nationalgrid

Black Start

Service Description V2 October 2012

General Description of the Service and National Grid Procurement and Requirements

1. Introduction

This document provides a summary of the service of Black Start as set out in the generic Black Start contract terms. Where there is any conflict between this document and the Service terms, the service terms shall take precedence.

This document is intended only as a general guide to the Black Start service terms, which will reside in a Commercial Services Agreement as Clause 4. Each Black Start contract is bilaterally agreed.

2. Service description

Black Start is the procedure to recover from a total or partial shutdown of the National Electricity Transmission System which has caused an extensive loss of supplies.

The Black Start service is procured from generators that have the capability to start main blocks of generation from an on-site auxiliary generator, without reliance on external site supplies. In the event of a Black Start, the service requires the provider to start up its main generator(s), carry out initial energisation of sections of the National Transmission System and distribution network, and support sufficient demand to create and control a stable power island. The Black Start generator may be required to provide start up supplies to other power stations as the system restoration progresses and will eventually be required to synchronise to other power islands. The restoration is initiated under the instruction of National Grid and proceeds under the general guidance of a site specific restoration plan.

Not all power generation have, or are required to have, this Black Start capability. Black Start capability is usually a consideration when the plant is being built, although National Grid does also procure Black Start service where the facility can be retrofitted, if this is an economic alternative.

3. Background to Black Start Requirements/Why is it needed?

National Grid has an obligation under Grid Code to ensure that the National Electricity Transmission System can be re-energised in the event of a total or partial system shutdown as described in section 2 above, .

The likelihood of a total or partial system shutdown occurring is considered remote. However, it is the case that should a total or partial shutdown occur anywhere on the National Electricity Transmission System, contingency arrangements must be in place to enable a timely and orderly restoration of supplies. The need to contract for Black Start at an individual location will largely be driven by current arrangements at other nearby power stations, the expected longevity of such contracts and the implications involved in improving system restoration.

National Grid sets out its approach to determining and procuring an economic and efficient level of Black Start Service Provision on an ongoing basis in the Black Start Statement required under its Transmission License.

4. Major Technical Requirements

Irrespective of the type of plant installed to provide a Black Start service, the following technical capabilities are required:

- The ability to start up the main generating plant (at least one unit/module) of the station from shutdown without the use of external power supplies, and be ready to energise part of the Network Electricity Transmission System or, if appropriate, the Network Distribution System within two hours of instruction from National Grid;
- The capability to accept instantaneous loading of demand blocks, ideally in the range 35 to 50 MW, and controlling frequency and voltage levels within acceptable limits during the block loading process (under these conditions, frequency can be within the range 47.5 to 52 Hz);
- The ability to provide at least three sequential Black Starts, to allow for possible tripping of the Transmission/Network Distribution System(s) during the re- instatement period or trips during the station's starting sequence itself;
- Back-up fuel supplies (e.g. distillate fuel), if appropriate, to enable the power station to run for a minimum duration, ideally in the range 3 to 7 days, following a Black Start instruction;
- Facilities to ensure that all generating units can be safely shutdown without the need for external supplies, and can be maintained in a state of readiness for subsequent start ups;
- The ability to maintain a high service availability on both the main and auxiliary generating plant (typically 90%); and
- The reactive capability to charge the immediate Transmission/Network Distribution System(s). This capability will depend on the local system configuration, but generating plant connected at 400kV or 275kV with a capability of at least 100MVAr leading (as measured at the commercial interface) should almost invariably meet this requirement. The generator must also be capable of withstanding the magnetic inrush and transient voltages associated with this charging duty.

5. Contractual Overview of Black Start

a. Introduction

Black Start is defined as a Part 2 System Ancillary Service (Grid Code CC8.1), which is a necessary service required from and agreed with some generators to meet National Grid's Black Start restoration strategy.

b. National Grid requirement and procurement

National Grid will indicate its potential requirement for a Black Start service at a new generator during the connection application process, prior to construction. Black Start will become an agenda item for the connection issues meeting(s) where the commercial and technical considerations for the service can be discussed. A draft set of generic Black Start terms are published and will be provided to the User as background of the more detailed and applicable contract terms for discussion.

For an existing station, National Grid will contact the potential provider to declare National Grid's interest in a future service and invite response. This does not preclude a provider approaching National Grid in the first instance to offer the potential for a Black Start service. A bilateral meeting will then be held with the provider to discuss the service.

Black Start will be procured on a bilateral basis to meet the requirements of National Grid's Black Start strategy. National Grid may discuss the provision of a Black Start service with one or more potential providers at the same time to ensure the most economic and efficient solution.

c. Payment Structure

There is a suite of payment forms that National Grid will make as part of the service, some of which may not be applicable in all instances depending on type, age, status of plant.

i. Availability Payments
National Grid will, where a service provider makes the Black Start service available, pay for the availability on a £ / settlement period basis.

ii. Exercise Price
Where an auxiliary unit is called upon for a Black Start test, then National Grid shall pay an agreed amount by reference to the exercise price (£/MWh) and the metered MWh output of the auxiliary unit during the test.

iii. Contribution Sums – new plant, refurbishments
Where the installation or refurbishment of capital assets at a plant would return a valuable Black Start service, National Grid may choose to contribute towards the provider's costs and it will carry this forward through one of a number of possible mechanisms. including profiled (staged) and upfront payments, all supported by valid invoices. National Grid also reserves the right to request further evidence to ascertain to its satisfaction that the works have been completed.

d. New provider/new asset

i. Feasibility study
Where National Grid believes a new asset may be able to provide a valuable Black Start service, then it may agree to provide a capped contribution towards a feasibility study that will cover for example the installation, technical capabilities and cost of installing Black Start capability at the site.

ii. Commissioning Assessment
Following the successful completion by the generator of the Grid Code compliance testing, it will then follow that the provider will carry out a Commissioning Assessment to prove the Black Start capability of the assets as described in section 7a below.

e. Term

The contract term will be specific to the particular Black Start station and requirements at the time. For a new build Black Start station it is likely that the contract term would be at least 10yrs.

f. Black Start renewal terms

Renewal of an existing Black Start service is likely to provide a cost effective option to National Grid; capital elements within the contract price structure will have been recouped within the original term. Renewals will however need to be assessed against potential alternative providers and National Grid's current Black Start strategy.

At an agreed period before the expiry of a Black Start agreement, National Grid and the provider shall meet to discuss whether the provisions of the agreement shall be extended for a further agreed period and if so the duration and terms of the extension.

6. Local Joint Restoration Plan

Power islands are developed in accordance with a Local Joint Restoration Plan (LJRP) which is agreed alongside a Black Start contract and sets out the communications, activities and steps that the Black Start power station, the relevant Network Operator and National Grid will carry out during a Black Start situation. Desktop exercises will be conducted between the three parties in accordance with the provisions of the Grid Code.

7. Service Monitoring

Black Start is a vital service for the restoration of the National Electricity Transmission System, and is a prime responsibility for National Grid and any contracted Black Start service provider. Therefore in order to confirm that National Grid is paying for an available and deliverable service, there are a series of testing and assurance measures in place as set out in the Grid Code and the bilateral Commercial Services Agreement:

a. Commissioning Assessment (new providers)

A new provider will be required to pass a two part Commissioning Assessment before commencement of the service. The first part will test the resilience and capability of the auxiliary unit. The second part will be a Commissioning Black Start Test that may include both a Grid Code Black Start Test and a Remote Synchronisation Test, as described below.

Where the provider passes the Commissioning Assessment then the service shall be deemed commissioned and the service commencement date shall be applied. Should a provider fail three successive Commissioning Assessments, National Grid may serve written notice on the provider to terminate the provisions of the Black Start agreement with all capital contribution sums refunded to National Grid

b. Grid Code Black Start Testing

Grid Code OC5 allows for testing at either a Unit or a Station level. The tests are to demonstrate that the generator can synchronise a main unit to the transmission system within two hours of removal of external supplies. OC5 makes provision for the frequency at which such Black Start tests can be called by National Grid.

c. Remote Synchronisation Testing

Each Black Start station may be required to undertake a Remote Synchronisation Test not more than once every two years. National Grid will isolate a section of the National Electricity Transmission System to provide a Test Network, including a local busbar, circuit(s), transformer(s) and a remote busbar. The station will be required to energise the Test Network and synchronise it to the National Electricity Transmission System.

d. Reproving and/or Capability Assessment

A Reproving Assessment may be required by National Grid following a period where the Black Start service at a station has been unavailable. A Capability Assessment may be required by National Grid where there are reasonable grounds to believe that a nominally available Black Start service at a station is not Black Start capable. The extent of such assessments will be agreed with the generator and will have regard to the circumstances leading to the requirement.

e. Inspection

National Grid may, with not less than 24hr notice, verify the capability of Black Start at a power station through a station inspection. Such inspection would be carried out without undue interference with the normal operation of the Black Start provider,

f. Assurance Visit

National Grid may carry out an Assurance Visit, not more than once in any calendar year, to confirm that the Power Station has the appropriate documentation, technical and training procedures in place to support the Black Start service. The visit is fundamentally a desk top exercise at the station to complement the Black Start testing regime and is an opportunity for both parties to agree any areas for development.

g. Unavailability

Where a Black Start station is unavailable to provide Black Start it will advise National Grid and availability payments will cease until such time that the station redeclares its availability. Settlement periods where the power station is unavailable will be accrued and utilised in the annual assessment of unavailability as mentioned below.

h. Availability Assessment

National Grid will assess the availability of Black Start at a station over consecutive periods within the contract term, typically every 12 or 24 months. Where the station has not achieved its contracted level of availability over that period then National Grid will rely on the agreed arrangements in order to reflect the reduced level of service being provided. Typically National Grid consider recouping any contribution sums paid and/or discuss and agree with the generator an appropriate reduction in the availability payments.

8. Further information

For further information on the Black Start service please view our webpage at

Black Start Service Webpage

Or contact the Contracts & Settlements team via your Account Manager or

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