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Steven McMahon
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Ofgem
32 Albion Street
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22 September 2020

Dear Steve,

Call for evidence: Visibility of distributed generation connected to the GB distribution networks

Thank you for the opportunity to respond to Ofgem's call for evidence on the visibility of distributed generation connected to GB distribution networks. Our networks business SP Energy Networks (SPEN) is responding separately from its perspective as a Distribution Owner.

We believe that improving the visibility of generation connected to the distribution network is fundamental for improving the planning, security and real time operation of the GB transmission and distribution systems. Real time measurements such as power output are critical to ensure there is a clear picture of the status of the network, and a must-have for DSOs delivering flexible solutions that support the system balance and stability at both transmission and distribution level.

ScottishPower's Renewables business operates over 430MW of wind farms across the distribution network in GB, connected at 33kV and 132kV. Most of these sites already have the necessary infrastructure to provide DNO/DSOs real time data to provide assurance about the performance of those assets in their network. However, the characteristics of the measurements and their resolution should be discussed further as some of them may not be available in real time while using standard communication interfaces.

The existing capabilities of our embedded assets are based on internal technical and quality operational standards that have been developed out of operating large renewable portfolios, connected to transmission and distribution, across different jurisdictions. This could be considered part of the 'know-how' the company has gained along the years.

We do not believe there are currently any regulatory or legal barriers that would stand in the way of improving the visibility of embedded generation. Rather, we believe it is the

lack of clarity around the expectations for these assets when operating at the DNO level that is behind the current industry situation.

We would welcome the development of new standards and codes to facilitate visualisation and network operations at distribution level. However, we would highlight that communications infrastructure always comes at a cost to new and existing projects. We believe any new regulation should be developed in a way that provides sufficient flexibility to allow adoption of new innovative software solutions for data exchange (such as web-based solutions) that will bring benefits in terms of cost effectiveness and deployment timescales, while reducing integration challenges.

We expand on the above points in Annex 1.

Should you have any questions on this response, please do not hesitate to contact Ricardo da Silva (Tel: 07712431404, ricardo.dasilva@scottishpower.com) in the first instance.

Yours sincerely,

Richard Sweet
Head of Regulatory Policy

Annex 1

CALL FOR EVIDENCE: VISIBILITY OF DISTRIBUTED GENERATION CONNECTED TO THE GB DISTRIBUTION NETWORKS – SCOTTISHPOWER RESPONSE

1. DCUSA modification DCP350 will provide data on a number of characteristics for DG greater than 1MW. Are there additional characteristics for DG, such as real-time MW/MVAr output, load factors and protection settings, which would aid in the prevention of, live management, and recovery from loss of supply events?

Yes, we believe that real-time data such as MW/MVAr output, along with load factors, could be significantly beneficial to the prevention of, live management, and recovery from loss of supply event. In fact, DSOs should be able to access this data on a regular basis to efficiently operate their networks, as well as using it retrospectively for assessing, designing and procuring assertive flexibility solutions.

ScottishPower's Renewables business operates over 430MW of wind farms across the distribution network in GB, connected at 33kV and 132kV. Most of these sites have already the necessary infrastructure for monitoring real time data, which interfaces directly with our centralised Renewables Control Room and data centres. We believe we are in a position to improve the visibility of the assets in coordination with DNOs in order to provide them with assurance about the performance of these assets in their network.

With regard to the protection settings, we do not believe it is necessary for these to be included in the cluster of real-time data. We agree that protections information and settings configuration should be available to DNO/TOs, but these characteristics seldom change following commissioning, making real time monitoring unnecessary. Furthermore, we would not be able to provide a real time signal relating to the status of protection without incurring significant additional cost, as there is no communication link between the protection systems infrastructure and our Renewables Control Centre. We believe that compliance eye-witness processes should be carried out at the point of commissioning to ensure protection settings are aligned with existing regulation, with a recorded agreement of the network owner and developer.

The ongoing Accelerated Loss of Mains Change Programme (ALoMCP)[1] is a good example of how this data around protection settings could be gathered and DNOs can ensure they have relevant visibility of the status of the distributed generation in relation to protection settings.

2. What value will these additional characteristics provide to improving the planning, security and real time operation of the GB transmission and distribution systems?

These characteristics are critical for planning and operating transmission and distribution systems across GB. They will allow DSOs to be proactive in the way they keep their systems secure and balanced, managing and foreseeing situations that may require coordinated actions with the transmission system operators. Similar to how the TSO operates, DSOs will be able to calculate and assess in real time the status, and therefore headroom, of locational system variables (frequency, voltage, RoCoF), addressing any potential issues by enacting services or network configurations when required and in a timely manner.

At the same time, access to this data retrospectively would certainly enhance a DSO's ability to understand the performance of its network and the assets within, with a view to proposing

[1] https://www.ena-eng.org/ALoMCP/

more effective network reinforcement solutions (either wired or non-wired), while futureproofing their ability to address situations of distress.

3. What value will the above characteristics provide to improving DSO function delivery by the DNOs or other stakeholders? DSO functions may include network management, flexibility procurement, and service conflict avoidance.

As per our answers to Questions 1 and 2, DSOs will certainly require these characteristics and the ability to access the data retrospectively to effectively fulfil their functions as system operator. Without them, the DSO role will be limited and always dependant of the visibility the TSO has and contingent on its actions.

4. At what temporal resolution (instantaneous, seconds, minutes etc.) would real time data on DG be valuable to improve the resilience of the GB electricity system in the prevention of, live management, and recovery from loss of supply events?

Although the communications infrastructure that SP Renewables has is already capable of providing resolutions of seconds, this should be subject to a site by site assessment. Turbines, electrical and control equipment don't usually provide a second by second granularity and therefore, trying to obtain detailed resolutions could sometimes be misleading as it would not reflect the actual status of the sites.

We have come to an internal homogenised approach of 30 seconds by 30 seconds resolution (as some wind turbines down go further), that works for most of our systems and technologies. However, we believe the characteristics of the measurements and related resolution should be discussed further with the wider industry for codification. Discussions need to be held about the appropriate balance between the added value of very granular resolutions vs their associated costs. Second by second granularity could be seen as ideal for providing assurance but, unless operation is automated, it may have no operational value for decision making.

5. What investment would be required for monitoring, collecting, storing and disseminating real time operational data associated with DG? Which party should be responsible for these investments? How does this vary, based on the size of visible DG at 1MW or 50kW?

Investment costs should be considered on a site by site basis as they do not always depend on the MW size of the asset. Other aspects that can affect the costs are the associated technology, location, layout, etc, so detailed assessments require further study.

There are also costs associated to integration of IT systems between generators and DNOs. There is currently no standardisation for communication systems which could create significant challenges to integrate existing infrastructure without investing in new interfaces.

From the generator side, investment costs are usually associated, but not limited, to the below:

- communication network upgrades
- hardware installation for our own SCADA install (servers, switches, routers etc)
- SCADA software
- PI server
- turbine switch upgrades to provide robust communications with our SCADA.

- contractor costs for installation
- associated costs related to land agreements: wayleaves, landowner negotiation fees, etc.
- total O&M costs (overheads).

As mentioned above, costs may not have a direct relationship with the MW size of the generator. Our experience indicates that sites over 10MW require investments of hundreds of thousands of pounds for either retrofits or new installations.

6. What are the credible technical, regulatory (industry codes, licences and governance) and legal barriers and costs associated with increasing the data collected, stored and shared regarding DG operations, and in obligating parties to do so?

We do not believe there are currently any regulatory or legal barriers that stand in the way of improving the visibility of embedded generation. Rather, we believe it is the lack of clarity around the expectations for these assets when operating at the DNO level that is behind the current industry situation.

We support the development of new standards and codes to facilitate visibility and network operations at distribution level. However, we'd like to highlight that communications infrastructure always comes at a cost to new and existing projects. Any new regulation should be developed with sufficient flexibility to allow adoption of new and innovative software solutions for data exchange (such as web-based solutions) that will bring benefits in terms of cost-effectiveness and deployment timescales. These will allow us, and the wider industry, to work towards optimising and re-using our own infrastructure for developing standardised systems for all sites, reducing integration costs.

Physical wired interface solutions through DNO's Remote Terminal Unit (RTU) or marshalling boxes should be avoided due to the associated costs and resources. These will always require bespoke assessments that may involve third parties for facilitating the works (landowners, legacy technology providers).

We would welcome further engagement with Ofgem and DNOs to look for potential solutions to improving the visibility of DG on different timescales (short/mid and long term) with a view to improving the security and resilience of the GB network.

ScottishPower
September 2020