

IMPACT OF THE EUROPEAN GUIDELINE ON SYSTEM OPERATION OF EXISTING AND NEW GENERATING UNITS

On 25 August 2017, the “Guideline on electricity transmission system operation” was published in the Official Journal of the European Union and came into force on 14 September 2017. The complete guideline is available at the website of the European Union.¹

The guideline contains three parts describing: the operational security, the operational planning and the load-frequency control & reserves. The greater part of provisions applies on grid operators but some provisions apply on **existing and new** significant **grid users** such as demand facilities, distributors, aggregators, HVDC systems and generating facilities type B,C and D (defined according to the network code “Requirements for Generators”).

The follow-up of this guideline is ensured by a European Stakeholder Committee. VGB is a member of this committee together with other stakeholders. Only pan-European associations can participate.

This paper describes the major consequences for generating units in continental Europe. For other synchronous areas in Europe, slightly different requirements are imposed.

The major concerns in the part “**Operational security**” for generators are:

- The TSOs have to respect the voltage and frequency limits of existing installations (Art.25.2). Voltage limits have to be submitted to the TSO within 3 months (Art.28.1). This was communicated by VGB by a dedicated mail to all generating companies.
- The capacity limitations caused by simultaneous frequency and voltage deviations are not mentioned in this guideline. IEC describes this limitation in its standard IEC 60034.1. VGB advises to submit this limitation also to the TSO (extension of Art. 25.2).
- Each TSO will request data for a dynamic stability assessment. This request can require the submission of additional data to the TSO, especially for wind farms (Art.45.1.i and 2.i).
- Each TSO can impose remedial actions to keep the electrical system secure. The price paid for those remedial actions can be based on market mechanisms and are considered as sufficient (Art.45.1.k and 2.h).
- The compliance of units supplying ancillary services can be verified at any time (Art.57.1).
- If appropriate, a joint training with distributors and generating facilities can be organised by each TSO (Art.58.4.k).

In the part “**Operational Planning**” the following points are important :

Within 6 months, all TSOs shall define a harmonised data format for data exchange (Art.114.2).

Within 24 months ENTSOE shall operate an “operational planning data environment” (Art.114.1).

¹ See <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1509793819819&uri=CELEX:32017R1485>

Each TSO has to prepare grid models according to this data format for several time-frames: year-ahead / week-ahead (if needed) / day-ahead / intraday (Art.64.1).

Each TSO shall perform the outage coordination of relevant generating facilities with support of the regional security coordinator (Art.82). The notion “relevant” has to be defined in the future. Incompatibilities have to be solved at a regional level (Art.83.3)

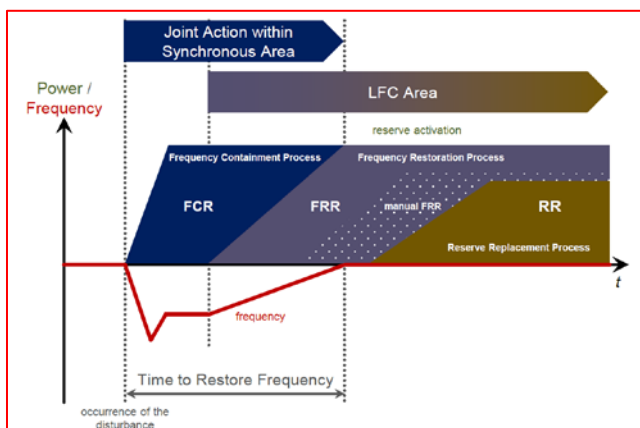
An indicative availability plan has to be assessed by each TSO by two years before the start of any year-ahead outage coordination starting on 1 August for the following year (Art.93.1 and 94.1).

Modifications of the outage planning have to be approved at a regional level (Art. 100.3).

Conclusion: the format to submit the planning of generating units will probably change in each country. Modifications of the outage planning will become more complicated and will take more time than in the past.

Several requirements in the part “**Load-frequency control and reserves**” need our attention:

In this guideline, new notions are described for primary, secondary and tertiary reserves:



frequency containment reserves (FCR), frequency restoration reserves (FRR) and replacement reserves (RR). The dimensioning rules for each kind of reserves have to be defined before September 2018 in operational agreements developed by TSOs at the level of the synchronous area (Art. 118) or at the lower level of a LFC block or LFC area (Art.119 – 120). Requirements for the exchange and for the sharing of reserves between TSOs are described (Art. 147-149 and 163-180).

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Conclusion: each TSO can purchase reserves at suppliers located outside its territory.

The quality of the frequency is defined by several parameters. The most important ones are : the standard frequency range (50 mHz), the maximum instantaneous deviation after a reference incident (800 mHz), the maximum steady-state deviation after a reference incident (200 mHz). The values for continental Europe are given between brackets for a reference incident of 3000 MW. The time to restore the frequency is 15 minutes (See Annex III).

Procedures to modify those values and to evaluate the quality of the frequency by a statistical analysis (Art. 131) are added in the guideline.

In order to respect those quality criteria, each TSO can impose a **ramping restriction** for each generating unit (Art. 137.4) and stringent requirements for all generating units supplying the FCR ancillary service (Art.154).

Those requirements are (Annex V) : maximum value of insensitivity and dead band of 10 mHz, an activation of 50% after 15 s, a full activation after 30 s at a frequency deviation of 200 mHz and a more than linear activation between 15 s and 30 s (Art.154). Also the requirements of Art.15.2.d of the network code “Requirements for Generators” are imposed.

Generating units with a limited energy reservoir have to fulfil their commitment during 15 or 30 minutes as specified in the near future (Art.156.9 and 156.11). The period of time for recovery of the energy reservoir is limited at 2 hours (Art.156.13).

Conclusion: Ramping restrictions for ALL generating units and potentially more stringent requirements for FCR supplying units, especially for hydro installations with a limited energy reservoir.

More information is available at VGB.

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