ACER

European Union Agency for the Cooperation of Energy Regulators

Grid Connection NCs Amendments – update

Grid Connection ESC

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Public

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ACER main changes from PC draft proposals
for NC RfG amendment

Note: All proposed amendments are based on stakeholders' submissions to the Public Consultation, unless marked with an asterisk (*). These marked amendments have been proposed through ACER's internal processes.

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MCS

Mixed-Customer Sites

Recital (11) (old (9)) to tackle units of different classes behind a single connection point

To account for hybrid power generating facilities where there is a need to aggregate different types of PGMs

"capacities of units of different classes, for instance, photovoltaic, electricity storage, combined heat and power installations, or V2G electric vehicles, should not **necessarily** be aggregated for the purpose of the determination of significance **unless so agreed** between the relevant system operator and the power-generating facility owner."

Integrated energy storage also for SPGMs

"Electricity storage integrated to a power-generating module, ~~**where module is either non-synchronously connected to the network or connected through power electronics,**~~ used solely for the purpose of meeting the requirements of this Regulation should be considered as part of such module while its capacity **should not count towards** the power-generating module capacity."

PGM – power-generating module
SPGM – synchronous power-generating module

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Demonstration of Compliance

According to agreed proposal between ENTSO-E and EG HCF

- need for specifying a compliance scheme, in case the relevant system operator decides to use equipment certificates;
- possibility of mutual recognition of equipment certificates between MS;
- possibility of issuing certificates for power generating units or components that belong to a family.

- New definitions
- Amendments to Article 29
- New Article on common provisions on equipment certificates

ACER draft proposals – main changes (Requirements for Generators)

PGMs

Determination of significance

- A-B upper limit for capacity threshold reverted back to **1 MW** for Continental Europe SA

Electromobility

- EV2/EV3 threshold changed from 42kW to 50kW
- Added high-voltage ride through requirement for EV3 EVs to be consistent with type B PGMs

Forced oscillations

- Added provisions for forced oscillations of PPMs based on agreed proposal between ENTSO-E and WindPower Europe
- Provisions in Article 21 Requirements for type C power park modules and Article 26 Robustness requirements applicable to AC-connected offshore power park modules

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RoCoF

RoCoF withstand capability

Type A, B, C and D PPMs

1) Staying connected to the network and operating at:

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

2) Staying connected to the network and operating at the sequence defined by the frequency against time profiles

Type A, B, C and D SPGMs with Pmax < 140 MW

Staying connected to the network and operating at:

- ±2,0 Hz/s over a period of 0,5 s,
- ±1,5 Hz/s over a period of 1 s,
- ±1,25 Hz/s over a period of 2 s;

Type D SPGMs with Pmax ≥ 140 MW

Staying connected to the network and operating at:

±1,0 Hz/s over a period of 0,5 s

the relevant system operator, in coordination with the relevant TSO, and the power-generating facility owner may agree on a higher value of rate-of-change-of-frequency

RoCoF – rate of change of frequency
Pmax – maximum capacity

SPGMs – synchronous power-generating modules
PPMs – power park modules

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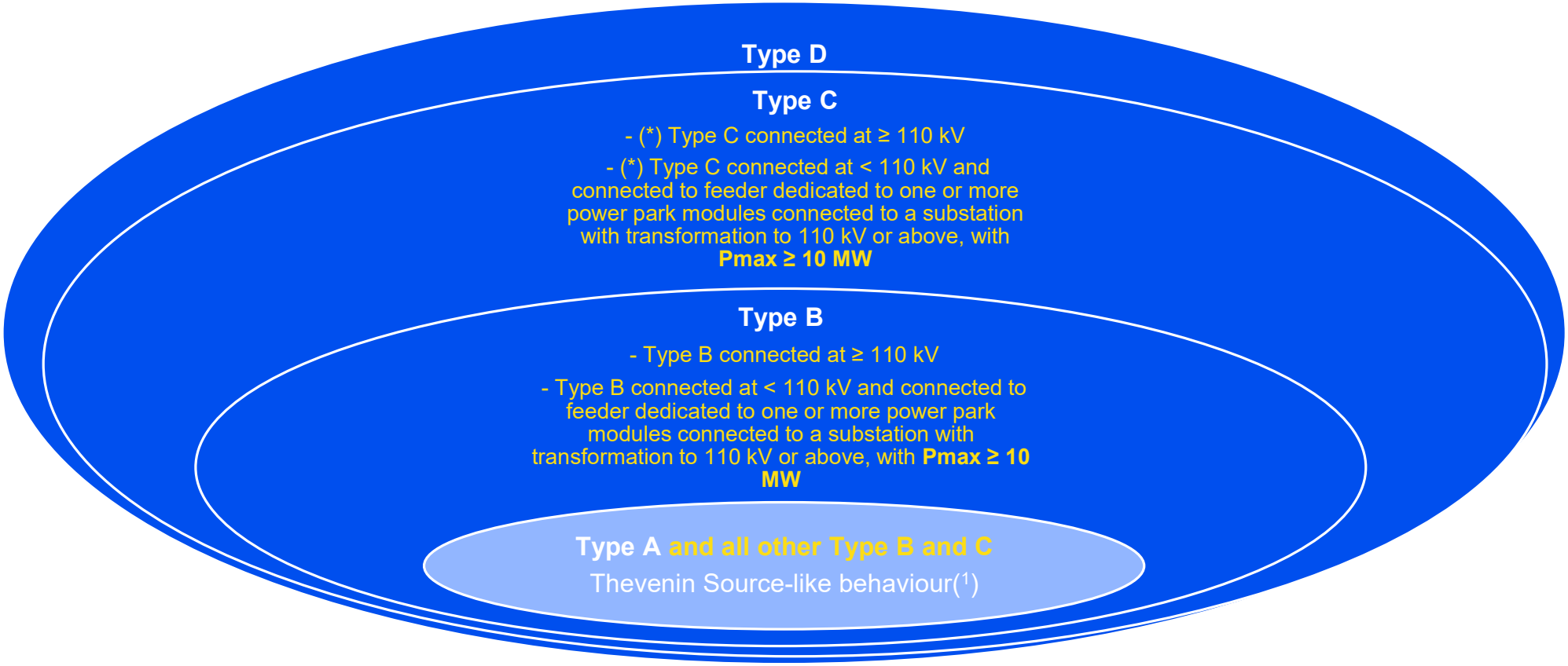
Grid forming capabilities



(1) the instantaneous AC voltage characteristics of the internal Thevenin source shall be capable of not changing its amplitude and voltage phase angle while voltage phase angle steps or voltage magnitude steps are occurring at the connection point.

Mandatory requirements | **Non-mandatory requirements**

(*) Amendment proposed through ACER's internal processes

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Grid forming capabilities

Type A

Type B or C other than:

- Type B or C connected at ≥ 110 kV
- Type B or C connected at < 110 kV and connected to feeder dedicated to one or more power park modules connected to a substation with transformation to 110 kV or above, with Pmax ≥ 10 MW

The Member State or a designated entity within the meaning of Article 7(1) may require that the relevant TSO in coordination with the relevant system operator shall specify that type A power park modules shall be capable of providing grid forming capability at the connection point. In this case, the Member State or a designated entity within the meaning of Article 7(1) shall develop a roadmap within two years after entry into force of this Regulation in order to assess a roll-out of grid forming capability, that may include impact assessments on oscillations, island mode detection or other technical challenges

Re-introduced fast fault current requirements as they are only redundant for grid forming PPMs, not for grid following PPMs.

Pmax – maximum capacity

ACER draft proposals – additional changes following NRAs proposals (NC RfG and DC)

(*)(NC RfG) Deletion of paragraph 14 of Article 13

- This paragraph is redundant and could create misinterpretations. The relevant provisions are already included in Articles X and Y for type A PGMs with regard to fault-ride-through and grid forming capability

(*)(NC RfG) Provisions with regard to information exchange in Article 14(5)(d) changed to non-mandatory

- Provisions in Art. 14(5)(d) on information exchange of type B PGMs currently include mandatory requirements for real time data exchange that do not allow the flexibility in the national implementation to specify the PGMs that need to have the capability based on the SOGL requirements. Therefore, the phrase 'if specified by the relevant system operator or the relevant TSO' is added in paragraphs (i), (ii) and (iii) of Art. 14(5)(d). Based on ACER SOGL implementation monitoring report, there are MSs that do not require real time data exchange from all type B PGMs.

(*)(NC RfG) Clarifying the notion of underlying technology in recital (11) of NC RfG

- The phrase in sentence from 'capacities of units of different classes' has been changed to 'capacities of units of different underlying technology' to clarify the notion of underlying technology based on the examples.

(*) Amendment proposed through ACER's internal processes

ACER draft proposals – additional changes following NRAs proposals (NC RfG and DC)

(*)(NC RfG) Introducing provisions in Article 21 for grid forming for type C PPMs in line with type B PPMs

- New provisions have been introduced in Article 21 to provide protection of small type C power generating modules with regard to grid forming in line with type B PPMs.

(*)(NC RfG) Aligning grid forming requirement on synthetic inertia for types B and C with the conditions specified in Articles 20 and 21

- According to the draft legal text submitted to the AEWG, the synthetic inertia is required for all type B and C PPMs. However, the conditions provided in Articles 20 and 21 that specify which type B and C PPMs shall have synthetic inertia capability should be taken into account. Therefore, amendments have been introduced to take these conditions into account.

(*)(NC RfG) Amendment to Article 30(3) on operational notification of type A power-generating modules (PGMs)

- ACER proposed amendment to Article 30(3): '*If required by national rules, the relevant system operator, on acceptance of a complete and adequate installation document, shall issue a final operational notification as soon as possible*.'
- ACER's proposal keeps the requirement to issue a FON as soon as possible for Member States that require it but allows the flexibility not to issue a FON if not required in national rules.

(*)(NC DC) Updated Figure (3)XX.c on LFSM capabilities of V1G

- Updated the figure and added the relevant symbols to the legal text.

(*) Amendment proposed through ACER's internal processes

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ACER main changes from PC draft proposals
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ACER draft proposals – main changes (Demand Connection)

P2G

Power-to-Gas demand units

Power-to-gas demand units

- Addition of high-voltage ride through provisions for power-to-gas demand units

Electromobility

- Harmonisation of frequency and voltage ranges for V1G EVs

Transitional provisions

Transitional provisions

- Added transitional provisions to be consistent with NC RfG

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ACER indicative timeline for NC HVDC amendments

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NC HVDC - amendment process