Connecting to UK Power Network's South East Coast network Information for Distributed Energy Resources (DERs)

Context

This fact sheet sets out what developers of Distributed Energy Resources (DER) need to know regarding the constraint management arrangements that will facilitate additional capacity to connect within the South East Coast distribution network from June 2017 (Bolney, Ninfield, Sellindge and Canterbury Grid Supply Points (GSPs).

There are three categories of constraint relevant to DERs connecting to the South East Coast:

- ***Transmission constraints:*** Following detailed study work as part of the 2016/17 Network Options Assessment (NOA) process, it has been determined by National Grid that it is not economically efficient to fully reinforce the network at this time, and that the use of flexibility is a lower-cost option. To enable this, National Grid requires access to flexibility within the South East Coast transmission and distribution network, and will be seeking to access that flexibility through a mechanism that will enable both transmission participants and DERs to receive compensation for any curtailed output (other than where qualified in the 'Summary' section of this document).

- ***Existing distribution constraints:*** In some, but not all, parts of the network there are distribution constraints. DERs wishing to connect behind these constraints will be offered either a standard connection (which may involve a delay whilst works are carried out and may require a contribution to the reinforcement of the distribution network) or a Flexible Connection. Such Flexible Connections will require curtailment according to pre-determined rules that will be incorporated into the connection agreement. In the future, DERs may also be given the opportunity to access a local flexibility market that will allow them effectively to "trade" their curtailment obligations where it is economically better for them to do so.

- ***Emerging distribution constraints:*** Even in areas of the distribution network that do not currently face constraints, it is expected that constraints will emerge. DERs connecting today will not be obliged to curtail in order to manage such constraints, but will be able to offer constraint management services to the Distribution Network Operator (DNO) and other DERs, perhaps through the local flexibility market.

We outline below the proposed operational and commercial arrangements to deliver this capacity. The principles that underpin these arrangements include:

- Maintaining the integrity and security of the transmission and distribution networks;

- Operating efficient, economic and coordinated transmission and distribution networks;
- Managing network constraints at least cost to consumers;
- Supporting DER investment decisions; and
- Providing DERs access to new and existing markets to allow them to build a viable business case.

Connecting to the distribution network

DERs will each have a connection agreement with UK Power Networks defining their operational requirements, including any technical capabilities that DERs will need to have, such as:

- Control & Visibility - to provide the relevant signals and control capabilities necessary to instruct changes in either your export or import of electricity;
- Loss of Mains protection – for small generators/storage connecting this will mean a requirement to use RoCoF. Vector Shift must not be used; and
- 0.95-0.95 lead/lag power factor capability – the ability, under instruction, to change your target power factor across the aforementioned range.

Given the existing and emerging constraints on the distribution network, it is proposed that all new DER connections (where HV/EHV connected and >200kW) should include an Active Network Management (ANM) capability. As per existing Flexible Connection regimes[1], a DER will be obliged to accept some curtailment when the predetermined constraints are binding, with the level of curtailment dependent on the magnitude of the constraint and the Principles of Access. Such constraints will be specified in the connection agreement, and any other distribution constraints will confer no such obligation on the DER.

If the distribution network is unconstrained, the DER will not be obliged to curtail if constraints emerge at a later date.

In due course it is expected that this ANM system will be the means by which the local flexibility market is enabled, allowing DERs to participate and UK Power Networks to manage constraints as required.

Managing transmission constraints

In order to connect to this region, because of the transmission constraints, DERs will need to provide adequate Control & Visibility to be able to participate in constraint management. The installation of ANM equipment would be sufficient to meet this requirement so there should be no additional obligation on DERs.

[1] Reference Norwich and March Grid

Initially, National Grid will seek curtailment prices from DER to allow them to be compensated for flexibility they provide to manage transmission constraints. These prices will be submitted to UK Power Networks as part of the connection process; and will represent 'back-stop' prices that will apply/endure should the DER not wish to participate in a future tender procurement process for transmission constraint management services. Once submitted to UK Power Networks, DERs will then be able to review and re-submit these prices if their circumstances change.

By ensuring DERs connecting in this region provide 'back-stop' curtailment prices and encouraging them to participate in market-based procurement events for constraint management services, it would be expected that National Grid's service needs can be met in an efficient and economic manner. This would avoid the risk of National Grid having to resort to emergency measures to maintain the integrity of the transmission system.

Recruitment & procurement approach for transmission constraint management

Recruitment and procurement will be based on the following principles:

- UK Power Networks and National Grid will work together to bring DERs into constraint management procurement events for the South East Coast GSPs (Bolney, Ninfield, Sellindge, Canterbury) as required;
- Procurement may be based on short-term specific requirements and/or longer-term more general requirements, as considered necessary;
- DERs (or their aggregators) may choose to post holding bids, which endure until subsequently changed, which reduces the operational burden placed on them, particularly if their commercial position remains consistent for a prolonged period of time; and
- UK Power Networks ANM system will facilitate the dispatch, based on the state of the network.

Stacking services and managing conflicts

Even if a DER has a financially firm connection agreement, if there are constraints on the distribution network, or if they are expected to emerge, then providing transmission constraint management or wider system service requires coordination between National Grid, UK Power Networks, DERs and aggregators. Coordination between UK Power Networks and National Grid will take place to ensure service stacking may occur on a case by case basis.

Summary

This paper is intended to provide DER developers with information regarding the constrained South East Coast network, and to give them confidence that they will be able to connect under terms that are acceptable to them. Whilst some questions remain, we are able to say that:

- Customers in the South East will be offered a new type of connection, allowing them continued access to generation capacity;
- Connecting DERs will be obliged to interface with UK Power Networks ANM system, to provide the Control & Visibility required to manage transmission constraints, and distribution constraints where they exist, and to future-proof the distribution system against emerging constraints;
- Initially, and in advance of market-based procurement, DERs will be required to submit 'back-stop' prices (as part of the connection process) to allow them to be compensated for flexibility they provide to manage transmission constraints;
- Subsequently, connecting DERs will be encouraged to participate in market-based procurement events for constraint management services, as part of the process to ensure constraint management services can be efficiently sought to safeguard the integrity of the transmission network in the region; and
- Provision of such constraint management services to manage a transmission constraint will be compensated by National Grid competitively and in an economic and efficient way.

For clarity, areas that are currently subject to curtailment on an uncompensated basis are as follows:

- Where the connection is via a single point of connection to the distribution network, the connection may be subject to long-term de-energisation during abnormal network conditions and/or during periods of network maintenance;
- Where there is an immediate and identified distribution constraint;
- Where there is an n-3 condition on the transmission network resulting from a double-circuit fault during a planned outage on the South Coast route, which requires the inter-tripping of DER to secure. Curtailment assessment analysis shows this to be a less than 1 in 100 year event; and
- Where conditions on the Distribution System or Transmission System are more adverse than the operators are required to plan for, or are reasonable to plan for, and the disconnection of DERs is necessary to maintain system integrity and safety (this includes Emergency Disconnection).