



Open Networks Project DSO Service Requirements: Definitions

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DSO Service Requirements: Definitions

Introduction

The WS1 P2 work group has identified the following four real (MW) power services to meet different distribution network congestion management needs (i.e. to manage P2/network security). These could be used for demand turn down (generation turn up) or demand turn up (generation turn down). Further DSO services may be required in future (e.g. reactive power for voltage control, or to facilitate a whole-system approach to black start), however we are focused on real power services as a first development priority. Note that the services National Grid Electricity System Operator procures and uses to manage the transmission system are outside the scope of this document (details of these services can be found via the link¹ below).

Real Power Service Descriptions

The following real power services are all constraint management services differentiated by their timing and means of dispatch; being either pre-fault or post-fault with varying periods of provision and likely frequency of utilisation.

1. **Scheduled Constraint Management** - The DSO procures, ahead of time, a pre-agreed change in input or output over a defined time period to prevent a network going beyond its firm capacity (thereby ensuring all load remains secure following the next fault). For example, a reduction in demand is procured over an evening peak period to mitigate risk of overload that might result should a fault occur on one of two in-feeds to a group;
2. **Pre-fault Constraint Management** – The DSO procures, ahead of time, the ability to access a pre-agreed change in Service Provider output based on network conditions close to real-time. Utilisation is then delivered by different mechanisms, depending on whether the DSO wishes to manage network risk manually, or automatically:
 - a. Utilisation may be instructed **manually**, ahead of real-time, to prevent a network going beyond its firm capacity. This will generally be a manual call **based on circuit loading forecasts**. For example a Service Provider is contracted to be available to the DNO over winter evening peaks. The DNO then calls the Service Provider on days forecast to have the worst predicted loadings; or
 - b. Utilisation may be initiated through an **automated DSO system**. For example a Service Provider is contracted to be available to the DSO over winter evening peaks. **The DSO system then triggers the service when the loading reaches the firm capacity;**
3. **Post-fault Constraint Management** - The DSO procures, ahead of time, the ability of a Service Provider to deliver an agreed change in output following a network fault. Utilisation is then instructed when the fault occurs on the network (but only if loading is beyond the post fault rating of the remaining assets). This will generally be instructed through an automated system and will utilise the short term ratings of the assets, such that a sustainable post-fault flow can be achieved. For example a Service Provider is contracted to

¹ <https://www.nationalgrid.com/uk/electricity/balancing-services>

be available to the DSO over winter evening peaks. The DSO system instructs the Service Provider to deliver the contracted change in output when the fault occurs; and

4. **Restoration Support** – Following a loss of supply, the DSO instructs a provider to either remain off supply, or to reconnect with lower demand, to support increased and faster load restoration under depleted network conditions. For example a Service Provider may be restored at minimal load to allow for other (perhaps less flexible) customers to be restored.

Service Characteristics	Scheduled Constraint Management	Pre-fault Constraint Management	Post-fault Constraint Management	Restoration Support
When to act	Pre-fault	Pre-fault	Post-fault	Post-fault
Triggering action	Time	DSO forecast; or Asset Loading	Network Fault	Network Fault
Certainty of utilisation	Very certain	Uncertain	Uncertain	Very uncertain
Efficiency of utilisation	Low	Medium	High	Low
Risk to network assets	Low	Medium	High	Low
Frequency of use	High	Medium	Low	Low

Examples of How Services Might Be Used

The following examples show scenarios where each service might be utilised. Note that these examples are not intended to be exhaustive, however they give an indication of the circumstances under which DSOs might wish to procure and utilise each service.

The example scenarios are for where the winter peak demand of a BSP load group is in excess of the rating of the supplying 132/33kV transformers during an outage of one of the transformers. The peak demand in excess of the transformer rating occurs only within the period 17:00hrs to 20:00hrs; October to March.

Scheduled Constraint Management

The DSO contracts with a Service Provider, which could be a dominant demand customer or smaller customers contracting via an aggregator, to limit their import each day during the stated period to avoid the peak demand in excess of the transformer rating (irrespective of whether the peak loading actually occurs).

Pre-fault Constraint Management

The DSO contracts with a Service Provider to limit their import either:

- a) only on days when the DSO forecasts that the peak demand will exceed the transformer rating and sends a request for the service to be delivered. Note that, depending on circumstances, service call-off may be limited to the period 17:00hrs to 20:00hrs; October to

March, or there may exist the potential for further optional utilisation outside these windows (typically this would be a manual process); or

- b) only on days when their monitored demand exceeds the transformer rating, following receipt of a signal from the DSO (typically this would be an automatic process).

Post-fault Constraint Management

The peak demand of a BSP load group is in excess of the rating of the supplying 132/33kV transformers during an outage of one of the transformers. The DSO contracts with a Service Provider to ramp-down (within prescribed timescales) their demand immediately post the fault loss of one of the transformers to maintain peak demand within the rating of the remaining transformer. This service makes use of the short-term ratings of assets – the magnitude of those ratings will determine whether the service could be instructed manually, or whether it would need to be triggered automatically.

Restoration support

The peak demand on a HV feeder is traditionally managed to ensure that following the fault loss of that feeder the demand can be fully restored via another feeder by opening and closing appropriate network circuit breakers. This means that there is inherently capacity on the network that is only used under fault or maintenance conditions. Contracting for *Restoration Support* allows this 'spare' capacity to be used whilst the network is operating in its normal state on the basis that, following a fault, these contracted Service Providers would remain off supply until the fault was rectified– thereby facilitating restoration of customers not contracted for Restoration Support.