Joint DSO response to ENTSO-E public consultation on the Stakeholder Survey on the Frequency Stability Parameters Implementation Guidance Document

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General comment

Distribution System Operators (DSOs) fully recognise the usefulness of ensuring a coordinated approach at synchronous area level of the national implementation on frequency related parameters and transparency on the approaches, processes and decisions taken in each Member State.

A public consultation of stakeholders on guidance for Connection Codes implementation of frequency related parameters is thus very welcome. However, DSOs are surprised by the limited scope of the survey aiming exclusively at generators. The IGD on parameters related to frequency stability clearly states frequency non-exhaustive requirements require co-ordination between TSOs and DSOs. As already agreed between all stakeholders, including ENTSO-E, in the European Stakeholder Committees, frequency stability is a subject across grid connection requirements as well as system operation. Due to the limited scope of the survey now published, DSOs are concerned that TSOs intend to define parameters related to frequency stability at European level without extensive coordination with DSOs. The concerns of the EU Associations representing DSOs' are listed hereafter.

Distribution networks are also managed by system operators

A majority of the installed capacity of renewable energy resources is connected to distribution networks, and DSOs have been investing continuously in automation and control equipment. The transition from traditional grid to smart grids is of course still ongoing, but already today DSOs are *system* operators who have learnt over years to cope with bidirectional power flows and variable generation. The growing importance of flexibility in the distribution networks will only enhance the DSO's role as system operator.

As system operators, they need data from and direct access to grid users to operate their networks safely and efficiently manage distributed energy resources. In several Member States, distributed generation is not connected to distribution systems following the n-1 principle, that means, already the line connecting a set of generators can be overloaded during abnormal but not necessarily extreme situations. In other words, automatically controlled increase of generators' infeed like foreseen for example for LFSM-U can lead to tripping of lines and other elements of the distribution system. Such a tripping would result in the loss of the whole generation capacity, having an inverse effect on frequency stability.

To mitigate this risk, DSOs need the right and capability to block in real time LFSM-U for generators and DSM-APC for loads connected to their systems, if the necessity arises. Of course, such blocking would only be carried out for single generators and loads feeding on contingencies.

Investigations are needed with regard to future probability of (unintended) islands in distribution systems

With the increased number of distributed generators taking part in automatic load-frequency control, the probability of islands in distribution systems will presumably rise. This effect is strengthened by

obligations on the same generators to control voltage directly and ride through voltage drops. Since it is currently unclear how probable (unintended) islanding will be in future, this effect needs further investigations. For the time being, DSOs will train their field forces to be aware of (unintended) islands in day-to-day operation. Obviously, this will result in higher operational expenses.

Requirements on generators to provide synthetic inertia force DSOs to adapt their protection systems

Changed inertia of the system will translate directly into changed short-circuit power. As short-circuit power is the design parameter crucial for the parameterization of protection systems, DSOs will need to adapt their protection if distributed generators or demand-response facilities are obliged to provide synthetic inertia.

Although it is common practice to adapt the protection system layout constantly to changed circumstances – which might also be caused by adaptations of the distribution system itself – investigations are necessary and studies need to be carried out to identify the impact of synthetic inertia on the local protection system's layout and parameterization, as synthetic inertia is not yet state-of-the-art. If such impact is identified and quantified, it will force DSOs to review their protection systems' design, again resulting in increased operational expenses.

Recommendations & way forward

This paper first aimed to draw attention to issues of interest for DSOs linked to frequency parameters. In addition to this, the four associations representing DSOs at European level would like to propose recommendations on how to move forward with this topic.

Coordination at national level should be continuously ensured between DSOs and TSOs on all aspects relevant to the DSOs. Network codes on grid connection foresee extensive cooperation and coordination with "relevant system operators", which in most cases are the DSOs.

DSOs and TSOs should also discuss, at national and EU level, in a constructive way on the points elaborated upon in this paper, among others on undesirable islanding and protection systems & schemes in relation to synthetic inertia.

As a final point, DSOs underline the necessity in the implementation process to differentiate between what the machines/installations are able to withstand on one side – dealt with in Article 13-1-a of the RfG Network Code such as range of frequency, maximum ROCOF – and the decoupling protection settings on the other side – decision taken by the relevant System Operator, as provided in Article 14-5-b of the same code, and which are usually based according to local network operational security criteria.