Demand Connection Code Public workshop
Call for Stakeholder Input

Frequency Withstand Capabilities

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Reliable Sustainable Connected

Frequency Withstand Capabilities – Introduction

The operating frequency of the system is around 50 Hz. However, an imbalance between generation and demand causes the frequency to deviate from this target value with an extension depending on the severity of the imbalance.

➢A predictable reaction of generation and demand contributes to a easier return of the system to its frequency target value ensuring stable operation

✓In the future generation is expected to be based on more volatile energy sources, mainly non-synchronously connected and with reduced inertia. **This will increase the frequency sensitivity of the power system to power imbalance**

✓The less predictable the reaction of generation and demand is during a frequency deviation **further it will bring a challenge to the frequency control challenge**

As a consequence ENTSO-E evaluates if requirements to withstand frequency deviations should be required in the NC DCC

Frequency Withstand Capabilities – Context of the past

Historically large synchronous generation facilities have formed the backbone of providing the most significant system services to the power system

Concerning frequency withstand capability requirements a different approach was usually taken, in grid codes, for **Generation** and **Demand**

Generation: Required the capability to withstand a determined frequency range

➢Maintaining generation service during frequency deviations is indispensable to contribute to preserve system stability

Demand: No specific requirements for frequency withstand capabilities

➢Demand facilities not providing any service have the natural prerogative, unless contractually agreed, to connect or disconnect at any time depending on specific user needs and decisions

Frequency Withstand Capabilities – Alternatives in the DCC

•Network Operators cannot ensure the system security regardless of the technical capabilities of all users

•Distribution networks (both DSOs and CDNs) provide a pathway for embedded generation and DSR to contribute to frequency response

➢Frequency withstand capabilities within prescribed ranges are therefore essential for distribution networks

Two options are possible to deal with frequency withstand capabilities in the NC DCC:

•i. Frequency withstand capabilities are mandatory for Distribution Networks and all Significant Demand Facilities

•ii. Frequency withstand capabilities are mandatory for Distribution Networks and for the Demand Facilities or Closed Distribution Networks, which offer DSR services

Frequency Withstand Capabilities – Questions

- Do you agree that certainty is required in the performance of elements in the electrical power system to ensure stable frequency operation and to minimise the cost of procuring frequency response?
- Which of the previous options (i or ii) would you prefer and for which reason?
- Which frequency-sensitive installations do you have in your Distribution Networks or Demand Facility?
- Please provide cost information to:
  - o establish frequency withstand capability over the **full range from 47.5 Hz to 51.5 Hz** and over a **limited range from 49 Hz to 51 Hz** for Distribution Networks and Demand Facilities and explain which typical apparatus are needed
  - o reinforce frequency-sensitive installations with frequency withstand capability over the **full range from 47.5 Hz to 51.5 Hz** and over a **limited range from 49 Hz to 51 Hz**