5.5 DETERMINISTIC FREQUENCY DEVIATION TARGET

5.5.1. EXPECTED FREQUENCY QUALITY

One of the solutions that could be envisaged at European level is to establish which size of DFD is detrimental to the security of the grid, and which DFD size can be considered as acceptable. The target could be used to check if the proposed solutions are adequate to reduce the size of DFD to the acceptable level.

The proposal of an acceptable DFD size comes from the realization that it will be virtually impossible to completely eliminate the DFD as there will always be a remaining mismatch between the accounting schemes of balancing which are related to minimum counter period (usually 10 or 15 minutes) and the load curve which changes constantly and smoothly.

First Target: Maximum Frequency Deviation

A DFD should allow the occurrence of the defining incident of FCR without going below 49.8 Hz, which means the frequency deviation should always be smaller than 200 mHz.

The dimensioning incident (double outage of power plants) of FCR is 3,000 MW which causes a frequency deviation of (3,000 MW / 27,000 MW / Hz) approx. 115 mHz for standard conditions. However, sometimes load/production is higher or lower and regulating power of the grid is also sometimes higher and lower.

So, expected frequency deviation would be in an interval of 100 to 125 mHz

Total margin therefore should be 125 mHz

In order to keep a margin of 125 mHz, the DFD should never be larger than 75 mHz

This leads to an acceptable DFD = 75 mHz

Second Target: Frequency Outside Interval

A second target could be related to the quality target which is given in SO GL:

Article 127 and Annex III of SO GL specify Frequency quality defining parameters in CE, establishing ± 50 mHz as the standard frequency range, which shall not be exceeded during more than 15,000 minutes per year.

SO GL requires that the frequency of Continental Europe stays within an interval of ± 50 mHz for the whole time, except for a maximum of 15,000 minutes per year.

This volume covers both the DFDs and the frequency deviations due to outages in the grid. Given that there are statistically less than 100 large outages per year and more than 2,500 DFDs per year, most of the 15,000 minutes will be used by DFDs.

This roughly translates to 40 minutes per day which can be used by DFD. Considering that there are daily approx. 7 large DFDs, this can be converted into a value of around 5 minutes per DFD.

So, a second target could be:
A DFD should not leave the interval of ± 50 mHz for more than 5 minutes