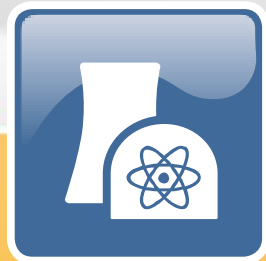


Requirements for Grid Connection of Generators : List of items to improve.

Presented at GC- ESC 8/3/2018



Content

It was proposed at the Brainstorming session on 31/1/2018 to list all items susceptible for improvement of the RfG network code and to create one or more workshops to solve those issues.

All stakeholders are invited to add items and to participate at the workshops.

This presentation can be divided in three parts :

- Items mentioned & discussed explicitly at the Brainstorming session
- New important items
- New minor items

Items discussed in the Brainstorming Session

1. Procedure for amendments
2. Classification of PGMs : impact of the 110 kV criterion
3. Measurement of the frequency
4. Max voltage in 400 kV grids : 440 kV (See also Art.7.3.f)
5. Battery storage devices
6. Pump storage : generating mode <> pumping mode
=> see additional items in this presentation
7. CENELEC's proposal
8. Entering into force of the RfG requirements for future purchases
=> see slide in this presentation
9. Specifications in IGDs : not discussed
=> see additional items in this presentation

Pump-storage : generating mode <> pumping mode

According to Art.6.2, pump-storage has to fulfil relevant requirements in generating and in pumping mode. The word “relevant” is not defined. Also synchronous compensation shall not be limited in time.

We see large differences in the **pumping mode** for :

- Fault-ride-through : see slides presented at the Brainstorming Session
- FCR requirements depending on the internal configuration of the RfG (not possible without invertors)
- Frequency range : disconnection imposed at 49,8 Hz
Why to impose a full range 47,5 Hz – 49,8 Hz ???

The requirement to act permanently as synchronous compensator has to be investigated in detail.

Future purchases according to the RfG code.

All PGMs connected at the grid after 27/4/2019 have to be compliant (Art. 72) at the exception of PGMs purchased before 17/5/2018 by a binding contract (Art.4.2.b).

Each TSO has to submit the requirements to the NRA by 17/5/2018 (Art.7.4).

The NRA has to take decisions on the proposal before 17/11/2018 (Art.7.6)

=> All requirements are publicly available on 17/11/2018.

But the transparency rules of the EU (Directive 2015/1535) impose that technical requirements have to be notified to the Commission 3 months in advance (= 17/8/2018).

They will be published at : <http://ec.europa.eu/growth/tools-databases/tris/en/>

Conclusion : requirements for the purchase of new equipment are **not available between 17/5/2018 and 17/8/2018.**

Is this interpretation correct?

Comments on the IGDs

- IGD on LFSM :
 Thresholds and droop proposed for LFSM-O and LFSM-U.
 Are those issues for the GL SO or for an IGD according RfG NC?
 The droop for LFSM-U is not specified => **specified by each TSO???**
- Automatic reconnection : is the range 49,9 Hz – 50,1 Hz not too small in case of the restoration of the grid according to the E&R network code?
 Note : according to LFSM IGD : thresholds for LFSM at 49,8 Hz – 50,2 Hz.
 Why are those values **not consistent** for Continental Europe?
 A manual reconnection is **not** possible for most smaller PGMs during the restoration of the grid because the public internet is not available.
- ROCOF : In Ireland a ROCOF of 1 Hz/sec provokes problems.
 For continental Europe, a ROCOF of 2 Hz/ sec is proposed. Why?
 This value is considered as a **violation of Recital 25.**

New IMPORTANT items (1)

- Upper time limit for fault-ride-through (FRT) : 140 msec or 250 msec?
Which methodology will be used to define it by each TSO or by ENTSOE?
See Recital 18 and Tables 3.1 ; 3.2 ; 7.1 and 7.2
- Specifications of the pre-fault and post-fault grid conditions at FRT :
See Recital 19 and Art. 14.3 and Art.16.3
A thorough investigation by **ALL stakeholders** is needed.
- Combined heat and power production PGMs class A,B,C are exempt of some requirements according to Art.6.4 at industrial sites.
=> not applicable at PGMs connected at 110 kV or above (= class D).
But the **majority of large industrial sites** is connected at 110 kV or more.
Is this according to Recital 28 describing the benefits of “combined heat and power plants”?
- Art.5.3 : The thresholds for the classification of PGMs has to be **coordinated with adjacent TSO**. Why do we see such differences between adjacent TSOs?

New IMPORTANT items (2)

- The period of time to withstand simultaneous voltage and frequency deviations can be **shorter** according to Art. 16.2.a.ii. This has to be specified **according to IEC**.
- Additional reactive power (Art.18.2.a) is not clear. Requirements apply at the connection point. Why this provision? See also Art. 18.2.b.iii.
- Art. 23 imposes for offshore installations that also test installations (e.g. wave energy of 800 kW) are considered as class D PGMs because table 10 has no **under-limit** for the voltage.

We propose to respect the classification of PGMs and to add 110 kV as under limit in table 10. This would solve also the problem of some 66 kV offshore grids.

(66 kV switchboard with $U_{max} = 72,5$ kV unable to respect $115\% pu = 75,9$ kV)

- Art.59.1 imposes a monitoring of this code by ENTSOE. ENTSOE is a stakeholder. Is this **legally** justified? A monitoring by ACER looks more appropriate due to the principle of **separation of powers**.

New minor items (1)

- Def. 6 of a power generating facility includes also trains designed to brake by injecting power in the grid. Is this the intention of the code?
- According to Art.3.2.b, back-up systems may NEVER operate in parallel with the grid, even under severe adequacy conditions. Correct?
- Art. 15.2.d.vi imposes to notify the FCR parameters to the NRA except point (iv). Why?
- Art.15.6.c.i imposes that a **member state** may require a verification of a simulation by an authorised certifier. Why not by the NRA?
- Art.20.2.b.ii makes a reference to a method in Art.2. The reference is incorrect.
- What is the status of a PGM when a **LON is refused** according to Art. 37.7 in the period of six months? Can the PGM remain connected?
- Does Art. 45.2.b describe a test or a simulation? It is not clear.
- Art.50 : testing of reactive power for offshore installations according to Art.48.6 is not allowed. Why?

New minor items (2)

- Art.62.2.e imposes that a request for derogation filed by a PGM has no adverse effect on cross-border trade. This information is missing at a PGM. How to do this?

QUESTIONS?