

Feedback concerning requirements for grid connection of generators (RfG 2.0)

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These comments are prepared from the German Solar Association (BSW-Solar) but the German Wind Energy Association BWE (Bundesverband WindEnergie e.V.) shares and supports the views presented in this submission.

Grid Forming

Since the roots for the RfG2.0's requirements were set in 2022/2023, the world has moved on. Large-scale storage systems are becoming increasingly relevant and commonplace in as well as standalone systems, but also colocated to PV installations (driven by market dynamics and limited grid connection capacity). Standalone PV plants are likely to become less common in the future. Grid forming specifications for large storage systems are already in place in several countries and experience is being gathered. Meanwhile, the system's capacity needs for grid-forming capabilities are being determined with increasing precision through an iterative process. Potentially, the inertial capacity of large scale storage systems will already be sufficient to meet the future's inertia needs.

Looking at grid-forming properties with pure wind/PV systems in mass application, there is still unanswered technological uncertainty. There are still several fundamental open questions with regard to robust validation, potential interaction of PV-generators and grid dynamics and the effect of heavily changing effective inertia depending on how many PV-plants are in operation at a certain point in time (especially day-/nighttime). The transition time for GFM from power park modules other than electricity storage modules should be four years until grid connection to give enough time for maturing technology and verification approaches based on experience from grid forming electricity storage modules.

The original ACER draft already neglected risks for grid forming PV-systems claimed in the [ACPPM Report](#) (section 11.3.5), so does the actual draft of the EU-Commission.

We suggest the following changes:

Article 30:

Grid Forming Requirements have to be differentiated between PV and ESM and should be simplified. Specific inertia provision should only be mandated from ESM, not other PPM (replace "power park modules" by electricity storage modules" in Art. 30.5(a); delete Art. 30.5(b); change

text in Art. 30.5(c) to “(b) type B electricity storage module shall be capable of contributing to limiting the transient frequency deviation under **high and** low frequency conditions.

Article 31:

Additional Storage should not be mandatable by TSO/RSO (delete Art. 31.4(b); delete Art. 31.4(a))

Article 62:

Transition period on grid forming capabilities for PPM other than ESM should be extended to 48 months (add to Art. 62: “Articles 29 (3-8), 30 (3-5), 31 (4)[*not required with change of Art. 31] shall apply from [the date of entry into force of this Regulation plus 48 months] to PPM other than ESM.”

Overvoltage Ride-Through capability

We support introducing an overvoltage Ride-Through capability for PGM in **Article 17** for the sake of grid stability. However, this should be limited to 1,25 p.u. (instead of 1,3 p.u.) for type A PPM. This capability (1,25 p.u.) can be found already today in some member states (e.g. Germany) and an increase would lead to high efforts and more costly systems.

This requirement has just been moved from type B to type A PGM (compared to the Acer Proposal). In Type B PGM it's very likely that there is a MV transformer which decouples overvoltages from the grid. In LV connections, voltages of up to 130% are extremely unlikely as they would also endanger loads (looking at the OV capability of consumer products due to the ITIC-Curve (see e.g. ITIC Curve – Voltage Disturbance)). So it's likely that DSOs are going to impose overvoltage protection in their LV systems which undermine this capability (as we see today for LVRT).

As a consequence, 1,25 p.u. overvoltage robustness requirement would be a sensible solution for sufficient robustness, considering protection requirements and efforts.

Significant modernisation (Article 4)

Regulation on Significant modernisation is too strict. The criterion on Power management capabilities should be deleted or at least written more specific, because also minor changes (even improvements in controllability by Software updates (also regarding e.g. energy management in mixed customer sites) may lead to a mandate on applying the new requirements on the whole plant. In turn this may result in not applying voluntary improvements.

Article 4(3) should be replaced by the Acer draft (“the relevant TSO's proposal shall specify the requirements of this Regulation that shall apply to the entire modernised power-generating module or only to the modernised part of the power-generating module”) in order to leave room for sensible solutions with regard to cost-benefit. Extending a PPM e.g. by adding a PV installation on another roof in a mixed customer site mustn't lead to a mandate on modernising an existing installation.

The term “maintenance” should be accompanied by exemplary mentioning “repair and spare parts” as in the Acer recommendation document.

Legal text proposals:

Article 4(2)

(c) a **significant** change in frequency stability and active power management capabilities of the power-generating module, whether that change results from a single modernisation or from the cumulation of the several modernisations, provided that the first modernisation has been implemented after [the date of entry into force of this Regulation];

(d) for Type C and D, a change of components of a power-generating module except for changes resulting 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.**

~~The requirements of this Regulation shall apply to the entire power-generating module and not only to the modernised part of the power-generating module.~~

Article 4(3)

For each criterion listed in paragraph 2 above, the relevant TSO's proposal shall specify the requirements of this Regulation that shall apply to the entire modernised power-generating module or only to the modernised part of the power-generating module. ~~The requirements of this Regulation shall apply to the entire power-generating module and not only to the modernised part of the power-generating module.~~

Functional split of AC V2G EV / AC V2G EVSE components (Annex)

The functional split of AC V2G EV / AC V2G EVSE components (this is addressed in the consulted Annex of the RfG) is technically not feasible with regard to unintentional Islanding. The active islanding detection functionality is mandated to be realized in the AC V2G EVSE.

This contradicts today's approved common architecture of PV - Storage Systems, where this function is realized by the control of the power electronics which for EVs would mean to include in the onboard charger of the vehicle. V2G EVSE usually don't need to comprise the power electronics needed for the realization of this function.

Years ago, there was a steep learning curve with regard to that functions which lead to the existing solutions and international product compliance standards (EN 62116), which could easily be applied to AC V2G EVs.

Mandating to include this in the EVSE would mean significant additional effort / cost or a much lower performance of that capability compared to today's Type A PPMs. It should therefore be located in the EVSE. Turning the functionality on or off (based on the needs of the RSO) may be realized by appropriate signaling of the V2G EVSE.

Additional recommended Improvements

- Point of reference (Article 3(3)) should also be allowed to be the connection point of the unit, if specified by the RSO as specified often today. This is also important to open the door for sensible solutions in mixed customer sites.
 - The requirement regarding the LFSM blocking signal (Article 15(7), 18(5), 22(2b)) should be re-worded from “in real-time” to “without undue delay”, since this avoids lengthy discussions on what “real-time” may be.
- When requiring the PPM to react to external commands, the regulation uses different terms (“external signal, data exchange interface, input port”). If no differentiation is intended, only one term should be used. If differentiation is intended, the terms must be defined. The data exchange interfaces shall be harmonized within the EU.
- The LFSM requirements should be amended by the “active power control shall be designed to not adversely impact the active power frequency response of the power-generating module” as it is for FSM in Article (22(2c(vii))).
- Article 18(1(b)) specifies a lower droop limit of 0.2% for droop “s”, which is extremely low and may lead to stability issues (100% change in P for 100mHz frequency deviation).
- Prioritization of active / reactive current for type C sounds like there should be either active or reactive power priority during faults (Article 31(2d)). This interferes with requirements in Article 29(7) and the Entso-e TG GFC report, where neither a prioritization of active or reactive current is allowed. Proposal: delete Article 31(2d).
- Table 11 specifies parameters for the dynamics of FSM. In order to avoid that this does not only refer to 10% change in active power for ESM, just like in Table 10 it should be differentiated between other PPM and ESM and be added "1.5-100% for electricity storage module." for the active power range.

Questions:

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