ENTSO-E views on electricity storage related amendments of the Connection Network Codes

11 May 2023, presented by Manuel Froschauer and Adrian Gonzalez
Context on electricity storage

✓ The penetration of energy storage devices at EU level is continuously rising.
✓ Electricity storage is a mature technology.
✓ In some member states already have national requirements for storage.
✓ Storage devices need to fulfil certain harmonized technical requirements with cross-border relevance.
✓ Currently, the three European Connection Network Codes (RfG, HVDC and DCC) explicitly exclude storage (other than PSH).

>> A contribution to the security of supply and sustainability on EU-level is required.
Recommendations for electricity storage in the CNC

1. Electricity Storage Modules (ESM) are to be considered as PGMs. Therefore, they are either a SPGM or PPM.

2. Consequently, ESMs have to fulfill the relevant requirements, which simplifies the introduction into the CNC.

3. Requirements shall also be applied in consumption mode.

4. Only where necessary specific requirements shall be introduced (e.g. limited energy reservoir or transition for consumption to generation)

>> General concept should be explained in Whereas
Feedback to ACER proposal

✓ ENTSO-E’s proposal endorsed the output of the Expert Group “storage” – with minor updates.

✓ ENTSO-E share the view of ACER that ESMs will play a key role in the system and it is necessary to introduce requirements for the grid connection.

✓ ENTSO-E supports in general the proposal of ACER.
Feedback to ACER proposal – General

– The *Whereas* should include the underlying concept of implementation.

– If V2G is defined as an ESM, no explicit mentioning of V2G is required thereafter. ENTSO-E supports including charging points or installations as ESMs and differentiating only the vehicles (this distinction should be more explicit).

– As a matter of form the exception for storage devices should be deleted from Art. 3

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(55) *An electricity storage module connected to a network by a synchronous generator has to meet the same requirements as a synchronous power generating module and an electricity storage module connected to a network by a non-synchronous generator or through power electronics has to meet the same requirements as a power park module (which could include electric vehicles that comply with the definition of electricity storage).*

(67) *Electricity storage module* or *ESM* means a synchronous power-generating module or a power park module which can inject and consume active power to and from the network for electricity storage, excluding pump-storage power-generating modules. A V2G electric vehicle and associated V2G electric vehicle charging point or installation with a bidirectional functionality is regarded as an electricity storage module.

6. *Electricity storage modules and V2G electric vehicles and associated V2G electric vehicle charging points or installations shall be capable of satisfying the requirements of this Regulation both when the electricity storage module or V2G electric vehicle charging points or installations injects and consumes active power to and from the network.*

(4) *Storage devices except for pump-storage power-generating modules in accordance with Article 6(2).*
Feedback to ACER proposal – $P_{\text{ref}}$ for (L)FSM

- As for PPMs: The $P_{\text{ref}}$ should be defined by the relevant TSO.

- $P_{\text{ref}}$ should be the same as for already specified for PPM/SPGM -> so no more specification should be required. In consumption mode of ESMs, the $P_{\text{ref}}$ should be $P_{\text{max}}$ (exhaustively).
ENTSO-E supports the harmonized and simplified approach for LFSM-U-ESM but points out that 49Hz might not be suitable for all Synchronous Areas.

(c) The frequency threshold shall be adjustable between 49.8 Hz and 49.5 Hz inclusive. The default frequency threshold shall be 50 Hz reduced by Δf1 where Δf1 is defined in Table X of Article 15.2.d.

(e) Instead of the capability referred to in paragraph (a), the relevant TSO may choose to allow electricity storage modules of Type A in consumption mode within its control area automatic disconnection at randomized frequencies, ideally uniformly distributed, between the frequency threshold and 49 Hz.

<table>
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<tr>
<th>Parameter</th>
<th>Values SA Continental Europe</th>
<th>Values SA Nordics</th>
<th>Values SA Great Britain</th>
<th>Values SA Ireland</th>
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| Demand disconnection starting mandatory level: Frequency | 49                          | 48.7 - 48.8       | 48.8                   | 48.85             | Hz
Feedback to ACER proposal - FSM

- ENTSO-E opposes to allow special storage facilities to have less stringent FSM requirements.
- From ENTSO-E perspective this might be discriminatory.

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-the actual delivery of active power frequency response depends on the operating and ambient conditions, as well as, on the underlying energy storage technology of the power-generating module when this response is triggered, in particular, but not limited to, limitations on operation near maximum capacity at low frequencies according to paragraphs 4 and 5 of Article 13 and available primary energy sources;

- the TSO shall take into account the time needed for some technologies of electricity storage modules to switch from consumption mode to generating mode or vice versa and also the fact that the droop primary frequency control characteristic in consumption and generating mode could be different;
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