

### NC RfG DC Recommendation:

Annex 7 - Evaluation of responses to the public consultation (17 July until 25 September 2023)



## **Public Consultation**

on

## the amendments to the Electricity Grid Connection Network Codes

(NCs RfG and DC)

# PC\_2023\_E\_07

# **Evaluation Report**

December 2023

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### 1. INTRODUCTION

This report summarises the responses received to the public consultation on the amendments to the Electricity Grid Connection Network Codes ('public consultation'), and provides an evaluation of the points raised, in relation to the Agency for the Cooperation of Energy Regulators (ACER) consultation document PC\_2023\_E\_07.

ACER published a Policy Paper<sup>1</sup> on the revision of the Network Code on Requirements for Grid Connection of Generators (NC RfG) and the Network Code on Demand Connection (NC DC) in September 2022 ('ACER Policy Paper'). This document aimed at transparently indicating to stakeholders the key policy areas in which amendments are to be expected. Moreover, the ACER Policy Paper drew on the alternative policy options and provided recommendations and proposed actions for the amendment process.

Following the publication of ACER Policy Paper, ACER ran a public consultation from 26 September until 21 November 2022. The evaluation report on responses received to this public consultation on the amendments to the Electricity Grid Connection Network Codes (GC NCs) has been published on the 17 July 2023 in order to indicate how stakeholders' views and concrete amendment proposals regarding the two GC NCs: the NC RfG and the NC DC were assessed.

Within this evaluation context, ACER formed its amendment Proposal on the two GC NCs and carried out another public consultation between 17 July and 25 September 2023, inviting all interested stakeholders to provide any comments on the Proposal. The consultation resulted in a total of 94 responses (56 for NC RfG and 38 for NC DC) provided by 62 stakeholders (ENTSO-E, EU DSO and European energy stakeholders representing the industry across Europe). The list of respondents is available on ACER's website, alongside their responses<sup>2</sup>. In the present document we explain how the responses received have been taken into account for the network codes' amendment. The steps following the results of this public consultation are also outlined in this document.

The stakeholders proposed amendments mainly concerning the following policy areas:

- Technical requirements for pump storage hydro power generating modules (PMGs);
- Determination of significance of PMGs;
- Determination of mixed customer sites (MCS);
- Requirements for type A PGMs;
- Significant modernisation of system users' facilities and equipment;
- Requirements for storage and electromobility;
- Simulation models and compliance monitoring;
- Advanced capabilities;
- Weather hazard resilience;
- Active customers and energy communities;
- Units providing demand response services;
- Improvement of the applicable rules and procedures;
- Demonstration of compliance.

<sup>&</sup>lt;sup>1</sup><u>https://acer.europa.eu/sites/default/files/documents/Position%20Papers/260908%20ACER%20GCNCs%20Policy%20Paper\_final.</u> <u>pdf</u>

<sup>&</sup>lt;sup>2</sup>https://www.acer.europa.eu/documents/public-consultations/pc2023e07-public-consultation-amendments-electricity-gridconnection-network-codes



### 2. EVALUATION OF RESPONSES

Following the close of the public consultation, ACER assessed stakeholders' views regarding amendment proposal on the two GC NCs: the NC RfG and the NC DC.

Below we provide a summary and analysis of the responses received, organised by policy area. It should be noted that the following tables provide the responses received in the 2023 public consultation and focuses on the key issues raised by the respondents.



### Abbreviations

**CDSO:** Closed Distribution System Operator DSO: Distribution System Operator EG CSM: Expert Group criteria for significant modernisation ENTSO-E IGD: ENTSO-E Implementation Guidance Document **EV**: Electric vehicle EVSE: Electric vehicle supply equipment FON: Final Operational Notification FRT: Fault ride through GC ESC: Grid Connection European Stakeholders Committee **ION:** Interim Operational Notification LFSM-UC: Limited Frequency Sensitive Mode -Under frequency for consumption MCS: Mixed Customer Site NC DC: Network Code Demand Connection NC RfG: Network Code Requirements for Generators PGF: Power Generating Facility PGM: Power Generating Module **PPM**: Power Park Module **RES**: Renewable energy sources **RoCoF**: Rate of change of frequency RSO: Relevant System Operator SO GL: Guideline on electricity transmissions system operation SPGM: Synchronous Power Generating Module **TSO:** Transmission System Operator



### 3. REQUIREMENTS FOR PUMP-STORAGE HYDRO PGMS

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	ENTSO-E, Fingrid Oyj, WindEurope,	Article 6(2)(e)	The stakeholders propose the possibility to agree on a different value to be added as the current provision may challenge processes in certain Member States where pumped hydro PGMs are used during the system restoration to stabilise the island with frequency that could go below 49Hz for a limited time. The stakeholders also propose to include the word frequency for the higher value.	Agree	ACER ackn amendment
NC RfG	Terna Spa	Article 6(2)	As regards paragraph 2(e), the stakeholder argues that only pump-storage power-generating modules with fixed speed machines and single shaft ternary machines have problem to remain connected below 49 Hz. As regards paragraphs 2 (f), (g), (h), (j), (k), the stakeholder argues that non-applicable requirements should be verified with the definitive numbering of paragraphs. For pumping operation mode the reference to 17(3) is unclear.	Partly agree	The GC ES power gene propose imp final recomm ACER has u
NC RfG	VGBE	Article 6(2)	The stakeholder argues that in the NC RfG an obligation for synchronous compensation mode is introduced only for Pump Storage Hydro technology, not for any other rotating technology e.g., DFIM Wind Farms or conventional power plants. Since synchronous compensation mode is also a special operation for Pump Storage Power Plants, additional investments e.g., for blade cooling, must be done, even if the mode is not used by the relevant system operator. Therefore, the reference to the synchronous compensation mode is removed from Article 6(2).	Disagree	The GC ES power gene propose imp final recomr
NC RfG	Eurelectric, EDF	Article 6(2)	The stakeholders argue that it seems that there is an inconsistency between point 6(2)(d) and 6(2)(f) regarding pump-storage assets, so it is not clear what to take into account.	Disagree	Article 6(2)( operation m storage pow operation Furthermore storage hyd issues and p line with the
NC RfG	VGBE	Article 13(2)	The stakeholder proposes to add a provision that the rate-of-change-of- frequency withstand capability should respect the safety aspects imposed by the technology of the PGM as agreed between the TSO and the operator of the PGM, because for hydro installations the inertia of the fluids does not allow high values of the RoCoF.	Partly agree	ACER ackn certain tech higher valu introduced generating requirement

### ACER views

owledges the need to amend the current provision. The relevant thas been introduced in the NC RfG.

<u>SC Expert Group study</u> "Requirements for pump-storage hydro ration modules" had been published to clarify the issues and provements. The proposed amendment by ACER is in line with the mendations by the expert group.

updated the references where needed.

SC Expert Group study "Requirements for pump-storage hydro eration modules" had been published to clarify the issues and provements. The proposed amendment by ACER is in line with the mendations by the expert group.

(d) refers to pump-storage power-generating modules in pumping node and concern active power. Article 6(2)(f) refers to pumpwer-generating modules with fixed speed machines in pumping mode and synchronous compensation operation mode. e, the GC ESC Expert Group study "Requirements for pumpdro power generation modules" had been published to clarify the propose improvements. The proposed amendment by ACER is in e final recommendations by the expert group.

nowledges the need to take into account technical limitations of inologies, but also to allow SPGMs that can technically withstand ues of RoCoF to do so. Relevant amendments have been to NC RfG to allow this flexibility. Furthermore, relevant power facility owners may request a derogation from one or several ts of the NC RfG.



#### 4. DETERMINATION OF SIGNIFICANCE OF PGMS

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	EUGINE, EUROPGEN	Recital (9), Article 2(9)	The stakeholders consider that with the existing text, the case of a synchronous machine which can be operated independently from others is left ambiguous – further wording changes are needed, as proposed. The word "individual" is key – it is essential to include wording that clarifies the classification of a synchronous machine should be based on the individual machine capacity where they can be operated independently, not the whole capacity of the installation and not the aggregation of multiple synchronous power generating units.	Disagree	ACER cons European re into accoun
NC RfG	Undisclosed stakeholder	Article 5	The stakeholder considers that the determination of significance of power- generating modules should not depend on voltage level as this does not affect the generator type. Instead, it recommends determining PGMs based solely on their maximum export power capacity or nominal export power in order to cover behind-the-meter assets as most of the time, the generator is connected behind a transformer that will affect the power quality of the system. In addition, the stakeholder suggests simplifying existing rules by setting out only three types of PGMs: A, C, and D, eliminating category B. The stakeholder suggests that Table 1 is amended accordingly in order to reflect the suggested simplification of determination of significance for PGMs.	Partly agree	ACER ackr determination should adent the large PC Removal of subsequent compliance It is importat the maximum or as agreed facility own
NC RfG	VDMA e.V.	Article 5	The stakeholder proposes to fix the limit for maximum capacity threshold from which a PGM is of type B at 0,5MW for Continental Europe and Baltic.	Partly agree	As regards purposeful harmonisa only if com
NC RfG	ENTSO-E, VGBE, Oesterreichs Energie	Article 5	The stakeholders propose the following two modifications of the legal text: 1) the use of park instead of vehicle and 2) the change of the threshold. 1. The maximum capacity for V2G is defined at V2G electrical charging park level and that those are identified as ESM (see comment on definitions) to ensure they comply with the same requirements than PGMs (the introduction of specific/differentiated requirements should not be the default rule). The collection of EVs behind a same connection point that constitute a charging park shall be aggregated when the total capacity of the charging park is above a threshold. 2. With regard to the threshold, ENTSO-E sees the benefits of aligning the requirements of installations above the A/B threshold with SO GL requirements applicable to significant grid users (esp. on data exchanges). For this reason, ENTSO-E believes the threshold of 1MW has to be changed to the A/B threshold defined at national level. Stakeholders propose that it shall be possible to decrease the threshold below which the voltage is not taken into account down to 5 MW regardless of the existing national B/C or C/D thresholds. Another stakeholder proposes to increase the threshold below which the voltage is not taken into account down to 5 MW regardless of the existing national B/C or C/D thresholds. Another stakeholder proposes to increase the threshold below which the voltage is not taken into account down to 5 MW.	Partly agree	1. ACER am for V2G el equipment to determination requirement lead to increa 2. The capa to be type C below whic Nevertheles (1 MW is ke

### ACER views

siders that this should be decided on a case-by-case basis since a egulation cannot capture all local specificities that could be taken nt in the connection agreement.

nowledges the need to modify the voltage criteria for the on of significance. Nevertheless, properly adjusted voltage criteria equately reflect significance of smaller PGMs, while still capturing GMs' impact on the system.

any category of PGMs should be followed by a clear indication of changes to technical requirements and demonstration of rules.

ant that the requirements applied to the PGMs are proportionate to im capacity of the PGM, as specified in the connection agreement d between the relevant system operator and the power-generating er.

s to the determination of significance of type A PGMs, it is I to harmonise the threshold of maximum capacity. However, the ation of banding values would bring the alleged economies of scale, abined with associated full harmonisation of type A requirements.

nendment proposal differentiates the determination of significance lectric vehicles and associated V2G electric vehicle supply below 1 MW. Furthermore, the notion of park is not used for the on of significance as this would bring about non-harmonised ts for mass-produced V2G assets affect cross-border mobility and eased costs for decarbonisation of energy and mobility sectors. acity threshold at which a power-generating module is considered being a state to a power-generating of the threshold at which a power-generating of the threshold at which a power-generating module is considered being a state to a state the determination of the threshold at which a power-generating module is considered being a state to a state threshold at which a power-generating module is considered being a state to a state the determination of the state threshold at which a power-generating module is considered being a state to a state the determination of the state threshold at which a power-generating module is considered being a state to a state the determination of the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state threshold at which a power-generating module is considered by the state to state the state to state the state to state the state to state to state the state to state

C is an important parameter for the determination of the threshold ch voltage is not taken into account and it should be retained. ss, ACER dropped the proposed change to the type A/B threshold ept for all PGMs including V2G assets) – see the next reply.



NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	ENTSO-E, EU DSO, VGBE, CENELEC, undisclosed stakeholder, IFIEC	Article 5	The stakeholders argue that the reduction of upper limit for type A/B from 1 MW to 0,5 MW will have huge impact on retrieving high quality forecast data from Significant Grid Users (SGUs) as required in SOGL, because SGUs are defined in SOGL as B, C and D PGMs of RfG. This would result in significant increase in resources from TSO, DSOs and connected parties for enabling this increase of data exchange. This impact on SOGL should be addressed either in RfG 2.0 or in next version of SOGL. Another stakeholder proposes to introduce a minimum threshold between Type A and Type B at 50kW as the Expert Group Baseline for type A power-generating modules report proposes or 0,1 MW. Also, it is suggested that proposals for maximum capacity thresholds for types B, C and D PGMs shall be formed with the agreement of the RSO. Another stakeholder strongly opposing lowering the threshold for type B to 0,5MW and insists to be maintained at least at the current value of 1MW. It is argued that by lowering this threshold, many assets would fall under new obligations with very important cost implications. Moreover, this could have an important impact on industrial sites connected to the 380/400kV grids, as this could influence the deployment of assets of type B (such as PV and wind). The voltage criteria for new PGMs type B would create additional investments for industrial sites connected at a voltage level in the range 110 kV - 330 kV if the existing transformers HV/MV were not designed in the past according to the imposed voltage requirements.	Partly Agree	ACER und favour of th regime an PGMs. Fu of a minir economie A requirer threshold that the r specified I Concernir
NC RfG	VGBE, COGEN Europe, IFIEC, KCORC	Article 5	One stakeholder proposes to remove voltage criteria at the connection point for all types. Other stakeholders propose to exclude PGMs embedded in the network of industrial sites or in case of Combined Heat and Power facilities, from the voltage level criteria. Another stakeholder considers that the 110 kV criterion needs to be abolished completely, or alternatively proposes to at least establish it as the value of the B/C delineation to avoid that any assets of type A or B would be treated as type D and this because of the important cost implications.	Partly agree	ACER ac determina should ad the large F applied to as specifie system op
NC RfG	National Grid ESO	Article 5	The stakeholder states that this section that relates to the "Determination of Significance" is quite difficult to interpret, and the stakeholder suggests this Article be rewritten to make it clear what a Type A, B, C and D Power Generating Module is.	Disagree	ACER pro provisions Group wh assess a s additional supply eq ACER doe
NC RfG	Gunnar Kaestle	Article 5	The stakeholder proposes to reshape the limits of thresholds between different types that these follow topological boundaries, e.g., the LV/MV substation or the MV/HV substation. The stakeholder emphasises that to clearly differentiate between low voltage units, and maybe medium voltage units from those at higher voltage levels, the voltage level is the most important not the power criterion.	Partly agree	ACER ac determinat should ad the large F
NC RfG	Solar Power Europe, Bundesverband Solarwirtschaft e.V.	Article 5	The stakeholders consider that Continental Europe harmonisation is crucial for a cost-effective energy transition, especially regarding mass-market products. Therefore, a harmonised type A/B threshold is proposed. As the effort is increasing rapidly, and the market segment is very sensitive to the time a project takes, this limit is proposed to be 500kW. As an alternative, in case the fixed limit of 500kW is not acceptable, adding at least a lower limit of 300kW is proposed, resulting in a range of 300 – 500kW for the type A/B threshold to be defined on the national level. For the sake of requirements in mass-market products and limitation of site-specific notification efforts, one stakeholder proposes changes to Table 1 to introduce a lower limit of 300 kW for the threshold be proposed, resulting in a range of 100 - 500 kW for the Type A/B threshold to be defined on national level.	Partly agree	As regard purposefu harmonisa only if con Determina already ou of requirer objectives and related be consid necessaril unless so

derstands that there are certain aspects that do not advocate in the reduction of the type A/B threshold, as more onerous compliance and data exchange requirements would apply to higher number of arthermore, the harmonisation of banding values or the introduction mum threshold between types A and B would bring the alleged as of scale only if combined with associated full harmonisation of type ments. Therefore, ACER has reconsidered the reduction of A/B and reverted to the previous limit of 1 MW. In addition, ACER notes maximum capacity thresholds according to Article 5(2)(b) are by each relevant TSO.

ng the voltage criteria see the replies above and below.

knowledges the need to modify the voltage criteria for the tition of significance. Nevertheless, properly adjusted voltage criteria lequately reflect significance of smaller PGMs, while still capturing PGMs' impact on the system. It is important that the requirements the PGMs are proportionate to the maximum capacity of the PGM, ed in the connection agreement or as agreed between the relevant perator and the power-generating facility owner.

posal on the determination of significance builds upon the current s of NC RfG and the proposal by the Mixed Customer Sites Expert tich was formed within the European Stakeholder Committee to solution to the issue of determination of significance. Furthermore, types for V2G electric vehicles and associated V2G electric vehicle uipment below 1 MW maximum capacity have been introduced. es not consider the need to rewrite this article.

knowledges the need to modify the voltage criteria for the tion of significance. Nevertheless, properly adjusted voltage criteria equately reflect significance of smaller PGMs, while still capturing PGMs' impact on the system.

ds to the determination of significance of type A PGMs, it is all to harmonise the threshold of maximum capacity. However, the ation of banding values would bring the alleged economies of scale mbined with associated full harmonisation of type A requirements. ation of significance should be carried out for all PGMs, however, as attlined in ACER Policy Paper, ACER believes that a harmonisation ments applicable to EVs is necessary in order to enable climate s. Nevertheless, modalities of both EVs (V2G and V1G technology) d charging infrastructure (including that of charging parks) need to lered. In addition, capacities of units of different classes should not ly be aggregated for the purpose of the determination of significance agreed between the RSO and the PGM owner.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Terna Spa	Article 5	The TSO fully supports the ACER proposal not to harmonise the banding value among type A/B PGMs. Indeed, <i>ceteris paribus</i> , a simple harmonisation to an higher threshold would negatively affect those TSOs, that currently apply a lower band among type A/B PGMs because of specific system needs. However, if strongly requested by many stakeholders, a certain harmonisation of the threshold (up to not more than 100 kW) might be acceptable if accompanied by the extension of some requirements, currently applied to Type B PGMs, also to Type A PGMs. Particularly, in this case, type A PGMs should satisfy at least the following additional requirements (to be added or confirmed compared to the version under consultation): - FRT mandatory for PPMs an EVs with Uret for EVs and type A 0,05 (in Article 13a for EV and Y.4 for PPM); - Voltage control system and reactive power capability; - The power-generating module shall be equipped with a communication interface.	Partly Agree	ACER un favour of complian number o introducti alleged e harmonis the reduct
NC RfG	EDP, CEZ, Eurelectric, Enel Group	Article 5(2), Article 5(3), Article 5(4)	Stakeholders suggest that in point (b) the proposals for defining thresholds between types of power-generating modules shall be subject to approval by the relevant regulatory authority or, where applicable, the Member State. In developing the proposals, the TSO shall coordinate with relevant DSOs and conduct a public consultation. One stakeholder proposes that in accordance with Article 10 Relevant System Operators and relevant TSOs shall carry out a public consultation, in coordinated manner among them, including also competent authorities of each Member State and taking into account the views of the stakeholders.	Partly agree	The proce 5, accord coordinat consultati relevant re
NC RfG	Better Energy	Article 5	The stakeholder commented that in Table 1, Type C, Continental Europe: For technical requirements it could easily be 0,5 MW or lower, but the compliance documentation requirements for Type A, should be increased up to 1 MW. The stakeholder did not introduce a proposal for the amendment of this article.	Disagree	For consist the type th
NC RfG	Undisclosed stakeholder	Article 5(6)	The stakeholder suggests that it should be made clear that the EVSE is subject to certification, not the EV inverter.	Agree	Relevant
NC RfG	EDF	Article 5	The stakeholder considers that ACER's proposal regarding the thresholds between categories is quite adequate. However, it is suggested 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%. 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. On the specific topic of EV and EVSE, the stakeholder suggests the following modifications: As regards paragraph 1 which serves as an introduction for the rest of the article, should 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). As regards EV3 in paragraph 6, requirements comparable to category B ones will be applied. 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, the stakeholder suggests that it should be clear that the requirements applicable to each individual EV and associated supply equipment should 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. The stakeholder proposes modifications to avoid any doubt as to the application of this principle.	Partly agree	ACER doe for each th the comple beyond wh Paragraph electric veh 1 MW max these tech the determ V2G electr

nderstands that there are certain aspects that do not advocate in of the reduction of the type A/B threshold, as more onerous nee regime and data exchange requirements would apply to higher of PGMs. Furthermore, the harmonisation of banding values or the tion of a minimum threshold between types A and B would bring the economies of scale only if combined with associated full sation of type A requirements. Therefore, ACER has reconsidered ction of A/B threshold and reverted to the previous limit of 1 MW.

redure is already provided in paragraphs 3 and 4 of the same Article rding to which, in forming proposals, the relevant TSO shall ate with adjacent TSOs and DSOs and shall conduct a public tion. Moreover, such a proposal shall be subject to approval by the regulatory authority or, where applicable, the Member State.

istency reasons, the demonstration of compliance should follow hresholds according to the determination of significance.

amendments have been introduced in the NC RfG.

es not consider to be appropriate to introduce a percentage range nreshold for the determination of significance. This would increase exity and reduce clarity and in the end, there will still be a strict limit hich a PGM will be determined as a higher type.

n 1 of Article 5 refers to paragraph 2. According to paragraph 2 V2G chicles and associated V2G electric vehicle supply equipment below kimum capacity are excluded. The determination of significance of anologies is provided in paragraph 6. ACER proposal differentiates mination of significance for V2G electric vehicles and associated ric vehicle supply equipment below 1 MW, from other PGMs.



NC RfG	RWE AG, Solar Power Europe, E.ON, Bundesverband Solarwirtschaft e.V., Fingrid Oyj, Iberdrola, ENTSO-E, EU DSO, Terna SpA, CENELEC, Oesterreichs Energie, VDE FNN, ACCIONA, AEE, undisclosed stakeholder, VGBE, WindEurope, Danish Energy Agency, National Grid ESO, WindEurope, Eurelectric, RES Group, EDF, Enel Group, Iberdrola, Enercon, Undisclosed stakeholder, Better Energy, EDP, E- REDES, Swedenergy	Recital (9), Article 2(16), Article 2(17), Article 2(67), Article 5(1)	<ul> <li>hybrid installations / mixed customer sites (e.g., PV /Storage / PVWind). For these applications, it is important to allow them to be controlled and operated as one system, e.g., to optimise plant operation or keep a maximum power infeed limit. The suggested change will enable that other electrical equipment, such as capacitor banks and power electronics can be used to fulfil the requirements in the NC RIG (including on the communication which may be used for balancing services). Some stakeholders suggest completely removing the part of the recidal concerning differentiation of classes, in order to ensure consistencies in the current operation of the Member States.</li> <li>Some stakeholders argue that all non-synchronous power generating units should be aggregated into a single PPM behind a single connection point. The word 'solely' needs to be deleted. Otherwise, it will not be possible to use the capabilities of energy storage and other electrical equipment across more power generating modules.</li> <li>PV inverters will very likely be used to deliver reactive power for power generating modules with another underlying technologies in hybrid plants. If energy storages are used for other purposes e.g., providing system services, they will still need to fulfil the requirements of the NC RIG. It is crucial to allow use of the flexibility in hybrid installations / Mixed customer sites (e.g., PV /Storage P/Wind). For these applications, it is important to allow them to utilise synergies between different underlying technologies.</li> <li>One stakeholder proposes that the significance of power-generating modules be based on their agreed maximum continuous export capacity at the point of connection, and makes a proposal to aggregate capacities of units of same underlying technology only for type A PGMs; allow only electricity storage integrated to a power-generating module of Type A.</li> <li>2. Some stakeholder generally agrees with the clarification regarding electricity storage integrates that thick into</li></ul>	Partly agree	<ol> <li>While aggregative ensure the necessary ACER has properly b sentence the detern separately appropria electricity requiremen from the significan case-spece be the sar RSO's nel</li> <li>While considered in the conne implemen</li> <li>As mer cover the significan as the sys</li> <li>ACER agr delivering capacities significan or type 3 of falling into requiremen help harm</li> <li>Recital (9) significan aggregatio PGFs.</li> <li>Recital (9) significan aggregation PGFs.</li> </ol>
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the text added in recital (9) aimed at addressing the on/bundling capacities of units of same underlying technologies to e harmonisation or rules for mass-market products, it was also to allow for hybridisation of power generating facilities. Therefore, amended recital (9) to ensure that these kinds of installations can be addressed. Nevertheless, the use of the word 'solely' in the last of the concerned paragraph, is to exclude electricity storage from mination of significance of the PGM which may be operated in a site connecting more than one PGM. This is deemed te since any other use of electricity storage is not precluded. If such storage has a dual use, i.e., to allow the PGM to meet the ents of the NC RfG and also being able to operate independently PGM, then for example its capacity should count towards the ice of the PGM or be defined in the connection agreement on a cific basis, as appropriate. Furthermore, PGM requirements should me irrespective of whether a plant is connected to a MCS or to the twork.

ACER understands that site specific grid export limitations are ed during the connection process and adequately taken into account inection agreement, ACER does not consider the proposed wording able, as it could lead to trade-offs on the expense of system security. Ing provision of Article 7(8) concerning the dispute resolution during ection process, is in ACER's view sufficient to address any potential tation issue.

ntioned under point 1. above, ACER amended recital (9) to also hybrid power plants. Nevertheless, it is necessary that any new it PGM complies with the applicable connection rules in NC RfG so stem security to be ensured.

agrees that electricity storage may also be used solely for SPGM to with the applicable requirements – appropriate changes have been ecital (9). Nevertheless, ACER does not consider that a meaningful could be included to determine the purpose of the electricity storage ad in the PGM to comply with requirements vs standalone on), as various technical solutions are possible and the site-specific ation is thus needed during the connection process.

rees that aggregation of V2G assets is possible for the purpose of ancillary services but their aggregation (e.g. summing up of different V2G EVs and associated EVSE) for determining their ce, e.g. by the system operator, i.e. to determine their type (type 2 or else) should not take place so as to ensure that the converters o one of the type categories would not be subject to higher type ents (after the aggregation of their capacities). Such approach will nonising requirements for the mass-produced V2G assets.

) as amended allows not only the determination of individual ce depending on each class of PGMs in a PGF, but also an on across different classes of PGMs to facilitate hybridisation of

(9) has been amended as above while the relevant definitions allow ble implementation depending on the site specificities. However, nsiders that the already applicable definition adequately describes n of maximum capacity.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response	
			store electrical energy by different technologies. Addition of provision regarding integrated energy storage. Another stakeholder proposes that the definition of PPM should allow the flexibility to consider generating units of different underlying technology connected to the same point of connection either as independent PPMs or as one PPM. Concerning Article 5(1), one stakeholder proposes to align it with recital (9).	
			One stakeholder suggests including the words <i>'measured at the connection point'</i> to this paragraph as maximum capacity should be understood at the connection point. 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).	
			Another stakeholder commented that it should be clarified that if you have more power park modules, it should be allowed for other types of PPMs and other electrical equipment such as capacitor banks to support one specific PPM to comply with these rules. The stakeholder did not introduce a proposal for amendment of this article.	
			One stakeholder recommends that the definition of maximum capacity is clarified in order to better reflect the purpose of PGMs. Indeed, while the general notion of 'maximum capacity' can be understood as an Energy Capacity (in MWh), it is actually an instantaneous power.	
			One stakeholder proposes to provide that Pmax means 95% of maximum continuous active power, as existing definition drives costs due to very rare operational conditions that may give a high maximum output of a few hours per year.	



### 5. MIXED CUSTOMER SITES

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 6	The stakeholder proposes to insert a new paragraph (8) as follows: "For mixed costumer sites the following applies: (a) the type classification according to table 1 does not refer to the installed capacity, but the maximum feed-in capacity as agreed with the relevant system operator; (b) if the mixed costumer site was taken into operation before the application date of this regulation, the requirements to the power-generating unit may apply at its connection point within the mixed costumer site; (c) there shall be the same requirements for the power-generating module regardless if the relevant DSO or connected to demand-dominated mixed costumer site." The stakeholder considers that it makes sense to limit the infeed capacity and focus on self-consumption. The most important impact parameters of a PGM to the network is related to the maximum infeed capacity to the grid, rather than installed capacity. As regards the proposed paragraph 2(b), the stakeholder considers that especially in medium voltage connected existing demand facilities, a reference point at the PCC often leads to significant additional cost for measuring equipment / reconstruction of the switchgear, etc. Such cost may jeopardise investments into such PGMs. A reference point within the MCS - at least for relatively small plants in relation to the connection point's capacity - is technically feasible. As regards the proposed paragraph (c), the stakeholder considers that the technical requirements with regard to a PGM of the same size should not be different if it is connected to LV may be higher than if it's connected to MV Level within a large demand facility. In practice, today the latter has to fulfil more complex requirements, e.g., due to requirements being related to the connection point at MV level.	Partly agree	PGM require connected to voltage criter capturing the

### ACER views

uirements should be the same irrespective of whether a plant is d to a MCS or to the DSO's network. Furthermore, properly adjusted iteria will adequately reflect significance of smaller PGMs, while still the large PGMs' impact on the system.



### 6. REQUIREMENTS FOR TYPE A PGMS

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	EDF	Article 13(2)	The stakeholder requests a clarification regarding Article 13(2)(b)(iv): 'does it mean that the operator needs to trigger the loss of mains protection with the RoCoF criteria ?' The stakeholder 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. The stakeholder proposes to delete the new requirement in Article 13(2)(d) regarding the 51,5Hz-52,5 Hz frequency range. It is not justified and was initially only created to take into account the new RoCoF profile in the over frequency 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 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. The stakeholder again underlines that the "Unlimited" requirement for the frequency has not stayed for more than one hour in the vicinity of 49Hz. This triggers too many constraints and costs compared to its real relevance.	Disagree	Article 13(2) of mains pr relevant TSG type loss of than the loss performance When a sys transiently of settings. If, of frequency, t stabilise the aggravated the tripping island from E's submiss <u>grid connec</u> Article 13(2 situations of The require of operation provisions, following a frequency ra
NC RfG	EDF	Article 13(3)(g)	The stakeholder proposes to delete this paragraph, as the required use of TOR signals for LFSM-O may result in legal responsibility topics and cybersecurity issues. In case this paragraph is not deleted, the stakeholder 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. Figure XX on the topic of LFSM-O shows an active power increase instead of a decrease. With regard to Article 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.	Partly agree	As regards r Member Sta consideratio RSO shall d Figure XX re this in the fi
NC RfG	Polskie Sieci Elektroenergetyczne (PSE)	Article 13(3)(g)	The stakeholder states that it may be difficult for SPGMs, to meet the requirements specified for LFSM-O dynamics in point 13(3)(g) while ensuring correct, smooth adjustment operation after such an active power setpoint change. From the technical side, active power automation, especially LFSM should operate smoothly, ensuring stable and uninterrupted operation of the PGM. Due to the variety of technologies used and the resulting technical limitations, the stakeholder proposes defining this requirement at the national level. i.e. (g) (i) for synchronous power-generating module: less or equal to value agreed between the relevant TSO, the relevant system operator and the power-generating facility owner.	Disagree	The new regramp-up of a Baseline for GC ESC. Security of s Type A rene of generation
NC RfG	Fingrid Oyj	Article 13(3), Article 15(2)	The stakeholder argues that LFSM-O and LFSM-U shall be independent and stackable meaning that the function works seamlessly with possibly active FSM control and has parameters of its own.	Partly agree	Article 15(2) LFSM-U.

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)(b)(iv) provides that if rate-of-change-of-frequency is used for loss rotection, the relevant system operator, in coordination with the O, shall specify the threshold of this rate-of-change-of-frequencyf mains protection. It is important that protection schemes, other as of mains protection do not jeopardise the frequency-ride-through as this is a requirement.

existem split occurs, frequency in the over frequency island can overshoot before it is stabilised to a value according to the droop during that transient, all generation is tripped due to transient overthe island will black out, even if it would have been possible to e frequency below 51.5 Hz. This system behaviour will be with decreasing system inertia. The proposed modification delays of the generation during the transient and therefore prevents the blacking out. Thus, system resilience is increasing. (see ENTSOsion to <u>ACER's 2022 Public Consultation on the amendments to the ction network codes</u>). ACER considers that the current provision of 2) regarding the 52,5Hz requirement sufficiently covers the of a transient frequency overshoot.

ements defined according to the NC RfG regarding the time period n for the frequency range of 49Hz to 51Hz do not contradict SO GL as the latter are referring to system operation and recovery disturbance. Furthermore, the time period of operation for the range of 49Hz to 51Hz is in line with the European standards.

nuclear safety, according to Article 7(3)(f), when applying NC RfG, ates, competent entities and system operators shall take into ton relevant nuclear safety rules. The TSO in coordination with the define the framework conditions for the use of the LFSM-O function.

efers to the definition of response parameters. ACER has clarified igure.

equirements will enhance system security further considering the renewable generation, as demonstrated by the final report of the r type A power-generating modules Expert Group created by the Such a new approach would significantly contribute to the EU supply level and sustainability, taking into account the ambitious ewable generation development, and reduce the risk of further loss on from these units.

)(d) states that FSM shall apply cumulatively with LFSM-O and



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	ENTSO-E	Article 13	The stakeholder proposes to include the 52,5Hz requirement in the Table 2. In addition, it is proposed to amend the requirement as provided in Article 13(12) so that the voltage levels between 1kV and 110kV shall be specified by the RSO.	Disagree	ACER con requiremen overshoot recommen mass mark
NC RfG	Oesterreichs Energie	Article 13(12)	The stakeholder proposes the voltage threshold to be changed to 1 kV, since this is the usual threshold for LV or MV connection requirements.	Agree	A relevant
NC RfG	VGBE, COGEN Europe, EUGINE, EUROPGEN, EUTurbines, CEZ, Eurelectric, Energie- Nederland	Article 13(2)(d)	The stakeholders argue that a maximum over-frequency of 52,5 Hz is forbidden. The SOGL imposes to respect the frequency ranges of existing PGMs. So, a frequency above 51,5 Hz will never be allowed. One stakeholder (Energie- Nederland) proposes to delete this provision.	Disagree	ACER con requirement the system frequency according tripped du would hav system be proposed and therefor increased on the amount that the cu sufficiently The require of operation provisions following a frequency
NC RfG	VGBE, CENELEC	Article13	Stakeholders propose amendments regarding Type A requirements. These include: proposal that remote operation of PGM is provided if the PGM operator requests, change the lower frequency for autonomous connection to 49,8 Hz, a droop of 1% is not realistic for LFSM-U-ESM (proposed by two stakeholders), to harmonise FRT requirements for type A PGMs.	Partly agree	The NC Rf technical r needs to b LFSM-U-E 1%. Finally economies
NC RfG	COGENEurope	Article 13(3)(b)	The stakeholder proposes that the capability for automatic disconnection and reconnection of power-generating modules of Type A at randomised frequencies should be mandatory.	Disagree	The capal capability
NC RfG	Eurelectric	New article after Article 13(9)	The stakeholder proposes to add a new provision covering requirements for power quality as power quality affects both the consumers, producers and grid components.	Disagree	Power qua it is deeme level and v
NC RfG	EDF	Article 13(11)(e)	The stakeholder suggests that in LFSM-U mode, an electricity storage module should 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 (removing the wording 'vice versa').	Disagree	According modulesh its prior s generation
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Article 13(14)	The stakeholder notes that for FRT in Type APGM, there is a distinction needed, see EN 50549-1, clause 4.5.3 Under-voltage ride through (UVRT).	Partly agree	The FRT re A PPMs is Furthermo derogatior
NC RfG	Bundesverband Solarwirtschaft e.V.	Figure XX.b	The stakeholder suggests that the blue time labels should be corrected as they are inconsistent with the RoCoF / delta f values.	Disagree	The requir of-change
NC RfG	Bundesverband Solarwirtschaft e.V., VDE FNN, Avere- France and ATEE, Renault	Figure YY	The stakeholders note that the value of the droop in the figure is inconsistent with the text.	Agree	The droop directly un

nsiders that the current provision of Article 13 regarding the 52,5Hz nt sufficiently covers the situations of a transient frequency t. Regarding the voltage levels, ACER considers that it is indable to harmonise voltage ranges for type A PGMs as these are ket products.

amendment has been introduced in the NC RfG.

nsiders that the current provision of Article 13 regarding the 52,5Hz ent covers the situations of a transient frequency overshoot based on m needs. When a system split is occurring, frequency in the over risland can transiently overshoot before it is stabilised to a value to the droop settings. If, during that transient, all generation is ue to transient over-frequency, the island will black out, even if it ve been possible to stabilise the frequency below 51.5 Hz. This ehaviour will be aggravated with decreasing system inertia. The modification delays the tripping of the generation during the transient fore prevents the island from blacking out. Thus, system resilience is (see ENTSO-E's submission to <u>ACER's 2022 Public Consultation</u> tendments to the grid connection network codes. ACER considers urrent provision of Article 13(2) regarding the 52,5Hz requirement y covers the situations of a transient frequency overshoot.

rements defined according to the NC RfG regarding the time period on for the frequency range of 49Hz to 51Hz do not contradict SO GL s, as the latter are referring to system operation and recovery a disturbance. Furthermore, the time period of operation for the range of 49Hz to 51Hz is in line with the European standards.

fG provides for technical requirements for connection of PGMs. The requirements are not requested by the facility owners. The PGM be able to connect at frequencies below 49,8 Hz. The droop for SM is provided with a range and can be changed from the default y, full harmonisation of type A requirements would bring the alleged s of scale only if combined with the harmonisation of banding values.

bility specified in Article 13(3)(b) is instead of the mandatory referred to in paragraph (a).

ality is indeed important for the end consumer and user. However, ed appropriate that power quality issues are tackled at the national via appropriate standards.

to Article 13(11)(b) if the frequency recovers the electricity storage all follow the same power-frequency characteristic until it is back to state of active power input/output. Therefore, switching from n to consumption should also be covered.

requirement for type A SPGMs is non-mandatory whereas for type mandatory, taking into account the different levels of penetration. ore, relevant power generating facility owners may request a n from one or several requirements of the NC RfG.

rement for frequency against time profiles is in addition to the ratee-of-frequency (RoCoF) withstand capability.

value has been amended for consistency. Pref is mentioned der the referred figure.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13(2)(d)	The stakeholder proposes to rephrase this paragraph to indicate that a power- generating module shall be capable of remaining connected to the network and secure a limited operability, not including power exchange in case of reasonable technological limitations, as for some technologies, providing the proposed dynamics is limited. In the stakeholder's view, it should be possible to respect those limitations. The stakeholder considers that the modules can stay connected but cannot guarantee a power exchange at this frequency range, as the protection of the facility/module should prevail.	Disagree	ACER con requiremer overshoot
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13(3)(g), Article 13(3)(h)	The stakeholder proposes to delete part of this paragraph and define, under (g)(ii), between 0.7 and 2 seconds for an active power setpoint change of 50% maximum power. The stakeholder considers that the relevant TSO could require the response time to be less than one second, which is not feasible for some technologies of electricity storage modules today (which will fall under this provision). Therefore, the stakeholder argues that it needs to be clarified that the response time cannot be set to less than half a second for electricity storage modules, alternatively via an exception for electricity storage modules of specific types. Additionally, the stakeholder commented that the requirements should not be established by the relevant TSO but by the relevant European entities to ensure a Single Market at least for type A power park modules. As regards the second subparagraph of Article 13(3)(h), the stakeholder suggests deleting the possibility for the TSO to define a different characteristic as they argue that it does not seem clear what the technical rationale behind it is and that, without further reasoning, the complexity should not be increased.	Partly agree	According possible. F to the requ technically The requir area in coo minimal im a different
NC RfG	E.ON	Article 13(3)(g)	The stakeholder considers that the DSO with the relevant TSO shall define the framework condition for the use of this function.	Disagree	ACER con should be
NC RfG	Swedenergy	Article 13(3)(c)	The stakeholder notes that $\Delta f1$ in Table X is not including range of delta F1 means all connected plants in the same synchronous area will act at the same time. It was also argued that the effect of the system perspective of this change from a range-value to a fixed set value for $\Delta f1$ must be taken into account.	Partly agree	The capab relevant T disconnec randomise threshold.
NC RfG	Swedenergy	Article 13(3)(g), Article 15(2)(c)(ii)	The stakeholder argues that an external signal to change active power mode in real-time is not allowed for type D PGM such as for examples nuclear power plants due to security reasons, which needs to be clarified. To block the LFSM-O function could be done by the plant after agreement with TSO (but not from an external real-time signal).	Partly agree	According competent nuclear sat framework
NC RfG	Undisclosed stakeholder	Article 13(2)	The stakeholder proposes to introduce in Table 2: 49 Hz-49,5 Hz: To be specified by each TSO, but not less than 5 hours 49,5 Hz-50,5 Hz: Unlimited 50,5 Hz-51 Hz: To be specified by each TSO, but not less than 90 minutes The stakeholder does not understand the justification for a time period for operation "unlimited" in the frequency range 49-51Hz when deviations of more than 200 mHz are very rare and brief: such exceptional deviations are either corrected fairly quickly with exceptional corrective measures, or in the worst case, can lead to a blackout quickly if the measures have not made it possible to stop the drop in frequency or restore the frequency. The stakeholder considers that under no circumstances will the system be able to remain for a long period in the extremities of the 49-51 Hz frequency range. To avoid disproportionate requirements for PGMs and to ensure that network code requirements are aligned with network needs, the stakeholder suggests introducing non-unlimited time periods for exceptional deviations of more than 500 mHz, periods that can be specified at the national level.	Disagree	The NC Rf the SO GL the Europe
NC RfG	AEE	Article 13(3)	The stakeholder considers that figure XX should be clearer. The Y axis should mention " $\Delta P$ " instead of "value" and the initial value should be 0% of $\Delta P$ . The initial time should be also referred to a step in frequency.	Disagree	ACER cor

siders that the current provision of Article 13 regarding the 52,5Hz nt, sufficiently covers the situations of a transient frequency

to Article 13(3)(g), the response time shall be as fast as technically Furthermore, the response time of the PGM should be less or equal uired provision. Therefore, faster response times may be used if y feasible. The provision also covers the option for slower response. rements should be determined by the relevant TSO for its control ordination with the TSOs of the same synchronous area to ensure apacts on neighbouring areas. The flexibility for the TSOs to define characteristic, based on their needs, should be retained.

nsiders that the TSO is responsible for the frequency and therefore mainly responsible for this function.

bility, referred to in Article 13(3)(b), is also included so that the rSO may choose to allow within its control area automatic ction and reconnection of power-generating modules of type A at ad frequencies, ideally uniformly distributed, above a frequency

to Article 7(3)(f), when applying the NC RfG, Member States, tentities and system operators shall take into consideration relevant fety rules. The TSO in coordination with the RSO shall define the conditions for the use of the LFSM-O function.

fG defines capabilities for the robustness of the system, whereas defines targets for operation. The frequency ranges are in line with ean standards.

siders that the figure is adequately described in Article 13(3)(g).



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Article 13(3)	The stakeholder commented that the requirement contained in paragraph (g) is, for the very small units of type A, an unproportional hardship, as the costs of a reliable communication interface per active power to be influenced is very high. In contrast to the requirement of a "logic interface (input port) according to the current Article 13(6), which can be legally also fulfilled by the existing overvoltage protection in the PGM combined with the voltage regulator at on-line tap changer for use in emergencies, a dedicated extra communication channel is needed. The stakeholder suggests that this requirement should only apply to larger PGMs of type B and above, and that an exemption to this requirement is added for micro CHP (up to 50 kW, see EED) and other rotating machinery, and use the same requirement for the response time as for synchronous generators. instead of the capability referred to in paragraph (a), the relevant TSO should allow within its control area automatic disconnection and reconnection of powergenerating modules of type A at randomised frequencies for disconnection, ideally uniformly distributed, above a frequency threshold, and with a randomised time delay for reconnection as determined by the relevant TSO unless it is able to demonstrate to the relevant regulatory authority, and with the cooperation of power-generating facility owners, that this has a limited substantial cross-border impact and jeopardize operational security in all system states.	Disagree	ACER co requireme in Europe It is impo technical support th may reque The capa capability
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13(4)	The stakeholder pointed out that the references to the relevant paragraphs are incorrect.	Agree	ACER rev
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V., Gunnar Kaestle	Article 13(7)	The stakeholders suggest using the term "logic interface (input port)" in Article 13(7) as the currently used logic interface is the more general term and it allows a broader solution space, including simple relays which may be triggered by some kind of digital or analogue communication channel, if the DSO needs to activate this option for remote control.	Disagree	ACER co adequate the interf
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13(7)	The stakeholder suggests replacing "reduce" by "limit" as they consider that this signal specification is ambiguous. Reduce can mean it shall reduce the power by a delta value or a setpoint and what seems to be meant it that the output power is limited. The stakeholder also proposes that ACER should have the right to specify requirements for equipment after consultation with the relevant stakeholders. The stakeholder commented that to establish up a level playing field for all European manufacturers in the Single European Market, one European communication standard should be established. Individual standards by TSOs would lead to extensive market fragmentation. In the US, the adoption of the IEEE 2030.5 communication standard has led to significant harmonisation and consumer benefit.	Disagree	ACER co adequatel the interfa
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V., Enercon	Article 13(8), Article 13(9)	The stakeholders suggest that this synchronising conditions only apply with power generating units, if the generator works as a voltage source with a defined rotating voltage vectors. This is in many cases not implemented as in current sourced converters, asynchronous generators, or CHP engines that are started via the generator. The stakeholder suggests referring to the clauses in EN 50549-1:2019 that deal with synchronisation (clause 4.10) or reuse the described concept of starting power generation there.	Disagree	Paragraph to conneo synchron
NC RfG	WindEurope, Enercon	Article 13(8), Article 13(9)	The stakeholders propose to delete the provision about adjustable observation time as observation time is undefined. Furthermore, "observation time" is not applied in the conditions for automatic connection in Article 13(9).	Disagree	Observation not necess current Im ENTSO-E of change
NC RfG	Bundesverband Solarwirtschaft e.V., Enel Group	Article 13(9)	The stakeholders note that the references to the relevant paragraphs are incorrect.	Agree	ACER rev

onsiders that the current wording adequately describes the ent. More detailed information regarding the interface may be found ean standards and at a national level.

ortant that all generation units at domestic level comply with the requirements as specified in relevant articles of NC RfG in order to the system. Nevertheless, relevant power generating facility owners est a derogation from one or several requirements of the NC RfG. ability specified in Article 13(3)(b) is instead of the mandatory referred to in paragraph (a).

vised all cross-references to ensure that they are correct.

onsiders that the current wording of paragraph 7 of Article 13 ly describes the requirement. More detailed information regarding ace may be found in European standards and at a national level.

onsiders that the current wording of paragraph 7 of Article 13 ly describes the requirement. More detailed information regarding ace may be found in European standards and at a national level.

hs 8 and 9 of Article 13 refer to the technical capability of the PGM ct to the network, providing the connection conditions, including ising conditions.

on time is used in paragraph 9 of Article 13 as default settings. It is sary to define observation time, as the term is already used in the pplementation Guidance Document of ENTSO-E (ENTSO-E IGD) IGD on Autonomous connection/reconnection and admissible rate a of active power.

ised all cross-references to ensure that they are correct.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	AEE	Article 13(8) and (9)	The stakeholder suggests that the words 'taking into consideration the availability of primary resource' should be added, as in the case of PPM, the technical capability to connect to the network depends on the availability of primary resource. The stakeholder adds that the concept "Observation time" should be defined.	Disagree	Paragraph to conne availability consider in the curr admissible
NC RfG	Undisclosed stakeholder	Article 13(11)	The stakeholder notes that compared to the current normative and national requirements, this paragraph proposes a significant change in Tresp time and droop settings. Currently, the minimal value of Tresp=1s for dP=100%Pn is required by the German VDE-ARN 4105 and EN 50549-1. Further decreasing the response time could affect currently available products in the sense that some modifications would be required on the level of a converter. Proposed changes in the default values of droop and the required range of droop settings correspond to the requirements defined in Great Britain's regulation, and it is not aligned with European EN 50549-1 and the requirements of other countries. The mentioned parameters should correspond to the European standard EN 50549-1.	Disagree	The requir ESM is pr
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13(11)	The stakeholder proposes to adjust the droop to be between 1% and 5% as very low droop settings may lead to instability of the grid. Also, the stakeholder adds a sentence to clarify that an increase of the active power setpoint of the ESM shall not influence the active power output of the ESM, as long as the frequency is lower than the frequency threshold. The stakeholder considers that an operational setpoint change of an ESM should be neglected once the frequency threshold is crossed, as long as the frequency returns, this is a difference in relation to FSM.	Partly agree	The droop from the de the LFSM-L power setp
NC RfG	Better Energy	Article 13(11)	The stakeholder suggests introducing additional wording to this sentence to require that Pmax in the grid connection agreement or as agreed between the relevant system operator and the power-generating facility owner is also taken into consideration. The reason for this suggestion is, that if you have consumption and provide storage to this installation and you look at the graph, then you must produce active power. Then the question is that, if an owner has a consumption installation and with this requirement needs to deliver active power into the grid, the owner should then buy a production access to the grid as well. If active power is delivered to the grid more than 5 minutes in one month it is seen as a production unit and power-generating module according to Article 3(2)(b).	Disagree	The NC R electricity s applied to t as specifie the power- irrespective
NC RfG	Bundesverband Solarwirtschaft e.V, VDE FNN.	Article 13(12)	The stakeholders propose a sentence to be inserted in this paragraph to clarify that the actual active power does not necessarily have to be maintained. Also, at least for LV installations at 400V, the stakeholders suggest that it should be clarified, that nominal power does not have to be provided down to 0.85 p.u. voltage.	Disagree	Paragraph actual activ Article.

hs 8 and 9 of Article 13 refer to the technical capability of the PGM ect to the network, providing the connection conditions. The ty of primary resource is an operational issue. ACER does not necessary to define observation time, as the term is already used rent <u>ENTSO-E IGD on Autonomous connection/reconnection and</u> le rate of change of active power.

rement applies to new PGMs. Furthermore, the droop for LFSM-Urovided with a range and can be changed from the default 1%.

o for LFSM-U-ESM is provided with a range and can be changed efault 1%. ACER agrees to clarify, as with the LFSM-O, that when U-ESM mode is active the setpoint will prevail over any other active points.

RfG provides for capabilities for PGMs in order to support the system. ACER considers that it is important that the requirements the PGMs are proportionate to the maximum capacity of the PGM, ed in the connection agreement or as agreed between the RSO and -generating facility owner. PGM requirements should be the same ve of whether a plant is connected to a MCS or to the RSO's network.

12 of Article 13 refers to voltage stability and does not involve ve power behaviour, which is addressed in other provisions of this



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Solar Power Europe	Article 13(3),(7),(10),(11)	The stakeholder states that as regards Article 13(3)(g)(ii), the relevant TSO could require the response time to be less than one second, which is not feasible for electricity storage modules today (which will fall under this provision). Therefore, it needs to be clarified that the response time cannot be set to less than one second for electricity storage modules. Additionally, the requirements should not be established by the relevant TSO but by the relevant European entities to ensure a Single Market at least for type A power park modules. Article 13(7) requirements should only apply to type B power-generating modules or bigger and not to small type A units. type A units are typically found in household level storage systems. The requirements that the TSO can impose will be costly to implement and would pose an unnecessary burden on European consumers. As regards Article 13(10), the stakeholder notes that it is ok to stipulate reactive power capability for type A power power control functions. Those mentioned today just for type C PGMs in Article 21 should become the reactive power control modes already for type A PGM. Voltage control (continuous fast control with fast fault current) may be stipulated as a substitute for grid forming capability for small PPM. Specifying the reactive power is needed in such situations, it should be obtained via the mechanisms of the Directive (EU) 2019/944 as a non-frequency and inefficiencies. If reactive power is needed in such situations, it should be obtained via the mechanisms of the Directive (EU) 2019/944 as a non-frequency and infertice the response time to be less than one second, which is not feasible for electricity storage modules. Additionally, the requirements should not be established by the relevant TSO but by the relevant European entities to ensure a Single Market at least for type A power park in a consumer is needed in such situations, it should be obtained via the mechanisms of the Directive (EU) 2019/944 as a non-frequency and inefficiencies. If reactive	Partly agree	The specific for active po PPMs. This The capabil for type A Po the capabili system user ACER agree modes. This generation. ACER agree technically j
NC RfG	Terna Spa	Article 13(3), Article 13(7)	The stakeholder argues that in LFSM-O, Electricity Storage Module should have the same response time as in LFSM-U which is defined in Article 13.11.e. In paragraph 7, the stakeholder suggests that the TSOs should be involved in the specification of the requirements for equipment to operate remotely a PGM.	Partly agree	According to possible. Fur to the requir technically f requirements operable rem
NC RfG	VDE FNN	Article 13(3), Article 13(7)	The stakeholder argues that there must be a uniform interface for communication in Europe. The DSO with the relevant TSO shall define the framework condition for the use of this function - not the other way around 2nd paragraph (" <i>The</i> <i>relevant TSO may define a different characteristic"</i> ). However: another point that increases the complexity between Member State implementation, especially if storage is integrated into a PPM.	Disagree	The NC RfG to ENTSO-E communicati grid connect "In order to connected of entities and Users, Third The ENTSO- structural date via the follow https://www.e modelcim/Pag Recommende practice on h ETSI X.501 a recommende Energy Grid Draft Report-

ific provisions for LFSM-O adequately describe the response time power decrease in case for increasing frequency for SPGMs and his provision also covers the option for slower response.

ability to cease active power within 5 seconds is currently required A PGMs in NC RfG. ACER proposes this capability be replaced with bility to reduce active power output, as this is to the benefit of the sers and system security.

grees to provide clarity with regard to the reactive power control This requirement could help to increase the penetration of distributed on.

grees that longer response times should be possible in case it is lly justified.

g to Article 13(3)(g), the response time shall be as fast as technically Furthermore, the response time of the PGM should be less or equal quired provision. Therefore, faster response times may be used if ly feasible. The relevant system operators should specify ents for equipment to make this power-generating module facility remotely based on their network needs.

fG could not possibly include every detail. However, one could refer o-E's <u>Implementation Guidance Document</u> on real-time data and cation which serves national implementation for network codes on ection. This document states the following:

to create a seamless, efficient and secure information exchange it is y to apply harmonized standards at various stages, as the number and/or parties is dramatically increased– TSOs, DSOs, RSO, Grid hird party service provider s etc.

SO-E recommended standards to be applied for market related and data exchange of information can be found on ENTSO-E website lowing link:

w.entsoe.eu/major-projects/common-information-Pages/default.aspx

endations on applicable standards for information security and best on handling confidential information can be found in the IEC 62351, 01 as well as the ISO27000 standard series. The global best practice inded to be applied can be found in the following report: Smart arid – Coordination Group Cyber Security & Privacy, SEG-CG/CSPport-V07.pdf



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VDE FNN	Article Y(1)	The stakeholder argues that PPM cannot detect whether the voltage drop is caused by a disturbance in distribution network (to which most of the PPMs are connected to) or in the overlaying transmission network. The stakeholder proposes the following: ' <i>The power park module shall be capable of staying connected to the network and continuing to operate stably after the power system has been disturbed by faults according to a voltage against-time-profile in line with Figure 3 at the connection point and with the set points in Tables X.2.1 and X.2.2</i> '.	Disagree	Fault ride ti transmissio

through is a requirement in relation to secured faults on the on system only.



### 7. SIGNIFICANT MODERNISATION

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	ENTSO-E	Article 4a	The stakeholder notes that reference to 'successive modernisation' may introduce potential difficulties because it is not clear what is the baseline for these successive modernisations steps, and it should be removed. Therefore, the stakeholder recommends using the ENTSO-E proposal with regard to significant modernisation (which is based on the EG report).	Disagree	ACER's pr decision (v requiremen successive characteris requiremen existing co
NC RfG and NC DC	ENTSO-E, EU DSO, COGEN Europe, EUTurbines, WindEurope,lberdrola, ACCIONA, EUROPGEN, Solar Power Europe, Iberdrola, ACCIONA	Article 4, Article 4a	The stakeholders suggest that where parts are added or replaced for an existing PGM or transmission connected demand or distribution facilities those new parts should be compliant with the requirements of the GC NCs, not limiting the eventual compliance of the PGM if compliance with the GC NCs is required in the future. Maintenance activities or spare parts are not concerned. One stakeholder proposes that the proposal shall be agreed with relevant DSOs. Proposal to include in the criteria change to the software, modification associated to carbon emission reduction and efficiency improvement and change of components due to aging. Several stakeholders request the removal of the criterion for change in frequency stability and active power management capabilities. Some stakeholders propose to remove the words 'and active power management capabilities' as a change in active power control by blade-pitching or advance PPC function) to allow participation in ancillary services such as secondary frequency control. One stakeholder states that the use of the replacement of a percentage of the equipment comprising that distribution system as a criterion for modernisation is unclear and impractical.	Disagree	The compliance modificatio replacemen modernisa implies the compliance develop pr additional modernisa generating power cape which affect the roles o <u>report</u> . Also, regar CSM final modernisa paragraph of the NC module or
NC RfG	CENELEC, EUTurbines	Article 4a	The stakeholders argue that according to the provision of paragraph 3, an existing PV plant needs to be updated to the new RfG requirements if, at the same point of connection, a second PV Plant is connected. As all PV plants at one connection point are seen as one PPM this second PV plant would not be considered as a separate PPM, but it would be considered as a significant modernisation of a one PPM resulting in the need to update the existing plant.	Disagree	Article 4a ir and not ind the TSO's p apply to th modernise
NC RfG and NC DC	Finnish Energy	Article 4a	The stakeholder notes that there are risks of widely varying implementations between Member States and care should be taken that every Member State acts in a same way, to achieve better consistency in the EU area.	Partly agree	ACER ack States. Ho principles It should b significanc significant principles.

### ACER views

roposal suggests that each Member State elaborates in a single which could be the same as the one regarding the other nts of general application) the criteria for significant (including e) modernisation based on the general criteria (electrical stics, ranges of modification) defined in the NC RfG as well as the nts of the GC NCs that should apply, as well as whether the ponnection agreement needs to be revised or replaced.

liance of new parts should be required so as not to prevent e with the GC NCs in the event of subsequent additional ons. If the addition, as requested by several stakeholders, / nt of a part / component does not trigger a significant ation criterion and if the compliance of the new part /component e need to retrofit other parts of the PGM / demand facility, the e of this new part should not be required. In addition, TSOs shall roposals for defining significant modernisation and can propose criteria. According to the Expert Group Criteria for significant ation (EG CSM) the key electrical characteristics of power g modules are the maximum capacity of the module, its reactive ability and Its inertia, or other appropriate intrinsic characteristic cts its stability. Furthermore, ACER proposal sufficiently describes of the TSOs and the DSO(s) and it is based on the <u>EG CSM final</u>

rding the active power management, which is based on the EG report, Article 4a includes provisions for defining significant ation of PGMs and not individual units. However, according to (3) of Article 4a, the TSO's proposal shall specify the requirements RfG that shall apply to the entire modernised power-generating only to the modernised part of the power-generating module.

ncludes provisions for defining significant modernisation of PGMs dividual units. However, according to paragraph (3) of Article 4a proposal shall specify the requirements of the NC RfG that shall he entire modernised power-generating module or only to the ed part of the power-generating module.

knowledges that the implementation can vary among Member owever, at the same time, the proportionality and subsidiarity need to be observed.

be noted that the banding values (thresholds for determining the ce of the PGMs), affecting the implementation of the provisions on modernisation, are set at the Member State's level due to these



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VGBE, EUROPGEN, Fingrid Oyj, EU DSO, Enel Group, BDEW, EDF, Bundesverband Solarwirtschaft e.V., RES Group, Solar Power Europe, Iberdrola, ACCIONA, Swedenergy	Article 4a(2)(b)	<ul> <li>One stakeholder proposes that the range for a deviation from the reactive power capability of the PGM should be 5-30%. Two stakeholders propose a range of 5-20%. Some stakeholders suggest that the range should be proposed by the TSO. One stakeholder proposes to delete this paragraph altogether.</li> <li>As regards reactive power, a few stakeholders propose a minimal high value (at least 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.</li> <li>One stakeholder proposes an increase of the reactive power capabilities should be a criterion for significant modernisation and a minimum percentage to be defined in the range 10-20 %.</li> <li>A few stakeholders proposes "20% or above".</li> <li>One stakeholder proposes X be significantly larger than zero.</li> </ul>	Partly agree	As no unifi prescribing power capa range 10-2 It should b to paragra requiremen generating module.
NC RfG and NC DC	National Grid ESO	Article 4(a) RfG Article 4(a) DC	As regards the NC RfG, the stakeholder argues that there are now new criteria related to "Significant Modernisation". Some of these criteria are quite strict, for example a change of components / assets of a power generating module apart from maintenance and repair activities and spare parts. In theory a plant failure may require a new part, but the new part may not be identical to the failed component. It is suggested this is reviewed as, potentially, an existing plant could make a relatively small change which would then be caught by the requirements of RfG 2.0. This could have the unintended consequence of making that plant uneconomic hence resulting in premature closure. As regards the NC DC, the stakeholder argues that there are now new criteria related to "Significant Modernisation". Some of these criteria are quite strict. It is suggested this is reviewed as, potentially, an existing demand user through a relatively small change could be caught by the requirements of DCC 2.0. This could have the unintended consequence of making that plant uneconomic hence resulting in premature closure.	Disagree	As provide scope of m

form solutions were provided by stakeholders, ACER agrees on g the proposed minimum percentage of a deviation from the reactive bability leading to a "significant modernisation" be chosen from the 20 %.

be noted that, regarding the reactive power capabilities, according aph (3) of Article 4a, TSOs shall specify in their proposal the nts of the NC RfG that shall apply to the entire modernised powerg module or only to the modernised part of the power-generating

ed in Article 4(a)(2)(d), maintenance and repair activities are out of nodernisation.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Solar Power Europe, Iberdrola, ACCIONA	Article 4a	The stakeholders suggest that to install external compensation solutions (e.g., a STATCOM at the PPM substation) to allow or enhance participation of a PPM in ancillary services such as voltage control. Stakeholders propose, in 4a (2), to delete the sentence "In the proposal, TSO can propose additional criteria defining a significant modernisation", and in 4a(3) add in the end: " <i>In case of PPMs the requirements of this Regulation shall only apply to the modernised or new part of the PPM</i> . As regards paragraph (3), the stakeholders mention that there should be a balance between the cost and the benefit of a need to fulfil the new requirements as a whole, especially when they originate in the Member States grid codes rather than in the NC RfG (e.g., the need to comply with new safety regulations of the switchgear, just because the PGM has more reactive power capability). In any case the new requirements shall be specific to the modernized or new or additional part of the plant. Especially when talking about PPMs: e.g. An existing PPM of 100kW (PV designed according to the existing NC RfG). At the same connection point a new 100kW PV system shall be added. With the NC RfG definitions this would be a 200kW PPM and depending on the TSO it can be defined that the old and the new part of the system must fulfil the new requirements. In such a scenario the new part would just not being built, because of the high costs of exchanging all existing inverters. The stakeholders consider that the existing, old PPMs when subject to modernisation need to comply with the new requirements (e.g., being grid-forming capable, RoCoF), PPM owners will regrettably discard participating in these markets, and TSOs will loss a significant number of potential ancillary service providers already connected in their grids. In addition, deployment of hybrid power plants will be also impacted since a new PPM forming a hybrid installation with an existing PPM.	Disagree	As regards (3) of Artic specify the modernise power-gen not taken i When exte is subject to be underta line with th any case, a proposal s entire mod of the pow
NC RfG	RES Group	Article 4a(2)(d)	The stakeholder proposes that Article 4a(2)(d) should be deleted. Replacement of components/assets should not trigger application of new RfG requirements if the replacement is for the purpose of retaining /restoring the original functions, e.g., replacement of a PV inverter with an identical item or one of substantially equivalent performance.	Disagree	As mentio activities a modernisa
NC RfG	EDP, E-REDES, Enel Group	Article 4a(2)	One stakeholder notes that the replacement of some component as per point (d) appears to be deemed as a "significant or substantial modernization", even if no technical or other relevant metric changes. The obligation for the PGM to comply with the NC in these cases seems excessive. One stakeholder proposes to modify the text in (d), providing that any intervention, software or hardware in single power generating units, determining a modification of existing capabilities of an existing power generating module. The stakeholders suggest providing that DSOs also can propose additional criteria.	Disagree	It should b criterion, th that shall a the modern activities o significant Furthermon developing
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 4a	The stakeholder proposes the introduction of a new paragraph (d) as there should be a balance between the cost and the benefit of a need to fulfil the new requirements as a whole, especially when they originate in the Member States Grid Code rather than in the RfG (e.g. the need to comply with new safety regulations of the switchgear, just because the PGM has more reactive power capability).	Disagree	It should be between th involved s

s the comment on Article 4a(2), it should be noted that paragraph cle 4a provides that for each criterion, the TSO's proposal shall e requirements of the NC RfG that shall apply to the entire ed power-generating module or only to the modernised part of the nerating module. Also, the maintenance activities or spare parts are into account for the definition of significant modernisation.

ernal compensation solutions are applied to an existing PGM which to significant modernisation, appropriate engineering solutions can aken so that some of the existing PGM's capabilities are brought in ne NC RfG and if relevant for the provision of ancillary services. In as stated above, according to paragraph (3) of Article 4a, the TSO's shall specify the requirements of the NC RfG that shall apply to the dernised power-generating module or only to the modernised part ver-generating module.

oned, according to Article 4(a)(2)(d), maintenance and repair are not taken into account for the definition of significant ation.

be noted that paragraph (3) of Article 4a provides that for each the TSO's proposal shall specify the requirements of the NC RfG apply to the entire modernised power-generating module or only to mised part of the power-generating module. Also, the maintenance or spare parts are not taken into account for the definition of t modernisation.

ore, it is already stated in paragraph 1 of the same Article that in g the proposals, the TSO shall coordinate with relevant DSOs.

be noted that according to Article 7(3)(c), the principle of optimisation he highest overall efficiency and lowest total costs for all parties shall be applied by the relevant TSOs.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	ACCIONA, AEE, Iberdrola	Article 4a(2)(a)	The stakeholders propose the value of '20% or more' to the wording of Article 4a (2)(a) as they consider that the minimum percentage value of 5% is too low and typically would include all minor operational optimisation to improve energy yield and would potentially not result in a significant cross-border impact on frequency and voltage stability. Some Member States have already defined this threshold during the national implementation of Regulation (UE) 2016/631. In Spain, for instance, the percentage of power increase has been defined as more than 20%. Therefore, the threshold defined in this amended NC should be closer to this value and not much lower than this.	Disagree	It should b minimum p Member St (thresholds State's leve while 20%
NC RfG	CEZ, Eurelectric, EDF	Article 4a (new)	A stakeholder proposes Article 4a(2) a to be revised as follows: "an increase above the latest contractual maximum capacity of the power- generating module, whether this increase results from one modernisation or several successive modernisations, of a minimum percentage to be defined in the range 5-20 (newly suggested: 5-30) %" (within this range, different percentages may be defined for different technologies depending on their constraints) The stakeholder considers that additional criteria regarding substantial modification may trigger additional Capex for some projects and thus put undue risk on some investments: - the range 5-20% for power generating modules (and not installations) may prevent some hydro power plants from investing in improvements on one machine in a multi-machine installation (e.g., + 30% on only one machine in a hydro power plant consisting of 5 machines would require compliance with NC RfG v2, even if at the end the Pmax increase would only amount to 30%/5 = 6%). - The stakeholders propose to delete the criterion c) "change in frequency capabilities", if the performances and electrotechnical capabilities for the TSOs are not changed, it should not lead to substantial modification. - A request to provide the exact definition of a component has been made. In this context that the criterion (d) should be deleted, or, at least, define exactly "component/ asset". Also, a suggestion is proposed to exclude current practices from the modernisation procedure as generator rewind, change of control system, the transformer, the governor or the automatic voltage regulator. Furthermore, the stakeholders suggest that a change in the main transformer should also be excluded, a modernisation 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, one stakeholder requests what is taken into account for the initial value for active po	Disagree	<ul> <li>As reg ACER the por</li> <li>As reg paragr to be of level w determ level. In 20% w</li> <li>As reg plants, specify moder the po</li> <li>As reg transfc for insi biomas increas appro- a a regu in the i</li> <li>As reg</li> </ul>

be noted that paragraph 2(a) of Article 4a provides for the exact bercentage is to be defined (from the given range of 5-20%) at tate's level which may also be affected by the banding values is for determining the significance of the PGMs) set at the Member el. In some Member States 5% will be the appropriate threshold will be the appropriate threshold in others.

pards the proposal to consider latest contractual maximum ranges prefers legally sound reference to existing maximum capacity of over-generating module.

gards the minimum percentage ranges, it should be noted that raph 2(a) of Article 4a provides for the exact minimum percentage defined (from the given range of 5-20%) at the Member State's which may also be affected by the banding values (thresholds for nining the significance of the PGMs) set at the Member State's In some Member States 5% will be the appropriate threshold while will be the appropriate threshold in others.

gards frequency capabilities and the comment on hydro power a, according to paragraph (3) of Article 4a, the TSO's proposal shall by the requirements of the NC RfG that shall apply to the entire rnised power-generating module or only to the modernised part of ower-generating module.

gards the exact definition of components and exclusion of the main ormer, a modernisation of the remote control (analogical to digital stance), or a change of primary source of energy (example: coal to lass, or CH4 to other gases, or Gas Oil to HVO/bioliquid, etc) or asing of the height of the dam, ACER disagrees with such an each as these issues are too detailed to be provided at the level of alation as they can be adequately specified, if deemed necessary, national framework according to paragraph (1) of same Article. gards the initial value for active power, as provided in paragraph , existing maximum capacity of the power-generating module (e.g., fined in the connection agreement) is to be taken into account.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response	
NC RfG	EDF	Article 4a (new)	The stakeholder considers that additional criteria regarding substantial modification may trigger additional Capex for some projects and thus put some risk on some investments: As regards the active power criterion for substantial modification, the stakeholder considers that 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 separately, with a total effect lower than 10% seen from the connection point.	Parag shall mode powe not ta impor syste Disagree As to of Arti given by th PGMs the a others
NC RfG	CEZ	Article 4a (new)	The stakeholder argues that the general principle should be that the criteria apply only to the modernised part of the power-generating module, hence Article 4a point 3 should be amended accordingly.	Article and n Disagree the T apply mode
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Article 4a (new)	The stakeholder proposes to modify paragraph (d) and add two new paragraphs as follows: (d) a change of components/assets of a power-generating module or electricity storage module apart from maintenance and repair activities and spare parts, whether or not those parts are purchased new at the time of their incorporation in the power generating module. This exemption also applies for improved components/assets as long as the electric characteristics are not relevantly influenced; (e) a change of components/assets of a power-generating module or electricity storage module apart from modification that provide momentary or time limited increase of power; (f) a change of components/assets of a power generating module or electricity storage module apart from modification that will foster an increase of power associated to an improvement in the efficiency or emission reduction. The stakeholder requests that if in a fuel cell the stack or within and ICE based CHP unit the motor will be changed with a more modern version, if the whole power generating module need to fulfil the then applicable requirements. If it does, that would be a knock-out criterium for the industry. The exchange of components including repair needs to be addressed more clearly.	The p misin level deem same Furth requin parag
NC RfG	ACCIONA, AEE, Iberdrola	Article 4a(2)(d)	The stakeholders propose an addition to Article 4a to clarify what would be considered as the main generating plant. This criterion has been already well defined by some Member States, e.g., Spain. The stakeholders consider that this should be a relevant reference in the NC to achieve some degree of harmonisation.	ACER gener Regul (1) o prosp imple
NC RfG	Swedenergy	Article 4a(2)	The stakeholder considers that it is not clear whether the modernisation is significant when all points (a-d) are fulfilled, or if only one criterion needs to be met. It is also noted that point (d) implies that changing a component that has no RfG-relevance still makes RfG requirements applicable, which is not desirable.	Lt sho met, t (3). C than o shall mode powe

(3) of Article 4a provides that for each criterion, the TSO's proposal sify the requirements of the NC RfG that shall apply to the entire ed power-generating module or only to the modernised part of the nerating module. Also, the maintenance activities or spare parts are into account for the definition of significant modernisation. It is for system stability that the modernised PGM supports the electricity

ninimum percentage ranges, it should be noted that paragraph 2(a) 4a provides for the exact minimum percentage be defined (from the ge of 5-20%) at the Member State's level which may also be affected nding values (thresholds for determining the significance of the at the Member State's level. In some Member States 5% will be priate threshold while 20% will be the appropriate threshold in

includes provisions for defining significant modernisation of PGMs dividual units. However, according to paragraph (3) of Article 4a, proposal shall specify the requirements of the NC RfG that shall the entire modernised power-generating module or only to the ed part of the power-generating module.

osed changes and provisions seem to be unclear and could lead to retation. ACER also disagrees with such a detailed approach at the regulation as the relevant issues can be adequately specified, if ecessary, in the national framework according to paragraph (1) of cle.

ccording to paragraph 3 of Article 4a, any relevant applicable nts to meet significance criteria will be specified by the TSO under n (3).

es not agree with such an approach as any clarifications on main g plant are deemed too detailed to be provided at the level of n and will be addressed in the national framework under paragraph e same Article. Harmonisation can also be achieved via the we Implementation Guidance Document of ENTSO-E or tation monitoring.

be noted that each time a criterion of significant modernisation is espective requirements shall apply, in accordance with paragraph ative requirements, as defined in paragraph (3), apply in case more criterion is met. Also, according to paragraph (3), the TSO's proposal sify the requirements of the NC RfG that shall apply to the entire ed power-generating module or only to the modernised part of the nerating module.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Energie-Nederland	Article 4a(2)	The stakeholder proposes to provide that in paragraph (c) only an increase of the frequency stability shall be a criterium for significant modernisation; and in (d) only component changes that lead to increased capabilities shall be a criterium for significant modernisation.	Disagree	It should be modernisati whether or r regards the <u>report</u> , Articl PGMs and n 4a, the TSO apply to the modernised

be underlined that a PGM may be subject to several successive tions and these need to be assessed cumulatively to determine on the significant modernisation criterion/criteria is/are met. As e active power management, which is based on the <u>EG CSM final</u> cle 4a includes provisions for defining significant modernisation of not individual units. However, according to paragraph (3) of Article D's proposal shall specify the requirements of the NC RfG that shall the entire modernised power-generating module or only to the ed part of the power-generating module.



### 8. REQUIREMENTS FOR STORAGE, ELECTROMOBILITY, HEAT-PUMPS AND POWER-TO-GAS DEMAND UNITS

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	Undisclosed stakeholder	Recital (s2)	The stakeholder proposes to add at the end of the paragraph:"ensure that Electric Vehicles (EVs) can charge at any time (V1G) regardless their V2G capability"	Disagree	The right to NC RfG.
NC RfG	Undisclosed stakeholder	Recital (18)	The stakeholder proposes to remove national choices for fault-ride-through capability.	Disagree	The Membe comitology
NC RfG	Undisclosed stakeholder	Article 2(2)	The stakeholder proposes to remove/replace the word synchronous from the definition of "synchronous area".	Disagree	Synchronou or energy po power syste
NC RfG	Undisclosed stakeholder	Article 2(5)	The stakeholder agrees on the need to set out requirements for storage technologies under the NC RfG, it considers that it should be included in the definition of a power-generating module to take into account related technologies under the NC RfG and set out technical requirements according to their actual application.	Disagree	ACER cons power gene
NC RfG	Undisclosed stakeholder	Article 2 (new definitions)	The stakeholder proposes the introduction of definitions for energy storage, load, generator, and embedded generator not reexporting power.	Disagree	ACER does to reexport to synchror System use changes aft
NC DC	BDEW e.V.	Article 2(1)	The stakeholder proposes that in Article 2 first sentence, reference is made to the definitions laid down in the revised NC RfG which is being developed in parallel to the revised NC DC. Further, in the revised NC RfG (draft) there are three definitions which are not being used in the NC RfG but in the NC DC: • "V1G electric vehicle" • "V1G electric vehicle supply equipment" • "V1G electrical charging park" It should be considered to shift these definitions from NC RfG to NC DC.	Agree	V1G electric have been r electrical ch DC and NC
NC RfG	Undisclosed stakeholder	Article 2(10a), Article 30a and b	The stakeholder suggests that the SED-document should be clarified, especially in relation with type approval for EV3. If intention of SED is to demonstrate the setup of a charging park (consisting of EV3 approved types) it is ok. SED should not include additional requirements for EV3 or charge park. Installation document including details of the EV2. According to the stakeholder, V2G EVSE equipment should be stored and archived after commissioning of the equipment. The owner or operator is responsible for this. It should be avoided that every single charging park owner (Landlord), owner of infrastructure, mostly not related to the Charging Point operator of the facility, should sign. A statement of compliance should be part of an initial Supply Equipment Document (SED) and be validated one-off by means of the certification procedure. It should be avoided that SED's and/or corresponding statements on compliance need to be distributed every single time a EV3 V2G EVSE will be installed.	Disagree	It should be content of d Further, pro additional ty
NC RfG	Energie-Nederland	Article 2(10a)	The stakeholder proposes to add the definitions of EV1, EV2 and EV3.	Disagree	The categor view, the de
NC RfG	Undisclosed stakeholder	Article 2(17)	The stakeholder suggests adding examples for more clarity, e.g., PV inverter, chemical energy storage system, etc.	Disagree	Adding propote

### ACER views

charge V2G EVs in different Member States is out of scope of the

er States requested and approved the national choices during the / leading to the NC RfG v1.0.

ous area is a well-established term in the EU. Interconnected area oower area as alternatives would lead to lack of clarity as all electric rems (apart from Ireland) are interconnected via AC or DC links.

siders that including energy storage modules under the definition of erating modules could lead to lack of clarity.

s not agree with distinguishing the PGMs based on their capability power. This is due to the fact that all significant users connected nous area power network need to contribute to system stability. ers not reexporting power still respond to frequency and voltage fter an incident in the transmission system.

ic vehicles and V1G electric vehicle supply equipment definitions moved to the NC DC as they are not used in the NC RfG. V1G harging park definition has been removed as not used in the NC C RfG.

e noted that the purpose of the definitions is not to specify the locuments, in this case the SED.

ovisions on significant modernisation (Article 4a) apply in case of type EV3 V2G EVSE installations.

risation of EV types is provided in Article 5 of the NC RfG. In ACER efinitions of EV types in Article 2 would be redundant.

posed examples would give rise to uncertainty on the treatment of ples not known at the time of the drafting.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	BDEW e.V.	Article 2(22)	The stakeholder requests to be clarified whether all Modes (Mode 2, Mode 3, Mode 4) are meant. Since Mode 2 is an IC-CPD, which is pluggable and movable, it should not be in the scope of a demand facility owner or CDSO.	Disagree	Modes are DC apply t 5(6) deter categories
NC RfG	ACCIONA, AEE	Article 2(16), (67)	The stakeholders propose an addition to the definition of 'electricity storage module' complementing the proposed language changes for the definitions of Pmax and PPMs in Article 2, paragraphs (16) and (17).	Partly agree	ACER agr generating power-gen definitions (subject to
NC RfG	Undisclosed stakeholder	Article 2(71), Article 2(72)	<ul> <li>The stakeholder suggests that it should be made clear that:</li> <li>1. V1G EVSE equipment function as chargers primary and that primary charging is not impacted at all by the existence of V2G capability of the EVSE or EV.</li> <li>2. V2G EVSE equipment remains the core function of charging an EV, and that V2G will not impact this core feature at all.</li> </ul>	Disagree	The techni defines te following a operationa
NC RfG	Undisclosed stakeholder	Article 3, Article 6	The stakeholder considers that energy storage units which are pure loads, or embedded generators which commit to not re-export power back into the grid, should always be treated as consumption assets only and, therefore, be exempt from technical requirements covering power-generating modules, except for anti- islanding when they interact with electricity networks in order to ensure human safety. This will enhance the market uptake for such assets which can help decarbonizing the electricity grids at scale. The stakeholder considers that paragraph 1 should be further amended to delete the opportunity for refusal by the SOs in case of no-export. Giving such discretion to the SOs will result in disparate treatment across the internal market. There should be a Rule where SOs cannot intervene or refuse the connection of a device in case of a zero nominal export power commitment, and then exceptions to the Rule that allows SO intervention for specific and justified emergencies (there should never be a cost benefit analysis that is poorly defined and does not incorporate decarbonization and environmental objectives). The Rule should not be one in support of intervention. In this way, planning predictability will promote private investment which is necessary to expand the pool of flexible behind-the- meter assets that are needed to support high variable- renewables grids.	Disagree	ACER doe to re-expo to synchro System us changes a The syster comply wit connection network lin of the con system use
NC RfG	EDF	Article 4a (4) (new)	The stakeholder considers that 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.	Disagree	The techr applies to
NC RfG	BDEW	Article 6	The stakeholder considers that there is no need to state that V2G EVs & EVSE must fulfil the NC RfG with respect to electricity consumption. This should be part of the NC DC. The same applies to Article 13a(6)(a).	Disagree	V2G EVs
NC RfG	Undisclosed stakeholder, Avere- France and ATEE	Article 13a(5)	The stakeholders point out to asymmetrical values of Tresp in LFSM-O and LFSM-U. LFSM-U (0.5 s for 1 pu of P max) and LFSM-O (2 s for 50 % of P max).	Disagree	The value such a wa
NC RfG	Avere-France and ATEE, Renault	Recital (9)	In order to avoid any confusion in the case of multiple connections of electric vehicle supply equipment to the same grid's connection point, the stakeholder proposes to add at the end of Recital (9) a sentence: "For clarification, the requirements are applied to both the electric vehicle and the associated electric vehicle supply equipment, not to the grid's connection point."	Disagree	There is r that "Requ and asso exhaustive EV3 V2G equipment
NC RfG	Undisclosed stakeholder	Article 13(3)(e)	The stakeholder considers that if notifications are in place, a PGM should be able to notify a delay in start of active power decrease.	Disagree	ACER ac decrease is a desig required.

e out of scope of the NC DC. The requirements as set out in the NC to V1G EVs and V1G EVSEs as per the defined categories in Article rmining their significance. Concrete requirements for different s take into account their capabilities.

rees that if the electricity storage is fully integrated to a powerg module its capacity should not necessarily count towards the nerating module capacity. However, this could not be included in the as such examples follow each concrete implementation case the connection agreement).

ical requirements are clearly defined in the NC RfG. The Regulation echnical capabilities in order to provide support to the system a disturbance. It is not the objective of the Regulation to rule on al issues.

es not agree with distinguishing the PGMs based on their capability ort power. This is due to the fact that all significant users connected onous area power network need to contribute to system stability. sers not re-exporting power still respond to frequency and voltage after an incident in the transmission system.

m operator (SO) shall refuse a connection of a PGM that does not ith the requirements of the NC RfG. ACER understands that the n of a PGM within the given connection capacity, taking into account mitations, is always possible. However, such issue is out of scope nnection codes, as they specify technical capabilities of different ers.

ical requirements are clearly defined in the NC RfG. Article 4a all PGMs.

and associated V2G EVSE are within the scope of the NC RfG.

es correspond to those for PPMs which were intentionally set in ay so as that a proper system response is ensured.

no need for such an addition, as Article 5 of the NC RfG clarifies uirements applicable to types EV1 and EV2 V2G electric vehicles ociated V2G electric vehicle supply equipment are set out rely in Article 13a.", as well as: "...requirements applicable to type G electric vehicles and associated V2G electric vehicle supply t are set out exhaustively in Article 14a..."

cknowledges that the requirement on the "start of active power by the power-generating module shall not be intentionally delayed" on parameter and no further interaction with the system operator is



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Undisclosed stakeholder	Article 13(2)(b)(iv)	The stakeholder considers that if the rate-of-change-of-frequency is used for loss of mains protection, the relevant system operator, in coordination with the relevant TSO, shall specify the threshold parameter range and align this with a representation of EVSE OEMs of this rate-of-change-of-frequency-type loss of mains protection.	Disagree	The owner in the conr
NC RfG	E.ON, VDE FNN	Article 13a(12) (new)	<ul> <li>The stakeholders propose to introduce a new paragraph to this article as follows:</li> <li>'Type EV2 electric vehicles and associated V2G electric vehicle supply equipment shall fulfil the following additional requirements in relation to voltage stability:</li> <li>(a) with regard to reactive power capability, the relevant system operator shall have the right to specify the capability of a type EV2 electric vehicles and associated V2G electric vehicles and associated V2G electric vehicle supply equipment to supply and absorb reactive power.'</li> <li>The stakeholders considers that a contribution to voltage stability is also required from the EV2 (in Germany so far from 12 kVA, this was necessary).</li> </ul>	Disagree	Non-exhau to fragmen EVs and E
NC RfG	EDF	Article 13a(1)	As regards paragraph 1(b)(iii), the stakeholder considers that the missing reference should be clarified. As regards Table XY, the stakeholder requests 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.	Disagree	When a sy transiently transient, experienc frequency decreasin load durin Thus, syst <u>ACER's 20</u> network co
NC RfG	EDF, BDEW	Article 13a(2)	One stakeholder (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. As regards EV2, the same stakeholder 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 harmonisation effort pushed by ACER on V2G. In the context where there is no standardised 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 is associated smart dis/charging platform to transmit the system operators 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 standardised solution at European level. The proposed wording allows the two previous options while respecting the key need about harmonisation. The other stakeholder (BDEW) considers that the technology must be open in this case, whether EVSE or EV be equipped with a cyber-protected data exchange interface.	Partly agree	ACER agr the best w standardis paragraph has been i

r of the prospective new PGM may invite EVSE OEM to participate nection process.

ustive requirement on EVs and EVSEs at the EU level would lead tation of the otherwise harmonised rules on mass-produced V2G EVSEs, creating a barrier for the cross-border movement of EVs.

ystem split is occurring, frequency in the over frequency island can y overshoot before it is stabilised at a lower value. If, during that all load is tripped due to transient over-frequency, the island will ce a blackout, even if it would have been possible to stabilise the y below 51.5 Hz. This system behaviour will be aggravated with ng system inertia. The proposed modification delays the tripping of ng the transient and therefore prevents the island from blacking out stem resilience is increasing. (see also ENTSO-E's submission to to 22 Public Consultation on the amendments to the grid connection codes).

rees that the technology openness needs to be ensured and that way to deliver on the relevant data exchange provisions is via the sation. The relevant amendments have been introduced in the h (2). Further, a generally applicable provision on cyber protection introduced in paragraph 3 of Article 7 of the NC RfG.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EDF	Article 13a(3)	The stakeholder 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. The stakeholder's concern is to avoid any additional delay for the customer between the EV-EVSE connection and the charging process. The stakeholder 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.	Disagree	The minim to the netv ongoing f
NC RfG	EDF	Article 13a(4)	The stakeholder requests some clarifications regarding the frequency range between 50.2 Hz and 52.5 Hz: More specifically if the EV and the associated EVSE are expected to connect autonomously.	Partly agree	As per p reconnec frequency reconnec have flex
NC RfG	Avere-France and ATEE, Renault, EDF	Article 13a(2), (5)(a) and (d) and (6)	The stakeholders consider that modulation of active power, LFSM-O-EV and LFSM-U-EV are not economically viable for EV1 and should therefore be excluded for EV1 types.	Disagree	The same plants an capacities
NC RfG	BDEW	Article 13a(5)	The stakeholder considers that if the vehicle does neither charge nor discharge, it is in a charging pause. From this state, it also needs more time to activate. For this reason, the stakeholder proposes that the response time, Tresp in Figure XX, should be less or equal to 0,5 s for an active power setpoint change of 1 pu of Pmax excluding the time for switching from consumption to generation or vice versa as well as the time for switching on consumption or generation.	Agree	Relevant 13a of the
NC RfG	Enel Group	Article 13a(5), Article 13a(6)	The stakeholder notes that paragraphs $13(11)(a)(i)$ and $13(11)(a)(i)$ respectively mention a range for the droop for LFSM-U of a storage: $[0,2\%-5\%]$ , and that the TSO sets the threshold for LFSM-U of a storage in a range [49,5 Hz - 49,8Hz]. The stakeholder questions the reasoning behind hy imposing a strict value at 5% and at 49,8 Hz for EV, which it considers should be decided by the TSOs. The same applies to a droop setting in the range [2%-12%] for generators in paragraph 13(3)(d). The stakeholder questions why should a strict value be set	Disagree	The droo so that the the droo dedicated was at 1 9
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 13a(8)	at 5 % for EV, as in its view, this should be decided by the TSOs. The stakeholder proposes to introduce 'Active power may be reduced when voltage decreases' to paragraph 8, as they consider that active power may be reduced, while active current shall not be reduced.	Disagree	A similar
NC RfG	Enel Group	Article 13a(8)	The stakeholder points out that the reference to paragraph 10 for LVRT is incorrect as it must be paragraph 9.	Agree	The inco
NC RfG	Avere-France, ATEE, Renault, EDF	New recital	To avoid a retrofit application of the regulation on existing EVs and EVSE the stakeholder proposes to add a new recital: "This Regulation establishes new requirements for electric vehicles and associated electric vehicle supply equipment that may not be compatible with already existing equipment. Thus, those requirements should not apply to existing equipment at the entry into force of this Regulation."	Disagree	Applicatio is exhaus is addres
NC RfG, NC DC	Avere-France and ATEE, Renault	Article 4a (NC RfG) Article 4a (NC DC)	<ul> <li>The stakeholders propose provisions to be added in Article 4a, to clarify that for the EV and/or its associated EVSE that the following circumstances are not considered as significant modernisation:</li> <li>maintenance and repair activities and spare parts, whether or not those parts are purchased new at the time of their incorporation in the electric vehicle and/or associated electric vehicle supply equipment.</li> <li>Replacement of the existing equipment by identical one.</li> <li>Replacement of the existing equipment by new equipment of same power and compliant with the new Regulation.</li> </ul>	Disagree	The defin EVSE, is DC and it parts.
NC RfG	Avere-France and ATEE, Renault	Articles 13a, 30a, 30b	The stakeholders propose to add a word "new" before the notions of "type EV1 and EV2 V2G electric vehicles" in the article's title and the concerned paragraphs in order to ensure consistency with Article 30a(1).	Disagree	It is clear connectio Chapter

num observation time after which EVs may autonomously connect work is a system requirement to avoid such connections during any frequency excursions after a system disturbance.

baragraph (4)(b), the EV and associated EVSE may only be cted to the network after tripping due to a system disturbance if the y is in the prescribed range (49.8 Hz  $\leq$  f  $\leq$  50.1 Hz). The ction is however not mandatory and the equipment manufacturers ibility to implement it or not.

requirements apply to all other types of PGMs (e.g., solar power d electricity storage modules) of comparably small installed

amendments have been introduced in the paragraph (5) of Article e NC RfG.

p setting for V2G EVs and EVSEs needs to be exhaustively defined e cross-border mobility and harmonisation are achieved. Moreover, p setting at 5% was proposed by several stakeholders during a d <u>ACER public workshop</u> on 17 April 2023 (initial ACER proposal % but it was deemed too stringent and not needed by the system).

requirement applies to PPMs (including ESMs) in Article 13(12).

rrect reference has been amended.

on to existing power-generating modules (including EVs and EVSE) stively provided in Article 4. Moreover, any significant modernisation used in Article 4a.

nition of significant modernisation of any PGM, including EVs and provided in Article 4a (2) of the NC RfG and Article 4a(3) of the NC t excludes already the maintenance and repair activities and spare

It is clear from the title and the content of Chapter 1 that it applies to the connection of new power-generating modules. The procedures set out in this Chapter do not necessarily apply in full to PGMs which are subject to significant modernisation. Also, Articles 13-28 prescribe for PGMs'



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
					capabilitie Further, th RfG unles
NC RfG	Avere-France and ATEE, Renault	Article 13a(2)	As regards EV2, the stakeholders consider that the data exchange interface should be developed under the requirements of the existing and coming international standards and regulations (e.g., IEC 63110).	Disagree	It should "Developm possible, therefore, consequer
					Article 7(4
NC RfG	Avere-France and ATEE, Renault	Article 13a(4)	The stakeholder considers that the minimum observation time of 5 seconds is deemed as not needed and might stem additional delays between the EV-EVSE connection and the charging process.	Disagree	The minin by the stat after a sys the networ
NC RfG	Avere-France and ATEE, Renault, EDF	Article 13a(5)(e)	The stakeholder considers that the 1 pu of Pmax is not clearly defined and the requirement is not understandable.	Agree	Relevanta
NC RfG	VDE FNN	Article 13a(6)	The stakeholder considers that, it needs to be made clear, the wording in text and figure 1X is using generation convention (increase of consumption vs. decrease of generation).	Agree	Relevanta
NC RfG	ENTSO-E	Article 13a(3), (4)	As regards autonomous reconnection of EV1 and EV2, the stakeholder proposes to keep the same settings as in article 13.9. The threshold of 50,1 Hz for Continental Europe would facilitate the restoration process in the initial stages. It would mitigate the significant impact that this autonomous reconnection would have on system operation while maintaining the targeted frequency within normal operation ranges. ENTSO-E considers that a threshold of 50,2 Hz is too high since it is the value for entering in emergency state as per SO - GL.	Agree	Relevanta
NC RfG	ENTSO-E	Article 13a(1)	The stakeholder argues that Table XY regarding frequency ranges should contain the outer boundaries of all the synchronous areas. Hence, it is proposed to increase the duration in order to stay connected within this f-range.	Disagree	ACER cor EVs and network u extreme fr deployed
NC RfG	Verband der Automobilindustrie, Mercedez Benz	Article 13a(1), 13a(5)(d), 13(6)(a-e)	The stakeholder proposes the following to be added to the text: "The specifications mentioned here are not an obstacle for the driver/customer to be able to use the vehicle at any time according to his own needs."	Disagree	The relevant they are n
NC RfG, NC DC	Dr. Ing. h.c. F. Porsche AG	Article 13a(1) of NC RfG Article XX of NC DC	The stakeholder argues that some PLC chips step out below 48.5 Hz. ISO 15118- 20 communication is based on PLC (Powerline Communication). High-level charging is not possible anymore, so no digital data transfer is possible anymore. During certification tests, data for LFSM-U and LFSM-O could not be transferred anymore. However, if data like frequency threshold and droop is already transferred before the frequency drop, function could still work, and certification tests might still be passed. The stakeholder suggests deleting the 47,5 Hz-48,5 Hz range.	Disagree	The frequ stability. T is in the ra
NC RfG and NC DC	ENTSO-E	Article 13a(9), Article Y(1) (RfG) Article XX(5) (DC)	The stakeholder proposes to change the Uret value from 0.15 to 0.05 (pu). Although this value was initially proposed by ENTSO-E for type A PPMs, recent discussions on the minimum threshold of 100 kW for type A/B as well as a recent study from Spain, have shown that this value needs to be 0,05 p.u in order to avoid large scale tripping of EVs and PPMs in case of faults in the transmission grid. The same is proposed for FRT in NC DC.	Agree	Relevanta
NC RfG	Dr. Ing. h.c. F. Porsche AG	Table X.1.1	The stakeholder argues that today's onboard-chargers are able to operate at 0.35 pu. Their proposal is to increase the limits to avoid difficulties in AC charging.	Disagree	The prop capabilitie
NC RfG	ENTSO-E	Article 13a(4)	As regards autonomous reconnection after tripping, the stakeholder proposes to add "Autonomous connection is allowed unless specified otherwise by the relevant system operator in coordination with the relevant TSO"	Disagree	Theprope

es irrespective of whether they are determined as new or existing. he existing PGMs are not subject to the requirements of the NC as so determined in accordance with Articles 4 and 4a.

be noted that Recital (27) has been amended to ensure that nent of non-exhaustive requirements should, to the extent be carried involving European standardisation organisations; permitting the evolution of product standards and, as a nce, the adoption of the same by the industry."

se, the EU standards are considered uniformly for all PGMs in  $\Theta(f)$ .

num observation time before discharging (not charging as claimed keholder) is a system need to avoid adverse frequency excursions stem disturbance (see the notion of "...autonomously reconnect to rk after tripping due to a system disturbance..." in paragraph 4).

amendments have been introduced in the NC RfG.

amendments have been introduced in the NC RfG.

amendments have been introduced in the NC RfG.

nsiders that the proposed time durations for frequency ranges for associated EVSE are sufficient for ensuring robustness of the under extreme frequency deviations. Furthermore, within these equency events other countermeasures should have already been , such as LFDD.

ant provisions concern the frequency withstand capabilities and not intending to clarify the overall usage of the EVs.

ency withstand capabilities are essential to preserve the system The converters used in the V2G EVs shall not trip if the frequency ange 47,5 Hz-48,5 Hz for less than 30 minutes.

amendments have been introduced in the NC RfG.

osed amendments in the NC RfG concern the new converters' es (in the future) and they are not addressing the existing ones.

osed wording already provides for such a solution.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	ENTSO-E	Article 14a	The stakeholder proposes a high voltage ride through requirement for EV3 to ensure that distributed generation and storage, including EV, do not disconnect during high voltage event. It could be based on the same requirement as for PGMs type B.	Agree	ACER ag the robus introduce
NC RfG	ENTSO-E	Article 48(4)(a)	The stakeholder proposes to remove the part "depending on the energy stored" as this is not relevant for this particular article.	Agree	ACER ag been intro
NC DC	ENTSO-E	Article XX	In line with RfG Article 13a.2, the stakeholder proposes to foresee the capability to disconnect all EV (advanced load shedding plan).	Disagree	The provi to load sl disconne
NC RfG	EU DSO, Oesterreichs Energie, Terna	Recital (S2), Article 2, Article 5, Article 13a, Article 14a, Article 30a, Article 30b	The stakeholders propose the categorisation of charging points which contain a bidirectional converter as electricity storage modules (ESM) and the creation of a single category of requirements in the RfG for EVs with on board bidirectional converters, thus splitting EVs into AC V2G and DC V2G. Two stakeholders consider that it is important that V1G/V2G electrical charging parks should fulfil additional requirements (on top of V1G/V2G EVs) or be treated as ESMs (e.g., above certain capacity), similar to other PPMs.	Disagree	ACER co EVs and t Furtherme associate charging of their si electrical
NC RfG	EU DSO	Recital 9, Article 1, Article 2,	The stakeholder proposes to remove the notion of an Electricity Storage Module and only define SPGM and PPM as including Electricity Storage, where it exists.	Disagree	ACER co storagem text to aid
NC RfG	EU DSO, EDP, Eurelectric, E-REDES, Enel Group	Article 13a(3), (4)	It is important to prevent EVs from reconnecting if the network voltages are outside of the allowable range. A voltage range identical to that for Article 13 is proposed.	Agree	ACER ag been intro
NC RfG	EU DSO, Moeller Operating Engineering GmbH	Article 15(2)(c)(iv), Article 15(2)(d)	The wording needs adjusting and citing the instantaneous active power to replace one instance of maximum capacity and maximum consumption capacity in the case of ESM.	Agree	ACER ag been intro
NC RfG	Energie-Nederland	Article 15(2)(c)(v) and Article(2)(d)(i)	The stakeholder proposes that ENTSO-E should choose what is Pref in case of ESMs, the same concerns $2(d)(i)$ . It is argued that those values should not be left to the discretion of the relevant system operators.	Disagree	lt depend
NC DC	EU DSO	Article XX(3)	The stakeholder proposes to add the provision for V1G EVs to have the capability to block active power LFSM-UC mode in real-time.	Disagree	This spec considere
NC DC	EDF	Article XX	The stakeholder suggests that frequency and voltage ranges for the V1G requirements should not be more constraining than the V2G ones. XX.3. it should be noted that LFSM-U requirements risk to apply additional costs to EV and will create undue barriers to the development to e-mobility. In addition, the droop setting of 5% of the whole European EV fleet for a frequency threshold of 49.8 Hz could lead to grid instability. Consequently, the stakeholder considers that this new requirement needs to be duly justified through a cost/benefit analysis at system level. The stakeholder is not convinced about the net social welfare of these types of services and is in favour of eliminating this part and they remain open to any initiative on this field in order to elaborate more detailed and more consensual measures. XX.4. for the same reasons as above, the stakeholder proposes to delete any reference to LFSM-UC mode for heat-pumps. As regards the RoCof withstand capability requirements, no clear technical study has been made yet to see if electrolysers are able to withstand the four given criteria. The stakeholder proposes to remove this requirement. The same considerations should apply for frequency and voltage ranges, as some assets are quite new (e.g., electrolysers) and their behaviour inside the grid is not well known and does not benefit a strong return on experience compared to classical generation assets or even batteries.	Partly agree	ACER ha EVs/EVSE The droo system op These ca contributi disturban Electrolys in the nea thus hav manufacto
NC DC	Dr. Ing. h.c. F. Porsche AG	Article XX(3)(c), (5)(c), Table X.1.1	The stakeholder requests how would the vehicle know, in which country it is located. E.g., for LFSM-UC: Ireland has 49.5 Hz frequency threshold as compared to rest of Europe with 49.8 Hz.	Disagree	In the par different. Ireland (ri

rees with the inclusion of HVRT capability for type EV3 to increase tness during high voltage events. Relevant amendments have been ed in the NC RfG.

rees with the proposed amendment. Relevant amendments have oduced in the NC RfG.

ision for LFSM-UC will already be activated for these devices prior hedding. ACER does not consider that the proposed wording on ection of EVs is adequately justified.

nsiders full harmonisation of all pertaining requirements for both the the EV supply equipment important for these mass market products. ore, it is important that capacities of electric vehicles and ed electric vehicle supply equipment connected to an electrical park should not be aggregated for the purpose of the determination ignificance. However, certain additional requirements apply to the charging park, such as the information exchange.

onsiders important to properly define and include the electricity nodules, as well as, defining their associated capabilities in the legal d clarity.

rees with the proposed amendment. Relevant amendments have oduced in the NC RfG.

rees with the proposed amendment. Relevant amendments have oduced in the NC RfG.

Is on the device itself as to what the Pref is.

cific capability is not included in the NC RfG for V2G EVs as it is not ed to be appropriate (proportional) to be included for V1G EVs.

as aligned the frequency and voltage ranges for the V1G and V2G Es.

p at 5 % was discussed during the dedicated ACER workshop and perators seem to agree with this value.

apabilities are not deemed as services but system needs ing to the system stability shortly after the occurrence of a system ce.

sers, which are planned to reach a significant network penetration ar future, are employing similar converters as for example PPMs ving similar technical capabilities. In discussions with the urers, no issues with compliance have been identified.

In the particular case of Ireland, the capabilities may, to a certain extent, be different. This is due to the presumably low number of EVs originating from Ireland (right-hand-side driving) that will cross the Member States borders. EMC is out of the scope of the NC DC.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			The stakeholder notes that fast and high-power changes may lead to flicker so that electromagnetic compatibility tests may not be passed. Today's onboard-chargers are able to operate at 0.35 pu. The stakeholder proposes to higher the limits to avoid difficulties in AC charging.		The prop capabiliti
NC RfG	VGBE	Article 30a	The stakeholder proposes to add a provision regarding operational notification for EV1.	Partly agree	Article 5 required
NC RfG	CENELEC	Article 13a(2)	The stakeholder proposes to add provisions that a V2G electric vehicle supply equipment shall be capable of smart recharging.	Disagree	The NC F therefore may as w
NC RfG	CENELEC	Article 13a(6)(d)	The stakeholder proposes Article 13(3)(e) be consistent regarding the response time for LFSM-O-EV. Article 13 does not allow any delay in the action of LFSM-O for other PPM.	Partly agree	Article 13 includes
NC RfG	Avere-France and ATEE, Renault	Article 13a(6)(f)	The stakeholders suggest adding the same requirement on switching: "Switching from consumption to generation and vice versa should be as fast as technically feasible".	Agree	Relevant
NC RfG	Avere-France and ATEE, Renault	Article 14a(5)(d)	The stakeholders suggest that the information exchange should be applied on the electrical cabinet and should not impact individual electric vehicle supply equipment of EV charging park.	Partly agree	Accordin park mea network a connecte informatio connecte
NC RfG	EDF	Article14(a)(1), Article14(a)(6)	The stakeholder considers that 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. The stakeholder suggests that it should 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 the stakeholder does not see any drawback to it, it suggests removing the reference to electrical charging parks in Article14a title.	Partly agree	Type EV3 specific p certain si ACER fin bundling applicatio
NC RfG	Finnish Energy	Article 30a	The stakeholder argues that in Finland they do not allow household plug connections of generation. Also, all production equipment must be approved to be connected by the DSO. The process is straightforward if everything is in order and EN 50549-1 is used.	Partly agree	ACER agr connectio assets. No
NC RfG	Avere-France and ATEE, Renault, EDF	Article 30a(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.	Agree	ACER ag Articles 3
NC DC	Avere-France and ATEE, Renault	Article XX(1)(b)	As for the V2G requirements, the stakeholder considers that the frequency and voltage ranges should be harmonised for V1G on the European level and should not be dependent on the national regulations. Moreover, the V1G requirements should not be more restricted than the V2G ones. For these reasons, they propose to copy paste here the relative paragraphs of the Article 13a from the NC RfG.	Agree	The corre
NC DC	Avere-France and ATEE, Renault	Article XX(3)	As regards LFSM-UC on V1G electric vehicles and associated V1G electric vehicle supply equipment, the stakeholders argue that the V1G electric vehicle supply equipment are not capable to measure the frequency and adapt their consumption. Such requirements risk creating additional costs to EVSE and could create barriers to the development to e-mobility. Moreover, they are not convinced about the net social welfare of these types of services. Therefore, they suggest eliminating this part and they remain open to any initiative on this field in order to elaborate more detailed and more consensual measures.	Disagree	The LFSM electric ve transition power sys
NC RfG	National Grid ESO	Article 14(5)(b)	The stakeholder notes that Article 14(5)(b) relates to protection schemes and settings for EVs. It looks like the list of protection functions has been copied from a synchronous generator, which would not be applicable for an EV- for example	Agree	The requ accordin

bosed amendments in the NC RfG concern the new converters' es and they do not apply to the existing ones.

includes provisions on type EV1. No operational notification is for type EV1 in the NC RfG.

RfG provides for technical requirements for connection of PGMs, provisions for smart recharging are out of scope. However, they rell be included in the standards, if deemed necessary.

Ba(6)(f) provides specifications for the overall response time that any unintentional delays.

amendments have been introduced in the NC RfG.

ing to the proposed definition (Article 2(72)) V2G electrical charging ins the installation that has a single connection point to the relevant and where one or more V2G electric vehicles can be simultaneously ed. Therefore, it is clear that the concerned requirement (exchanging on) can be met at the point of the V2G electrical charging park on and not at individual electric vehicle supply equipment.

B associated V2G electrical charging parks should be subject to the provisions of the proposed Article 14a, as their capacity should meet ite-specific requirements, e.g., protection settings. Nevertheless, hal amendment proposal of Article 14a does not suggest that the of type EV2 EVs and EVSEs would fall within the scope of the on of this Article.

rees that national connection requirements are applicable for the on procedure e.g., to determine conditions for the connection of V2G of further amendments have been introduced in the NC RfG.

grees and the proposed amendments have been introduced in 0a(3) and 32(3) of the NC RfG

esponding amendments have been introduced in the NC DC.

I-UC requirement on V1G electric vehicles and associated V1G whicle supply equipment is a system need so as to allow for the to low carbon society. In the absence of such capability the electric stem is at risk of unstable operation.

irements concerning the protection schemes have been amended gly.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			an EV charging station would not have under or over excitation protection. References to "alternator" should also be deleted.		
NC RfG	National Grid ESO	Article 13(11)	The stakeholder points out that there are now requirements for Electricity Storage Modules to automatically drop their consumption level as system frequency starts to fall. Some consideration should be given as to whether Article 15(3) of the EU Emergency and Restoration Code is relevant now this requirement has been introduced into RfG 2.0.	Disagree	Although may becc ESM cap ESMs. In ESMs tha
NC RfG	Undisclosed respondent	Article 14a(1)	The stakeholder request clarification as to whether Article 14a is still valid for V2G type EV1 and EV2, since the ACER documentation explicitly mentions this.	Agree	Article 14 associate V2G elect electric ve been reme
NC RfG	Undisclosed respondent	Article 14a(2),(6)	The stakeholder suggests that the relevant TSO should specify shorter periods of time and reactive power capability within a defined bandwidth.	Disagree	These red bandwidt
NC RfG	RES Group	Article 5(6)	The stakeholder considers that the original text referred to "the capacity of the power-generating module" but "capacity" is undefined. The stakeholder proposes the following: Also, the new Article 5(6) leaves the significance of V2G >=1MW undefined Article 5(2)(b) "Where the maximum capacity of the power generating module" Article 5(2)(c) "Where the maximum capacity of the power generating module"	Disagree	The maxi used in th criteria in associate
NC RfG	National Grid ESO	General comment	The stakeholder notes that there are new requirements on V2G Electric Vehicles and their related charging Networks. it would be significantly simpler to treat V2G Electric Vehicles and their associated charging Networks as Electricity Storage Modules and then apply the type A, type B, type C and type D Power Generating Module criteria to them rather than duplicating large sections of text. That said, there needs to be consistency between charging arrangements between EVs driving between different Member States.	Disagree	Requirem and exha type A, ty fit for this connectio
NC DC	SIEMENS AG	Article XX	The stakeholder states that as the tolerances for the system voltage are defined by EN 50160 is +/-10% (Chapter 4.2.2.1), a lot of devices and units are designed and tested under these mandatory requirements. By introducing higher tolerances, such deviation can lead to a lot of effort on redesign and testing and might hinder the market access. The requirements on the variation of the supply frequency and fault right through requirements are not in line with EN 50160 and for example EN 61000-4-11 and EN 61000-4-34. This leads to extra effort in testing and redesign for products which were already tested under well-defined IEC Standards. The stakeholder proposes to define the voltage tolerances according to EN 50160. Change the value Urec 2 from 0.85 % to 0.9% in Table x1.1 Define the requirements on frequency variation and FRT based on the well proven IEC and EN standards like EN 50160 and EN 61000-4-11 und EN 61000-4-34	Disagree	V1G volta voltage ra effective products.
NC DC	Undisclosed stakeholder	Article XX	The stakeholder suggests that according to Table X.1.1 and Table X.1.2; values Uclear and Urec1; trect1 and trect2 values should be aligned with Figure XX. C; to represent the graph.	Disagree	Figure X setpoints paragrap
NC DC	Undisclosed stakeholder	Article XX+2, Article 35	The stakeholder considers that when simulation models are becoming an obligation for V1G, a harmonised standard is needed, which is covering the Level of details of a model, e.g. generic approach; SW format. Also, the stakeholder claims that harmonised standards are required, as a basis for CE declaration, which will certify compliance.	Partly agree	When app system op and techn reference the Europ
NC DC	Terna Spa	Article XX	As regards paragraph 3(b): The stakeholder recommends defining a range for the LFSM-UC droop in order to have an adjustable parameter with a default value (in line with the NC RfG approach).	Disagree	The requi

Article 15(3) of the EU Emergency and Restoration Code (NC ER) some obsolete for the new ESMs which will provide the LFSM-Ubability, nevertheless, the NC ER is still relevant for the existing any case, it is system operators' (SOs) task to identify the relevant at need to comply with Article 15(3) of the NC ER.

ta(1) stipulates requirements for type EV3 electric vehicles and ed V2G electric vehicle supply equipment and type EV3 associated trical charging parks only. The reference to type EV1 and EV2 V2G ehicles and associated V2G electric vehicle supply equipment has loved.

quirements may require a site-specific consideration and ad-hoc the are not appropriate.

imum capacity of the power-generating module is the parameter he existing NC RfG and is defined in Article (2). Nevertheless, the Article 5(6) to determine the significance of the V2G EVs and ed EVSEs have been amended along with Charln proposal.

ments for V2G EVs and associated EVSEs need to be harmonised austively defined so as to allow for the cross-border mobility, thus ype B, type C and type D Power Generating Module criteria are not is purpose. Also, charging arrangements are out of scope of the ion codes.

tage ranges should be consistent and harmonised with the V2G anges as defined in the proposed NC RfG legal text for a costenergy transition, especially with regard to these mass-market

X represents a generic voltage-against-time profile with the defined in the tables. The same figure is referenced to other hs, such as for FRT for power-to-gas demand units.

plying the NC DC, the Member States, competent authorities and perators should take into account the agreed European standards nical specifications as per Article 6(3)(f) of the NC DC. The current is deemed sufficient for promoting further harmonisation through bean standards.

irements for the mass-market products should be harmonised.

The accuracy for frequency measurements as currently set at  $\pm$  30ms was proposed by ENTSO-E during 2022 public consultation.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			As regards para 3 (g) (ii): in order to make a useful LFSM regulation, the accuracy of the frequency measurement must be more severe. (table X.1.1): It is recommended to set the Uret for V1G as well as for V2G and type A PPM to 0,05p.u. in table X.1.1. This would guarantee an important improvement in system robustness. New paragraph (7) in Article XX: in line with V2G in RfG, they recommend being provided the equipment to operate the facility remotely. The stakeholder proposes: (g) Requirements for frequency measurement: (i) Maximum measuring time window: 100 ms (ii) Accuracy: ±10 mHz; Table X.1.1 - Uret to be 0,05 p.u 7. A V1G electric vehicle supply equipment shall be equipped with a cyber- protected data exchange interface in order to modulate, without undue delay, active power input following an instruction being received at the input port. The relevant system operator shall have the right to specify requirements for equipment to make this facility operable remotely.		ACER c equipme order to instructio unneces the cons
NC RfG	Terna Spa	Article 13a(3), (5),(6),(9)	As regards Article 13a(3), concerning autonomous reconnection of EV1 and EV2, the stakeholder recommends to maintain harmonised requirements with PGM (Article 13.9) regarding adjustable reconnection conditions and default values. As regards Article 13a(5), the stakeholder recommends defining a range for the LFSM-U-EV droop in order to have an adjustable parameter with a default value, in line with the NC RfG approach. As regards Article 13a(6), the stakeholder recommends defining a range for the LFSM-O-EV droop in order to have an adjustable parameter with a default value, in line with the NC RfG approach. As regards Article 13a(6), the stakeholder recommends defining a range for the LFSM-O-EV droop in order to have an adjustable parameter with a default value, in line with the NC RfG approach. As regards Article 13a(9), the stakeholder fully supports the inclusion of mandatory FRT requirements for EVs. It is also understandable ACER's reasoning for proposing FRT requirements as exhaustive. However, the exhaustive nature of the requirement makes it necessary to define appropriate voltage and time parameters. The stakeholder recommends setting the Uret for EV1, same as for PPM type A, to 0,05 p.u and not 0,15p.u., in order to avoid trip of large scale of EVs for transmission faults. They propose Table x.1.1 - Uret to be 0.05 p.u	See reply to ENTSO-E above	See reply ENTSO-E
NC DC	E.ON	Recital (15)	The stakeholder considers that the DSO's UFLA concepts must remain untouched and proposes adding the sentence <i>"For distribution grids, LFDD is</i> <i>retained as an emergency measure in the event of frequency decline."</i>	Disagree	LFDD sc
NC DC	VDE FNN	Recital (15)	The stakeholder proposes a scheme different from the LFSM-UC later in the text. LFSM-UC/FFDD-UC requirements must be fulfilled by V1G electric vehicle and the associated V1G electric vehicle supply equipment. An AC electric vehicle supply equipment alone is able to adjust the charging current according to IEC 61851-1:2017 but the power electronics in the electric vehicle has to react upon this signal. The DSO's LFDD concepts shall remain untouched.	Disagree	DSO's LF proposed maintaini transient disconne this latter frequency plants op pumps, p the distri mitigated transmiss large num proposed which in that this f
NC DC	EDP, E-REDES, Eurelectric	Recital (15)	The stakeholders propose to add the sentence "Also, in big car parks, the impact of the V2G charging station on the frequency, namely super-harmonic, should be considered" at the end of the recital.	Disagree	V2G is of the conn
NC DC	Finnish Energy	Recital (15)	The stakeholder generally agrees with the proposal, however stresses that care should be taken to make sure that the frequency sensitive mode is reliable. It	Disagree	A deliver

considers that a requirement for V1G electric vehicle supply ent to be equipped with a cyber-protected data exchange interface in modulate, without undue delay, active power input following an on being received at the input port, is disproportionate and esary due to introduction of the LSFM-UC capability which will reduce sumption of V1G EVs during an underfrequency event.

to above

hemes are out of scope of the NC DC.

FDD concepts are out of scope of the NC DC. Moreover, as to the alternative scheme, the general idea of the NC DC is to allow for ing the system users' connection to the network during the system ts (thus voltage and frequency withstand capabilities) and not to ect them at randomised frequencies with long reconnection times, as will bring additional system operation problems (following the initial y excursion). For example, if on a sunny day with lots of solar power perating in distribution network one loses a lot of consumption (heatpower-to-gas units, V1G EVs and associated EVSEs) overloads in ibution networks could occur and which in turn will have to be with disconnections of distributed RES. Similarly, from a sion system perspective, following loss for a considerable time of a nber of consumption units (10-60 minutes reconnection time was by VDE FNN) the frequency will experience a large overshoot turn will require the entire system to adapt. It could well be the case requency overshoot would exceed the dimensioning incident in the tal Europe Synchronous Area set at 3000 MW today. Which in turn, ad to the need to activate emergency and restoration measures.

ut of the scope of the NC DC. Super-harmonics are out of scope of ection codes and subject to applicable standards.

ry of any system users' capability needs to be reliable, not just the sy sensitive mode. Local frequency measurement is the only option



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			was argued that local frequency measurement is not always accurate and can lead to unwanted disconnections.		when fast r a limited im
NC DC	Undisclosed respondent	Article 1	The stakeholder proposes to introduce connection requirements on thermal appliances gradually. Furthermore, mass deployment of heat pumps must not be hindered in order to achieve the European decarbonization target. Heat pumps should not be disadvantaged by additional requirements over less efficient appliances that can provide similar functionality. The target application should be heat pumps as well as other appliances that can provide similar services such as electrical equipment, electric boilers, and electric water heaters.	Disagree	Application Member Sta from 2012. Heat-pump levels, which to ensure e appropriate
NC DC	Undisclosed respondent	Article 2, XX	The stakeholder proposes that the definition of heat pumps should be changed to limit the application to only heat-pumps with thermal storage. The proposed definition is too wide and due to the variety of HP types (air based, water based, monobloc, split multi-split, gas powered, electricity powered, hybrid), application (residential, commercial, process), will impose requirements on many systems that cannot serve the purpose of NC DC. In thermal appliance such as heat-pumps, it is necessary to consider the comfort and thermal health risk to the user. During a smart appliances study, it has been recognised that when considering flexibility two categories of thermal appliances should be distinguished. These are appliances with thermal storage capabilities (such as thermal inertia and water tank) and appliances without thermal inertia should be the first target for flexibility requirements as they provide the most flexibility potential while not jeopardising user comfort.	Disagree	Every heat (e.g., air in
NC DC	Undisclosed respondent	Article 3, XX	The stakeholder argues that it could be possible to reduce the set temperature of a residential heat pump, but it could be problem for a heat pump used to heat/cool a process in industry. Furthermore, it should be noted that fixed speed (non-INV) air conditioners should not be included because changing the temperature setting does not directly reduce power consumption. In the same way, GHPs with a different driving force should not be included.	Disagree	The freque which mea frequency on system
NC DC	Undisclosed respondent	Article 3	The stakeholder argues that for the improvement of the power system stability to be achieved in the regulation, it should be implemented by power system operators and that is not a function that directly benefits equipment manufacturers and consumers. This additional cost should not be reflected in the product price because the cost should not cause hindrance to the purchase of heating and cooling by consumers. They would like to confirm whether it is correct to understand that the development and implementation costs required for the requirements in the regulation are covered by the authorities as a network tax and do not need to be passed on to the equipment costs purchased by consumers.	Disagree	The conne and freque efficient de to a signific an equal tro users' capa turn lead to the transitio
NC DC	Undisclosed respondent	Article XX(4)(g)	The stakeholder requests the clarification of the meaning of random. For the purpose of avoiding the simultaneous return of all devices, it is not necessary for the same device to randomly change the delay time for each event occurrence, and it would be sufficient if each model had different delay values.	Disagree	Random tir normal ope the manufa device.
NC DC	Undisclosed respondent	Article XX(4)(h)	The stakeholder proposes to reduce the accuracy of the frequency change detection from 0,01 to 0,1 Hz.	Disagree	The value of to ensure the
NC DC	European Heating Industry (EHI)	Article 3	The stakeholder argues that it is not clear whether setting requirements for heat pumps falls within the scope of the Regulation on the Internal Market for Electricity ((EU) 2019/943). Specifically, Article 59 paragraph 2(a) of Regulation (EU)	Disagree	Article 59 exhaustive

t reaction time is required. Any local miss-measurements will have impact to the overall system behaviour.

on of requirements on all thermal appliances was rejected by the States during the comitology process – see the ENTSO-E proposal

nps, similar to EVs, will expectedly reach significant penetration nich will impact all other system users (existing and new). In order equitable treatment of all system users, it is necessary to establish ate capabilities that will contribute to the system stability.

eat pump affects directly or indirectly the temperature of reservoir in the house or a fluid in the reservoir).

uency threshold for the activation of the LFSM-UC is set at 49,8 Hz eans that it will be triggered on rare occasions only. Also, such y deviations are usually short-lived and will have minimum impact m users.

nection requirements for the system users concerning their voltage uency withstand capabilities as well as LFSM-UC allow for a costdesign of the bulk power system. These requirements will not lead ificant increase of costs for the mass market products and allow for treatment of significant grid users. In the absence of these system pabilities, the stability of the system would be at risk which would in to significant costs of blackouts/brownouts and inevitably hamper ition to net-zero.

time delay of up to 5 minutes implies a random time for returning to peration of the device. The said random time delay can be set during ifacturing process or an appropriate random logic is installed in the

e of the proposed accuracy cannot be reduced because it is required the detection of the frequency drop below 49,8 Hz.

(2) of the Electricity Regulation makes reference to a none list i.e. '(a) network connection rules **including** rules....'



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			2019/943 only indicates "connection of demand units used to provide demand response", and transmission-connected demand facilities, and not heat pumps per se connected to the distribution level. They ask ACER – and the European Commission – to clarify what is the legal basis of this initiative as well as whether it is in line with the requirements set forth in the Better Regulation agenda.		Thus, und codes incl above pos
NC DC	European Heating Industry (EHI)	Public consultation	The stakeholder argues that they have not been directly involved in network code's amendment process. Also, the stakeholder asks for clarification on the origin and the intention of the proposed requirements for heat pumps and also asks ACER work closely together with the heat pump sector to improve them.	Partly agree	Following Network ( and the N were mer <u>amendme</u> E propo- larger tha 17 April 2 pumps in During se of large-s relevant ACER dra should h devices. <sup>1</sup> within the the NC D
NC DC	European Heating Industry (EHI)	Ecodesign Directive	The stakeholder proposes ACER to coordinate with the European Commission to assess whether the Ecodesign framework would be the better location for such connection requirements.	Partly agree	In ACER's be includ its scope vehicle to
NC DC	European Heating Industry (EHI)	Technical feasibility	The stakeholder argues that from a technical standpoint, requirements linked to e.g., frequency or voltages changes will have an impact at product level in terms of i.e. design, engineering, sourcing of components, manufacturing, among others. As an example, the suggested obligations for heat pumps to reach their target temperature within 300 milliseconds, monitor the frequency of the electricity grid, and shut off autonomously if needed, are not taking into account what a heat pump is actually technically capable of and designed to do. The stakeholder also argues that the significance criteria (capacity greater than 0.8 kW at any voltage level), is not grounded in any specific technical analyses of heat pumps, nor of the market for heat pumps.	Disagree	Regardin than 300r As to the ENTSO-E should be storage n
NC DC	European Heating Industry (EHI)	Interaction with similar national initiatives	The stakeholder argues that it is currently unclear how the revised NC DC will interact with similar national initiatives. The stakeholder is of the opinion that provisions in view of the NC DC cover cross-border issues, such as potential blackouts, and should therefore be applicable EU-wide. As such, to avoid double regulation and ensure free movement of goods, the interaction between European initiatives and similar national legislations (e.g., as discussed by Forum Netztechnik/ in Germany) currently in the pipeline should be carefully assessed and synchronised.	Disagree	The prop requireme playing fi frequency during lat Neverthel not in cor possible
NC RfG	EDP	Article 2(73)	The stakeholder asks for the reason the V1G electrical charging park definition says "where three or more V1G" and not "one or more" as in the V2G electrical charging park definition.	Partly agree	The defin
NC RfG	EDP, Eurelectric, Enel Group	Article 2(75)	The stakeholder suggests adding "or operating" to the definition of electrical charging park owner, arguing that in many cases the entity that legally owns the installation does not have the expertise to operate it, to which purpose an operator is responsible for securing all technical requirements regarding the electrical installation.	Disagree	As the c "owning obligation and not t

er such provision, the Commission is empowered to adopt network luding network connection rules for other system users as well. The sition is also adopted by the Commission.

g the publication of the <u>ACER Policy Paper</u> on the revision of the Code on Requirements for Grid Connection of Generators (NC RfG) letwork Code on Demand Connection (NC DC), where heat-pumps intioned, AC<u>ER consulted all stakeholders on their proposal for the</u> <u>ents</u> of the NC RfG and NC DC. During such consultation ENTSOsed to include requirements for temperature-controlled devices an 800W at all voltage levels. In turn, <u>ACER publicly consulted</u> on 2023 the preliminary draft proposals including requirements on heata dedicated workshop.

evere frequency events, especially in over-frequency case, the trip scale demand units would jeopardise system security. Therefore, voltage and frequency related requirements have been added in aft amendment proposal of the NC DC. These technical capabilities ave no noticeable or negligible effect on the primary use of these Where their performance and comfort for the user should be defined a European Standards in accordance with the principle defined in

s view, appropriately harmonised connection requirements should led in the NC DC, as this applies for any other device falling within e. Nevertheless, the Commission may choose a different legal o this end.

g the total reaction time for LFSM-UC's sensitivity (set as not higher ns) refers to the electrical control system and not the temperature.

significance criteria, said capacity was introduced on the basis of E's proposal to ensure equitable treatment of system users (it e noted that the same capacity is used for generators, electricity nodules, EVs and power-to-gas demand units).

boosed amendments to the NC DC allow for harmonisation of ents which will, in contrast to national approaches, allow for a level ield and ensure geographically even system response during y excursions. This latter is essential to the preserve system stability rge scale system disturbances.

less, in our understanding, any additional requirements which are ntradiction with the harmonised requirements of the NC DC are still at national level, e.g. applied via the agreed European standards.

ition of V1G electrical charging park has been removed.

definition only covers ownership, ACER considers that adding *or operating*" to the definition is irrelevant. Moreover, the legal n for an installation to comply with the NC RfG is laid on the owner the operator.
AC	ER	$\langle 0 \rangle$				
European Union Agency for the Cooperation						
of Energy Regulate	ors					

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EDP, Eurelectric	Article 13a(5)	As regards to point (f), the stakeholder proposes to acknowledge that switching must be done while "safeguarding the integrity and conservation of associated components" (EV battery and EVSE).	Disagree	ACER con the require vehicle an
NC RfG	EDP, Eurelectric, Enel Group	Article 30(2), Article 30b(2)(f)	The stakeholders propose to delete the requirement in point (f) as it is excessive considering that the EV3 type begins at 40kW, which can be a barrier.	Disagree	The opera vehicle su Studies de required fo
NC RfG	EDF	Article 30a (new)	The stakeholder insists on the importance of a simple and fast process. The relevant system operators shall provide the installation document template online and allow the digitally filled in documents to be easily posted on its website.	Partly agree	ACER un provided of requireme requireme and adequ as soon a
NC RfG	EDP, Eurelectric, Enel Group	Article 30b(1)	The stakeholder proposes that a supply equipment document shall be provided either by the electrical charging park owner or by the operator. That is due to the fact that the owners usually do not have the expertise to operate the installation, to which purpose an operator is responsible for securing all technical requirements.	Disagree	The electr a supply e comply wi
NC RfG	CharIN, BDEW, Verband der Automobilindustrie, undisclosed stakeholder	Article 2(67)	The stakeholders request, in order to be made clear that V2G EVs and EVSE do not have to fulfil all requirements for ESMs, adding a clarification that separate requirements and connection procedures apply if maximum capacity is less than 1 MW (type EV3).	Agree	The releva
NC RfG	CharIN, Verband der Automobilindustrie, VDE FNN, BDEW	Article 2(69), (70) and (72)	<ul> <li>The stakeholders suggest the following to be added to the definitions to clarify that</li> <li>an V1G electric vehicle always requires an associated V1G electric vehicle supply equipment.</li> <li>an V2G electric vehicle always requires an associated V2G electric vehicle supply equipment. No distinction is made between AC and DC V2G, which means that cars and charging points are often mixed up. It would be helpful if the two variants were described once, and if it was clearly stated that both are meant.</li> <li>no distinction is made between AC and DC V2G, which means that cars and charging points are often mixed up. It would be helpful if the two variants were described once, and if it was clearly stated that both are meant.</li> </ul>	Partly agree	ACER agr and (70) a connected This is to e the same electricity
NC RfG	Verband der Automobilindustrie, Mercedez Benz	Article 2(73)	The stakeholders suggest, as this definition is not further used neither in NC RfG nor in NC DC, to be deleted. According to the regulation, a multi-family house with three charging points would already be a charging park. However, in such cases, there would not be one single power park operator. In general, it should be avoided to impose additional bureaucratic hurdles on private individuals for the use of EVs.	Agree	The defini from the R
NC RfG	CharIN, Verband der Automobilindustrie	Article 5(6)	Stakeholders propose to clarify the significance criteria to ensure that it concerns the maximum feed-in capacity. Also, alignment with CharlN BiDi Power Classes is proposed, type EV2 shall be at 50 kW (not 42 kW).	Partly agree	Maximum power-ger consumpt a demand Relevant c
NC RfG	Eurelectric, Enel Group	Article 5(6)	The stakeholders propose to move the minimum level for EV3 to a higher value, at least 100 kW, to ensure that EV3 are connected at MV level.	Disagree	The thresh
NC RfG	CharIN, Verband der Automobilindustrie	Article 5(6)	The stakeholders ask ACER to clarify the following questions: What if the EVSE has two charging points, both are capable of 40kW active power output to the grid. What is the maximum capacity? 40kW or 80kW? How is "maximum capacity" defined? They suggest that the logic must be that the EVSE maximum active power output capacity is relevant here. EVs change, if	Disagree	It is clear f internal co significan capacity 6 kW conve

nsiders that the phrase *technically feasible*, adequately covers that ement should respect the technical capabilities of the V2G electric ad associated EVSE.

ational notification procedure for type EV3 associated V2G electric upply equipment is provided in Article 30b.

emonstrating steady-state and dynamic performance are already or type B PGMs, as provided in Article 32.

derstands that the installation documents are already being electronically by the relevant system operators via transparency ints in Article 7(3)(b). Nevertheless, ACER introduced a int for the relevant system operator, on acceptance of a complete uate installation document, to issue a final operational notification is possible.

ical charging park owner shall be responsible for the provision of equipment document, as the legal obligation for an installation to the the NC RfG is laid on the owner and not the operator.

ant amendments to the definition have been added.

rees with the proposed clarifications to definitions in Article 2 (69) nd partly in (72) but the application to stationary and permanently d V2G electric vehicle supply equipment should not be restricted. ensure equitable treatment of system users (it should be noted that criteria, the capacity of 800 W and above, is used for generators, storage modules, EVs and power-to-gas demand units).

tion is no longer used in the NC DC therefore it has been removed IfG.

capacity is defined as maximum continuous active power which a nerating module can produce in Article 2(16). Maximum ion capacity refers to the maximum continuous active power which unit or electricity storage module can consume.

hanges regarding the thresholds have been introduced in NC RfG.

nold should be aligned with the V2G power classes.

from the 'V2G electric vehicle supply equipment' definition that the onfiguration of the EVSE determines the capacity used to apply the ce criteria. If, for example, the EVSE contains a single converter of 0 kW it is EV3 and each individually is type EV2 if there are two 30 erters inside the EVSE.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			minimum between EV and EVSE is taken, this value would always change. The stakeholders ask to be confirmed whether it is the EVSE maximum capacity.		
		CharlN, Verband der Automobilindustrie, undisclosed stakeholder	The stakeholders suggest that it shall be open how the V2G electric vehicles and associated V2G electric vehicle supply equipment proof that the total system of EV and EVSE complies with the requirements of this regulation. Certification should be possible for different technical solutions. The target would be to have the V2G electric vehicle part as part of the homologation. An interim solution until it is included in homologation is necessary.	Partly agree	
NC RfG	CharIN, Verband der Automobilindustrie, undisclosed stakeholder		The requirements set in this regulation are not covered by the relevant product standards for V2G electric vehicles (ISO 17409/ISO 5474-series) and associated V2G electric vehicle supply equipment (IEC 61851-1/-23) and therefore are not taken into consideration in V2G electric vehicle homologation/certification and the conformity assessment of the V2G electric vehicle supply equipment. They propose a workshop with European system operators to discuss how this can be done.		ACER full and sugge Committee See revisi
			Technology openness shall be ensured. European-wide solutions must be ensured.		
			One stakeholder states that the conformity declaration to be completed either by the EV manufacturer or their designated agents to perform analysis, tests and inspection of the EV or EVSE as a proof of compliance within the national NC RfG implementation.		
NC RfG	E-REDES	Article 5(6)	The stakeholder argues that there is no difference between the types of V2G electric vehicles and electric vehicle supply equipment in points (a) and (b). They propose to merge these two categories.	Disagree	The appli- types vary when the types with
NC RfG	EFAC	Article 5(6)	The stakeholder argues that introduction of technical requirements as well as of provisions on compliance of V2G types is inconsistent with the type definition of PGMs in Article $5(2) - (5)$ .	Partly agree	The relev stakehold
NC RfG	Verband der Automobilindustrie, Mercedez Benz	Article 5(6)	As regards the rules for EV1 and EV2 with reference to Article 13a, the stakeholders propose that a distinction between AC charging (AC vehicle to grid) and DC charging (DC vehicle to grid) to be added. In any case, the EV supply equipment shall be the master of the charging / generation operation. In the case of AC power generation by the EV, the vehicle can implement requirements through the on-board charger itself. In the case of DC power provisioning by the EV, the off-board charger external to the vehicle is the implementing instance (as EV supply equipment). Therefore, a pure power definition is not sufficient to assign functions in the charging system.	Disagree	The requi vehicle su onboard th and assoc system of (related to several sta The NC Rf operation converter. behaviour manage th behaviour
NC RfG	CharlN	Article 6(6)	The stakeholder asks whether V2G EV & EVSE must fulfil the NC RfG in respect of consumption. This should be part of NC DC. Also, it is suggested to move Title II Article 13a 6a to NC DC.	Disagree	V2G EVs storage m and assoc extent that
NC RfG	Energie-Nederland	Article 6(6)	The stakeholder asks why ESMs should comply with the NC RfG when they are in charging mode; the stakeholder considers that in charging mode they should comply to NC DC and proposes to provide that the relevant requirements of the NC RfG shall be satisfied when the electricity storage module or V2G electric vehicle and associated V2G electric vehicle supply equipment injects active power to the network.	Disagree	ESMs are relevant re proposal
NC RfG	Undisclosed stakeholder	Article 6(6)	The stakeholder proposes the activation be subject to customers consent and CPO consent.	Disagree	The preso their resp

ly agrees that European-wide solutions are the best way forward ests the involvement of the Grid Connection European Stakeholder are to discuss the implementation aspects.

ions in Article 42(5).

icable requirements and compliance provisions for different V2G y (as type EV1 charging does not necessarily require a wall box charging is via the emergency charging cable) and thus the two h different capacity ranges cannot be merged.

vant provisions have been amended in accordance with some ders' concrete proposals.

tirements for V2G electric vehicles and associated V2G electric upply equipment apply irrespective of whether the converter is the EV or not. In turn, it shall be open how the V2G electric vehicles ciated V2G electric vehicle supply equipment prove that the total f EV and EVSE complies with the requirements of the NC RfG o the above decision on compliance) – this was requested by takeholders.

the remains silent on who is the master of the charging/generation n. It is understood that the reaction time is a capability of the r. Also, the EVSE should not restrict the on-board converter's r during large frequency transients. In our view, EVSE should he "stationary" operating point and not necessarily the converter's r during frequency transients.

and associated EVSE are not technically different from electricity nodules. In this respect, similar requirements shall apply. V1G EVs ciated EVSE need to comply with the NC DC requirements to the at they can only withdraw energy from the network.

e in the scope of the NC RfG and they need to comply with the equirements irrespective of their operation mode – this was also a of the <u>EG Storage</u>.

cribed V2G EV end EVSE capabilities are inherent to the design of ective converters and allow for the system stability.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	CharlN, Verband der Automobilindustrie	Article 13a(5)(c), Article 13a(6)(b)	The stakeholders argue that $\Delta f1$ is not a threshold value but a delta frequency.	Agree	Relevanta
			The stakeholders argue that the customer will not provide grid support services for free, and question how this grid support function is monetised? Making this function a rule, business models will not be possible anymore.		The prop
			The main purpose of an electric vehicle is driving – not power generation. Electric vehicles are no power plants.		system us requireme purpose o
NC RfG	Verband der Automobilindustrie,	Article 13a(5)	The "vehicle to grid" function might just cover a low percentage rate of the vehicle operating time. In this requirement, 100 % availability is assumed. The charging strategy of the customer is not considered.	Disagree	would not potential t via an a decarbon
	Mercedez Benz		Reaction times of 500ms are not realistic, because digital communication between the EVSE ("Master of the grid code") and the vehicle is needed in order to negotiate the operating point.		system st capabilitie We under
			The stakeholders ask what happens if the specified reaction for limited frequency sensitive mode – underfrequency (LFSM-U-EV) according to the grid code differs from the operational limits communicated by the EVSE (e.g., current limit below vs. P_Max requirement), and which device clarifies the conflict.		the EVSE frequency operating
	CharlN, Verband der				System in thus the in
			The stakeholders argue that this provision should be deleted because consumption should not be considered in NC RfG. In general, the forced charging		EVSE.
			of the vehicle is rejected, because this will have negative effect on the lifetime of the electrical components in the EV and EVSE. Different limits of mains, EVSE and vehicle are realistic.	Partly agree	EV and E implemen associate
		CharlN, Verband der Automobilindustrie, Eurelectric, Mercedez Benz, undisclosed participant, BDEW Article 13a(6)(a) The stakeholders pose the following qu What happens if the specified reaction EVSE? Which device is master? Do only V2G electric vehicles and a equipment have to fulfil these requirement and associated electric vehicle supply end shift these requirements to NC DC. The stakeholders propose that the phras should also include that the EV, not the the power consumption of the EV.	The stakeholders pose the following questions:		Appropria
			EVSE?		LFSM-O-E
NC RfG	Eurelectric, Mercedez Benz, undisclosed		Which device is master?		example, I Assuming
	participant, BDEW		equipment have to fulfil these requirements? What about VIG electric vehicles and associated electric vehicle supply equipment. The stakeholders propose to shift these requirements to NC DC.		there will Converse could trip
			The stakeholders propose that the phrase "to the extent that is technically feasible" should also include that the EV, not the grid or the charging station, determines the power consumption of the EV.		Technical electric v
			It should be made clear that the level to increase active power should be related to the state of the battery and taking into account the battery health.		the technically
					The state extent that
NC RfG	Undisclosed participant	Article 13a(7)	The stakeholder asks for the definition of 'constant output' and in particular acceptable fluctuation limits.	Disagree	This provi NC RfG v changes a referred to
NC RfG	CharIN, Verband der Automobilindustrie	Article 14a: article's title	The stakeholders propose a clarification to ensure that Article 14a is not relevant for type EV1 and EV2 electric vehicles and associated V2G electric vehicle supply equipment, even if they are within an V2G electrical charging park.	Agree	Relevanta
NC RfG	Fingrid Oyj	Article 14a(5)(b)(iii)	The stakeholder suggests adding change in angle (vector shift) to the list.	Agree	Relevanta

amendments have been introduced in the NC RfG.

bosed technical capabilities allow for equitable treatment of all sers. If the V2G EVs inject power into grids they need to bear similar ents as other PGMs so as to ensure system stability. If the main of an electric vehicle is driving and not power generation then we t need V2G capability of EVs. However, V2G EVs have a significant to help balance the system (participate in balancing markets e.g., aggregator). In fact, they will play an important role in the issation of the electricity sector. As their cumulative effect on the tability is expected to be substantial in the future the technical es are included in the NC RfG.

rstand that the reaction time is a capability of the converter. Also, should not restrict the on-board converter's behaviour during large y transients. In our view, EVSE should manage the "stationary" point only.

ncidents associated with large frequency deviations are very rare, mpact of this requirement is negligible on the lifetime of the EV and

EVSE manufacturers should agree on the practical aspects of the nation considering the cumulative technical capabilities on EV and ed EVSE as prescribed in NC RfG.

ately developed standards should facilitate the implementation.

EV capability for V1G EVs is technically possible but in practice, for limited by the remaining available capacity of the household fuses. g that the household uses a smart meter/modbus to set the g point of the EV to fully utilise the available connection capacity, not be any remaining capacity to use the LFSM-O-EV capability. ely, in the absence of a smart meter and modbus control, the fuses the entire household during the activation of the LFSM-O-EV.

I requirements apply to V2G electric vehicle and associated V2G vehicle supply equipment. ACER considers that the phrase *r* feasible adequately covers that the requirement should respect ical capabilities of the V2G electric vehicle and associated EVSE.

of battery is already taken into account in the following text: "to the at is technically feasible"

vision is the same with the provisions of Article 13(4) of the current v1 and the emphasis is on the robustness regarding frequency and not on acceptable fluctuations in the device output which are o in the same paragraph.

amendments have been introduced in the NC RfG.

amendments have been introduced in the NC RfG.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	CharIN, Verband der Automobilindustrie	Article 14a(5)(d)(ii)	The stakeholders propose that the usage of sub-metering or dedicated metering devices (DMD) as described in the Network Code on Demand Response should be allowed.	Disagree	Sub-meter
NC DC	Verband der Automobilindustrie	General comment	Reactive power provision while providing dynamic grid support requires energy flow into the grid. Therefore, the stakeholder proposes that the demand unit must have an internal storage (e.g., for heat-pumps) or the hardware must be built bi- directional (e.g., V1G electric vehicle supply equipment).	Disagree	The NC D functional
NC DC	CharIN, Verband der Automobilindustrie	Recital (15)	The stakeholders propose a clarification to ensure that the LFSM-UC requirements have to be fulfilled by V1G electric vehicle and the associated V1G electric vehicle supply equipment. An AC electric vehicle supply equipment alone is able to adjust the charging current according to IEC 61851-1:2017 but the power electronics in the electric vehicle has to react upon this signal.	Agree	Relevanta
NC DC	CharIN, Verband der Automobilindustrie, Mercedez Benz	Article 2	The stakeholders argue that the definition of V1G electric vehicle supply equipment is missing in NC DC, it is only available in the NC RfG. To avoid misunderstandings and to clarify the scope, a definition is necessary. Definition of "electricity storage" is missing.	Disagree	As it is ex definitions V1G electring definitions
NC DC, NC RfG	CharIN, Verband der Automobilindustrie, Mercedez Benz, Iberdrola, BDEW e.V	Article 3(1) (NC DC) Article 14a(1) (RfG)	The stakeholders argue that the definition of "new" is unclear. The requirements set in this article for demand unit "V1G electric vehicle and associated V1G electric vehicle supply equipment" (operating behaviour for frequency (Annex I) and voltage (Annex II), ROCOF withstand capability, LFSM-UC, fault-ride-through capability) are not covered by the relevant product standards for V1G electric vehicles (ISO 17409/ISO 5474-series) and associated V1G electric vehicle supply equipment (IEC 61851-1/-23) and therefore are not taken into consideration in V1G electric vehicle homologation/certification and the conformity assessment of the V1G electric vehicle supply equipment. The stakeholders consider that there must be a long enough transition period to guarantee the revision of these standards. The system operator is not able to distinguish between new vehicles, that have to comply with this regulation and old vehicles. Also, the system operator cannot monitor which V1G EV connects for charging. Thus, this requirement should apply to the vehicle supply equipment at most. The phrase "a new V1G electric vehicle" should be deleted. The stakeholder considers that since electric vehicles are a new player in the NC RfG, it is necessary to require a time extension to study the implications in a properly way.	Partly agree	The mean RfG and a applicatio Undoubtfu and adop expected
NC DC	Verband der Automobilindustrie, Mercedez Benz, Undisclosed stakeholder	Article 24(3)(a,b)	The stakeholders propose to 1): delete "V1G electric vehicle supply equipment" and 2) clarify that the obligations mentioned here only concern commercial charging infrastructure. Private charging infrastructure is to be excluded.	Disagree	The provis owners ar
NC DC	CharIN, Verband der Automobilindustrie, Mercedez Benz, BDEW e.V	Article 25(3)	The stakeholders pose the following questions: As regards AC charging: How are simulation models possible for V1G EVs, which move from connection point to connection point? How to handle different V1G EVs charging at a charging point or installation? As regards DC charging: Inverter in EVSE, so simulation can be easily done with EVSE only. They consider that vehicles must be regarded here as mobile equipment. In contrast to stationary equipment (such as heat-pumps), compliance and technical data cannot be provided here. In principle, all vehicles must be allowed to charge at all charging points (grid connection points). The stakeholders consider that it is	Disagree	This articl during IOI requested procedure simulation simulation

ing or dedicated metering devices are out of scope of the NC RfG.

DC does not require from V1G EVSE to be built with a bi-directional lity.

amendments have been introduced in the NC DC.

expressly stated at the beginning of Article 2 of the NC DC, the s of the NC RfG shall apply also to NC DC. It should be noted that ric vehicle supply equipment and electricity storage are not the only s that are "inherited" from the NC RfG. The reference to the of other legal acts is usual in the legal drafting of EU regulations.

ning of "new" derives clearly from Articles 3, 4 and 71a of the NC Articles 3, 4 and 58a of the NC DC so as to avoid retroactive on.

ully the European Commission will coordinate any grace periods tion related issues with Member States. Moreover, NC DC v2 is to be adopted in late 2024.

sions of this article apply to transmission-connected demand facility nd transmission-connected distribution system operators only.

the concerning FON requires an update of information requested N. If simulation models for AC charging V1G EVs have not been d during ION there is no need to submit them during FON e. We understand that TSOs will not request AC charging V1G EVs n models during ION phase and will rather rely on generic n models in case needed to perform dedicated studies.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			not possible to assign specific vehicles or vehicle types to a certain demand facility or certain TSO/DSO.		
NC DC, NC RfG	Verband der Automobilindustrie, Mercedez Benz, undisclosed stakeholder	Articles XX(2)(a) and XX (5)(a) (NC DC) Article 2(42) (NC RfG)	The stakeholders argue that 'staying connected' is not defined and question its meaning: the vehicle remains connected to the grid with active communication and the charging components no longer need to be active? More detailed information needed.	Agree	Relevant a question n stably. Thi
NC DC	CharlN, Verband der Automobilindustrie	Article XX(3)	The stakeholders suggest defining and use Pref throughout the article.	Agree	Relevant c
NC DC	BDEW e.V	Article XX(5)(a) and (c)	As regards (a), the stakeholder suggests adding text in order to clarify what is meant by "connection point" as follows: The V1G electric vehicle and associated V1G electric vehicle supply equipment, when operating above the minimum stable operating level, shall be capable of staying connected to the network and continuing to operate stably after the power system has been disturbed by faults in the trans-mission network according to a voltage-against-time-profile in line with Figure XX.c at the connection point of the V1G electric vehicle or associated V1G electric vehicle supply equipment and with the set points in Tables X.1.1 and X.1.2. Understood to recover the same load as before but EV might not want to recover pre-fault active power consumption due to: Battery almost full Time-of-use tariff entering an expensive time HEMS is lowering charging current due to local overload no/not enough solar power for charging available anymore 1s recovery time from "not charging" to "charging" is too short. EVSE-EV communication setup is taking much longer. A steep ramp-up curve could lead to flicker (EMC). Also, the stakeholder proposes to change from "shall" to "should" in order to not put this requirement mandatory. Extend recovery time to 60s.	Partly agree	Provision Conditions power con this capabi conditions conditions Recovery
NC DC	Verband der Automobilindustrie, Mercedez Benz	Article XX(3)(a)	The stakeholders propose the following requirement to be added: V1G electric vehicle supply equipment has the responsibility of ensuring that the V1G vehicle behaves compliant to the requirements of this regulation. Supply equipment shall be the master of the charging process, because according to current concepts and standards, the limits of the infrastructure and the communication with the system operator is located there. The electric vehicle and its on-board charging equipment are the last members in the "control chain". The stakeholders consider that regarding the DCC draft, the V1G shall remain the master. Furthermore, electric vehicles are not assigned to a certain demand facility. Every electric vehicle shall be allowed to charge with every supply equipment in every demand facility. Procedures and certificates which are based on a fixed assignment have to be avoided.	Disagree	The NC RfC operation. converter. behaviour manage the behaviour o
NC DC	Mercedez Benz	Article XX(3)(f), (g)	The stakeholder proposes to add requirement in (f):	Disagree	The NC Rf operation. converter. behaviour

amendments have been introduced clarifying that the devices in need to remain connected to the network and continuing to operate is wording is used in other instances concerning the PGMs.

changes have been introduced in the NC DC.

of paragraph (a) has been amended for clarity.

s proposed to be considered during the recovering of the active nsumption after the clearing of the network fault fall out of scope of sility aiming at ensuring the stability of the network. The proposed as may be considered after the fault is cleared and the stable network s are attained.

time has been adjusted to 60s so as to avoid flickers.

G remains silent on who is the master of the charging/generation ACER understands, the reaction time is a capability of the Also, the EVSE should not restrict the on-board converter's during large frequency transients. In our view, EVSE should e "stationary" operating point and not necessarily the converter's during frequency transients.

G remains silent on who is the master of the charging/generation . ACER understands that the reaction time is a capability of the . Also, the EVSE should not restrict the on-board converter's during large frequency transients. In ACER's view, EVSE should



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			The random time delay is implemented by the V1G electric vehicle supply equipment.		manage t behaviou
			Supply equipment is master. The EVSE shall be the master, communicating with the grid.		The meas
			They propose that (g) should be modified:		calculatio
			The V1G electric vehicle supply equipment and the power-to-gas demand unit shall measure		
			The stakeholder considers that measuring time window should be specified and asks what is the meaning of observation of 100 ms before reaction.		
NC DC	CharIN, Verband der Automobilindustrie	Article XX(2)(d)	The stakeholders suggest updating the reference of table 2 and that table 2 cannot be found in the document.	Agree	Relevant
			The stakeholders argue that, as regards AC charging, it is not clear/possible how to implement it. They propose the following:		
			Option 1: Use PWM or ISO15118-2 to send "limit" from EVSE to EV. However, this is only an upper limit and EV can decide to charge less. Also: EV has up to 5s to respond to PWM-signal. Then the EV still needs to adjust the power. So, it can be done only in up to 10s.		
	CharIN, Verband der Automobilindustrie, Mercedez Benz		Option 2: Use ISO 15118-20 amendment with grid codes and transmit P(f) curve to EV, which can react according to its own frequency-measurement. But: Also, V1G EVSE/EV would need to support ISO15118-20.		
			The stakeholders pose the following questions:		The existred
NC DC		arIN, Verband der tomobilindustrie, Article 3, Article XX(3)(i) ercedez Benz	Does this regulation intentionally imply an obligation for PLC (power line communication) between V1G and V1G supply equipment according to (a modified) ISO 15118? Timings should be adapted to the values IEC 61851.	Disagree	LFSM-UC
			Does this regulation intentionally imply an obligation for PLC communication between V1G and V1G supply equipment according to (a modified) ISO 15118? Timings should be adapted to the values IEC 61851.		communi
			The stakeholders point out that compatibility between this regulation and existing charging and product standards has a significant impact on the feasibility.		
			The stakeholders suggest that existing charging standards should continue to be used in their basic concepts. The same applies to existing infrastructure.		
			Requirements based exclusively on technical solutions with digital communication between V1G supply equipment and vehicle should be avoided (for AC charging).		
			The stakeholders suggest that the droop in the figure should be corrected from 1% to 5% and that intersection lines in terms of frequency/power should be added.		
			The stakeholders pose the question: What does s[%] mean? 1% reduction of the power consumption per -1% change of the frequency?		
NC DC	CharIN, Verband der Automobilindustrie,	Figure XX	1. meaning of droop and s[%] should be explained	Agree	Relevant
	Mercedes Benz		2. Which gradient deltaP / delta f is specified?		
			4. Power Generation is not possible at V1G. Figure axis labelling shall be adapted.		
			5. Axes descriptions shall be more detailed (in terms of power).	ļ	
NC DC	Mercedes Benz	Article XX(5)(c)	The stakeholder suggests that "staying connected" should be replaced by "staying ready to operate" and "operate stably" means that it is able to operate at all.	Disagree	The capab stably imp

the "stationary" operating point and not necessarily the converter's ir during frequency transients.

asuring time window influences the performance of the application e same time it represents the minimum time needed to avoid wrong ons.(please refer to <u>ENTSO-E document</u> for further explanation)

amendments have been introduced in the NC DC.

sting solutions should not prevent the application of new ents to ensure system stability.

C on V1G electric vehicles' can be achieved by the on-board r itself (local frequency measurement) and not via the cation with EVSE.

amendments have been introduced in the NC DC.

bility of staying connected to the network and continuing to operate olies that the V1G EV and associated EVSE shall not trip following the transmission network as per defined conditions in voltage-



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
					against-tin and X.1.2.
NC DC	CharIN, Verband der Automobilindustrie, BDEW e.V	Article XX(5)(c)	The stakeholders argue that active power "output" is the wrong word here, and that better would be "consumption".	Agree	Relevant a
NC DC	CharIN, Verband der Automobilindustrie, Mercedes Benz, BDEW e.V	Article XX+2 and Article XX+3	The stakeholders suggest that as V1G electric vehicles move around in Europe and have to be compliant with several grid codes, it is beneficial if a central certification (or even better homologation) according to a central European standard like EN 50549-10 is done. It should be open which part of the system will be certified. Also, in consideration of AC and DC V1G.	Partly agree	The Europ need to ind that the sa EU market check the 1000 V.
NC DC	BDEW e.V	Article XX+2 and Article XX+3	The stakeholder argues that Article 24 Interim operational notification 3c says: "equipment certificates issued by an authorised certifier in respect of transmission- connected demand facilities including any V1G electric vehicle supply equipment, power-to-gas demand units, heat pumps of the facility, transmission-connected distribution facilities and transmission-connected distribution systems, where these are relied upon as part of the evidence of compliance;" and no EV is mentioned here. (related to Art. 24 par. 3 lit. c)	Disagree	It would be between th owner or t
NC DC	E.ON	Article XX+3	The stakeholder considers that just like generation plants and storage facilities, consumers must also be able to block the LFSM-U functionality. This is necessary to avoid possible over voltages which may be caused by the LFSM-U functionality itself. The stakeholder proposes a new paragraph as follows: ( <i>j</i> ) The V1G electric vehicle and associated V1G electric vehicle supply equipment and power-to-gas demand units shall be able to receive and react on an external signal allowing the relevant system operator to block active power LFSM-UC mode in real-time. The RSO in coordination with the TSO shall define the framework conditions for the use of this function.	Disagree	ACER is n V1G electr and power increase th issues for
NC DC	CharIN, Verband der Automobilindustrie	Article XX+3	The stakeholder proposes that the relevant system operator, in coordination with the relevant TSO, shall specify the content required for the DUD and make the requirements publicly available.	Agree	Relevant a
NC DC	Verband der Automobilindustrie, Mercedes Benz	Article 34	The stakeholder suggests that it should be open which part of the system (EV/EVSE) must comply with the requirements - also in consideration of AC and DC V1G.	Disagree	The NC DO However, i is necessa requirement services d
NC DC	BDR Thermea	Article XX(1)	The stakeholder suggests that as the heat pump often contains an electrical backup heater, within the thermodynamic compressor system, it should be considered that the response time of an electrical heater is much faster than the thermodynamic system.	Disagree	Backup sy this mode
NC DC	BDR Thermea	Article XX(4)(b)	The stakeholder requests clarifying the temperature range that is referred to and if it is the leaving water temperature of the heat pump or the ambient temperature setpoint of a room. Moreover, the stakeholder suggests that the principle of an inverter heat pump is to modulate continuously on a temperature setpoint and not to switch ON/OFF depending to a hysteresis.	Disagree	In Article X of the heat unit) or it regulation cost effect Article XX. settings si frequency and max o and Off val of inverter

me-profile in line with Figure XX.c with the set points in Tables X.1.1

amendments have been introduced in the NC DC.

been standards are already mentioned in Article 6(3) so there is no clude the proposed wording in this article. ACER comprehends that ale of EVs with certificates of compliance will only be allowed in the t, implying that the system operators will not necessarily need to compliance of the new EVs if connected at voltage levels below

e irrelevant as Article 24 provides for the information exchange he relevant TSO and the transmission-connected demand facility transmission-connected distribution system operator.

not convinced that blocking the LFSM-U functionality is needed for ric vehicle and associated V1G electric vehicle supply equipment er-to-gas demand units. Also, such requirement might significantly the costs for the end-consumer and bring about interoperability EVs when crossing borders.

amendments have been introduced in the NC DC.

C remains silent on how the compliance of EV/EVSE is ensured. in case of demand response service to relevant system operator it ary that the system users comply with the minimum technical ents set out in NC DC so as to ensure the robustness of the offered during the system transients.

stems are out of scope of the NC DC because the time spent in is too small to justify associated additional costs.

XX.4.(b) is the temperature that is controlled by regulation system t pump. It can be the room temperature (e.g., air to air decentralise can be water temperature. The important element is that this system is integrated in the heat pump product in order to reach tive standard product.

4.(c) provides that the heat-pumps on and off temperature range hall not be exceeded by the LFSM-UC when responding to deviations from 50Hz.. The two extreme temperatures are the min operation range of the heating system that corresponds to the On ilues of hysteresis-based heat pump or the Pmin and Pmax values based heat pumps.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	BDR Thermea, Undisclosed stakeholder	Article XX(4)(d) ,(f)	The stakeholders argue that the overload of the network is not directly linked with the target temperature but more with the power consumed by the heat pump. Therefore, the adjustment variable of the LFSM-UC should be Target Temperature OR Target Power.	Agree	The releva
NC DC	BDR Thermea	Article XX(4)(h)	The stakeholder argues that the response time as fast as 300ms is not compatible with heat pumps., and that the response time is rather in the order of several seconds.	Disagree	The respo associated
NC RfG	Verband der Automobilindustrie, Mercedez Benz	Where applicable, Article 13a(4)	The stakeholders argue that for the controlled reaction of the EV and the EVSE, four cases can basically be distinguished. Taking into account the communication times and the physical limits of the components involved, the following expert estimates for achievable reaction times result. The reaction time is defined from the moment when the EVSE registers an undesired grid condition until the moment when the changed charging behaviour appears on the grid. 1. EV is connected to the EVSE, but no current is flowing (sleep mode). Achievable reaction time less than 60 seconds for AC & DC BiDi. 2. EV is being charged or discharged and the power shall be changed by approx. ± 30%. Reaction time for AC and DC less than 10 seconds. 3. EV is being charged or discharged and the current flow direction shall be reversed. Achievable reaction time for AC and DC less than 20 seconds. The stakeholders also note that fast and high power changes may lead to flicker so that EMC (electromagnetic compatibility) tests may not be passed. The stakeholder requests why 60s observation time and they suggest that normal frequency ranges can be verified within milliseconds.	Disagree	The NC DC operation. converter. behaviour manage th behaviour When the s connected (non)oper Electromag understand standards. The said o system fro
NC RfG	Verband der Automobilindustrie	Where applicable	<ul> <li>The stakeholder argues that as regards the achievable rection times from EV &amp; EVSE, it should be differentiated among different cases. They provide their expert estimate on achievable reaction times. For the controlled reaction of the EV and the EVSE, four cases can basically be distinguished. Taking into account the communication times and the physical limits of the components involved, the following expert estimates for achievable reaction times result. The reaction time is defined from the moment when the EVSE registers an undesired grid condition until the moment when the changed charging behaviour appears on the grid.</li> <li>1. EV is connected to the EVSE, but no current is flowing (sleep mode). Achievable reaction time less than 60 seconds for AC &amp; DC BiDi.</li> <li>2. EV is being charged or discharged and the power shall be changed by approx. ± 30%. Reaction time for AC and DC less than 10 seconds.</li> <li>3. EV is being charged or discharged and the current flow direction shall be reversed. Achievable reaction time for AC and DC less than 20 seconds.</li> </ul>	Disagree	The NC R PGMs white V2G EV s operation The NC R operation. converter. behaviour manage th behaviour When the s connected (non)oper

ant amendments have been introduced in the NC DC.

onse time is not related to the temperature itself but rather to the d control system.

C remains silent on who is the master of the charging / generation . ACER understands that the reaction time is a capability of the . Also, the EVSE should not restrict the on-board converter's during large frequency transients. In ACER's view, EVSE should he "stationary" operating point and not necessarily the converter's during frequency transients.

sleep mode is activated, there is no expected reaction from the EV d to the EVSE. For example, this is equivalent to solar power plants ration during the night.

gnetic compatibility is out of scope of the NC DC and in our ding addressed via the implementation of agreed European

observation time aims to ensure that the EV reconnects after the requency attained a sufficient stability following a system ce.

RfG applies similar requirements on all power-electronics based ich are in the case of type EV1 and EV2 V2G EVs and associated supply equipment harmonised to allow for free movement and of EVs across the EU.

G remains silent on who is the master of the charging / generation . ACER understands that the reaction time is a capability of the . Also, the EVSE should not restrict the on-board converter's during large frequency transients. In ACER's view, EVSE should ne "stationary" operating point and not necessarily the converter's during frequency transients.

sleep mode is activated, there is no expected reaction from the EV d to the EVSE. For example, this is equivalent to solar power plants ration during the night.



# 9. SIMULATION MODELS AND COMPLIANCE MONITORING

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	WindEurope, Enercon	Recital (26)	The stakeholders suggest that the compliance testing must be differentiated as by applicable A/B/C/D type.	Partly agree	ACER cor covers the
NC RfG	Doosan Škoda Power a.s	New paragraph after Article 14(3)(a)(vii), new paragraph after Article 16(3)(c), new paragraph after Article X(1)(e)	The stakeholder proposes to introduce more details regarding the evaluation of stability of the SPGM during fault-ride-through (FRT) by simulation. The proposal includes provisions for use of grid models, on how the fault shall be simulated, on the voltage at the connection point and on the criterion for stability of the SPGM during FRT. The stakeholder argues that based on experience each of national implementation understands the way of simulation of FRT capability differently. However, the principle of simulation should be clearly defined in the NC RfG and the correct approach should be to let the voltage recover after the simple voltage dip to value Uret has elapsed.	Disagree	Article 14( available tt details. AC describe th FRT comp national im verified.
NC RfG	ENTSO-E, CENELEC, AEE, Iberdrola, Enercon	Article 15(5)(c)(iii), Article 15(5)(c)(v), Article 52(2)(a), Article 2 (76) to (78) (new)	<ul> <li>One stakeholder proposes to leave the decision to include RMS simulations at national level based on existing practices.</li> <li>Another stakeholder proposes to rely on generic models, if available for the plant technology, in case of TSO request or unavailability of suitable generic models, rely on encrypted detailed RMS models and also to use a simplified Norton equivalent for type C.</li> <li>A couple of stakeholders propose new definitions for 'generic model', 'userwritten model' and 'inherent energy storage'. One stakeholder considers that any definition should be introduced into the Article 2 Definitions (and not in the text of Article Y).</li> <li>One stakeholder proposes to additionally include the definitions of 'gridfrequency', arguing that for any frequency-related the relevant TSO shall publish a specific definition of 'frequency' that suits the sub-cycle character of this phenomena, and 'short circuit current is exactly meant, as there are several possible as by JEC 60000.</li> </ul>	Disagree	ACER proj Expert Gro
NC RfG	COGEN Europe, EU Turbines	Article 15(5)(c)	The stakeholders propose to amend the inclusion of the estimate of the minimum and maximum short circuit capacity as it belongs to short circuit study (either carried out from Power Generating Facility Owner or System Operator). Also, it is proposed that simulation models and performance data and recordings shall be treated as confidential by TSO. It is proposed that the relevant system operator shall adopt simulation software which can accept simulation model defined in other simulation software in common use.	Disagree	According this inform Article 12. TSOs tool However, A effort to op
NC RfG	WindEurope, Enercon	New definitions, Article 15(5)(c), Article 35	The stakeholders propose amendments with regard to the simulation models. These include, that in Article 15(5)(c)(iv), 2500Hz is much higher than the frequencies typically observed in control system interactions (i.e. up to 200Hz). An upper limit of 1000Hz is sufficient and the text should be amended accordingly to avoid unnecessary processing and effects dominated by passive components. The requirements for EMT models and frequency domain simulations Article 15 5(c)(iv) and (v) is very extensive, especially for type C. Suggestion is that this shall only be required for type D and that (iv) shall only be provided if requested by the DSO or TSO with justification. If there is not a CIM model standard for these types of models, standard for the performance of the models, then it would be challenging to achieve a level of consistency with the development of the models. Accurate EMT models and plant data can only be provided after equipment FAT commissioning and final control tuning. At this stage the actual dynamic performance instead of simulating it with high uncertainties can be measured. One stakeholder proposes to add a sentence in Article 35(3)(d) providing that if generic models are required by the RNO and the accuracy of simulations with these is deemed insufficient, the RNO shall proceed with user-written models, without delaying the connection process.	Disagree	ACER's pr ExpertGro

# ACER views

nsiders that appropriate and proportionate compliance testing a need to differentiate between different types.

(3)(a)(iv) states that each TSO shall specify and make publicly the pre-fault and post-fault conditions that can include proposed CER considers that the already specified provisions adequately he requirements. In addition, Article 51(4) provides the basis of how bliance should be performed. If needed, ENTSO-E IGD could guide mplementation with more details on how this capability could be

posed amendment is in line with the conclusions of the GC ESC oup in "Interaction Studies and Simulation Models for PGM/HVDC".

to Article 15(5)(c)(vi) it is for the RSO to include upon its request nation. Furthermore, confidentiality obligations are provided in The delivery of simulation models in standards not compliant with I, may affect compliance process and safety system analysis. ACER considers that it is beneficial for both parties to make an otimise the delivery of simulation models.

roposed amendment is in line with the conclusions of the GC ESC pup in "Interaction Studies and Simulation Models for PGM/HVDC".



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	WindEurope, Enercon, KCORC	Article 7(3), Article 31, Article 32	The stakeholders stated that equipment certificates are issued based on international or European testing standards. Compliance test reports according to IEC or EN standards. The national regulatory authority shall define a grace period for the provision of models, which applies to new generation technologies, in order to enable prototypes to be commissioned and operated under a special Limited Operation Notification. One stakeholder proposes to add in Article 32(2)(b) that the itemised statement of compliance shall be in a format as specified by the relevant system operator regarding the exhaustive and non-exhaustive requirement from this regulation as specified in the national implementation applied by the relevant system operator. One stakeholder proposes to include additional point (h), establishing that Member States, competent entities and system operators shall "give permission to prototypes with new technologies to be connected to the grid with prototype declarations, and give reasonable time for power generating module owners to submit the PGMD later".	Disagree	The reference of the promoting considers be prescrible prescrible in locatio regulatory
NC RfG	Moeller Operating Engineering GmbH	Article 40	The stakeholder proposes that the facility owner may rely on equipment certificates for PGM of type B and C as well, to ensure their compliance with the requirements of RfG.	Partly agree	Theprovi B, C and and 56 of
NC RfG	Enercon	Article 40(4), Article 41	The stakeholder proposes to add in the beginning of the paragraph <i>"If tests for compliance verification are required by the relevant system operator",</i> arguing that in DSO-connected PPMs compliance testing is not common throughout the Member States. It would by exaggerated for most small PPMs, specifically type A and B. Similarly, it is suggested that the list of information and documents of the compliance process in Article 41(3) shall be differentiated by PGF type A/B/C/D and for type D, arguing that requesting the same level of detail from all types would be exaggerated at least for type A and B. The stakeholder proposes to add that the studies shall be also in accordance with exact quantitative compliance criteria for each steady-state and dynamic performance item under consideration of the relevant system operator. The stakeholder proposes to amend the wording by providing that compliance tests or simulations cannot be carried out as "required by the relevant system operator due to reasons not attributable to the power-generating facility owner, then the relevant system operator shall not unreasonably withhold the operational notification referred to in Title III".	Disagree	Articles 40 responsit operator f included national r sufficientl
NC RfG	Enercon	Article 42	The stakeholder notes that requesting that "all relevant" signals are recorded is too open, and questions who shall decide what includes "all". It was also proposed to delete the provision in the paragraph 4 that would require PGF owners' representatives be on site in any case for the entire testing period, while the SOs representatives may decide to attend remotely.	Disagree	According relevants at the ow necessary available
NC RfG	Enercon	Article 48	The stakeholder proposes to amend paragraph 6(b) providing that the reactive power capability test shall be carried out at <i>"at two reactive power set points defined by the relevant power system operator (within the maximum reactive power ranges)"</i> , arguing that DSOs typically do not want PPMs to test the full Q-capability in the field, as this would influence the local voltage too much and consequences for other connected parties are feared. The modified wording could allow a RSO to test extreme Q values, but they do not have to go to extremes.	Disagree	Paragraph which has necessity
NC RfG	RES Group	Article 15(5)(c)(i)	The stakeholder considers that Article 15(5)(c)(i) requires PGFO to provide EMT simulation model if requested. This is a significant increase in requirements and will incur extra costs and project delay of up to 1 year and should therefore be justified in every case it is requested. It is unlikely that type C PGMs will require EMT simulation. Unless justified, this requirement for EMT simulation models should be removed from type C PGMs and applied to type D PGMs.	Disagree	There is n has been change th
NC RfG	VGBE	Article 15(5)(c)	The stakeholder proposes to include a paragraph that the relevant system operator shall specify whether a study is required, and define the scope and extent of that study, to demonstrate that no adverse interaction will occur when one or more HVDC convertor stations or large PPMs are within close electrical proximity of a new to build installation.	Disagree	Relevanti NC RfG. reflect the purpose,

ence in current Article 7(3)(f) of NC RfG is deemed sufficient for g further harmonisation through the European standards. ACER s that details regarding the itemised statement of compliance may ibed through the national regulatory framework. By definition, these eration technologies (prototypes) should be limited in numbers and n and therefore this should better be covered by robust national y frameworks.

ision that the facility owner may use equipment certificates for types D is included in Articles 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55 the NC RfG.

0 and 41 of the NC RfG include general provisions regarding the bilities of the PGF owner and the tasks of the relevant system for all types. Specific provisions for compliance for each type are in other articles. More details may be prescribed through the regulatory framework. ACER considers that the current provisions ly describe the compliance process.

g to Article 42(4) of the NC RfG signals shall be specified by the system operator. Furthermore, the compliance testing is carried out wner's power generating facility therefore it is important that the y representatives of the power-generating facility owner are on site for the entire testing period.

h 6(b) of Article 48 is the same as in (g) in the current NC RfG, is been agreed with Member States. ACER does not see the to change these provisions.

no major amendment of this paragraph of the current NC RfG, which agreed with Member States. ACER does not see the need to the provision as per the stakeholder proposal.

interaction studies, among other studies, are not excluded from the Indeed, Article 15(5)(c) requires simulation models to properly behaviour of the power-generating module for the relevant study including interaction studies.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG and NC DC	Moeller Operating Engineering GmbH, EFAC	Article 41 (NC RfG) and Article 35(5) (NC DC)	The stakeholders propose to specify that the compliance monitoring can be delegated to third parties " <i>including authorised certifiers</i> ", as an option to raise the quality of service in critical aspects of compliance monitoring.	Partly agree	Article 41( relevant sy its complia
NC RfG EDP, E-REDES, Eurelectric, EU DSO Enel Group	EDP, E-REDES, Eurelectric, EU DSO, Enel Group	Article 3, Article 41	Some stakeholders argue that that Article 41 does not describe what actions should be made in case the power-generating facility is no longer compliant with the regulation. The stakeholders propose to establish the incentives for the power-generating facility owner to rectify the source of the non-compliance in the agreed deadlines. One stakeholder argues that the NC RfG does allow a RSO to refuse the connection of a non-compliant PGM. However, there is no legal recourse in the NC RfG for remedying a PGM which becomes, or is found to be, non-compliant over its lifetime. The stakeholder proposes that the RfG requires Member States to have an effective national process to deal with non-compliance within 1 year of entry into force of the regulation.	Disagree	ACER cor incentives specific tin provided b
			One stakeholder proposes to add a new paragraph 7 that would establish the procedure in case of non-compliance.		
NC RfG	EUTurbines	Article 41, Article 42	The stakeholder proposes to add a paragraph regarding establishing procedures permitting generating units to be connected to the grid with the purpose of conducting tests and verifications. In addition, it is proposed to allow the use of alternative or same set of tests carried out in a different facility provided that those tests are efficient and suffice to demonstrate that a power-generating module complies with the requirements of this regulation.	Disagree	ACER co complianc

(5) of the NC RfG and Article 35(5) of the NC DC state that the ystem operator may totally or partially delegate the performance of ance monitoring to third parties.

nsiders that it is not relevant to establish a list of actions or s, or to require Member States to pass relevant provisions within a meline, as those could differ from case to case. These may be by the national regulatory framework.

onsiders that the current provisions sufficiently describe the ce process.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	BDEW, VDE FNN, Verband der Automobilindustrie, CharlN, undisclosed stakeholders	Article 42(5)	The stakeholders suggest that technology openness must be guaranteed. It should be clarified that if compliance with the requirements of this regulation can be verified only by certification of the V2G electric vehicle supply equipment, the V2G electric vehicle as part of an electricity storage module leads to the need to store digital certificates in the V2G electric vehicle. These digital certificates is the V2G electric vehicle as part of an electricity storage module leads to the need to store digital certificates in the V2G electric vehicle. These digital certificates is the V2G electric vehicle supply equipment. To establish such a system, it will take years, because a chain of trust (Public Key Infrastructure (PKI)) needs to be established and operated. Beside resources it will also require the willingness of all parties involved to implement such a system. The more effective way is to certify only the stationary V2G electric vehicle supply equipment for being able to monitor the behaviour of the inverter installed in the V2G electric vehicle and the variang and to preven tharging in the case of misbehaviour by opening the V2G electric vehicle supply equipment switching-device. Besides monitoring especially, the interface protection and islanding detection part can be fully implemented and certified on V2G electric vehicle supply equipment, the V2G electric vehicle must not be certified at all. Proposal to review as: "Concerning V2G electric vehicle and V2G electric vehicle supply equipment on one side and the V2G electric vehicle supply equipment (in case of AC V2G) on the other side. A certification shall include for instance the data exchange protocol, or system performance criteria, associating the V2G electric vehicle borologated platform. The individual type-test certificates? "Regulation (EC) No 765/2008": Does this meant that the EV will also have to have a CE mark? "V2G electric vehicle homologated platform": Here, an in-vehicle charging system, which can be used in different leectric vehicle sh	Agree	ACER's pl V2G electr options. The provis criteria, as electric ve separation The V2G converter
NC RfG	Eurelectric	Article 44, Article 47	The stakeholder suggests that the requirement of Article 44 should include compliance testing of the information exchange system. Information exchange between the relevant system operator and the power-generating module is critical for the system operation. Testing of the information exchange ensures the relevant system operator that the communication works as intended	Disagree	ACER co demand, provided
NC RfG	Eurelectric	Article 48(6)(a)	The stakeholder suggests removing the testing requirement of reactive power capability for the U-Q/Pmax -profile, because it is not possible to change the voltage in the grid to make a sufficient test.	Disagree	This is a simulation

proposal does not prescribe for digital certificates be stored in the tric vehicles. In fact, the proposed wording leaves room for different

ision concerning the data exchange protocol, system performance ssociating the V2G electric vehicle supply equipment and the V2G ehicle homologated platform has been removed and clarity on the n of certification of V2G EV and V2G EVSE has been introduced.

electric vehicle should be certified attesting that the on-board r is compliant with the applicable provisions of the NC RfG.

hydrony of the data exchange with every new object (PGM, HVDC system, etc.) from connection network code should be in Article 40(5) SO GL or related methodology.

mandatory capability that needs to be verified by test and/or a. Further details can be provided by the relevant TSO.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EUROPGEN, WindEurope	Article 51(2)(d), Article 51(3)(a), Article 52(2)(d), Article 55(2)(d), Article 55(7)(c)	The stakeholders state that the wording of 'stability compliance' is ambiguous. They pose the following questions 'What is a stability compliance? A statement of compliance? Certificate of compliance? Simulation report?' They suggest making the wording more comprehensible.	Agree	ACER agre have been
NC RfG	EUROPGEN	Article 51(3)(b)	The stakeholder states that Article 51(3) refers to the reactive power capability simulation and point (b) of said article refers to point (a) of Article 14(3). But this refers to fault-ride-through capability of power-generating modules and does not contain reactive power control requirements.	Agree	ACER agre have been
NC RfG	Eurelectric, CEZ	Article 52(4), Article 54, Article 55(4)	The stakeholder suggests that the requirement regarding simulation of island operation following Article 52(4) should only be required if stated by the relevant system operator.	Partly agree	The provis conditions for island c

ees with the need to clarify the provisions. Relevant amendments introduced in the NC RfG.

ees with the need to correct the reference. Relevant amendments in throduced in the NC RfG.

sion with regard to the island operation simulation refers to the set out in Article 15(4) regarding the non-mandatory requirement operation.



#### 10. ADVANCED CAPABILITIES

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	VDMA e.V.	Article Y(5), Article Y(8)	The stakeholder proposes to define the behaviour for grid forming in more detail.	Disagree	The differin provides or technical do 7 of the NC designated
NC RfG	Avere-France and ATEE, Renault	Article 14a(7)	The stakeholder proposes to define grid forming in order to better understand the requirement with regard to its application to EV3 electric vehicles and associated V2G electric vehicle supply equipment.	Disagree	Article Y(5) this non-ex proposal re details. Also E can bring
NC RfG	CENELEC	Article Y(5), Article Y(8), Article 55(4)(c)	As regards Article Y(5), the stakeholder suggests that grid forming needs to be specified mutually between the relevant TSO and the relevant system operator by an agreement.	Disagree	An agreeme of Article 7 (RSO) woul party may r six months - Differe to grid formin and re - Grid fo becaus netwo Article - The c stabilit therefo specif - It wou indivio
			As regards Article Y(8), the stakeholder points to a contradiction in the wording of Article Y(8) which seems to make grid forming capabilities compulsory for all PPM, including type A PPM, while Article Y(5) establishes only a possibility to specify such requirement for type A PPM.	Agree	The misinte forming cap relevant sys
			As regards, Article 55(4)(c), the stakeholder proposes to establish the obligation of the relevant TSO to coordinate with the RSO when defining an external short- circuit power and inertia to supplement the island scenario of the island operation.	Agree	The RSO c connection
NC RfG	Oesterreichs Energie	Article 2(34)	The stakeholder proposes a minor modification of the definition of "synthetic inertia" by using the word "emulate" instead of the word "replace" with regard to the effect of inertia of a synchronous power-generating module.	Partly agree	The curre regards its technical t the substit generating on the pro

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ng situations in the Member States necessitate that the NC RfG nly for non-exhaustive requirements. The determination of precise etails must therefore be left to the approval procedure under Article RfG by which grid forming requirements will be specified by the entities of each Member State.

to (8) of the consulted amendment proposal already determines chaustive requirement. Article 14a(7) of the consulted amendment efers to that provision. Relevant standards shall define relevant o, a prospective Implementation Guidance Document by ENTSO-g additional clarifications.

ent approach would lead to the application of Article 7(5) instead (1). Hence, the relevant TSO and the relevant system operator Id have to endeavour to seek an agreement and if they fail, each equest the relevant regulatory authority to issue a decision within . This would have several negative implications:

ent procedural paths with differing actors and timelines would apply d forming requirements vis-à-vis other requirements, while grid ng and other general requirements, such as LFSM, fast fault current espective notification procedure provisions, are interrelated.

orming requirements should be treated as general requirements se they serve the frequency stability of the entire interconnected rk. Therefore, a fragmentation should be avoided by applying e 7(1) with its broader scaled harmonisation approach.

concerns of the RSOs (unintended islanding, oscillations, other ty concerns) are of a structural nature. These concerns should ore be addressed in a uniform manner rather than on a network fic case-by-case basis.

Id be inefficient to have a legal framework in place where each dual RSO negotiates individual requirements with each relevant

erpretation should be avoided by adding the words "Where grid bability is specified by the relevant TSO in coordination with the stem operator".

ould provide relevant network data for the compliance at the point.

nt legal definition of "synthetic inertia" needs improvement as s precision and completeness. Instead of actually defining this term, it only explains the desired effect of synthetic inertia, namely tution ("replace") of the inertia provided by synchronous powerg modules. The proposed definition is precise and complete, based oposal of ENTSO-E and Oesterreichs Energie.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response			
NC RfG	Undisclosed Stakeholder	Article Y(5)	The stakeholder proposes to introduce the possibility of the relevant system operator to request a switch from grid forming to grid following mode.	Disagree	The cons Article Yi stakehold possibiliti Obliging P and grid fo and conse procedure could lead hindsight p the availab	
		Article Y(5)	The stakeholder suggests that before the introduction of the grid forming requirement in the RfG in the foreseen rather short implementation time period, there should be a standard or a guideline which clearly defines the requirements for its implementation.	Disagree	Article 72 sufficient referred to details du basis of w entities of	
			Recital 28 and Article 60	The stakeholder proposes to give ACER the authority to introduce a derogation at Union level for new requirements for the lack of practical experience with grid forming.	Disagree	The object connection Derogation where locc example, in the stabilit power-ge line with the national a circumsta
		Article 13(14)(b), Article Y(5)	The stakeholder requests a definition of grid forming capability.	Disagree	The basic provided i draft. The in the app will be sp	
NC RfG	VGBE	Article 20(4), Article 21(4)	The stakeholder requests for clarification as to whom will impose grid forming and would prefer the competence to lay with ACER. Further, the stakeholder proposes to add the notion " <u>if</u> imposed [by ACER]" or " <u>when</u> imposed [by ACER]" to the legal text.	Disagree	Taking int EU DSO I should ma within the within the under Artic but rather The proper whether th draft uses by attribu requireme under Arti designate designate States oth As to the Member S must be le	

sulted amendment proposal includes such switching possibilities in (7) and Article Y(8)(d). Following the proposal of several ders, including ENTSO-E and the EU DSO Entity, these switching ies have been removed from the draft NC RfG.

PPM owners to provide two modes of operation, grid forming mode ollowing mode, would significantly increase the complexity of design equently the manufacturing costs. This also affects the compliance as and thus the certification costs. Furthermore, factual uncertainty to an abundant use of the deactivation option which could in prove to be a redundant use of that tool. The latter would put at risk bility of an effective and reliable amount of grid forming PPMs.

provides the relevant TSOs, RSOs and designated entities with implementation time to introduce precisely the missing standards by the stakeholder, namely by determining the precise technical uring the approval procedure under Article 7 of the NC RfG on the which grid forming requirements will be specified by the designated f each Member State.

active of the grid connection codes is to harmonise the grid on requirements throughout the Union as much as possible. The should therefore be the exception which should only be used cal circumstances should be exceptionally taken into account. For where compliance with the grid connection rules could jeopardise ity of the *local* network or where the safe operation of a specific enerating module might require operating conditions that are not in the NC RfG, as pointed out in Recital 28 of the current NC RfG. The authorities are in a better position to assess local and site-specific inces.

technical design criteria for grid forming power park modules are in Article Y(8) (and Article 20(4) and Article 21(4)) of the consulted precise technical details of these basic criteria will be established proval procedure under Article 7 by which grid forming requirements ecified by the designated entities of each Member State.

to account the changes proposed by inter alia ENTSO-E and the Entity, some specific type B and C PPMs and all type D PPMs andatorily provide grid forming, meaning that it should neither be discretion of the relevant TSO to trigger the approval process nor e discretion of the designated entity to issue the approval decision cle 7, rather these are obligations (neither "may" nor "if" nor "when", "shall").

osed addition to the legal text would raise legal uncertainty as to here shall be an additional decision-making process. The consulted is the established law-making technic of the grid connection codes uting the right and obligation to specify the non-exhaustive ent to the relevant TSO and thereby opening the approval procedure icle 7. This way it is clear that the "imposition" follows from the ed entity of each Member State. In most Member States the ed entity is the national regulatory authority while in other Member her entities are designated (e.g., the VDE (FNN) in Germany).

e proposed competence of ACER, the differing situations in the States demand that the determination of precise technical details eft to be specified by the designated entities of each Member State.



	Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response			
NC RfG	NC RfG	RWE AG	Article Y(5) to (8), Article 20(1) and (4), Article 21(1) and (4), Article 22(1)	The stakeholder proposes to completely refrain from grid forming requirements in the NC RfG to avoid additional conversion costs for operators of existing plants and to avoid inefficiency and costs for consumers. Instead, system operators should design market-based tenders, such as specified auctions, to procure grid forming capable PGMs in a cost-effective manner.	Disagree	Existing p requireme The legal connectio Directive pillars co may serv owners w technolog procedur there are	
			Article 20(2)(b)	The stakeholder does not support the deletion of the fast fault current requirement for type B PPMs.	Agree	Fast fault not for gr	
		Article Y(5) and (8)	The stakeholder notes discrepancies between Y(5) and Y(8) and requests for clarification as to whether the grid forming capability is mandatory in all circumstances or only when specified by the relevant TSO in coordination with relevant system operator.	Agree	Under the mandator and for ty of the rele of the des these are Article Y( requirement to provid clarification character		
		RES Group	Article Y(8)(a)	The stakeholder proposes to limit the scope of the grid forming requirements by referring to all technical limits of PPM, such as their mechanical limits, instead of only referring to their current and energy limits.	Disagree	A referen provision PPMs wit	
	NC RfG		Article Y(8)(a)	Adequate grid forming performance at the connection point should be sufficient, mandating grid forming performance by every individual unit is overly restrictive.	Disagree	While the terminals energy st may be in Both wou the grid fo at the cor	
			Article Y(8)(d)	The stakeholder argues that the capability to activate or deactivate grid-forming mode is likely to cause significant costs and if it is retained must be subject to robust cost benefit analysis.	Agree	Obliging and grid f and cons procedur	
			Article 20(1) and (4)	The stakeholder requests clarification in the legal text as to whether the grid forming mode will be required for all PPMs, but the capability of (de-)activating grid forming mode will not be required from PPM $\geq$ 10MW, and that grid forming mode must be permanently activated by PPM $\geq$ 10MW.	Disagree	The cons However, 10 MW g	
	NC RfG	Fingrid Oyj	Article Y(8)(d)	The stakeholder argues that if grid following is allowed, all the simulations and site tests also have to be conducted for grid following and not only for grid forming.	Agree	Obliging and grid f and cons procedur	
	NC RfG	Undisclosed Stakeholder	Article 2 Article 14a(8) Article Y(5) and (6)	As regards Article 2, the stakeholder proposes a definition of "grid forming" as follows: "Upon detecting grid outage, the main break shall be opened, a PPM shall be disconnected from the main grid, then form a grid and supply local load."	Disagree	Under the jeopardis	
			Stakenolder	Article 20(4) Article 21(4)	As regards Article 14a(8), the stakeholder proposes to give the relevant TSO the right to request grid forming capability to supply local load.	Disagree	It is not th Grid form adequacy

power-generating modules will not be subject to the grid forming ents, see Article 4 and Article Y(6).

I framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three omplement each other. Legally binding grid connection requirements we as a jump start for investments in the new technology. The PGM villing to participate in any market-based procurement need the new ogy available before they can participate in any corresponding tender re. There is a risk that this chicken and egg problem will remain if a no binding grid connection requirements in place.

current requirements are only redundant for grid forming PPMs, rid following PPMs.

e consulted amendment proposal, grid forming capabilities are nonry requirements for type A PPM ("may" in Article Y(5)) and ry requirements for type B and C (according to specified conditions) type D PPM. The latter means that it is neither within the discretion evant TSO to trigger the approval process nor within the discretion signated entity to issue the approval decision under Article 7, rather e obligations.

(8) of the consulted draft should be read that if grid forming tents for type A are specified under Article Y(5), then the PPM has de the requirements laid down in that provision. A corresponding ion should be added in Article Y(8). The *ipso iure* mandatory r of Articles 20 to 22 remains untouched.

nce to all technical limits would deprive the grid forming requirement ns of their purpose, i.e., to enhance design and development of th regard to grid forming capabilities.

e Thevenin-source like behaviour must be determined at the s of the individual unit(s) for reasons of robustness, the inherent torage or the additional energy beyond the inherent energy storage installed within the individual units or with additional components. uld contribute equally to the provision of synthetic inertia as part of forming capability of the PPM which would have to be complied with nnection point.

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the complexity of design equently the manufacturing costs. This also affects the compliance es and thus the certification costs

sulted proposal amendment of the NC RfG is clear in this regard. the revisions will provide that for certain type B PPM with  $Pmax \le$ rid forming will be a non-mandatory capability.

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the complexity of design equently the manufacturing costs This also affects the compliance es and thus the certification costs

e stakeholder's proposal, a stable synchronous operation would be sed.

ne task of the system operator to satisfy the demand for electricity. ning capability is a means for grid stability, not for generation



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			As regards Article Y(5), the stakeholder is opposed to any mandatory requirements and advocates for market based solutions leaving it to the manufacturers to weigh additional technology development costs with anticipated returns, allowing for a cost-efficient deployment of grid-forming capabilities.	Disagree	The legal f connectio Directive ( pillars cor may serve owners wi technolog procedure there are n
NC RfG	Enercon Global GmbH	Recital (25)	As regards Recital (25), the stakeholder proposes to include a recital as follows: Some technologies are connected through inverters with power electronics for which no requirement was existing regarding any (synthetic) inertia contribution. Countermeasures should be adopted to avoid a larger RoCoF and facilitate further expansion of such converter-based generation which do not naturally contribute to inertia.	Partly agree	A recital w regulation
		Article 2	The stakeholder proposes that for any requirements about grid forming, synthetic inertia and fast-fault-current injections the relevant TSO (or RSO) shall publish specific definitions of certain physical quantities, such as voltage, current, phase and phase angle, frequency, active power and reactive power, which suit the sub-cycle character of these phenomena prior to the introduction of any requirement about grid forming or synthetic inertia and subject to stakeholder consultations.	Partly agree	A clarifica provide th fast-fault-o shall deter and phase sub-cycle should tak to it.
		Article 2(33) and (34)	The stakeholder suggests that in Article 2(33) and (34), the definitions of "inertia" and "synthetic inertia" need to be changed in order to better reflect the electrical context.	Partly agree	Under the inertia wh adequatel The curre regards it technical the substi generating on the pro
		Article 2(78) and Article Y(8)(c)	The stakeholder suggests that the definition of "inherent energy storage" in Article Y needs to be removed to Article 2 and changed in order to better reflect that the PPM owner decides if the storage can be used for grid forming purposes.	Disagree	Whether a must neith the PPM inherent p consulted proposed provisions to provid requireme Since the not neces
			As regards Article 14a(8), grid forming capabilities in the EV domain can only be effective if the electrical charging park owner is obliged to install an electricity storage, which would be very costly.	Disagree	Article 14 Article 21( require the of type E equipmen
		Recitals and Article Y(5)	The stakeholder argues that the specification of grid forming capabilities at national level under Article 7 could be accelerated if the PPMs are incentivised to provide grid forming under an ancillary service scheme determined by the NRA according to the national implementation of Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity.	Partly agree	The legal the connection Directive ( pillars connective ( pillars connective ( owners with technology procedured there are nective the connective the conne

framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three mplement each other. Legally binding grid connection requirements e as a jump start for investments in the new technology. The PGM illing to participate in any market-based procurement need the new gy available before they can participate in any corresponding tender e. There is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.

vith the same meaning was already included in the consulted draft n, see Recital (\*\*4).

ation could be added in Article Y(8) of the consulted draft as to hat for any requirements about grid forming, synthetic inertia and current injections the relevant TSO in coordination with the RSO ermine specific physical quantities, such as voltage, current, phase e angle, frequency, active power and reactive power, which suit the e character of these phenomena. However, such specifications ke place within the approval procedure under Article 7 and not prior

e consulted draft, synthetic inertia will be attributed to PPM, while nile be attributed to SPGM. The established definition of inertia ly reflects the respective property of SPGM.

ent legal definition of "synthetic inertia" needs improvement as ts precision and completeness. Instead of actually defining this term, it only explains the desired effect of synthetic inertia, namely itution ("replace") of the inertia provided by synchronous powerg modules. The proposed definition is precise and complete, based oposal of ENTSO-E and Oesterreichs Energie.

an energy storage can inherently serve for grid forming purposes her be left to the discretion of the TSO/RSO nor to the opinion of owner. Rather it must be determined objectively, hence by its properties, i.e., the nature of its design. The definition of the d amendment proposal adequately reflects that. The definition I by the stakeholder would deprive the grid forming requirement s of their purpose because it would be left to the legal entity obliged le the requirement to determine whether it has to provide the ent.

definition appears only in the context of grid forming capability, it is ssary to move it to Article 2.

(4). Hence, EU law does not grant the relevant TSO the right to e provision of additional energy beyond the inherent energy storage V3 electric vehicles and associated V2G electric vehicle supply

framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three mplement each other. Legally binding grid connection requirements e as a jump start for investments in the new technology. The PGM illing to participate in any market-based procurement need the new gy available before they can participate in any corresponding tender e. There is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response			
		Article Y(5)	The stakeholder suggests that, because it is complex to determine if grid forming capability is to be achieved at the connection point, or at the terminals of the individual unit (or component), neither of them should be mentioned without context, but rather where it is defined in detail and with the complete context.	Disagree	While the terminals energy sto may be in Both woul the grid fo at the cor draft.	
		Article Y(8)	The stakeholder proposes to add the notion "In case specified in accordance with Article Y(5)".	Partly agree	The phras in coordin	
		Article Y(8)(a)	The stakeholder suggests that grid forming requirements should leave the flexibility that the requirement is met either within the individual units or with additional components.	Partly agree	While the terminals energy be individual to the prov PPM whic is adequa	
		Article Y(8)(a)	The stakeholder proposes to limit the scope of the grid forming requirements by referring to all technical limits of PPM, such as their mechanical limits, instead of only referring to their current and energy limits.	Disagree	A reference provisions PPMs with	
		Article Y(8)(d)	The stakeholder proposes to delete the obligation to provide the capability to active and deactivate grid forming mode.	Agree	Obliging F and grid fo and conse procedure introduce	
	ENTSO-E		As regards Article 2(34), the stakeholder proposes a modification of the definition of "synthetic inertia" with the aim to improve its clarity.	Agree	The curre regards its technical t the substi generating on the pro	
			Article 2(34)	As regards Article Y(6) the stakeholder highlights that the consulted draft of Article Y(6) refers to a derogation from Article 4(2) in its entirety, while effectively only derogating from Article 4(2)(b), implying that the provision should be redrafted.	Disagree	If Article Y legal unce with regar connected
NC RfG		Article 2(34) Article Y(6), Article Y(7), Article Y(8) Article 20(1) and Article 20(2) Article 23	As regards Article Y(6), the stakeholder proposes to add a reference to grid forming.	Agree	Useful cla grandfath technical the NC Rf	
			As regards Article Y(7) and Y(8)(d), the stakeholder proposes to delete the relevant system operators' option to activate and deactivate the PPM's grid forming mode and the corresponding obligation of the PPM owner to provide the capability to activate and deactivate grid forming mode, since it would increase costs and thereby potentially make grid forming PPMs uneconomical.	Agree	Obliging F and grid fo and conse procedure Furthermo deactivatio that tool. T amount of Relevant o	

e Thevenin-source like behaviour must be determined at the of the individual unit(s) for reasons of robustness, the inherent orage or the additional energy beyond the inherent energy storage installed within the individual units or with additional components. Id contribute equally to the provision of synthetic inertia as part of prming capability of the PPM which would have to be complied with innection point. All of this is adequately reflected in the consulted

se "Where grid forming capability is specified by the relevant TSO nation with the relevant system operator" has been added to clarify.

e Thevenin-source like behaviour must be determined at the of the individual unit(s) for reasons of robustness, the additional eyond the inherent energy storage may be installed within the l units or with additional components. Both would contribute equally vision of synthetic inertia as part of the grid forming capability of the ch would have to be complied with at the connection point. All of this ately reflected in the consulted draft.

ce to all technical limits would deprive the grid forming requirement s of their purpose, i.e., to enhance design and development of n regard to grid forming capabilities.

PPM owners to provide two modes of operation, grid forming mode ollowing mode, would significantly increase the complexity of design equently the manufacturing costs This also affects the compliance es and thus the certification costs. Relevant changes have been ed in the legal text.

ent legal definition of "synthetic inertia" needs improvement as ts precision and completeness. Instead of actually defining this term, it only explains the desired effect of synthetic inertia, namely itution ("replace") of the inertia provided by synchronous powerg modules. The proposed definition is precise and complete, based oposal of ENTSO-E and Oesterreichs Energie.

Y(6) would explicitly order the derogation only from Article 4(2)(b), ertainty might arise about the scope of the concept of grandfathering and to grid forming capabilities of power park modules already d to the network on the date of entry into force of the new NC RfG.

rification in order to limit the scope of application of this specific ering provision to grid forming, i.e., to avoid an application to all requirements of PPMs. A relevant amendment was introduced in G.

PPM owners to provide two modes of operation, grid forming mode ollowing mode, would significantly increase the complexity of design equently the manufacturing costs This also affects the compliance as and thus the certification costs.

ore, factual uncertainty could lead to an abundant use of the on option which could in hindsight prove to be a redundant use of The latter would put at risk the availability of an effective and reliable f grid forming PPMs.

changes have been introduced in the legal text.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
			As regards Article Y(7) and Article 20 (1), the stakeholder proposes to provide that grid forming capability becomes a mandatory requirement for - all type C and D PPMs, - all type B PPMs at and above the 110 kV voltage levels, - all type B PPMs below 110 kV if directly connected to a substation (bus-bar) with a feeder dedicated to one or more PPMs connected to a substation with transformation to 110 kV or above voltage levels. Grid forming capability should become a non-mandatory requirement for - all other type B PPMs under the conditions determined by the Member State or the entity designated by the Member State in a formal process ("roadmap") developed to assess a further roll-out of the grid forming capability, including, if deemed necessary, an impact assessment on island mode detection. - the Member State or the entity designated by the Member State shall provide the formal and substantive conditions under which the relevant system operator may conduct grid forming specification for type A PPM.	Partly agree	On the or manufactu technical d takes into the detect allowing for capability in the con connected to do har However, order to co stakehold However, below the modules of should be in order to of the Mer
			As regards Article Y(8)(c)(i) and (ii) the stakeholder suggests that the term "voltage stability" should be used instead of the term "voltage control". The relevant system operator should coordinate with the relevant TSO when specifying additional requirements regarding the contribution of active and reactive power.	Agree	The requirequirequirequireme Current lir
			As regards Article 20(2)(b) and (c), the stakeholder does not support the deletion of the fast fault current requirement for type B PPMs when they are in grid following mode.	Agree	Fast fault not for gri
			As regards Article 23, the stakeholder suggests that offshore power park modules should also have grid forming capabilities	Agree	Offshore a need for s the decor reaches its the legal t
NC RfG	EU DSO Entity	Article Y(6)	As regards Article Y(6), the stakeholder argues s that this is not a derogation but an exclusion from the application of the regulation and that the provision should refer to Article 4(1) instead of Article 4(2).	Partly agree	The object RfG . Rath from not n in Article 4 The use of Article Y(6 To avoid s from Article
NC RfG	ACCIONA	Recital (25) **	The stakeholder proposes to add to this recital that the regulatory authority should consider if advanced capabilities are to be provided in accordance with mandatory requirements (supported by a full, publicly consulted cost-benefit analysis) or if some should be provided as ancillary services. The stakeholder considers that requiring all new PPMs to provide the full scope of "appropriate grid-forming and rate-of-change-of-frequency withstand requirements" is probably the costliest way to introduce them. The stakeholders suggest that the regulatory authority makes a full CBA and decides in a differentiated manner, what system needs are more cost-effectively satisfied through mandatory requirements and what others shall be procured as market-based ancillary services.	Partly agree	The legal connectio Directive ( pillars cor may serve owners wi technolog procedure there are n

one hand, this proposal takes into account the concern of urers regarding a timely design and development of the required characteristics for the PPMs. On the other hand, the proposal also account the concerns of DSOs regarding inter alia oscillations and tion of unintended islanding. Both ends are adequately met by for more flexibility on whether, how and in which timeline grid forming needs to be established not only for type A (as already proposed nsulted draft) but also for such type B and C PPMs which are d to network elements where said risks are less likely to occur and rm system stability or life, limb and property of network users. the proposal must be formulated differently in some respects in orrectly reflect the shared substantive objectives expressed by the der.

the mandatory path for type B and C PPMs, which are connected a 110 kV level to a feeder dedicated to one or more power park connected to a substation with transformation to 110 kV or above a limited to type B and C power park modules of Pmax of  $\geq$  10 MW o accommodate the differing needs within the distribution systems mber States.

uirement is not a steady state but a dynamic performance ent. Relevant amendment was introduced in the NC RfG.

mitations and active and reactive infeed may concern the network of the overlaid transmission system.

current requirements are only redundant for grid forming PPMs, id following PPMs.

and onshore PPMs should equally alike contribute to satisfying the system stability by providing synthetic inertia needed to compensate mmissioned conventional power plants inertia when the Union ts renewable energy targets. The provisions have been included in text.

ctive of Article Y(6) is not to exclude any application from the NC her it shall establish a *lex specialis* providing an *ipso iure* deviation nore and not less than the 2-year-grandfathering period referred to 4(2)(b) and instead providing a 3-year-grandfathering period.

of the term "derogation" might lead to the misinterpretation that 6) refers to the derogation process laid down in Articles 60 *et seqq*. such misinterpretation the wording should use the term "Deviating the 4(2)".

framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three mplement each other. Legally binding grid connection requirements e as a jump start for investments in the new technology. The PGM illing to participate in any market-based procurement need the new gy available before they can participate in any corresponding tender e. There is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	ACCIONA	Article 2(76) (new)	The stakeholder argues that there should be a definition of grid-forming. The potential co-existence of different definitions of grid-forming is against the development and certification of standardised mass-market products, thus impacting in costs and technical complexities. The stakeholder does not propose a wording for the definition.	Disagree	The basic follows fro draft. The in the appr will be spe
NC RfG	ACCIONA	Article Y(5) and (8), Article 20(1) and (4), Article 21(1) and (4), Article 22(1)	The stakeholder considers that it is important to specify that the relevant TSO in coordination with the relevant system operator shall technically justify that power park modules shall be capable of providing grid forming capability at the connection point. It is argued that a specific process must be designed to define under which circumstances the TSO may require grid forming capabilities. PGM owners and manufacturers should know in advance if the PGM is going to be able to be grid forming or not. Different parameters shall be analysed.	Partly agree	Under Arti capabilitie requireme The same ENTSO-E any event particular
NC RfG	ACCIONA	Article Y(8)	The stakeholder proposes to amend the wording so that the obligation to provide grid forming capability depends on the availability of the primary resource.	Disagree	This is a le fulfils this the NC Rff requireme configured provided Hence, a I to be grid forming w
NC RfG	ACCIONA	Article Y(8)(a)	The stakeholder proposes to delete the reference to the terminals of the individual units.	Disagree	The Theve the individ
NC RfG	ACCIONA	Article Y(8)(d)	The stakeholder proposes to delete the provision since the capability of the PPM to act in grid forming and grid following mode would have a significant impact on costs.	Agree	The risks of must be co obliging P and grid f design an complianc Relevant of
NC RfG	ACCIONA	Article 20(2)	The stakeholder does not agree with the deletion of the paragraph, as it needs to be maintained in particular for grid following PPMs.	Agree	Fast fault of for grid fo
NC RfG	AEE	Recital (25) **	The stakeholders propose to add to this recital that the regulatory authority should consider if advanced capabilities are to be provided in accordance with mandatory requirements (supported by a full, publicly consulted cost-benefit analysis) or if some should be provided as ancillary services. The stakeholders consider that requiring all new PPMs to provide the full scope of "appropriate grid-forming and rate-of-change-of-frequency withstand requirements" is probably the costliest way to introduce them. The stakeholders suggest that the regulatory authority makes a full CBA and decides in a differentiated manner, what system needs are more cost-effectively satisfied through mandatory requirements and what others shall be procured as market-based ancillary services.	Partly agree	The legal f connectio Directive ( pillars con may serve owners wi technolog procedure there are r Ancillary s three pilla implication
NC RfG	AEE	Article 2(78) and Article Y(8)(c)	The definition of "inherent energy storage" in Article Y needs to be moved to Article 2 and changed in order to better reflect that the manufacturer determines if the storage can be used for grid forming purposes.	Partly agree	Whether a must neith the PPM inherent p consulted Since the not neces
NC RfG	AEE	Article 2(79) (new)	The stakeholder argues that there should be a definition of grid-forming. The potential co-existence of different definitions of grid-forming is against the development and certification of standardised mass-market products, thus impacting in costs and technical complexities. The stakeholder does not propose a wording for the definition.	Disagree	The basic follows fro draft. The in the appl will be spe

technical design criteria for grid forming power park modules of Article Y(8) (and Article 20(4) and Article 21(4)) of the consulted precise technical details of these basic criteria will be established roval procedure under Article 7 by which grid forming requirements ecified by the designated entities of each Member State.

cle Y(5) of the consulted draft, the TSO "may" specify grid forming as for type A PPM, which means that the establishment for this ant for type A PPM is non-mandatory from a Union law perspective. approach should apply to specific type B PPMs, following partially 's new proposal. The technical justification for these PPMs can in be carried out under the approval procedure of Article 7, see in Article 7(3) of the consulted draft.

egitimate concern in the matter. However, the RfG legal text already concern. According to Article 1, all requirements established under G are requirements for grid connection. This means that the legal ents are based on how the PGMs are designed (constructed and/or d). The legal requirements are not linked to the provision of the service, but to the design of the PGM.

PPM will have to be constructed and configured in such a way as forming capable. The PPM will however not need to perform grid hen such is impossible due to e.g., lack of wind or solar infeed.

nin-source like behaviour must be determined at the terminals of ual unit(s) for reasons of robustness.

of unintentional islanding, oscillations and other stability concerns onsidered. The consulted draft tried to address these concerns by PPM owners to provide two modes of operation, grid forming mode following mode. However, this would significantly increase the nd hence the manufacturing costs on the one hand, and the ceprocedures and hence the certification costs on the other hand. changes have been introduced in the legal text.

current requirements are only redundant for grid forming PPMs, not llowing PPMs.

framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three mplement each other. Legally binding grid connection requirements as a jump start for investments in the new technology. The PGM illing to participate in any market-based procurement need the new gy available before they can participate in any corresponding tender e. There is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.

services are out of scope of the NC RfG legal basis. Therefore, the ars could at best be mentioned in the recitals without giving any n that the legal basis for the NC RfG is exceeded.

an energy storage can inherently serve for grid forming purposes ner be left to the discretion of the TSO/RSO nor to the opinion of owner. Rather it must be determined objectively, hence by its properties, i.e., the nature of its design. The definition of the draft adequately reflects that.

definition appears only in the context of grid forming capability, it is sary to move it to Article 2.

technical design criteria for grid forming power park modules of Article Y(8) (and Article 20(4) and Article 21(4)) of the consulted precise technical details of these basic criteria will be established roval procedure under Article 7 by which grid forming requirements ecified by the designated entities of each Member State.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	AEE	Article Y(5) and (8), Article 20(1) and (4), Article 21(1) and (4), Article 22(1)	The stakeholder considers that it is important to specify that the relevant TSO in coordination with the relevant system operator shall technically justify that power park modules shall be capable of providing grid forming capability at the connection point. It is argued that a specific process must be designed to define under which circumstances the TSO may require grid forming capabilities. PGM owners and manufacturers should know in advance if the PGM is going to be able to be grid forming or not. Different parameters shall be analysed.	Partly agree	Under Arti capabilitie requireme The same ENTSO-E any event particular
NC RfG	AEE	Article Y(6)(b)	The stakeholder notes that three years seems to be a short time to implement a mandatory requirement as grid forming is not yet a maturely developed technology. Grid forming requirements are not yet exhaustively defined and therefore not properly modelled and tested for a large-scale deployment.	Disagree	Article Y(6 the gener regard to implemen urgent nee targets. T defined an deployme such suffi national s
NC RfG	AEE	Article Y(8)	The stakeholder proposes to amend the wording so that the obligation to provide grid forming capability depends on the availability of the primary resource.	Disagree	This is a le this conce NC RfG a requireme configured provided Hence, a to be grid forming w
NC RfG	AEE	Article Y(8)(a)	The stakeholder proposes to delete the reference to the terminals of the individual units.	Disagree	The Theve the individ
NC RfG	AEE	Article Y(8)(d)	The stakeholder proposes to delete the provision since the capability of the PPM to act in grid forming and grid following mode would have a significant impact on costs.	Agree	The risks must be co obliging P and grid design ar compliant Relevant o
NC RfG	AEE	Article 20(2)	The stakeholder does not agree with the deletion of the paragraph, as it needs to be maintained in particular for grid following PPMs.	Agree	Fast fault of for grid for
NC RfG	Bundesverband Solarwirtschaft e.V.	Recital (25) **	The stakeholder proposes to add "If no grid-forming capability is provided, voltage control capabilities as well as fast and stable LFSM capability support the system robustness", as voltage control capability is an important contribution of non-grid forming PPM to power system stability.	Disagree	The NC R Though th requireme Otherwise
NC RfG	Bundesverband Solarwirtschaft e.V.	Article Y(5), Article 20(4) and Article 21(4)	The stakeholder emphasises the risks for DSOs, especially in terms of unintentional islanding and potentially too much short circuit power in the distribution grid. This would result in diverging requirements for PPM operators and manufacturers. Furthermore, the requirement to provide an activated and a deactivated mode bears the risk for the manufacturer, that the grid forming and grid following mode capabilities are implemented, tested and certified with high efforts, but would never be used. The stakeholder therefore proposes to establish a non-mandatory grid forming requirement which would only apply if the relevant system operator and as far as the contribution to synthetic inertia is concerned also the PPM owner would agree to it.	Partly agree	The risks of must be co obliging PI and grid fo and hence procedures Furthermon deactivatio that tool. T amount of In the light ensure sta generation to the disc must strike where the s

icle Y(5) of the consulted draft, the TSO "may" specify grid forming es for type A PPM, which means that the establishment for this ent for type A PPM is non-mandatory from a Union law perspective. approach should apply to specific type B PPMs, following partially is new proposal. The technical justification for these PPMs can in the carried out under the approval procedure of Article 7, see in Article 7(3) of the consulted draft.

6) establishes a grandfathering rule according to which instead of ral 2-year-grandfathering of Article 4(2), 3 years are granted with o grid forming capability. Article 72 will provide a three-year tation grace period. Three years seems adequate, considering the ed of grid forming PPMs in order to achieve the Union's climate The fact that grid forming requirements are not yet exhaustively nd therefore not properly modelled and tested for a large-scale ent is exactly the reason why the regulation should trigger precisely ficiently defined, modelled and tested requirements under the specification procedure of Article 7.

egitimate concern in the matter. However, the NC RfG already fulfils ern. According to Article 1, all requirements established under the are requirements for grid connection. This means that the legal ents are based on how the PGMs are designed (constructed and/or ed). The legal requirements are not linked to the provision of the service, but to the design of the PGM.

PPM will have to be constructed and configured in such a way as forming capable. The PPM will however not need to perform grid then such is impossible due to e.g., lack of wind or solar infeed.

enin-source like behaviour must be determined at the terminals of ual unit(s) for reasons of robustness.

of unintentional islanding, oscillations and other stability concerns considered. The consulted draft tried to address these concerns by PPM owners to provide two modes of operation, grid forming mode following mode. However, this would significantly increase the nd hence the manufacturing costs on the one hand, and the ceprocedures and hence the certification costs on the other hand. changes have been introduced in the legal text.

current requirements are only redundant for grid forming PPMs, not llowing PPMs.

tG establishes a diverse range of technical requirements for PGMs. he statement proposed is not wrong *per se*, the relations of the ents should not be pre-empted by mentioning them in the recitals. e, there is a risk of misinterpretation.

of unintentional islanding, oscillations and other stability concerns onsidered. The consulted draft tried to address these concerns by PM owners to provide two modes of operation, grid forming mode llowing mode. However, this would significantly increase the design e the manufacturing costs on the one hand, and the compliance s and hence the certification costs on the other hand.

re, factual uncertainty could lead to an abundant use of the on option which could in hindsight prove to be a redundant use of The latter would put at risk the availability of an effective and reliable grid forming PPMs.

t of the fact that grid forming capabilities for PPMs are required to able operation with the high penetration of non-synchronous a, the consequence cannot be to leave the grid forming capabilities cretion of the individual DSOs. Rather, the grid connection codes a balance by establishing mandatory requirements for those PPM said concerns do not easily materialise.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Bundesverband Solarwirtschaft e.V.	Article Y(6)	The stakeholder calls for a guaranteed minimum transition period of at least two years after the specification, arguing that it should not be the problem of the industry, if the TSO and designated entity do not finalise the specification in due time.	Disagree	Article Y(6 the gener regard to implemen urgent ner targets. A national tr shall be es
NC RfG	Bundesverband Solarwirtschaft e.V.	Article Y(8)	The concept of a mandatory minimum requirement within the inherent capabilities of the PPM should be replaced by market-based provisions of guaranteed contributions of grid forming capabilities.	Disagree	The legal fr connection Directive (E pillars com may serve owners wil technology procedure there are n
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 20(2)	The stakeholder does not support the deletion of the fast fault current requirement for merely grid following PPM.	Agree	Fast fault of for grid fo
NC RfG	Better Energy	Recital (25) **	The stakeholder points at the risk that there will be many different requirements in the different Member States and markets which will make it difficult for the manufacturers of components. The stakeholder did not introduce a specific proposal for amendment.	Partly agree	The grid of harmonisa differing r transmissi
NC RfG	EDF	Article14a(8)	Regarding the emerging market of V2G EV and associated supply equipment, the stakeholder suggests a cost-benefit analysis for the grid forming requirement should be provided, before including it in the NC RfG. The stakeholder argues that the requirement would increase the costs of the EV and its supply equipment. The stakeholder therefore proposes to remove this paragraph.	Disagree	Article 14 Article 21( require the of type E equipmen
NC RfG	BDEW	Article 13(14)(b), Article Y(5), Article 20(4), Article 21(4) and Article 22(1)	The stakeholder argues that the need for the provision of grid forming capability by power generating modules (PGMs) and power park modules (PPMs) in the future electricity system is unquestionable. Yet, it has to be carefully arranged how to define the group of PGMs and PPMs which are addressed by a compulsory rule to provide grid forming capability. With regards to the overall efficiency of the power system, it should be assessed whether it is adequate to introduce such a rule for all PGMs and PPMs connected to a certain grid. The stakeholder asks ACER to discuss this aspect and possible alternatives to a mandatory provision (e.g., market-based procurement) in further detail with the different stakeholder groups which would be affected by such a rule.	Partly agree	Grid formi PGMs, i.e The decre system m source lik substitute necessary forming c ancillary s fully integ other. Leg start for in participate available t There is a binding g
NC RfG	Enel Group	Article 13(14)(b)	The stakeholder suggests to reference to Article Y(5) and replace "shall fulfil" with "may be required to fulfil".	Partly agree	A reference as to whe shall not a The notio that grid fo However, Article 13( provide a Article 13(

S) establishes a grandfathering rule according to which instead of al 2-year-grandfathering of Article 4(2), 3 years are granted with grid forming capability. Article 72 will provide a three-year tation grace period. Three years seems adequate, considering the ed of grid forming PPMs in order to achieve the Union's climate a transposition deadline for a Union act should not be linked to ranspositions. According to Article 7(4) and (6) the specification stablished within 2,5 years after entry into force of the NC RfG 2.0.

ramework for grid forming capabilities consists of three pillars: Grid n requirements, ancillary services under Articles 31 and 40 of EU) 2019/944 and fully integrated network components. The three nplement each other. Legally binding grid connection requirements as a jump start for investments in the new technology. The PGM lling to participate in any market-based procurement need the new y available before they can participate in any corresponding tender there is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.

current requirements are only redundant for grid forming PPMs, not llowing PPMs.

connection codes must strike a balance between a Union wide ation for the sake of economies of scale on the one hand and the needs and concerns of the operators of the distribution and sion systems of the Member States on the other hand.

(4) of the consulted draft only refers to Article Y and not to (4). Hence, Union law does not grant the relevant TSO the right to e provision of additional energy beyond the inherent energy storage V3 electric vehicles and associated V2G electric vehicle supply nt. Therefore, the additional costs will not be excessive.

ing capability is only necessary for PPMs and EVs since other ., SPGMs, inherently provide inertia and short-circuit power.

easing share of SPGMs and the increasing share of PPMs in the nake it necessary to provide grid forming capabilities. Theveninke behaviour and synthetic inertia by converter-based PPMs the ever-decreasing inertia of the rotating masses. All means y must be used to achieve this goal. The legal framework for grid capabilities consists of three pillars: Grid connection requirements, services under Articles 31 and 40 of Directive (EU) 2019/944 and grated network components. The three pillars complement each gally binding grid connection requirements may serve as a jump investments in the new technology. The PGM owners willing to e in any market-based procurement need the new technology before they can participate in any corresponding tender procedure. A risk that this chicken and egg problem will remain if there are no grid connection requirements in place.

ce only to paragraph 5 of Article Y would lead to legal uncertainty ther the content of paragraphs 6 to 8 of the consulted draft shall or apply.

on "may be required to fulfil" could wrongly be interpreted to mean orming capability is completely non-mandatory for all PPM types.

this kind of dilemma should be avoided by simply deleting 14) entirely. This is feasible, because the provision does not any legal content of its own. The same is the case for (14)(a) on FRT requirements.



NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Enel Group	Recital (**) after Recital 22, Article Y(5), (7), (8)(d) and (new9)	The stakeholder states that the effect on the distribution network should be considered. Due to the lack of studies on the effect on distribution networks, the activation/deactivation function is necessary. The stakeholder suggests to explicitly provide that the "Member State or the body designated by the Member State shall set out a formal process by which the relevant TSO in agreement with the relevant system operators, may specify that type A power park modules shall be capable of providing grid forming capability at the connection point, as established in Article Y(8). The process shall consider the maintenance and operating procedures, the impact on the distribution network and the eventual necessary interventions on it. Furthermore, the relevant TSO in agreement with the relevant system operator shall require activation or deactivation of grid forming capability if any, as established in Article Y(9)." As an alternative solution, it is proposed that type A shall be excluded from grid forming capability.	Partly agree	The risks on the dis address of operation node). He nanufact rence the several s should be capability PMs. Jnder Art capabilitie equireme (V level to o a subs ype B a accommod Vember 3 be carrie Article 7(3
NC RfG	Enel Group	Article 20(1) and (4), Article 21(1) and (4) and Article 22(1)	To avoid any risk and collateral effects in terms of security of operation and safety for distribution system, the proposal is to introduce the grid forming capabilities in a mandatory way only for type B and type C PPMs which are directly connected to a voltage level equal or above 110 kV or at busbars of substations of relevant system operators. For the type B and type C PPMs below 110 kV, the capability should be carefully assessed and agreed between TSO and relevant system operators. Moreover, the activation/deactivation of GFCs should always be possible as mentioned in the new Article Y(9).	Partly agree h co ty ty ta a	The grid narmonis liffering ransmiss of DSOs slanding now and only for ty ype B an o a feed substatio risks are l and prop
			The stakeholder does not support the deletion of the fast fault current requirement for merely grid following PPM.	Agree F	-astfault or grid fo
NC RfG	SolarPower Europe	Article Y(5), (6) and (8), Article 20(2) and (4) and Article 21(4)	The stakeholder emphasises the risks for DSOs, especially in terms of unintentional islanding and potentially too much short circuit power in the distribution grid. This would result in diverging requirements for PPM operators and manufacturers. Furthermore, the requirement to provide an activated and a deactivated mode bears the risk for the manufacturer, that the grid forming and grid following mode capabilities are implemented, tested and certified with high efforts, but would never be used. The stakeholder therefore proposes to establish a non-mandatory grid forming requirement which would only apply if the relevant system operator and as far as the contribution to synthetic inertia is concerned also the PPM owner would agree to it.	Partly agree th ar Bartly agree th ar br de br d br d	he risks lust be c bliging F nd grid fo nd hence rocedure urthermo eactivation at tool. T mount of the ligh nsure st eneration the dis nust strike there the

s of unintentional islanding, oscillations and other stability concerns istribution network must be considered. The consulted draft tried to these concerns by obliging PPM owners to provide two modes of n, grid forming mode and grid following mode (activation/deactivation lowever, this would significantly increase the design and hence the turing costs on the one hand, and the compliance procedures and the certification costs on the other hand. Following the proposal of stakeholders, including ENTSO-E and the EU DSO Entity, these here removed from the draft regulation. At the same time grid forming y should not be mandatory for type A and specific type B and C

ticle Y(5) of the consulted draft, the TSO "may" specify grid forming ies for type A PPM, which means that the establishment for this nent for type A PPM is non-mandatory from a Union law perspective. The approach should apply to specific type B and C PPMs, following ENTSO-E's new proposal ("roadmap approach"). However, the bry path for type B and C PPMs, which are connected below the 110 to a feeder dedicated to one or more power park modules connected station with transformation to 110 kV or above should be limited to and C power park modules of Pmax of  $\geq$  10 MW in order to odate the differing needs within the distribution systems of the States. The technical justification for these PPMs can in any event ed out under the approval procedure of Article 7, see in particular (3) of the consulted draft.

d connection codes must strike a balance between a Union wide sation for the sake of economies of scale on the one hand and the needs and concerns of the operators of the distribution and sion systems of the Member States on the other hand. The concerns regarding inter alia oscillations and the detection of unintended g can be adequately met by allowing for more flexibility on whether, in which timeline grid forming capability needs to be established not type A (as already proposed in the consulted draft) but also for larger nd smaller type C PPMs which are connected below the 110 kV level for dedicated to one or more power park modules connected to a on with transformation to 110 kV or above. Because there the said less likely to occur and to do harm to system stability or to life, limb, perty of network users.

t current requirements are only redundant for grid forming PPMs, not following PPMs.

of unintentional islanding, oscillations and other stability concerns considered. The consulted draft tried to address these concerns by PPM owners to provide two modes of operation, grid forming mode following mode. However, this would significantly increase the design be the manufacturing costs on the one hand, and the compliance es and hence the certification costs on the other hand.

ore, factual uncertainty could lead to an abundant use of the ion option which could in hindsight prove to be a redundant use of The latter would put at risk the availability of an effective and reliable f grid forming PPMs.

Int of the fact that grid forming capabilities for PPMs are required to table operation with the high penetration of non-synchronous on, the consequence cannot be to leave the grid forming capabilities accretion of the individual DSOs. Rather, the grid connection codes are a balance by establishing mandatory requirements for those PPM as aid concerns do not easily materialise.



	Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
				The concept of a mandatory minimum requirement within the inherent capabilities of the PPM should be replaced by market-based provisions of guaranteed contributions of grid forming capabilities.	Disagree	The legal fr connection Directive (E pillars com may serve owners wil technology procedure there are n
			According to Article 20(4)(b), the dynamic performance regarding voltage control shall reflect the specified contribution to synthetic inertia. The stakeholder proposes to delete that provision because the dynamic performance referred to would only refer to voltage control and cannot be used to influence synthetic inertia.	Partly agree	Article Y(8 the tempo <i>control</i> , wi the consu as it is.	
NC RfG		Recital **	The stakeholder proposes to add the notion that "The regulator shall consider if such advanced capabilities are to be provided as in accordance with mandatory requirements, or if some of these shall be provided as ancillary services according to EU Directive 2019/944 of 5 June 2019. Those capabilities to be provided as in accordance with mandatory requirements shall be supported by a full, publicly consulted cost-benefit analysis."	Disagree	The legal connection Directive ( pillars cor may serve owners wi technolog procedure there are n Therefore the direct the scope considere regime of State.	
			Article 2	The stakeholder asks for a definition of grid forming capability in the NC RfG.	Disagree	The basic follows fro The precis approval be specifi
NC RfG	Iberdrola	Article Y(5) and (8), Article 20(1) and (4), Article 21(1) and (4), Article 22(1)	The stakeholder considers that it is important to specify that the relevant TSO in coordination with the relevant system operator shall technically justify that power park modules shall be capable of providing grid forming capability at the connection point. It is argued that a specific process must be designed to define under which circumstances the TSO may require grid forming capabilities. Different parameters shall be analysed. PGM owners and manufacturers should know in advance if the PGM is going to be able to be grid forming capabilities is advantageous or detrimental. The stakeholder highlights that in order to provide grid forming capabilities, reverse current flows must be tolerated. The stakeholder proposes to refer to Article Y(5) also in Article 20, 21 and 22, hence to leave the decision on whether PPM should provide grid forming capabilities to the discretion of the TSO, i.e. to make grid forming a non-mandatory requirement.	Partly agree	Under Arti capabilitie requireme The same partially E can in any see in par	
		Article Y(6)(b)	The stakeholder notes that three years seems to be a short time to implement a mandatory requirement as grid forming is not yet a maturely developed technology. Grid forming requirements are not yet exhaustively defined and therefore not properly modelled and tested for a large-scale deployment.	Disagree	Article Y(6 the gener regard to implemen urgent ner targets. T defined an deployme such suffi national s	

ramework for grid forming capabilities consists of three pillars: Grid n requirements, ancillary services under Articles 31 and 40 of EU) 2019/944 and fully integrated network components. The three nplement each other. Legally binding grid connection requirements as a jump start for investments in the new technology. The PGM lling to participate in any market-based procurement need the new y available before they can participate in any corresponding tender there is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.

B(c)(i) of the consulted draft was erroneous because it referred to oral parameters of the dynamic performance regarding voltage thile it should refer to voltage *stability*. Hence, Article Y(8)(c)(i) of ulted draft has been amended, while Article 20(4)(b) has been left

framework for grid forming capabilities consists of three pillars: Grid on requirements, ancillary services under Articles 31 and 40 of (EU) 2019/944 and fully integrated network components. The three mplement each other. Legally binding grid connection requirements e as a jump start for investments in the new technology. The PGM illing to participate in any market-based procurement need the new gy available before they can participate in any corresponding tender e. There is a risk that this chicken and egg problem will remain if no binding grid connection requirements in place.

e, it is essential to establish Union-wide mandatory requirements in thy applicable NC RfG. However, those PPM which do not fall into e of mandatory requirements under Union or national law should be ed for market-based procurements under the ancillary services said directive by the national regulatory authorities of each Member

c technical design criteria for grid forming power park modules om Article Y(8), Article 20(4) and Article 21(4) of the consulted draft is etechnical details of these basic criteria will be established in the procedure under Article 7 by which grid forming requirements will ied by the designated entities of each Member State.

icle Y(5) of the consulted draft, the TSO "may" specify grid forming es for type A PPM, which means that the establishment for this ent for type A PPM is non-mandatory from a Union law perspective. e approach should apply to specific type B and C PPMs, following ENTSO-E's new proposal. The technical justification for these PPMs y event be carried out under the approval procedure of Article 7, rticular Article 7(3) of the consulted draft.

6) establishes a grandfathering rule according to which instead of ral 2-year-grandfathering of Article 4(2), 3 years are granted with o grid forming capability. Article 72 will provide a three-year tation grace period. Three years seems adequate, considering the ed of grid forming PPMs in order to achieve the Union's climate The fact that grid forming requirements are not yet exhaustively nd therefore not properly modelled and tested for a large-scale ent is exactly the reason why the regulation should trigger precisely ficiently defined, modelled and tested requirements under the specification procedure of Article 7.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
		Article Y(8)	The stakeholder proposes to remove "at the terminals of the individual unit(s)", arguing that grid forming capability can be provided either by the PPM itself or by dedicated storage units within the PPM.	Disagree	While the terminals energy sto may be ir Both woul the grid fo at the cor
		Article Y(8)	The stakeholder proposes to amend the wording so that the obligation to provide grid forming capability depends on the availability of the primary resource.	Disagree	This is a le this conce NC RfG a requireme configure provided Hence, a to be grid forming w
		Article Y(8)(d)	The stakeholder notes that the capability to activate or deactivate grid-forming mode could lead to have double products, certification and testing of the PPM and its components.	Agree	Obliging F and grid f the manu certificatio use of th redundan effective a been intro
		Article 20(2)	The stakeholder does not agree with the deletion of the paragraph, as it needs to be maintained in particular for grid following PPMs.	Agree	Fast fault of for grid for
NC RfG	EDP	Recital 25**	The provisions on grid forming capability should only apply to new PGM	Partly agree	According the requir 4 should r
NC RfG	EDP	Article Y(8)(d)	The stakeholder proposes to explicitly provide that the activation or deactivation of the grid forming mode could be done remotely.	Disagree	Obliging F and grid f the manu certificatio use of th redundan effective a
NC RfG	EDP	Article 21(4)(a)	The stakeholders argue that the provision is not coherent with Recital 16 and can create distortions between Member States. The stakeholder proposes to mandate ENTSO-E to present a proposal for synthetic inertia requirements for all synchronous areas.	Disagree	The differ provides technical Article 7 N designate
NC RfG	E-REDES	Article Y(8)(d)	The stakeholder proposes to explicitly provide that the activation or deactivation of the grid forming mode could be done remotely.	Disagree	Obliging F and grid f the manu certificatio use of th redundan effective a
NC RfG	E-REDES	Article 21(4)(a)	The stakeholder argues that the provision is not coherent with Recital 16 and can create distortions between Member States. The stakeholder proposes to mandate ENTSO-E to present a proposal for synthetic inertia requirements for all synchronous areas.	Disagree	The differ provides technical Article7 N designate

e Thevenin-source like behaviour must be determined at the of the individual unit(s) for reasons of robustness, the inherent orage or the additional energy beyond the inherent energy storage nstalled within the individual units or with additional components. Id contribute equally to the provision of synthetic inertia as part of orming capability of the PPM which would have to be complied with nnection point.

egitimate concern in the matter. However, the NC RfG already fulfils tern. According to Article 1, all requirements established under the are requirements for grid connection. This means that the legal ents are based on how the PGMs are designed (constructed and/or ed). The legal requirements are not linked to the provision of the service, but to the design of the PGM.

PPM will have to be constructed and configured in such a way as d forming capable. The PPM will however not need to perform grid when such is impossible due to e.g., lack of wind or solar infeed.

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the design and hence ufacturing costs and the compliance procedures and hence the on costs. Furthermore, factual uncertainty could lead to an abundant ne deactivation option which could in hindsight prove to be a nt use of that tool. The latter would put at risk the availability of an and reliable amount of grid forming PPMs. Relevant changes have oduced in the legal text.

current requirements are only redundant for grid forming PPMs, not blowing PPMs.

g to Article 4 existing power-generating modules are not subject to rements of the NC RfG. However, the exceptions provided in Article not be put into question by adding the word "new" to the recitals.

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the design and hence ufacturing costs and the compliance procedures and hence the on costs. Furthermore, factual uncertainty could lead to an abundant he deactivation option which could in hindsight prove to be a nt use of that tool. The latter would put at risk the availability of an and reliable amount of grid forming PPMs.

ring situations in the Member State demand that the NC RfG only for non-exhaustive requirements. The determination of precise details must therefore be left to the approval procedure under NC RfG by which grid forming requirements will be specified by the ed entities of each Member State.

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the design and hence ufacturing costs and the compliance procedures and hence the on costs. Furthermore, factual uncertainty could lead to an abundant ne deactivation option which could in hindsight prove to be a nt use of that tool. The latter would put at risk the availability of an and reliable amount of grid forming PPMs.

ering situations in the Member State demand that the NC RfG only for non-exhaustive requirements. The determination of precise details must therefore be left to the approval procedure under NC RfG by which grid forming requirements will be specified by the ed entities of each Member State.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Terna S.p.A.	Article Y(8)(d)	The stakeholder agrees with the mandatory/non mandatory application of grid forming capability by type to be nationally implemented, but considers it essential to maintain the functionality to activate and deactivate the grid forming capability (also remotely) as a grid connection requirement, so that the new power plants will be set up to be able to activate step by step the functionality in the future, where and when the grid will be adapted to manage the functionality.	Disagree	Obliging P and grid fo the manufa certificatio use of the redundant effective an
		Article 20(2)	The stakeholder does not agree with the deletion of the paragraph, as it needs to be maintained in particular for grid following PPMs.	Agree	Fast fault on not for grid
NC RfG	VDE FNN	Article 20(4)	The stakeholder argues that the provision of a small share of symmetrical inertia is vital for the stable operation of a grid forming power park module. This is valid during normal operation in terms of small signal stability as well as for large disturbances after which the following transient of the frequency requires this small share of symmetrical inertia to reach and hold a new stable operating point. Especially the transition from an operating point within the frequency range of 50 Hz ± $\Delta$ f1 to an operating point outside that region requires the initial grid-forming behaviour, which particularly requires a small share of symmetrical inertia. The stakeholder therefore proposes to add the following provision: "The relevant TSO in coordination with the relevant system operator may specify the symmetric contribution to synthetic inertia during normal operation in the frequency range of 50Hz ± $\Delta$ f1. For the provision of additional energy above the inherent energy storage for this purpose, the relevant TSO may apply to the regulatory authority for the right to require the provision of additional energy beyond the inherent energy storage in coordination with the relevant system operator."	Disagree	Article 20(4 to be spec would rend contributio path. The provis stable ope should not 20(4)(a) in possible a energy sto
NC RfG	Energinet	Article 20(2)(b) and (c)	The stakeholder proposes not to delete the provisions, arguing that there will continue to be a need for the provision of fast fault current from grid following inverters.	Agree	Fast fault c for grid fol

PPM owners to provide two modes of operation, grid forming mode following mode, would significantly increase the design and hence facturing costs and the compliance procedures and hence the on costs. Furthermore, factual uncertainty could lead to an abundant ne deactivation option which could in hindsight prove to be a at use of that tool. The latter would put at risk the availability of an and reliable amount of grid forming PPMs.

current requirements are only redundant for grid forming PPMs, d following PPMs.

4)(a) already determines that the contribution to synthetic inertia is cified, even so in a mandatory manner. The proposed amendment der a specific part of that contribution, namely the symmetric on to synthetic inertia during normal operation, to a non-mandatory

sion of a small share of symmetrical inertia is indeed needed for the eration of a grid forming power park module. However, the NC RfG t pre-empt the technological path to achieve that objective. Article conjunction with Article 7 allows for flexible solutions considering alternative solutions, be it additional energy above the inherent prage or other means.

current requirements are only redundant for grid forming PPMs, not llowing PPMs.



#### 11. WEATHER HAZARDS RESILIENCE

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	Finnish Energy	Recital (**3)	The stakeholder argues that any requirements that are derived from this text should never realise into blanket obligations that affect every Member State.	Disagree	Recitals do provided in
NC RfG	EDF	Recital (22)(**)	The stakeholder proposes to add a sentence to the end of this paragraph stating that these points are to be addressed at the appropriate European and national level, and not in this NC RfG.	Partly agree	A cost-bene power-gene contribute.
NC RfG	EUTurbines	Article 13(13)	As regards weather-related hazards, the stakeholder argues that those requirements shall reflect the specificities of generation technologies as discussed involving manufacturers.	Partly agree	A cost-bene power-gene contribute.

# ACER views

not impose legal obligations. The legally binding obligations are the Articles of the Regulation.

efit analysis will be undertaken in accordance with Article 39 and erating facility owners and DSOs including CDSOs shall assist and

efit analysis will be undertaken in accordance with Article 39 and erating facility owners and DSOs including CDSOs shall assist and



#### ACTIVE CUSTOMERS AND ENERGY COMMUNITIES 12.

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG and NC DC	ENTSO-E, Terna Spa, VGBE, Eurelectric, EDF, Enel Group	Recital (**), Recital (10), New recital after recital (27) (NC RfG) New paragraph after Article 2(75), Article 3(2)(b) (NC DC)	The stakeholders argue that a fully autonomous energy island is not clearly defined in Regulation (EU) 2019/943 and can therefore be confused with other concepts. One stakeholder proposes to replace "fully autonomous energy island" by "off-grid system" and to define the latter in the definitions section. Finally, the term "citizen energy community" is defined in Directive (EU) 2019/944 but not in Regulation (EU) 2019/943. Fully autonomous energy community shall not be allowed to join the main continental Europe synchronous network if it does not comply with the NC RfG. One stakeholder supports ENTSO-E's position that a new recital should be added to avoid unjustified limitations in technical capabilities of PGMs.	Agree	ACER agree been introdu that an energ

# ACER views

rees with the proposed amendment. A relevant amendment has oduced in the NC RfG. ACER's proposed recital aims at clarifying nergy community should comply with the NC RfG.



# 13. UNITS PROVIDING DEMAND RESPONSE SERVICES

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC DC	IFIEC, Energie- Nederland	Recital (7), Recital (8) and other relevant articles	The stakeholders argue that while it is important that demand facilities can provide demand response services to system operators and relevant TSOs and while many (industrial) demand facilities are already doing so, these requirements should not be tackled via NC DC but rather be specified in the product requirements of the specific products of these system operators. This would allow much faster modifications if needs and/or capabilities change and would also avoid that facilities because they would not be able to fulfil (without costly investments) all requirements of the NC DC.	Partly agree	Technical re be included system use place, the re
NC DC	Energie-Nederland	Article 2(19)	The stakeholder considers that the definition of "demand aggregation" does not need to be defined in NC DC as there no need to mention aggregators or any other market role in the connection codes and the connection codes should only deal with connection requirements for assets. The extent to which a certain costumer is active on the market and through with arrangement, should not be relevant for connection requirements.	Partly agree	ACER in pri NCs or SO provisions
NC DC	IFIEC	Article 4a(2), Article 31, Article 32, Article 33, Article 34	The stakeholder proposes to specify in multiple articles that demand units providing demand response services "to relevant system operators and relevant <i>TSOs</i> ". The stakeholder also suggests to replace "can" with "will" in Article 4a(2)(c) where it is provided that "In the case of a demand unit that can be used by a demand facility or closed distribution system to provide demand response services", arguing that potentially this is every demand unit, hence too large as a scope.	Partly agree	Due to the in relevant pro demand res provides fo appropriate

# ACER views

requirements for units providing demand response services could d in the SO GL. This may support better integration of concerned ers. However, until the necessary revision of the SO GL takes relevant provisions of the NC DC shall continue to apply.

inciple agrees that certain requirements could be moved to market O GL. However, until those necessary revisions are made, the of the NC DC shall continue to apply.

introduction of new demand units, ACER has clarified through the rovisions, that these articles refer to demand units providing sponse and not to all demand units. Furthermore, the NC DC or capabilities, therefore the word 'can' is considered to be more e.



#### 14. IMPROVEMENTS TO THE APPLICABLE RULES AND PROCEDURES

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasonin
NC RfG	ENTSO-E	Recital (s1)	The stakeholder proposes to add that 'in coordination with the relevant TSO' the relevant system operator may define the technical requirements that apply in the case of electrical equipment such as synchronous compensators, flywheels and regenerative braking systems which do not fall into the definition of a power generating module or electricity storage module.	Agree	ACER ack these tech Relevant a
NC RfG	COGEN Europe, EU Turbines, WindEurope, Enercon	Recital (s1), Article 2(19), Article 6	Stakeholders propose to add that 'In the case of synchronous compensator and flywheels, the relevant TSOs in cooperation with stakeholders and eventually involving relevant European standard organisation, shall define harmonised proposal for technical requirements within 1 year from the entry into force of this regulation. The harmonised technical requirements shall be introduced within 2 years from the entry into force of this regulation'. Another stakeholder proposes to add that: 'if synchronous compensator can provide active power, then NC RfG requirements may apply unless differently defined in national regulation'. Amendment to the definition of synchronous compensation operation is proposed to include a PGU that is not generating active power, to provide inertia to the system and to provide short circuit contribution to the system. A provision in Article 7 is proposed about requirements for synchronous compensator and eventually associated flywheels to be defined by TSOs and RSOs, in coordination with manufacturers.	Disagree	Recitals do compensa
NC RfG	CENELEC, COGEN Europe, EUTurbines, Gunnar Kaestle	Recital (3), Recital (**), Article (1)	Some stakeholders propose to add that a major need for harmonisation is the EU-wide trade of components for power generating modules. Some other stakeholders propose that the harmonisation of the rules should also favour the union wide trade of these products and that appropriate countermeasures should be deployed by system operators.	Disagree	The NC Rf generating componer
NC RfG	Gunnar Kaestle	Recital (2), Recital (3), Recital (18), Recital (21), Recital (22), Recital (24), Recital (26)	The stakeholder proposes amendments regarding the possibility to have also rules which discriminate between different technologies and to use European standardisation for harmonisation of grid connection. Also, to remove the reference to RES and reduce the 250 ms upper limit to a reasonable value of maximum fault clearing time a synchronous generator must cope with for FRT. It is suggested to use the principal of state observers, include different versions of digital and analogue communication channels and that the capabilities should take into account the voltage level of the point of connection in regard to possible cross-border issues.	Partly agree	Recital (1 difference inherent o of the NC through th (24) are a necessity provision
NC RfG	EDP, Eurelectric	Recital (3)	The stakeholders propose to specify whether this concerns front of the meter storage only, or also behind the meter in a consumer (for instance, an industrial site with a battery installed).	Disagree	The NC R modules,
NC RfG	WindEurope, Iberdrola, Enercon	Recital (6), Recital (**4)	The stakeholders argue that transition from traditional power system dominated by synchronous generators to very high shares of power park modules in the future leads to the need of additional ancillary services, which so far had not been thought of. Such additional system needs and the ways to satisfy them have to be assessed and organised by the regulator. Neither power facility owners, nor TSOs or DSOs can make that. The system needs and the ways to satisfy them have to be identified, defined, introduced, given a commercial value, and at the end procured. The obligation to trigger thinking and acting about this is in EU Directive 2019/944 of 5 June 2019 under the term "non-frequency ancillary service". The stakeholders finally argue that the regulator shall consider if advanced capabilities are to be provided as ancillary services in accordance with EU Directive 2019/944 of 5 June 2019, justified based on a publicly consulted CBA.	Disagree	Procureme contain les

# ACER views

#### ng

knowledges the need to include the relevant TSO when defining nnical requirements.

amendment has been introduced in Recital s1 of NC RfG.

o not contain legally binding provisions. In addition, synchronous ators and flywheels are out of scope of the NC RfG.

If G provides for technical capabilities for grid connection of power g modules that could be used to provide system services and not nts. Furthermore, trade considerations are out of scope of NC RfG.

15) already specifies that the requirements should reflect the es in the treatment of generation technologies with different characteristics. In addition, the reference in current Article 7(3)(f) C RfG is deemed sufficient for promoting further harmonisation the European standards. The relevant recitals (18), (21), (22) and already included in the current NC RfG. ACER does not see any y to change it. Furthermore, recitals do not contain legally binding ns.

RfG provides for requirements for connection for electricity storage, as proposed to be defined in the NC RfG.

ent of ancillary services is out of scope of NC RfG. Recitals do not egally binding provisions.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Better Energy	Recital (24)	The stakeholder considers that reactive power capabilities should be assessed based on the maximum capacity in the connection point and suggests making this addition to this recital. The stakeholder considers that reactive power capabilities introduce higher investment costs as electrical equipment must be oversized to comply with the requirements. In hybrid power plants the installed capacity is normally significantly higher than the grid export capacity as synergies between different underlying technologies are utilised. As system operators are interested in the capabilities in the connection point, which is also reflected in this regulation, the stakeholder considers that reactive power requirements should be defined based on the maximum capacity in the connection point.	Partly agree	According t several fact feed and co order to sup that the re maximum c or as agre generating
NC RfG	Bundesverband Solarwirtschaft e.V., Solar Power Europe	Recital (27)	The stakeholder considers that European standardisation and harmonisation are crucial for a cost-effective energy transition, especially with regard to mass-market products. The stakeholders propose to replace 'should' with 'shall' in this paragraph.	Partly agree	When apply operators s technical sp reference is the Europe provisions.
NC RfG	Gunnar Kaestle	Article 2	The stakeholder proposes amendments to various definitions.	Partly agree	ACER amer
NC RfG	WindEurope, Enercon	Article 2(35)	The stakeholder suggests the addition of 'contribute to' as any plant can only "contribute" to the stabilisation of a stable frequency. It can never maintain it on its own (except isolated operation).	Disagree	Maintaining system. Un purposes o
NC RfG	WindEurope, Enercon	Article 2(48), Article (2(55)	The stakeholders argue that feedback is not the right term. It should usually be "closed-loop". However, if its closed-loop or open-loop is not relevant here. As "alternator" is the term used for the classic synchronous generator, it should be here also for consistency. As far as possible already existing definitions shall be used: (29). The defined FRT event includes with its "voltage time- profile" already the times during and after the fault.	Disagree	Under curre of the NC R
NC RfG	WindEurope, Enercon	Article 2(63)	The stakeholders propose to add 'allowing to energize its power-generating facility' at the end of the definition.	Disagree	The definit owner's inte
NC RfG	CENELEC	Article 2(7)	The stakeholder proposes that the responsible legal entity of a power-generating facility should be the "operator" in the NC RfG documents and not the owner.	Disagree	As regards with the NC
NC RfG	CENELEC, EUTurbines, Enel Group	Article 2(68)	The stakeholders propose to replace 'less any demand or losses' with 'including any demand or losses' or include the word controllable.	Disagree	The definiti
NC RfG	Undisclosed stakeholder	Article 2(68)	The stakeholder suggests changing the words to 'maximum power consumption'.	Disagree	The definiti
NC RfG	Bundesverband Solarwirtschaft e.V., VDMA e.V., WindEurope, Iberdrola, AEE	Article 7(4)	One stakeholder proposes that the last sentence of paragraph (4) is deleted, since shorter time periods than two years (with no limit as to how short) to implement new requirements would impose difficulties on market participants. For the development of products to be distributed within the EU's internal market it is helpful to have the same timeline in each Member State. One stakeholder argues that regarding the provision that the Member State may provide for a shorter time period, it must be considered with all stakeholders and with respect to the best economic solution. There must be serious reasons here (e.g., critical grid stability). Another stakeholder proposes to increase the deadline for approval to three years. Two stakeholders propose that the proposal for requirements of general application, and the methodology used to calculate or establish them should be submitted.	Partly agree	Article 7(4) the method relevant sy implementa According t provide for at a politica Both the pr ACER has i
NC RfG	VDMA e.V.	Article 13(2)(b)(i)	The stakeholder proposes to specify conditions and requirements if stable operation implies a specific reaction in dynamic conditions.	Disagree	The provisi frequency i specified in provisions.

ing to the recital, the reactive power capability needs depend on factors including the degree of network meshing and the ratio of inind consumption. The NC RfG provides for capabilities for PGMs in o support the electricity system. ACER considers that it is important e requirements applied to the PGMs are proportionate to the um capacity of the PGM, as specified in the connection agreement agreed between the relevant system operator and the powerting facility owner.

applying NC RfG Member States, competent authorities and system ors should take into account agreed European standards and cal specifications as per Article 7(3)(f) of the NC RfG. The current ce is deemed sufficient for promoting further harmonisation through opean standards. Further, recitals do not contain legally binding ons.

mended the text to ensure clarity where required.

ning stable system frequency is not attributed to the PGM or HVDC Under current NC RfG the terms are sufficiently defined for the es of the NC RfG.

current NC RfG, the terms are sufficiently defined for the purposes IC RfG.

finition refers to notification issued prior to energisation of the internal network.

rds a power-generating modules, the entity responsible to comply NC RfG is the facility owner and not the operator.

inition follows the one for maximum capacity.

inition follows the one for maximum capacity.

(4) refers to the proposal for requirements of general application, or hodology used to calculate or establish them submitted by the t system operator or TSO. A shorter period could accelerate entation and provide clarity to stakeholders.

ng to the proposed provision, it is the Member State that may for a shorter period, thus ensuring that there is a broader consensus itical level.

e proposal and the methodology might not be needed. However, has introduced an amendment to clarify the provision.

ovision refers to the stable operation of the PGM when the system icy is between the specified frequency ranges and time periods ad in Table 2. Therefore, there is no need to amend the current ons.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Undisclosed stakeholder	Article 13(2)(b)(i)	The stakeholder proposes to add the following text: "which means that a PGM can re-establish a connection and active power after a loss of connection; this does not include V2G EVs connected to an V2G EVSE."	Disagree	The refe
NC RfG	Gunnar KAESTLE	Article 13(2)	The stakeholder proposes that the text in figure 1 about the Pref needs to be revised in such a sense that Pref should be the default value for both PPMs and synchronous PGMs.	Disagree	The differ different of option wo a high fr modules
NC RfG	Doosan Škoda Power a.s	Article 13(3)(g)(i)	As regards the response time of SPGMs when operating during LFSM-O mode, the stakeholder proposes to include that active power decrease events should be limited throughout SPGM lifetime as it is obvious such power change might influence lifetime of the turbine. The stakeholder argues that it cannot be generally accepted that all turbines can do such big change of power within so short time while continuing in operation without impact to its lifetime. Any longer time for 45% power reduction would be beneficial for plant stress reduction.	Disagree	The NC I the elect of the PC the SO security impact o
NC RfG	RES Group	Article 13	The stakeholder states that Article 13(3)(c) says "The frequency threshold shall be $50Hz+\Delta f1$ " but should be $50Hz-\Delta f1$ for LFSM-U. Seems like a copy/paste error from LFSM-O, and that Article 13(3)(g) refers to an undefined acronym "RSO" which should be relevant system operator Article 13(3)(g) refers to "Tresp in Figure XX, for active power decrease" however this figure XX illustrates active power increase The subscripts in figure 1 are practically illegible.	Partly agree	ACER har response in the cur
NC RfG	WindEurope, Enercon	Article 13(3), Article 15(2)	The stakeholders propose amendments to the article such as referencing the paragraph about droop settings, change block in real time LFSM-O to activate/deactivate without unintentional delay and allow the relevant system operator to determine more relaxed time responses.	Partly agree	ACER ag the TSO i for the us
NC RfG	Eurelectric	Article 14(2)	As regards the phrase "the TSO may specify shorter periods of time" the stakeholder argues that this could risk having too stringent and also divergent requirements across Europe.	Disagree	The flexil time durin connecte underfrec be retaine
NC RfG	WindEurope, Enercon	Article 14(2)	The stakeholder proposes amendments to the article such as removing requirements for Spain, and that wider voltage ranges shall not overlap the ranges for FRT.	Disagree	Provision Member provision specified
NC RfG	Doosan Škoda Power a.s, VGBE, EUROPGEN, EUTurbines, Swedenergy, WindEurope, Enercon, Moeller Operating Engineering GmbH, VDE FNN	Article 15(2)(c)(i)	The stakeholders argue that the frequency threshold shall be 50Hz- $\Delta$ f1 instead of 50Hz+ $\Delta$ f1 as the provision is about LFSM-U.	Agree	ACER ac amendme
NC RfG	Doosan Škoda Power a.s	Article 15(2)(d)	The stakeholder proposes changes to Figure 5 to illustrate the case of non-zero deadband and insensitivity and additional text to prescribe the calculation of the change in active power output.	Partly agree	Figure 5 capability deadband paramete Documen Article 15 within the needed.
NC RfG	Doosan Škoda Power a.s	Article 15(2)(d)(ii)	The stakeholder proposes to change the maximum admissible choice of full activation time in Table 5 for SA Ireland and Northern Ireland from 5 sec to 15 sec.	Disagree	Accordir choice o is 5 sec.

rred provision concerns the SPGMs and not ESMs.

erent definition of Pref for PPMs should be retained as it allows for operating regimes of these modules to be taken into account. Such ould enable at system level an equitable active power response to requency event irrespective of the number of power-generating in operation.

RfG provides for technical capabilities for PGMs in order to support tricity system. The impact these capabilities might have on the life GM is outside the scope of grid connection codes. Nevertheless, Regulation provides for TSOs reporting of relevant operational indicators (Article 15) which can contribute to assessing the overall of incidents on system users.

as corrected the acronym. Figure XX refers to the definition of e parameters. ACER has clarified this in the figure. Figure 1 exists rrent NC RfG.

grees to reference the paragraph about droop settings. However, in coordination with the RSO shall define the framework conditions se of the function to block LFSM-O mode.

bility for the relevant TSO to specify if needed shorter periods of ng which power-generating modules shall be capable of remaining ed to the network in the event of simultaneous overvoltage and quency or simultaneous undervoltage and over frequency should ed as this refers to the V/f ratio that PGMs can withstand.

ns for Spain exist in current NC RfG and have been agreed with States. ACER does not consider the need to change these ns. Article 14(2)(b) states that beyond the voltage range values I, the under and over voltage ride through immunity limits apply.

knowledges the need to amend the sign of the formula. Relevant ents have been introduced in the NC RfG.

in the NC RfG illustrates the active power frequency response y of power-generating modules in FSM with the case of zero d and insensitivity. More information and figures on these ers can be found in the ENTSO-E Implementation Guidance int on Frequency Sensitive Mode. Furthermore, it is evident from 5(2)(d) that the parameters are specified by each relevant TSO e ranges shown in Table 4, therefore the additional text is not

ng to ENTSO-E, the correct value for the maximum admissible of full activation time in Table 5 for SA Ireland and Northern Ireland



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	COGEN Europe, EUTurbines, WindEurope, Enercon	Article 15(2)(d)	The stakeholders propose changes to various parts of the article, such using droop requirement of 27% in table 4 only for ESMs, replace frequency response dead band for FSM with frequency response insensitivity for FSM, replacing for PGMs without inertia with ESMs and removing FSM from Table X.	Disagree	The highe in the enti Δf1 is use deleted. T response GL. The p RfG. ACE
NC RfG	Enercon	Article 15(2)(d)	The stakeholder proposes to add new point (v), providing that for PPM with volatile primary power source the combined effect of frequency response insensitivity and frequency response deadband shall not be smaller than 20mHz.	Disagree	Frequence of this glo band. Fo
NC RfG	EDF	Article 15(2)	The stakeholder considers that the point about LFSM-U in Article 15(2)(c)(ii) does not seem justified and that it should be erased. The stakeholder argues that new requirements should be duly justified for any type of grid user, based on a need clearly identified by TSOs in all transparency. The stakeholder regrets the lack of solid justifications and of cost-benefit analyses to justify new requirements. 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. As regards Article 15(2)(d)(iv), the stakeholder argues that the wording "shall be as short as feasible" is too vague, and extensive, which may lead to technical debates. As regards table 4 in Article 5(2)(d)(i), insensitivity is reduced from 30 mHz to 15	Disagree	As any d and prev importan ACER's a energy s As freque stability o the dead
			mHz. The stakeholder argues that new requirements should be duly justified for any type of grid user, based on a need clearly identified by TSOs in all transparency. The stakeholder regrets the lack of solid justifications and of cost- benefit analyses to justify this requirement and request its removal. As regards Article 15(2)(d)(i), the stakeholder argues that 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.		Article 15 U mode. included mode an
NC RfG	EDF	Article 15(4)	As regards Article 15(4)(b)(vi), the stakeholder requests for some clarification on what is expected from PGMs for their operation between 0 and their Minimal Operating Point and how long, in which conditions. The stakeholder argues that the reference mentioned in Article 15(4)(b)(iv) is invalid.	Disagree	Article 15 shall be s relevant mover te and LFSI
NC RfG	Doosan Škoda Power a.s	Article 15(4)(b)(iii)	The stakeholder proposes to clarify that, with regard to the capability to take part in island operation, if the island mode signal is not received from the TSO, it should be ensured by other means that AVR of SPGM is operating in voltage control mode with no superimposed regulation of reactive power nor power factor. The stakeholder argues that if the island mode is not signalled to the PGM and generator AVR is in reactive power control or power factor control, the voltage control might not be working well.	Disagree	Accordin in voltage control s during th operation operator. control o
NC RfG	Eurelectric, EDF	Article X(1)	The stakeholder requests what is the justification for 0,85 pu and argues that 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.	Disagree	Given the recomme requirement values pr are in line
NC RfG	Energie-Nederland	Article X(1)	The stakeholder argues that ACER/ENTSO-E should specify whether FRT is required for type A SPGMs in order to facilitate the level playing field.	Disagree	The FRT specified mandato

est values of droop are important in order to require a value of FSM ire ranges (see also ENTSO-E amendment proposal 25). Further, ed in Figure 5 for FSM therefore the reference to FSM cannot be The frequency response insensitivity and intentional frequency e dead band for FSM in the NC RfG is aligned with that in the SO provision regarding PGMs without inertia exists in the current NC Rf does not see the necessity to change it.

cy is common parameter for whole synchronous area, the stability lobal variable is strongly linked to the insensitivity and to the dead or safety reasons, this variable needs to be as small as possible.

delay in active power response is a crucial parameter for stopping eventing the change of frequency during system incidents, it is in that such parameter is as small as possible, especially for a PPM.

amendment proposal in Article 15(2)(d) introduces provisions for storage modules.

ency is a common parameter for the whole synchronous area, the of this global variable is strongly linked to the insensitivity and to band. For safety reasons, such variable needs to be as small as

5(2)(d)(i) refers to frequency sensitive mode (FSM) and not LFSM-. In FSM mode over frequency and underfrequency cases are I. Therefore, when switching from consumption mode to generation ad vice versa, electricity should be included for ESMs.

5(4)(b)(vi) of the NC RfG provides that the minimum operation time specified by the relevant system operator in coordination with the TSO, taking into consideration the specific characteristics of prime echnology. The references in Article 15(4)(b)(iv) refer to LFSM-O M-U provisions.

ng to Articles 17(2)(b) and 19(2) of the NC RfG the SPGM operates e control. Furthermore, Article 15(4)(b)(v) requires that the voltage system of the SPGM shall be able to continuously and stably operate he transition from interconnected system operation to island n without relying on information provided by the relevant system r. Reactive power and power factor control mode is not requested or operation mode of SPGMs.

he mass production of type A generating modules, the endation for type A PPM FRT capabilities is an exhaustive nent as a harmonised and predefined voltage-time profile. The roposed stem from the ranges provided for FRT for type B and they ne with the EN standard.

requirement for type A SPGMs is non-mandatory, and it is by the relevant TSO if required, whereas for type A PPMs is ry taking into account the different levels of penetration.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Doosan Škoda Power a.s, COGEN Europe, EUTurbines	Article 19(2)(a)(iii)	One stakeholder proposes that the PSS of the SPGM shall have the capability to damp inter-area power oscillations in the frequency range of, at least, 0,2 Hz – 1,0 Hz, instead of 0,1Hz-1.0Hz. The stakeholder argues that from practical point, the lower limit should be rather 0.2Hz, as it is more demanding on test duration and keeping stable power to evaluate frequencies lower than 0.2Hz from the measurement with band limited noise signal and the contribution to power damping of generators at such low frequency is negligible and accuracy of evaluation is questionable. Other stakeholders propose that the PSS of the SPGM shall have the capability to damp inter-area power oscillations in the frequency range of, at least, 0,3 Hz – 1,0 Hz, instead of 0,1Hz-1.0Hz.	Disagree	As inter importar
NC RfG	Doosan Škoda Power a.s	Article 19(2)(b)(ii)	The stakeholder proposes to replace the phrase 'bandwidth limitation of the output signal' with 'bandwidth limitation of the generator excitation system loop in relation to the influence to stator voltage and active power' as bandwidth limitation would not just limit the periodic output, but also the steep of AVR voltage output. In addition, if bandwidth limitation is required from TSO, it should be ensured by proper tuning of PSS main filters and R-T filter and studying of sensitivity of the system to frequencies of interest.	Partly agree	Accordir paramete agreeme system o has intro
NC RfG	COGEN Europe	Article 19(2)(b)(iii)	The stakeholder suggests removing the requirement for a stator current limiter. They argue that it is not necessarily needed, there is already the overexcitation limiter (OEL) that is limiting the permissible current on the stator based on thermal limits. OEL is defined on rotor thermal limit which is normally conservative compared to stator thermal limit.	Disagree	Both the
NC RfG	VDE FNN	Article 19(3)	The stakeholder considers that many power generating facilities are connected to the distribution network (110 kV). Therefore, the TSO should set the parameters, but any agreement or contract with the facility owner should be made by the relevant system operator.	Disagree	Article 19 an agree owner re aid angu oscillatio TSO sho
NC RfG	Swedenergy, Energie- Nederland	Article 19(4)	The stakeholders propose to delete Article 19(4)(a), since it is referring to Article 13(2)(b), which is excluded for type D according to Article 19(1).	Disagree	The cor Article 1
NC RfG	WindEurope	Article 27	As regards quick re-synchronisation capability, the stakeholders suggest that the relevant system operator in coordination with the relevant TSO and the power- generating facility owner could agree on a larger time limit than 15 minutes considering project specific design conditions.	Disagree	Article 1 synchro any exte operatin
NC RfG	VDMA e.V., CENELEC, COGEN Europe, EUGINE, EUROPGEN, EUTurbines	Article 13(3)(g), Article 13(7), Article 14(5)(d), Article 15(2)(c)(vi)	Some stakeholders propose to specify the interface for the external signal. In addition, some stakeholders propose to differentiate the response time per class of technology.	Disagree	More det standard adequate for incre the optic party ha
NC RfG	Eurelectric	Article 15(2)(c)	The stakeholder suggests erasing the point about LFSM-U in Article 15(2)(c) as it does not seem justified.	Disagree	The spec be retain NC RfG.
NC RfG	COGEN Europe, EUTurbines	Article 13(3)(h), Article 13(7), Article 13(8), Article 13(9)	The stakeholder proposes amendments to the capability of an electricity storage module to activate the provision of active power frequency response, to the capability of a PGM to be equipped with a communication interface and to the capability to connect to the network.	Partly agree	ACER c capabilit circuit br
NC RfG	VDMA e.V., CENELEC, COGEN Europe	Article 13, Article 14	The stakeholders propose to exclude small micro-CHP generators up to 50 kW from certain technical requirements in Articles 13 and 14.	Disagree	It is imp technica order to facility o the NC F
NC RfG	Undisclosed stakeholder	Articles 14, 17, 20, 31 and 32	The stakeholder proposes to delete type B PGMs due to the need to simplify the determination of significance of PGMs.	Disagree	Remova subsequ

area oscillations may occur in the range of 0,1 to 0,3 Hz, it is not to be able to damp these oscillations.

ng to Article 19(2)(b) of the NC RfG, bandwidth limitation is one ter and setting of the components that should be covered by an ent between the power-generating module owner and the relevant operator, in coordination with the relevant TSO. However, ACER oduced amendments to clarify this provision.

ese requirements are needed to cover all operating conditions.

9(3) of NC RfG refers to type D SPGMs and describes the need for ement between the relevant TSO and the power-generating facility egarding technical capabilities of the power-generating module to ular stability under fault conditions. Damping of power of system ons is a transmission system requirement, therefore the relevant ould be responsible for the tuning and approval of damping control.

rect reference has been included in Article 19(1) of the NC RfG. 3(2)(b) applies to type D.

5(4)(c)(ii) of the NC RfG provides that a PGM with a minimum remisation time greater than 15 minutes after its disconnection from ernal power supply must be designed to trip to houseload from any ag point in its P-Q-capability diagram.

Atailed information regarding the interface may be found in European ds and at a national level. Furthermore, the specific provisions ately describe the response time for active power decrease in case easing frequency for SPGMs and PPMs. The provision also covers on for slower response. In addition, Article 7(8) provides for any aving a complaint against a relevant system operator or TSO.

cific article provides requirements for LFSM-U that are important to ned. Moreover, this requirement is already provided in the current

considers that the current wording adequately describes these ties. However, ACER has amended the wording regarding the reaker in a way that is technology neutral.

ortant that all generation units at domestic level comply with the al requirements as specified in relevant articles of the NC RfG in o support the system. Nevertheless, relevant power generating owners may request a derogation to one or several requirements of RfG.

Removal of any type of PGMs should be followed by a clear indication of subsequent changes to technical requirements and demonstration of compliance rules.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	COGEN Europe, EUROPGEN, EUTurbines	Article 14(5)	Some stakeholders propose to reduce the number of protection schemes that may be required by the relevant system operator as some of these functions might not typically be applicable for type B units. In addition, provisions for data exchange for fault events are proposed. Some other stakeholders propose to change the quality of supply and dynamic system behaviour monitoring to fault recording.	Disagree	The flexit protectio generatic all protec 14(5)(d)( communi behaviou owner an TSO.
NC RfG	EDF	Article 14(5)	The stakeholder argues that it seems that there is an inconsistency in Article 14(5)(d)(iii), it is unapplicable to type D machines. 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 NC RfG version.	Disagree	For type I in the cu
NC RfG	WindEurope	Article 14(5)	The stakeholder suggests avoiding specific reference to EU Regulation. In case SO GL is updated then this reference does not work anymore.	Disagree	SO GL, relevant a NC RfG 2
NC RfG	VDMA e.V., ENTSO-E, undisclosed stakeholder, Oeterreichs Energie	Article 13a(2)	The stakeholders propose to define the cyber protection for the data exchange interface. They also propose to use a more generic definition, such as "communication interface".	Disagree	As the Ne the grid definition
NC RfG	E-REDES, Eurelectric	Article 17(4) (new provision), Article 20(2)(a)	One stakeholder proposes to add new paragraph 4 to Article 17 to provide that the relevant system operator shall have the right to send reactive power setpoints to the generation station. These setpoints shall be executed by the generation station. The stakeholders propose the same right to be included in Article 20(2)(a), in order to achieve an optimised reactive power flow in the network, as reactive power flows can vary daily, seasonally and from network to network.	Partly agree	ACER ag able to re operator However, of distribu
NC RfG	KCORC	Article 13(3)	The stakeholder proposes to add new points (i) and (j), providing that the "( <i>i</i> ) power-generating modules shall be capable of activating this provision with a power decrease response time as specified by the relevant system operator, in coordination with the relevant TSO, but always limited by the capabilities inherent to the power generating technology" and "( <i>j</i> ) the increasing and decreasing active power ramp rate shall consider the technical constraints of power generating module technologies as defined in Table X: Maximum active power ramp rates for various technologies". The stakeholder also suggests providing that if the active power change is greater than the given limits, the response time for the part of the active power change exceeding the given limit shall be as fast as possible. The power-generating facility owner shall justify the response time, providing technical evidence to the relevant TSO.	Disagree	The spec for active PPMs. Th
NC RfG	Swedenergy	Article 13(9)	The stakeholder notes that due to the reference to Article 13(7) which is excluded for type D, it is difficult to have Article 13(9) to be valid for type D. Additionally, the requirement for type D concerning connection/synchronisation is in Article 16(4) for type D. Considering that, it is suggested to provide in Article 19(1) that also Article 13(9) is excluded from application for type D.	Partly agree	The inco
NC RfG and NC DC	Finnish Energy	Article 14(2), Article 14a(2) (NC RfG) Article XX, Annex II (NC DC)	The stakeholder considers that 1 pu should be defined more clearly. In Finland, 110 kV network is generally operated at 118 kV. It was inquired whether 1 pu the nominal or normal voltage. The stakeholder argues that this may have significant outcomes regarding, for example, the voltage withstand capabilities of network equipment if 1 pu is 118 kV. It was requested to double-check this with the Finnish TSO Fingrid. The stakeholder also argues that the short measurement window of frequency should be reviewed thoroughly, especially for smallest demand units.	Disagree	Article 14 in the tal in coord voltage s provides differ fo propose on the s

bility for the relevant system operator to decide on the necessary on scheme aspects based on their network and the available on fleet should be retained. In any case, there is no obligation that ction scheme aspects should be covered. According to Article (v) of the NC RfG settings of the fault recording equipment and the ications protocols for quality of supply and dynamic system ar monitoring shall be agreed between the power-generating facility and the relevant system operator in coordination with the relevant

D PGMs, Article 15(5)(b)(i) applies. These are provisions that exist rrent NC RfG.

namely, Regulation (EU) 2017/1485 continues to apply even if amendments were introduced following the entry into force of the 2.0.

etwork Code on Cybersecurity will apply to data exchange per se, connection network codes do not need to include any specific n. The Network Code on Cybersecurity will define its own scope.

prees with the proposal that the power generating module shall be beceive and react to an external signal allowing the relevant system to transmit reactive power or voltage control mode set points. , it would be beneficial to the system and for the potential increase uted generation to allow such requirement for type A as well.

cific provisions for LFSM-O adequately describe the response time e power decrease in case of increasing frequency for SPGMs and he provision also covers the option for slower response.

prrect reference to Article 13(7) was changed to Article 13(8).

4(2)(a)(i) of the NC RfG provides that for rated voltages not included bles and above voltage level 110 kV the relevant system operator dination with the relevant TSO shall specify the ranges of the network at the connection point. Furthermore, Article 13(3) of the NC DC s that for other grid voltage levels the reference 1 pu voltage may or each system operator in the same synchronous area. The ed maximum frequency measuring time window is achievable based state-of-the-art technology.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Swedenergy	Article 14(2)	The stakeholder considers that use of "rated voltage" in Article 14(2)(i) is incorrect and it needs to be changed to "nominal voltage". It was also argued with regard to point (iv), that the fixed reference value for 400kV-level is not optimal to some synchronous areas from a system perspective with all PGMs designed to a historically different reference value. It was proposed to allow, within the synchronous area, to choose the best reference value for the system stability and security perspective. As for Table XX2, 0.85 to 0.90 p.u. is an added voltage range for Nordic area. The stakeholder argues that this requirement drives the plant designs towards the use of OLTC for transformers connected between plant and grid. This has not been the praxis for the Nordic power system in history until now and enhances new modes of failure to the system.	Partly agree	ACER ac voltage'. As regar RfG, in A does no Accordin for opera than 60
NC RfG	Enel Group	Article 13(3), Article 14(2), Article 14(3),	The stakeholder proposes to enforce the role of DSO in points (g) of Article 13(3), (i) and (vi) of Article 14(2), (iv) of Article 14(3). The stakeholder also suggests providing regarding Table XX.1 and XX.2 that the maximum high voltage value shall be coordinated with the relevant IEC standards for the equipment manufacturing and testing.	Disagree	Accordin relevant the volt adequat proposa sufficien
NC RfG	Moeller Operating Engineering GmbH, VDE FNN, Swedenergy	Article 14(3)	The stakeholder proposes rephrase the paragraph so as to read "longer" times or "higher and longer times".	Agree	Relevan
NC RfG	EDF	Article 14(3)	As regards Figure X "High voltage-ride-through profile of a power-generating module", the stakeholder suggests the addition of the sentence: 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. Urecf is the maximum voltage specified in paragraph 2. The stakeholder requests what is the voltage level before the beginning of the over-voltage profile. (Urecf? 1 pu?)	Partly agree	The volt specified
NC RfG	Swedenergy	Article 14(3)	The stakeholder proposes to exclude the requirement in Article 14(3)(a)(v) for type D and only leave the requirement in Article 16(3)(b), arguing that since the text is the same it might cause issues if either of them will be amended in the future. As regards point (c), the stakeholder suggests that the plan oner needs to be a part of the process if higher ranges than in Figure X shall be designed for. This cannot be decided only by SOs/TSOs.	Partly agree	Article 1 feasibilit times for
NC RfG	Enel Group	Article 14(3)	The stakeholder proposes to add in point (iii) that the lower limit shall be specified by the relevant TSO using parameters in Figure 3 "or in harmonised standards if more stringent", arguing that each relevant system operator is already able to make publicly available the pre-fault and postfault conditions for the fault-ride- through capability.	Disagree	When an system of and tech referenc through
NC RfG	Swedenergy	Article 16(3)	The stakeholder proposes to compliment that the voltage-against-time profile specified by the relevant TSO need to take the network topology for plant connection into consideration. The stakeholder suggests deleting the parenthesis in Table 7.1.2 as it is unclear and not specificon who has to justify the system protection and secure operation needs. It was also proposed to provide in Article 16(3)(a) that the need to enlarge the time range above time limits set in Table 7.1.2 (up to 0,25 seconds) may be agreed with PGM owner, only if justified by the relevant TSO that there are system protection and secure operation needs.	Disagree	Current Member provisio against-
NC RfG	WindEurope	Article 25(3)	The stakeholder proposes to add that requirements on the voltage ranges 0,85 to 0,9 as well as 1,1 to 1,15 pu. are only applicable when explicitly required by the TSO. Also, to include the 66kV voltage with the same ranges as 110 kV.	Disagree	The volt stakeho robustne relevant

cknowledges the need to provide clarity regarding the use of 'rated'. Relevant amendments have been introduced to the NC RfG.

ards point (iv), such provision is already included in the current NC Article 16(2)(a)(iv) and has been agreed with Member States. ACER ot see the necessity to change this provision.

ng to Table XX2 for the voltage range 0,85-0,90 pu the time period ation shall be specified by each TSO, however, should not be more minutes.

ng to points (i) and (vi) of Article 14(2) of the NC RfG, it is for the system operator in coordination with the relevant TSO to specify tage ranges. ACER considers that the current provisions are tely described. The voltage ranges have been amended based on als from several stakeholders relating to the need to maintain at levels of system robustness.

at amendments have been introduced in the NC RfG.

tage level prior to the beginning of the high-voltage profile is not d. Relevant amendments have been introduced in the NC RfG.

16(3)(a) apply to type D PGMs. The technical and economic ty of the PGM should be taken into account when applying longer r operation.

pplying the NC RfG, Member States, competent authorities and operators should take into account the agreed European standards nnical specifications as per Article 7(3)(f) of the NC RfG. The current ce is considered to be sufficient for promoting further harmonisation the European standards.

provisions in Table 7.1.2 of the NC RfG have been agreed with States. ACER does not see the necessity to change these ons. ACER considers that the current wording regarding the voltagetime profile adequately describes the requirement.

tage ranges have been amended based on proposals from several Iders relating to the need to maintain sufficient levels of system ess. Voltage levels for voltages below 110kV are specified by the system operator.


Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EU DSO, EDP, Eurelectric, E-REDES	Recital (18)	The stakeholders suggest that it is important to recognise that fault ride through is a requirement in relation to faults on the transmission system only. The stakeholders recommend that this distinction is made clear from the first opportunity in the NC RfG.	Agree	ACER ag
NC RfG and NC DC	CENELEC, Enel Group	New recitals, Article 7, Article 13, Article 47, Article 48, Article 54, Article 55 (NC RfG) Article 25, Article XX+2, Article XX+3, Article 35 (NC DC)	The stakeholders propose new recitals noting that technical specifications for interoperability of recharging and refuelling points and for grid connection should be specified in European or international standards.	Partly agree	Interoper (27) adeo establish requirem RfG and promotin
NC RfG	EDF	Article 2(17)	The stakeholder suggests an editorial modification in the definition of "power park module", to add the words 'or to a' to the last sentence.	Disagree	ACER co the notio
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Article 2(17)	The stakeholder proposes to either differentiate centrally by amending the definition, so that PPMs are only converter based generators (full convertors or DFIGs) or do not forget to check each requirement on PPM if there is an exception according to EN 50549 (for µCHP up to 50 kW, and asynchronous generators used for other microgenerators), see also in the report of the Expert Group on type A about the Expert Group on type A on the relevance to the power system of micro CHP. The stakeholder argues that the definition " '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, distribution system including closed distribution system or HVDC system" cannot distinguish between asynchronous generators and converter based generators, although these two technology have different features and capabilities.	Disagree	The additi in the defi PGM doe generated voltage ar to be a P PPMs.
NC RfG	AEE, WindEurope, Enercon	Article 2(22)	The stakeholders propose to reword the definition of frequency to be more precise than 50HZ as the NC RfG 2.0 text also addresses phenomena in the frequency range 0.2Hz up to 9kHz. The stakeholders consider that in the interest of system stability it is not acceptable that a key electrical value like frequency remains with such a blurry "definition". In addition, one stakeholder proposes to include that the frequency is calculated based on the measurement of this physical quantity over a gliding 200 ms time window.	Disagree	The curre purposes dependin
NC RfG	WindEurope, Enercon	Article 2(24)	The stakeholders request to clarify difference to definition (50) and they pose the following questions: 'What for is a "minimum regulating level" if it is not "stable"? If there is a timely difference between (24) and (50) this must be quantified'.	Disagree	The define current de NC RfG.
NC RfG	WindEurope, Enercon	Article 2(29)	The stakeholders propose that the definition for fault-ride-through includes the over voltage requirement.	Disagree	It is imp requirem voltage c
NC RfG	Enercon	Article 2(33), Article 2(40), Article 2(62)	The stakeholder proposes amendments to the definitions.	Disagree	The defir agreed w these de
NC RfG	Enercon	Article 2(69) and Article 2(70)	The stakeholder suggests that there should be consistency of terms and since the definition (67) mentions "inject" and "consume", these shall be the terms for the two possible flow directions of power used throughout the document.	Agree	Relevant
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 2(76) (new)	The stakeholder proposes to introduce a definition of 'mixed customer sites' as the combination of demand facility and a power-generating facility at a connection point.	Disagree	In ACER
NC RfG and NC DC	ENTSO-E	Article 7(4) (NC RfG) Article 6(4) (NC DC)	The stakeholder suggests that it should be possible to coordinate with the relevant TSO if it is feasible or if this shorter time is linked to system needs.	Partly agree	It is imp However will invol
NC RfG	CENELEC	Article 7	The stakeholder proposes to replace competent entity with designated entity.	Disagree	These tw

prees to clarify this in the recital. Relevant amendments have been ed in the NC RfG.

rability issues are out of scope of the NC RfG. Furthermore, recital equately describes the need to take into particular consideration ned technical standards in the development of connection nents. In addition, the current reference as per Article 7(3)(f) of NC Article 6(3)(f) of the NC DC is considered to be sufficient for ng further harmonisation through the European standards.

onsiders that the already specified definition adequately describe on of maximum capacity.

tion, of *"which is not a synchronous power-generating module and"* finition of PPM in the amendment proposal, aims to clarify that if a es not fall within the definition of SPGM ("the frequency of the d voltage, the generator speed and the frequency of network re in a constant ratio and thus in synchronism") then it is considered PPM. This clarifies also that DFIG and induction generators are

ent definition of frequency is sufficient to define the term for the s of the NC RfG. Furthermore, measurement window can vary ng on the application.

nitions are used for different requirements in the NC RfG. The efinitions are sufficient to define the terms for the purposes of the

portant to note that the HVRT requirement is separate from ent on FRT capability as overvoltages are not synchronised with dip.

nitions are the same as in the current NC RfG and they have been vith Member States. ACER does not see the necessity to change finitions.

amendments have been introduced in the NC RfG.

is view, PGM requirements should be the same irrespective of a plant is connected to a MCS or to the RSO's network.

ortant that the Member State may provide for a shorter time. r, it is anticipated that the decision to provide shorter time period live the relevant TSO.

wo notions are not interchangeable.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	CENELEC, EFAC, Enel Group	Article 13(3)(a)	The stakeholderspropose to clarify that the frequency threshold is specified in para. (c) below and not by the TSO.	Agree	Relevant
NC RfG	CENELEC, VGBE	Article 13(9)	The stakeholder suggests that in case of small size PPMs the synchronisation is not done with circuit breakers. It should be stated in a way which is technology neutral to allow other suitable switch types.	Agree	ACER ag neutral. R
NC RfG	COGEN Europe, EUTurbines	Article 14(2)(a)	The stakeholders propose that voltage deviation should not be at PGU terminals. In addition, a requirement for simultaneous overvoltage and underfrequency is proposed.	Partly agree	Article 41 connectio underfree
NC RfG	ENTSO-E	Recital (27)	The stakeholder proposes that European standardisation organisations should not be involved in the development of non-exhaustive requirements.	Disagree	There is n the develo extent pos benefitting exhaustive organisati
NC RfG	VDE FNN	Recital (2)	The stakeholder suggests that national methodologies would contradict all efforts of achieving cost efficiencies on the side PPM constructors and operators, which are regarded as market integration issues by the standard below. The aim is to achieve international solutions.	Partly agree	Harmonis be set ou facilitate the integ allow mo consume when est
NC RfG	VGBE	Recital (27)	The stakeholder proposes that European standardisation organisations shall be involved in the development of non-exhaustive requirements.	Disagree	The NC F Neverthe requireme standard
NC RfG	Fingrid Oyj	Recital (27)	The stakeholder generally agrees on the component level but argues that the compliance of power plants as an entity has to be ensured. Consequently, proper design of the entire power plant to work as a whole has to be emphasised.	Partly agree	The NC R compliance
NC RfG	Finnish Energy	Recital (27)	The stakeholder generally agrees with the amendments but notes that the standardisation can take time and it does not make compromises to meet deadlines. If the standardisation process regarding these requirements is not already ongoing, it is a clear case for improvement in the drafting of future NCs.	Partly agree	The cons for all PG "Developi possible, therefore, conseque
NC RfG	ENTSO-E, Terna Spa	Recital (27), Recital (28)	The stakeholders propose to add provisions for extended system support by PGMs beyond the frequency, voltage or reactive power capabilities, in the NC RfG. The stakeholder argues that these extended capabilities should not be withheld unjustifiably.	Disagree	ACER un contributi the frequ requireme economic
NC RfG	ENTSO-E	Recital (32)	The stakeholder proposes that recital (32) should be part of the Article 70a.	Disagree	The recita therefore legal cert
NC RfG	VGBE, Enercon	Article 2(9)	The stakeholder proposes an amendment to the definition of synchronous power-generating module.	Disagree	ACER connection of
NC RfG	Enercon	Article 2(10), Article 2(10a)	The stakeholder proposes to add that the compliance with the technical criteria is set out in <i>the applicable national implementation of</i> this Regulation, arguing that PGMD already exist in some countries, such as NL or DE. Key criteria for the PGMD are that specific non-exhaustive criteria from the RfG are met. A PGMD that is only based on the exhaustive criteria from RfG2.0 would help, it would especially not meet the expectations from the RSO.	Disagree	Definition The docu with the te Definition change it.

amendments have been introduced in the NC RfG.

grees with amending the wording in a way that is technology Relevant amendments have been introduced in the NC RfG.

I(2)(a)(i) of the NC RfG specifies that voltage ranges apply at the on point. Provisions for simultaneous overvoltage and quency may be specified by the relevant TSO.

no obligation to involve European standardisation organisations to opment of non-exhaustive requirements as the recital refers to the ssible. ACER underlines that a higher degree of harmonisation, g the EU consumer, will be achieved if the development of the nonre requirements is carried out involving European standardisation tions, which should already be the case.

ised rules for grid connection for power-generating modules should ut in order to provide a clear legal framework for grid connections, Union-wide trade in electricity, ensure system security, facilitate gration of renewable electricity sources, increase competition and ore efficient use of the network and resources, for the benefit of ers. However, it is also appropriate to consider regional specificities tablishing network connection rules.

RfG cannot impose such a requirement on the mentioned entities. eless, ACER understands that non-site specific and non-exhaustive ents are in any way developed in coordination of European lisation organisations.

IfG provides for technical requirements and demonstration of ce rules for PGMs.

sideration of the EU/international standards is prescribed uniformly Ms in Article 7 while Recital (27) has been improved to ensure that ment of non-exhaustive requirements should, to the extent be carried involving European standardisation organisations; , permitting the evolution of product standards and, as a ence, the adoption of the same by the industry."

nderstands the benefit of PGMs continuous system support and ion to overall system robustness under system conditions beyond uency or voltage defined in the NC RfG. However, additional ents can be included in the connection agreement, respecting their c and technical feasibility.

al provides context and background information to the provisions it should remain. ACER included provisions in Article 71 a to add tainty as to the application of Regulation (EU) 2016/631.

onsiders that the proposed definition adequately describes the f SPGM.

(10) in the current NC RfG has been agreed with Member States. ment confirms that compliance of the power-generating module echnical criteria set out in the NC RfG has been demonstrated. (10a) is based on definition (10). ACER does not see a need to



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Enercon	Article 2(12)	The stakeholder proposes to add the wording at the end "which are not part of a power-generating facility", arguing that it is a key to define where "network" starts and ends. By clarifying this is not part of the PGF, hence in view of the power inflow from the PGF into the grid behind the connection point, it becomes clear.	Disagree	Definition ACER doe
NC RfG	ENTSO-E, EU DSO, Oesterreichs Energie	Article 2(15), Article 2(16), Article 2(68)	One stakeholder proposes to clarify that the connection point is reflected only to an AC electrical interface. In addition, they propose to remove the phrase 'by appropriate means'. One other stakeholder proposes to add where an agreement is not required by the relevant SO.	Partly agree	ACER agr electrical i is no con NC RfG).
NC RfG	EU DSO	Article 2(14), Article 2(16)	The stakeholder suggests that it should be made clear in the definitions of 'Pmax' and 'connection agreement' that 'Pmax' is distinct from the facility maximum import or export values at the connection point and 'Pmax' should take account of reactive current.	Partly agree	ACER cor of maximu
NC RfG	COGEN Europe	Article 2(16)	The stakeholder proposes that Pmax shall be referred to specific ambient and operative condition.	Disagree	Pmax refe generating
NC RfG	ENTSO-E	Article 2(69), Article 2(70), Article 2(71), Article 2(72)	The stakeholder proposes to replace grid with network. There is a clear use of the term network in the NC RfG.	Agree	Relevant
NC RfG	COGEN Europe	Article 2(44)	The stakeholder proposes changes to the definition as houseload can be also an intentional disconnection from the grid.	Disagree	ACER c houseloa
NC RfG	VGBE, CENELEC, COGEN Europe, EUTurbines, Bundesverband Solarwirtschaft e.V., RWE AG, Solar Power Europe, CEZ, Eurelectric	Article 4(2)	Some stakeholders propose that a power-generating module should be considered existing if the power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by three years or even more as decided at national level by the NRA for specific technologies. Other stakeholders propose also to include that a power-generating module should be considered existing if the power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by one year after the designated entity made a decision on requirement proposals according to Article 7(6), whichever is the later. Other stakeholders question the difference of 2 years for SPGMs and 3 years for PPMs and suggest that it is 3 years for all PGMs. In the stakeholder's view, this would mean that if the generating plant by 3 years after the entry into force of this Regulation, it would not apply. The stakeholders also propose that besides TSOs, DSOs should be included here to propose additional criteria defining a significant modernisation.	Disagree	ACER co requirem In additic shorter ti Furtherm proposal public co Undoubte and adop expected
NC RfG	E.ON	Article 4(2)	The stakeholder proposes to introduce the words 'on the date of entry into force of this Regulation' as it questioned whether the contract must be concluded at the time of entry into force and should only the delivery of the main components take place within the 2 years, or whether the contract only be concluded within the period.	Disagree	Accordin two years
NC RfG	CEZ, Eurelectric	Article 4(3)	As regards the cost-benefit analysis, the stakeholder stressed the importance of taking into account market parties, especially the role of the generating asset owner in this exercise, and to clarify who is expected to carry the burden of the costs – any CBA should be neutral and ensure a level playing field between the SOs and generators.	Partly agree	Accordin consultat Member to existin
NC RfG	National Grid ESO	Article 4	The stakeholder argues that it is very unclear how the requirements will apply to i) generation caught prior to RfG 1.0, ii) generation caught by RfG 1.0 and iii) generation caught by RfG 2.0. We believe this needs to be articulated in RfG 2.0 a more precise way so that it is clear what requirements apply to what party.	Partly agree	ACER ag ensure le
NC RfG	EDF	Article 4	The stakeholder proposes adding wording to paragraph (2)(b), in order to propose three years for all PGMs. The stakeholder considers 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 should not apply.	Disagree	ACER co requirem

(12) in the current NC RfG has been agreed with Member States. es not see a need to change it.

rees to clarify that the connection point is reflected only to an AC interface. However, the phrase aims at covering cases where there nection agreement (connection agreement is not required by the

nsiders that the specific definitions adequately describe the notion um capacity.

fers to the maximum continuous active power which a powerng module can produce and not to any conditions during operation.

amendments have been introduced in the NC RfG.

considers that the current definition adequately defines the ad.

onsiders that three years should be used for the grid forming nents only.

ion, according to Article 7(4) the Member State may provide for a time period for all or parts of the requirements or the methodologies. nore, according to ACER proposed Article 4a(1) in developing the als, the TSO shall coordinate with relevant DSOs and conduct a onsultation in accordance with Article 10.

edly the European Commission will coordinate any grace periods ption related issues with Member States. Moreover, the NC RfG is I to be adopted in late 2024.

ng to Article 4(2)(b) it is the contract that has been concluded by rs after the entry into force of the Regulation.

ng to Article 10(1), relevant TSOs shall carry out a public tion with stakeholders, including the competent authorities of each State, on the proposals to extend the applicability of the NC RfG ng power-generating modules in accordance with Article 4(3).

grees with the need to improve the clarity of the text in order to egal certainty and revised Article 70a accordingly.

onsiders that three years should be used for the grid forming nents only.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VGBE, COGEN Europe	Article 6(4)	One stakeholder proposes to include type D PGMs of facilities for combined heat and power production embedded in the networks of industrial sites relating to the capability to maintain constant active power output or to modulate active power output. Another stakeholder notes that the sentence shall force to have an explicit statement in the NC RfG.	Disagree	The purp types of technolo the capa is incluo adequat generati embedd
NC RfG	VGBE, COGEN Europe, Eurelectric, EUTurbines, WindEurope, EDF	Article 7(3)	Some stakeholders propose to remove or amend the provision that local system needs should be considered. Another stakeholder proposes to delete Article 7(3), as this gives TSOs extensive competencies without evident justification. Another stakeholder proposes that IEC and EN testing standards are accepted to verify compliance against this document.	Disagree	Identified specifyin of the No operator discrimin conside when ap sufficien standard
NC RfG	EU DSO	Article 7(9)	The stakeholder argues that this paragraph should be deleted. The requirement was probably appropriate in 2016 as the NC RfG was being originally implemented. However, the NC RfG has been in force for several years and is well established. In addition, it is also inappropriate for TSOs to develop those requirements which DSOs should develop, given DSOs' legal duties under Regulation (EU) 2019/943.	Disagree	This pro with Mer basis to
NC RfG	EU DSO, EDP, E- REDES, Eurelectric, Enel Group	Article 11	The stakeholders propose to add into the article the EU DSO Entity for the purposes of the responsibility for stakeholder engagement as now it is shared between ENTSO-e and the EU DSO Entity.	Agree	Relevan
NC RfG	EU DSO	Article 13(2)(a)	The stakeholder proposes that the time period for operation for the frequency range 47,5Hz to 48,5 Hz is standardised at 90 mins. This is in line with EN 50549-10 and would be more consistent for manufacturers and RSOs.	Disagree	The flexi standard
NC RfG	EUTurbines, Oesterreichs Energie	Article 13(2)(a)	One stakeholder proposes to have a maximum time of 30min associated to a single event for frequency between 47.5Hz-48.5Hz and 51Hz-51.5Hz. 30 minutes associated to a single event is considered already a pretty long time (nowhere else such long time associated to large frequency deviation are present). Another stakeholder proposes to harmonise the frequency ranges, 47,5 Hz-48,5 Hz for 60 min, 48,5 Hz-49,0 Hz for 90 min, 49,0 Hz-51,0 Hz for unlimited, 51,0 Hz-51,5 Hz for 30 min.	Disagree	The flexi standard
NC RfG	Undisclosed stakeholder	Article 13(2)(a)	The stakeholder suggests that it should be made explicit what the effect is if type A PGMs do not comply with the rates-of-change over time. It should be possible to add a bandwidth in time or infrequency a PGM has to comply with.	Disagree	Accordin that ead applicab Furthern refuse to not com covered
NC RfG	Finnish Energy	Article 13(2)(b)	The stakeholder suggests that the requirement should be compatible with EN 50549-1, given the 500 ms measurement window for >2 Hz/s RoCoF tripping. However, care should be taken that PGMs are tested accordingly, to withstand the 4 Hz/s requirement.	Disagree	As in the serve as on RoCo needs.
NC RfG	Enel Group	Article 13(2)(b), Article 13a(1)	The stakeholder proposes to compliment in point (iv) that the thresholds of the RoCoF-type loss of main protection "shall not jeopardise frequency ride-through performance except in case of local and temporary needs".	Partly agree	The loc frequenc in coord of-chang
NC RfG	Enel Group	Article 13(2)(c)	The stakeholder notes that the reference to (b)(iii) is wrong as it should be (b)(iv).	Agree	Relevan

pose of this article is not to introduce an overall exemption for all f customers and heat demand which would imply an overall ogy-specific exemption of all CHP units. Furthermore, the limit for acity threshold for type D for the Nordics is 30 MW, therefore type D ded for the Nordics. ACER considers that the current wording tely describes the exception from requirements for powering modules of facilities for combined heat and power production ed in the networks of industrial sites.

In a down of the second second

ovision is the same as in the current NC RfG and has been agreed mber States. ACER does not consider that there is concrete legal remove this provision.

t amendments have been introduced in the NC RfG.

ibility to set different times for the frequency ranges in line with the ds should be retained.

ibility to set higher times for the frequency ranges in line with the ds should be retained.

ng to Article 40(1), the power-generating facility owner shall ensure ch power-generating module complies with the requirements ble under the NC RfG throughout the lifetime of the facility. more, Article 3(1) provides that the relevant system operator shall b allow the connection of a power-generating module which does apply with the requirements set out in the NC RfG and which is not I by a derogation.

e past and in the case of other requirements, the network codes the appropriate acts to establish new standards. The requirements oF contained in the NC RfG reflect the present and future system

cal system needs are covered since, if the rate-of-change-ofcy is used for loss of mains protection, the relevant system operator, dination with the relevant TSO, shall specify the threshold of this ratege-of-frequency-type loss of mains protection.

nt amendments have been introduced in the NC RfG



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EU DSO, E.ON	Article 13(2)(c)	The stakeholders suggest that in order to ensure that DSOs' anti-islanding protection is not compromised, the words "anti-islanding schemes" should be added to paragraphs 13.2(c).	Disagree	Article13 not of DS of PGM schemes
NC RfG	Swedenergy	Article 13(2)(c)	The stakeholder proposes to exclude type D from the application of this provision, as it refers to point (b), which is excluded from type D according to Article 19(1).	Disagree	The inco excluded
NC RfG	EU DSO, E.ON	Article 13(2)(d)	The stakeholders propose that for some Member States an operating period of 10s for 52,5Hz it interferes with the arrangements for controlling DSOs' standby power supplies. Changing this to 5s would avoid this and obviate the need for these control schemes to be reengineered.	Disagree	ACER u PGMs th are exer Furthern to the gri high free
NC RfG	EU DSO, Enel Group	Article 13(7)	The stakeholders propose that the signal to a type A PGM (notjust to an ESM) would be for the modulation of active power output – as the control cannot just be one way, i.e., for when the restriction on active power output is removed.	Disagree	ACER co a commu active po
NC RfG	Enel Group	Article 13(7)	The stakeholder also proposes to provide that the TSO in agreement with the relevant system operator shall define the framework conditions for the use of this function adopting a proper communication network.	Disagree	lt is th requiren remotely
NC RfG	EU DSO	Article 13(9)	The stakeholder is proposing some changes to this paragraph because DSOs need to be able to change the default settings. Apart from operational needs of local networks, some countries have or plan to have in place stricter ranges that need to be reflected in order to be in coherence with the National Regulation. For example, in Spain DSOs must comply with Royal Decree 1955/2000 and maintain voltage within the range of $\pm$ 7%, which will not be possible if PGMs are allowed to work outside of this range.	Agree	ACER a unless s with the Relevan
NC RfG	EU DSO, EUROPGEN, Eurelectric, Bundesverband Solarwirtschaft e.V., VDE FNN, EUTurbines, Oesterreichs Energie, WindEurope, Enercon, ACCIONA, AEE	Article 13(10), Article 17(2), Article 20(3), Article 21(4)	Some stakeholders propose to add that the power generating module shall be capable of providing reactive power automatically by voltage control mode, reactive power control mode, power factor control mode or active power-related power factor control mode (as is specified in EN 50549). In addition, the power generating module shall be able to receive and react to an external signal allowing the relevant system operator to transmit reactive power or voltage control mode set points. Other stakeholders propose to clarify this requirement as it could lead to multiple possible interpretations. The device cannot guarantee constant voltage at its terminals. It can only contribute to a more constant voltage. Also, the reactive power should be always in line with the P-Q capability chart. One stakeholder proposes that the control mode should be specified in coordination with the power park module owner. Two stakeholders argue that any additional reactive power capability shall be always procured by market-based ancillary services.	Partly agree	ACER ag Relevan This rec generati control r The PGI exportin
NC RfG	EUTurbines	Article 17(2)(a)	The stakeholder proposes to add boundary limits of the expected reactive power capability. They shall not exceed type C/D limits and in general they shall be defined based on typical capabilities associated to technologies.	Partly agree	The tech when sp Relevan
NC RfG	EUROPGEN	Article 17(2)(b), Article 19(2)	The stakeholder proposes to remove under and over-excitation limiter requirements as it is not within the responsibility of RfG to specify the method of implementation within the power generating units. This is a matter of system design of power-generating units.	Disagree	The NC Conseq the volta or over-6
NC RfG	EU DSO, VDE FNN, E.ON	Article 13(11)	The stakeholders propose to block LFSM as it may be important for local network management reasons. EU DSO proposed for LFSM-O for PGMs in Article 13 and LFSM-U for PGMS in Article 15. It is also appropriate to add this for PGMs incorporating storage in Article 13.	Agree	Relevan
NC RfG	Enel Group	Article 13(11)	The stakeholder proposes that the interval or limits of thresholds for $\Delta f1$ are reported directly in Article 13 (paragraph 3(c)). In point (e) is clarified the reference to ESM since they are defined in Article 2.	Disagree	Δf1 is de 13(3).

3(2)(c) of the NC RfG concerns protection schemes of PGMs and SO to TSO interface point. With regards to the protection schemes is including PGMs connected to the DSO grid, no protection is should jeopardise the robustness against RoCoF.

orrect reference was amended in Article 19(1), type D is not ad from the application of Article 13(2).

understands that the issue is linked to the technical capability of hat were installed by DSOs to provide back-up power. Those PGMs mpted from the requirements of the NC RfG (see Article 3.2.(b)). more, these backup PGMs do not normally operate synchronously rid (i.e., island mode operation) and for that reason do not encounter equency events.

onsiders that type A PGMs (except ESMs) should be equipped with unication interface (input port) in order to reduce and not modulate ower.

ne responsibility of the relevant system operator to specify nents for equipment to make the power-generating facility operable y, based on their system needs.

acknowledges the need to clarify that the default settings apply specified otherwise by the relevant system operator in coordination relevant TSO.

at amendments have been introduced in the NC RfG.

grees to provide clarity with regard to the control modes.

nt amendments have been introduced in the NC RfG.

quirement could help to increase the penetration of distributed ion. However, the relevant system operator should specify the mode.

M should supply or absorb reactive power both when importing or ag active power over its operating range.

ssues are out of scope of the NC RfG.

nnical characteristics of the SPGM should be taken into account pecifying the reactive power capability.

t amendments have been introduced in the NC RfG.

RfG provides for technical requirements for connection of PGMs. uently, the specific provisions require a function to be included in age control system to limit the excitation of the SPGM in an under excited condition. The method of implementation is not specified.

t amendments have been introduced in the NC RfG.

efined in Article 15(2)(d). The response time is defined in Article



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	COGEN Europe, Eurelectric, EUTurbines, Gunnar Kaestle	Article 13(3)(g), Article 15(2)(c)(ii)	The stakeholders suggest removing the provision that the power generating module shall be able to receive and react on an external signal allowing the relevant system operator to block active power LFSM-O mode in real-time from the text since it is introducing a higher complexity and may arise legal responsibility topics and cybersecurity issue.	Disagree	The spec Furtherm sensitive the NC R
NC RfG	COGEN Europe, EUTurbines	Article 15(4)(a)	The stakeholder proposes amendments with regard to black start capability, such as to remove the requirement for LFSM, add provisions regarding load acceptability, delete the word parallel from the phrase 'be capable of parallel operation' and delete the word automatically from the phrase 'control voltage automatically'.	Disagree	The blac mode ne to contro the whole maximum parallel o required
NC RfG	EU DSO	Article Y(4)	As regards the voltage range after the fault has been cleared, the stakeholder proposes to add that other range may be specified by the relevant system operator in coordination with the relevant TSO.	Disagree	The volta
NC RfG	VGBE	Article 15(2)(c)	The stakeholder argues that it is not clear what LFSM-U provision prevails for type C ESM, the one in Article 13(11) or in Article 15(2)(c). In addition, it is proposed that having an external signal allowing the relevant system operator to block the LFSM-U mode in real-time is a cyber-security risk.	Partly agree	ACER ag introduce However by the Cy
NC RfG	VGBE	Article 15(4)(b)(i)	The stakeholder notes that the original paragraph 3 referred to the article has been removed.	Agree	The refer
NC RfG	COGEN Europe, EUTurbines, WindEurope, Enercon	Article 15(4)(b), Article 15(4)(c)	The stakeholders propose amendments to the text with regard to the capability to take part in island operation and to re-synchronisation capability.	Partly agree	ACER ha
NC RfG	Enercon	Article 15(4), Article 15(5)	The stakeholder proposes to define the term "block load" and specify what considers "quick" re-synchronisation capability in 4(c). It was suggested to replace "properly" with "adequately" in $5(c)(i)$ , "all" to "the required" and remove "open source" in $5(c)(ii)$ .	Disagree	Block loa provides 15 minute designee diagram. conclusie Simulatio
NC RfG	Eurelectric	Article 15(4)(b)(vi)	As regards the capability to take part in island operation, the stakeholder suggests that some more clarification is needed of what is expected from PGMs for their operation between 0 and their Minimal Operating Point. How long, and in which conditions.	Disagree	Further d specified
NC RfG	CENELEC, Eurelectric, Enel Group	Article 14(3)(a)(iv), Article Y(3)	The stakeholders suggest that there should be an agreement between the TSO and the DSO, or that the relevant system operator shall specify the pre-fault and post-fault conditions for the fault-ride-through capability.	Disagree	It is the re at the co describe staying c
NC RfG	COGEN Europe, EUTurbines	Article 14(3)(a), Article 16(3), Article X	The stakeholders argue that it is today common practice during the verification process to consider the LVRT shape as a multiple fault characteristic. The generating unit is then tested against each of such fault's conditions represented by a rectangular shaped voltage-against-time profile. The proposed text is used to align to such common practice used to verify robustness of the generating unit.	Partly agree	Accordin against-t describes to the ne specific.
NC RfG	CENELEC, COGEN Europe, EDP, EUGINE, Eurelectric, E-REDES, undisclosed stakeholder	Article 14(3)(b)	Some stakeholders propose that fault-ride-through capabilities in case of asymmetrical faults should not exceed the limits imposed under Article 14(3)(a) for symmetrical faults. Two stakeholders argue that the NC RfG should strive for having uniform requirements on that, so to facilitate all conformity checking processes and remove unduly barriers to cross border equipment sales. One stakeholder requests to clearly define the type/sequence of asymmetry needs to be - positive, negative or Zero.	Disagree	The flexil asymmet networks The deta Ideally, a requirem

cific provision is important for local network management reasons. hore, this is elaborated in ENTSO-E IGD on limited frequency e mode. Specific cybersecurity issues are in general out of scope of RfG and dealt with by the Cybersecurity Network Code.

ck start capability relates to system restoration therefore LFSM seds to be preserved. It is also clear that the PGM should be able of frequency in case of overfrequency and underfrequency within e active power output range between minimum regulating level and n capacity. ACER considers that the current wording regarding operation and automatic voltage control adequately describes the capabilities.

age range follows provision in Article 13(12).

rees with the need for clarity. Relevant amendments have been ed in the NC RfG.

, cybersecurity aspects are out of scope of NC RfG and dealt with /bersecurity Network Code.

ence has been corrected.

as amended the text to ensure clarity where required.

ad is a term already used in the current NC RfG. Article 15(4)(c)(ii)is that a PGM with a minimum re-synchronisation time greater than the after its disconnection from any external power supply must be d to trip to houseload from any operating point in its P-Q-capability . ACER proposed amendment in Article 15(5)(c) is in line with the tons of the GC ESC Expert Group "Interaction Studies and on Models for PGM/HVDC".

etails may be provided in the national regulatory framework and I in the connection agreement.

responsibility of each TSO to specify a voltage-against-time profile onnection point for secured faults on the transmission system and the conditions in which the power-generating module is capable of connected to the network.

ng to the current provisions each TSO shall specify a voltagetime-profile at the connection point for fault conditions which s the conditions in which the PGM is capable of staying connected etwork. ACER considers the current provisions to be adequately

bility for TSOs to specify fault-ride-through capabilities in case of trical faults needs to be retained so that conditions at their local s can be taken into account.

ils concerning asymmetrical faults will be defined by each TSO.

agreed standards will be used in the implementation of this ent.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG and NC DC	CENELEC, COGEN Europe, EUGINE, EUROPGEN, EUTurbines undisclosed stakeholder, Oesterreichs Energie, WindEurope,Enercon, Fingrid Oyj, VDE FNN, Enel Group	Article 14(2), 14(3)(c) (NC RfG) Article 13(1), Annex II (NC DC)	The stakeholders argue that as Fig X demands to ride through voltage swells up to 1.3 p.u. for 100 ms., this may not be technically feasible for some components of present generating modules. The stakeholders also argue that OVRT for type A and B has been standardised in EN 50549 since 2019 with a survey in 2022 resulting in no need to increase the present values of 125%@ 100ms. They propose to use the OVRT curve being state of the art in Europe also in NC RfG or refer to this standard. Also, the option to further increase the requirements by the TSO/RSO results in a very unsecure situation. Some stakeholders propose that appropriate technical justification shall be provided to operate at longer times or even no longer times should be defined. Another stakeholder proposes to move the OVRT requirement in Article 14(2)(b), as this requirement can be applied at voltage connection levels greater or equal to 110 kV. One stakeholder argues that with typical protection relays (U>, U>>) there could be a contradiction between the relevant system operator's protection concept and the full activation of HVRT in certain grid areas. Two stakeholders consider that the duration of a 60 seconds at 1.2U/p.u looks challenging for the industry. One stakeholder argues that trequiring 1,2pu for 60 seconds will lead to oversizing of primary equipment causing extra costs. Also, the protection settings of new power plants would have to be set acc. to 1,2pu/60 sec which would cause extra stress for old equipment in the grid as it might lead to prolonged overvoltages in the range of 1,1-1,2pu which would not be switched off rapidly.	Partly agree	The tech account ACER co the OVR As in the serve as requiren future sy
NC RfG	EUROPGEN	Article 14(3)(c), Article 15(4)(a)(iv)	The stakeholder proposes to add a reference to paragraph 12 of Article 13 as Article 14(2) specifies voltage levels only for 110 kV and above.	Agree	Relevan
NC RfG	CENELEC, EDP, Eurelectric, E-REDES, Enel Group	Article 14(4)	The stakeholders propose that the DSO should also decide on the reconnection conditions. One stakeholder proposes that the owner of network where type B PGM is connected should be considered. Proposal to specify in the connection agreement the reconnection conditions.	Partly agree	The reco coordina
NC RfG	Enel Group	Article 14(3)	The stakeholder states that Figure 3 is not aligned with EN 50549 – 2 and Tables 3.1.1 and 3.2.1,3.2.2 seem to be not aligned with Figure 3.	Disagree	Figure 3 with Me paramete provisio
NC RfG	ENTSO-E	Article 15(2)(d)	The stakeholder's position is that if an ESM is used solely for the purpose of meeting the NC RfG requirements (which in this case the requirement could be FSM), this ESM which is integrated in the PGM shall follow the PGM requirements. The stakeholder considers that this text does not follow EG Storage definitions (autonomous/standalone ESM vs collocated ESM) because ESMs are treated as something different than the PGMs whereas the definition of Article 2 (67) clarifies that an ESM is considered as a PGM with the capability of absorbing (consuming) active power. It should be also explained what is the "energy content" of a PGM that it is not an ESM.	Partly agree	ACER ha
NC RfG	CENELEC	Article 15(2)(d)(i)	The stakeholder suggests that in the second dashed provision it must be "in-feed" and "minimum energy.	Agree	ACER ag limited b introduc
NC RfG	EU DSO, COGEN Europe	Article 15(4)	The stakeholders propose to remove the prohibition to use switchgear position for detecting islanding.	Partly agree	The prov able to intercon added te
NC RfG	EUTurbines	Article 15(5)(b)(ii)	The stakeholder argues that it is not clear what is requested nor for what purpose it shall be used. Therefore, it is proposed to be deleted. The stakeholder suggests that this topic should be discussed with manufacturer prior to introduce such new requirement in the NC RfG.	Disagree	The curr

nnical and economic aspects of the PGM should be taken into the when applying longer times for operation.

considers Article 14(3)(c) to be more appropriate for accommodating RT requirement.

he past and in the case of other requirements, the network codes as the appropriate acts to establish any new standards. The ments on RoCoF contained in the NC RfG reflect the present and ystem needs.

at amendments have been introduced in the NC RfG.

onnection conditions should be specified by the relevant TSO in ation with the relevant system operator.

B is the same as in the current NC RfG text and has been agreed ember States. The tables correspond to the time and voltage ters of Figure 3. ACER does not see the necessity to change this on.

as clarified the requirement. Relevant amendments have been ced in the NC RfG.

grees that for ESMs the active power frequency response is by the maximum capacity. Relevant amendments have been ced in the NC RfG.

vision relates to the capabilities of the PGM control schemes to be continuously and stably operate during the transition from nected system operation to island operation. However, ACER has ext for clarity.

rent NC RfG already includes this provision.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Fingrid Oyj	Article 14(5)(b)(iii)	The stakeholder considers that both transformer and busbar protection at the substation of the power plant should be considered.	Partly agree	Accordin schemes the char 14(5)(b)( aspects.
NC RfG	Fingrid Oyj	Article 15(5)(c)(i)	The stakeholder suggests adding the wording " <i>and if needed in electromagnetic simulations</i> " at the end of the first sentence.	Partly agree	Accordir operator provide power-g state and
NC RfG	ENTSO-E, Energinet	Article 15(5)(c)(i)	The stakeholders propose to remove the sentence referring to the intellectual property. The NDAs which are made available on projects are capable to safeguard the intellectual property. Also, Article 12 includes the same general provision with regard to confidential information.	Disagree	The tern intercha
NC RfG	ENTSO-E	Article 15(5)(c)	The stakeholder proposes to consider points (iv) et (v) for this requirement. EMT model and frequency domain model shall be coordinated with the relevant TSO.	Agree	ACER ag been intr
NC RfG	Energie-Nederland	Article 15(5)(e)	The stakeholder proposes that this provision should be either deleted, arguing as it is up to market participants with which ramping speed it wants/need to react to market circumstances, or to at least change the wording from "shall" into "may". The stakeholder also disagrees with ACER's reasoning on the rejection of the same proposal during previous public consultation.	Disagree	To maint operators frequency PGMs (as be discar or stricter The curre and maxi limits).
NC RfG	COGEN Europe, EUTurbines	Article 16(2)	The stakeholder proposes to delete the phrase 'have the right to' in the phrase 'the relevant TSO shall specify/define voltages at the connection point at which type D power-generating module is capable of automatic disconnection'.	Disagree	The prop
NC RfG	Enel Group	Article X	The stakeholder proposes to move the provisions of Article X directly to Article 13. The stakeholder also argues that in relation to the provision that the relevant TSO shall specify if FRT capabilities shall be required for type A SPGMs is coherent as long as the type A generators are connected directly to networks directly owned or managed by TSO; this kind of network, generally are in HV or EHV levels. It is also inquired whether in other case (so level of voltages) it would be the EN 50549 standards.	Disagree	Provisio apply to is the res the con describe staying o
NC RfG and NC DC	ENTSO-E, Oesterreichs Energie	Article 16(3), Article 16(3)(a)(i)	The stakeholders propose to delete the clause "when operating above their minimum stable operating level". Some stakeholders may misunderstand it and misuse it. They also argue that the operation point changes due to a dynamic event, see faults. For example, if there is a fault, the active power may oscillate and go below the min stable operating level, so this may trip the PGM cancelling the need for FRT. It makes sense to have this in the pre-fault condition. Hence, the stakeholders suggest that this needs to be transported in the prefault. In addition, the same is proposed for V1G FRT provision in NC DC. Stakeholders propose to include requirements regarding consecutive faults as this is a cross-border issue and should be addressed in RfG.	Disagree	The fault- electric v level. ACER un national I does not through t
NC RfG	VGBE	Article 18(1)	The stakeholder proposes to add an exception for Article 13(10) since there is provision for voltage control in Article 17(2)(b).	Agree	ACER ag been intr
NC RfG	COGEN Europe, EUTurbines	Article 17(2)(b)	The stakeholders propose to align the wording regarding voltage control system as with the Article 19(2)(a).	Disagree	The requirem requirem to ensure
NC RfG	COGEN Europe	Article 17(3)	The stakeholder suggests to delete Article 17(3) since it was meant for other technologies and natural behaviour of SPGM should be already acceptable.	Disagree	From a s all gener power pl need to

ng to Article 14(b)(i) the relevant system operator shall specify the s and settings necessary to protect the network, taking into account racteristics of the power-generating module. Furthermore, Article (iii) provides that protection schemes may cover the mentioned

ng to Article 15(5)(c)(i) it is at the request of the relevant system r or the relevant TSO, that the power-generating facility owner shall simulation models which properly reflect the behaviour of the generating module for the relevant study purpose in both steadyd dynamic simulations or in electromagnetic transient simulations.

ms intellectual property and confidential information are not ingeable. The specific provision should not be deleted.

grees with the proposed amendment. Relevant amendments have roduced in the NC RfG.

tain system stability is an overarching priority task of system s (DSOs/TSOs). For example, to effectively minimise deterministic y deviations, the specification of ramping requirements for larger s from type C on) is a necessary and powerful means that cannot rded. The relevant SO already has discretion to determine (looser r) ramping limits.

ent provision already defines the requirement to specify minimum imum limits on rates of change of active power output (ramping

posed amendment changes the legal meaning of the provision.

ons in Article X apply to SPGMs, whereas provisions in Article Y PPMs, and that explains why they are not included in Article 13. It sponsibility of each TSO to specify a voltage-against-time profile at nection point for secured faults on the transmission system and a the conditions in which the power-generating module is capable of connected to the network.

ride-through capability should not apply when the PGM or the V1G vehicle is operating below the agreed minimum stable operating

nderstands that the consecutive faults capability is only included in legislation of a very limited number of Member States. Therefore, it t warrant the inclusion of this requirement on a European scale the network codes.

grees with the proposed amendment. Relevant amendments have roduced in the NC RfG.

uirements for type B SPGMs should be less advanced when voltage is used. On the other hand, as regards type D SPGMs more detailed nents are proposed. In addition, since type D SPGMs are subject to nents for Power Oscillations Damping, the definition of AVR is used re better understanding.

system operation perspective, it can be of crucial importance that rators (type B and above), including PPMs are able to restore active roduction fast after fault clearance. Therefore, ACER doesn't see a delete this provision.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VGBE, COGEN Europe	Article 13(10), Article 18(2)	One stakeholder argues that the application of European Standards should be the normal approach in implementing NC RfG, not only the "consideration" of standards. Another stakeholder proposes that capabilities to support voltage shall be based on European standardisation.	Disagree	When ap system of and tech reference through
NC RfG	EUTurbines, Enel Group	Article 18(2)(a)	Reactive power requirements are specified at the Point of Common Coupling (connection point) therefore it is not clear what the requirement is addressing. PGU capabilities normally consider reactive power associated to the equipment installed in the Power Generating Facility. The article should also clarify who must provide what. The stakeholders propose either to draft the article with more clarity or delete it.	Disagree	This pro compens between synchron provision adequate
NC RfG	VGBE	Article 18(2)(c)	The stakeholder proposes to add the active and reactive power losses of the high-voltage line or cable between the high-voltage terminals of the step-up transformer of the synchronous power-generating module or its alternator terminals.	Disagree	This pro reactive the high step-up alternato
NC RfG	EDF	Article 19(2)	The stakeholder argues that in Article 19(2)(a)(iii), on power system stabilisers (PSS) function, the requirement concerning the inter-oscillation mode should be removed.	Disagree	It is impo
NC RfG	VGBE, COGEN Europe, EUTurbines	Article 19(2)(a)(iii)	The stakeholders propose to add wording that a PSS function to attenuate power oscillations is required, if the synchronous power-generating module size is above a value of maximum capacity specified by the relevant TSO, since a PSS is not required in several Member States.	Agree	ACER ag flexibility Relevant
NC RfG	ENTSO-E	Article 21(2)(d)(i)	The stakeholder proposes amendments so that only the relevant system operator, in coordination with the relevant TSO and not with the power park module owner, shall specify which of the four reactive power control mode options and associated setpoints is to apply.	Disagree	lt is impo four read apply.
NC RfG	WindEurope	Article 21(2), Article 22(2), Article 55(7)	The stakeholder proposes amendments to the articles such as, removing active power related power factor control mode and with regard to power oscillations damping control.	Disagree	The contr details re through t
NC RfG	VGBE	Article 51(2)(b)	The stakeholder proposes to include the phrase 'taking into account the droop settings and the deadband', as is the case in Article 52(2)(b).	Agree	ACER ag 52(2)(b). Relevant
NC RfG	EU DSO, CENELEC, COGEN Europe, EUTurbines, WindEurope, Enel Group	Article 51, Article 52, Article 55	One stakeholder proposes that the request for a stability compliance for the LFSM-O control shall be in co-ordination with the relevant system operator. Another stakeholder proposes that the DSO should also be able to require a stability compliance for the reactive power control in a close loop operation. Other stakeholders propose to remove stability compliance for the reactive power and LFSM-U control in a close loop operation as it is argued that these control modes are not defined in NC RfG.	Disagree	Accordin specifyin The stabi in a close Since the phase an (again e.g must be attributes, to take th
NC RfG	COGEN Europe, Eurelectric	Article 51(6)	The stakeholder argues that it is common practice to check the capability of the generating unit considering worst case scenario rather than during a step change in the short circuit current. Simulations are carried out on data provided by the system operator. The stakeholder proposes to keep the present procedure. The step change would be in any case questionable. One stakeholder suggests elaborating a specific test strategy for this feature in order to consolidate this with the manufacturer of the PGM.	Disagree	This art requirem reductio controlle More de

pplying the NC RfG, Member States, competent authorities and operators should take into account the agreed European standards nnical specifications as per Article 7(3)(f) of the NC RfG. The current ce is considered to be sufficient for promoting further harmonisation the European standards.

ovision concerns supplementary reactive power to be provided to sate the reactive power demand of the high-voltage line or cable the high-voltage terminals of the step-up transformer of the nous power-generating module or its alternator terminals. The on exists in the current NC RfG. ACER considers that the legal text ely describes the requirement.

ovision is defined in Article 18(2)(a) regarding supplementary power to be provided compensate the reactive power demand of n-voltage line or cable between the high-voltage terminals of the transformer of the synchronous power-generating module or its or terminals.

ortant that type D SPGMs are able to damp interarea oscillations.

grees to include the proposed wording in order to add this

t amendments have been introduced in the NC RfG.

ortant to include the power park owner when specifying which of the ctive power control mode options and associated setpoints is to

rol mode shall be specified by the relevant system operator. Further egarding power oscillations damping control may be provided the national regulatory framework.

grees with the proposed amendment to be consistent with Article

t amendments have been introduced in the NC RfG.

ng to Article 13 and 14 of the NC RfG, the TSO is responsible for ng these capabilities.

ility compliance for the reactive power control and LFSM-U control e loop operation refers to provisions regarding stable PGM control. e generating unit does affect the grid (e.g., voltage magnitude, ngle, frequency) and at the same time is reacting on grid values g., voltage magnitude, phase angle, frequency) those interactions considered and modelled in the verification of necessary unit s. Thus, the modelling approach in a closed loop set up is chosen his interactive nature into account.

ticle includes provisions for verification of compliance for the nents for PGMs to exhibit a stable control behaviour in the case of n of the system strength (low short-circuit level). Robustness of the er of the PGMs should be ensured in case of outage in the network. tails can be defined by the relevant system operator.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VGBE, COGEN Europe	Article 52(4)(a)	The stakeholders propose to delete the text: 'In addition to point (b) of Article 51(2) as well as point (c) of Article 52(2), the power-generating module shall demonstrate its technical capability to control stably the frequency within the frequency range specified in Table 2 in island operation in p arallel to a load, based on FSM. Load steps leading to active power increase and decrease between 0% and 2% shall be considered; the control structure and parameters that are applied during normal grid operation shall be applied during island operation. If parameter changes are necessary, they shall not affect the damping or small-signal stability', as this is not a result of the Expert Group ISSM.	Disagree	This arti requirem modes o
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 15(2)	The stakeholder proposes an addition to paragraph (c) to clarify that that an operational setpoint change of a PGM or ESM should be neglected, once the frequency threshold is crossed, as long as the frequency returns, this is a difference in relation to FSM. As regards subparagraph (v), the stakeholder proposes to delete 'maximum' as it does not make sense. As regards paragraph 2, the stakeholder considers that there are too many variables, and that it should be limited to maximum capacity or actual capacity, just like with PPMs, and proposes to delete 'maximum capacity or maximum consumption'. The stakeholder also proposes some amendments to paragraph d) to improve the comprehension of the sentences.	Partly agree	Relevant where ap
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 15(4)	The stakeholder pointed out the need to check the reference as there is no existing paragraph $21(5)(d)$ .	Agree	In the fina
NC RfG	CEZ, Eurelectric	Article 15(4)(a)	As regards black start (BS) capabilities, in the case of pumped storage with BS capability, the stakeholder considers that it cannot be guaranteed that the power- generation module will be able to be operational for the full system restoration phase in case this would go beyond the pumped storage availability, hence only a certain amount of MWh can be guaranteed for such assets, similar to large battery storage systems with BS capability.	Disagree	Accordin at the rec start cap framewor describes
NC RfG	AEE, Enercon	Article 15(5)	The stakeholders consider that the TSO shall define, subject to public consultation and approval of relevant stakeholders, the verification standards and acceptance criteria considering state-of-the-art international standards and suggests inserting this wording in paragraph (c)(i).	Disagree	ACER co clear and
NC RfG	E.ON	Article 17(1) and 19(1)	The stakeholder suggests wording improvements to this article to clarify the references to the exceptions.	Agree	ACER re- corrected
NC RfG	Swedenergy, E.ON	Article 18(2)(b)(ii)	One stakeholder argues that the enlarged area of operation (Figure 7) with high reactive power production (lag) and by adding a lower outer voltage level (14.2) could make it difficult to operate generator and also close to stator current limiter. One stakeholder argues that Figure 7 should refer to maintaining the current boundary line at 0,41 Q/P (consumption lead).	Disagree	lt is note 7 are ind
NC RfG	Energie-Nederland	Article 18(2)(b)(ii), Article 21(3)(b)	The stakeholder notes that the reference to Article 13(10) in Figure 7 and Figure 8 is incorrect.	Agree	ACER co
NC RfG	E.ON	Article 19(3)	The stakeholder suggests referring to 'system operator' in this paragraph as many power generating facilities are connected to the distribution network (110 kV). Therefore, the TSO should set the parameters, but any agreement or contract with the facility owner should be made by the relevant system operator.	Disagree	Damping requirem tuning ar

icle includes provisions for verification of compliance for the nents for PGMs to exhibit a stable control behaviour in different of operation and in switching between modes.

t amendments have been introduced in the NC RfG for clarity oplicable.

al revisions, ACER aimed at ensuring correct cross-references.

ng to Article 15(4)(a)(ii), the power-generating facility owners shall, equest of the relevant TSO, provide a quotation for providing black bability. Further details may be provided in the national regulatory ork. Therefore, ACER considers that the current wording adequately as the required capabilities.

onsiders that the existing requirements are set out in a sufficiently d explicit way.

vised the text for legal clarity and ensured that references are d.

ed that the position, size and shape of the inner envelope in Figure dicative.

prrected the reference.

g of power of system oscillations is a transmission system ent, therefore the relevant TSO should be responsible for the nd approval of damping control.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Iberdrola, ACCIONA, AEE	Article 21(2)(a), Article 21(2)(b)	The stakeholders propose to specify in this Article that the requirements are not applicable in the cases where national legislation imposes obligations for several power park modules, even when they are from different owners, to use and share the same electrical infrastructure up to the point of connection, and additional supplementary reactive power has not been requested by the relevant authority when authorising the shared use. The stakeholders argue that shared connection grids have existed for over 20 years in Spain and there have not been any requirements imposed by authorities or TSO/RSO for supplementary reactive power. If this requirement is not delimited, for existing PPMs in one of this shared connection grids means a retroactive application of NC requirements and co-financing the grid connection costs of new PPM connected to the same shared connection grids. If apply to new PPMs only, a new PPM would bear over-costs derived for the evacuation of its maximum capacity.	Disagree	Article 2 maximur been ag change
NC RfG	Enel Group	Article 21(3)	The stakeholder suggests that the requirements given through Figure 9 should be generic for a PPM (including BESS). However, P-Q graph indicated in Figure 9 seems not to be applicable for a BESS/EMS where active power could be either positive or negative.	Partly agree	Article 6 vehicles the relev module o equipme
NC RfG	ACCIONA, AEE	Article 22(2)	The stakeholders propose to add the wording 'if specified by the relevant TSO' to this article as oscillations damping control is not yet a standard control for all type of PPM. It should remain a voluntary requirement or an agreement between the PPM owner and the relevant TSO.	Disagree	It is impo The requ NC RfG
NC RfG	CEZ, EDP, E-REDES, Eurelectric	Article 33	The stakeholders suggest including in the title: "Procedure for type B, C and D power-generating modules", as the procedures defined for type D should also be applicable for types B and C to facilitate the connection of these generators. The stakeholder considers that otherwise there is a different understanding in different Member States. For the same reasons, the stakeholders propose also to include in article: "The operational notification procedure for connection of each new type B, C and D power-generating module shall comprise ()".	Disagree	The oper comprise on the sy Therefore dispropo
NC RfG	Enel Group	Article 47, Article 48, Article 54, Article 55	The stakeholder proposes to explicitly provide that instead of the relevant test, the power generating facility owner may use equipment certificates issued by an authorised certifier using harmonised standards / documents to demonstrate compliance with the relevant requirement.	Partly agree	The prov types B, 0 54, 55 an
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Other articles	The stakeholder submitted a general comment regarding the use of European standardisation (EN 50549-1/-2). The EN 50549 takes into account into detail the differentiation between inverters and asynchronous generators, and also the requirements with today come from the gas appliance directive and related harmonised standards. This relates to the structure of definitions, and the fact that Power Park Modules include also asynchronous generators which is used for some micro-CHP, microhydro, etc. NC RfG should link to EN 50549 or adopt the differentiations made there.	Disagree	When ap operator specifica deemed Europea
NC RfG	Bundesverband Kraft- Wärme-Kopplung e.V.	Other articles	The stakeholder suggests that the amendment process of the grid connection network codes, which in its view should be made simultaneously so that improvements in the technical discussion will affect all three related network codes. The stakeholder considers that this will avoid a deadlock of common definitions and requirements.	Partly agree	As the ruimportar DC will anticipa
NC RfG	Undisclosed stakeholder	Other new provisions	The stakeholder argues that a number of ENTSO-E amendment proposals introducing additional requirements for PGMs with a level of justification that was not always satisfactory were taken on board. It will be important to assess in detail whether all these new requirements remain proportionate for PGMs/ESMs. Only quantified elements (cost benefit analysis) will make it possible to assess proportionality and qualitative analyses cannot be sufficient.	Disagree	ACER amendm containe are furth

21(2)(b) includes provision regarding reactive power capability at m capacity. These provisions exist in the current NC RfG and have greed with Member States. ACER does not see the necessity to these provisions.

5(7) provides that electricity storage modules and V2G electric s and associated V2G electric vehicle supply equipment shall satisfy vant requirements of the NC RfG both when the electricity storage or V2G electric vehicle and associated V2G electric vehicle supply ent injects and consumes active power to and from the network.

ortant that type D PPMs should be able to damp power oscillations. uirements on power oscillations damping control contained in the reflect the present and future system needs.

rational notification procedure for connection of type D PGMs is ed of more steps due to the size of these PGMs and their impact ystem.

e, imposing this procedure to types B and C PGMs is deemed ortionate.

vision that the facility owner may use equipment certificates for C and D is provided in Articles 44, 45, 46, 47, 48, 49, 51, 52, 53, ad 56.

pplying NC RfG Member States, competent authorities and system rs should take account of agreed European standards and technical ations as per Article 7(3)(f) of NC RfG. The current reference is sufficient for promoting further harmonisation through the an standards.

revision of the NCs is an ongoing process, ACER agrees that it is nt that requirements and definitions introduced in the NC RfG and be taken into consideration in the revision of the NC HVDC, ted to take place during 2024, in order to ensure consistency.

highlights that the underlying justification for a number of nents are the technical standards in use. The requirements ed in the NC RfG reflect the present and future system needs and her justified in different expert group reports where relevant.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EDP, Eurelectric E- REDES	Recital (16)	The stakeholders consider that the recital states an important principle that is not being followed entirely. As a consequence, power generator modules are often required to test for different national non-exhaustive requirements in different countries thus creating an unneeded barrier and complicating the compliance checking for the relevant system operator. The stakeholder proposes to highlight this recital in the comments to NC RfG and replace "should" with "must".	Disagree	Recitals backgrou statemen establish articles c
NC RfG	EDP, E-REDES, Eurelectric, CEZ	Article 13(2)	The stakeholders argue, in relation to Table 2, that it is not defensible that for a synchronous area each country should have a different frequency withstand criterion. The diverse requirements in each country create an artificial barrier and entail various conformity checks by the equipment suppliers. ENTSO-E should play an important part in bringing together the TSOs to define these criteria for each synchronous area.	Disagree	The flexi be retair electricit
NC RfG	EDP, E-REDES, Eurelectric, Fingrid Oyj	Article 13(9)	The stakeholders consider that is not clear which entity will decide on the autonomous settings for reconnection, so it should be clarified that the default setting should be as follows, unless otherwise specified by the relevant system operator. The stakeholder also argues that 4% setting for voltage mismatch in point (f) may be too low. Fingrid proposes 5% as 4% might be too small difference in weak grid.	Disagree	Article 13 13(8).
NC DC	ENTSO-E	Recital (15)	The stakeholder proposes to replace 'exceptional cases' with 'emergency state' to improve the legal text.	Agree	Relevant
NC DC	ENTSO-E	New recital	The stakeholder proposes a new recital which already exists in NC RfG (Recital 25**) but it slightly modified for meeting the purpose of NC DC.	Agree	Relevant
NC DC	Gunnar Kaestle	New recital	The stakeholder proposes a new recital for dispatchable loads.	Disagree	The term
NC DC	ENTSO-E	New recital	The stakeholder proposes a recital section that would enable the TSO to provide additional requirements if needed to ensure system stability. The stakeholder argues that this is also in line with the need of some states to define national level rules for data centres or large industrial sites like heating boilers and facilities with power to gas demand units.	Disagree	ACER a requirem defined prescribe framewo
NC DC	CENELEC, Enel Group	Article 2(1)	The stakeholders propose to include in the definition of demand facility 'with or without the presence of power generating modules'.	Disagree	ACER co facility.
NC DC	Terna Spa	Recital (15)	The stakeholder proposes deleting Recital (15), because it can be misunderstood. The LFSM UC cannot replace the demand disconnection in emergency state.	Disagree	ACER co UC repla supports
NC DC	ENTSO-E, Energinet	Annex II	The stakeholders would like to raise the fact that for the Nordic system, there is a need to modify the Annex II in NC DC to include the range 0,85-0,90 pu.	Agree	Relevant
NC DC	ENTSO-E	Article 15(1)	The stakeholder proposes to include in the proposal the situation with multiple connection points.	Agree	ACER ag adapted
NC DC	EU DSO, Oesterreichs Energie, VDE FNN, Finnish Energy, Enel Group, E.ON	Article 19(1)(c)	<ul> <li>One stakeholder proposes to rephrase the text regarding specifications to relay tripping time to improve legal certainty and clarify.</li> <li>Another stakeholder argues that a relay tripping time of 100 ms is technically not feasible. A stable operation of UFLS relays needs at least 150 ms to avoid unintentional tripping.</li> <li>Another stakeholder suggests that a tripping time of 120ms is deemed realistic and is the technical standard in Germany. Additionally, existing concepts for LFDD should not be jeopardised.</li> <li>Another stakeholder argues that the frequency measurement window and tight relay tripping times should be very carefully considered. In principle, low frequency demand disconnection is a good addition. But there are some doubts that the local frequency measurement can be accurate enough, given the very fast reaction times proposed. Faster reaction time equals less accurate measurement.</li> </ul>	Partly agree	ACER ag wording r time of 20

are not compulsory but are usually included to set out the und to the Regulation provisions. They typically contain concise ints of fact, describing key circumstances and details relevant to the hment of a provision. Legally binding obligations are provided in the of the regulation.

ibility for TSOs to set different times for the frequency ranges should ned. The minimum level of frequency stability of the European ty system is achieved based on the defined minimum time periods.

3(9) provides default settings within the capability defined in Article

amendments have been introduced in the NC DC.

amendments have been introduced in the NC DC.

dispatchable load is not used in the NC DC.

acknowledges the need to provide additional (e.g. site-specific) nents if needed to ensure system stability beyond the requirements in NC DC. However, such additional requirements can be bed in the connection agreement or through the national regulatory ork.

considers that the current definition adequately defines the demand

onsiders that the proposed legal text does not imply that the LFSM laces the demand disconnection in emergency state, but only s the frequency in emergency state.

amendments have been introduced in the NC DC.

grees with the proposal but the concrete legal wording needs to be for clarity.

grees with the proposal to improve clarity, but the concrete legal needs to be adapted. The important parameter is the total tripping 00ms.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	ENTSO-E	Article 20	The stakeholder proposes to modify the article on power quality so that it provides clarification that power quality parameters should not be only limited to fluctuation and distortion of voltage sinus wave but to all relevant power quality parameters, according to specification of relevant TSO, at the connection point.	Disagree	Power qu NC DC r agreed E
NC DC	ENTSO-E	Article 21(5)	The stakeholder proposes that only the TSO should specify the requirements of the performance of the recordings.	Partly agree	ACER co for trans system o
NC DC	EU DSO, EDP, E- REDES, Eurelectric, Enel Group	Article 10	The stakeholders propose to add into the article for the purposes of the responsibility for stakeholder engagement now being shared between ENTSO-E and the EU DSO Entity.	Agree	Relevant
NC DC	EU DSO, CENELEC, Enel Group, National Grid ESO	Article 15(2)	The stakeholders propose that the agreement of the DSO is important as the potential impact on DSO operation may be very significant. The stakeholders believe that a threshold cannot therefore be unilaterally imposed on a DSO without all such implications being understood and agreed.	Agree	ACER ag be adapte
NC DC	EU DSO, EDP, E- REDES, Eurelectric	Article 17(2)	The stakeholders propose to remove the phrase 'on 1-phase faults' as it is not clear why it is necessary to limit agreement to single phase reclosing when there could be relevant aspects to agree for three phase reclosing.	Agree	Relevant
NC DC	CENELEC, Enel Group	Article 19(4)	The stakeholders propose to clarify that for transmission-connected distribution facility the logic interface input port could better be replaced with a command to the SCADA system.	Disagree	The spec
NC DC	CENELEC, Enel Group	Article 20, Article 21(2)	The stakeholder proposes to clarify the point by adding to specify the output data format and the simulation tools, in agreement with the relevant distribution operator.	Partly agree	lt is up to models o
NC DC	EU DSO	Article 25(3)(c)	The stakeholder proposes to add text to make it clear that the sub paragraph applies to transmission connected demand facilities only, and not all demand facilities.	Agree	Relevant
NC DC	EU DSO, EDP, E- REDES, Enel Group	Article 28(2)(d)	The stakeholders propose to change "TSO" to "system operator" in order to include DSOs in point (d), as those services are available to all RSOs, not only to TSOs.	Agree	Relevant
NC DC	EU DSO, Enel Group	Article 31, Article 32	The stakeholders propose to delete the phrase 'providing demand response services' arguing that a demand unit not providing a service is specifically excluded from the scope of the NC DC in Article 3(1)(d).	Disagree	The defir only dem electric v power-to Further, A
NC DC	EU DSO	Article XX(4)	The stakeholder proposes to add the provision for heat pumps to have the capability to be able to receive and react on an external signal allowing the relevant system operator to block active power LFSM-UC mode in real-time.	Disagree	As this conside
NC DC	EU DSO, Eurelectric, Enel Group	Article XX(5)	The stakeholders propose to add power-to-gas and heat pumps in the specific provision.	Disagree	Fault-rid XX(6).
NC DC	Eurelectric	Article XX+1	The stakeholder proposes to delete: "() and heat pumps demand units" as in some Member States heat pumps are treated like any normal costumer load behind the meter. This could be different in other countries, but it should not imply to have a notification procedure for heat pumps across the whole EU.	Disagree	Articles X certificate
NC DC	EU DSO	Article 49(1)	The stakeholder argues that it is appropriate that the timescales here should be agreed between the relevant TSO and the relevant system operator.	Disagree	Accordin undertak agree an
NC RfG	VGBE, WindEurope	Article 35	The stakeholders propose to reinstate Article 35(5) regarding granting an extension of the period during which the power-generating facility owner may maintain ION status, beyond the period established in paragraph 4, if a request for a derogation is made.	Disagree	An exten implemer derogatio
NC DC	Terna Spa	Article 19(1)(c)	The stakeholder suggests in order to make better manageable the LFDD, the frequency measurement accuracy be reduced to 10mHz.	Party agree	The legal accuracy

uality requirements beyond the ones specified in Article 20 of the may be provided in national legislation taking into consideration European standards.

onsiders that the relevant TSO should prepare such specifications mission-connected system users in coordination with relevant operators.

amendments have been introduced in the NC DC.

grees that the DSO needs to be included but the wording needs to ted for consistency.

amendments have been introduced in the NC DC.

cific provision follows similar provisions in NC RfG.

o each TSO to specify the content and format of the simulation or equivalent information, as provided in Article 21(3).

amendments have been introduced in the NC DC

amendments have been introduced in the NC DC.

nition of demand unit, according to ACER proposal, includes not nand units providing demand response services, but also V1G vehicle and associated V1G electric vehicle supply equipment, -gas demand unit or heat-pump.

Article 3 of the NC DC accurately provides its scope of application.

requirement is not specified in any other demand unit, it is not appropriate to add this provision only for heat pumps.

e-through provisions for power-to-gas units are specified in Article

(X+2 and XX+3 provide that heat-pumps shall possess equipment es, proving compliance with the NC DC.

ng to Article 48, the relevant TSO is subject to the obligation to e a cost-benefit analysis, therefore it is for the relevant TSO to other timeline.

nsion of ION status under the derogation regime would lead to ntation challenges, as noted by Polish NRA (URE) in its July 2022 on decisions.

The legal text does not preclude the possibility the frequency measurement accuracy to be reduced to 10mHz.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Energie-Nederland	Article 15(1), Article 16(1)	The stakeholder considers that the provision in Article 14(5)(d)(iii) on fault recording if required by the relevant system operator, should not be exempt from application by types C and D PGMs.	Disagree	The prov whereas Hence Art
NC RfG	Moeller Operating Engineering GmbH, Swedenergy	Article 15(2)	The stakeholder notes that the numbers and percentages in Table 4 need to be consistent.	Agree	ACER ago new rango RfG.
NC RfG	VDE FNN	Article 15(2)	The stakeholder requests to clarify that FSM operates on top of active power operating points. A change (also an increase) in active power availability will affect the active power output. Paragraph "the actual delivery of active power frequency response depends on the operating and ambient conditions, as well as, on the underlying energy storage technology for the, of the power generating module when this response is triggered, in particular, but not limited to, limitations on operation near maximum capacity at low frequencies according to paragraphs 4 and 5 of Article 13 and available primary energy sources" does not make sense Figure 5: 2nd bullet does not make sense. FSM cannot have the LFSM threshold as a trigger point for Pref.	Partly agree	Article 15 adverse generatir Article 15 taken int response set out in Figure 5
NC RfG	VDE FNN	Article 15(5)(c)(v)	As below a frequency of 100 Hz the operating point has a strong influence on the converter impedance, the stakeholder suggests a starting frequency of 100 Hz.	Disagree	During co models a
NC RfG	VDE FNN, Enel Group	Article 22(2)	The stakeholder argues that many PPM are connected to the distribution network (110 kV). Therefore, the TSO should set the parameters, but any agreement or contract with the facility owner should be made by the relevant system operator.	Disagree	Damping requirem tuning ar
NC RfG	Enel Group	Article 13(3)	The stakeholder argues that it could be better to move directly here, in this chapter the table X reported in Article 15(2)(d)	Disagree	ACER co to FSM m
NC DC	National Grid ESO	Article 19	As regards Low Frequency Demand Disconnection Schemes, the stakeholder argues that there are some requirements in Article 15 of the EU Emergency and Restoration Code relating to Low Frequency Demand Disconnection Schemes. It may be appropriate to consider removing the requirements in Article 15(5) – 15(8) of the EU Emergency and Restoration Code and including them in DCC 2.0 or referring to these clauses in DCC 2.0 so that parties are aware of the requirements.	Disagree	Article 19 demand connecte systems. transmis distributio
NC RfG	Moeller Operating Engineering GmbH	Article 33	The stakeholder proposes that for type D PGM to go through a certification process so Member States may provide that a PGMD according to Article 32 shall be issued by an authorised certifier for the notification procedure ION and FON.	Disagree	This is co
NC RfG	Polskie Sieci Elektroenergetyczne (PSE)	Article 2(67)	The stakeholder proposes a revision of the way in which the ESM is taken into account in its current form as they consider that the current definition in practice does not define ESM. The proposed definition is not precise compared to the entire text and the definition of technical requirements for ESM.	Disagree	The defin are related
NC RfG	RES Group	Article 2(68)	The stakeholder argues that the proposed text "less any demand or losses associated solely with facilitating the operation of that demand unit or electricity storage module" will cause confusion and it should be deleted. The above exclusion text makes sense where it is used in the definition of "maximum capacity or Pmax", particularly as Pmax is used for determining the significance of a PGM (i.e. type A, B, C or D). However, it makes no sense and serves no purpose to copy this text over to the definition of "maximum consumption capacity".		There are demand u also used V1G elect heat-pum

vision in Article 14(5)(d)(iii) is a non-mandatory requirement, the provision in Article 15(5)(b)(i) is a mandatory requirement. ticle 14(5)(d)(iii) does not apply to type C and D PGMs.

prees that the percentage should be corrected to correspond to the ge of  $|\Delta fi|$ . The relevant amendment has been introduced to the NC

5(2)(d)(vi) provides that active power control must not have any impact on the active power frequency response of powering modules.

5(2)(d)(i)) provides that operating and ambient conditions should be not account for the actual delivery of active power frequency se of the PGM. ACER considers that the existing requirements are n a clear and explicit way.

has been amended.

onsultation, the system operators explained that impedance-based are still needed from 5 Hz onwards.

g of power of system oscillations is a transmission system ent therefore, the relevant TSO should be responsible for the nd approval of damping control.

onsiders that table X is better suited in Article 15(2)(d) as it applies node as well.

9 of NC DC provides for requirements related to low frequency disconnection functional capabilities of new transmissioned demand facilities and transmission-connected distribution . Nevertheless, the NC ER is still relevant for the existing asion-connected demand facilities and transmission-connected ton systems.

overed by Article 35.

ition covers the meaning of 'electricity storage'. The requirements d to required capabilities and not with the definition itself.

e losses or demand associated with facilitating the operation of a unit or electricity storage module when consuming. The definition is d in NC DC for the application of connection requirements of new tric vehicles and associated V1G electric vehicle supply equipment, ups and power-to-gas demand units.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	EDP, E-REDES	Recital (11), Article X	The stakeholders argue that the review of the requirements for type A PGMs is in any case required. In this regard, it is necessary to determine which requirements applicable to type B PGMs may also be necessary for type A PGMs in terms of system security. The following candidate requirements were identified by the Expert Group "Baseline for type A PGMs": a) Fault Ride Through (FRT), b) Post Fault Active Power Recovery (PFAPR), and c) Active Power Control (APC). The review of the requirements for type A PGMs, namely for power between [250kW; 1MW] or connected with MV grid, should also consider, measures, binary inputs and commands.	Partly agree	The require present and standards.
NC RfG	RES Group	Deleted Article 15(3)	The stakeholder considers that the deleted section allowed distribution system operators to specify over and under voltage protection settings which helped to disconnect generators contained in inadvertently islanded sections of a distribution system where their persistent operation might cause danger from: (a) unearthed energisation of part of the island, or; (b) operation of the island at frequencies or voltages which are outside the required standard, or; (c) might result in inadvertent out-of-phase closure of switches when one side was expected to be dead, with consequent over-currents and transient loads on motors and generators within the reconnected island. The stakeholder recommends that this proposed deletion is discussed with distribution network operators and their representative organisation.	Disagree	According connected reactive po generating the system TSOs as ne EU DSO or
NC RfG	RES Group, COGEN Europe, EUGINE, EUTurbines	Article 7(3)(f)	The stakeholders consider that Article 7(3)(f) introduces the unacceptable risk that additional requirements could be introduced via IGDs without the scrutiny and consultation applied to this Regulation. They propose deletion of the reference to IGDs because they should only guide and not specify.	Disagree	According ENTSO fo out in para guidance o ENTSO for submit any opinion int consultatio
NC RfG	Solar Power Europe, Better Energy	Article 7	As regards Article 7(3f) Split (f) into 3: The stakeholders suggest (f) is dealing with 3 different topics and shall be addressed separately and differently. As regards Article 7 paragraph 3(f) the stakeholders argue that: 1) European standards and technical specifications shall not just be considered. European standardisation and harmonisation is crucial for a cost effective energy transition, especially with regard to mass market products. 2) Implementation guidance documents developed by ENTSO-E in accordance with Article 59(15) of Regulation (EU) 2019/943, shall have a transparent process, with results that are agreed by all relevant stakeholders. The stakeholders argue that after Article 7(3)(g) a proposal text should be added because it should be clarified that the designated entity has the right to request an explanation from the relevant system operator or the relevant TSO on how the principle in this regulation has been taking into account 7(4) - The timing of the NC RfG amendment is one of the most critical points. The stakeholders argue that even for the current NC RfG with relatively easy to fulfil because of state of the art requirements, the timing (2+1 years) caused massive chaos in the national implementations. Allowing the Member States to provide even shorter time periods is not seen as useful.	Partly agree	ACER con promoting According Electricity paragraph guidance of ENTSO for submit any opinion int consultation There is al States, con principles. With regar provide fo
NC RfG	Bundesverband Solarwirtschaft e.V.	Article 7(3)(f)	The stakeholder proposes to replace the words 'take into consideration' with the word 'apply', with regard to European standards. The stakeholder considers that 'take into consideration" is too weak. For the sake of harmonisation, functionality that is already agreed on in European Standards must be taken over and implemented, rather than implementing it nearly the same but slightly different.	Disagree	The currer sufficient standards.

irements for type A PGMs contained in the NC RfG reflect the and future system needs and are based also on agreed European

ing to the system needs, power generating modules shall stay and control voltage within defined ranges. Taking into account power capabilities and voltage control capabilities of power and units, an automatic disconnection is the worst-case scenario for the stability. No utilisation of such capability has been identified by needed in the future. In addition, no objection has been raised by or any other stakeholder regarding the deletion of this requirement.

ng to paragraph 15 of Article 59 of the Electricity Regulation, for Electricity may develop non-binding guidance in the areas set aragraphs 1 and 2 of Article 59 of the above Regulation, where such the does not relate to areas covered by a request addressed to the for Electricity by the Commission. The ENTSO for Electricity shall any such guidance to ACER for an opinion and shall duly take that into account. Thus, the Guidelines will not be applied without prior ation and an opinion by ACER.

considers that the current reference is deemed sufficient for ng further harmonisation through the European standards.

ng to para 15 of Article 59 of the Electricity Regulation, ENTSO for ty may develop non-binding guidance in the areas set out in phs 1 and 2 of Article 59 of the above Regulation, where such the does not relate to areas covered by a request addressed to the for Electricity by the Commission. The ENTSO for Electricity shall any such guidance to ACER for an opinion and shall duly take that into account. Thus, the Guidelines will not be applied without prior ation and an opinion by ACER.

already an obligation that when applying this Regulation, Member competent entities and system operators shall apply the mentioned es.

pard to Article 7(4), it is important that the Member States could for a shorter period in order to accelerate implementation.

rent reference as per Article 7(3)(f) of the NC RfG is deemed t for promoting further harmonisation through the European ds.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	Enercon, RES Group	Article 21(2)(d), Article 21(2)(e)	One stakeholder considers that in point (d)(ii) it needs to be specified that the stable operation shall be ensured "based on network characteristics (minimum, normal and maximum short circuit capacity at the connection point) to be provided by the relevant system operator". With regard to point (d)(iv) it is proposed to change 5 seconds with 60 seconds in the time range, arguing that DSOs usually do not want the U-control of PPMs to react within few seconds, so widening the range from 1 to 60 seconds allows the different DSOs to request what they need. Asking for a T1 of 1 to 5s, as done in the current NC RfG, is typical for the UK, but very untypical for the rest of Europe. One stakeholder proposes to add in Article 21(2)(d)(ii) that a control point other than the connection point can be chosen if the relevant system operator and the power-generating facility owner both agree to this. Another stakeholder argues that in Article 21(2)(d)(ii) the voltage setpoint range covering only covers 0,95 pu to 1,05 pu does not function in practice. The voltage setpoint range must cover the entire voltage operation range i.e., for CE it would be 0.85-1.15pu. (110 – 300kV). Also, the stakeholder considers that it should be explicitly stated that the voltage control must be functional in the entire normal operation range, though reduced reactive power capabilities is accepted outside of the U-Q/Pmax profile.	Disagree	The NC Rf the PGMs stably. Ad provided i Provisions and have need to ch Voltage co As specifi purposes, power set voltage ra
NC RfG	Undisclosed stakeholder	Article 21(2)(d)(vi)	The stakeholder proposes to introduce the actual plot in X-Y coordinates depicting the power factor control using reactive power and control reactive power using active power.	Disagree	The provis remains th
NC RfG	Swedenergy	Article 2 (new definition)	The stakeholder proposes to introduce a new definition of "controlled quantity" as a safety precaution, arguing that the background is the problem of applying power regulation in some of the Swedish hydro power plants.	Disagree	The NC Rf in the pow synchrono gate posit network c possibility since the power gen definition.
NC RfG	VDE FNN	Article 2(18)	The stakeholder argues that on the one hand, a uniform terminology must be used, compared to NC HVDC, but on the other hand, the characteristic of the grid connection point is of great interest for the respective definition and the resulting requirements for the power park modules. Furthermore, the type of connection (HVAC or HVDC) of the power park module to the transmission grid plays an important role to determine the respective requirements.	Partly agree	Article 6(1 modules requireme requireme or unless t current co coupled to back conv
NC RfG	VDE FNN	Recital (**4)	The stakeholder considers that voltage control capability and stable LFSM operation are important contributions of non grid forming PPM to power system stability.	Partly agree	The recital RoCoF re
NC RfG	WindEurope, Enercon	Recital (**2)	The stakeholders propose to replace high voltage-against-time profile with over voltage-against-time profile.	Disagree	The recita
NC RfG	EDP	Recital (**4)	The stakeholder considers that the recital should explicitly apply to only new PGMs, not the ones already connected.	Partly agree	This is alr
NC RfG	WindEurope, Enercon	Recital (23)	The stakeholders argue that for frequency-ranges and all parameters for frequency-control it is even more relevant that the requirements from neighbouring countries within a synchronous area match to each other.	Partly agree	Recital (16
NC RfG	WindEurope, VDE FNN, Gunnar Kaestle, Enercon	Recital (25)	The stakeholders argue that converter-based is the correct word instead of RES. E.g., hydro power plants are usually designed as synchronous power generating modules. The capability to provide synthetic inertia from converter-based generating technologies is based on technology and product design decisions, it is a not an intrinsic (natural) characteristic / limitation of such technologies.	Agree	ACER act amended

RfG already provides for frequency and voltage ranges within which As shall be able to remain connected to the network and operate Additional network conditions at the connection point may be d in the connection agreement.

ons in Articles 21(2)(d)(ii) and 21(2)(e) exist in the current NC RfG ve been agreed with Member States. ACER does not consider the change these provisions.

control contribution shall be provided at the connection point.

cified in in Article 21(2)(d)(v), for reactive power control mode es, the power park module shall be capable of setting the reactive etpoint anywhere in the reactive power range, therefore the setpoint range corresponds to the full reactive power capability.

vision has only been amended for corrected references but largely the same as in the current NC RfG.

RfG does not go into the detail as to the turbine and governor used ower generating module. Furthermore, the active power output of a mous hydro power generating module is essentially a function of the sition and therefore there is a direct relationship between them. The code, when referring to active power, does not exclude the ity to use, within the governor, the guide vane opening as feedback, e purpose is to eventually control the active power output of the generating module. Therefore, there is no need to introduce this n.

S(1) of the NC RfG already states that offshore power-generating s connected to the interconnected system shall meet the nents for onshore power-generating modules, unless the nents are modified for this purpose by the relevant system operator is the connection of power park modules is via a high voltage direct connection or via a network whose frequency is not synchronously I to that of the main interconnected system (such as via a back-tonvertor scheme).

tal refers to the introduced grid forming requirements for PPMs and requirements for PGMs.

tal refers to the introduced high voltage ride through requirement.

already provided in Article 3 and in Recitals (9) and (10).

16) deals with frequency-related requirements.

acknowledges the need to provide clarity. The recital has been d accordingly.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	SIEMENS GAMESA RENEWABLE ENERGY	Recital (27)	The stakeholder argues that during and after the development of the NC RfG in 2016 certain gaps between the NC RfG and international standards have been identified. In various areas these gaps are of high significance, create uncertainties and drive significant costs of the products. The issue has been presented in an ESC meeting in 2020. The stakeholder proposes specific requirements be aligned based on technical standard, however not possible in any case. It is furthermore proposed that an expert group shall do a mapping of all applicable standards, identify the gaps and aligns with standardisation bodies how the gaps can be closed.	Partly agree	The volta stakeholo robustnes relevant s
NC RfG	VDE FNN	Recital (27)	The stakeholder argues that European standardisation and harmonisation is crucial for a cost-effective energy transition, especially with regard to mass market product.	Partly agree	The cons for all PG "Develop possible, therefore consequ
NC RfG	SIEMENS GAMESA RENEWABLE ENERGY	Article 13(2)(d)	The stakeholder argues that there is no technical justification explaining in detail the background for such extended frequency requirements. The stakeholders argues that it seems it is just added to specified requirements in Table 2 and in conflict with Table 2.	Disagree	ACER c 52,5Hz frequenc
NC RfG	SIEMENS GAMESA RENEWABLE ENERGY	Article 21(2)(e)	The stakeholder argues that due to deleted Article 20(2)(b), Article 21(2)(e) needs to be rewritten or deleted.	Disagree	Deleted
NC RfG	EDP, E-REDES	Article 4(3)	The stakeholders propose to provide "relevant system operators" instead of TSOs, in order to include DSOs. One stakeholder argues that the proposed changes to Article 4 exclude from compliance to this NC RfG existing PGMs, including PGMs with binding contract signed and closed after 2-years of the entry into force. This article, together with Article 71a (that repeals the current NC RfG) may be removing any requirement to existing PGMs.	Disagree	As a rule for the N (3), the a may be applicab propose In addition public con- each Men- to existin
NC DC	C DCT&D Europe, VDE FNNArticle 14(2) and (3)The stakeholders suggest that in paragraphs (2) and (3) it should be specified from what side the short circuit current is measured, and they propose in: Paragraph (2): The relevant TSO shall deliver to the transmission-connected demand facility owner or the transmission-connected distribution system operator an estimate of the minimum and maximum short-circuit currents contribution to be expected from the transmission-connected demand facility owner or the transmission-connected distribution system operator of the network.Paragraph (3): The relevant transmission-connected demand facility owner or the transmission-connected distribution system operator shall deliver to the relevant TSO an estimate of the minimum and maximum short-circuit current contribution to be expected from the demand facility or the distribution system at the connected from the demand facility or the distribution system at the connected from the demand facility or the distribution system at the connection point as an equivalent of the network.		Partly agree	ACER ha	
NC DC	T&D Europe	Article 18	The stakeholder argues that this article covers the requirements only for transmission connected demand uses (facilities, distribution systems). However, information exchange between the DSOs and the distribution connected demand users (EVs, demand facilities etc.) will be needed. The stakeholder proposes clauses covering distribution-connected assets to be added, but no concrete amendment proposals is made.	Partly agree	ACER cc demand, in Article
NC RfG	ACCIONA	Article 9	The stakeholder argues that non-synchronously connected power-generating units of the same any underlying technology and any primary energy source, where they are collected together to form an economic unit towards the RSO and where they have a single connection point to the RSO, should be assessed based on the agreed maximum continuous active power export capacity at the point of connection, irrespective of their installed their aggregated capacity.	Disagree	Article 9 d

age ranges have been amended based on proposals from several ders relating to the need to maintain sufficient levels of system ss. Voltage levels for voltages below 110kV are specified by the system operator.

sideration of the EU/international standards is prescribed uniformly GMs in Article 7 while Recital (27) has been improved to ensure that oment of non-exhaustive requirements should, to the extent , be carried involving European standardisation organisations; e, permitting the evolution of product standards and, as a uence, the adoption of the same by the industry."

considers that the current provision in Article 13 regarding the requirement sufficiently covers the situations of a transient cy overshoot.

provisions do not relate to Article 21(2)(e) of the NC RfG.

e, existing PGMs do not fall within the of the amendment proposal IC RfG. However, under the special conditions provided in Article 4 application of the NC RfG to existing power-generating modules decided at the national regulatory authority level or where ble at Member State level. Therefore, it is the relevant TSO that may e the application to existing PGMs.

on, according to Article 10(1), the relevant TSOs shall carry out a onsultation with stakeholders, including the competent authorities of ember State, on the proposals to extend the applicability of NC RfG ng power-generating modules in accordance with Article 4(3).

as added the word 'contribution' to clarify the requirement.

builders that the data exchange with every new object (PGM, HVDC system, etc.) from connection network code should be set 40(5) SO GL or related methodology.

of the NC RfG refer to the recovery of costs.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	VDE FNN	Article XX, Article 2 (new definition)	The stakeholder argues that the newly introduced mode (LFSM-UC) is too complex for heat-pump both in operation and in verification. For V1G, the mode LFSM-UC is to be dimensioned stability-oriented in closed loop, for a stable behaviour. In operation with the interconnected system, such behaviour requires the provision of additional inertia to which the P (f) behaviour must be tuned. By shifting the LFDD-UC to the load, the need for stability-oriented sizing of the LFSM-UC and wide-area application of the LFDD is eliminated. Make sure that the concept of LFSM-UC is being used for large types of power-to-gas demand units.	Disagree	One of th connection voltage ar randomis bring add example, distribution power-to- distribution disconnectime large proposed which in the that this fir Continent would lea
NC DC	Verband der Automobilindustrie	Article XX	The stakeholder proposes to add "the actual consumption of active power frequency response in LFSM-UC mode shall be capable of taking into account, if applicable: — ambient conditions when the response is to be triggered, — the operating conditions of the V1G electric vehicle and connected electric vehicle supply equipment, in particular limitations on operation near maximum and minimum capacity at low frequencies and the respective impact of ambient conditions, and — the need for consumption."	Disagree	The propo the chang
NC DC	Eurelectric	Article XX	The stakeholder argues that so far, FRT was only applicable to generators as described in the NC RfG. In NC RfG, the minimum level of Uret is 0,05. The Uret proposal for P2G is 0 which is very stringent. The technology used in P2G PCUs (power conversion units) is comparable with the technology of solar or wind turbine converters. Solar and wind turbine converters are capable of dealing with Uret of 0,05, but we are very concerned that these converters will not be able to cope with Uret = 0. Therefore, the stakeholders consider this requirement (Uret = 0 for P2G) as a real risk. They note that Uret = 0 is a more stringent requirement that the Uret requirement in NC RfG. The request for clarification as to why Uret = 0 is necessary for P2G and why it differs from NC RfG and from FRT requirements for V1G vehicles and associated V1G electric vehicle supply equipment.	Disagree	In the con connected expected. several hu of referen makes it through fa size of the introduce
NC RfG	ACCIONA, AEE, Iberdrola	Article 14(3)(c)	equipment. The stakeholders propose to add the word 'agreed' before connection point since, in Spain, there are connection points where multiple PGMs/PPMs are connected sharing electrical infrastructure and commonly through long HV/MV connection lines up to the grid interface with the TSO/RSO. Therefore, the stakeholders consider that this requirement would not be possible to comply with and that there needs to be an exception on this kind of connection configurations, where the specific connection point (and verification of compliance point) of the PGMs/PPMs is agreed by the owner and the TSO/RSO (usually the HV side of the PPM main step-up transformer).		Connection at which t or HVDC distribution as identifi system op owner or l where an
NC RfG	ACCIONA, AEE	Article 14(4)(c)	The stakeholders propose to add a sentence to this article as they consider that all connection agreements of PGMs/PPMs shall clearly define minimum short- circuit level. It is not the case in all Member States.	Partly agree	According is defined
NC RfG	E.ON	Article14a(3)(b)	The stakeholder proposes that fault-ride-through capabilities in case of asymmetrical faults shall be specified by the relevant system operator, as asymmetrical errors in the transmission grid have hardly any effect on the subordinate voltage levels. Corresponding requirements should therefore be defined by the relevant system operator.	Disagree	Article 14 associate the netwo disturbed appropria be specifi

he general purposes of the NC DC is that the system users' on to the network is maintained during the system transients (thus nd frequency withstand capabilities) and not to disconnect them at ed frequencies with long reconnection times because this latter will itional system operation problems following system transients. For if on a sunny day with lots of solar power plants operating in on network, the system loses a lot of consumption (heat-pumps, gas units, V1G EVs and associated EVSEs), overloads in on will occur and which in turn will have to be mitigated with ctions of distributed RES. Similarly, after losing for a considerable sum of consumption units (10-60 minutes reconnection time was by VDE FNN) the frequency will experience a large overshoot urn will require the entire system to adapt. It could well be the case requency overshoot would exceed the dimensioning incident in the tal Europe Synchronous Area set at 3000 MW today. Which in turn, d to the need to activate emergency and restoration measures.

osal is not explained or justified; therefore, it is not clear how would ge impact the overall delivery of the LFSM-UC capability.

ming years, a strong increase in new controllable demand facilities ad to the European high-voltage and extra-high-voltage grid is I. For example, an expansion of electrolysis plants in the order of nundreds of megawatts up to tens of gigawatts (target of by 2030) nec capacity is expected to take place in the next few years. This is necessary for system security that electrolysis plants can ride faults in the future (fault-ride-through). Due to the expected large nese installations requirements similar to type D PGMs have been ed.

on point is defined in Article 2(15) of the NC RfG as the interface the power-generating module, demand facility, distribution system system is connected to a transmission system, offshore network, on system, including closed distribution systems, or HVDC system, ied in the connection agreement or as agreed between the relevant perator and the demand facility owner, power-generating facility HVDC system owner, or determined by other appropriate means, agreement is not required.

g to Article 14(4)(c) of the NC RfG the minimum short-circuit level d in the connection agreement.

Aa(3) refers to the capability of type EV3 electric vehicle and ad V2G electric vehicle supply equipment, to remain connected to ork and continue to operate stably after the power system has been by secured faults on the transmission system. Therefore, it is ate that fault-ride-through capabilities in case of asymmetrical faults ied by each TSO.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	E.ON	Article14a(5)(c)	The stakeholder considers that the grid security management of the grid operator ensures local grid security, the prerequisite is that a frequency control (active power adjustment) brings any benefit at all. The stakeholder suggests exchanging the order of paragraphs (iii) and (iv).	Disagree	The spec should o extend fre This prov NC RfG.
NC RfG	EDP, Eurelectric	Article 14a(4)	The stakeholder proposes to explicitly provide in point (b) that the relevant system operator should inform the operator of the charging point on the expected timeline of authorisation.	Disagree	ACER co prescribe
NC RfG	BDEW	Article 14a(5)	As regards Article 14a(5)(d)(ii), the stakeholder considers that especially EVs might rely on Dedicated Metering Devices (DMDs) as they can be deployed much faster and might even be embedded in the charger itself and proposes that these should be allowed in this paragraph. The stakeholder also suggests that, for the avoidance of doubt, it should be clarified in Article 14a (5)(d)(iii) that the requirements with regard to reactive power do not apply in the case that EV2 electric vehicles and/or associated V2G electric vehicle supply equipment is/are connected in the V2G electrical charging park.	Partly agree	The usag details m 14a(5)(d) charging of the pa
NC DC	EDP, E-REDES, Eurelectric	Recital (**)	The stakeholders propose to include the home energy management system as a subject to the requirements of this Regulation.	Disagree	NC DC p electricity managen such can
NC DC	Finnish Energy	Recital (**), Article 2(*)	The stakeholder considers that the list of technologies in the recital is narrow and perhaps should be defined differently, referring to the capabilities of the demand facility, for example. The stakeholder argues that it is strange to focus on certain technologies and there are numerous other products that will be produced that are not gases. The stakeholder suggests widening the scope and making the definition technology neutral.	Disagree	The recit units that New type power-to to the ele devices of proposes on freque the energy
NC DC	EDP, Eurelectric	Recital (8)	The stakeholder proposes to add after "agreement for a third party to take action on their behalf" the wording in parentheses "(individually or as part of an aggregation portfolio)".	Disagree	ACER pr requirem energy c or a form
NC DC	EDP, Eurelectric	Recital (13)	The stakeholder proposes to complement "kept within reasonable limits" with "and proportional to the consumer size".	Disagree	NC DC of based on and not of
NC DC	Enel Group	Recital (7), Recital (13)	The stakeholder proposes to add in Recital (7) the sentence that "an existing demand facility that starts providing demand response should not be treated as a new facility, as this could create a serious barrier to participation" in order to prevent existing demand sites being required to meet impossible requirements as a precondition of providing demand response, as this might lead to demand response not being provided. The stakeholder proposes to provide in Recital (13) that "Where an existing consumer starts providing demand response, this should not lead to a compliance burden with respect to existing, unchanged equipment on the consumer's site, as this would be a barrier to participation", arguing that just because a customer starts providing demand response using their EV charger, they should not be required to prove that other appliances are tolerant to a particular frequency and voltage range.	Partly agree	Accordin connection new trans including demand f services to vehicles a and power kW or mo
NC DC	EDP, E-REDES, Eurelectric	Recital (14)	The stakeholders propose to add "or jeopardise the European electricity network system" at the end of the recital.	Partly agree	The word

cific provision refers to how the power-generating facility owner rganise and prioritise its protection and control devices. To that equency control should be prioritised compared to power restriction. vision is also included in Article 14 for type B PGMs in the current

onsiders that details regarding the prior authorisation may be ed through the national regulatory framework.

ge of sub-metering or DMDs is not excluded; however, further may be provided in the national regulatory framework. Article (iii) provides requirements for fault recording of V2G electrical parks. Therefore, it is important to keep the reactive power as one rameters to be recorded.

provides for capabilities for demand units in order to support the y system following a disturbance. To that extend the home energy nent system is another layer on top of the demand units and as anot provide these capabilities.

tal covers the demand facilities, distribution systems and demand t are subject of the NC DC, according to Article 1.

es of demand units, such as V1G electric vehicle supply equipment, o-gas demand units and heat pumps, are expected to be connected actricity system *en masse*. Therefore, it is imperative that these new can support the system during network disturbances. Thus, ACER is the introduction of a new Article under a new Title in the NC DC ency and voltage-related requirements in order the reinforcement of gy system, transforming during the green transition, be ensured.

roposed recital (\*\*1) states that demand units are subject to the ents of this Regulation regardless of whether they are part of an ommunity as defined in Regulation (EU) 2019/943, another entity, of system users' aggregation.

differentiates demand units providing demand response services their voltage level at their connection point (below or above 1000V) on their size.

Ig to Article 3 of the NC DC, the scope of its application covers on requirements for new transmission-connected demand facilities, smission-connected distribution facilities, new distribution systems, new closed distribution systems, new demand units used by a facility or a closed distribution system to provide demand response to relevant system operators and relevant TSOs, new V1G electric and associated V1G electric vehicle supply equipment, heat-pumps er-to-gas demand units, with maximum consumption capacity of 0,8 ore at any voltage level. Other devices are out of scope.

"equipment" in this recital does not exclude network equipment.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	Eurelectric	Article 1	As regards to $2(a)(b)(c)(d)$ – Rate of change of frequency and considering a "level playing field" among grid users, it is surprising that a V1G electric vehicle and associated V1G electric vehicle supply equipment, power-to-gas demand unit and heat-pump have to comply to these ROCOF requirements while other demand facilities do not have to comply to ROCOF requirements. The stakeholder inquires about the reasoning for this discrepancy.	Disagree	New type power-to to the elec devices of proposes on freque the energ
NC DC	EDP, Eurelectric	Article 2(12)	The stakeholder inquires why the term is only "on load tap changer", as the market already offers different solutions (after the transformer), for example, based on power electronics, to achieve the same objective.	Disagree	The spec
NC DC	EDP, E-REDES, Eurelectric	Article 2(18)	The stakeholders propose to delete the definition of " <i>demand response transmission constraint management</i> " as it not clear the difference between this type of demand response and the one defined in paragraph 16 (demand response active power control). Otherwise, a description highlighting the differences should be provided.	Disagree	The defir services consider
NC DC	Undisclosed stakeholder	Article 2(*)	The stakeholder considers that there is a chance that the current definition of 'power-to-gas unit' is too vague and will not include the hydrogen productions converted to liquid fuels. Therefore, the stakeholder proposes to add a sentence as follows: <i>This also includes units where electricity is converted to hydrogen that is ultimately converted to liquid fuels</i> .	Disagree	ACER co the notion
NC DC	E-REDES	Article 2(**)	The stakeholder proposes to include the abbreviation of power-to-gas demand unit – P2G – to the definition.	Disagree	The abbre
NC DC	EDP, E-REDES, Eurelectric Article 3(1)(b) The stakeholders argue that there is a need to clarify what constitutes a "(b) new transmission-connected distribution facility". They also argue that although this definition is laid in the present version of the NC DC, it is not clear and creates different interpretations.		Disagree	ACER co 2(3): 'tra distributio the site o	
NC DC	EDP, E-REDES, Eurelectric	Article 12(1), Article 13(1)	The stakeholders propose to change the wording "distribution systems" to "distribution systems assets managed by the DSO", as in their view distribution systems is vague since it can also include the clients that are part of the distribution network. The DSO does not have control over the clients' facilities.	Disagree	Article 2 distributio transmiss distributio
NC DC	EDP, E-REDES, Eurelectric	Article 13(7)	The stakeholders propose to include DSO to agree on the voltage range, following the spirit of DC Regulation.	Disagree	The relev the distri designed
NC DC	EDP, E-REDES	Article 15(2)	The stakeholders propose to delete "where applicable" in the second abstract of the paragraph, as it is not clearly defined.	Disagree	ACER co to allow f
NC DC	EDP, E-REDES, Eurelectric	Article 21(1)	The stakeholders propose to specify after "Transmission-connected demand facilities and transmission-connected distribution systems" the condition " <i>if agreed between DSO and TSO</i> ". They argue that the distribution network models are dependent on the behaviour of the clients connected to the distribution grid and currently there is no requirement for distribution grid client to provide the DSO with a model of its installation.	Disagree	Article 21 models o connecte system, o equivaler be aware
NC DC	EDP, E-REDES, Eurelectric	Article 27(1)(a), Article 28(1)	The stakeholders propose to delete the separate point on demand response transmission constraint management, arguing that there is no practical difference between this and demand response active power control. They suggest referring that demand response active power control can be used for constraint management services.	Disagree	Demand provided managen consider amendme concerne

es of demand units, such as V1G electric vehicle supply equipment, -gas demand units and heat pumps, are expected to be connected actricity system *en masse*. Therefore, it is imperative that these new can support the system during network disturbances. Thus, ACER is the introduction of a new Article under a new Title in the NC DC ency and voltage-related requirements in order the reinforcement of gy system, transforming during the green transition, be ensured.

cific definition is needed as the term is used in the NC DC.

nitions in Article 2(16) and (18) refer to the demand response provided to system operators as stated in Article 27. ACER is that these terms are adequately defined.

onsiders that the currently proposed definition adequately defines n of a power-to-gas demand unit.

eviation P2G is not used in the NC DC.

onsiders that the wording is clear as the definition is given in Article ansmission-connected distribution facility' means a part of a on system connection or the electrical plant and equipment used at of the connection point to the transmission system.

2(7) defines transmission-connected distribution system as a on system connected to a transmission system, including sion-connected distribution facilities. Moreover, the notion of on system is used in the DIRECTIVE (EU) 2019/944.

vant TSO shall specify the voltage range at the connection point that ibution systems connected to that transmission system shall be d to withstand.

onsiders that it can be beneficial to leave certain level of discretion for the consideration of local specificities.

1(2) of the NC DC states that each TSO may require simulation or equivalent information showing the behaviour of the transmissioned demand facility, or the transmission-connected distribution or both, in steady and dynamic states. Therefore, the ability to use nt information is provided. Furthermore, DSOs are in a position to e of the behaviour of their systems.

response transmission constraint management is a service by the demand response units to the system operators to help the nent of transmission constraints. Therefore, ACER does not appropriate to remove this service. Nevertheless, the upcoming ents to the SO GL and/or Demand Response NC may revise the ed provisions.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	Undisclosed stakeholder	Article 27, Article 28, Article 29, Article 30	As regards the current differentiation of remotely controlled demand response services which could be provided to SOs, the stakeholder considers that transmission constraint management should be within the purview of TSOs. With regard to autonomously controlled demand response services, the stakeholder would like to simplify the existing categorisation, as frequency response services include very fast active power control. In addition, the stakeholder would like to underline that autonomously controlled demand response services can be delivered based on what can be measured, namely frequency control, voltage and current. To this end, the stakeholder suggests the introduction of a second category for system voltage control, which includes reactive power support. The above suggestions are aimed at attracting private investments which is needed to expand the pool of flexible, behind the meter assets which are able to decarbonise the grid at scale by providing demand response services. The stakeholder proposes to delete paragraph (1)(a)(iii). Additionally, the stakeholder considers that the delivery of demand response services should not be dependent on the existence of a third party for aggregation. Therefore, the stakeholder recommends to further simplify the rules by removing reference to a third party for aggregation purposes. In addition, the stakeholder is concerned that requirements in Article 29 may be overly restrictive, specifically with regards to measurement of actual system frequency and detection of a change in system frequency. Finally, the stakeholder is wondering.	Disagree	Demand provided managen consider Articles 2 fluctuatio frequenc: control, w for modu of the sys ACER do active po upcomin revise the Single fac or more of Furtherm DC and h
NC DC	EDP, E-REDES, Eurelectric	Article 28(2)(k)	The stakeholders propose to establish that the common value for the RoCoF withstanding capability shall be proposed by ENTSO-E.	Disagree	It is up to may pub regarding
NC DC	EDP, E-REDES, Eurelectric	Article 32(1) and Article 32(6)(d)	The stakeholders propose to provide that, for the provision of demand response services, it is possible to qualify demand units not yet connected to the distribution network. The wording "within a demand facility or a closed distribution system connected" should be complemented with " <i>or proposed to be connected</i> ". It is also suggested to delete point (d) of paragraph 6, to consider demand units not yet connected.	Disagree	The prov connecte demand f demand connecte
NC DC	EDP, E-REDES	Article 49	The stakeholder proposes to change "unless agreed otherwise by the relevant TSO" to "unless agreed otherwise by the relevant system operators", to include DSOs.	Disagree	Accordin TSO to u timeline f
NC DC	EDP, E-REDES	Annex I	The stakeholders argue that frequency requirements must be the same for different synchronous areas and ENTSO-E has to be mandated to propose a uniform value by researching a consensus.	Disagree	The flexit be retain system is
NC DC	EDF	Annex I	As is the case for the NC RfG proposal, the stakeholder states that no clear cost/benefit analysis was performed regarding the 51,5Hz-52,5Hz during 10s frequency requirement and asks for the removal of this requirement for all zones.	Disagree	When as transient transient black out below 51 system in the trans system re <u>Public Co</u> <u>codes</u> ).

response transmission constraint management is a service d by the demand response units to the system operators to help the ment of transmission constraints. Therefore, ACER does not r appropriate to remove this service. Furthermore, according to 2(20) and 2(21), system frequency control is response to frequency ons whereas very fast active power control aims to capture fast cy deviations. In addition, according to Article 2(17) reactive power which is affecting the system voltage, is a service that is available ulation by the relevant system operator, as they have complete view restem voltages, and not to be autonomously controlled. Therefore, oes not deem appropriate to substitute the service for very fast ower control with system voltage control. Nevertheless, the g amendments to the SO GL and/or Demand Response NC may e concerned provisions.

eeds to be a third party since demand aggregation means a set of facilities or closed distribution systems which can operate as a cility or closed distribution system for the purposes of offering one demand response services.

nore, the provisions in these articles are identical to the current NC have been agreed with Member States. ACER does not see a need ge these provisions at this point.

the relevant TSO to specify the value for the RoCoF. ENTSO-E lish an Implementation Guidance Document providing guidance g this value.

visions of Articles 31-33 of the NC DC describe procedures for ed demand units providing demand response services within a facility or a closed distribution system. There is no need to include units proposed to be connected as these units will eventually be ed in order to provide these services.

ng to Article 48 of the NC DC it is the responsibility of the relevant undertake a quantitative cost-benefit analysis and to agree on the for providing the necessary data.

bility for TSOs to set different times for the frequency ranges should ed. Minimum level of frequency stability of the European electricity s achieved based on the defined minimum time periods.

system split is occurring, frequency in the overfrequency island can the overshoot before it is stabilised to a lower value. If, during that t, all load is tripped due to transient over-frequency, the island will t, even if it would have been possible to stabilise the frequency .5 Hz. This system behaviour will be aggravated with decreasing nertia. The proposed modification delays the tripping of load during sient and therefore prevents the island from blacking out. Thus esilience increases. (see ENTSO-E's submission to <u>ACER's 2022</u> onsultation on the amendments to the grid connection network



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	IFIEC	General comment	The stakeholder considers that the specific topic of the discrepancy between NC DC (sites/CDSs and provisions applicable on their connection points) and NC RfG (installations and provisions applicable on the equipment) has not yet been addressed. The concern is expressed that a NC DC site can contain one or several installations falling under the NC RfG, which can directly lead to potential conflicts. E.g., under the NC RfG a PGM is requested to provide reactive power, while at the same time under NC DC the site where that PGM is based needs to remain between certain thresholds (maybe not succeeding to comply and then being exposed potentially to penalties). To this regard, the stakeholder proposes to add an article to the NC DC (and/or NC RfG) stipulating that all requirements are only applicable insofar under NC RfG (or other codes, e.g., the future NC DSR) and no conflicting requirements are applicable, in which case the requirements under NC DC would only be applicable insofar taking into account those other required/requested actions.	Partly agree	As regard provision (installatii mentionin both defin fundamer underfred should in eventually reactive capabilitii SO's poin within the The amen aggregatii ensure th necessar Therefore these kin However, the conne any case regulator
NC DC	Undisclosed respondent, EHI	Article 59	The stakeholder proposes to set different grace periods for each application and scope, and gradually increase the number of devices equipped with functions. In addition, if launched models without the requirements are prohibited from being sold, significant switching costs are required. EHI further questions the timeline for the application and reiterates their position that any change in technical requirements forced on products requires a sufficiently long lead-time (e.g., 2-3 years) before becoming applicable.	Partly agree	Undoubtfu and adopt the NC DC

ds the alleged discrepancy between the NC DC (sites/CDSs and ns applicable on their connection points) and the NC RfG ions and provisions applicable on the equipment), it is worth ng that the codes define connection requirements. Thus, as they ine ranges and capabilities, they should not be in conflict. The ntal goal is to support the grid. For example, when there is an quency event, the demand should reduce and the generation ncrease within the site, thus all working at supporting the system to by recover the frequency back to the nominal value. As regards power again the NC RfG and DC NCs define ranges and tes. Assuming there is only one connection point, then from the nt of view they would like this connection point's voltage to remain e specified ranges from all equipment within the facility.

endment of Recital (9) of the NC RfG aimed at addressing the tion/bundling capacities of units of same underlying technologies to he harmonisation of rules for mass-market products it also to ry to allow for hybridisation of power generating facilities. e, ACER has amended Recital (9) of the NC RfG to ensure that ads of installations can properly be addressed.

, operational issues of the mixed customer site are out of scope of ection codes as the scope of these codes is precisely defined. In e whatsoever, these issues may be tackled within the national ry framework or within the connection agreement.

ully the European Commission will coordinate any grace periods tion related issues with Member States. Moreover, the adoption of C is expected in late 2024.



## 15. DEMONSTRATION OF COMPLIANCE

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG and NC DC	EFAC	Recital (26) (NC RfG) Recital (17) (NC DC)	The stakeholder proposes to complement the recital with the following: "Setting up procedures for operational notification and compliance schemes including tests, simulations and the application of certificates will promote standardised grid connection and non-discriminatory access to the European market for manufacturers and project developers".	Partly agree	
NC RfG	ENTSO-E, CENELEC, COGEN Europe, EUGINE, EUROPGEN, EUTurbines, Moeller Operating Engineering GmbH	Article 2, Article 7, Article 29, new article in Title IV	The stakeholders propose to introduce a new article called "common provisions on equipment certificates" in the Chapter 1 "Compliance Monitoring" under Title IV "Compliance" with the motivation of: 1) The stakeholder states the need for specifying a compliance scheme, in case the RSO decides to use equipment certificates; 2) possibility of mutual recognition of equipment certificates between Member States, and 3) possibility of issuing certificates for power generating units or components that belong to a family. Apart from this new article, there is a need for new definitions related to certification process.	Partly agree	
NC RfG	EFAC	Article 2(46)	Based on EG HCF final report, the stakeholder suggests changing the definition of 'authorised certifier', to clarify that any authorised certifier issuing an equipment certificate shall hold a valid accreditation according to the international accreditation standard on product certification, i.e., ISO/IEC 17065. It was also proposed introducing the option for issuing equipment certificates "and/or" PGMD as not all authorised certifiers may issue both conformity statements but only one of these.	Partly agree	
NC RfG	EFAC	Article 2(47)	Based on EG HCF final report, the stakeholder proposes to clarify in the definition of 'equipment certificate' that any equipment certificate issued under the regime of this Regulation is based on a certification scheme (as required by ISO/IEC 17065) according to the relevant standard (currently ISO/IEC 17067) and issued based on a conformity assessment with respect to specified requirements.	Partly agree	ACER ackno
NC RfG	KCORC, EFAC	Article 2 (new definitions)	The stakeholders propose to introduce new definitions on "power generating unit (PGU)" and "PGU Family". One stakeholder (KCORC) proposes to define "PGU Family Certificate". Another stakeholder (EFAC) also suggests providing definitions of 'component', 'component family', 'compliance scheme', 'specified requirements' and 'statement of conformity'.	Partly agree	grouping" ha the framewo common pro
NC RfG	KCORC	Article 3 (new paragraph)	The stakeholder proposes to add a new paragraph describing the power generating unit family and the conditions that need to be met to consider that a group of PGUs belong to a specific family. The stakeholder argues that certification and family concepts are on PGU and not PGM level. PGU Family definition is missing in existing NC RfG and is essential for acceptance of PGU certification among EU countries.	Partly agree	
NC RfG and NC DC	EFAC	Article 7 (new) (NC RfG) Article 6 (new) (NC DC)	The stakeholder proposes to introduce a new paragraph on the procedure for the provision of compliance schemes on national level – equivalent to the provisions on requirements of general application in paragraph (4).	Partly agree	
NC RfG and NC DC	EFAC	Article 29(2) (NC RfG) Article 31(4) (NC DC)	The stakeholder proposes to embed the compliance scheme into the operational notification process, providing that the compliance scheme shall address the use of equipment certificates of PGU and component.	Partly agree	]
NC RfG	EFAC	Article 32(2)(d)	The stakeholder proposes to remove "in respect of power-generating modules" as equipment certificates, in general, are not issued in respect of a PGM. In general equipment certificates are issued for PGUs and component – however, here the final project characteristic as "in respect of a PGM" are not defined.	Partly agree	
NC RfG	EFAC	Article 32 (new)	The stakeholder proposes to introduce new paragraph 5 to enable that the consecutive scheme of EON, ION and FON may be also applied for type B and C PGMs, as this is the practise e.g., in Germany (Einzelnachweisverfahren according to VDE AR N 4110).	Partly agree	

## ACER views

nowledges the need to include common provisions on equipment is in the NC RfG. Furthermore, discussions between ENTSO-E and iC Expert Group "Harmonisation of Certification and product Family have taken place to agree on a common legal text proposal. Within work of the relevant EU legislation, ACER has considered the proposal for the legal text as agreed between the relevant parties.

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European Union Agency for the C of Energy Regulators	ooperation

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response	
NC RfG	EFAC	Article 33 (new)	The stakeholder proposes to introduce a new paragraph 2 to enable that – equivalent to Article 32(4) the documentation may be checked by authorised certifiers (as in practise in Germany according to NELEV and VDE AR N 4120).	Partly agree
NC RfG	EFAC	Article 40(1)	The stakeholder proposes to delete the phrase "issued as per Regulation (EC) No. 765/2008" as that regulation only defines the accreditation of certification bodies but not the issuing of certificates; and the issuing of certificates can be sufficiently addressed by the amended definitions (46) and (47) and the new Article ZZ as proposed by EG HCF.	Partly agree
NC RfG and NC DC	EFAC	New article after Article 43 (NC RfG) Article 35 (NC DC)	The stakeholder proposes to introduce a new article on common provisions on equipment certificates that would establish the general requirements and procedure.	Partly agree
NC RfG	Undisclosed stakeholder	Article 40, Article 41	The stakeholder proposes to introduce a unique equipment certificate model in the EU for all types of power-generating modules in order to prevent market fragmentation. While PGMs of type C and D do not currently face the same regulatory barrier, the stakeholder would like to pre-empt future barriers for the uptake of such critical technologies which are able to manage the electricity grids more efficiently. Moreover, the stakeholder suggests that such certificates should be valid only when issued by European certification body located in the EU in order to ensure product safety. Indeed, often European certification bodies are located outside the EU territory, and in particular in countries with lower standards for product safety, such as the PRC. In addition, the stakeholder proposes to further amend this Article with a view to allow the verification of compliance with the NC RfG of PGMs through automated and automatic type testing of devices based on existing standards for installation. As a result, testing should only take place when the related devices are not installed according to such standardised type-testing procedures. This will limit SO discretion as much as possible and, in turn, promote investment to expand the pool of flexible, behind the- meter assets that are needed to support high- variable renewables grids.	Partly agree
NC RfG	Undisclosed stakeholder	Article 42	The stakeholder considers that the introduction of additional requirements for compliance testing of power-generating modules could become too cumbersome where different national rules set out different requirements. The stakeholder proposes to amend this Article with a view to introduce requirements on compliance testing based on standardised type-testing procedures for any sites. Such procedures should include the power measurement of the concerned device and a demonstration of the connection with smart meters in order to guarantee that the device is not reexporting power to the grid, and /or the delivery of grid ancillary services.	Partly agree
NC RfG	Undisclosed stakeholder	Article 43	The stakeholder considers that the introduction of additional requirements for compliance simulation of power-generating modules could become too cumbersome where different national rules set out different requirements. The stakeholder suggests amending this Article with a view to introduce requirements on compliance simulation based on standardised type-testing procedures for any sites. Such procedures should include the power measurement of the concerned device and a demonstration of the connection with smart meters in order to guarantee that the device is not reexporting power to the grid, and/or the delivery of grid ancillary services. In addition, the stakeholder proposes to further amend this Article to limit SO discretion to carry out compliance simulations as this could derail the market uptake of many flexible, behind the meter assets that are needed to support high variable- renewables grid.	Partly agree



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	VDE FNN, Bundesverband Solarwirtschaft e.V., AEE, Iberdrola, E.ON, Enel Group	Article 14(5)	The stakeholders argue that there must be a uniform interface for communication in Europe. Any agreements or contracts should be made solely between the facility owner and the relevant system operator. The communication protocol has to be set by the relevant system operator. Any data exchange to the TSO has to be agreed between the relevant system operator and the relevant TSO. Another stakeholder suggests that ACER should have the right to specify the real time interface after consultation with relevant stakeholders since there must be a uniform interface for communication in Europe. One stakeholder considers that the metering device and communication link should be defined. One stakeholder considers that the adoption of low latency communication network should be provided in (d)(i) and (d)(ii).	Disagree	The NC Rff for example data and co codes on g "In order to is necessar of entities a Users, Thir The ENTSO structural d via the follo https://www. modelcim/P Recommen practice on ETSI X.50 practice rea Smart Ener CG/CSP-D The commu equipment;
NC RfG	EDP, E-REDES, Eurelectric	Article 29(3)	The stakeholders propose to provide that the provision on the permanent decommissioning notification is also applicable to the existing power generation facilities.	Disagree	ACER cons

fG should not provide for every detail. Reference could be made le, to ENTSO-E's <u>Implementation Guidance Document</u> on real-time communication which serves national implementation for network grid connection. According to this document:

o create a seamless, efficient and secure information exchange it ary to apply harmonized standards at various stages, as the number and/or parties is dramatically increased– TSOs, DSOs, RSO, Grid ird party service provider s etc.

O-E recommended standards to be applied for market related and data exchange of information can be found on ENTSO-E website owing link:

w.entsoe.eu/major-projects/common-information-Pages/default.aspx

ndations on applicable standards for information security and best in handling confidential information can be found in the IEC 62351, as well as the ISO27000 standard series. The global best ecommended to be applied can be found in the following report: ergy Grid – Coordination Group Cyber Security & Privacy, SEG-Draft Report-V07.pdf

nunication protocol needs to respect the capabilities of the owner's t; hence the owner's agreement is important.

siders that that would not be in line with Article 4 of the NC RfG.



#### 16. OTHER AREAS NOT COVERED BY THE POLICY PAPER EXPLICITLY

Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
Response refers to:	Name of stakeholder(s)	Reference to Article(s) / paragraph(s) corresponding to ACER's draft NC proposed amendments	Summary of stakeholders' response	ACER position	Reasoning
NC RfG	COGEN Europe	Article 3	The stakeholders propose to provide that the documents defining the requirements and verification of compliance should be made available in English. One stakeholder proposes that these should be available within three months of publication of the original document.	Disagree	ACER cons against the p the system (https://euro history/lang 20Sloveniar
NC DC	Undisclosed stakeholder	Article 7, Article XX+3	The stakeholder considers that as there are 39 different TSO's in the different Member States, having different requirements in different countries leads to an unclear situation and that obligations and Regulation should be fixed within harmonised standards within the European community.	Partly agree	In the NC D distributions grid connect security, fac competition the benefit c in the Union when setting consider reg required by
NC DC	Undisclosed stakeholder	Article 27	The stakeholder considers that as chargers are brought to the market under a CE declaration, a harmonised standard for functions and interface is needed. (harmonised standard to be inserted in paragraph (3)).	Partly agree	When apply operators sl specification deemed suff standards.
NC RfG	ENTSO-E	Article 16(3)(a)	The stakeholder argues that the FRT profile is less strict for type D installation connected below the 110 kV and does not go at Uret of zero. It is suggested changing this need because a large number of offshore projects are expected to be connected at 66kV, mainly DC connected. In the future, DC connected PPMs will have 66 kV connection point to the offshore HVDC platform, in scale 400-500MW. Therefore, the stakeholder considers that FRT shall be down to zero.	Disagree	FRT robusti requirement considered imposed to PPMs conn
NC RfG and NC DC	Energinet	Article 13(2)(b), Article 13a(1)(b) (NC RfG) Article XX (NC DC)	The stakeholder generally agrees with ACER's proposal. However, it was proposed to introduce some additional specifications to ensure that RoCoF assessment rejects spurious frequency measurements caused by distortion and transients. It is important that plants do not trip during faults/phase jumps due to RoCoF protection.	Disagree	The provis requirement The provision More details found in Euro
NC RfG	ENTSO-E, Oesterreichs Energie	Article 19(4)	The stakeholders do not support the exclusion of type D SPGMs based on the 400 MW capacity threshold. The RoCoF withstand capability is a major design parameter for power systems. One stakeholder proposes to allow a type D SPGM to apply for an exception to the relevant TSO from the 2Hz/s over a period of 0,5s requirement.	Partly agree	ACER ackno higher value exception. Relevant arr
NC RfG	VGBE, COGEN Europe, EUGINE, Eurelectric, EUTurbines, Undisclosed stakeholder, Gunnar Kaestle, Energie- Nederland, EDF	Article 13(2)(b), Article 19(4)	Some stakeholders propose to apply RoCoF of 1Hz/s for all SPGMs type D. It is not allowed to block investments due to this RoCoF requirement due to two major advantages of SPGMs: (i) saving CO2 emissions in cogeneration units and (ii) increasing the robustness of the electricity system by adding "real" inertia. Another stakeholder proposes that PGMs shall provide information on the maximum acceptable RoCoF withstand capability, with minimum withstand capability not less than +/-1Hz/s and for type D SPGMs RoCoF protection settings shall be agreed with Power Generating Facility Owner.	Partly agree	ACER acki certain tech higher valu flexibility.

#### ACER views

siders that the proposed provision would be disproportionate, principle of subsidiarity and would create unnecessary burden for n operators. Moreover, the EU has 24 official languages opean-union.europa.eu/principles-countries-

uages\_en#:~:text=The%20EU%20has%2024%20official,%2C% n%2C%20Spanish%20and%20Swedish.).

DC harmonised rules for grid connection for demand facilities and systems are set out in order to provide a clear legal framework for actions, facilitate Union-wide trade in electricity, ensure system cilitate the integration of renewable electricity sources, increase n, and allow more efficient use of the network and resources, for of consumers. However, different synchronous electricity systems in have different characteristics which need to be taken into account ing the non-exhaustive requirements. It is therefore appropriate to igional specificities when establishing network connection rules as Article 59(1) and (2) of Regulation (EU) 2019/943.

ying NC DC, Member States, competent authorities and system should take account of agreed European standards and technical ons as per Article 6(3)(f) of NC DC. The current reference is fficient for promoting further harmonisation through the European

tness requirements for offshore power park modules follow the ts in Articles 14(3)(a), 15(3), 16(3)(a), and 20(3). It is not appropriate and proportionate the same requirements to be offshore PPMs connected to higher voltages and to offshore nected to lower voltages.

sion for rate-of-change-of-frequency capability refers to the t to withstand specific values of Hz/s over a specific time period. ions do not provide details regarding the frequency measurement. led information regarding the frequency measurement may be uropean standards and at a national level.

owledges the need to allow SPGMs that can technically with stand es of RoCoF to do so. However, this should not be based on an

nendments have been introduced to NC RfG to allow this flexibility.

nowledges the need to take into account technical limitations of hnologies but also to allow SPGMs that can technically withstand ues of RoCoF to do so. A provision will be added to allow this



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC RfG	IFIEC, National Grid ESO	RoCoF, Article 13(2)(b)	One stakeholder expresses doubts regarding the proposed RoCoF and considers that the topic was not sufficiently studied to allow the incorporation of specific values and requirements in the Regulation. One stakeholder notes that the changes in the rate of change of frequency withstand capability are quite onerous. The rate of change of frequency withstand capability will vary from synchronous area to synchronous area and the security standards that apply. Some TSOs may not have a system split condition in their security criteria, and, in this case, it is questionable whether such high rates of change of system frequency withstand are required. Also, there is a difference in the requirements between synchronous power generating modules and power park modules, so there is a risk that if high rates of change of frequency occurred in a synchronous area, the synchronous plant would tip first making it very difficult for the system to survive based on the remaining power park modules.	Disagree	Frequence area robb implemen ACER's p transpare discussice was also acknowle technolog values of Furtherme the future requireme
NC RfG	ENTSO-E, WindEurope	Article 21(3), Article 26	The stakeholderspropose a legal text for the forced oscillations requirement of PPMs, starting from type C.	Agree	ACER acl forced os to the NC
NC RfG	VGBE	Article 24	The stakeholder proposes to improve the clarity of the text with regard the references to other articles.	Agree	ACER ag amendme
NC RfG	VGBE, IFIEC	Article 60	The stakeholders propose to give ACER the authority to introduce a derogation at the level of the European Union, added to the existing national ones and persisting during the lifetime of the concerned PGMs.	Disagree	This prov 2019/942.
NC RfG	ENTSO-E	Article 70a	Recital 32, as given by the proposal of ACER should be included in Article 70a (Repeal), as it is not considered a transitional provision. Moreover, the wording is not precise enough regarding the modifications which makes the PGM fall within the scope of application of the regulation. For example, it is necessary to give more details for the case of new PGMs that will arrive after the entry into force of this regulation and before the date on which the requirements it provides begin to apply (to avoid that none of the NC apply to them). Introducing new requirements without specifying their temporal application (scope <i>ratione temporis</i> ) entails the risk of legal uncertainty for PGMs, which existed already before the entry into force of the newly adopted regulation, due to its retroactive application.	Partly agree	ACER co the need agrees wi certainty Relevant of the NC
NC RfG	ENTSO-E	Article 71a	The stakeholder proposes a reviewed legal text for the Article 71a in order to ensure clarity.	Partly agree	The appr
NC RfG and DC	EU DSO, EDF, E- REDES, Eurelectric	Article 58 (NC RfG) Article 56 (NC DC)	The stakeholders propose that the ENTSO for Electricity shall, in co-ordination with the EU DSO Entity, prepare and thereafter every two years provide non- binding written guidance to its members and other system operators.	Disagree	Accordin develop r
NC DC	ENTSO-E	Article 2(4)	The stakeholder considers that the part of the legal text proposal as "being part of a demand facility or part of a closed-distribution system," is important to avoid legal ambiguity and misinterpretation for the applicability of the technical requirements.	Disagree	Accordin demand f services t considers
NC DC	ENTSO-E, Undisclosed stakeholder	New paragraph in Article (2), Article 3, Title XX	One stakeholder proposes to add a definition for data centre demand unit in the definitions of NC DC and to introduce technical requirements for these units. Another stakeholder shares the interest in defining requirements for a certain number of new uses (V1G, heat pumps, power to gas units). However, other technologies representing an increasingly significant share of consumption and being technologically capable of meeting similar requirements such as data centres could logically also be included in the scope of the NC DC. The stakeholder considers that further justification is necessary for this partial broadening of the scope of application of the NC DC.	Disagree	ACER co in the cor

<sup>&</sup>lt;sup>3</sup> <u>https://www.acer.europa.eu/public-events/acer-workshop-rate-change-frequency-and-grid-forming-capabilities</u>

cy withstand capabilities are key for the design of a synchronous ustness and lack of strong collaboration in the network code nation could lead to inefficient effort from some Member States. proposal aims to provide RoCoF values to further improve the ency and the robustness of the system. Furthermore, extensive onshave been held within the GC ESC and also bilaterally. The topic o discussed in a dedicated ACER public workshop<sup>3</sup>. ACER edges the need to take into account technical limitations of certain gies but also to allow SPGMs that can technically withstand higher RoCoF to do so. A provision will be added to allow this flexibility. ore, NC RfG provides for requirements for new PGMs, therefore, in the there will still be a mix of existing SPGMs based on the RoCoF ent specified nationally and the new PGMs with the new ents.

knowledges the need to provide more clarity with regard to the cillations provision. Relevant amendments have been introduced RfG.

rees with the need to improve the clarity of the text. Relevant ents have been introduced to the NC RfG.

vision is not under ACER's remit according to Regulation (EU)

nsiders that it is relevant to include a recital to provide context as to to have transitional or repeal provisions in the regulation. ACER th the need to improve the clarity of the text in order to ensure legal and revised Article 70a accordingly.

amendments have been introduced in the recitals and Article 71a  $\Xi$  RfG.

opriate amendments have been introduced to Article 71a.

g to Article 59(15) of the (EU) Regulation 2019/943, ENTSO-E may non-binding written guidance.

ng to Article 1(d) the subject matter includes demand units used by a facility or a closed distribution system to provide demand response to relevant system operators and relevant TSOs. Therefore, ACER rs that the proposed definition adequately defines the notion.

nsiders that requirements for these types of units may be prescribed nnection agreement or through the national regulatory framework.



Applicable NC	Respondents	Section of proposed amendment	Summary of respondents' response		
NC DC	ENTSO-E	Article 1(1), Article 19	The stakeholder proposes to add a new point in the subject matter, namely, "distribution-connected demand facilities, if specified by the relevant TSO, in coordination with the relevant system operators, to provide demand disconnection and reconnection"	Disagree	As it is not system use ACER cons out in a clea
NC DC	ENTSO-E	Article 6(7)	The stakeholder proposes to remove the provision that relevant regulatory authority or designated entity can also deem an amendment necessary, allowing regulatory authorities to propose an amendment.	Disagree	According NRAs is to i proceed to
NC DC	ENTSO-E	Article XX	The stakeholder proposes to add a requirement on HVRT to avoid mass disconnection of large-scale power to gas demand facilities due to grid disturbances. This is an important requirement together with the FRT.	Agree	ACER agre units to imp been introd
NC DC	ENTSO-E	Article XX	The stakeholder argues that power-to-gas is foreseen to represent several GW in a very restricted geographical area. A fault could then impact GW of load whose behaviour could impact drastically the stability of close generators as well as the system frequency. The recovery after fault should be discussed between TSO and P2G facility owner in order to address this risk. For France for example, we could have to delay the active power recovery of hundreds of ms after voltage recovery to improve transient stability of close nuclear power plants. However, a recovery of 5s could be too long and lead to LFSM-activation, which is perhaps not intended for normal faults. A recovery ramp of active power after voltage recovery could be better than just a time recovery. The line should allow these discussions and set only maximum tolerable values. For Germany the time for active power recovery is much too long for the requirements in the German grid.	Agree	ACER agree Relevant an
NC DC	T&D Europe	Recital 7, Article 2(21), (22)	The stakeholder argues that the term 'demand response' is used as these codes do not consider the demand facility, demand unit to be comprised of any generation source. They suggest demand response be replaced by demand side flexibility. As the latter covers more granular control strategies to make demand elastic, irrespective of whether there is a generation unit or not.	Disagree	The NC DC distribution operators a described i describe the amendmen concerned
NC DC	T&D Europe	Articles 1(1)(e) and 3(1)(e)	As regards V1G electric vehicles and associated V1G electric vehicle supply equipment, heat-pumps and power-to-gas demand units, the stakeholder suggests treating these new demand facilities not separately from other demand units. Especially if these new demand units are part of a demand facility, the requirements from the NC DC should apply to the grid connection of this demand facility and it is subject to the energy management within the demand facility to fulfil these requirements utilising the available capability of all controlled demand units, even if these demand unit standalone would not meet the NC DC requirement. Therefore, a merger of points (d) and (e) of Article 1 is proposed and apply this throughout the legal text.	Disagree	The NC DC system in t V1G electri heat-pumps ACER cons responses to the SO integration are provide

t clear to what extent they would affect or have implications for ers, the suggested changes could turn out to be disproportionate. siders that the existing requirements for the specific units are set ar and explicit way.

to Article 59 of the Electricity Directive among the duties of the implement the codes through national measures. Thus, they may amendments where they deem appropriate.

es with the addition of HVRT provision for power-to-gas demand prove the robustness of the system. Relevant amendments have duced in the NC DC.

es with the proposed amendment.

mendments have been introduced in the NC DC.

C covers demand units used by a demand facility or a closed system to provide demand response services to relevant system and relevant transmission system operators. These services are in Article 27(1). ACER considers that the terms used adequately e required services from such units. Nevertheless, the upcoming ts to the SO GL and/or Demand Response NC may revise the provisions.

C provides for requirements for connection in order to support the the event of disturbances. Therefore, the requirements apply to ic vehicles and associated V1G electric vehicle supply equipment, s and power-to-gas demand units.

siders that the technical requirements for units providing demand ervices should instead be included in the upcoming amendments GL and/or Demand Response NC. This may support better of concerned system users. However, until such amendments s ed the rules of NC DC continue to apply.



# 17. NEXT STEPS

Following the evaluation of the stakeholders' responses to the 2023 public consultation, ACER plans to submit recommendations for the amendments of the NC RfG and NC DC to the Commission by the end of 2023.