Stakeholder Workshop
Load Frequency Control and Reserves

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Stakeholder Impact

Article 27 RAMPING RESTRICTIONS FOR ACTIVE POWER OUTPUT ON SYNCHRONOUS AREA LEVEL

- TSOs of each Synchronous Area shall have the right to define restrictions for the Active Power output of HVDC Interconnectors by defining (NRA notification):
  - a unique maximum Ramping Rate and/or a unique Ramping Period applicable to all individual HVDC Interconnectors; and/or
  - a combined maximum Ramping Rate for all HVDC Interconnectors of the Synchronous Area.

Article 28 RAMPING RESTRICTIONS FOR ACTIVE POWER OUTPUT ON LFC BLOCK LEVEL

- 28(1) all Connecting TSOs of an HVDC Interconnector in the same or in different Synchronous Areas shall have the right to define common restrictions for the Active Power output of this HVDC Interconnector by agreeing on Ramping Periods and/or maximum Ramping Rates (NRA notification);
- 28(2) TSOs of an LFC Block shall have the right to define and apply the following measures (NRA notification):
  - definition of Ramping Periods and/or maximum Ramping Rates on Power Generating Modules and / or Demand Units;
  - individual ramping starting times for Power Generating Modules and / or Demand Units within the LFC Block; and
  - coordination of the ramping between Power Generating Modules, Demand Units and Active Power consumption within the LFC Block

Article 29 MITIGATION

- If the values calculated for the measurement period of one calendar year the Frequency Quality Target Parameters or the FRCE Target Parameters are outside the set targets the TSOs shall perform a frequency investigation analysing the root causes and develop recommendations and decide on mitigation measures (NRA approval)

Stakeholder Impact (Article 44)

Article 44 FCR TECHNICAL MINIMUM REQUIREMENTS

- 44(1) Applicable to all FCR Providing Units and FCR Providing Groups

	NC LFCR	Grid Code
Minimum accuracy of frequency measurement	10 mHz or the industrial standard if better	
Maximum combined effect of inherent Frequency Response Insensitivity and possible intentional Frequency Response Dead band of the governor of the FCR Providing Units or FCR Providing Groups.	15 mHz	15 mHz
FCR Full Activation Time	15 s	15 s
FCR Full Activation Frequency Deviation.	Dynamic FCR ±500 mHz Static FCR ±1000 mHz	

Stakeholder Impact (Article 44)

Article 44 FCR TECHNICAL MINIMUM REQUIREMENTS

- 44(2) TSO can define additional FCR properties, respecting NC RfG and NC DC, following a transition period and NRA approval.
- 44(3) TSO can define additional FCR properties for or exclude FCR Providing Groups, respecting NC RfG and NC DC, following NRA approval. FCR Provider to ensure monitoring of FCR activation of units within the group is possible.
- 44(4)Each FCR Providing Unit and each FCR Providing Group shall only have one Reserve Connecting TSO.
- 44(5) TSO shall implement an FCR prequalification process for potential FCR Providers. Reassessed periodically (at least 5 years) or if requirements or equipment changes.
- 44(6) FCR Providers shall comply with the required properties of and activate (44(1)&(2)) FCR by means of a proportional governor or based on a piecewise linear power-frequency characteristic (relay activated).
- 44(8) FCR Providers shall make available at least the following information, if requested in real-time and for installations which are part of the same FCR Providing Unit (NRA notification), aggregation allowed below 1.5 MW:
  - time-stamped status indicating if FCR is on or off;
  - time-stamped Active Power data needed to verify FCR activation;
  - Droop of the governor or its equivalent parameter.

Stakeholder Impact (Article 45)

Article 45 FCR PROVISION

- 45(4) Continuous availability of FCR when Provider is obliged to provide FCR, except for a Forced Outage. Inform the TSO without undue delay.
- 45(5) loss of an FCR Providing Unit does not endanger System Security, for SA IRE this is a requirement on the TSO.
- 45(6) An FCR Provider:
  - With no energy reservoir limit shall activate its FCR as long as the frequency deviation persists or for SAs GB and IRE until it activates its FRR.
  - With an energy reservoir limit shall activate its FCR as long as the frequency deviation persists unless its energy reservoir is exhausted or for SAs GB and IRE until it activates its FRR.
  - Recovery of energy reservoirs according to methods defined by TSO and approved by the NRA.

Stakeholder Impact (Article 47)

Article 47 FRR TECHNICAL MINIMUM REQUIREMENTS

- 47(1) FRR Technical Minimum Requirements:
  - FRR Provider shall be connected to only one reserve connecting TSO;
  - Activate FRR according to the Setpoint received from the reserve instructing TSO;
  - Automatic FRR Activation Delay of at most 30 seconds;
  - For monitoring FRR Provider shall be able to supply to the connecting and instructing TSO in real-time:
    - time-stamped scheduled Active Power output; and
    - time-stamped instantaneous Active Power

    for
    - each FRR Providing Unit;
    - each FRR Providing Group; and
    - each Power Generating Module or Demand Unit of a FRR Providing Group with a maximum Active Power output larger than or equal to 1.5 MW;
  - FRR Provider providing Automatic FRR shall be able to activate its FRR capacity within the Automatic FRR Full Activation Time;
  - FRR Provider providing Manual FRR shall be able to activate its FRR capacity within the Manual FRR Full Activation Time;

Stakeholder Impact (Article 47)

Article 47 FRR TECHNICAL MINIMUM REQUIREMENTS

- an FRR Provider shall fulfil the FRR Availability Requirements;
- an FRR Providing Unit or FRR Providing Group shall fulfil the ramp rate requirements of the LFC Block.

- 47(2)&(3) TSOs define FRR Availability Requirements and control quality and reserve connecting TSO shall define technical requirements for the connection of FRR providers (NRA approval).
- 47(4) TSO has the right to exclude FRR Providing Groups (NRA approval).
- 47(5) TSO shall implement an FRR prequalification process to assess the fulfilment of the FRR requirements. Reassessed periodically (at least 5 years) or if requirements or equipment changes.
- 47(6) potential FRR Providers shall have the right to apply for FRR Prequalification.
- 47(7) FRR providers shall meet the FRR technical , availability and ramp rate requirements and inform the TSO with out undue delay of any FRR availability reduction.

Stakeholder Impact (Article 49)

Article 49 RR TECHNICAL MINIMUM REQUIREMENTS

- 49(1) RR Technical Minimum Requirements:
  - RR Provider shall be connected to only one reserve connecting TSO;
  - Activate and de-activate RR according to the Setpoint received from the reserve instructing TSO;
  - RR Capacity to be activated within the activation time defined by the instructing TSO;
  - For monitoring RR Provider shall be able to supply to the connecting and instructing TSO in real-time:
    - time-stamped scheduled Active Power output; and
    - time-stamped instantaneous Active Power

    for
    - each RR Providing Unit;
    - each RR Providing Group; and
    - each Power Generating Module or Demand Unit of a RR Providing Group with a maximum Active Power output larger than or equal to 1.5 MW;
  - an RR Provider shall fulfil the RR Availability Requirements;

Stakeholder Impact (Article 49)

Article 49 RR TECHNICAL MINIMUM REQUIREMENTS

- 49(2)&(3) TSOs shall define RR Availability Requirements and control quality and reserve connecting TSO shall define technical requirements for the connection of FRR providers (NRA approval).
- 49(4) TSO has the right to exclude FRR Providing Groups (NRA approval).
- 49(5) TSO shall implement an RR prequalification process to assess the fulfilment of the RR requirements. Reassessed periodically (at least 5 years) or if requirements or equipment changes.
- 49(6) potential RR Providers shall have the right to apply for RR Prequalification.
- 49(7) RR providers shall meet the RR technical and availability requirements and inform the TSO with out undue delay of any RR availability reduction.

Stakeholder Impact

Article 50 EXCHANGE OF FCR WITHIN A SYNCHRONOUS AREA

- 50(8) The FCR Providing Unit or Group shall only have a responsibility for FCR activation towards its Reserve Connecting TSO.

Article 58 GENERAL REQUIREMENTS (Exchange and Sharing of Reserves Between Synchronous Areas)

- HVDC Interconnector shall provide the capability where the technology is installed permitting the connecting TSOs to exchange and share reserves.

Article 59, 60, 62, 63, 64 and 65 EXCHANGE AND SHARING OF FCR, FRR AND RR BETWEEN SYNCHRONOUS AREAS

- Each operator of a HVDC Interconnector shall control the Active Power Flow over the HVDC Interconnector in accordance with instructions defined by the TSOs

Stakeholder Impact

Article 68 RESERVE PROVIDING UNITS CONNECTED TO THE DSO GRID

- 68(2) information to be provided by Provide on application;
  - voltage levels and Connection Points of the Reserve Providing Units or Groups;
  - the type of Active Power Reserves;
  - the maximum Reserve Capacity provided by the Reserve Providing Units or Groups at each Connection Point; and
  - the maximum rate of change of Active Power for the Reserve Providing Units or Groups.
- 68(3) during prequalification a DSO shall have the right to set limits to or exclude the delivery of Active Power Reserves located in its Distribution Network in cooperation with the TSO;
- 68(4) DSO shall have the right to set temporary limits at any point in time before reserve activation in cooperation with the TSO.


EIRGRID
semo
Single Electricity
Market Operator
SONI
System Operator for Northern Ireland