



# Balancing Principles Statement

Report for the period  
1 October 2004 to  
30 September 2005



November 2005

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## Executive Summary

National Grid has developed a Balancing Principles Statement (BPS) in accordance with Licence requirements to define the broad framework within which balancing action decisions are made.

The BPS is intended to help electricity market participants to understand actions National Grid may take to achieve the efficient, economic and co-ordinated operation of the transmission system. To assist with this we have also held regular industry forums where we have provided data, detailed explanations of our balancing actions and answers to questions raised by participants.

Our compliance with the BPS is subject to independent external review and reflected in this our fifth BPS report. This report covers a twelve month period to align with Balancing and Settlement Code review periods.

*This report demonstrates that throughout the period from 1 October 2004 to 30 September 2005, National Grid has operated the England and Wales and GB Transmission Systems in accordance with the guidelines set out in the Balancing Principles Statement. A statement from the external auditor (PricewaterhouseCoopers) accompanies this report.*

### Key events highlighted in this report:

On 1 April 2005, the new British Electricity Transmission and Trading Arrangements (BETTA) came into force and National Grid became responsible for the operation of the GB transmission system including the Scottish Power and Scottish Hydro Electric systems. This report spans the BETTA go-live date and includes the two 6 month periods immediately preceding and following this milestone.

There were no instances of Black Start, NRAPM warnings or Involuntary Reductions in this reporting period.

There was one instance of islanding on Thursday 21 October 2004. Wylfa – Pentir number 1 & 2 circuits tripped during bad weather, leaving Wylfa Power Station islanded and supporting some local demand. The island was re-synchronised to the main interconnected system 17 minutes later, with the Wylfa – Pentir number 1 circuit restored to full service.

There was one occasion when a BMU was disconnected by a Transmission system fault. On Monday 11 October 2004, Bus Coupler 1 at Dungeness 275kV substation opened during trip tests which effectively disconnected Main Bar 1 with Generating Unit 1 and Station Transformer 1 from the National Grid Transmission system. Main Bar 1 was reconnected to the system 22 minutes later. As Unit 1 was temporarily physically disconnected from the system due to National Grid's action, CAP048 compensation was paid to BNFL (Magnox Electric) in relation to this disconnection.

On 15 March 2005, emergency export was utilised across the French interconnector for 3 minutes to contain a high system frequency in the short time remaining prior to the demand increase at midnight.

On 12 August 2005, some control room computing facilities were lost in the early evening spanning the darkness peak. At this time, during periods where the demand was changing rapidly, fast generation and demand actions including Emergency Assistance on the French interconnector were required to secure the power system and control system frequency.

During this reporting period, National Grid agreed 28 Pre Gate Closure BMU Transactions (PGBTs). These are described further in BPS section C9. See section 5.

The annual average availability of our NETA Balancing Mechanism systems was 99.83% during this reporting period. See section 7.5.

# The National Grid Company plc

## Balancing Principles Statement Report for the period – 1 October 2004 to 30 September 2005

### 1. BPS Part A: Introduction

National Grid has developed a Balancing Principles Statement (BPS) in accordance with Licence requirements in order to define the broad framework within which balancing action decisions are made.

The BPS is intended to help electricity market participants to understand actions National Grid may take to achieve the efficient, economic and co-ordinated operation of the transmission system.

An overview of the BPS is contained in Appendix 1.

Our compliance with the BPS is subject to independent external review and reflected in this annual report. Appendix 2 of this report contains an opinion from the external auditors.

On 1 April 2005, the new British Electricity Transmission and Trading Arrangements (BETTA) came into force and National Grid became responsible for the operation of the GB transmission system including the systems owned by Scottish Power Transmission Ltd (SPTL) and Scottish Hydro Electric Transmission Ltd (SHETL). This report spans the BETTA go-live date and includes the two 6 month periods immediately preceding and following this milestone.

### 2. BPS Part B: General Principles

The BPS is written to be consistent with our Licence obligation to operate the system in an efficient, economic and co-ordinated manner.

In determining which balancing measures to employ, we take account of various sources of information. These include Balancing Mechanism Unit (BMU) data, our demand forecasts, our Transmission outage plan, actual system conditions and any other relevant data (Grid Code BC 1.4.2 (f)).

In certain circumstances, we may need to issue Emergency Instructions or Involuntary Reductions in order to preserve the integrity of the transmission system. These circumstances may include system events and situations involving the requirement for demand control, Negative Reserve Active Power Margin, Black Start, frequency response and communication failure. In these circumstances it may be necessary to depart from normal Balancing Mechanism operation in accordance with Grid Code BC2.9.

**Throughout the period from 1 October 2004 to 30 September 2005, National Grid has operated the England & Wales and GB Transmission Systems in accordance with the general principles set out in the Balancing Principles Statement.**

**We are permitted in certain circumstances to operate the system outside the normal principles of Balancing Mechanism operation (as described in the BPS), and specific occurrences are covered in more detail later in this report.**

### **3. BPS Part C: Principles underlying Balancing Measures**

There are a number of principles described in the BPS that underpin the measures National Grid will take to balance the system. The balancing measures include the acceptance of bids and offers, call off of Ancillary Service contracts and other services, and instruction of Emergency Actions and other Involuntary Reductions. These measures are called off in cost order unless this is not possible under circumstances described in Part C section 5. Part C also describes the treatment of BMUs disconnected by Transmission System faults.

**We have used balancing measures in cost order wherever possible during this reporting period, with any exceptions being in line with the circumstances described in BPS Part C section 5 and of a non-material nature.**

### **4. BPS Part D: Transmission Constraints and Reserve / Response**

We employ a number of principles for the management of transmission constraints and response/reserve holdings. These include outage planning from year ahead to day ahead, security studies, constraint cost forecasting and negotiating Balancing Service contracts. BPS Part D also describes the calculation of response and reserve holding levels, allocation of holdings with due regard to cost, delivery dynamics and transmission constraints, and regaining levels of response holding following delivery.

**We have managed transmission constraints and response/reserve holdings during this reporting period in line with the principles described in BPS Part D.**

### **5. BPS Part E: Day Ahead and Within Day Balancing Processes**

BPS Part E describes the Day Ahead and Within Day balancing processes – the Scheduling and Control phases. At the Day Ahead stage, this includes publishing day ahead demand forecasts, performing security studies, calculating reserve/response levels and calculating half hourly system plant margins. It also includes forecasting constraint costs, calling off Balancing Service contracts and revising the national and zonal margin data.

Within Day, it includes releasing revisions to the demand forecasts and margin data to the Balancing Mechanism Reporting System, performing additional security studies, reassessing the need to call off Balancing Service contracts, and balancing the system minute by minute through the deployment of Balancing Services on an economic basis.

In this reporting period, we agreed 28 Pre Gate Closure BMU Transactions (PGBTs). There were 18 Buys at a total volume of 20.6GWh and a volume weighted average price of £139/MWh. There were 10 Sells at a total volume of 44.8GWh and a volume weighted average price of £1.86/MWh.

**We have managed the Day Ahead and Within Day balancing processes during this reporting period in line with the principles described in BPS Part E.**

## 6. BPS Part F: Operational Security Standards

BPS Part F summarises the Operational Security Standards used by National Grid. We operate the system within these standards in order to maintain system security. The system is normally secured against certain specific “secured events” which are defined in Part F – for example the fault outage of a double circuit overhead line.

Since BETTA go-live on 1 April 2005, we have planned and operated the GB Transmission System to a single GB Security and Quality of Supply Standard (GB SQSS). This new combined standard incorporates previous standards relating to the three separate England and Wales, SPTL and SHETL transmission systems. Whilst allowing for minor differences between the previous standards, the new GB SQSS provisions are broadly similar for the three systems and National Grid has planned and operated the GB system to this new combined standard.

**We have maintained system security in accordance with our Operational Security Standard during this reporting period. There have been no deviations from this Standard as it relates to loss of supply, deviations from statutory frequency limits, system instability or unacceptable overloading of apparatus, subject to the provisions and exceptions noted in BPS Part F.**

**Loss of supply and frequency or voltage excursions outside statutory limits are reported separately in accordance with Standard Condition C17 of the Transmission Licence.**

## 7. BPS Part G: Exceptions to the BPS

Infrequently, circumstances may arise which require us to operate outside the principles described in the BPS. The specific examples identified in BPS Part G are:-

- (i) Black start
- (ii) System islanding
- (iii) Emergency control centre evacuation or widespread communication problems
- (iv) Circumstances where operating within the BPS would prejudice the safe and secure operation of the system
- (v) Insufficient time available to balance the system in accordance with the BPS
- (vi) Where the BPS is inappropriate and awaiting modification.

Of these categories above, the only circumstances that have arisen have fallen into categories (ii), (iv), (v) and (vi). Actions were taken as described in the following subsections to ensure the safe and secure operation of the transmission system, to avoid breaching our statutory obligations or where insufficient time was available to employ alternative measures to achieve balancing.

### 7.1 Emergency Instructions

In certain circumstances, it may be necessary for National Grid to issue Emergency Instructions in order to preserve the integrity of the Transmission System and any synchronously connected external system. In such circumstances, it may be necessary to depart from normal Balancing Mechanism operation in accordance with BC2.9 of the Grid Code.

**There were no Emergency Instructions issued as defined in the Grid Code section BC2.9.**

**There were two occasions when we utilised emergency assistance from the French Interconnector.**

On 15 March 2005, at 23:49hrs a BMU demand loss coincided with a rapid decay of system demand just before midnight. The system frequency rose to 50.19Hz, but containment actions on conventional generation would not have been effective in the short timescales prior to the large demand teleswitch (>1200MW) which was expected at midnight. At 23:53 the frequency started to rise rapidly again. Emergency export was utilised across the French interconnector for 3 minutes to contain the high system frequency in the short time remaining prior to the demand increase at midnight.

On 12 August 2005, some control room computing facilities were lost in the early evening spanning the darkness peak. At this time, during periods where the demand was changing rapidly, fast generation and demand actions were required to secure the power system and control system frequency. As part of this, Emergency Assistance on the French interconnector was used for short durations to assist with managing the situation.

## **7.2 Demand Control**

A situation may arise in BM timescales where there is insufficient active power generation available to meet demand, or there may be local operating problems on part of the transmission system. Under these circumstances, it may be necessary for Network Operators and National Grid to make provisions for the reduction of demand in accordance with Grid Code OC6.

**There were no occasions when Demand Control instructions were issued by National Grid.**

## **7.3 Negative Reserve Active Power Margin**

In order to ensure system security, National Grid must always be able to schedule sufficient frequency responsive plant to contain system frequency against the largest credible loss of generation or demand. Under conditions of low system demand (particularly overnight demand troughs during summer weekends), the generation notified to us may not include enough plant capable of providing this response. Under these circumstances we would normally accept bids to desynchronise unresponsive plant and accept offers to replace this plant with more responsive generation.

However, in extreme cases, there could be an insufficient volume of bids available to reduce the level of unresponsive generation. In these circumstances, National Grid issues Negative Reserve Active Power Margin (NRAPM) warnings to the market to signal the shortage of responsive plant and request additional plant flexibility. If the NRAPM warnings have no effect, as a last resort National Grid could instruct plant to desynchronise under these NRAPM conditions in accordance with Grid Code section BC2.9.4.

**No NRAPMs or instructions relating to NRAPM conditions have been issued.**

## 7.4 Black Start / Islanding

Under extreme conditions (e.g. multiple circuit trippings during severe weather), parts of the Transmission System could become disconnected from the main system, or islanded. In addition, there could be a “partial shutdown” where all generation has ceased in an island, or a “total shutdown” where all generation has ceased in the total system and there is no electricity supply from external Interconnectors.

Grid Code section OC9 describes the implementation of recovery procedures following a total or partial shutdown (Black Starts), the re-synchronisation of islands and the Joint System Incidents Procedure which would apply under the above circumstances. National Grid has Ancillary Service contracts with certain generators to provide a Black Start capability to re-establish supply following a partial or total system shutdown.

**There was one incident involving islanding. On Thursday 21 October 2004, Wylfa – Pentir number 1 & 2 circuits tripped during bad weather, leaving Wylfa Power Station islanded and supporting some local demand. The island was re-synchronised to the main interconnected system 17 minutes later, with the Wylfa – Pentir number 1 circuit restored to full service.**

**There were no occasions of partial or total shutdown. No Black Start services were called off (excluding routine testing).**

## 7.5 Maximum Generation

The Maximum Generation Service would normally only be instructed to maintain system security once all valid and feasible bids and offers have been accepted in the BM. Where possible the service will be instructed prior to Demand Control Measures and it will only be instructed where a BMU has been instructed to its Maximum Export Limit, or is already generating at that level. Under exceptional circumstances, it may be necessary to invoke Maximum Generation before all valid and feasible bids and offers have been accepted. These circumstances may include avoiding the erosion of response or reactive reserve levels or where no other plant with suitable dynamics is available.

**The Maximum Generation Service was not invoked during this reporting period.**

## 7.6 Communication Failures

This subject is covered in both Grid Code BC2.9.7 and BPS Part B section 5(f). A communication failure is defined in the BPS as an “unplanned outage of the electronic data communication facilities or National Grid’s associated computing facilities preventing normal Balancing Mechanism operation”. Under these circumstances, National Grid will normally issue a “National Grid Computing System Failure Notification” as soon as it is reasonably able to do so. This will normally be issued via the Balancing Mechanism Reporting System and where possible will indicate the likely duration of the outage.

**Our NETA systems achieved 99.83% availability (excluding planned outages) in this reporting period.**

## 7.7 Involuntary Reductions

This subject is covered in BPS Part B section 6. Under certain exceptional circumstances, National Grid may need to instruct reductions in generation or demand before all valid and relevant Balancing Mechanism bids or offers have been accepted. This could be to preserve system response or reactive reserve levels, or as a result of automatic measures (e.g. the operation of an intertrip), or because communication problems prevent other relevant bids or offers being instructed. Involuntary Reductions include Demand Reduction and Disconnection referred to in Grid Code OC6.

**There have been no Involuntary Reductions of Demand or Generation.**

## 7.8 Treatment of BMUs disconnected by Transmission System faults

This subject is referred to in BPS Part C paragraph 6. In unusual situations, generation BMUs may become disconnected from the Transmission System following transmission system faults.

**There was one occasion where a generation BMU became disconnected from the Transmission System following a transmission system fault.**

On Monday 11 October 2004, Bus Coupler 1 at Dungeness 275kV substation opened during trip tests which effectively disconnected Main Bar 1 with Generating Unit 1 and Station Transformer 1 from the National Grid Transmission system. Main Bar 1 was reconnected to the system 22 minutes later. As Unit 1 was temporarily physically disconnected from the system due to National Grid's action, CAP048 compensation was paid to BNFL (Magnox Electric) in relation to this disconnection.

## 8. BPS Part H: Incidences of Emergency Instructions, Involuntary Reductions and other significant events

The following table summarises the above reporting sections and compares this reporting period and the first year of NETA operation to the last year of the Pool:

Category	2001/ 2002 NETA	*Apr – Sep 2002	Oct 2002 – Sep 2003	Oct 2003 – Sep 2004	Oct 2004 – Sep 2005
Emergency Instructions	0	0	0	1	0
Interconnector Emergency Assistance	2	2	2	1	2
Demand Control	0	0	0	0	0
NRAPM warnings	0	0	0	0	0
Black Start / Islanding	0	0	0	0	0 / 1
Availability of NETA systems	99.8%	99.8%	99.77%	99.92%	99.83%
Involuntary Reductions	0	0	0	0	0
Generation Disconnection following a system fault	1	0	1	1	1

\* 6 month transitional reporting period.

## 9. Future Reports

BPS reports are prepared by National Grid in accordance with the timetable set out in our Transmission Licence Standard Condition C16.

This report covers the period from 1 October 2004 to 30 September 2005 and aligns with Balancing and Settlement Code review periods.

For further information on this report please contact:

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## **Appendix 1 – Overview of the Balancing Principles Statement**

### **I The Purpose of the Balancing Principles Statement**

The BPS has been developed by National Grid to assist electricity market participants to understand our actions in achieving the efficient, economic and co-ordinated operation of the transmission system.

National Grid is required by Transmission Licence Standard Condition C16 section 5 to establish and maintain a BPS to define the broad framework within which we make balancing action decisions.

### **II Changes to the BPS**

The BPS is approved by OFGEM and may only be modified in accordance with the processes set out in Standard Licence Condition C16. The first approved BPS (version 1.0) was issued on 20 March 2001.

Where changes are required to the BPS in advance of the annual update then, subject to approval, a BPS supplement may be issued.

The latest version of the BPS is version 5 issued on 2 September 2004. The changes to this version were mainly of a housekeeping nature to ensure consistency with respect to definitions. Part B.5 was updated to provide detailed clarification of the Maximum Generation Service relating to Bids and Offers.

### **III Further information**

Copies of the BPS are available from National Grid on request. The most recent edition is available on the National Grid website ([www.nationalgrid.com/uk](http://www.nationalgrid.com/uk)). From the home page, select Electricity, then Balancing Services, Transmission Licence Statements, and then use the link on the right of the page titled Transmission License Condition C16 Statements.

Alternatively, please use the following link:

<http://www.nationalgrid.com/NR/ronlyres/901B9E73-C0B8-48AF-AC52-B3A54B1813AD/2873/BPSv50EffectiveSept05.pdf>

For further enquiries relating to the BPS, please contact:

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## Appendix 2 – Review opinion by PricewaterhouseCoopers