
New definition	

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## TITLE I - General provisions

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 1		
Article 3		
Article 4	<p>4.2.b regarding the condition and the time line for considering an installation as existant: it seems that the delay is 2 years for SPGMs but 3 years for PPMs. Why a difference? EDF proposes 3 years for all PGMs: it would mean that if the generator has concluded a final and binding contract for the purchase of the main generating plant by 3 years after the entry into force of this Regulation, it would not apply.</p>	<p>4.2.b « For the purposes of this Regulation, a power-generating module shall be considered existing if the power generating facility has concluded a final and binding contract for the purchase of the main generating plant by two years after the entry into force of the Regulation”, taking into account that for some technologies, this duration might be longer, subject to discussions with the relevant regulatory authority, as the duration between the decision to launch the investment and the 2 conditions mentioned above may not be feasible within 2 years.</p>
	<p>EDF considers that additional criteria regarding substantial modification may trigger additional Capex for some projects and thus put some risk on some investments:</p> <ul style="list-style-type: none"> <li>- Regarding the active power criterion for substantial modification, there is a need to propose a higher upper value (30%) to take into account hydraulic plants containing 3 groups or more where each group could be upgraded</li> </ul>	<p>(a) an increase above the existing maximum capacity of the power-generating module, whether this increase results from one modernisation or several successive modernisations, of a minimum percentage to be defined in the range 5-30 % (within this range,</p>

Article 4a [new]

separately, with a total effect lower than 10% seen from the connection point

- regarding reactive power, there is a need to propose a minimal high value(10%), otherwise, any change including an improvement in the reactive power capability would lead to a substantial modification, and thus the investment may not be made.

- EDF proposes to suppress the criterion "change in frequency capabilities". If the performances and electrotechnical capabilities for the TSOs are not changed, it should not lead to substantial modification.

- What is the exact definition of a component? It should at least exclude a change in the main transformer, a modernization of the remote control (analogical to digital for instance), or a change of primary source of energy (example: coal to biomass, or CH4 to other gases, or Gas Oil to HVO/bioliquid, etc).

In addition, what is taken into account for the initial value for active power? Is it during at the moment of the start-up? What is filled in the connection agreement?

How is the increasing of the height of the dam

different percentages may can be set defined for different technologies depending on their constraints);

(b) a deviation from the reactive power capability of the power-generating module, whether this deviation results from one modernisation or several successive modernisations, of a minimum percentage to be defined in the range 10-20 %;

for the avoidance of doubt, this shall also exclude any change of transformer, modernization of remote control or change of primary energy (e.g. conversion to biomass)

	<p>(limited to civil engineering work) considered?</p> <p>According to the definitions of article 2, V2G electric vehicles and their associated supply equipment are considered as PGM. As applicable requirements depend on the individual capacity of the V2G electric vehicle and its associated equipment, article 4a concerning significant modernization of PGM is not relevant for V2G EVs and it should be clearly stated that it does not apply to it.</p>	<p>4.Type EV1 to EV3 V2G electric vehicle and associated V2G electric vehicle supply equipment are not subject to significant modernization</p>
	<p>EDF considers that ACER's proposal regarding the thresholds between categories is quite adequate. However, EDF would suggest to smoothen the thresholds effect by not turning directly a power plant into the upper category after a power increase, but rather more with an additional condition: level of active power + power increase bigger than 10%.</p> <p>For example, this would avoid a 74 MW hydro power plant not to make investments by 2 MW as it would become type D category and not C (74 to 76 MW, the threshold being 75 MW) and in fine be positive to the electrical system.</p> <p>On the specific topic of EV and EVSE EDF suggests the following modifications:</p>	

Article 5

Concerning paragraph 1:

Paragraph 1, which serves as an introduction for the rest of the article, shall consider both the case of the “standard” power-generating modules with A/B/C/D categories (as defined in paragraph 2), and the case of V2G electric vehicles and associated supply equipment below 1MW maximum capacity, with their specific rules for determination of significance (as defined in paragraph 6).

Concerning paragraph 6:

EV3 will be applied requirements comparable to category B ones. Therefore, in order not to distort competition between the different flexibilities, given that a very large majority of member states has set up a threshold between categories A and B at or above 100 kW, it is necessary to fix a limit between EV2 and EV3 at a value that will allow EV to submit to the same requirements than other flexibilities of the same size.

In addition, it shall be clear that the requirements applicable to each individual electric vehicle and associated supply equipment shall be determined based on its individual capacity, as stated by ACER in the different workshops, and not on the aggregated capacity of the electrical charging park connected to the same connection point. We propose the following modifications to

Paragraph 1:

Power-generating modules shall comply with the requirements on the basis of the voltage level of their connection point and their maximum capacity according to the categories set out in paragraph 2 in the general case, or in paragraph 6 for V2G electric vehicles and associated V2G electric supply equipment below 1MW maximum capacity.

Paragraph 6 :

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

- (a) maximum capacity of the individual V2G electric vehicle and associated vehicle supply equipment larger than or equal to 0,8 kW and less than 2,4 kW (type EV1);
- (b) maximum capacity of the individual V2G electric vehicle and associated vehicle supply equipment larger than or equal to 2,4 kW and less than or equal to 100 kW (type EV2);

	avoid any doubt as to the application of this principle.	(c) maximum capacity of the individual V2G electric vehicle and associated vehicle supply equipment larger than 100 kW and less than 1 MW (type EV3).
Article 6	Provisions 6.2.d and 6.2.f regarding pump-storage assets are inconsistent. EDF considers 6.2.f gives the ability to decrease costs associated with pump-storage assets and consequently promotes the development of renewable (carbon-free?) assets.	
Article 7	We propose to complement point 7.3.g, as this is a too extensive power for TSOs.	take into consideration local system needs in specifying power-generating modules capabilities where necessary, submitted to approval by the national regulatory authority.
Article 8		
Article 9		
Article 10		
Article 11		
Article 12		

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

	Text amendment proposal (if applicable)
New article	

Please upload figures or tables if necessary

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## TITLE II CHAPTER 1 - General Requirements

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**General requirements for type A power-generating modules**

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 13(1)		
Article 13(2)	<p>EDF asks for clarification regarding 13.2.b.iv : does it mean that the operator needs to trigger the loss of mains protection with the RoCoF criteria ?</p> <p>EDF proposes to suppress point 13.2.c : generators are free to choose their own protections for their materials as they will be responsible for it in the end.</p> <p>EDF proposes to erase the new requirement 13.2.d regarding the 51,5 Hz-52,5 Hz frequency range. It is not justified and was initially only created to take into account the new Rocof profile in the overfrequency range. No real analysis was performed about it. Requirements should be set after a robust justification of system needs, be subject to cost-benefit analysis (because they can imply huge costs for</p>	

generators and deter investment) and after assessment of alternative network solutions. In addition, regarding pump-storage assets, this requirement will lead to the request for a derogation, to avoid significant civil engineering work due to risks of water hammers.

EDF again underlines that the “Unlimited” requirement for the frequency range 49Hz-51Hz may seem irrelevant, during the 2006 huge grid incident, the frequency has not stayed for more than one hour in the vicinity of 49Hz. This triggers too much constraints and costs compared to its real relevance.

49,0 Hz-51,0 Hz

Alternative proposal:

Unlimited time period for operation with a frequency deviation exceeding its maximum steady state value <sup>(2)</sup> means that the time period for operation shall be at least ten times longer than the “time to restore frequency” (\*)

<sup>2</sup> as defined by Commission Regulation (EU) 2017/1485 Annex III)

\* subject to discussions with both the TSO and the NRA on the duration in the extreme limits of this range.

Article 13(3)	<p>13.3.g: EDF proposes to erase this paragraph, as the required use of TOR signals for LFSM-O may result in legal responsibility topics and cybersecurity issues.</p> <p>In case this paragraph is not erased, EDF highlights that it is not consistent with point 7.3.f that puts relevant nuclear safety rules in priority. Indeed this requirement may endanger the ability of a power plant, for example a nuclear one, to go into islanding mode.</p> <p>Figure XX on the topic of LFSM-O shows an active power increase instead of a decrease.</p> <p>13.3.h In LFSM-O mode, an electricity storage module shall be able to increase its consumption, if possible, or to decrease its generation and switch to consumption, but in no case, to switch from consumption to generation. The wording should be modified as proposed.</p>	<p>Switching from generation to consumption should be as fast as technically feasible. The relevant system operator has the right to request the demonstration of technical evidence of the required switching time.</p>
Article 13(4)		
Article 13(5)		
Article 13(6)		
Article 13(7)		
Article 13(8)		
Article 13(9)		
Article 13(10)		

Article 13(11)	13.11.e In LFSM-U mode, an electricity storage module shall be able to increase its generation, if possible, or to decrease its consumption and switch to generation, but in no case, to switch from generation to consumption. The wording should be modified as proposed.	<p>(e) The response time <math>T_{resp}</math> (Figure xx in Article 13.2) for LFSM-U-ESM shall be as described below:</p> <ul style="list-style-type: none"> <li>— for SPGM: less or equal to 8 s for an active power setpoint change of 1 pu of capacity excluding the time for switching from consumption to generation.</li> <li>— for PPM: less or equal to 0,5 s for an active power setpoint change of 1 pu of capacity excluding the time for switching from consumption to generation.</li> </ul> <p>Switching from consumption to generation should be as fast as technically feasible. The relevant system operator has the right to request the demonstration of technical evidence of the required switching time.</p>
Article 13(12)		
Article 13(13)		
Article 13(14)		

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

	Text amendment proposal (if applicable)
New provision	

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**[NEW]** General requirements for type EV1 and EV2 V2G electric vehicles and associated V2G electric vehicle supply equipment

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 13a(1)	<p>Concerning paragraph 1 (b) (iii): Missing reference to be clarified.</p> <p>Table XY: EDF asks for the removal of the requirement to withstand during 10s in the frequency range 51,5 Hz-52,5 Hz as it was not technically justified through a Cost/Benefit Analysis</p>	<p>Paragraph 1 (b) (iii): (iii) If the rate-of-change-of-frequency is used for loss of mains protection, the rate-of-change-of-frequency threshold shall be set at higher values than the ones defined in point i</p>

Article 13a(2)

EDF considers that this requirement to be equipped with a cyber protected data exchange interface is not relevant to EV1 electric vehicles which are under sized and not economically viable for active power regulation. An alternative proposition could be to deploy an ON/OFF logical port - functionality for EV1.

For EV2, EDF considers that the requirement about data exchange interface should be worded in a way that lets the technical solutions open, provided that the same products shall be useable in the different member states of the Union without country-specific hardware adaptations. Such a requirement is indeed consubstantial with the harmonization effort pushed by ACER on V2G.

In the context where there is no standardized solution for a local input port defined by the European system operators yet and their precise needs are not defined as well, the wording should in particular not prohibit a solution that would use the cyber-protected data exchange interface between the EVSE and its associated smart dis/charging platform to transmit the system operator's instructions.

If the system operators would finally want to impose solutions based on a local input port for any relevant reason, they shall coordinate to define a standardized solution at European level. The proposed wording allows the 2 previous options while respecting the key need about harmonization.

2. An EV2 V2G electric vehicle supply equipment shall offer a cyber-protected data exchange interface in order to modulate, without undue delay, active power output and input following an instruction being received from the relevant system operator. The relevant system operator shall have the right to specify requirements for equipment to make this facility operable remotely. To ensure harmonization at European level, the relevant system operators shall not require solutions that would imply country-specific adaptations of the EVSEs' hardware.

<p>Article 13a(3)</p>	<p>EDF considers that the minimum observation time for the EV connection to the electric vehicle supply equipment is not needed. Indeed, if the electric vehicle supply equipment is connected to the grid, it means that the required technical conditions for the EV connection are satisfied. EDF concern is to avoid any additional delay for the customer between the EV-EVSE connection and the charging process.</p> <p>So EDF proposes that this 5s observation time only apply when the EVSE connects to the grid (1st installation or restart) not when connecting the EV to the EVSE to start a charging session</p>	<p>b) Minimum observation time: 5 s, limited to the situations where the EVSE is switching from power off to power on.</p>
<p>Article 13a(4)</p>	<p>EDF requests some clarification regarding the frequency range between 50.2 Hz and 52.5 Hz : are the EV and the associated EVSE expected to connect autonomously ?</p>	
	<p>EDF considers that this requirement is not relevant to EV1 which is under sized and not economically viable for active power regulation.</p> <p>(a) and (d) The contribution of EV2 vehicles to LFSM-U shall not lead to not respect the electric vehicle user's requirements on minimum battery state-of-charge</p> <p>EDF considers that this requirement is not relevant to EV1 which is under sized and not economically viable for active power regulation.</p>	

Article 13a(5)

(a) and (d) The contribution of EV2 vehicles to LFSM-U shall not lead to not respect the electric vehicle user's requirements on minimum battery state-of-charge

The proposed requirement about LFSM-U

(a) A type EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment shall be capable of activating the provision of active power frequency response from the current active power input/output automatically up to the maximum capacity according to the indicative Figure YY at a frequency threshold defined in point (c) and with the droop setting defined in point (b), provided that the electric vehicle user's requirements on minimal battery state-of-charge are respected.

(d) A type EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment shall stay and operate stably in this specific mode as long as the frequency is below the frequency threshold and according to its content of energy, provided that the electric vehicle user's requirements on minimum battery state-of-charge are respected. If the frequency recovers, the V2G electric vehicle and associated V2G electric vehicle supply equipment shall follow the same power-frequency characteristic until it is back to its prior state of active power input/output;

(e) The response time,  $T_{resp}$  in Figure XX, shall be as fast as technically feasible and less or equal to 2 s for an active power increase of 0,5 pu of  $P_{max}$ .

reactivity – 13a (5) (e) – shall be updated:

- The meaning of “for an active power setpoint change of 1 pu of Pmax” should be clarified. It is unclear if it refers to the new targeted operating point, whatever the initial operating point is, or to the required power variation from the initial operating point. We understand that the second case should be considered and propose a wording accordingly.
- The requirement is new and stringent. It may be challenging and V2G compliance with it (with no significant cost increase) has not been demonstrated yet. Although embedded power electronics allows V2G assets to be quite reactive against frequency deviations, EDF believes that a prudent approach should be adopted before fixing the detailed reactivity parameters of the LFSM-U requirement. EDF proposes to use the same reactivity requirement than for LFSM-O as long as additional studies do not confirm the current requirement’s relevance.

<p>Article 13a(6)</p>	<p>EDF considers that the requirements in Article 13a.6.a,b &amp; e are not relevant to EV1 which is under sized and not economically viable for active power regulation.</p> <p>(f) In the same way than for LFSM-U (13a 5 e), the wording for active power variation shall be clarified.</p>	<p>(a) A type EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment which is consuming active power during an overfrequency event shall increase the level of active power consumed...</p> <p>(b) A type EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment, which is injecting active power during an overfrequency event, shall activate the provision of active power frequency response...</p> <p>(e) The EV2 V2G electric vehicle and associated V2G electric vehicle supply equipment shall be capable of operating stably during LFSM-O operation</p> <p>(f) The response time Tresp (Figure XX) for active power decrease in case of increasing frequency, shall be as fast as technically feasible and less or equal to 2 seconds for an active power decrease of 50% maximum power.</p>
<p>Article 13a(7)</p>		
<p>Article 13a(8)</p>		
<p>Article 13a(9)</p>		
<p>Article 13a(10)</p>		
<p>Article 13a(11)</p>		

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

	Text amendment proposal (if applicable)
New provision	

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**General requirements for type B power-generating modules**

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 14(1)		
Article 14(2)[deleted]		
Article 14(2)		
Article 14(3)	<p>Regarding Figure X “High voltage-ride-through profile of a power-generating module”, we want to precise 2 points:</p> <ul style="list-style-type: none"> <li>- Addition of the sentence in bold: The diagram represents the higher limit of a voltage-against-time profile of the voltage at the connection point, expressed as the ratio of its actual value and its reference 1 pu value, before, during and after a fault. U<sub>refc</sub> is the maximum voltage specified in paragraph 2.</li> <li>- What is the voltage level before the beginning of the over-voltage profile? (U<sub>refc</sub>? 1 pu?)</li> </ul>	<p>The diagram represents the higher limit of a voltage-against-time profile of the voltage at the connection point, expressed as the ratio of its actual value and its reference 1 pu value, before, during and after a fault. U<sub>refc</sub> is the maximum voltage specified in paragraph 2.</p>
Article 14(4)		
Article 14(5)	<p>It seems that there is an inconsistency in the point 14.5.d.iii, it is unapplicable to type D machines.</p> <p>It looks like there is a lag in the references in this ACER’s proposal due to the fact that some articles were suppressed compared to the initial RfG version.</p>	

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

	Text amendment proposal (if applicable)
New provision	

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**[NEW] Requirements for type EV3 electric vehicles and associated V2G electric vehicle supply equipment and V2G electrical charging parks**

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 14a(1)	<p>The proposed title of article 14a refers to V2G electrical charging parks in addition to EV3 electric vehicles and associated V2G electric vehicle supply equipment.</p> <p>It shall be clear that article 14a requirements apply to the electric vehicles and associated V2G EVSE which have been defined as EV3 based on their individual capacity and not on the aggregated capacity of the electrical charging park. For this reason, and because we don't see any drawback to it, EDF suggests removing the reference to electrical charging parks in article 14a title.</p>	<p>Article 14a Requirements for type EV3 electric vehicles and associated V2G electric vehicle supply equipment</p>
Article 14a(2)		
Article 14a(3)		
Article 14a(4)		
Article 14a(5)		
Article 14a(6)	<p>We insist on the fact that these requirements are applicable on EV3 and not several EV2 connected to the same connection point.</p>	
Article 14a(7)		

Article 14a(8)	Regarding the emerging market of the V2G EV and associated supply equipment, EDF suggests providing a cost-benefit analysis for this requirement, which would increase the EV and its supply equipment's cost, before including it in the RfG NC code	Remove 14a (8)
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Please write your amendment proposals, if any, in the table below

	Text amendment proposal (if applicable)
New provision	

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### General requirements for type C power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 15(1)		
Article 15(2)	<p>The point about LFSM-U at 15.2.c.ii does not seem justified. It should be erased.</p> <p>Introducing new requirements should be duly justified for any type of grid user, based on a need clearly identified by TSOs in all transparency. EDF regrets the lack of solid justifications and of cost-benefit analyses to justify new requirements.</p> <p>The former formulation in RfG v1 about 15.2.d was quite relevant and should be kept. The new proposal with several added information makes the reading unclear.</p> <p>At 15.2.d.iv, the wording “shall be as short as feasible” is too vague, and extensive, which may lead to technical debates.</p> <p>In table 4 in 15.2.d.i, insensitivity is reduced from 30 mHz to 15 mHz. Introducing new requirements should be duly justified for any type of grid user, based on a need clearly identified by TSOs in all transparency. EDF regrets the lack of solid justifications and of cost-benefit analyses to justify this requirement and request its removal.</p> <p>15.2;d.i In LFSM-U mode, an electricity storage</p>	



Article 15(4)	<p>At 15.4.b.vi, EDF calls for some clarification on what is expected from PGMs for their operation between 0 and their Minimal Operating Point? How long, in which conditions?</p> <p>The reference mentioned in 15.4.b.iv is invalid.</p>	
Article 15(5)		

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

	Text amendment proposal (if applicable)
New provision	

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## General requirements for type D power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 16(1)		
Article 16(2)		
Article 16(3)		
Article 16(4)		

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

	Text amendment proposal (if applicable)
New provision	

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

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**[NEW]** Requirements for type A synchronous power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article X	<p>Where does the 0,85 pu come from? The 0,9 value regarding voltage FRT capability had been discussed during a long time, but not this new value, which may trigger technical problems. The former 0,9 value should be kept as it was used as a basis for design studies for the past years. EDF would like to remind that type D assets are providing support to the grid to keep the voltage at its expected level. This new requirement will jeopardize the development of similar type of assets.</p>	Urec2: 0,9

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

	Text amendment proposal (if applicable)
New provision	

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## Requirements for type B synchronous power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 17(1)		
Article 17(2)		
Article 17(3)		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type C synchronous power-generating modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 18(1)		
Article 18(2)		

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type D synchronous power-generating modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 19(1)		
Article 19(2)	In 19.2.a.iii, on power system stabilisers (PSS) function, the requirement concerning the inter-oscillation mode should be removed.	
Article 19(3)		
Article 19(4)	<p>All type D SPGMs, and not only the ones with a power of more than 400 MW, shall be exempted from the toughest RocoF withstand capability requirements.</p> <p>Delete 19.4.c on main protections</p>	<p>4. With regard to frequency stability:</p> <p>(a) requirement laid down in Article 13(2)(b) shall not apply to a synchronous power-generating modules belonging to D-category</p> <p>(b) synchronous power-generating modules belonging to the D-category shall be capable of staying connected to the network and operate at rate-of-change-of-frequency up to <math>\pm 1,0</math> Hz/s over a period of 0,5 s;</p>

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

	Text amendment proposal (if applicable)
New provision	

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## TITLE II CHAPTER 3 - Requirements for power park modules

---

**[NEW]** Requirements for type A power park modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article Y(1)		
Article Y(2)		
Article Y(3)		
Article Y(4)	<p>Were there some studies regarding the voltage profile for DFIG pump-storage ?</p> <p>This requirement will lead to introduce oversized components to deal with a risk which is not demonstrated.</p>	
Article Y(5)		
Article Y(6)		
Article Y(7)		
Article Y(8)	<p>Requirements on grid forming need to be consistent with existing technology and detailed to ensure their good understanding by PPM operators</p>	

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

	Text amendment proposal (if applicable)
New provision	Y.9 The Rocof withstand capability requirement shall apply for type A- PPMs- pump storage, except the 4 Hz/s during 250ms.

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### Requirements for type B power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 20(1)	Requirements on grid forming need to be consistent with existing technology and detailed to ensure their good understanding by PPM operators	
Article 20(2)		
Article 20(3)		
Article 20(4)	Requirements on grid forming need to be consistent with existing technology and detailed to ensure their good understanding by PPM operators	

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

	Text amendment proposal (if applicable)
New provision	

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### Requirements for type C power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 21(1)		
Article 21(2) [deleted]		
Article 21(2)		
Article 21(3)		
Article 21(4)	Requirements on grid forming need to be consistent with existing technology and detailed to ensure their good understanding by PPM operators	

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

	Text amendment proposal (if applicable)
New provision	

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## Requirements for type D power park modules

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

Includes new paragraphs

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 22(1)		
Article 22(2)		

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

	Text amendment proposal (if applicable)
New provision	

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## TITLE II CHAPTER 4 - Requirements for offshore power park modules

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 23		
Article 24		
Article 25		
Article 26		
Article 27		
Article 28		

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

	Text amendment proposal (if applicable)
New article	

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## TITLE III - Operational notification procedure for connection

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 29		
Article 30		
Article 30a [new]	<p>EDF insists on the importance of a simple and fast process. The relevant system operators shall provide the installation document template on line and allow the digitally filled in documents to be easily posted on its web site.</p>	<p>1. The operational notification procedure for connection of each new type EV2 associated V2G electric vehicle supply equipment shall consist of submitting an installation document. The electrical charging park owner shall ensure that the required information is filled in on an installation document obtained from the relevant system operator and is submitted to the system operator.</p> <p>The relevant system operators shall propose a fully digitalized process.</p> <p>The relevant system operator shall ensure that the required information can be submitted by third parties on behalf of the electrical charging park owner.</p>
Article 30b [new]	<p>EDF considers that the final operational notification should be notified within an acceptable delay.</p> <p>EDF considers that the process should be fully digitalized to ease the data exchanges.</p>	<p>(3) The relevant system operator, on acceptance of a complete and adequate SED, shall issue a final operational notification as soon as possible, to the electrical charging park owner.</p> <p>Added at the end of article 30b:</p> <p>The relevant system operators shall propose a fully digitalized process.</p>

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

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

	Text amendment proposal (if applicable)
New article	

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## TITLE IV - Compliance

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 40		
Article 41		
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 proposals, if any, in the table below

	Text amendment proposal (if applicable)
New article	

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## TITLE V - Derogations

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 60		
Article 61		
Article 62		
Article 63		
Article 64		
Article 65		

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

	Text amendment proposal (if applicable)
New article	

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## [DELETED] TITLE VI - Transitional arrangements for emerging technologies

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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Title VI [deleted]		



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

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 70a [new]		

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

	Text amendment proposal (if applicable)
New article	

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## TITLE VII - Final provisions

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

Includes new articles

	Comment on the ACER draft amendments	Alternative text amendment proposal (if applicable)
Article 71		
Article 71a [new]		
Article 72		

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

	Text amendment proposal (if applicable)
New article	

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## Other additional provisions

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

	Text amendment proposal (if applicable)
Other new provisions	

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## Background Documents

[NC\\_RfG\\_ACER\\_draft\\_amendments\\_for\\_PC\\_2023\\_E\\_07.docx](#)

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