

Information for customers wishing to connect Distributed Energy Resources to Western Power Distribution's South West Distribution System

Background

Due to the cumulative impact of new generation connections on the distribution system in the South West, National Grid Electricity Transmission ('NGET') has identified that, in many instances, there risks being insufficient transmission capacity to cope with peak intermittent generation. One option to manage the situation is the reinforcement of the transmission system prior to the connection of any further generation capability; however the cost and timescales associated with this means it isn't necessarily the most appropriate solution in this instance.

WPD and NGET are working collaboratively to find an alternative solution to undertaking conventional reinforcement. This includes the use of analysis to identify instances where it is more beneficial to address transmission system constraints in the South West through NGET having better management, visibility and control of Distributed Energy Resources (DER). We call this solution, 'Connect & Manage'. Facilitating this Connect & Manage approach will reduce costs and timescales for connection therefore WPD is working with NGET to roll out the Connect & Manage arrangements throughout the South West, alongside existing arrangements for providing connections in constrained areas of the distribution network.

This guidance document sets out what developers of DER need to know regarding the Connect & Manage arrangement that will facilitate additional capacity to connect within the South West¹ region from July 2018.

System Constraints

There are three categories of constraint relevant to DER connecting to the distribution system in the South West:

- **Transmission constraints:** Following detailed study work as part of the Regional Development Programme (RDP), NGET has determined 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, NGET requires access to flexibility within the South West transmission and distribution system, and will be seeking to access that flexibility through a mechanism that will enable both transmission participants and DER to receive compensation for any curtailed output (other than where qualified in the 'Summary' section of this document).

¹ South West network included in Connect & Manage consists of the following Grid Supply Points (GSPs): Abham, Alverdiscott, Axminster, Bridgwater, Exeter, Indian Queens, Landulph and Taunton.

- **Existing distribution constraints:** In some, but not all, parts of the distribution system there are existing constraints. Customers wishing to connect behind these constraints will be offered either a conventional connection (which may involve a contribution toward any reinforcement works and a delay whilst the works are carried out) or an Alternative Connection. Such Alternative Connections will require curtailment according to pre-determined rules that will be incorporated into the connection agreement.
- **Emerging distribution constraints:** Even in areas of the distribution system that do not currently face constraints, it is possible that constraints will emerge. Customers connecting today will not be obliged to curtail in order to manage such constraints, but may be able to offer constraint management services to WPD, perhaps through a 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 systems;
- Operating efficient, economic and coordinated transmission and distribution systems;
- Managing system constraints at least cost to consumers;
- Supporting customer investment decisions; and
- Providing customers access to new and existing markets to allow them to build a viable business case.

Connecting to the distribution system

Customers will each have a connection agreement with WPD defining their operational requirements, including any technical capabilities that customers will need to have, such as:

- Control & visibility - to provide the relevant signals and control capabilities necessary to instruct changes in either export or import of electricity;
- 0.95-0.95 lead/lag power factor capability – the ability, under instruction, to change target power factor across the aforementioned range.

Given the existing and emerging constraints on the distribution system, it is proposed that all new DER connections (where HV/EHV connected and $\geq 500\text{kW}$) should include an Active Network Management (ANM)² capability.

As per existing ANM connections, a customer will be obliged to accept some curtailment when the predetermined distribution network 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.

² Additional information on our ANM can be found here <https://www.westernpower.co.uk/Connections/Useful-Information/Competition-in-Connections/Alternative-Connections/ANM-Further-Info.aspx>

In due course it is expected that this ANM system will be a means by which participation in the local flexibility market is facilitated, allowing customers to offer services for WPD to manage constraints as required.

Managing transmission constraints

In order to connect within the South West, because of the need to manage the potential for transmission constraints, customers requiring an export capability of 1MW and above will need to provide adequate control & visibility to be able to participate in the provision of transmission constraint management services. The installation of ANM equipment would be sufficient to meet this requirement.

Initially, NGET will seek prices from the customer to allow them to be compensated for flexibility they provide to manage transmission constraints. These prices may be submitted as part of the connection process; and, if submitted, will represent 'back-stop' prices that will apply/endure should the customer not wish to participate in any future structured procurement process for transmission constraint management services. Once submitted customers will then be able to review and re-submit these prices if their circumstances change.

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

Recruitment and procurement approach for Connect & Manage

Recruitment and procurement will be based on the following principles:

- WPD and NGET will work together to bring customers into Connect & Manage procurement events for the South West distribution system as required;
- Procurement may be based on short-term specific requirements and/or longer-term more general requirements, as considered necessary;
- Customers (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
- WPDs ANM system will facilitate the dispatch, based on the state of the network.

Stacking services and managing conflicts

Even if a customer has a firm connection agreement, if there are constraints on the distribution system, or if they are expected to emerge, then providing transmission constraint management will require co-ordination between all parties. Facilitating the provision of flexibility services and managing potential conflicts requires co-ordination between WPD, NGET, customers and aggregators.

Summary

This guidance document is intended to provide DER developers with information regarding the constrained South West distribution system, 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 requiring an export capability of 1MW and above in the South West distribution system will be offered a way of managing their connection, where there are transmission constraints, allowing them continued access to generation capacity;
- Connecting customers will be obliged to interface with WPDs 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, customers will be asked 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;
- Connecting customers will be encouraged to participate in market-based procurement events for Connect & Manage services, as part of the process to ensure such services can be efficiently sought to safeguard the integrity of the transmission system in the South West region; and
- Provision of Connect & Manage services to NGET to manage a transmission constraint will be on a compensated basis;
- Developers of DER who are unwilling to participate in the Connect & Manage arrangement will become subject to a Modification Application to NGET and be required to pay all associated fees. Any subsequent Modification Offer made by NGET will reflect that the resultant works will not be the most economic and efficient solution. On this basis developers will be required to fully fund the cost of the infrastructure transmission works, which will be significant, and be unable to connect until they are complete.

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 system, 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 system constraint;
- Where there is an n-3 condition on the transmission system in the South West resulting from a double-circuit fault during a planned outage, 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 or transmission systems 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).