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Executive Summary

This document considers the role of the National Grid Company plc (NGC) and its incentives under the new electricity trading arrangements (NETA). The document examines NGC's role as system operator (SO) in keeping the electricity system in balance (energy balancing) and maintaining the quality and security of supplies (system balancing) and we have also considered the tools that NGC will use, under NETA, to fulfil this role.

NGC has a pivotal role as system operator. This document explains why Ofgem believes that NGC should be allowed discretion in the way in which it balances the system and maintains the security and quality of supplies under NETA, subject to: the publication of Procurement Guidelines and Balancing Principles, a new SO incentive scheme under NETA and a new licence condition to operate the transmission system in an efficient, economic and co-ordinated manner.

Ofgem's views on the form, scope and duration of a new incentive scheme for NGC under NETA are set out in this document. The intention is to ensure that NGC continues to face strong financial incentives on the costs it incurs as system operator, which are ultimately borne by customers. Similarly, this document suggests that both generation and demand should face the costs that transmission losses impose on the system. Currently suppliers bear all the costs of system operation and transmission losses. Since the intention is that participants who are out of energy balance should face the costs they impose on the system, the document also outlines a proposal for including, in the energy imbalance, the contractual costs incurred by NGC in balancing the system. It would not be reasonable to impose system balancing costs on those out of energy balance and a simple method for removing at least some of these costs is proposed. We propose that these incentivised costs should be borne equally by generators and suppliers.

The treatment of distribution constraints and failures will be considered as part of a consultation exercise to be conducted by Ofgem over the coming months.

Ofgem intends to publish initial proposals on the transitional incentive scheme on NGC under NETA in June 2000. Final Proposals will be issued in September 2000. Implementation is expected to coincide with the introduction of NETA.

1. Introduction

The Purpose of this Document

- 1.1 The New Electricity Trading Arrangements (NETA) are due to be implemented in England and Wales in Autumn 2000. In December 1999, Ofgem issued a consultation document (the 'December Consultation')¹ setting out our thinking on a number of areas related to the role and incentives of the National Grid Company plc (NGC) as both System Operator (SO) and Transmission Asset Owner (TO) under NETA.
- 1.2 The purpose of this document is to consult on the role and incentives of NGC under NETA including how balancing services are to be procured and utilised, the development of new incentive schemes on the NGC as SO under NETA, and the treatment of transmission losses on the introduction of NETA. These issues require consideration in order for there to be a smooth transition from the current system to the new trading arrangements. Ofgem expects that these transitional arrangements will be in place for around six months.
- 1.3 In this document we do not consider longer term developments to the transmission access and transmission losses regimes and the associated longer term developments in incentives on the SO. These areas will be the subjects of a further consultation document to be published in May 2000.
- 1.4 Ofgem has issued or will issue a number of consultation and proposal documents on issues that are related to the proposals set out in this document. A brief description of these documents is set out below.

The Process to Date

New Electricity Trading Arrangements

- 1.5 Detailed proposals for implementing NETA were outlined in Ofgem's consultation document² published in July 1999 (the 'July 1999 NETA

¹ NGC Incentive Schemes from April 2000. Transmission Services Uplift and reactive power Uplift Schemes: A Decision Document.

² The new electricity trading arrangements, Volume 1, Ofgem, July 1999.

Document'). This was followed by a conclusions document in October 1999³ (the 'October 1999 NETA Document') published jointly by Ofgem and the Department of Trade and Industry (DTI). In the July 1999 NETA Document, Ofgem presented some initial thinking on the role of and incentives on NGC as SO and the development of new transmission access and pricing arrangements under NETA. The October 1999 NETA Document discussed respondents' views on the initial thinking outlined in the July 1999 NETA Document but left a detailed discussion of transmission and incentive related issues to a separate consultation process to be conducted by Ofgem.

The December Consultation

- 1.6 In the December Consultation, Ofgem's initial view was that the SO incentive scheme introduced for NETA should be a single scheme covering both the energy and system balancing costs incurred by NGC in operating the system. It should continue to be of a sliding scale or profit sharing form with incentivised costs being based on a target volume of services and a reference price emerging from forward markets. Ofgem considered that this approach would allow NGC, as SO, to take appropriate balancing actions looking across all of its activities.

Current Incentives Schemes on NGC as System Operator

- 1.7 Ofgem has consulted on revising NGC's incentive schemes for the period from 1 April 2000 to the introduction of NETA. There are presently four separate incentive schemes. Those covering Energy Uplift (the costs of energy balancing in the Pool) and transmission losses are negotiated between suppliers and NGC via the electricity Pool. Those covering Transmission Services Uplift (TSU) and Reactive Power Uplift (RPU) are governed by a condition in NGC's Transmission Licence. The TSU scheme covers the costs incurred by NGC in procuring and utilising services required to ensure that security and stability of supply, including reserve, frequency response and the costs of resolving transmission constraints. The RPU scheme covers the costs incurred by NGC in procuring reactive power, which is needed to ensure that the voltage of the system remains within limits prescribed by legislation.

³ The new electricity trading arrangements, Ofgem/DTI Conclusions Document, October 1999.

- 1.8 In February 2000, Ofgem published its final proposals on the target cost levels for incentive arrangements for the NGC from 1 April 2000.⁴ For 2000/01, Ofgem and NGC have agreed a reduction of £20 million in the target cost level for Transmission Services Uplift and a reduction of around £0.5 million in the target for reactive power. The new incentive schemes have been designed to run for a full year from 1 April 2000. A new scheme will be required when NETA is implemented in Autumn 2000. With this in mind, Ofgem and NGC have agreed a 'break clause' in the current incentive arrangements to apply when NETA is implemented. NGC has agreed to accept Ofgem's proposals and the proposed licence amendments.
- 1.9 Suppliers have negotiated with NGC new incentive schemes on Energy Uplift and transmission losses, covering a similar duration, via the Pool. Suppliers and NGC agreed few changes to the parameters of the Energy Uplift and transmission losses incentive schemes. Details of these new schemes are summarised in Chapter 5.

Outline of this Document

- 1.10 Chapter 2 of this document discusses the current regulatory and legal framework related to the role of NGC in operating the transmission system and incentive schemes on NGC as SO. Chapter 2 also summarises developments in Ofgem's thinking on the creation of a new Connection and Use of System Code (CUSC) and the governance arrangements for the new trading arrangements. Chapter 3 considers the procurement and utilisation of balancing services by NGC at the beginning of NETA. Chapter 4 discusses changes to the structure and content of energy imbalance prices and the recovery of costs associated with balancing services and central NETA systems. Chapter 5 presents further thinking on the form, scope and duration of the initial incentive scheme on the SO to apply from the implementation of NETA. Chapter 6 discusses the treatment of losses on the introduction of NETA and Chapter 7 discusses how the debate on distribution issues will be taken forward.

⁴ NGC Incentive Schemes from April 2000. Transmission Services Uplift and reactive power Uplift Schemes: A Decision Document. February 2000.

Related Issues

Consultation on NETA Licence Conditions

- 1.11 Building on the proposals outlined in the July 1999 and October 1999 NETA Documents, in December 1999 Ofgem published a consultation document⁵ containing proposals on the licence changes necessary to introduce the new electricity trading arrangements in England and Wales and related transmission issues. A further consultation document was published in February 2000⁶ and this document contained draft conditions for each of the licences concerned in the light of the views of respondents to the earlier consultation. A final consultation will be published in June 2000.

March CUSC Document

- 1.12 Ofgem had argued in the December Consultation that the procedures for modifying the Master Connection and Use of System Agreement (MCUSA) and its Supplemental Agreements were slow and cumbersome, thus restricting the ability of the new trading arrangements to evolve, in response to market developments. In addition, there was a lack of clarity in relation to the resolution of disputes under the MCUSA. This led to the potential for disputes involving broad regulatory principles to be decided through arbitration procedures that may focus on the interpretation of contractual terms and ignore wider regulatory issues.
- 1.13 In the February 2000 NETA Licence Changes Document⁷ Ofgem/DTI expressed concern that the current governance regime in place for the MCUSA may potentially delay the progress of modifications to the Balancing and Settlement Code (BSC),⁸ where changes to the MCUSA are required. Thus, it was concluded that a failure to reform the governance of the MCUSA could result in

⁵ The New Electricity Trading Arrangements and Related Transmission Issues – Proposals on licence changes, Ofgem Consultation Document, December 1999.

⁶ The New Electricity Trading Arrangements, Proposed Licence Conditions, Ofgem/DTI Consultation Document, February 2000.

⁷ The New Electricity Trading Arrangements, Proposed Licence Conditions, Ofgem/DTI Consultation Document, February 2000.

⁸ With the introduction of NETA, most provisions of the Pooling and Settlement Agreement (which underpins the current trading arrangements) will no longer apply. A new Balancing and Settlement Code (BSC) will set out the rules and commercial framework for how the Balancing Mechanism will operate and how imbalance settlement will work.

a failure to realise the full benefits of NETA. Following on from discussions in the December Consultation and February 2000 NETA Licence Changes Document, in March 2000 Ofgem/DTI published a consultation document⁹ on the development and implementation of a new Connection and Use of System Code to replace the existing MCUSA and Supplemental Agreements.

- 1.14 The CUSC will have more flexible governance arrangements akin to those in place for the Network Codes of public gas transporters and proposed for the BSC. Dispute resolution procedures will be clearer, allowing for a more transparent and streamlined regulatory framework. Finally, the CUSC will codify generic aspects of the Supplemental Agreements¹⁰ to increase transparency and ensure consistency. Thus, the CUSC will have significant advantages over the MCUSA and Supplemental Agreements. In particular, its flexible governance procedures will allow arrangements for connection to and use of NGC's transmission system in response to market developments.
- 1.15 The March CUSC document describes the scope and content of the proposed CUSC and the main differences between the current contractual framework for connection to and use of NGC's transmission system and the future framework. The document also sets out Ofgem/DTI's preliminary thinking on the consequential changes to NGC's transmission licence and the process and timetable for developing and implementing the CUSC.
- 1.16 Ofgem/DTI will be considering responses to its March Consultation on the form and scope of the CUSC and intend to set out proposals on the form and scope of CUSC in a document to be published by Ofgem/DTI in May 2000. This document will also include proposals on the licence changes required to implement CUSC.¹¹ Ofgem/DTI are then intending to publish their final

⁹ NGC's Connection and Use of System Code, An Ofgem/DTI consultation on the scope and content of the Connection and Use of System Code, March 2000.

¹⁰ Parties to the MCUSA are required to sign appropriate Supplemental Agreements. These set out the terms for connection to and use of the transmission system and for payment to NGC of connection charges and use of system charges. A separate Supplemental Agreement is in place between NGC and each user of a site connected to the transmission network. There are presently in excess of 400 agreements in place. The Supplemental Agreements specify the equipment at each connection site and the basis of charging for that equipment.

¹¹ This document will also include initial proposals on the detailed drafting of the modifications to conditions 10, 10A, 10B and 10C of NGC's transmission licence require to implement CUSC. Final proposals on the detailed drafting of these changes to NGC's transmission licence will be published in June 2000.

proposals on the scope and content of CUSC and related licence modifications in June 2000. Thereafter, Ofgem/DTI are proposing that NGC will lead a programme of work designed to deliver a complete draft of the new CUSC for implementation in December 2000. Ofgem/DTI and NGC intend to consult the industry regularly on the progress being made in drafting the new CUSC.

NETA: Appointment of Service Providers

1.17 NGC, in consultation with Ofgem and DTI, published a notice in the Official Journal of the European Commission inviting Service Providers to express interest in providing a range of services to support the new trading arrangements in England and Wales. An Invitation to Tender was issued in October 1999. In December 1999, the NETA Programme, led by Ofgem and the Department of Trade and Industry (DTI)¹² announced that Logica and Energy Pool Funds Administration Limited (EPFAL) had been selected, subject to final contract, as preferred service providers to design, build, operate and maintain the core services supporting NETA in England and Wales. Logica, leading a consortium that includes OSI and UK Data Collection Services, has been selected by the NETA Programme, in conjunction with NGC, to provide services in three areas:

- ◆ settlement and reporting;
- ◆ collection and aggregation of contract data; and
- ◆ collection and aggregation of meter data.

NGC's Transmission Price Control Review

1.18 In March 2000, Ofgem published a document¹³ that set out the form, scope and duration of the next NGC price control, which will take effect from 1 April 2001. This provided information on NGC's forecasts of its future operating and capital expenditure requirements.

1.19 The document also set out Ofgem's initial analysis of NGC's costs over the period of the next control, including its cost of capital. However, it did not

¹² New Electricity Trading Arrangements (NETA) Programme: preferred service providers selected.

¹³ The transmission price control review of the National Grid Company from 2001, Initial thoughts consultation document, Ofgem, March 2000.

make specific proposals for the level of the price control. Ofgem will publish draft proposals on this in June 2000.

Review of Scottish Trading Arrangements and Interconnector Capacity

- 1.20 Ofgem received an application from Scottish Power to reserve access to the additional interconnector capacity (due to become available this year) and we have published a consultation paper on the subject. A determination, taking account of the responses received to the consultation paper, has been issued.¹⁴ Ofgem has announced that it intends to refuse Scottish Power's application to reserve 75 per cent of the upgraded capacity on the Scotland/England interconnector.
- 1.21 Ofgem will be publishing a document outlining the suggested way forward for the Scottish trading arrangements in the light of the responses to its previous consultation paper.¹⁵ The revised arrangements will form the first stage of an important set of structural changes to the Scottish electricity market that will be implemented over the next one to two years. Ofgem intends to publish this document in May 2000.

Modification to Exemption Order in Connection with NETA

- 1.22 The DTI intends to publish a document in Spring 2000, which will discuss proposed changes to the class exemptions for generation and supply as a result of NETA.

Distribution Licences – Criteria for Exemption

- 1.23 The DTI also intends to publish a document in Spring 2000 which sets out details of the criteria for exemption from the requirement to hold a distribution licence in electricity.

¹⁴ Proposed determination by the Director General of Electricity Supply of application by Scottish Power Plc for approval of reservation of upgrade capacity on the Scottish Interconnection, March 2000.

¹⁵ Review of Scottish Trading Arrangements, A consultation document, October 1999.

The Way Forward

The Role and Incentives of NGC on Implementation of NETA

- 1.24 Ofgem will be considering the responses to this consultation paper prior to taking a view on the way forward on the issues raised in this document. Ofgem intends to publish a further consultation in June 2000 containing initial proposals on the initial incentive scheme on NGC under NETA. Final proposals will then be developed and published in September 2000. Ofgem expects the SO incentive scheme on NGC and the arrangements for transmission losses, discussed in this document, to be in place for approximately six months until new transmission access and losses regimes are implemented in April 2001 (the subject of a separate consultation process described below).

Transmission access and Pricing and Long term Treatment of Losses

- 1.25 Ofgem intends to publish a further consultation on new transmission access and pricing arrangements and the long term treatment of losses in May 2000 (the May Document). This document will contain more detailed consideration of the issues relating to new transmission access and losses arrangements and outline a process for wider industry consultation. Ofgem intends to work towards the implementation of new arrangements in April 2001 via the new CUSC governance arrangements. Thus, after CUSC has been implemented, a formal proposal to modify the CUSC in order to implement the new transmission access and losses arrangements will need to be raised.
- 1.26 The issues considered in the May Document will also be discussed at the next NETA seminar scheduled for 28 June 2000. The morning session of the seminar will be co-chaired by Ofgem and the DTI and will provide an update on the work of the NETA Programme. The afternoon session will be chaired by Ofgem and will look in more detail at the content of Ofgem's further consultation document on transmission access and losses. Details of the seminar will be available from the NETA Programme Office shortly.

Development of an enduring SO Incentive Scheme

- 1.27 As details of the new transmission access and losses arrangements are considered, Ofgem will begin discussions with NGC and the industry on

developments to the SO incentive schemes under NETA. The proposals in this document outline the incentive scheme to be in place when NETA is first implemented. As the drivers of costs under NETA become better understood and as new transmission access and losses arrangements are implemented it will be necessary to amend the SO incentive scheme. Towards the end of this year, Ofgem will look to consult on the enduring SO incentive scheme to be implemented with new transmission access and pricing arrangements in April 2001.

Views Invited

1.28 Ofgem is seeking comments on the thinking, issues and proposals outlined in this document. A summary of the specific issues on which views are invited is included in Chapter 8.

1.29 Responses should be sent by 31 May 2000 to:

Dr Eileen Marshall CBE
Deputy Director General
Competition and Trading Arrangements
Office of Gas and Electricity Markets
Stockley House
130 Wilton Road
London SW1V 1LQ.

1.30 Electronic responses may be sent to: lorraine.ladbrook@ofgem.gov.uk

1.31 Respondents are free to mark their replies as confidential although we would prefer, as far as possible, to be able to place responses to this paper in the Ofgem library. Unless clearly marked 'confidential', responses will be published by placing them in the Ofgem library.

1.32 If you wish to discuss any aspect of this document, Ilesh Patel (telephone: 0207 932 5015) or Tony Spencer (telephone: 0207 932 6330) will be pleased to help.

2. The Regulatory and Legal Framework

Introduction

- 2.1 This chapter outlines both the current and anticipated legal and regulatory framework of the electricity industry. It summarises the current legislative, licencing and regulatory regimes and describes planned developments including the relationship between the Electricity Act 1989, licences and industry agreements. Thus, this chapter provides the regulatory and legal framework for proposals on balancing services, incentives and losses discussed in later chapters.
- 2.2 Further details on the developments in the licencing and regulatory regime can be found in the February 2000 NETA Licence Changes Document.¹⁶ The document outlined Ofgem /DTI's views on the licence conditions which will be necessary to introduce NETA (including the licence conditions required to introduce a new connection and use of system code).

The Current Regulatory and Legal Framework

The Legislative Framework

The Electricity Act

- 2.3 The Electricity Act 1989 provides the framework for the functions of a Director General of Electricity Supply (the Director General), of the consumers' committees, and for the licencing to enable the supply, generation and transmission of electricity.

UK Competition Legislation

- 2.4 The Director General has concurrent powers with the Director General of Fair Trading (DGFT) under parts of the Fair Trading Act 1973 and the Competition Act 1980. In relation to these concurrent powers, Ofgem works in conjunction with the Office of Fair Trading (OFT) under the terms of an agreement between the Director General and the OFT.

¹⁶ The New Electricity Trading Arrangements Proposed licence conditions. February 2000.

- 2.5 In exercising his functions under the competition legislation, the Director General must act in accordance with his specific duties under the Electricity Act 1989. These functions relate to monopoly situations and to courses of conduct which have, are intended to have, or are likely to have the effect of restricting, distorting, or preventing competition in respect of licensed activities.

The Competition Act 1998

- 2.6 The Competition Act 1998 (which came into effect on 1 March 2000, repealing large parts of the Competition Act 1980) reinforces the concurrent powers relating to the enforcement of competition policy of the Director General and the DGFT. Under the new Competition Act the Director General gains advanced powers of investigation, and the ability to impose financial penalties of up to 10% of turnover over three years on companies infringing the prohibitions under the new Act. Chapter One of the Act prohibits anti-competitive agreements and Chapter Two deals with the abuse of a dominant position.

The Utilities Bill

- 2.7 The Utilities Bill was introduced to Parliament on 21 January 2000 and is now progressing through the necessary stages before approval can be given by Parliament and Royal Assent received. Under the current timetable, the Bill would be enacted in July 2000. In the context of the issues discussed in this document the most relevant aspect of the Utilities Bill is the power to be given to the Secretary of State to modify conditions of any licence where it is necessary or expedient to do so in order to implement or facilitate the effective operation of NETA. This power will also be used to facilitate the implementation of licence conditions relating to the CUSC.

Licencing and Regulatory Regimes

The Director General's Duties

- 2.8 The general duties of the Director General are set out in sections 1,3 and 47 to 50 of the Electricity Act 1989. The Director General must exercise his functions in a manner he considers is best calculated to secure that all reasonable demands for electricity are met, that licence holders are able to finance their activities and to promote competition in the generation and supply of electricity.

- 2.9 Subject to these primary duties, the Director General also has a duty to exercise his functions in the manner he considers is best calculated to protect the interests of consumers, to promote efficiency on the part of transmission and supply licence holders and the use of electricity. In doing so, he has to take into account the effect on the environment of activities connected with the generation and supply of electricity, as well as the health and safety of those employed in the electricity industry.
- 2.10 Under section 11 of the Electricity Act 1989, the Director General can seek to modify a licence with the licensee's consent (and after consultation). Under section 11, the Director General shall give notice:
- ◆ stating that he proposes to make the modifications and setting out their effect;
 - ◆ stating the reasons why he proposes to make the modifications;
 - ◆ specifying the period (not being less than 28 days from the date of publication of the notice) within which representations or objections to the proposed modification may be made; and
 - ◆ consider any representations or objections which are duly made and not withdrawn. If a licensee does not consent to a proposed modification, the Director General may refer the matter to the Competition Commission under section 12 of the Electricity Act 1989.

The Transmission Licence

- 2.11 Under Section 9(2) of the Electricity Act 1989, NGC is obliged to develop and maintain an efficient, co-ordinated and economical system of electricity transmission and to facilitate competition in the supply and generation of electricity.
- 2.12 NGC is the sole possessor of a transmission licence in England and Wales. It owns and operates the national grid, which transports electricity at high voltage from the generators to the Public Electricity Suppliers' (PES) local distribution networks and to customers connected directly to the transmission system. It has

a further duty not to discriminate in connection to, and use of, the transmission system, and interconnections with Scotland and France.

The Pooling and Settlement Agreement

- 2.13 Generators, suppliers and transmission companies are required by virtue of being licenced to be party to the Pooling and Settlement Agreement (P&SA). This agreement contains the rules and arrangements for the current market in wholesale electricity (the England and Wales Pool). With the introduction of NETA, it remains to be decided whether the P&SA would continue as a stand alone agreement for final settlement and reconciliation or whether it would be terminated and the rules needed for 'run-off' purposes subsumed into a schedule of the BSC. A new Balancing and Settlement Code (BSC) will set out the rules for the Balancing Mechanism and imbalance settlement.

Current Incentive Arrangements

- 2.14 Until April 1997, all uplift costs were dealt with under the terms of the P&SA. However, following a review jointly conducted by the Pool, OFFER and NGC and a determination by the Director General, NGC's responsibility for managing Transmission Services Uplift and Reactive Power Uplift became part of the company's licensed activities. This means that NGC now pays the Pool for the costs of these services and then recovers the costs directly from suppliers taking demand. Given NGC's responsibility for charging suppliers directly for Transmission Services Uplift and Reactive Power Uplift, a revenue restriction was included in Condition 4A Part 2 of NGC's licence which embodies the incentives on it to manage Transmission Services Uplift and Reactive Power Uplift.
- 2.15 The payments by suppliers for the other components of Uplift, namely Energy Uplift and Unscheduled Availability Payments,¹⁷ are still arranged through the Pool. That is, the costs are added to the Pool Purchase Price to give the Pool Selling Price. Given that NGC can influence the costs of Energy Uplift to an

¹⁷ Unscheduled Availability Payments form part of Uplift and are made to generators to encourage them to make plant available at the day-ahead stage. NGC does not have an incentive scheme associated with Unscheduled Availability Payments as it cannot directly influence the level of unscheduled availability payments.

extent, the Pool negotiates directly with NGC incentive arrangements for Energy Uplift, which are then incorporated into the Pool Rules.

The Master Connection and Use of System Agreement

- 2.16 The MCUSA is a multi-party agreement between NGC, the Public Electricity Suppliers (PESs), second-tier suppliers, licensed generators and some non licensed generators and a small number of customers who are directly connected to the transmission system. There are presently over 100 parties to the MCUSA.
- 2.17 The MCUSA and its Supplemental Agreements set out terms and conditions for connection to, and use of, the transmission system. These include payment methods, metering, modifications to the transmission system, variations to the MCUSA, compliance with the Grid Code/Distribution Code and dispute resolution. The Director General is not a party to the MCUSA or the Supplemental Agreements. He has very limited powers for resolving disputes relating to the MCUSA and can only make such determinations in relation to specific types of disputes.¹⁸

Supplemental Agreements

- 2.18 Parties to the MCUSA are also required to sign appropriate Supplemental Agreements. A separate Supplemental Agreement is in place between NGC and each user of a site connected to the Transmission network. There are presently more than 400 such agreements in place. The Supplemental Agreements specify the equipment at each connection site and the basis of charging for that equipment.
- 2.19 Appendix E of the Supplemental Agreements sets out the charging rules for both connection to and use of the transmission system. It includes the provision whereby NGC revises its charges annually. To do this, NGC is required to notify customers by 31 October in the preceding financial year of the intended basis of calculation to be used in the following financial year. NGC is required

¹⁸ Under the present commercial and regulatory framework disputes can be referred to the Director General in relation to the proposed terms of an agreement or in respect of a proposed variation to an existing agreement. Similarly provisions in the MCUSA enable parties to refer disputes to the Director about whether NGC has charged in accordance with its charging statement.

to confirm this basis of calculation by 30 November in the preceding financial year.

- 2.20 Through a schedule to the MCUSA, the Transmission Users Group (TUG) was set up to discuss changes to NGC's business which impact on the MCUSA and its Supplemental Agreements.

The Future Regulatory and Legal Framework

The Balancing and Settlement Code

- 2.21 A panel has been charged with overseeing the management, modification and implementation of the BSC rules. The panel Chairman has been appointed by the Director General. It will also have representatives from industry, consumers, and NGC as well as independents. The Chairman of the BSC panel will also be the Chairman of the Balancing and Settlement Code Company (BSCCo). The primary purpose of BSCCo will be to provide or procure a range of operational and administrative services, both directly and through contracts with service providers, to implement the provisions of the BSC and modifications to it.

The Connection and Use of System Code

- 2.22 The December Consultation highlighted some problems with the existing arrangements in governing connection to, and use of, NGC's transmission system. In particular, it expressed concern that the procedures for modifying the MCUSA and its Supplemental Agreements were slow and cumbersome. A second problem was the lack of clarity in relation to the resolution of disputes under the MCUSA. Ofgem proposed that the current MCUSA be replaced with CUSC, which incorporated more flexible governance procedures. Ofgem proposed that the CUSC would be designed to cover most transmission-related issues (connections, transmission access and use of system obligations and charges¹⁹) and some elements of the incentive scheme on NGC as System Operator (SO). In addition, the CUSC would contain generic elements of the current Supplemental Agreements in relation to connection and use of system. Site specific data and charges would form individual bilateral ancillary agreements to be agreed between NGC and the relevant party.

¹⁹ It might also potentially cover Transmission losses.

- 2.23 In the February 2000 NETA Licence Changes Document, Ofgem/DTI proposed implementing licence conditions requiring NGC to 'establish a connection and use of system code' and 'to only enter into connection and use of system arrangements which conform with the CUSC'. Ofgem/DTI proposed to introduce a licence condition requiring all licensed generators, PES's and second tier suppliers²⁰ to 'be party to a CUSC Framework Agreement and comply with the CUSC'.
- 2.24 In the March CUSC document Ofgem/DTI outlined the scope and content of the proposed CUSC and the main differences between the current contractual framework for connection to and use of NGC's transmission system and the future framework. The March CUSC document also set out Ofgem/DTI's preliminary thinking on the consequential changes to NGC's transmission licence and the process and timetable for developing and implementing CUSC.

Framework for Incentives under NETA

- 2.25 As part of developing new incentive schemes for the SO under NETA it will be necessary to consider where the new schemes should be incorporated. As noted above, under the existing arrangements, two of the schemes are in NGC's licence and two of the schemes are arranged through the Pool.
- 2.26 Ofgem's initial view is that the SO incentive scheme under NETA could be incorporated in the new CUSC, the Transmission Licence or both. However, given that the CUSC is unlikely to be in place for the start of the new trading arrangements, Ofgem believes that the initial incentive scheme on NGC under NETA should sit in its Transmission Licence.

²⁰ The Utilities Bill provides for a split between distribution and supply of electricity. In order to facilitate this split, new licences for suppliers, distributors, generators and transmitters of electricity will be designated by the Secretary of State with standard conditions. The CUSC condition that will initially apply in respect of generators, PES' and second tier suppliers will at that stage become standard licence conditions on electricity suppliers, distributors and generators.

3. The Procurement and Utilisation of Balancing Services under NETA

Introduction

- 3.1 NGC, as SO, currently performs two main roles – energy balancing (the matching of generation and demand) and system balancing (ensuring that the frequency and voltage of the transmission system remain within statutory limits). NGC currently uses a combination of Ancillary Services contracts, rescheduling generators and demand-side bidders on the basis of the offers that they submit into the Pool and utilisation of its own specialist equipment to maintain system and energy balance. Under NETA, a similar range of options will be available to the SO, including the rescheduling of plant by accepting Balancing Mechanism bids and offers and by exercising contracts for services from generation and demand purchased in advance. Some of the services purchased under contract will bear strong similarities to the current Ancillary Services purchased by NGC. In this document, ‘balancing services’ will be used to cover both of these contracts and services which shall be purchased in the Balancing Mechanism.
- 3.2 The December Consultation document discussed a number of issues associated with how NGC might operate the transmission system under NETA, including:
- ◆ the procurement and utilisation of balancing services;
 - ◆ the development of markets for the procurement of balancing services;
 - ◆ the recovery of costs associated with balancing services; and
 - ◆ the targeting of energy balancing contract costs to energy imbalance prices.
- 3.3 This chapter takes forward the debate on the first two of these issues in the context of further discussions held between NGC and Ofgem and in the light of respondents’ views to the December Consultation. Chapter 4 discusses the last two issues.
- 3.4 There are strong interactions between the issues discussed in this chapter and those discussed in the February 2000 NETA Licence Changes document and

these documents need to be considered together. The areas of interaction include:

- ◆ The discretion given to NGC as SO in how it procures and utilises balancing services including the issue of NGC purchasing energy ahead of gate closure;
- ◆ The requirement to publish Procurement Guidelines and Balancing Principles and to report subsequently on its actions by reference to these statements; and
- ◆ The provision of information by NGC to the market.

3.5 The next section provides some background to the current procurement of Ancillary Services. The subsequent section discusses how balancing services will be procured and utilised at the start of NETA. The final section in this chapter discusses the treatment of Deemed Acceptances.

Current Definitions and Procurement of Ancillary Services

3.6 NGC is required, under Condition 6 of its current Transmission Licence, to procure sufficient "Ancillary Services" to enable it to discharge its obligations under the Electricity Act and Transmission Licence. This requirement is couched in terms of the provision of services specified in the Grid Code and the MCUSA. The Ancillary Services Business, currently a separate business (under the Transmission Licence) within NGC, is responsible for procuring these Ancillary Services and there is an economic purchasing obligation on NGC in contracting for Ancillary Services.

3.7 There are two categories of Ancillary Services: System Services and Commercial Services. System Services are services that NGC requires to operate the system safely and reliably. Part 1 System Services are services that all licenced generators must be capable of providing in accordance with the terms of the Grid Code and the MCUSA.²¹ They are restricted to specified capabilities for

²¹Unlicenced generators may also provide Ancillary Services but are not obliged to under the terms of the Grid Code.

frequency response and reactive power. Should a generator fail to provide them, NGC has the right to refuse to connect the generator to the transmission system. Part 2 System Services (such as 'Black start' services) are not required from every generator and their provision is agreed on a site by site basis. However, if NGC requests the provision of a Part 2 System Service, a participant must provide terms (technical and commercial) for its supply.

- 3.8 Commercial Services are services that are essential but not mandatory and generators can refuse to provide them. NGC makes payments for both System and Commercial Services under a variety of arrangements. These are covered in more detail in Appendix 1.
- 3.9 Four main Ancillary Services are defined: reactive power; reserve; frequency response and black start capability. In addition, NGC has on occasion, signed Ancillary Services contracts to assist in the alleviation of constraints. It also has contracts with the French and Scottish transmission systems for emergency assistance.
- 3.10 reactive power flows are required to control the voltage of the system. NGC uses the reactive power capabilities of generators and some consumers to provide real-time control of the voltage on a locational basis. In addition, NGC can use its own transmission assets (whose capital costs are remunerated under NGC's Transmission Price Control) to control flows. The operation and the configuration of the transmission network will itself affect reactive power flows.
- 3.11 Three different types of reserve are defined (Regulating, Standing and Contingency) that are distinguished by the timescales over which they operate and their payment mechanisms. However, along with frequency response, all three types of reserve are used by the SO to deal with the mismatch between generation and demand.
- 3.12 Frequency response can be viewed as short-term reserve that is provided automatically i.e. without explicit instruction and is used to contain and reduce or recover frequency changes before reserve can be instructed.
- 3.13 Black start is the capability of a power station to start-up at least one of its generating units without an external power supply and is called on by NGC as a

means of restoring supplies following a major failure on all or part of the network.

- 3.14 It is Ofgem's view that reserve is primarily associated with achieving an energy balance whilst reactive power is used for system balancing. Black start is a rather special category of service, which is utilised as a system balancing service but also involves capability to deliver energy. Frequency response is generally used for system balancing but to the extent that, at longer timescales, it merges with reserve it can also be considered partly as an energy balancing service.
- 3.15 Currently, Ancillary Services are typically procured under bilateral contracts between NGC and individual service providers. The length of these contracts varies between one year and effectively the lifetime of the asset (for Part 1 System Services). Remuneration for the service can either be cost or value based. Initially, cost-based remuneration was considered appropriate for mandatory services. However, progress is continuing to be made towards introducing competition (particularly from the demand-side) and market-based mechanisms for procurement together with value-based remuneration. Table 3.1 provides a breakdown of the annual average costs of Ancillary Services in England and Wales over the period 1996 to 1998.²²
- 3.16 Further details on the current procurement of Ancillary Services can be found in Appendix 2.

²² This information is based on data provided by NGC for the Ofgem document - The New Electricity Trading Arrangements, Volume 2. An Ofgem decision document. No further updates to this information are currently available.

Table 3.1 - Approximate Breakdown of Annual Ancillary Services Costs (£ million)

Service	Contract costs	Pool costs	Notes
Reactive power	50	Small	The costs of voltage constraints are included within constraints below.
Frequency response	35	40	
Regulating reserve	10	70	Regulating reserve covers all categories of reserve held on synchronised plant, excluding frequency response.
Standing reserve	5	10	The contract costs are option fees minus exercise rebates. The balance between contract and Pool costs is dominated by exercise rebates.
Constraints	< 1	35	In any year, there are very few ancillary constraint contracts.
Black start	10	< 1	

Note: Costs are rounded to the nearest £5m. Overhead and Miscellaneous costs have been excluded from this breakdown.

Source: The New Electricity Trading Arrangements, Volume 2. An Ofgem decision document/ NGC.

The Procurement and Provision of Balancing Services under NETA

Mandatory Provision of Balancing Services

3.17 The December Consultation asked for views on whether the current requirement on all participants to provide a specified level of various ancillary services should continue. Ofgem accepted that NGC, as SO, might need to be able to rely on a minimum level of service for important services from all participants. However, we argued that it might be possible to set a standard of service that each participant could provide either from their own facilities or under contract

from other participants (for example, in circumstances where such other participants were better placed to provide either a technically better or more cost effective service). Some services will clearly have important locational aspects to their delivery, and this may restrict the amount of trading between participants that can take place. For example, trading of minimum service levels might have to be restricted to participants within particular areas.

- 3.18 The December Consultation noted that the removal of the mandatory obligation to provide balancing services at a specified level would be consistent with the establishment of markets for providing and procuring balancing services and that the move to value based remuneration would facilitate the trading of minimum service standards.
- 3.19 Ofgem's initial view was that there should be no mandatory obligation for participants to provide system services from their own facilities, and that participants should be able to contract with other parties to meet minimum standards of service. Ofgem also considered that the move to more open and transparent markets for balancing services should be encouraged since such procurement mechanisms are more in line with the NETA principles than cost-based mandatory services.

NGC's View

- 3.20 NGC argued that the mandatory provision of services should continue until NETA has been implemented and become well established. It believes that the technical requirements relating to the provision of balancing services (as set out in the Grid Code) need to be maintained to deal with any abnormal or emergency conditions which may occur. NGC believes that there would be significant risk to the security of the system and to the quality of supply if the system had to rely on commercial or contingency arrangements only.
- 3.21 NGC noted that it was committed to the development of market based arrangements for the procurement and provision of balancing services. It believes the development of such arrangements would be possible in the medium term but, given the fundamental changes that NETA will bring about in the operation of the electricity system, it did not believe that the obligation to provide mandatory services should be removed at the introduction of NETA.

NGC thought that certain obligations would be required indefinitely, although it recognised that it would be appropriate to review some obligations related to balancing services as their procurement arrangements evolved.

- 3.22 NGC stated, however, that there might be a case for removing the obligations on Generators to provide Part 2 Ancillary Services (e.g. Black start). These are necessary services but they are not required from every generator and could therefore be treated as a commercial service, agreed on a site-by-site basis.

Other Respondents' Views

- 3.23 Fourteen respondents to the December Consultation commented on this issue. Of these, the majority (nine) agreed that the mandatory provision of balancing services from participants' own facilities should not be continued under NETA. Most respondents considered that the removal of this obligation would need to be contingent on the introduction of appropriate market structures for the services involved.
- 3.24 One respondent emphasised the need to ensure that considerations of system security and stability are paramount in any move to more market based arrangements. Another respondent suggested that a mandatory obligation should remain in the short term but could be phased out as market based arrangements for procuring balancing services become more widespread and established. A further respondent felt that if the mandatory requirement was removed participants should be required to provide evidence that their obligations had been met. Two respondents did not want to see the mandatory requirements removed at all.

Ofgem's View

- 3.25 Ofgem continues to believe that over time, and with the introduction of market based arrangements for the procurement and provision of balancing services, the obligation on participants to provide the same level of balancing services from their own facilities should be replaced with a tradable minimum service level. Ofgem welcomes NGC's view that the obligations to provide Part 2 Ancillary Services could be reviewed, and urges them to begin this review as soon as is practicable.

- 3.26 However, Ofgem accepts the argument that removing the mandatory obligation at the same time as NETA might lead to unnecessary risks being incurred in relation to the security and stability of supply.
- 3.27 Thus, Ofgem proposes that on implementation of NETA, participants should continue to have the same obligations in relation to the provision of balancing services as now. Nonetheless, Ofgem remains committed to reviewing the need for mandatory services once NETA and new transmission access arrangements are established.

Introduction of a Frequency Response Market

- 3.28 The Reserve and Response Procurement Principles Sub-Group (R2P2) of the TUG are considering proposals for the development of a market for the procurement of frequency response services. Although a detailed market design has not yet emerged, the broad objective of a moving away from cost reflective to value based remuneration²³ and of allowing generators to meet their frequency response obligations by purchasing services (either directly or via NGC) from other participants has been agreed. In addition, the principle that service providers should be able to reflect the value of the service they provide at different times through changes in the prices they offer has been agreed.
- 3.29 In the December Consultation, Ofgem invited views on whether market based arrangements for the provision and procurement of frequency response should be implemented at the same time as NETA or delayed until NETA was well established. Ofgem stated that it would like to see a frequency response market in place as soon as possible. NGC has consistently argued, however, that it would not be practical to implement such a market at the same time as NETA since the development of necessary systems to implement and operate such a market could have a detrimental effect on its ability to successfully deliver the new trading arrangements.

²³ Currently cost based payments cover approximately half the required level of frequency response services, with the remainder being provided through commercial arrangements that provide value based remuneration to service providers.

NGC's View

- 3.30 NGC remains of the view that its frequency response market should not be introduced at the same time as NETA. NGC indicated that the operational systems being developed for NETA would initially have reduced optimisation functionality compared to its current systems and that the systems may not adequately support the concurrent implementation of NETA and a market for frequency response.
- 3.31 NGC believed that an evolutionary approach to the introduction of a market in frequency response should be taken. NGC stated that value-based arrangements for remunerating the provision of frequency response services could be introduced after NETA is implemented, and as systems are developed, it would be able to process data more frequently, thus allowing service providers to change the price they wish to receive for the service ordered more frequently. At the same time, NGC envisaged that the proposed market would lead to the development of a new tender or auction arrangement for the provision of response services, participated in by both mandatory and commercial service providers. It is expected that this mechanism would be used to meet the bulk of its frequency response requirements.

Other Respondents' Views

- 3.32 Sixteen respondents to the December Consultation commented on this issue. Nine respondents were in favour of delaying the proposed frequency response market until after NETA was implemented whilst seven were against any delay. In general, respondents believed that priority should be given to the successful introduction of NETA, and as a result considered it would be better for the introduction of the frequency response market to be delayed until after NETA had been implemented. Four respondents wanted the design of the frequency response market to be finalised as soon as was practical even if its implementation was delayed. Another respondent asked for a firm timetable and implementation date to be established.
- 3.33 There was a more general concern that a frequency response market would be more difficult to implement after NETA since once new systems had been developed for NETA they might prove difficult or expensive to change. On the

other hand, a number of respondents foresaw few problems in having the frequency response market in place at the start of NETA. One respondent believed the frequency response market would actually help aid the successful introduction of NETA.

Ofgem's View

- 3.34 Ofgem believes the introduction of the proposed frequency response market should be delayed until after the introduction of NETA given the significant resource in the industry as a whole that is being concentrated on the successful delivery of NETA.
- 3.35 Nevertheless, Ofgem considers that there is no need for the design of the proposed frequency response market to be delayed, and thus looks to the TUG and its sub-groups to begin to develop a more detailed design for a frequency response market based around market principles consistent with the new trading arrangements. Early consideration of the design of a frequency response market will facilitate the early introduction of the market.

Procurement Options under NETA

- 3.36 The December Consultation recognised that many participants had expressed concerns over how NGC would contract for balancing services, and the impact that balancing services contracts would have on liquidity and price signals in the forward energy markets.
- 3.37 Ofgem noted that NGC maintained that its statutory and licence obligations with regard to operating an efficient system and economic purchasing, together with its SO incentive scheme(s), would ensure that the appropriate volume of balancing services is purchased competitively. As evidence that this has occurred in the past, NGC drew attention to its role in promoting market-based arrangements for the procurement of Ancillary Services in an increasingly open, transparent and contestable process.
- 3.38 Ofgem believed that it was important to recognise the key role that the SO has to play in both energy and system balancing and argued that the most effective way of ensuring that this occurs efficiently is to define an appropriate incentive scheme for the SO rather than limiting NGC's contractual choices. Limiting the

choices that the SO can make would also have the inevitable effect of reducing its ability to act as a countervailing force against the market power of participants, particularly over short timescales and with regard to locational issues.

- 3.39 However, recognising the concerns expressed by respondents, Ofgem considered the impact that six illustrative procurement options covering the range of likely approaches might have with regard to both the prices of Balancing Mechanism bids and offers and energy imbalance prices.²⁴
- ◆ Option 1 – Purchase services only via the Balancing Mechanism.
 - ◆ Option 2 – Purchase services under option contracts that only contain option/capability fees.
 - ◆ Option 3 – Purchase services under option contracts that are called outside the Balancing Mechanism.
 - ◆ Option 4 – Purchase services under option contracts that contain utilisation fees that act as hedges around Balancing Mechanism offers and bids.
 - ◆ Option 5 – Purchase services under option contracts that specify the prices at which Balancing Mechanism offers and bids can be submitted.
 - ◆ Option 6 – Purchase services under energy contracts.
- 3.40 Ofgem stated that Options 5 and 6 had considerable merit but it should probably be left to the SO to decide on the most effective mix of all these options, subject to an appropriate incentive scheme. Ofgem also raised the issue that if NGC used energy contracts (Option 6) to procure balancing services, it would need its own electricity account, since it might be exposed to imbalance charges from time to time. However, Ofgem argued that NGC should be prohibited from selling products back into the Balancing Mechanism since this would give NGC too much power on both sides of the Balancing Mechanism.

²⁴ These options are explained in more detail in Appendix 3.

- 3.41 The December Consultation also discussed the need for Procurement guidelines and Balancing Principles, as discussed further below.

NGC's View

- 3.42 In its response to the December Consultation, NGC welcomed Ofgem's view that it should be given discretion as to how it delivers system security and energy balance. It recognised that balancing services often have a high level of interaction with energy purchase decisions and that in many cases the boundary between the two may be hard to define (as would any consequential cost apportionment). NGC believes that different contracting options will suit different service providers, and expects the type and form of balancing services to evolve over time. Consequently, it would not wish to be limited in its procurement options. It agrees that the options considered in the December Consultation covered the range of forms for contracts that it may enter into under NETA.
- 3.43 However, in relation to Option 6, NGC questioned the need for it to have an electricity account. It also questioned the purpose of prohibiting it from selling energy products back into the Balancing Mechanism. On the first point, NGC argued that since it had been proposed that it should be exposed to the total balancing cost under its incentive scheme, it did not seem appropriate for it to also be exposed to imbalances on its own account. On the second point, NGC argued that whilst it would normally expect to be buying offers and bids within the Balancing Mechanism, it agreed that it would be cost effective to limit risk and buy some energy ahead of time. However, it would not know if it was long or short on its contracted position until real time, since this would be a function of market conditions. Given that it would not be trading electricity for resale, NGC's role in establishing an energy position would be to contribute to balancing the system.

Other Respondents' Views

- 3.44 Eighteen further respondents to the December Consultation commented on the procurement of balancing services. Eleven respondents were in favour of NGC having discretion as to how it procures balancing services whilst four were against. However, subsequent to the consultation period, at meeting of the

Development and Implementation Steering Group (DISG) in March 2000, significant concerns were raised by a wide variety of representatives regarding the desirability of allowing NGC to purchase and sell contracts.

- 3.45 Five respondents thought Option 5 would be most obvious form of contract for NGC to use. Of these, three respondents also believed a mix of procurement Options 5 and 6 could be considered appropriate.
- 3.46 Five respondents were strongly opposed to NGC using Option 6 i.e. purchasing services under energy contracts. These respondents were concerned (as were DISG representatives subsequently) that by purchasing services under energy contracts, NGC (as SO) could unduly interfere with the trading activities of market participants and the normal operation of forwards markets and the incentives and ability to self-balance.
- 3.47 Another respondent was concerned that Option 5 could lead to high prices in the Balancing Mechanism. It believed that uncertainty, as to the frequency with which participants will be called upon to provide their contracted volumes and prices, will lead to the assumption of low levels of utilisation of the service they are offering and thus increased contract prices as participants try to recover fixed costs over their expected utilisation level. This in turn could result in lower volumes and higher prices being posted in the Balancing Mechanism.
- 3.48 Some respondents suggested all of the procurement options presented had some merit but recognised that some were more attractive than others.
- 3.49 Three respondents highlighted that the publication of procurement and balancing guidelines would be essential if NGC were to be given discretion in how it procures balancing services. Three respondents agreed that a strong incentive scheme would ensure the efficient procurement of balancing services.

NETA Proposed Licence Conditions Document

- 3.50 The February 2000 Licence Changes document consulted on a number of licence changes required for wider aspects of the new trading arrangements including the discretion that should be given to the SO in procuring and utilising balancing services.

- 3.51 Ofgem/DTI confirmed that it was important to allow NGC discretion in the purchase of balancing services provided that its activities are conducted in an open and transparent manner and provided an appropriate incentive scheme is in place.
- 3.52 Ofgem/DTI argued that specific rules about NGC's system operation activities are inappropriate, but also recognised the concerns expressed by the industry that an incentive scheme alone is not necessarily sufficient in all circumstances. In consequence, Ofgem/DTI proposed that NGC should be subject to a licence duty to operate its transmission system in an efficient, economic and co-ordinated manner. This is consistent with one of the objectives by which modifications to the BSC will be evaluated.
- 3.53 To promote openness and transparency in the way in which NGC procures balancing services, and provide the market with sufficient advance information about NGC's procurement strategy to enable the market to respond accordingly, Ofgem/DTI considered that NGC should be required to produce a Procurement Guidelines outlining the kinds of balancing services NGC is interested in purchasing in the coming year and the mechanisms by which it intends to do so and Balancing Principles outlining the approach NGC will take to balancing the system. This need for, and the scope of these statements is addressed in the next section.
- 3.54 Further, Ofgem/DTI argued that NGC should provide the market from time to time with information about the contracts it has actually concluded, ahead of Gate Closure, for the provision of balancing services.
- 3.55 Subject to these requirements (and the establishment of an appropriate incentive scheme), Ofgem/DTI believed that NGC should be free to contract for balancing services in whatever timescales and in whatever form it saw fit in order to meet its statutory and licence obligations to operate and balance the system efficiently.
- 3.56 The consultation period for this document has now ended and final proposals on licence changes are due to be published in May 2000. The necessary changes to NGC's Transmission Licence will be made following this consultation and

with the use of the power to be given to the Secretary of State by Parliament under the Utilities Bill.

Ofgem's View

- 3.57 As the February 2000 NETA Licence Changes document makes clear, Ofgem remains of the view that NGC should be given discretion with regard to the procurement of balancing services, subject to a licence obligation to operate the transmission system in an efficient, economic and co-ordinated manner and an appropriate incentive scheme being in place and NGC publishing procurement and balancing guidelines. Thus, NGC should be able to make best use of the range of tools available to it including (but not limited to) energy contracts, and option contracts called both inside and outside of Balancing Mechanism timescales.
- 3.58 Ofgem believes that the fundamental features of the new trading arrangements – liquid forwards markets, a Balancing Mechanism to resolve imbalances and a settlement system for out of balance participants – will not be unduly affected by allowing NGC the option to purchase energy. For example:
- ◆ The costs of energy contracts will feed through to imbalance prices under a mechanism proposed in Chapter 4. Hence, imbalance prices will reflect the costs of energy balancing whether services are purchased in the Balancing Mechanism or in forwards markets;
 - ◆ Overall, we can expect participants will benefit in terms of lower energy balancing costs from NGC purchasing energy in forwards markets, where it is expected to be more economic to do so than through the Balancing Mechanism;
 - ◆ It is unclear at this stage how much energy NGC might be purchasing prior to gate closure and hence whether the result of NGC purchasing energy will be to reduce liquidity in forwards markets and thus prevent participants themselves from self balancing. It is for further consideration, when determining appropriate parameters for the initial SO incentive scheme under NETA and the form and content of NGC's Procurement Guidelines

and Balancing Principles, whether any limits on energy purchased ahead of gate closure should be imposed; and

- ◆ In terms of the information advantage enjoyed by NGC, this would clearly be of concern if NGC were to use this advantage to engage in speculative trading i.e. to profit from price movements. However, NGC will be prohibited from doing so and hence any purchases of energy that it makes forward should only be related to balancing the system. In addition, NGC will be required to publish a range of information to market participants. The precise details of the information to be provided will be developed over the next few months with consideration of NGC's Procurement Guidelines and Balancing Principles.

- 3.59 In summary, Ofgem believes that the proposals outlined in this document on including energy balancing contract costs in energy imbalance prices, the publication of Procurement Guidelines and Balancing Principles and the provision of information by NGC to other participants, will help to address the concerns that have been expressed by participants.
- 3.60 In relation to the need for NGC to have an energy account if it wishes to purchase/sell energy contracts, Ofgem believes (as explained below) that NGC should not be required to do so and the BSC specification is being developed on this basis. Notifications of bilateral (energy) contract volumes with NGC as counter-party will be accepted, but NGC's part of the contracts will not be processed further in Settlement i.e. NGC will not be directly exposed to energy imbalance charges but simply to the contract price.
- 3.61 If NGC were required to have an energy account, then in buying (or selling) energy under bilateral contracts NGC would not only have to pay the price in the bilateral contract but also to pay or be paid at the prevailing imbalance prices for the entire volume (NGC would have no metered volume and hence any net outstanding contract volumes would create an imbalance). Thus, the net effect to NGC will be that it will have to pay the bilateral contract price less either the System Sell Price (SSP) or the System Buy Price (SBP). This would seem to introduce undue complexity to the way in which NGC procures and utilises balancing services and could give rise to potential perverse incentives

with regard to Balancing Mechanism actions. For example, NGC might have an incentive to accept particular Balancing Mechanism actions that result in energy imbalance prices which minimise NGC's costs but which do not lead overall to lower costs for participants.

3.62 The December Consultation also asked whether NGC should be prohibited from selling (energy) products back into the Balancing Mechanism. For example, NGC might choose to purchase energy under bilateral contract, but find, perhaps after gate closure, that in fact it no longer needs the energy it has purchased i.e. NGC would have a long position. NGC might then look for some way for "unwinding" the delivery of energy under the contract it has signed. Only two respondents (NGC and an energy trader) to the December Consultation commented on this issue and they both supported the principle of allowing NGC to sell products back into the Balancing Mechanism. Three main options are possible in relation to this issue:

- ◆ do not allow NGC to sell products back into the Balancing Mechanism;
- ◆ allow NGC to post bids/offers into the Balancing Mechanism itself, and then accept that bid/offer in the Balancing Mechanism; or
- ◆ accept that NGC may agree terms with the counter-party to the energy contract, that enable the counter-party to post a bid/offer into the Balancing Mechanism that, if chosen, would have the effect of unwinding the energy contract.

3.63 The first option (not allowing NGC to sell products back into the Balancing Mechanism) is inconsistent with giving NGC discretion in the forms of contract it may use. However, allowing NGC to place bids directly into the Balancing Mechanism (the second option) might give it undue power on both sides of the market in the Balancing Mechanism.

3.64 Thus, the most sensible option appears to be allow NGC to agree with participants the terms under which it would be able to unwind energy contracts. No changes to the central systems would be required to effect this since it will be for NGC and potential counterparties to consider the terms under which NGC buys and sells energy. NGC could, of course, unwind a long or short

energy position by accepting offers and bids in the Balancing Mechanism that are not linked to any underlying contract position.

Procurement and Balancing Principles Statements

- 3.65 The new obligation under NETA on NGC to operate the system in an efficient, economic and co-ordinated manner and a strong and efficient incentive scheme coupled with the publication of statements on how NGC intends to procure and utilises balancing services should ensure NGC procures and utilises balancing services in an open, transparent and efficient manner.
- 3.66 In the December Consultation, Ofgem argued that although an effective SO incentive scheme should encourage the efficient procurement of balancing services, there would be strong merit in requiring NGC to publish 'Procurement Guidelines'. The form of the guidelines would be subject to approval by the Director General. Initially this statement could be confined to broad principles, with the option of changing the level of detail required if broad principles were to prove insufficient in ensuring an open, transparent and efficient procurement process. Ofgem invited views on whether NGC should be required to produce a statement setting out its policy in procuring balancing services.
- 3.67 The need for 'Operational Guidelines' or 'Balancing Principles' was also discussed in the December Consultation. These would serve to give the industry a better indication of the way in which NGC would use balancing services. Ofgem believed that the publication of NGC's 'Balancing Principles' would provide greater transparency and openness about the way in which system operation is carried out and thus provide reassurance to participants in a climate where NGC has greater discretion in its system operation activities.
- 3.68 The December Consultation suggested that the Balancing Principles could cover the manner in which NGC exercises its discretion in calling from the range of balancing services available to it. Although Ofgem considered that a prescriptive set of rules would be too inflexible, we argued that a general statement of principles and policies would be necessary and that, in a small number of areas, it might be desirable to have more detailed descriptions. Thus, as with the Procurement Guidelines, it was envisaged that the Balancing Principles would be fairly general in nature but sufficient to ensure openness

and accountability on the part of NGC in the way in which it operated the system. Ofgem argued that the form of these statements, like the Procurement Guidelines, would be subject to approval by the Director General, moreover, NGC would be obliged to comply with its published Balancing Principles.

NGC's View

- 3.69 NGC stated it already provides information as to how it assesses and selects Ancillary Service offers. For any future arrangements, NGC would continue to provide market information and assessment criteria. NGC did not believe that potential providers would be prepared to offer services unless they were clear on the principles underlying a particular contracting process. This ensures that NGC will have to make available sufficient information for providers to offer their services. Highlighting the Director General's ability to review actions after the event, and the information available in the market, NGC believed that additional guidelines would be unnecessary.
- 3.70 If there are to be further guidelines, NGC was of the view that they should be high level principles. It would want to be consulted on any modifications to these principles, as the new guidelines may have an impact on the costs against which NGC will be incentivised. NGC was also concerned that Operational Guidelines could restrict its flexibility in operating a secure and efficient system. It believed that an appropriate incentive scheme would remove the need for such guidelines. Though Ofgem was advocating only high level guidelines, NGC believed that even these could cause problems.
- 3.71 NGC considered that it would be difficult to produce meaningful guidelines given the factors to be taken into account in operational timescales. Although generally it would want to use the cheapest options available, for technical reasons this may not always be a viable solution. Secondly, guidelines might result in disputes on despatch decisions (which could be both frequent and potentially spurious), which could impact on the flexibility and independence of system operation.

Other Respondents' Views

- 3.72 Twenty respondents to the December Consultation commented on this issue. Thirteen of these respondents were in favour of the SO being required to publish

Procurement Guidelines whilst two were against believing that the combination of NGC's statutory and licence obligations and an efficient SO incentives scheme would be sufficient. Thus, the majority of respondents saw Procurement Guidelines as an essential corollary to allowing the SO discretion in how it procures and utilises balancing services.

- 3.73 A number of respondents indicated that the guidelines should be limited to 'high level' principles. One respondent was concerned NGC may act in a way detrimental to liquidity in forward markets (in the sense it may contract with participants, thus removing them from participation in forward markets). Two respondents thought that the Procurement Guidelines should be incorporated in the BSC. One respondent thought an appropriate and transparent incentive scheme would be sufficient to remove the need for Procurement Guidelines.
- 3.74 Almost all respondents (eighteen out of twenty) believed that the SO should publish Balancing Principles. A number of respondents pointed to the need for transparency in system operation. One respondent thought the main issue with regard to the Balancing Mechanism was NGC's ability to influence market prices and to discriminate between participants. It was for these reasons, therefore, that Balancing Principles and a requirement for NGC to publish information about its actions in the Balancing Mechanism was required.
- 3.75 Most respondents thought the Balancing Principles should be 'high level'. Only one respondent felt they should be detailed. One respondent thought the Balancing Principles should be in the BSC subject to the BSC modification procedure. Another respondent suggested the obligation should be in NGC's licence. One respondent thought an appropriate incentive scheme would be sufficient to ensure NGC operates the transmission system efficiently.

NETA Proposed Licence Conditions Document

- 3.76 The February 2000 NETA Licence Changes document also consulted on the need for Procurement Guidelines and Balancing Principles, and their form, content and status in order that appropriate changes to NGC's licence could be made to implement them.
- 3.77 As discussed above, Ofgem/DTI argued that NGC should be required to provide a statement of broad principles for the operation of balancing activities. The

statement would require the prior approval of the Director General and would be subject to annual review (to ensure the statement remained consistent with NGC's other licence and statutory duties). Proposals emerging as a result of those reviews would again require prior regulatory approval before the change could be made.

- 3.78 Ofgem/DTI recognised that the Balancing Principles should not restrict the ability of NGC to discharge its statutory and licence obligations to provide for a secure system. However, NGC should, in Ofgem/DTI's view, be required to use reasonable endeavours to comply with the principles set out in the statement and should be required to justify to the Director General any divergence from them.
- 3.79 In order to ensure confidence in NGC's processes, Ofgem/DTI proposed that NGC should be required to report annually on its compliance with these Principles and to provide an auditor's assessment of its level of compliance. It was envisaged that these reports would be made publicly available. These requirements would replace the existing Scheduling and Despatch Audit under the Pooling and Settlement Agreement.

Ofgem's View

- 3.80 As set out above, Ofgem remains of the opinion that NGC should publish annual Procurement Guidelines and Balancing Principles, and any updates as necessary if NGC's policy changes.
- 3.81 NGC has provided a draft of Procurement Guidelines and Balancing Principles for the start of NETA (attached in Appendix 4). The drafts produced by NGC are initial and for discussion purposes only. Nevertheless, it is useful at this stage to outline specific areas for consideration.
- ◆ In general, the draft Procurement Guidelines and Balancing Principles statements may be too general to provide participants with greater transparency in the way in which NGC procures and utilises balancing services. Some parts of the Procurement Guidelines probably require further clarification. For example:

- (a) The draft Procurement Guidelines state that the acceptance of Balancing Mechanism offers and bids fall outside the scope of the guidelines. Ofgem believes that the Procurement Guidelines should include guidance on the basis on which NGC will procure services through the Balancing Mechanism and on the relationship between services procured through and outside of the Balancing Mechanism.
 - (b) The services that NGC describes as "Other Services" are not well defined and thus it is unclear both what this category of services covers and its relationship to other services.
 - (c) The Procurement Guidelines need to distinguish more clearly between NGC buying energy for balancing purposes (which it is allowed to do) and buying and selling energy in order to profit from trading (which it will be prohibited from doing). Further information in the guidelines as to the circumstances under which NGC will sign energy contracts would be useful.
 - (d) Ofgem believes further details are needed with regard to the process for procuring services in order that all participants are able to participate in an informed manner. For example, the guidelines might include details on where NGC advertises for services, the criteria that it is looking for and how it selects these services.
- ◆ More detail and clarification would also be useful in relation to the Balancing Principles statement. For example:
- (a) The statement says little on the interaction between calling Balancing Services contracts versus Balancing Mechanism actions.
 - (b) NGC refers to 'system control actions' which it argues fall outside of the definition of Balancing Services given in the Transmission Licence. Examples of 'System Control Actions' include Negative Reserve Active Power Margin (NRAPM) and Demand Control instructions issued in accordance with Grid Code. Ofgem suggests that these additional actions need to be specified.

- (c) More information is needed in areas where NGC has discretion such as transmission constraint management, response reserve holding principles and involuntary reductions.
- (d) NGC refers to exceptions to its own Balancing Principles; further details are required about these exceptional circumstances so that deviations from the principles outlined could be investigated more easily at a later stage.
- (e) Ofgem believes that the Balancing Principles statement should, after consultation with interested parties, also state the information NGC intends to provide to the market.

3.82 In light of responses to this document, Ofgem will expect NGC to produce further drafts of these statements for further consultation.

Deemed Acceptances

3.83 Respondents to the July 1999 NETA document raised concerns regarding the treatment of "Deemed Acceptances". A Deemed Acceptance would arise, for example, when automatic control equipment curtails demand or generation without NGC issuing despatch instructions (a bid-offer acceptance). In the December Consultation, Ofgem suggested that Deemed Acceptances could be treated in a similar manner to Deemed Offers and Bids.²⁵ Thus, a pre-determined reference price would be used to determine payments to participants whose imbalance position had been altered by a deemed acceptance and the cost of the deemed acceptances would not be included in the calculation of energy imbalance prices.

3.84 The December Consultation noted that the pre-determined price might either be zero (as was then proposed for Deemed Bids and Offers) or the relevant energy imbalance price (the System Sell Price for generator disconnections and the System Buy Price for demand disconnections).

²⁵ Deemed Offers and Bids were defined as applying to physically achievable output or demand ranges not covered by Bids and Offers submitted by the BM Unit.

Respondents' Views

- 3.85 Thirteen respondents commented on this issue. Of these, seven agreed that Deemed Acceptances should be treated in a similar way to deemed offers and bids, five (including NGC) disagreed and one respondent had no firm view.

Ofgem's View

- 3.86 Since the December Consultation was published, considerable progress has been made in defining the business requirements for the new trading arrangements relating to the treatment of Deemed Offers and Bids and Deemed Acceptances.

- 3.87 First, it is currently proposed that the NETA systems and process will be designed such that Deemed Bids and Deemed Offers are unnecessary. There are a number of reasons for this:

- ◆ The System Operator will have the right to direct the output of all BM Units in emergency circumstances. However, this right may only be exercised if there are no relevant freely submitted bids and offers available in the Balancing Mechanism.^{26, 27} Therefore BM Units will only be directed to operate outside freely submitted bid and offer ranges in exceptional circumstances; and
- ◆ If Deemed Offers and Deemed Bids were to be used, then it would be necessary to establish a centrally determined price to apply in the unlikely event that they were called. Given that parties have freedom to submit their own bids and offers into the Balancing Mechanism, there would be great difficulty in establishing a fair and non-discriminatory price.

- 3.88 It is therefore proposed that if, under emergency circumstances, the System Operator directs BM Unit operation in an output range for which freely submitted bids and offers do not exist, Deemed Bids and Deemed Offers will not be used. Any resultant change in output will consequently be settled at the prevailing energy imbalance price.

²⁶ The exact wording to be applied is being developed in the NETA Programme.

²⁷ This does not necessarily mean that residual rights of dispatch for NGC are needed in the Grid Code.

3.89 Second, unlike Deemed Bids and Deemed Offers, it is proposed that the Deemed Acceptances are used as part of NETA. Deemed Acceptances will be treated as a Bid-Offer Acceptance for settlement purposes. A table is produced below (and in Appendix 5) that summarises how actions from participants should be settled in settlements under a range of possible circumstances. Of the circumstances listed, only the last (emergency action across dynamics) will be classified as a Deemed Acceptance.

Table 3.1 - List of directing actions to be settled at Bid/Offer Price and Imbalance Price

Action	Initial NETA Treatment	Discussion
BM Acceptance	BM trade @ bid/offer price	
Energy associated with delivery of Continuous frequency response	Imbalance	It is not proposed that frequency correction of accepted BM volumes will be implemented for initial NETA.
Energy associated with the delivery of Commercial LF frequency response	Imbalance. There may be an associated BM contract.	Treating as an imbalance would be consistent with the above.
'Back-stop' LF demand disconnections	Imbalance	These cover 60% of total system demand, and are initiated below 49 Hz.
Energy associated with the delivery of contracted reserve	Bid/Offer Price if purchased through BM. Imbalance otherwise – There may be an associated Balancing Services contract.	Treating as a BM Acceptance seems sensible, but may not be possible initially for some services (e.g. fast reserve / pump despatch).
Commercial inter-trips	As negotiated between NGC and the party concerned.	There are currently only a limited number of commercial inter-trips. Broadly speaking, commercial inter-trips are needed to meet operational standards, whereas non-commercial inter-trips are needed to meet planning standards.
Non-commercial inter-trips	Imbalance	
Transmission faults/ Transmission System disturbance resulting in a trip.	Imbalance	Will need to be reconsidered as part of Transmission access review.
Distribution Constraints	Imbalance	
Distribution faults	Imbalance	
Rota disconnection of demand	Imbalance	
Emergency action outside dynamics (e.g. rapid post-fault 'drops')	BM trade @ bid/offer price	Some further work to identify the relevant accepted volume is needed.

3.90 The main change this definition implies for NETA specified in the October 1999 NETA Document, is that it is now proposed that transmission and distribution faults and failures are treated consistently (i.e. both resulting in imbalances that will be cashed out at the relevant imbalance price). Ofgem will be addressing

the issue of transmission faults and failures as part of the wider review of transmission and access pricing arrangements.

Summary and Views Invited

- 3.91 In summary, Ofgem has carefully considered the responses to the December Consultation document. Ofgem continues to believe that NGC should be given discretion with regard to the procurement of balancing services including signing energy contracts ahead of Gate Closure. Ofgem does not consider that this implies that NGC should be required to have an energy account because it would introduce undue complexity to the settlement of energy contracts agreed by NGC and might give rise to perverse incentives with regard to Balancing Mechanism actions. However, mindful of the reservations expressed by some participants, this discretion will be coupled with a new licence obligation on NGC to operate the transmission system in an efficient, economic and co-ordinated manner, an effective incentive scheme and the requirement to publish Procurement Guidelines and Balancing Principles to ensure that the way in which NGC procures and utilises Balancing Services is both open and transparent.
- 3.92 Ofgem is committed to reviewing the mandatory obligations for the provision of balancing services. However, for the start of NETA, to avoid unnecessary risks to system security, participants should continue to have the same obligations as they do now. In addition, Ofgem believes that the implementation of a frequency response market should be delayed until after the start of NETA. Finally, Ofgem proposes that Deemed Acceptances are used as part of NETA trading arrangements.
- 3.93 Views are invited on the options and issues raised in this chapter, and particularly on the following specific issues:
- ◆ the proposal not to change the current requirements on participants to provide Balancing Services;
 - ◆ the decision to delay introducing the frequency response market;

- ◆ the proposal that NGC should have discretion with regard to how it purchases balancing services including the purchase of energy in forwards markets, subject to appropriate safeguards;
- ◆ the proposal that NGC does not need an energy account;
- ◆ views on the draft Procurement Guidelines and Balancing Principles, and their scope, form and content; and
- ◆ the proposed treatment of Deemed Acceptances.

4. Energy Imbalances Prices and Cost Recovery under NETA

Introduction

- 4.1 Under the new trading arrangements, NGC as SO will be purchasing a range of services through a variety of different arrangements, both inside and outside of the Balancing Mechanism, in order to meet its licence and other obligations to operate the electricity transmission system in an efficient, economical and co-ordinated manner and thus to ensure the security and stability of supply. In doing so, the SO will incur a range of costs. The December Consultation summarised these services and their costs into two broad categories:
- ◆ Energy balancing - the activities of the SO in matching overall supply and demand at a half-hourly level; and
 - ◆ System balancing – the activities of the SO in achieving the stable and secure operation of the transmission system.
- 4.2 The December Consultation argued that participants who are out of energy balance should be exposed to all the costs incurred by the SO in achieving a gross energy balance (i.e. matching demand and generation at the half-hourly level). The actions the SO takes in the Balancing Mechanism naturally flow through to energy imbalance prices i.e. the System Buy Price (SBP) and System Sell Price (SSP) charged to out of balance participants. However, imbalance prices based solely on actions taken by the SO in the Balancing Mechanism are unlikely to reflect the total costs incurred by the SO in maintaining a gross energy balance. For example, they would not include the costs incurred by the SO in contracting ahead for reserve to meet energy imbalances.
- 4.3 Furthermore, some Balancing Mechanism actions will be taken for system balancing reasons such as those taken to provide frequency response services or to relieve transmission constraints. The December Consultation argued that system balancing actions taken by the SO should be recovered from all participants on a fair and non-discriminatory basis. In addition, the July 1999 and October 1999 NETA documents argued that ways in which the costs of

transmission constraints, in particular, could be removed from imbalance prices should continue to be explored.

- 4.4 We address first the issue of how imbalance prices can be changed to reflect better the full costs including contract costs of energy balancing then consider how to exclude system balancing costs from energy imbalance cash out. The next section discusses how the costs of energy and system balancing services should be recovered under NETA. Finally, we consult on detailed proposals for the recovery of central NETA system costs being incurred by BSCCo.

Including contract costs in Energy Imbalance Prices

- 4.5 The July 1999 and October 1999 NETA documents described how energy imbalance prices would be calculated as the volume weighted average of all accepted Balancing Mechanism offers (in the case of the System Buy Price) and bids (in the case of the System Sell Price). Participants would be exposed to the relevant imbalance price on the basis of differences between their contract position at gate closure adjusted by any accepted offers and bids in the Balancing Mechanism and their outturn metered volumes (adjusted for losses).
- 4.6 In the December Consultation, it was Ofgem's view that the total cost of energy related balancing service contracts (option fees and utilisation payments or difference payments) should be included in the calculation of energy imbalance prices.
- 4.7 Ofgem proposed that the costs of reserve contracts should be targeted to those participants who are short of energy²⁸ by including these costs in the calculation of System Buy Prices on the same basis as accepted Balancing Mechanism offers. The costs of any "negative reserve" contracts could be included in System Sell Prices in a similar way.
- 4.8 Ofgem considered that it would be possible to feed through the costs of utilisation and difference payments as these are typically expressed in terms of £/MWh. However, we recognised that it would be necessary to convert the cost of any option fees, typically charged on a £/kW basis, into a £/MWh charge to

²⁸ Generators who produce less than their contracted volume and customers/suppliers who consume more than their contract position are considered to be 'short' of energy.

be spread across either the hours in which the option could be exercised or all hours in the year.

NGC's View

- 4.9 NGC expressed concern that Ofgem was suggesting two categories of balancing services, with separate arrangements for charging. Its concerns were based on the need to agree appropriate principles under which the costs of balancing services would be recovered and the practicalities of treating energy balancing and system balancing services separately.
- 4.10 NGC argued that the procurement and provision of all balancing services benefits all system users and not just those out of energy balance. It pointed out that the provision of reserve helps to ensure a secure and stable system, which is a benefit to all users.
- 4.11 A number of points dealing with the practicalities of separating energy and system balancing costs were also raised by NGC. First, NGC argued that it is impractical to define boundaries between energy and system services as a number of services can be interchanged. It cited as an example that a de-loaded generator would have the ability to provide reactive power, frequency response and reserve as well as potentially contributing to the relief of transmission system constraints.
- 4.12 Second, NGC was concerned about the difficulties in apportioning the costs of contracted balancing services. It claimed that since these contracted services may often include both a capability and utilisation element, it would be difficult to identify which periods the costs should be recovered over. NGC's main concern related to capability payments (option fees), which are typically spread over the term of the contract. If these are to be targeted ex-post over the periods when the service is actually utilised, then NGC argued it would be necessary to wait until the end of the contract term before determining imbalance prices.
- 4.13 Finally, NGC stated that there are economic benefits from buying joint balancing services products, some of which will cover both energy and system balancing services. NGC noted that it is more efficient to purchase these products together rather than independently and that it would seem more flexible and pragmatic to recover these costs collectively across all participants.

- 4.14 NGC also commented on the issue of whether frequency response costs should be excluded from energy imbalance prices. Its view was that frequency response was an automatic service provided for the benefit of all system users and it did not seem appropriate to target these costs solely on those out of energy balance.
- 4.15 Despite these reservations, NGC has assisted Ofgem in working up the proposals presented below.

Other Respondents' Views

- 4.16 Twelve respondents to the December Consultation commented on the inclusion of contract costs in imbalance prices. Respondents were evenly divided on the appropriateness of the proposal. Several suppliers, energy traders, large consumers and one generator agreed with the principle that all energy balancing costs should be recovered from participants out of energy balance. They felt that this naturally extended to the costs of contracting for reserve ahead of time. Many recognised that there would be difficulties in exactly labelling some services as either system or energy balancing but felt that it was important to separate the services where possible.
- 4.17 Participants opposed to the inclusion of contract costs in imbalance prices included a mixture of generators, suppliers, and traders. A consensus view amongst these respondents was that contracting for energy balancing services was a form of insurance to provide a stable and secure system, and hence it should be treated as a system cost and recovered from all participants. Several of these respondents, however, put forward the alternative view that the costs of utilising balancing service contracts should feed through to imbalance prices, but any option fees paid should be treated as a system service and recovered from all participants.

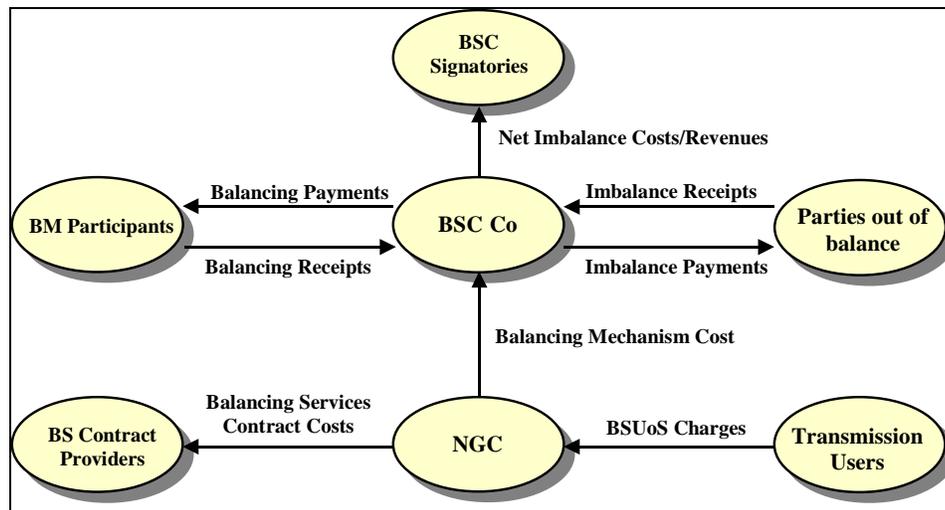
Ofgem's View

- 4.18 Ofgem has carefully considered respondents' views and NGC's detailed comments. However, we continue to believe that, as far as possible, the costs of energy balancing should be targeted on participants who are out of energy balance. We recognise that the boundary between energy and system balancing services can be difficult to define, but Ofgem believes that there are strong

arguments for considering reserve and energy contracts as energy balancing services and targeting their costs on out of balance participants.

4.19 However, it is worth emphasising that the energy imbalance charges are not a cost recovery mechanism for the costs of energy balancing. The SO will still recover all balancing service costs through a smeared charge across all BSC parties (as detailed later in the section on Balancing Services Cost Recovery Mechanism). The figure below, provided by NGC, emphasises this point by summarising the cash flows under NETA.

Figure 4.1 - Cash Flows under NETA



4.20 The diagram above differentiates between the cash flows under NETA for imbalance settlement (designed to price and settle imbalance based on the cost of balancing the system) and the recovery of all the costs of balancing services incurred by NGC. The cash flows relating to imbalance settlement have the following elements:

$$\text{Imbalance Payments} = \text{System Sell Price (SSP)} \times \text{MW Imbalances (long generation)} + \text{System Sell Price (SSP)} \times \text{MW Imbalances (short demand)}$$

$$\text{Imbalance Receipts} = \text{System Buy Price (SBP)} \times \text{MW Imbalances (short generation)} + \text{System Buy Price (SBP)} \times \text{MW Imbalances (long demand)}$$

$$\text{Net Imbalance Costs/Revenues} = \text{Imbalance Receipts} - \text{Imbalance Payments}$$

4.21 The cash flows under NETA for recovering of the costs of energy and system balancing are given by the following elements:

Balancing Payments = Σ Offers: Price x Volume (generation increments and demand decrements)

Balancing Receipts = Σ Bids: Price x Volume (generation decrements and demand increments)

Balancing Cost = Balancing Payments – Balancing Receipts

Balancing Services Contract Costs = Contract Payments for Balancing Services
(Frequency response, reactive power, Reserve and Black start)

Total Balancing Cost = Balance Mechanism Cost paid to BSCCo + Balancing Services Contract Cost (paid to BS contract providers)

BSUoS Charges = Total Balancing Cost + SO Internal Costs + NGC Incentive Payments

4.22 A number of issues must be addressed by any mechanism to target reserve contract costs to imbalance prices including:

- ◆ what specific types of reserve and energy contracts to be included in the calculation of energy imbalance prices;
- ◆ how imbalance prices should be specified;
- ◆ how option fees/capability payments should be allocated across periods;
- ◆ the treatment of contracts for bundled services (such as reserve and delivered energy) and system services; and
- ◆ data provision.

Contracts to be included in the Calculation of Energy Imbalance Prices

4.23 Following discussions with NGC, it has been agreed that three specific contract types that NGC may purchase could most straightforwardly be considered as energy contracts and hence should be incorporated in the calculation of energy imbalance prices:

- ◆ Standing reserve;
- ◆ Regulating reserve;²⁹ and
- ◆ Forward energy contracts.

4.24 All reserve contracts enable NGC to call, at its discretion, for additional volumes of energy to be delivered. In the Balancing Mechanism, therefore they will affect the volume and price of offers to sell additional energy that are accepted. Thus, reserve costs should only be incorporated into the calculation of System Buy Prices. If the SO were to enter into any “negative reserve” contracts that enabled a generator’s output to be reduced (or the demand of customers to be increased), these costs should be included in the calculation of System Sell Prices. The purchase or sale of forward energy contracts (Option 6 in terms of procurement mechanisms) will be physical transactions with NGC buying or selling blocks of electricity, and hence fall naturally into the energy balancing category. Thus, the costs of purchases will be included in the SBP, and the cost of sales in the SSP.

4.25 The only caveat to this is that NGC has told Ofgem that at the start of the new trading arrangements it will not be possible to forecast optional regulating reserve contract fees because the volume under such contracts is not known in advance since these contracts are instructed on an “as required” basis. The costs of optional regulating reserve contracts are small relative to total energy balancing costs.

4.26 The only form of reserve contract that will not be included in imbalance prices are warming contracts (primarily as a replacement for current Hot Standby provisions). These do not directly involve any energy delivery and they have a strong locational element, so they are in some senses a system balancing service.

Imbalance Price Calculations

4.27 On the basis that the SO will have discretion in the form of balancing services contracts it agrees with service providers (subject to licence obligations and an

²⁹ Most Regulating reserve will be delivered via the acceptance of bids and offers and hence will automatically be included in energy imbalance prices. However, NGC does contract for certain more specialised scheduled reserve services.

appropriate incentive scheme), it is necessary that the targeting mechanism should accommodate a variety of procurement options.

4.28 For example, the SO may choose to sign reserve contracts under which the utilisation price acts as a hedge around offers placed in the Balancing Mechanism (procurement Option 4). It will be possible to treat the utilisation fees associated with calling balancing services contracts simply as additional Balancing Mechanism acceptances. However, it will be necessary to define the basis under which any difference payments and option fees will be factored into imbalance prices.

4.29 Ofgem proposes to include energy contract costs in the following way:³⁰

- ◆ contract utilisation costs will be weighted by their volumes in the same way that Balancing Mechanism offers are; but
- ◆ the costs of reserve related contract fees will not be weighted by any volume since this would effectively result in a double counting of the contract volume. Whilst the utilisation of a reserve contract relates to a payment for an actual volume in the Balancing Mechanism or elsewhere, option fees represent the costs of having a particular facility available regardless of its actual utilisation. Thus, it is appropriate to include a contract fee element in

³⁰ Under the proposed approach, System Buy Prices and System Sell Prices can be defined conceptually as follows.

$$SBP = \frac{P_o \times V_o + \text{Option fees}_o + \text{Difference payments}_o + \text{Avg. util. price}_o \times \text{Total util vol}_o}{V_o + \text{Total util vol}_o}$$

$$SSP = \frac{P_b \times V_b + \text{Option fees}_b + \text{Difference payments}_b + \text{Avg. util. price}_b \times \text{Total util vol}_b}{V_b + \text{Total util vol}_b}$$

Where:

- ◆ The subscript identifies whether the quantity involved refers to o(offers) or b(ids)
- ◆ P is the price and V the volume of actions (adjusted for losses) accepted in the Balancing Mechanism. The summation is across untagged offers/bids (see next section). It should be noted that the formal specification for the BSC is somewhat different but entirely equivalent.
- ◆ Difference payments for reserve contracts relate to contracts where the Balancing Mechanism offer/bid price submitted for the contracted unit is hedged.
- ◆ The average utilisation price (Avg.util.price) and the total utilisation volume (Total.util.vol) in the methodology presented above refer to:
- ◆ forward energy contracts (both buys and sells); and
- ◆ option contracts called outside the Balancing Mechanism i.e. signed with non-BSC parties.
- ◆ The average utilisation price will be the volume-weighted average of all the utilisation fees of this type and this information will be provided by NGC to the central BSC and settlement systems.

the System Buy Price even if the contract is not utilised in a given trading period.

- ◆ the costs of difference payments will also not be weighted by the volumes associated with them since these volumes will have already have been included in the volumes of actions accepted in the Balancing Mechanism.

Allocation of Option fees across Settlement Periods and Data Provision

- 4.30 Ofgem believes that it is desirable for the costs involved in energy balancing to affect the imbalance prices in the settlement period for which the contracts apply.
- 4.31 As discussed in the December Consultation, utilisation and difference fees can be allocated to the settlement periods in which they occur. NGC has said that it will not enter into such contracts until it is able to provide the necessary utilisation or difference payment information to settlement.³¹
- 4.32 It would not be practical or appropriate to allocate capability fees for energy balancing contract to the settlement periods in which they are actually exercised, since, as NGC pointed out, it would not be possible to determine an accurate allocation of capability fees to settlement periods until the end of the contract period. Given the long-term nature of some balancing services contracts this would require a substantial annual reconciliation process. Furthermore, direct allocation of capability fees to settlement periods in which balancing services contracts were called could lead to a high and volatile allocation of capability fees across settlement periods.
- 4.33 Ofgem proposes that the capability fees contracts should be allocated evenly over the core service periods in which the contracts can be called. This will provide a simple mechanism with some degree of cost targeting as the utilisation of reserve contracts is likely to occur predominantly during core service periods.

³¹ NGC believes that this agreement may preclude it from signing contracts with difference payments at the start of NETA. An initial exception to this agreement may be contracts called after gate closure, but outside the Balancing Mechanism, i.e. contracts with participants who are not BSC parties. NGC has informed us that it may not have the systems available to provide this information in the timescales required for settlement. However, the materiality of such contracts is small.

4.34 Thus, for each contract, the contract fee for a half-hour will be calculated by dividing the total contract fee (£) by the number of core service hours for the contract. NGC will initially provide this information in aggregate to Settlement at the day ahead stage i.e. re declarations of contract availability after this point will be ignored. As the new trading arrangements develop, it might be possible to provide the information at Gate Closure and thus include redeclarations in the calculations.

The Treatment of Bundled Service Contracts

4.35 NGC has told us that there are strong economic benefits in buying bundled products from a single service provider, as there are strong similarities between how certain services are called for and utilised. This could present difficulties in the allocation of costs amongst different services. However, NGC has also stated it is normally possible to unbundle reserve costs from such contracts. If this were to prove not to be the case, Ofgem suggests that option fees under such contracts should be split evenly between the services covered. For example, if three services were provided under one contract, one-third of the option fee in the contract would be allocated to each service.

Implementation

4.36 Work is now progressing between the NETA Programme and NGC to ensure that the required systems and processes are in place to effect the targeting of energy balancing contract costs to energy imbalance prices payment information to settlement, and the Logica Settlement systems are capable of accepting this information.

Removal of Response and Constraint Costs from Energy Imbalance Prices

4.37 Ofgem has consistently suggested that it would be desirable to remove the costs of system balancing from the calculation of energy imbalance prices, since these costs should not be targeted only on participants who are out of energy balance. We recognised the difficulty of appropriately identifying and removing all system balancing costs from the calculation of energy imbalance prices but suggested that a simple approach might be feasible.

- 4.38 In the December Consultation, Ofgem consulted on whether it be possible to identify actions taken in order to provide a frequency response service and to 'tag' actions in the Balancing Mechanism taken to relieve transmission constraints and exclude the costs of these actions from energy imbalance prices.
- 4.39 In relation to frequency response, Ofgem argued that it may not be appropriate to remove frequency response costs due to the difficulties in separating out the costs of plant being de-loaded in the Balancing Mechanism to provide frequency response from plant being de-loaded to provide other services. On the possibility of some form of 'tagging' being used to identify actions taken to relieve transmission constraints, Ofgem noted that no appropriate proposals had been developed so far but that work was ongoing to find a possible solution.
- 4.40 Ofgem also noted that excluding actions taken in the Balancing Mechanism to relieve transmission constraints from energy imbalance prices was an interim measure. In the longer term, Ofgem believes that a new transmission access and pricing regime should enable most constraints to be resolved before gate closure with only a minority of constraints being resolved in the Balancing Mechanism.

NGC's Views

- 4.41 NGC's views on the targeting of energy balancing costs to energy imbalance prices, described above, apply equally to this issue and no further comment was made. However, NGC has been working with Ofgem to develop proposals in both these areas.

Other Respondents' View

- 4.42 The majority of respondents felt that it was appropriate to exclude the costs incurred in providing frequency response incurred in the Balancing Mechanism from imbalance prices. This was in line with the view that frequency response was a system service that benefited all participants not just those with energy imbalances. Respondents opposed to the exclusion of frequency response costs cited the difficulties of accurately separating out the costs incurred in providing frequency response from other Balancing Mechanism actions.
- 4.43 No respondents commented on the issue of tagging actions taken in the Balancing Mechanism to relieve transmission constraints, but this issue was

previously consulted on in the July 1999 and October 1999 NETA documents. Respondents to these documents generally supported further investigation of the means by which actions to relieve transmission constraints might be removed from the calculation of energy imbalance prices.

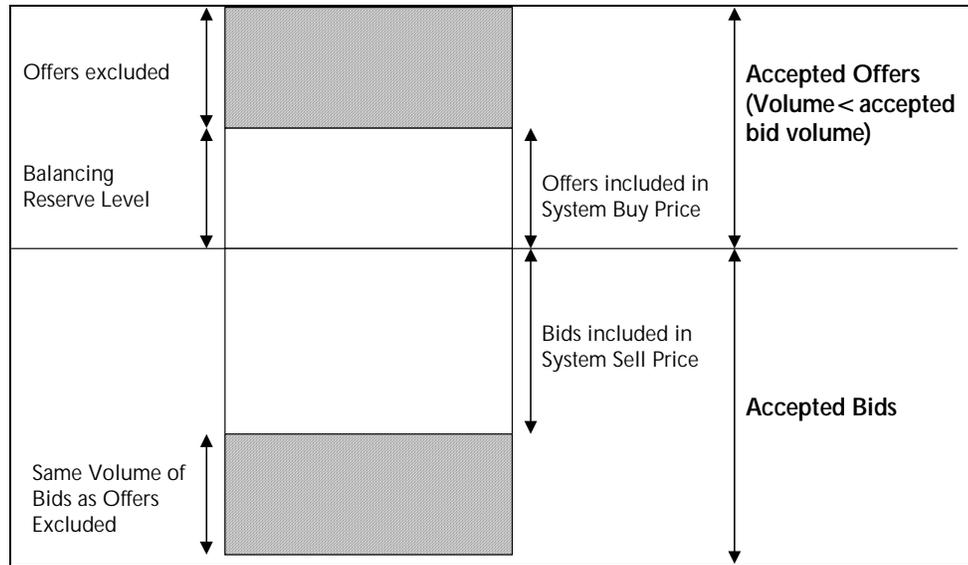
Ofgem's View

- 4.44 The NETA programme (via the Balancing Settlements Expert Group and the DISG) have developed a proposal for tagging Balancing Mechanism actions to exclude constraint costs from imbalance prices. This may also remove some of the costs of frequency response from energy imbalance prices. Ofgem accepts that any further removal is impractical for the introduction of NETA. Ofgem considers that this proposal, outlined below, represents a sensible way forward and proposes that it should be adopted until a new transmission access and pricing regime is introduced.

Proposal on Tagging Constraint (and other system) Related Actions

- 4.45 The tagging proposal involves removing matched volumes of the most expensive accepted offers and bids until a 'balancing reserve level' (which could be set to be consistent with the amount of reserve purchased and thus the reserve to be included in the calculation of energy imbalance prices) is reached for either offer or bid volumes. The remaining offers and bids will then be used to determine imbalance prices. The volumes of offers and bids discarded will not be constrained by dynamics.

Figure 4.2 - Illustration of the Tagging proposal



The 'balancing reserve level' will apply to offer volumes if these are smaller than the accepted bid volumes, and vice versa.

- 4.46 The 'balancing reserve level' allows for the tagging process to be tuned (and potentially turned off). For example, if it is set to a value greater than the volume of accepted trades then no trades would be tagged and all costs will feed through to the imbalance prices. Similarly, if only offers or only bids are accepted, no tagging will take place.
- 4.47 It will generally be the case that the most expensive bids and offers accepted will be related to relieving constraints and possibly other system balancing costs, and hence that this approach is broadly appropriate in its allocation of costs.
- 4.48 Work is now progressing to ensure that the necessary functionality will be available and working on the introduction of the new trading arrangements. A more detailed explanation of the proposals and worked examples drawing on a paper produced by NGC is included in Appendix 6.

Balancing Services Cost Recovery Mechanism

- 4.49 Under the current arrangements, most of the costs of energy and system balancing including the costs of Ancillary Service contracts are recovered from suppliers via a smeared charge – the Transmission Services Use of System

Charge (TSUoS). TSUoS is calculated daily and levied based on demand during Table A periods.³²

- 4.50 Following on from the views expressed in the October 1999 NETA document, Ofgem stated in the December Consultation all users of the transmission system benefit from the secure and stable operation of the transmission system and thus that the costs, efficiently incurred by NGC should be recovered from both generators and suppliers. Ofgem also suggested that the basis for determining a participant's exposure to the shared costs of system operation should be whether or not they are BSC signatories. We suggested the charges that BSC signatories face should be related to their metered volumes and there should be a move away from restricting cost recovery to arbitrarily specified trading periods.

NGC's View

- 4.51 In its response to the December Consultation, NGC argued that a TSUoS type charge, to be known as the Balancing System Use of System (BSUoS) charge, should continue to be used to recover the cost of balancing services. NGC recognised that there were a number of ways in which such a charge could be levied. Overall, NGC believed that all balancing services costs it incurs should be recovered through BSUoS and that given the distinction between Table A and Table B periods will no longer exist under the new trading arrangements, the most pragmatic solution would be to levy a charge on a simple MWh basis either daily or half-hourly.
- 4.52 NGC did not respond on the question of whether cost recovery should be over both generation and demand or on the basis on which exposure to BSUoS would be determined.

Other Respondents' Views

- 4.53 No other respondents commented explicitly on this issue although a number made reference to the fact that the costs of system operation should be smeared across all users of the transmission system.

³² Each settlement period is defined either as a Table A or Table B period. When the spare capacity of scheduled generation exceeds 1000 MW a period is defined as Table B. All other periods are Table A.

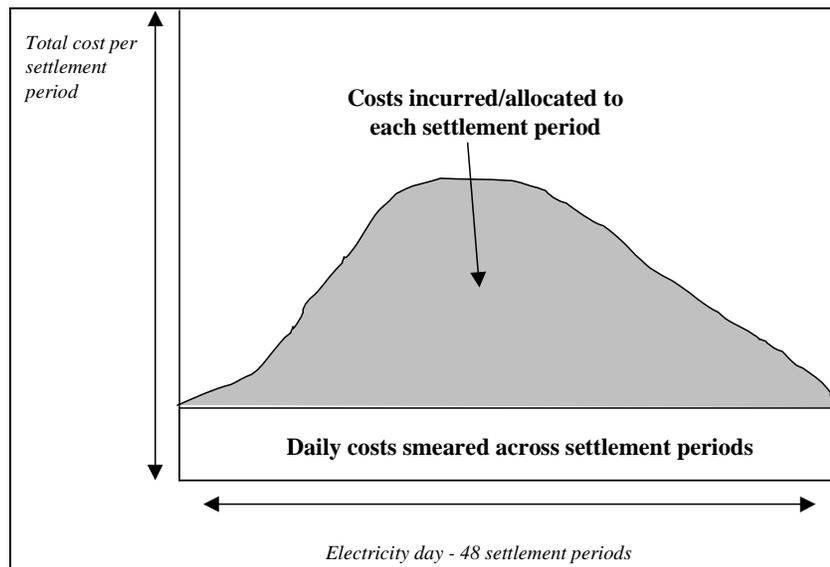
Ofgem's View

- 4.54 Ofgem proposes that the costs of balancing services should be recovered from all BSC parties based on their metered volumes. This means that the charging base for BSUoS will be expanded from any licensed suppliers to include all licensed generators and any license-exempt or unlicensed participants who choose to become parties to the BSC.
- 4.55 In terms of whether there should be any targeting of cost recovery to selected periods of the day, two main considerations need to be borne in mind. First, some balancing services costs, for example the costs or revenues incurred by NGC as a result of actions taken in the Balancing Mechanism, will be calculated for each settlement period and can thus be identified on a half-hourly basis. Second, some balancing services costs will be incurred over timescales longer than a half-hour and there will be no easy method of allocating these costs to individual settlement periods.
- 4.56 Given these considerations, two main options are possible for the recovery of balancing services costs:
- ◆ Calculate total balancing services costs over each day and then either spread these costs evenly through the day or target the recovery of these daily costs to selected periods.
 - ◆ Allocate costs to particular settlement periods and recover the total costs per settlement period based on metered volumes of participants in each settlement period.
- 4.57 The first option outlined has the advantage of simplicity but any allocation to selected periods is likely to be relatively arbitrary. The second approach is more complex but allocates the costs to be recovered to the half-hours when these costs have been incurred and the benefits received.
- 4.58 Ofgem recognises that, at least initially, it may be problematic to allocate all balancing costs to individual half-hours, and therefore for the introduction of NETA the following approach should be adopted:

- ◆ where possible identify costs that have been incurred in particular settlement periods e.g. revenues or costs from Balancing Mechanism actions and reserve contract costs; and
- ◆ aggregate the other balancing services for each day and smear them evenly across all settlement periods in that day.

4.59 This approach is illustrated in Figure 4.3 below.

Figure 4.3 - Balancing Services Costs Allocation across Settlement Periods



4.60 Through this approach, the costs to be recovered in each settlement period will be determined, which will be charged to metered generation or demand in each period as adjusted by payments due from or to NGC under its SO incentive scheme.

Recovery of Central NETA (BSC) Costs

4.61 There are a number of costs which are related to the introduction of NETA (including the funding of BSCCo), which are presently being met by NGC and Pool Members. These are central costs and are distinct from the internal costs that NGC and other parties are incurring in preparing their own organisations for the introduction of NETA. Ofgem will shortly be publishing a consultation document relating to the funding of the BSCCo and the recovery of these central

costs. This document will put forward a series of proposals in relation to the means of cost recovery and the treatment of certain other costs items.

Summary and Views Invited

- 4.62 In summary, Ofgem continues to believe that the costs of energy balancing should be targeted on participants who are out of energy balance. Ofgem proposes that reserve and energy contracts should be considered as energy balancing services and their costs should be included in the calculation of energy imbalance prices.
- 4.63 In consultation with NGC, a method has been developed which achieves some targeting of reserve and energy contract costs, and we propose that this should be in place from the beginning of NETA.
- 4.64 Ofgem also considers the removal of system balancing costs from energy imbalance prices is desirable. However, for the start of NETA, Ofgem believes that it would not be practicable to remove fully the costs of frequency response and transmission constraints actions from energy imbalance prices. The tagging proposal that would remove at least some of these costs from energy imbalance prices, and Ofgem proposes that this methodology be adopted for the start of NETA.
- 4.65 Ofgem believes that the costs of balancing the system should be recovered from all BSC parties based on their metered volumes. Initially it may be difficult to assign all of these costs to particular settlement periods. Thus, for the introduction of NETA, Ofgem has proposed a simple method for the recovery of these costs.
- 4.66 Views are invited on the options and issues raised in this chapter, particularly on the following issues:
- ◆ the proposed method for including energy balancing contracts in the calculation of energy imbalance prices;
 - ◆ the proposal to remove the costs of transmission constraints and other system balancing costs from the calculation of energy imbalance prices; and

- ◆ the proposed method for recovering the costs of balancing services and system operation.

5. SO Incentives under NETA

Introduction

- 5.1 As discussed in the previous chapters, NGC's role as system operator (SO) requires it to purchase a range of services to ensure the efficient, economic and co-ordinated operation of the transmission system and hence to incur substantial costs. NGC is currently incentivised to control these costs under four schemes. NGC will need to purchase similar services under NETA and should continue to face financial incentives to manage the costs.
- 5.2 This chapter discusses the development of a new incentive scheme on NGC as SO under NETA. The first section of this chapter provides some background to the current incentive schemes on NGC and the principles for future incentive schemes established in the December Consultation. The next section describes Ofgem's proposals for the scope, form and duration of the initial SO incentive scheme under NETA. The final section presents some initial thinking on how, given the scope, form and duration proposed, the parameters of the incentive scheme might be determined.
- 5.3 NGC and nineteen other respondents to the December Consultation commented on various issues related to the incentives on NGC as SO. Ofgem has also been in continuing discussions with NGC on incentive related issues. Ofgem has taken these views into account in developing the proposals presented in this Chapter.

Background

Incentive Schemes on NGC under the Current Trading Arrangements

- 5.4 Since 1994/95 NGC has been provided with financial incentives to control the costs of those areas of Uplift that were judged to be under its influence. NGC is currently incentivised on three main elements of costs: Transmission Services Uplift (TSU), Reactive Power Uplift (RPU) and Energy Uplift (EU). In addition, NGC is incentivised to minimise the volume of transmission losses at a fixed price.

5.5 Table 5.1 presents the details of the new incentive schemes on NGC, that have been agreed between NGC and Ofgem³³ (in the case of TSU and RPU) and NGC and Suppliers (in the case of EU and transmission losses), that apply from 1 April 2000 to the introduction of NETA.

Table 5.1 - Incentive Schemes on NGC to Apply from 1 April 2000

	Target value	Upside sharing factor	Downside sharing factor	Cap on revenues to NGC	Collar on payments by NGC	Operational expenditure allowance
Transmission Services Uplift	£201.2m	50%	50%	£21 m	£21 m	£0.541 m
Reactive Power Uplift	£46.5m	50%	50%	£2.5 m	£2.5 m	
Energy Uplift	£14 m ³⁴	12%	5%	£3m	£2m	
Transmission losses	5.13 to 5.33 TWh at a price of 25 £/MWh	50%	25%	£4m	£2m	

The December Consultation

5.6 The December Consultation highlighted a number of principles which Ofgem suggested should underlie the design of incentives on the SO under NETA. The principles are that the scheme(s) should:

- ◆ ensure that costs overall are at an efficient level, not just individual elements;
- ◆ recognise the interactions between NGC's roles as system balancer and energy balancer; and

³³ See NGC Incentive Schemes from April 2000, Transmission Services Uplift and reactive power Uplift Schemes. A decision document, February 2000.

³⁴ The target value will be reviewed in early October 2000 by looking at the value of capacity payments (calculated as PPP-SMP) from 1 April 2000 to end of September 2000. If capacity payments are in the range £15/kW to £20/kW the target value will be left untouched. Otherwise, the target value will be vary with different levels of capacity payments.

- ◆ recognise and take account of the interactions between the roles of SO and Transmission Asset Owner (TO) performed by NGC.

5.7 In the context of these principles, Ofgem proposed that the enduring SO incentive scheme under NETA should take the form of a single incentive scheme covering all energy and system balancing costs incurred by NGC. Ofgem suggested that the form of the incentive scheme should continue to be a sliding scale i.e. a profit sharing scheme. We further suggested that the incentivised target in an enduring incentive scheme should be based on a target volume of services costed at an appropriate reference price (possibly a price emerging from the forwards markets).

5.8 However, Ofgem recognised that it might not be practicable to implement an enduring SO incentive scheme from the inception of NETA. For example, there will be no data on Balancing Mechanism volumes on which to base such a scheme and it may take time for an appropriate reference price to emerge. Consequently, Ofgem argued that it might be appropriate to establish an initial incentive scheme to run from the introduction of the new trading arrangements to the enduring incentive scheme.

Scope, Form and Duration of the Initial SO Incentive Scheme

5.9 The December Consultation invited views on the scope, form and duration of the incentive scheme on NGC under NETA and in particular on:

- ◆ the coverage (scope) of the incentive scheme(s);
- ◆ whether there should be one or several incentive schemes (a bundled incentive scheme versus unbundled incentive schemes);
- ◆ how the incentive scheme target could be set;
- ◆ the form of the incentive scheme(s); and
- ◆ the duration of the initial incentive scheme(s).

Coverage of SO Incentives under NETA

- 5.10 In order to develop an incentive scheme on the SO under NETA, it is necessary to consider the appropriate coverage of any scheme i.e. which SO costs should be included in the scheme(s). The coverage should be determined by the functions that the SO carries out (namely energy and system balancing) and the extent to which the SO can control the costs of carrying out these functions.
- 5.11 The December Consultation considered two possible approaches for the coverage of the initial SO incentive scheme under NETA:
- 5.12 Under the first approach, the costs associated with the role of energy balancing i.e. the matching of generation and demand at the half- hourly level, would be separated from the costs associated with the SO's system balancer role i.e. alleviating transmission constraints and maintaining the security and quality of supplies. No incentives would be placed on NGC regarding the costs of energy balancing, but all of the system balancing costs would be subject to an incentive arrangement. Ofgem argued that this approach would reduce the interest that NGC had in controlling energy balancing costs and hence the prices charged to out of balance market participants.
- 5.13 Under the second approach, NGC would be incentivised to minimise the overall costs it incurs in fulfilling its SO role. This would include the costs of energy balancing as well as system balancing services i.e. all the costs incurred by NGC through balancing services contracts and the Balancing Mechanism (BM). Ofgem argued that under this approach NGC would have a direct interest in the level of energy balancing costs and its incentives in this respect would be aligned with those of customers, thereby incentivising NGC to maintain overall system and energy balancing costs at an efficient level. In addition, the SO would be encouraged to make use of the most efficient mix of the different instruments available to it without regard to the distinction between energy balancing and system balancing.
- 5.14 Ofgem's view in the December Consultation was that the SO incentive scheme under NETA should cover all energy and system balancing costs. In addition, Ofgem stated that NGC should continue to be incentivised to minimise the volume of transmission losses.

NGC's View

- 5.15 In its response to Ofgem's December Consultation, NGC agreed that the most pragmatic approach would be to establish an incentive scheme on the total costs of energy balancing and system operation. This would involve all the costs (and income) incurred in accepting bids and offers in the Balancing Mechanism, and the costs of Balancing Services contracts.
- 5.16 NGC argued that the main drawback of this approach is that it would give it a significant exposure to the net imbalance volume, which it believes is a function of the balancing decisions of market participants and hence not within its control. Moreover, if it is incentivised on total balancing costs, NGC argued that perversely it would gain when there were large, negative imbalance volumes (assuming that bid prices for these volumes were positive). Thus, NGC believed that a term should be included in the incentive scheme calculation that reduces its exposure to the net imbalance volume at a reference price.

Other Respondents' Views

- 5.17 Fifteen respondents to the December Consultation commented on this issue. Ten respondents agreed with Ofgem that NGC should be incentivised on all the energy and system balancing costs that it incurs. Three respondents disagreed with Ofgem, whilst two respondents felt that more detail was required before they could respond in an informed way.
- 5.18 One respondent agreed with Ofgem's proposals for the coverage of the SO incentive scheme, but noted that an incentive scheme set in this way should not include transmission losses (for largely practical reasons), and that a separate mechanism should be implemented to ensure that the volume of transmission losses were kept to a minimum.
- 5.19 A further respondent expressed support for a single incentive scheme, but suggested that it should be limited to system balancing services only.

Discussion

- 5.20 There was considerable agreement among respondents to the December consultation that NGC should continue to be incentivised on all energy and system balancing costs. NGC agrees with this in principle. Thus, the costs

which NGC believes should be covered by its incentive schemes, would include:

- ◆ Balancing Mechanism Costs – the costs NGC pays for calling off offers and bids in the Balancing Mechanism and which would be taken for energy and system balancing reasons;
- ◆ Balancing Services Contract Costs – the costs NGC would pay to providers of balancing services including for the provision of frequency response, reserve, Black start, constraints and reactive power and transmission losses; and
- ◆ NGC's internal expenditure on system operation.

5.21 Under NGC's proposal, the scope of the incentive on NGC would be determined as follows:

$$\text{Total Balancing Cost} = \text{Total BM Cost} + \text{Total Balancing Service Contract Cost} + \text{Internal NGC Costs}$$

Treatment of the Net Imbalance Volume

5.22 However, as noted above, NGC argues that its exposure to the net imbalance volume should be reduced. One approach to achieving this might be as follows:

5.23 Considering only balancing costs (internal NGC costs of transmission losses are discussed later), the incentive scheme target would be:

$$\text{Incentive scheme Target} = (\text{Allowed System Balancing BM costs} + \text{Allowed Balancing Services Contract Costs})$$

This implies that the incentive scheme target will be set assuming a zero net imbalance volume. To determine payments under the incentive scheme, a comparator value would be calculated as:

*Incentive Scheme Comparator = Total Outturn Balancing Costs – (Outturn Net Imbalance Volume * Reference Price)*

*Incentive Payment = Sharing Factor * (Incentive Scheme Comparator – Incentive Scheme Target)*

*Total Payment = Incentive Scheme Payment + (Outturn Net Imbalance Volume * Reference Price)*

- 5.24 A number of worked examples, based around this overall approach³⁵ on the impact of removing NGC's exposure to the net imbalance volume are included in Appendix 7.
- 5.25 NGC argues that with an approach of this type, its objective would be to minimise the cost of system balancing actions and there would be no perverse incentive on it to make imbalance volumes as negative as possible. After considering this approach NGC's proposal, Ofgem believes that it provides the following incentives:
- ◆ NGC would remain exposed to the difference between the relevant imbalance price (System Buy Price if the system is short, System Sell Price if the System is long) and the reference price for the net imbalance volume;
 - ◆ Hence NGC would also be incentivised to minimise the differential between imbalance prices and the reference price for the net imbalance volume, implicitly. NGC would also be incentivised to minimise the differential between the price of offers and bids required to resolve imbalances.
- 5.26 Thus, NGC's proposal would reduce, to an extent, its disincentive to minimise costs when the system was long (since it would be less exposed) and it would sharpen its incentive when the system was short. However, the effectiveness of NGC's proposal relies on the assumption that the reference price would always lie between the System Buy Price and the System Sell Price. For example, if the system was short and the reference price was higher than the System Buy Price, the NGC would have less of an incentive to minimise costs than if no adjustment had been made.

³⁵ The precise algebra used in NGC's examples is different from the overview of the overall approach given above.

Ofgem's View

- 5.27 Ofgem agrees that the initial incentive scheme on NGC under NETA should cover all energy and system balancing costs. We recognise NGC's concerns about its potential exposure to the net imbalance volume. We also recognise the potential benefits of NGC's proposal to reduce its exposure to the net imbalance volume at a reference price might bring, in sharpening its incentives to reduce system balancing costs. To the extent that NGC can influence net imbalance volumes (for example, via its demand forecasts), this proposal would reduce ITS perverse incentive to make the system as long as possible.³⁶
- 5.28 Whilst careful consideration will need to be given to setting a reference price that is likely to lie between the System Buy Price and the System Sell Price, from a practical perspective NGC's proposal has considerable merits for an initial scheme. For example, were we not to adopt NGC's proposal, the incentive scheme target would need to incorporate a forecast of the total costs of energy balancing.³⁷ Given that there will be no historic data on which to base such a forecast, it would be difficult to determine a reasonable forecast of the costs of energy balancing.
- 5.29 Thus, Ofgem proposes that, as an interim measure until the costs of energy and system balancing under NETA are better understood, the initial SO incentive scheme should be based on the total system and energy balancing costs and the costs of an allowed volume of transmission losses, subject to reducing NGC's exposure to the net imbalance volume at a reference price. It will be important to reconsider this decision in the light of experience when agreeing the scope and form for the enduring SO incentive scheme under NETA.

³⁶ Over time we would expect the importance of NGC's demand forecast to lessen as participants develop their own demand forecasting ability, and thus its influence on the net imbalance volume to reduce.

³⁷ There remains the issue of an allowance for the residual costs of the net imbalance volumes represented by the difference between the reference price and the outturn price.

Bundled versus Unbundled Incentive schemes

- 5.30 Both the July 1999 NETA document and the December Consultation discussed the evolution of the current incentive schemes on NGC and the way in which these schemes have focused on the progressive unbundling of cost categories, with each cost category having its own incentive scheme.
- 5.31 To date the unbundling of services and costs has been successful, in so far as it has attempted to target the costs over which NGC has some control and which it can therefore reduce. It has also enabled the costs of system operation and the key drivers to be better understood. However, the use of separate incentive schemes inevitably means that NGC will take actions designed to maximise its returns under the various incentive schemes rather than to improve efficiency overall, by reducing total system operator costs which are ultimately borne by the customers.
- 5.32 Under NETA, NGC as SO will be given greater choice in the tools it has available to achieve an overall system balance in each half-hour trading period. For this freedom to be effective, the SO incentive scheme(s) should give the SO greater discretion in how it controls costs incurred in its SO role.
- 5.33 Ofgem argued in the December Consultation that an incentive framework that covers all SO costs incurred by NGC within a single, and therefore bundled, incentive scheme covering all energy and system balancing costs is the most consistent approach to the NETA regime.

NGC'S View

- 5.34 NGC believes that in the long term there might be benefits to bundling costs into a single incentive scheme. However, due to the uncertainty surrounding the development of the reactive power market, NGC believes that the costs of reactive power and Losses should not be bundled with other energy and system balancing costs for the initial SO incentive scheme and that there should be a separate incentive scheme on these costs. NGC has commented that there is a significant uncertainty with regard to the costs involved in providing reactive power in relation to the valuation of reactive capability.

- 5.35 NGC suggested that there should be a Balancing Services Incentive Scheme (BSIS) and separate incentive schemes on reactive power and transmission losses.

Other Respondents' Views

- 5.36 Nineteen respondents commented on this issue. Nine remaining respondents agreed that a bundled approach to incentives would encourage NGC to work towards reducing system energy and balancing costs across all areas.
- 5.37 Four respondents argued that separate incentive schemes covering individual cost categories were appropriate given the transparency this approach would bring. One of these respondents suggested that a bundled scheme might be interpreted as a backward step, as it might still allow NGC to 'manage' its rewards. Four other respondents did not express any preferences but provided comments.
- 5.38 Two respondents agreed with bundling as a long term objective but commented that since unbundling had proven to be successful in the past then perhaps it should continue to be used in the initial SO incentives under NETA in order to reduce costs and establish market processes.

Ofgem's View

- 5.39 Ofgem appreciates that there are arguments for separate incentive schemes. However, having reassessed the relative merits of bundled versus unbundled schemes, Ofgem proposes that there should be one SO incentive scheme under NETA covering all energy and system balancing costs including reactive power and transmission losses. This will ensure that NGC is consistently incentivised across all cost categories such that overall system and energy balancing costs are maintained at an efficient level and that there are no perverse incentives on NGC to reduce one category of costs over another. NGC will then be able to look to the costs and benefits of reducing the costs of system operation as a whole and not just individual elements.
- 5.40 We acknowledge that any perverse incentives to reduce one category of costs rather than another could be reduced with unbundled incentive schemes by ensuring that each of the unbundled incentive schemes have consistent sharing

factors and caps and collars. However, consistent sharing factors would still not result in a complete incentive on NGC. For example, with unbundled incentives on individual cost categories, NGC could reduce costs in one category such that it would earn its maximum payment but having reached the cap it would face little incentive to make any further cost savings that might be possible.

Approach to Setting the Incentive Scheme Target

- 5.41 In the December Consultation, Ofgem described three possible options for setting the incentive scheme target:
- ◆ First, the incentive scheme target could be based on an ex-ante target of the total balancing costs NGC might be expected to incur over a given period;
 - ◆ Second, NGC could be incentivised to ensure that the price of its balancing actions was as close as possible to a reference price (either pre-determined or a dynamic reference price emerging from a power exchange), which would be set to reflect market conditions on the day; and
 - ◆ Third, NGC could be incentivised to minimise the volume of services it purchased at a reference price (either pre-determined or set dynamically).
- 5.42 Ofgem expressed a preference for the third option but, as noted above, accepted that this might not be appropriate for an initial scheme.

NGC's Views

- 5.43 NGC argued that the second approach to setting the incentive scheme target would not fully incentivise it and could give it perverse incentives. For example, it would preferentially take low volume, high price actions (or low price, high volume actions) in order to benefit under such an incentive scheme. NGC recognised that these types of actions would not necessarily be the most efficient actions in terms of overall system costs. Similarly, NGC argued that an incentive scheme based on minimising the difference between the actual and the target volume of balancing services (the third approach) could create perverse

incentives. Thus, NGC suggested that the incentive scheme should continue to be based on a forecast of the costs it can be expected to incur.

- 5.44 NGC suggested two options for setting the incentive scheme target: an ex- ante forecast of the costs it can be expected to incur, or the use of a rolling daily target. Under the rolling daily target approach, the incentive scheme target on any particular day would be based upon a weighted average of outturn costs in the preceding days, and the previous day's incentive scheme target. Given the uncertainty in the costs it might face under NETA, NGC argued that a rolling target approach should be adopted for the initial incentive scheme.

Other Respondents' Views

- 5.45 Nine respondents commented on whether a reference price approach (i.e. option two or three) to setting the incentive scheme target was appropriate. Three respondents agreed that a reference price based on prices emerging from a power exchange was appropriate. Four disagreed with the reference price approach and implicitly supported a cost based approach. Two respondents did not express any preference but provided comments.
- 5.46 Of the respondents who supported a reference price, most suggested that it was an appropriate measure to accompany a sliding scale scheme.
- 5.47 Comments supporting the views of those respondents who preferred a fixed reference price approach included the suggestion that the use of a dynamic reference price is likely to be overly complex in the initial period of the new electricity trading arrangements.

Ofgem's View

- 5.48 Although Ofgem favours moving away from an ex-ante forecast of costs for the enduring SO incentives scheme, we recognise that this may not be practicable for the initial scheme given the difficulties in setting a dynamic reference price at this stage. Moreover some of the costs faced by NGC (for example, reactive power and Black start) are unlikely to change substantially with the introduction of NETA and thus the parameters Ofgem has agreed with NGC relating to the April 2000 incentives are likely to continue to be applicable for this initial scheme. For other costs, such as reserve and response, where the volume of

services required is likely to change with NETA, the April 2000 parameters remain a good basis from which to start our considerations.³⁸ Thus, Ofgem proposes that for this initial scheme, the incentive target should continue to an ex-ante forecast of costs.³⁹

- 5.49 Ofgem believes, for three main reasons, that the rolling target approach is inappropriate. First, a rolling target approach would give NGC at least some control over the incentive scheme target on any particular day. Second, the incentive scheme would not be transparent since participants would be given little indication of the energy and system balancing costs NGC can be expected to incur over a period of time. Third, NGC has argued that one of the reasons it believes the rolling target approach is appropriate is the level of uncertainty surrounding the costs of system operation under NETA. However, given that Ofgem has proposed that NGC's exposure to the net imbalance volume should be reduced much of the uncertainty in balancing costs faced by NGC will have been removed.
- 5.50 Ofgem believes that an initial bundled SO incentive can be achieved. Although NGC has raised concerns about reactive power costs as part of one scheme, including them in the proposed initial incentive scheme this should be straightforward. Under the current incentive schemes, Ofgem and NGC, already agree a cost based target for reactive power. In order to incorporate transmission losses, one possible approach would be to agree a specific volume target (as opposed to the range in the current incentive scheme) and a reference price for losses, which, in combination, would give a cost target.

³⁸ It should be noted that other costs such as unscheduled availability payments borne by customers under the current arrangements such will not exist in their current form under NETA. Whilst other means of valuing availability may emerge, this will be in response to the needs of participants and not as part of a centrally administered payment mechanism.

³⁹ Further consideration might be given to whether the ex-ante forecast agreed for the period covered by the initial scheme should be profiled over months, weeks or days with monthly, weekly or daily sharing factors to give shorter term incentive schemes.

Form of the Incentive Scheme

- 5.51 In the December Consultation, Ofgem argued that, in general, the form of an incentive scheme (whether economic purchasing, RPI-X, or profit sharing) should be determined by the extent to which NGC can control the costs covered by the scheme.
- 5.52 The current incentive schemes are based on a sliding scale or profit sharing design. The sliding scale design of the current schemes has had a number of advantages, including simplicity and a clearly identified target.

NGC's View

- 5.53 NGC agrees that a sliding scale form of incentive remains appropriate.

Other Respondents' Views

- 5.54 Of the sixteen respondents who commented on this issue, fourteen agreed with Ofgem's view that a sliding scale form of incentive remained appropriate. No respondents disagreed with Ofgem's initial view. Two respondents did not express any preference but provided comments.
- 5.55 Many respondents commented that the sliding scale form of incentive is a tried and tested one and has delivered efficiency gains to the market.

Ofgem's View

- 5.56 Ofgem agrees with NGC and the vast majority of respondents to the December Consultation. A sliding scale form of incentive with appropriately set targets, caps, collars and sharing factors should provide an effective incentive on NGC to ensure that incentivised costs are maintained at an efficient level. Thus, Ofgem proposes retaining a sliding scale form of incentive for the initial SO incentive scheme under NETA.

Duration of the Incentive Scheme

- 5.57 Previous incentive schemes on NGC have lasted no more than two years. NGC has suggested in the past that it would be more appropriate to implement incentive schemes of a longer duration. This would encourage it to undertake

activities that would have a progressive and longer-term impact on the costs of energy and system balancing.

- 5.58 In general, Ofgem agrees that longer-term incentive schemes would provide a more effective incentive on NGC. However, the drivers of energy and system balancing costs under NETA will not be fully understood until after the new arrangements have been implemented. In addition, the introduction of new transmission access and pricing arrangements will require changes to the incentive schemes on NGC. Ofgem would like to introduce new access arrangements by April 2001. Given this, Ofgem argued in the December Consultation that it might be appropriate to introduce an initial SO incentive scheme of six months or one year.

NGC's View

- 5.59 Given the uncertainty associated with costs under NETA, NGC suggests that it may be appropriate to put in place a short initial incentive scheme from the implementation of NETA until April 2001. After this, a longer-term scheme could be implemented and this scheme could be aligned with the main price control.

Other Respondents' Views

- 5.60 Thirteen further respondents commented on the appropriate duration for the initial SO incentive scheme under NETA. Two respondents argued for a six-month scheme to run from the implementation of NETA until April 2001. Eight respondents argued for an initial scheme lasting for one year. Most respondents agreed that ultimately the duration of the SO incentive scheme should be aligned with that of the main NGC Price Control.

Ofgem's View

- 5.61 Ofgem believes that it is appropriate to implement an initial SO incentive scheme under NETA of a relatively short duration. We suggest that a scheme should be introduced to run from the implementation of NETA to October 2001 but with specific provisions included to allow for the scheme to be replaced on the introduction of new transmission access arrangements, targeted for April 2001, when the new NGC Price Control starts. The advantage of this approach is that not only does it provide the flexibility to incorporate further developments

to the scheme under NETA, but it also moves closer towards Ofgem's aim to align the duration of the SO and TO price controls, as a means of ensuring consistency between the incentives on NGC, across both its TO and SO activities.

Initial Views on Incentive Scheme Parameters

5.62 This section presents some initial thinking on the parameters of the initial SO incentive scheme under NETA including:

- a) The incentive scheme target and appropriate reference prices;
- b) The appropriate sharing factors, cap and collar for the scheme;
- c) Income Adjusting Events provisions; and
- d) The treatment of SO operational expenditure.

5.63 These parameters are defined and discussed below, in the context of the proposed form, scope and duration of the initial SO incentive scheme.

a) The Incentive Scheme Target and Appropriate Reference Prices

5.64 Given the form and coverage of the incentive scheme proposed by Ofgem, a target cost for the initial SO incentive scheme will need to be agreed. The target cost will need to incorporate a forecast of the following energy and system balancing services:

- ◆ Reserve (contract costs, loading and deloading, utilisation);
- ◆ Frequency response (contract costs, loading and deloading, utilisation);
- ◆ Transmission Constraints (contract costs, loading and deloading);
- ◆ Black start (contract costs);
- ◆ reactive power (contract and utilisation payments); and
- ◆ transmission losses (fixed volume at a reference price).

- 5.65 The costs involved in purchasing these balancing services will have both a volume and price component. We present below some initial thinking on the impact of NETA on the volume and price of balancing services.
- 5.66 A reference price to be used in removing NGC's exposure to the net imbalance volume also needs to be agreed. Possible options for this reference price are discussed in the last part of this section.

NGC Incentives from April 2000

- 5.67 Ofgem and NGC have agreed an allowance for each of the main cost areas covered by the TSU and RPU incentive schemes to apply from 1 April 2000, as shown in the table below. Taken together form the basis of the target of the incentive schemes.

Table 5.2 - Proposed allowances for TSU and RPU Incentive scheme for 2000/01

£m (1999/00 money)	1998/99 outturn	Probability weighted average of NGC scenario forecasts	Ofgem Allowance
Frequency response	85.9	88.3	83
Reserve	72.3	73.0	70
Constraint	21.2	24.6	20.2
Black start	7.9	12.0	10
Miscellaneous costs	24.4	15.7	13.2
Total TSU	211.5	213.5	196.4
Allowance for sensitivities	-	4.7	2.4
Total TSU outturn/target	211.5	218.3	198.8
Total RPU outturn/target	44.8	44.4	46.5⁴⁰

5.68 Ofgem believes that the new April 2000 incentive schemes on NGC, under the current trading arrangements, provide a useful base from which to begin thinking about the direction in which costs might move under NETA.

Impact of NETA on the Volume of Services

5.69 NGC has provided Ofgem with some initial views on how the volume of services required might change under NETA. We discuss NGC's views on the impact of NETA on each of the main balancing services below.

⁴⁰ Includes an additional allowance of £1.6 m for valuing reactive capability at low load factor stations.

Response and Reserve

- 5.70 NGC believes that there could be a substantial rise in the volume of response and reserve required under NETA.
- 5.71 NGC argues that the level of reserve required could rise, at least initially, for a number of reasons. For example:
- ◆ there could be a substantial increase in demand forecast errors due to active demand side participation in the energy market;
 - ◆ generation output may become more volatile as generators attempt to minimise imbalances at the half hour level i.e. their output within a half-hour could vary as they attempt to reach a particular volume over the half-hour;
 - ◆ gate closure at 3.5 hours before the start of each trading period will mean that a greater volume of plant requiring a long notification period will need to be utilised; and
 - ◆ at times of rapid changes in demand, the above effects of demand forecast error and generation adjustments within half-hour could be magnified.
- 5.72 Overall, NGC believes that the impact of NETA could lead to a significant increase in the level of reserve it needs to hold.
- 5.73 NGC also argues that it may need to procure more frequency response under NETA. For example:
- ◆ as for reserve, increased uncertainty associated with the intra half-hour performance of generation and demand and increased demand forecasting errors could require more response to be held; and
 - ◆ if NETA leads to a reduction of the provision of demand side response contracts (in response to more favourable prices in forwards markets or the Balancing Mechanism than for response contracts) then an additional amount of response will be needed.
- 5.74 NGC's initial thoughts produced in November 1999 on the increase in response and reserve required under NETA are summarised in Table 5.3 below. These

numbers are indicative only, at this stage and they will be the subject of further consideration before initial proposals on the SO incentive scheme under NETA are produced. Nevertheless, they represent a useful starting point to begin thinking about one of the key drivers of energy and system balancing costs under NETA.

Table 5.3 - Possible Impact of NETA on the Volume of Services

Factor	Current	Impact of NETA
Demand participation	Day ahead pricing based upon predicted demand behaviour. Demand uncertainty adds approx. 2.2TWh to total reserve requirements	Increase of reserve requirements to 4.4TWh due to increase in demand error forecast
Plant Loss	Average level of plant failure 500MW	None
Overgeneration /Generation Shortfalls	No penalty for failure to meet instructed levels of output	Generators forced to minimise imbalances for any integrated half an hour. May require additional reserve on system to compensate for any volatility Possible increase of 2.6TWh
Short Gate Closure	Day ahead gate closure allowing planning	FPNs and Offers and Bids notified 3.5 hours ahead may require extra plant to accommodate the reduced usable plant availability Possible increase of 1.8 TWh
Contingency reserve	Currently ensures there is spare capacity from day ahead stage to manage risk of plant breakdown. Ancillary Service contracts in place to allow a hot start or to accommodate a cancelled Plant	NGC will need to continue to make provisions for warming services to ensure stability of the system
Frequency response	NGC currently purchases frequency response in relation to level of demand as well as the largest demand and generation and loss on the system	NGC anticipates greater uncertainty in demand and generation profile and this could lead to an additional 1.8 TWh of response required. Potential loss of demand side response could lead to an increase in response required of 2.1 TWh

5.75 In total, NGC believes that NETA might require it to hold up to an additional 12 TWh of response and reserve headroom compared with the current trading arrangements.

Black start and reactive power

- 5.76 NGC believes that NETA will not influence the volume of Black start capability or reactive power that it needs to procure.

Constraints

- 5.77 NGC does not believe that NETA will have a significant impact on the volume of transmission constraints under NETA.

Energy Balancing

- 5.78 The volume of energy balancing that will be required is uncertain but is irrelevant given the proposed form of the initial incentive scheme.

Transmission losses

- 5.79 As with constraints, in the absence of a substantial change in the pattern flows across the country, there is unlikely to be a substantial change in the volume of Losses. Therefore, NGC believed that the current volume of Losses is an appropriate base from which to start.

Price of Balancing Services under NETA

- 5.80 NGC believes that the price of balancing services under NETA can be considered under two categories:
- ◆ Participants' Bidding Structures; and
 - ◆ Balancing Services Contracts.
- 5.81 In relation to participants' bidding structures, NGC believes the following factors may influence the prices submitted by participants:
- ◆ their (i.e. participants) ability to offer different prices in different markets will influence both the contract and utilisation price of response and reserve;
 - ◆ their (i.e. participants) ability to change the price of offers and bids submitted in the Balancing Mechanism from period to period; and
 - ◆ the fact that there will be no cap on the price offers or bids submitted in the Balancing Mechanism.

5.82 In relation to Balancing Services Contracts, NGC believes that three effects will influence the prices offered for the provision of such services:

- ◆ gate closure at 3.5 hours will influence the volume of reserve required and therefore its price;
- ◆ prices for frequency response may increase as participants internalise their expected exposure to imbalance prices as a result of providing response via their offers and bids; and
- ◆ greater transparency in the prices paid by NGC for balancing services will lead to participants extracting the maximum value for the service they offer by bidding up to the price of the most expensive service provider.

5.83 In addition, NGC believes that the removal of the capacity payments mechanism could lead to an increase in energy prices overall as participants internalise their fixed costs in the offers/bids submitted to the various markets.

5.84 Thus, overall, NGC believes that drivers of both the price and volume of balancing services required under NETA are generally in an upward direction. NGC acknowledges that an increase in competition may offset these trends to an extent, but considers that there will still be upward pressure on balancing costs.

Ofgem's view

5.85 Ofgem agrees with NGC and other participants, who have suggested that, at least initially under NETA, there may be a need to hold some additional response and reserve. The need for any additional holding of reserve and response for the introduction of NETA should reduce over time, as the uncertainty surrounding the behaviour of generation and demand becomes better understood. However, further consideration will need to be given to the volume drivers under NETA to ensure that any additional requirements are robust and that there is no double counting between drivers.

5.86 An increase in the volume of reserve and response implies (all other things being equal) an increase in the costs of balancing under NETA. However, against this must be set the removal of unscheduled availability payments under NETA which are effectively part of the costs of reserve and response now,

although they are not treated as such. Viewed in this light, higher reserve and response levels under NETA will not necessarily imply significantly higher costs.

- 5.87 Ofgem's initial view, in relation to the drivers of prices under NETA, is that whilst generators and demand will naturally try to extract the highest possible value for the service they provide, there are, equally, drivers that are working to reduce wholesale prices across the range of services that generators and demand offer.
- 5.88 NGC has argued that under the current Pool arrangements the shape of the supply curve is one of the key drivers of the cost of response and reserve. Ofgem agrees with this, but increasing competition across the supply curve could lead to falling prices for utilising response and reserve. Given recent experience of prices under the Pool, it is apparent that the shape of the supply curve needs to be taken into consideration when determining a target for the incentive scheme.
- 5.89 Overall, Ofgem believes that increasing competition in the wholesale market is driving prices lower across the supply curve. With this experience in mind, there are no grounds for certainty that prices charged by generators and demand for balancing services will increase under NETA. Ofgem considers that as competition within the wholesale market increases, average prices across the supply curve could fall.

Determining a Reference Price for the Net Imbalance Volume

- 5.90 Ofgem has proposed reducing NGC's exposure to the net imbalance volume, via the use of a reference price. As explained above, the effectiveness of this proposal relies on a reference price being chosen that lies between the System Buy Price (SBP) and System Sell Price (SSP).
- 5.91 Three possible options exist for how the reference price could be set:
- ◆ a dynamic reference price that changes daily or even hourly and is taken from an appropriate short-term forward market e.g. a power exchange.

- ◆ a pre-determined reference price. The pre-determined reference price could either be a fixed price that would apply for the duration of the scheme or a matrix of reference prices to be applied at different times of the year and at different times of the day; or
- ◆ the reference price could be linked directly to energy imbalance prices. For example, the reference price could represent an average of the two energy imbalance prices or it could be based on a proportion of the System Buy Price and the System Sell Price.

5.92 A dynamic reference price emerging from forwards market is likely to be the best reflection of the price of energy traded by market participants. However, as discussed previously in relation to the incentive scheme target, Ofgem recognises that at least initially a suitable reference price from a power exchange or other market may not have emerged at the start of NETA. Furthermore, whilst prices in the forwards markets and offers and bids in the Balancing Mechanism will have some common drivers, the drivers of prices in each market will not be identical. We could witness Balancing Mechanism offers and bids that are very different to prices seen in the power exchange. If the reference price were to fall outside the range represented by the System Buy Price and the System Sell price, the effectiveness of NGC's proposal would be significantly reduced. One possibility might be to cap and collar the reference price to ensure that it remained in the right range.

5.93 Similar considerations also apply to the pre-determined reference price approach. In addition, there is likely to be considerable debate as to the appropriate value(s) for a pre-determined reference price. One possibility would be the average EFA price for winter peak/baseload contracts in October 2000.

5.94 A reference price linked to outturn energy imbalance prices, could be set to ensure that the reference price always lies between the System Buy and System Sell Prices. However, this option could provide NGC with a perverse incentive. For example we will need to explore further whether, by taking certain actions in the Balancing Mechanism, NGC could influence energy imbalance prices to maintain a differential between System Buy Prices and System Sell Prices in order to obtain a pay-off under its incentive scheme.

5.95 Further consideration needs to be given to this issue over the coming months to enable an appropriate reference price to be selected that will lay (predominantly) between the System Sell Price and System Buy Price, in order to maximise the effectiveness of the initial SO incentive scheme on NGC.

b) The Appropriate Sharing Factors, Cap and Collar for incentive scheme

5.96 During discussions between Ofgem and NGC on revised Transmission Services Uplift (TSU) and Reactive Power Uplift (RPU) incentive schemes to apply from 1 April 2000, Ofgem and NGC agreed that an efficient and balanced incentive scheme should have symmetric sharing factors of 50%. Thus, NGC and customers would share equally the costs or benefits, of better or worse expected performance.

5.97 Now that the principle of symmetric sharing factors has been established, Ofgem believes it is appropriate to carry this principle over to the new incentive scheme under NETA. It would also be possible to introduce more complex sharing factors such that, for example, NGC was more exposed to costs close to the target levels and less to costs further away.

5.98 The precise value and complexity of the sharing factors is a matter for further consideration, but Ofgem believes that there is some uncertainty in terms of both system and energy balancing costs and in moving to a bundled incentive scheme. Thus, there may be merit in reducing the sharing factors in the initial SO incentive scheme to below 50%. An alternative would be to leave sharing factors at 50% but reduce the range over which the scheme applies.

5.99 The current TSU and RPU incentive schemes cap the payments that can be made to NGC and collar the payments made by NGC. Such an approach continues to seem appropriate given the uncertainties inherent in setting the initial target scheme.

5.100 Further consideration needs to be given to the appropriate form and value of the cap and collar under the initial SO incentive scheme. Ofgem's initial view is that the simplest arrangement would be a monetary cap and collar that could be linked to the incentive target. For example, the cap and collar could respectively be set at a percentage (for example, 10%) of the total cost target.

5.101 The above issues are also linked to the issue of Income Adjusting Events, discussed below. In general, Ofgem believes that it would be sensible to limit NGC's exposure through a suitable combination of sharing factors, caps and collars, and possible provisions for Income Adjusting Events.

c) Income Adjusting Events provisions

5.102 Under the current TSU and RPU schemes, NGC has the right to ask Ofgem to consider resetting the parameters of the incentive scheme should a particular event (or series of events) occur.⁴¹ Such an event must be deemed to be outside of NGC's control and also an event which results in a greater than £2 million increase or decrease in TSU or RPU.

5.103 In its November 1999 Consultation document,⁴² Ofgem suggested that in place of the current specific list of Income Adjusting Events, there should be a more general statement of principles and processes. In the past, Ofgem has taken the view that there may be no need to take account of any Income Adjusting Events listed under NGC's current incentive schemes, apart from in the case of emergencies. These arrangements provide protection for both NGC and customers in the event that an unforeseen incident results in extreme costs or unforeseen benefits.

5.104 This approach has been adapted for the TSU and RPU incentive schemes, which apply under the current arrangements from April 2000. Further consideration needs to be given as to whether these arrangements should be taken forward in the new incentive scheme under NETA.

d) The treatment of SO operational expenditure

5.105 NGC has highlighted one further issue. It believes that it would be appropriate to expand the scope of the incentive scheme to include all internal costs relating to its SO activities (e.g. all costs associated with procuring and settling balancing

⁴¹ LC A4(10) defines the circumstances under which NGC's income from the current Transmission Services Uplift and reactive power Uplift incentives schemes could be adjusted up or down.

⁴² NGC Incentive Schemes from April 2000. Transmission Services Uplift and reactive power Uplift Schemes: Initial Proposals. A Consultation Document. November 1999.

services, core system management costs and continuing operational systems development).

5.106 Two sets of internal system operator costs are included within the prevailing SO incentive schemes:

- ◆ an allowance of approximately £5m has been made for Ancillary Business Overheads for the period 1 April 2000 to 31 March 2001; and
- ◆ an allowance for incremental SO costs currently allowed in the SO incentive scheme. These costs are additional SO operational expenditure not foreseen at the time of setting the current transmission price control. For the period 1 April 2000 to 31 March 2001, Ofgem has made an allowance of £540,000 for operational expenditure incurred by NGC in its SO activities.

5.107 In both instances, Ofgem proposes that a simple pro rata approach should be followed to determine what proportion of these costs have been included in the current schemes when they are terminated on the implementation of NETA. The remaining costs should be included in the initial NETA scheme up to 31 March 2001.

5.108 A much larger amount (approximately £50 million) associated with the fixed costs of system operation (system management costs and the costs of central NGC overheads allocated to the SO) is currently included in the main NGC price control. Although further consideration needs to be given to whether these SO costs should in the future be recovered under the SO incentive scheme, Ofgem's initial view is that we would like all SO costs to be recovered under the SO incentive scheme from April 2001. This would have to be coordinated with equivalent changes to the RPI-X based main price control. The Price Control Initial Thoughts Consultation document (March 2000) proposed the separate identification of SO and TO costs within the Transmission Price Control that will make this possible and this will assist in moving the SO costs to the incentive scheme.

5.109 Clearly, NGC should be allowed to recover efficiently incurred costs associated with its SO function. However, it is for further consideration whether and how these costs could be incentivised. For example, rather than allowing a straight

pass through of these costs, they could be included within the SO incentive scheme, such that NGC would be incentivised to look at the trade-offs within the incentive scheme of incremental expenditure.

5.110 In addition, NGC has identified two new cost areas associated with the new trading arrangements.

- ◆ NGC's internal NETA development and operational costs incurred prior to 1 April 2001.
- ◆ NGC's internal NETA development and operational costs incurred after 1 April 2001.

5.111 Ofgem will look to ensure that the internal NETA related costs that NGC wishes to recover are both appropriately and efficiently incurred. Ofgem believes that some of these costs should be recoverable under the initial SO incentive scheme under NETA. Ofgem will invite views in the next consultation on NGC incentives under NETA (expected in June 2000) on the magnitude and treatment of these costs.

Settlement of the Balancing Services Use of System charges and the Incentive Scheme

5.112 Currently, Initial Settlement of Uplift costs occurs 28 days after the event and then an ongoing reconciliation of demand takes place over a 14 month period. NGC believes that any new incentive scheme will require extensive changes to the existing charging systems reflecting both the different cash flows under NETA and to an extent the different nature of the costs that will be incurred under NETA. In addition, NGC believes that NETA will require a small number of changes to the timetable for charging the Balancing Services Use of System (BSUoS) charges i.e. the successor to the current Transmission Services Use of System (TSUoS) charges, and also to the method it uses to incorporate the costs of Balancing Services (BS) contracts (and NGC internal system operator expenditure). NGC has outlined a number of working assumptions:

- ◆ Initial Settlement and funds transfer for the Balancing Mechanism takes place at Day+28. This includes NGC paying the total costs of the Balancing Mechanism known as System Operator Balancing Mechanism Charge (CSOBM);
- ◆ Initial Settlement of BSUoS will also take place at Day+28 to maintain an even cashflow for NGC;
- ◆ Thus: $BSUoS^* = CSOBM + \text{Balancing Services Contract costs} \pm \text{incentive payments}$;
- ◆ Timescales for the reporting and settlement of Balancing Services contract costs will be the same as those currently employed for Ancillary Services contracts.

5.113 In order to determine the BSUoS charge for any given settlement period, NGC will need to calculate the cost of all Balancing Services Contracts to be allocated to that settlement period. This calculation relies upon information supplied from the Initial Settlement of the central systems (for example, metered volumes). NGC believes that the timescales for settlement envisaged under NETA will not enable it to calculate balancing services contract payments after receipt of data from the central systems and prior to the publication of the BSUoS charge.⁴³ Consequently, NGC believes that it will not be able to calculate accurately the finalised Balancing Services contract cost until some time after the Initial Settlement run output has been received.⁴⁴

5.114 NGC believes, therefore, that a process is required that ensures that the best estimate of Balancing Services contract costs is included in the BSUoS charge at Initial Settlement, with a mechanism for including any reconciliation between this forecast and the actual cost within the BSUoS for a later date.

5.115 Thus, NGC proposes that:

⁴³ Since the BSUoS charge has to be published as soon as possible after the publication of the BM charges to allow market participants the time to organise funding.

⁴⁴ The costs are also subject to adjustment after this stage as disputes are raised by service providers.

- ◆ BSUoS charges are levied using the same timetable as Balancing Mechanism charges;
- ◆ Balancing Services contract costs included in the initial settlement of BSUoS will be based on the best available information at that time. Hence, at the start of NETA, NGC proposes that the Balancing Services contract costs included in BSUoS will be an ex-ante daily forecast smeared evenly across all half hours. NGC believes that this will give an acceptable degree of accuracy as it will be based on an accurate forecast of capability payments and a more subjective forecast of utilisation payments that will be based on historic precedent.⁴⁵

Although more accuracy could be introduced by ensuring that the finalised output of the BS settlement systems was used in the BSUoS charge, NGC believes that this would require a radical change to its systems and working practices to ensure that the timescales for notifying NGC's customers of its charges were maintained. NGC does not believe that these systems and process could be developed for the start of NETA.

- ◆ A reconciliation of forecast to actual Balancing Services contract costs will need to be included in the BSUoS charge and a mechanism for this will need to be agreed.
- ◆ NGC proposes that it maintains a rolling comparison of forecast to actual costs for incorporation of any difference into a BSUoS charge in the future. The reconciliation amounts can be smeared across a period of (for example) one month to ensure that no unnecessary distortions are introduced. This is similar to the current process for the funding of Ancillary Services contracts in the Pool.

5.116 In many respects, NGC's proposal represents the minimum change possible from the current systems and processes for settling and charging the costs of Ancillary Services. Ofgem and NGC will continue to explore NGC's processes and the development of its systems to ensure that the settlement and charging

⁴⁵ This could be refined at some point after day 1 to be based on the preliminary output of the BS settlement systems. These systems will utilise data from the preliminary output of the central systems.

systems are as fair as possible to all participants. Nevertheless, NGC's proposal appears to be a sensible starting point.

Summary and Views Invited

5.117 In summary, Ofgem believes that the initial SO incentive scheme under NETA should cover all energy and system balancing costs including reactive power and transmission losses, subject to reducing NGC's exposure to net imbalance volume at a reference price. We propose that there should be one bundled incentive scheme and the incentive scheme target should be based on an ex-ante forecast of total balancing costs assuming a zero net imbalance volume. The initial SO incentive scheme should continue to take a sliding scale form and it should last for one year, with specific provisions to enable the scheme to be terminated at an earlier date (for example, on the introduction of new transmission access arrangements). Further consideration needs to be given to the parameters of the initial SO incentive scheme.

5.118 Views are invited on all the issues discussed in the chapter. In particular views are invited on:

- ◆ the proposal to incentivise NGC on all system and energy balancing costs subject to reducing its exposure to the net imbalance volume via the use of a reference price;
- ◆ the proposal to have a single SO incentive scheme covering all incentivised costs;
- ◆ the proposal to base the incentive scheme target on an ex-ante forecast of total balancing costs;
- ◆ the proposal to retain a sliding scale form of incentive;
- ◆ the proposal to have an initial incentive scheme which is of a year in duration but which includes specific wind-up provisions;
- ◆ NGC's views on the volumes and price of balancing services under NETA;

- ◆ the appropriate method for determining a reference price to be used to reduce NGC's exposure to the net imbalance volume;
- ◆ the appropriate sharing factors;
- ◆ the appropriate cap and collar for the incentive scheme;
- ◆ the desirability of an Income Adjusting Events provision;
- ◆ the treatment of NGC's internal SO costs; and
- ◆ the appropriateness of NGC's proposed BSUoS settlement process.

6. The Treatment of Transmission losses under NETA

This chapter presents Ofgem's proposals for a transitional loss charging arrangement to be in place for the start of NETA. The transitional arrangements described in the chapter are consistent with moving towards the introduction of a more cost reflective treatment of transmission losses in the future.

Background

- 6.1 Transmission losses in England and Wales are currently charged on a uniform basis across all electricity purchased in the Pool. The metered demand of all suppliers, in each settlement period, is scaled up such that the total demand through the Pool is equal to total metered generation. Thus, the cost of actual losses is currently recovered only from demand participants.
- 6.2 In accordance with Schedule 12 of the PSA, set up at Vesting, the Pool's Transmission Steering Group, in March 1996, considered the issue of locational charging for losses and suggested a more cost reflective zonal approach to charging for losses on both generators and suppliers. Subsequent to Pool member approval and the Director General upholding the Pool's resolution in an appeal for determination, the Pool Executive Committee set out in July 1996 a timetable to implement a differential Transmission Loss Factor (TLF) scheme in November 1997. A challenge by Teeside Power and Humber Power led to a judicial review, which has so far, prevented the proposals being implemented.

December Consultation

- 6.3 In the December Consultation, Ofgem outlined a wide ranging review of the transmission access and losses regimes in order that the electricity trading arrangements deliver efficient price signals to participants as to the value of transmission capacity and energy at different locations. We argued that changes to transmission losses and access arrangements should be designed to provide appropriate signals of the value of generation and demand at different locations. The document presented several specific objectives for the treatment and charging of transmission losses including:

- ◆ first, any charging regime should help to promote the efficient short-run matching of generation and demand;
- ◆ second, it should provide signals for the location of new investments for generation and demand; and
- ◆ third, it should help to signal the need for and appropriate location of network expansions i.e. it should provide long term investment signals.

6.4 The December Consultation also raised a number of issues to be considered in the design and application of any transmission loss charging regime. Specifically Ofgem said consideration would need to be given to:

- ◆ whether charges for transmission losses should be defined on a zonal or nodal basis;
- ◆ whether predetermined or actual flows should be used to calculate loss factors;
- ◆ whether marginal or average losses should be used to determine charges; and
- ◆ whether responsibility for purchasing losses should be with participants or NGC as SO.

6.5 Ofgem proposed that losses should be charged by scaling the metered volumes of both generators and suppliers prior to settlement on the basis of predetermined (ex-ante) locational marginal loss factors. These loss factors would be based on historic data. Ofgem believe that this arrangement would provide the most appropriate and efficient economic signals to generators and suppliers as well as providing them with considerable commercial freedom to manage their exposure to transmission losses. The December Consultation went on to present a detailed proposal for a loss charging arrangement under NETA based on a scheme originally devised by the Pool for use under the current trading arrangements.

6.6 The December Consultation also suggested that the surplus revenues that would accrue from the use of marginal rather than average loss factors should be

retained by the SO to offset against other transmission charges. Furthermore, Ofgem argued that with the introduction of locational loss charges it might be appropriate to consider changes to the way that Transmission Network Use of System (TNUoS) charges are calculated so as not to overexpose participants to locational signals.

NGC's View

- 6.7 NGC was generally supportive of the objective of establishing an efficient regime for the treatment and charging of transmission losses. Although it agreed that locational marginal loss factors could provide appropriate economic signals to market participants, it felt that there were important implementation issues to do with the correct calculation of these factors, the efficient collection of the revenue surplus and the interaction with other locational charges. Foremost of NGC's concerns was that the adjustment of participants' metered volumes on the basis of marginal Transmission Loss Factors (TLFs) would be more likely to result in an energy surplus rather than a financial revenue surplus.
- 6.8 NGC argued that, under NETA, the majority of participants would seek to stay in energy balance by matching their contract volumes with their loss-adjusted metered volumes. Consequently the use of marginal loss adjustments would result in an overall energy surplus, as participants' actions would overcompensate for the level of actual system losses, i.e. the average level of losses. This in turn would result in the SO always having to purchase more bids than offers. NGC argued that it is unclear to what degree this would result in a revenue surplus to them as opposed to a subset of players in the Balancing Mechanism and imbalance settlement.
- 6.9 NGC also raised a number of points associated with the interaction between the treatment and charging of transmission losses and any potential new transmission access and pricing arrangements. Whilst it agreed that the fact that the demand of non-half-hourly metered customers can only be measured at the Grid Supply Point (GSP) group level made nodal charging for demand impractical, it felt that it would be beneficial for transmission loss charging zones to be compatible with the zones used in defining system access rights. NGC also agreed with the advantages of using ex-ante signals of transmission loss

factors but felt that these should be derived from the information discovered in ex-ante access markets in order to correctly deal with the interactions between loss factors and constraints.

- 6.10 A further, and related point, raised by NGC was the effect that transmission constraints would have on the calculation of locational loss factors. It argued that in order for the correct locational signals to be sent to participants it would be desirable to consider the treatment of access and losses together both in terms of the time frames under which they are purchased and in the determination of an appropriate reference point to ensure an equitable sharing of costs between generation and demand.
- 6.11 In subsequent discussions dealing with initial SO incentive scheme under NETA, NGC has proposed that at the inception of NETA, NGC should be responsible for the purchase of actual average losses. Participants' metered volumes would not be adjusted but the costs that NGC incurs in purchasing losses would be recovered through a smeared charge across all participants. NGC proposes that the charge on individual players would be adjusted to include locational messages.

Other Respondents' Views

- 6.12 Thirty respondents to the December Consultation commented on issues related to the treatment of transmission losses under NETA. Of these, the majority supported the need for reform with regard to the treatment of losses. However, a few noted that more detail would be required before they felt able to comment on the proposals.
- 6.13 Several participants were concerned to ensure that due process is observed in debating proposals particularly given the judicial review of the Pools proposed loss scheme. A majority of respondents had reservations over the introduction of marginal losses, especially with the introduction of NETA. However, most respondents were in favour of both sides of the market (i.e. generation and demand) being charged for losses.
- 6.14 Views were evenly divided on whether zonal loss factors should be varied by season and time of day with many respondents taking the view that this

additional level of complexity (at least initially) may hamper participants ability to come successfully to grips with the new trading arrangements. On the whole, respondents were not supportive of the SO retaining any surplus resulting from a marginal loss charging regime.

Ofgem's View

- 6.15 Ofgem recognises the concerns raised by NGC and other respondents to the proposals in the December Consultation with regard to attempting to implement a full zonal marginal loss factor scheme in time for the start of NETA. For example, the calculation of ex-ante loss factors to be used in a losses scheme for the introduction of NETA would have had to be based on data for electricity flows prior to the introduction of NETA. It is uncertain at this stage the degree to which pre-NETA patterns of generation and demand will be a fair indication of energy flows, and hence transmission losses under the new arrangements. Given these uncertainties, Ofgem believes that it would not be appropriate, at the outset of NETA, to expose participants to the sharper signals provided by locational and marginal loss factors.
- 6.16 Thus, Ofgem proposes that for the introduction of the new trading arrangements, the treatment of transmission losses should be as follows.
- 6.17 First, as under the current arrangements, adjustments for transmission losses should be based on actual (i.e. average) losses and should be uniformly recovered on the basis of metered volumes. Thus, Ofgem proposes that participants' metered volumes should be adjusted in each settlement period to reflect the actual losses incurred in each settlement period. Ofgem believes that the use of actual losses rather than an ex-ante forecast of marginal loss factors will help, in the absence of information on the pattern of flows under NETA, to avoid the uncertainties and risks involved in using pre-NETA data to determine loss factors to be applied to generation and demand under NETA.
- 6.18 Second, both generation and demand should be exposed to the costs and benefits of transmission losses. Hence, transmission loss volumes (adjustments to metered volumes) determined for each settlement period should be allocated across all BSC parties. Ofgem proposes that for the start of NETA, 40% of the total volume of losses should be allocated to generators while 60% should be

allocated to the demand side. The rationale for this 40:60 split (as opposed to say a 50:50 split), is that broadly speaking, the Defined Meter Point for generation (under the Metering Codes of Practice) is the high voltage side of the generator transformer, whereas that for demand is the low voltage side of the supergrid transformer. Therefore, the loss volumes calculated do not take into account the supergrid transformer losses already incurred by generators, but do include the supergrid transformer losses on the demand side.

- 6.19 Third, participants should be responsible for purchasing losses. The adjustment of metered volumes in the settlement process means that participants will ultimately be responsible for purchasing losses under the initial NETA arrangements. Participants can choose to provide for losses themselves by adjusting their contractual position accordingly. Alternatively, a participant who does not contract ahead, or adjust their consumption/production position to account for losses, will face an energy imbalance and hence will effectively be buying their losses at the appropriate imbalance price. Some uncertainty will be faced by participants through the adjustment of metered volumes in the settlement process on the basis of actual ex-post losses, as it may be difficult to accurately predict, and thereby contract for, the level of losses that will actually be applied, but this uncertainty is less than that faced by demand side participants under the current treatment of losses (due to the wider charging base over which losses will be spread).

Effect on Participants

- 6.20 The proposals set out above have been designed to minimise the effect on participants at the start of NETA. The only significant differences from today are that generation will be allocated a portion of the losses and all participants will have a range of options for purchasing their loss obligations. In 1998/99 the total volume of losses was approximately 5.1 TWh paid for entirely by the demand-side. Under the new scheme, the volume would be split 40:60 between generation and demand. Thus the demand-side would pay for 3.1 TWh (a decrease of 1.1%) and the generation-side would forego payments for 2.0 TWh less (a decrease of 0.7%).

6.21 Ofgem's proposal not to introduce a major change in the losses regime on the introduction of NETA will assist participants as they begin to operate with the new trading arrangements for the first time. It will also allow time for a wider debate on longer term arrangements. At the same time, the proposals outlined above would enable progress to be made towards an efficient transmission loss allocation and pricing regime.

Summary and Views Invited

6.22 In summary, Ofgem proposes to introduce for the start of NETA an interim regime for the allocation and pricing of transmission losses. Under this scheme, the metered volume of generation and demand would be scaled in each settlement period to account for actual transmission losses. This will incentivise participants to adapt their contract positions to reflect their expected allocation of losses. Ofgem will be consulting in due course on a more enduring transmission losses scheme.

6.23 Views are invited on all the issues discussed in this chapter. In particular, views are invited on the proposals for the treatment of transmission losses at the start of NETA including:

- ◆ The use of ex-post actual losses to adjust all participants metered volumes;
- ◆ The 40:60 split of total losses between generation and demand respectively;
and
- ◆ The implicit requirement for participants to be responsible for purchasing their own losses.

7. Distribution Constraints and Embedded Generation

Issues

7.1 The December Consultation outlined a range of options for how distribution constraints and failures could be treated under NETA. In particular, Ofgem considered whether arrangements that more appropriately shared the costs of distribution network constraints and failures between NGC, customers and generators could be implemented.

7.2 This chapter reviews the responses received to the December Consultation and describes how a review of the issues raised will be taken forward.

Background

7.3 The transportation of energy in England and Wales is conducted via two integrated systems. NGC owns and operates the high voltage (voltages of 400kV and 275kV) transmission system whilst the distribution businesses of the regional electricity companies (RECs) operate local distribution systems at mostly lower voltages (typically 132kV and below). Although the majority of large generating sites and some major loads connect directly to the NGC system, most customers and a number of generators, both small and large, are connected to distribution networks.

7.4 Generating plant that are connected through the distribution network, either directly or via a busbar,⁴⁶ are known as embedded generators.⁴⁷ Centrally despatched embedded generators are treated in exactly the same way as generation directly connected to the high voltage transmission network and face the same network charges. Embedded generators that are not Pool members (i.e. are exempt generators) or are Pool members but not centrally despatched, do not receive constrained off payments in the event of distribution constraints.

⁴⁶ This can be interpreted as including generation in a private distribution system, as long as it is connected to the REC system at some point.

⁴⁷ The Exemption Order under Section 5 of the Electricity Act requires that any power station, which is 10 MW; or 50 MW in the case of a generating station with a declared net capacity of less than 100 MW must be licensed and thus join the Pool and be centrally despatched. There are currently 11 power stations that are embedded, but centrally despatched by NGC, with a combined capacity of just under 2.8 GW (3.8% of pooled capacity).

However, exempt generators can share with their local suppliers a number of so called "embedded benefits".⁴⁸

- 7.5 Network failures and constraints arise for the same reasons whether they are on the distribution or transmission network. In addition, problems on a distribution network may lead to constraints on the transmission network. Similarly, problems on the transmission network may lead to constraints on a distribution network. Due to these interactions, it is currently the responsibility of the NGC as SO to constrain off or on generators embedded in the distribution network to resolve distribution constraints.

The December Consultation

Current Treatment of Distribution Constraints and Failures

- 7.6 A distribution failure is defined as an unplanned outage of the distribution network. As such, it may lead to a constraint on the transmission network, reductions in the system's voltage or frequency, or, in more extreme circumstances, to consumers losing their electricity supply. The December Consultation noted that a loss of supply is nearly always the result of a distribution failure rather than a transmission failure.⁴⁹
- 7.7 Constraints on distribution networks tend to arise as a result of two main network restrictions:
- ◆ limitations on the distribution network itself; and
 - ◆ limitations at the interface between the transmission and distribution networks.⁵⁰

⁴⁸ These include reducing the payments the supplier makes with respect to TNUoS, Energy Uplift, Unscheduled Availability payments, TSUoS and Transmission losses. In addition, the generators themselves avoid TNUoS charges.

⁴⁹ OFFER in its 1997/98 Report on Distribution and Transmission System performance stated that "the number of {transmission} incidents that result in a loss of supply to final customers is very small". The impact of these incidents in terms of average energy not supplied is also small.

⁵⁰ Reinforcement work carried out to a number of Grid Supply Points has all but eliminated the costs associated with import constraints from the transmission system to the distribution networks although these costs were significant in the period 1991/92 to 1994/95.

- 7.8 The December Consultation stated that constraints on exports from a distribution system to the transmission system occur when a distribution network has insufficient capacity to export the total output of the generators that are embedded in its system. Such constraints tend to coincide with distribution network outages (planned or unplanned).
- 7.9 When an export constraint arises, NGC is notified by the REC as to which embedded centrally despatched generator's output must be reduced and by how much.⁵¹ NGC then instructs the generator to reduce its output in accordance with the REC's notification and the embedded generator receives constrained off payments to compensate for its curtailed output. In addition, the output of another generator will need to be increased. The constrained-on generator may be located anywhere on the transmission and distribution systems. Thus, the costs of constraining on and off plant to relieve a distribution constraint fall into Transport Uplift, which is allocated across all suppliers via TSUoS charges.⁵²
- 7.10 In 1994, the Pool, in accordance with Schedule 12 of the P&SA, set up a working group to consider these issues. During 1995 and 1996, discussions took place to develop a contractual framework designed to reduce the level of distribution constraint costs borne by NGC (and thus suppliers) and to send better economic signals to distribution network operators. As a result of these negotiations, bilateral contracts were suggested between NGC and each REC for reallocating the costs of distribution constraints arising on their network. However, these contracts were never agreed by the RECs.

Drivers of the Cost of Distribution Constraints and Failures

- 7.11 During the early years of the Pool, distribution constraints were substantial in part due to the retirement of centrally despatched plant that had previously been used to support the distribution networks. Over the past four years, no

⁵¹ In these circumstances, the PES would notify NGC of an export limitation under sections OC2.4.1.1 (d) and SDC 1.4.4.1 of the Grid Code. In compiling the Generation Schedule (Grid Code SCD 1.4.5.3), NGC would take account of this restriction and effectively instruct the Generator to reduce its output.

⁵² Embedded generators that are not centrally despatched do not, under the current arrangements, receive compensation if they are constrained down or off due to distribution constraints. However, they pay neither TNUoS Generation charges nor Distribution Network Use of System (DNUoS) charges. If the non-centrally despatched embedded generator is pooled it is liable to TNUoS demand charges if it net imports (i.e. take demand) over the triad.

significant distribution constraints costs have been incurred. NGC has told us that this has been predominantly due to better outage co-ordination being undertaken between RECs and embedded generators to avoid system constraints. However, recently, there have been circumstances leading to distribution constraint costs once again increasing. Although these incidents have been resolved, Ofgem is concerned that such incidents may occur with increased frequency and in greater magnitude as more embedded generating plant are commissioned.

- 7.12 In its Review of Energy Sources for Power Generation,⁵³ the Government stated that a key part of its overall energy policy framework was encouraging the development of combined heat and power (CHP) and renewables plant.⁵⁴ Most CHP and renewable generation is likely to be embedded within distribution networks and exempt from licensing. A much smaller proportion is likely to require a licence (mostly large CHP). If this potential growth in embedded generation occurs, it is possible that the number and volume of distribution network constraints will increase.

Participation under NETA and Distribution Issues

- 7.13 Under NETA, only licensed generators and suppliers will be required to be Parties to the BSC. As the majority of embedded generators and customers are currently licence exempt they will be free to choose whether or not to be a party to the BSC. However, direct participation in the Balancing Mechanism, will only be possible for signatories to the BSC.
- 7.14 The December Consultation noted that, as at present, NGC will need to take balancing actions in response to distribution network failures and constraints that result in a regional or national energy imbalance. In this sense, distribution network constraints and failures will continue to be treated in the same way as transmission constraints and failures. However, the December Consultation noted that the impact of constraints and failures on the imbalance position of participants located within distribution networks will not be uniform.

⁵³ Review of Energy Sources for Power Generation, Consultation Document, 25 June 1998.

⁵⁴ For the CHP the Government has set a target of 5,000 MWe capacity by the year 2000. For renewables it is working towards a target of renewable energy providing 10% of UK electricity suppliers as soon as possible.

7.15 We noted in Chapter 3 in the discussion of Deemed Acceptances that, as part of the NETA arrangements, a distribution system failure could force suppliers or generators out of energy balance, and hence they could be exposed to the energy imbalance prices as a result of circumstances beyond their control.

Ofgem's Initial View

7.16 In the December Consultation, Ofgem argued that it would be consistent with the thrust of reforms both to the energy regime proposed for NETA and the new transmission access regime discussed in that document if there was to be a more appropriate allocation of the costs imposed by distribution constraints and failures to the parties best able to manage and control those costs. A range of possible options for addressing these issues were discussed, including:

- ◆ identifying the costs of distribution failures and constraints incurred by NGC, removing them from energy imbalance charges and allocating them to the party best able to control them;
- ◆ extending the access arrangements that are to be developed for transmission access down to the distribution level, at least for parties to the BSC; and
- ◆ requiring distribution network operators to include compensation arrangements in their distribution connection agreements.

7.17 Ofgem requested views on the issues and options presented, particularly on an appropriate mechanism for ensuring the participants best able to manage and control the costs arising from distribution constraints and failures are exposed to those costs. Ofgem recognised that it would be important that any revised arrangements were consistent with existing and future incentive and price control structures.

Respondents' Views

Distribution Failures and Constraints in the July and October Documents

7.18 The July 1999 NETA Document did not discuss the treatment of distribution constraints specifically but it did consider how distribution failures might be

treated and their impact on customers and embedded generators as outlined above.

- 7.19 A third of respondents to the July Document commented on this issue. Many felt it would be unacceptable if no compensation was available to parties whose energy imbalance was caused by network failures outside of their control. Several held the view that imbalance costs arising from failures of the distribution systems should fall to distribution operators.
- 7.20 In the October 1999 NETA Document, Ofgem/DTI stated that there was a strong case for reviewing the incentives upon distribution companies and that they intended to examine the terms of distribution connection and use of system agreements in relation to the terms available to embedded generators and customers in the event of network failures.

December Consultation

- 7.21 Twenty-four respondents to the December Consultation commented on the issue of whether distribution network operators should be exposed to the costs incurred centrally by NGC of resolving distribution failure and constraints.
- 7.22 Eleven respondents (including NGC) said that distribution network operators should be exposed to the central costs of resolving distribution constraints and failures, whilst seven disagreed. NGC further suggested that distribution network operators should pay such costs into the BSC. A further six commented on this issue but did not state a position.
- 7.23 Respondents to the December Consultation highlighted that changing the basis for the treatment of distribution constraints and failures raises the issue of how distribution systems are operated and how distribution costs are recovered. Changes in these areas would also affect the way in which distribution network operators are regulated and incentivised and consideration would also have to be given to the treatment of embedded generation. Thus, these issues centre on distribution connection, use of system and pricing arrangements and a consistent approach across these areas needs to be adopted.

Ofgem's View

- 7.24 Since the NETA arrangements will result in suppliers and embedded generators incurring costs for imbalances caused by distribution failures, Ofgem believes this issue needs addressing for the implementation of NETA.
- 7.25 Following consultation by the DTI on distribution issues in November 1999, a group chaired by Ofgem, has been formed to consider issues relating to embedded generation. Some of the concerns discussed in this chapter may be looked at by the group. However, given the breadth of the issues involved, including the overall areas of distribution issues and embedded generation, an important part of this process will be a consultation exercise, encompassing customers, distribution businesses, embedded generators and suppliers, to be initiated in June 2000. It will also be necessary to give consideration as to how best to co-ordinate this work with the introduction of NETA and other relevant policy initiatives, such as work on reviewing the existing structure of distribution charges and the incentives and information project.
- 7.26 Separately, the Electricity Association has set up the Distribution Commercial Group. This Group is a representative body set up under the auspices of the Engineering Operations Steering Group of the Electricity Association. It comprises representatives of the commercial and network tariff departments of each of the distribution businesses of England & Wales and Scottish distribution companies. Its main objective is to develop an industry-wide consensus on the commercial implications for the distribution businesses, of changes in the electricity trading arrangements, licence conditions, and other relevant matters. This group may have a useful role in co-ordinating responses from distribution businesses on certain issues.

8. Conclusions

The Role of NGC under NETA

- 8.1 NGC both owns the transmission system and operates it to ensure that, subject to generation being available, all reasonable demands for electricity are met. Thus, it fulfils the roles of Transmission Asset Owner (TO) and System Operator (SO). The TO function relates to the maintenance of and longer-term development and investment in the transmission system. The SO function covers all the short-term operational activities required to keep the system balanced and operating within safe limits. There are strong interactions between the SO and TO functions. For example, investment in and the maintenance of the transmission network (a TO function) can significantly impact both the way in which the overall balance of electricity on the system may be maintained and the existence of transmission constraints (an SO function). As long as a single company is responsible for both roles, it is important that the interactions between them are considered if the overall costs of operating, maintaining and developing the transmission system are to be minimised.
- 8.2 The new electricity trading arrangements will replace the Pool with voluntary forwards markets for energy trading, a voluntary Balancing Mechanism for resolving energy and system imbalances close to real-time, and mandatory imbalance cash-out. The SO function will continue to be undertaken by NGC but inevitably there will be changes in the way that it is carried out.
- 8.3 The SO role can conceptually be split into two parts. First, energy balancing which covers all the activities that the SO undertakes to ensure that the system is balanced at the gross i.e. half-hourly level (the level at which participants' imbalance positions are assessed). Second, system balancing which is concerned with maintaining the quality and security of supplies and of dealing with transmission related issues. Thus, contracting for reserve is an energy balancing activity whereas contracting for reactive power is a system balancing activity. Under NETA, it is expected that NGC's role in energy balancing will decrease over time. However, it will still be responsible for system balancing.

8.4 Generators and suppliers will contract bilaterally until the Balancing Mechanism for a half-hour trading period opens and notifications of contract volumes for the period have to be made. At this point, known as “gate closure”⁵⁵ market participants will have to inform NGC, as SO, of their intended generation or consumption profiles for the relevant half-hour. NGC will then accept offers and bids in the Balancing Mechanism to ensure the system balances and the quality and security of supplies is maintained. In addition, NGC will continue to be able to sign contracts with participants for the provision of specific services to aid in balancing the system. Generators and suppliers whose contract position does not match their metered volumes will be subject to energy imbalance prices based on the costs of the actions accepted by the SO in the Balancing Mechanism and relevant balancing services costs.

Wider Electricity Trading Arrangements

8.5 The December Consultation set out Ofgem’s initial thinking on both long and short term developments in the wider aspects of the electricity trading arrangements in England and Wales covering:

- ◆ the contractual and legal framework for connection to, and use of, the transmission system including a new Connection and Use of System Code (CUSC) to replace the existing contractual and legal framework;
- ◆ the role of NGC as SO in achieving energy balance and maintaining the quality and security of supplies (system balancing) including the procurement and utilisation of balancing services;
- ◆ the form, scope and duration of incentives on NGC as SO;
- ◆ how the current transmission access and pricing arrangements might be developed towards a structure consistent with the new electricity trading arrangements and the treatment of transmission losses under NETA; and
- ◆ the treatment of distribution constraints and failures.

⁵⁵ Initially this will occur 3 ½ hours before the start of a half-hour trading period.

- 8.6 Ofgem is committed to consulting on and introducing a programme of reform in these wider aspects of the electricity trading arrangements in England and Wales. However, we can clearly distinguish between changes required for the introduction of NETA and longer term developments in the wider trading arrangements.
- 8.7 Ofgem expects the new CUSC to be in place by December 2000. In March 2000 a joint Ofgem/DTI consultation document was issued outlining the proposed form and scope of the CUSC and how it will be implemented. The CUSC will also be the main vehicle through which new transmission access and pricing arrangements will be implemented in April 2001. Thus, the consultation process on the CUSC is one of three main areas of work that Ofgem and the DTI are progressing on the wider electricity trading arrangements.
- 8.8 Ofgem intends to issue a further consultation in May 2000 on longer term developments to the transmission access and pricing regime and to the treatment of losses. These longer term developments are a second aspect of the wider electricity trading arrangements on which Ofgem will be consulting.
- 8.9 However for the start of NETA it will be necessary to:
- ◆ put in place an initial SO incentive scheme on NGC;
 - ◆ ensure that NGC can recover the costs of system operations;
 - ◆ ensure that other aspects of the role of NGC, including its procurement and utilisation of balancing services, are clearly defined;
 - ◆ ensure that the industry is consulted on changes to the structure and content of energy imbalance prices; and
 - ◆ consult on the initial treatment of transmission losses on the introduction of NETA.
- 8.10 This third area of work must be progressed to ensure the smooth transition from the current trading arrangements to the new trading arrangements. This document addresses these issues.

The Procurement and Utilisation of Balancing Services

- 8.11 Ofgem believes that NGC should be given discretion with regard to the procurement of balancing services, but does not consider that this implies that NGC should be required to have an energy account. This discretion will be coupled with:
- ◆ an effective incentive condition;
 - ◆ an obligation on NGC to operate the Transmission System in an efficient, economic and co-ordinated manner; and
 - ◆ a requirement for NGC to publish Procurement Guidelines and Balancing Services Principles.

Taken together, these measures will ensure that the way in which NGC procures and utilises Balancing Services is both open and transparent and that it uses the most efficient mix of tools available to maintain security and quality of supply.

- 8.12 One consequence of allowing NGC discretion in how it balances the system is that it will be able to purchase energy for balancing purposes although not for speculative purposes. Ofgem recognises the concerns expressed by many participants on this issue and has sought to address the main concerns. We will continue to work to ensure that in purchasing services to balance the system, NGC does not unduly influence the efficient operation of forwards markets to the disadvantage of market participants. Nonetheless, Ofgem believes that it would be undesirable for security reasons to prohibit NGC from trading electricity.
- 8.13 Ofgem is committed to reviewing the mandatory obligations for the provision of balancing services. However, we consider that to avoid unnecessary risks to system security on the introduction of NETA, participants should continue to have the same obligations as they do now. In addition, Ofgem believes that the implementation of a frequency response market should be delayed until after NETA has been implemented. Finally, Ofgem proposes that Deemed Acceptances are used as part of NETA for a very limited set of circumstances.

Energy Imbalances Prices and Cost Recovery under NETA

- 8.14 Ofgem continues to believe that the costs of energy balancing should be targeted on participants who are out of energy balance. As it stood in October 1999, the calculation of energy imbalance prices would have been based only on the actions taken by NGC in the Balancing Mechanism. Ofgem proposes that reserve and energy contracts should be considered as energy balancing services and their costs should be included in the calculation of energy imbalance prices. A method of achieving some targeting of energy balancing contract costs to energy imbalance prices has been developed and we propose that this should be in place for the start of NETA.
- 8.15 A methodology has also been proposed that would remove at least some of the costs of transmission constraints and other system balancing costs from the calculation of energy imbalance prices, and Ofgem proposes that this methodology be adopted for the start of NETA.
- 8.16 Ofgem believes that the costs of balancing services (BSUOS charges) should be recovered from all BSC parties on the basis of their metered volumes. In so far as is practicable, these costs should be allocated to the particular settlement period in which they are incurred.

SO Incentives under NETA

- 8.17 Ofgem believes the SO incentive scheme under NETA should continue to take a sliding scale form and that the initial SO incentive scheme under NETA should cover all energy and system balancing costs (including reactive power) and transmission losses subject to reducing NGC's exposure to net imbalance volume at a reference price. We propose that there should be one bundled incentive scheme and the incentive scheme target should be based on an ex-ante forecast of total balancing costs assuming a zero net imbalance volume. The initial SO incentive scheme should last for one year with specific provisions to enable the scheme to be terminated at an early date (for example, on the introduction of new transmission access arrangements). Further consideration needs to be given to the parameters of the initial SO incentive scheme. However, Ofgem recognises that at least initially under NETA, there may be a

need for NGC more response and reserve as a result of greater uncertainty surrounding the behaviour of generation and demand.

The Initial Treatment of Transmission losses under NETA

- 8.18 Ofgem proposes to introduce for start of NETA an interim regime for the allocation and pricing of transmission losses. Under this scheme, metered generation and demand volumes would be scaled in each settlement period to account for actual transmission losses. This will incentivise participants to adapt their contract positions to reflect their expected allocation of actual transmission losses. Ofgem will be consulting in due course on a more enduring transmission losses scheme.

Distribution Constraints and Embedded Generation Issues

- 8.19 Respondents to the December Consultation highlighted that changing the basis for the treatment of distribution constraints and failures raises the issue of how the distribution system is operated and how distribution costs are to be recovered. Changes in these areas would also affect the way in which distribution network operators are regulated and incentivised and consideration would also have to be given to the treatment of embedded generation. Furthermore, since the NETA arrangements will result in suppliers and embedded generators incurring costs for imbalances caused by distribution failures, Ofgem believes this issue needs addressing for the implementation of NETA.
- 8.20 Ofgem will be conducting a consultation exercise on these issues, encompassing customers, distribution businesses, embedded generators and suppliers, to be initiated in June 2000. It will also be necessary to give consideration to how best to co-ordinate this work with the introduction of NETA and other relevant policy initiatives, such as work on reviewing the existing structure of distribution charges and the incentives and information project.

Views Invited

- 8.21 Ofgem invites views generally on the issues and proposals raised in this report. Specific views are invited on:

The Procurement and Utilisation of Balancing Services under NETA

- ◆ the proposal not to change the current requirements on participants to provide Balancing Services;
- ◆ the decision to delay introducing the frequency response market;
- ◆ the proposal that NGC should have discretion with regard to how it purchases balancing services including the purchase of energy in forwards markets, subject to appropriate safeguards;
- ◆ the proposal that NGC does not need an energy account;
- ◆ views on the draft Procurement Guidelines and Balancing Principles, and their scope, form and content; and
- ◆ the proposed treatment of Deemed Acceptances.

Energy Imbalance Prices and Cost Recovery under NETA

- ◆ the proposed method for including energy balancing contracts in the calculation of energy imbalance prices;
- ◆ the proposal to remove the costs of transmission constraints and other system balancing costs from the calculation of energy imbalance prices; and
- ◆ the proposed method for recovering the costs of balancing services and system operation.

SO Incentives under NETA

- ◆ the proposal to incentivise NGC on all system and energy balancing costs subject to reducing its exposure to the net imbalance volume via the use of a reference price;

- ◆ the proposal to have a single SO incentive scheme covering all incentivised costs;
- ◆ the proposal to base the incentive scheme target on an ex-ante forecast of total balancing costs;
- ◆ the proposal to retain a sliding scale form of incentive;
- ◆ the proposal to have an initial incentive scheme which is of a year in duration but which includes specific wind-up provisions;
- ◆ NGC's views on the volumes and price of balancing services under NETA;
- ◆ the appropriate method for determining a reference price to be used to reduce NGC's exposure to the net imbalance volume;
- ◆ the appropriate sharing factors;
- ◆ the appropriate cap and collar for the incentive scheme;
- ◆ the desirability of an Income Adjusting Events provision;
- ◆ the treatment of NGC's internal SO costs; and
- ◆ the appropriateness of NGC's proposed BSUoS settlement process.

The Treatment of Transmission losses under NETA

- ◆ The use of ex-post actual losses to adjust all participants metered volumes;
- ◆ The 40:60 split of total losses between generation and demand respectively; and
- ◆ The implicit requirement for participants to be responsible for purchasing their own losses.

Distribution Constraints and Embedded Generation Issues

General views are invited on the issues raised in this chapter.

Appendix 1 Current Definitions of Ancillary Services

NGC is required, under Condition 6 of its Transmission Licence, to procure sufficient “Ancillary Services” as is appropriate to enable it to discharge its obligations under the Electricity Act 1989 and Transmission Licence. This requirement is couched in terms of the provision of services specified in the Grid Code and the MCUSA. The Ancillary Services Business, a separate business (under the Transmission Licence) within NGC, is currently responsible for procuring these Ancillary Services and there is an economic purchasing obligation on NGC in contracting for Ancillary Services.

There are two categories of Ancillary Services: System Services and Commercial Services. System Services are services that NGC requires to operate the system safely and reliably. Part 1 System Services are services that all licensed generators must be capable of providing in accordance with the terms of the Grid Code and the MCUSA.⁵⁶ They are restricted to specified capabilities for frequency response and reactive power. Should a generator fail to provide them, NGC has the right to refuse to connect the generator to the transmission system. Part 2 System Services (such as Black start services) are not required from every generator and their provision is agreed on a site by site basis. However, if NGC requests the provision of a Part 2 System Service, a participant must provide terms (technical and commercial) for its supply. Commercial Services are services that are essential but not mandatory and generators can refuse to provide them. NGC makes payments for both System and Commercial Services under a variety of arrangements as outlined later in this chapter.

⁵⁶Unlicensed generators may also provide Ancillary Services but are not obliged to under the terms of the Grid Code.

Four main Ancillary Services are defined: reactive power; reserve; frequency response and Black start capability. In addition, NGC has, on occasion, signed Ancillary Services contracts to assist in the alleviation of constraints and it has contracts for emergency assistance from the French and Scottish transmission systems. It is Ofgem's view that reserve is primarily associated with achieving an energy balance whilst reactive power and Black start are used for system balancing. Frequency response is generally a System Service but to the extent that, at longer timescales, it merges with reserve it can also be considered partly as an energy balancing service.

Reactive power flows are required to control the voltage of the system. NGC uses the reactive power capabilities of generators and some consumers to provide real-time control of the voltage on a locational basis. In addition, NGC can use its own transmission assets to control flows. The way the transmission network itself is configured and operated also affects reactive power flows and NGC owns and utilises specialist equipment, such as Static VAr Compensators, the capital costs of which are remunerated under NGC's Transmission Price Control.

A number of different types of reserve are defined. Scheduled Reserve (also known as spinning reserve) is provided by part loading generating units able to increase output rapidly. There are two elements to scheduled reserve, frequency response as detailed below, and regulating reserve available over a 5-30 minute timescale. Standing reserve is provided under contract by generating plant and load managers able to respond in less than 20 minutes and maintain a service for at least two hours (repeatable within 20 hours). Contingency reserve is provided over longer timescales (5 to 24 hours). It is typically provided by NGC instructing plant with long notice to synchronisation times to start-up or to remain on hot standby.

Frequency response can be viewed as short-term reserve that is provided automatically i.e. without explicit instruction and is used to contain and reduce or recover frequency changes before reserve can be instructed. Frequency response is divided between the continuous service provided by generating units and the occasional service provided by parties that respond to large frequency changes (e.g. using a low frequency relay) and comprises different forms of response (primary, secondary and high frequency).

Black start is the capability of a power station to start-up at least one of its generating units without an external power supply and is called on by NGC as a means of restoring supplies following a major failure on all or part of the network.

Appendix 2 Current Procurement of Ancillary Services

Ancillary Services are typically procured under bilateral contracts between NGC and individual service providers. The length of these contracts varies between one year and effectively the lifetime of the asset (for Part 1 System Services). Remuneration for the service can either be cost or value based. Initially, cost-based remuneration was considered appropriate for mandatory services. However, progress is continuing to be made towards introducing competition (particularly from the demand-side) and market-based mechanisms for procurement and value-based remuneration.

NGC currently holds two tender rounds each year to meet its reactive power requirements. Any eligible service provider⁵⁷ can submit bids to NGC to provide reactive power services. NGC makes information available, in the public domain, on these tender rounds to aid transparency. This includes details on the tender evaluation, the number and type of tenders, details on the proportion of successful bids and the aggregate payments and volumes that have been made. Since reactive power is a Part 1 System Service, there are default arrangements to provide remuneration to generators that do not participate or are unsuccessful in the auction. The default payments are geographically differentiated and the basis for remuneration is changing from a split between capability and utilisation payments to pure utilisation payments from 1 April 2000.

In the last tender round, for contracts from 1 April 1999 to 31 March 2000, 102 tenders were received from centrally despatched generating sets (67% of eligible sets) at 39 power stations owned by 11 generators. No tender offered services above the minimum obligatory services.⁵⁸ Agreements were offered to 75 sets and signed with 57 sets (11 generators) or approximately 40% of the market. During the first year of reactive power tenders (April 1998 to March 1999), approximately 27% of total reactive power

⁵⁷ Eligible service providers are defined in Master Connection Use of System Agreement (MCUSA) but include centrally despatched generators, embedded generators, non-centrally despatched providers and large demand users.

⁵⁸ The Grid Code connection conditions specify "All Generating Units must be capable of supplying rated power output (MW) at any point between the limits 0.85 power factor lagging and 0.95 power factor leading at the Generating Unit terminals. The short circuit ration of Generating Units shall be not less than 0.5." Additional services above the mandatory conditions include Commercial Services such as synchronous compensation and extended power factor ability.

payments were under contract with the remaining 73% being made under the default arrangements.

The different types of reserve are procured and remunerated in different ways. Scheduled reserve is procured and paid for through the Pool with the costs appearing in Transport Uplift. Contingency reserve is procured through bilateral contracts. The costs of contingency reserve are captured through cancelled start and hot standby payments if the cancellation occurs within the plant's notice to synchronise period. If a plant is ordered and subsequently cancelled outside its notice to synchronise time then the service is provided free. If the plant is subsequently called to provide energy (not whilst being called to provide contingency reserve) then these costs appear in Operational Outturn.

Standing reserve is provided under contract via an annual tender process conducted by NGC. In assessing an individual tender, NGC calculates the effective expected cost of the reserve offered, taking into account the split between capability and utilisation prices, and a probabilistic assessment of the expected utilisation of the reserve contract.⁵⁹ NGC will enter into a reserve contract with a participant if the expected cost of each MWh of a tender is less than the Value of Lost Load (VoLL), on the basis that VoLL is intended to represent the maximum price that customers are willing to pay to ensure security of supply. Information on the Standing reserve tender, including offered and accepted volumes and successful tender prices has been made available in an NGC report available on their website.⁶⁰ The total new volume of Standing reserve options for 1998/99 was 1174 MW bringing the total volume, including existing contracts, to 2120 MW. It is estimated that the Standing reserve agreements entered into for the 1998/9 financial year will amount to an "Average Equivalent Cost" of around £9.8/kW per annum for approximately 4,500 service hours.

Cost based payments cover approximately half the required level of frequency response services, with the remainder being provided through commercial arrangements that provide value based remuneration. In addition, there have been discussions on the development of a frequency response market (see below). Since the level of frequency

⁵⁹ The probabilistic assessment takes into account plant loss statistics, reserve contracts (including scheduled reserve) already accepted and demand forecast errors.

⁶⁰ NGC's web address is www.ngc.co.uk

response required is based on NGC's judgement of the maximum infeed loss that could occur, NGC can make a trade-off between constraint payments (to limit the infeed loss possible) and frequency response payments.⁶¹ Similar tradeoffs can be made between other Ancillary Services, notably reserve and reactive power. In addition, deloading plant for constraints can also be used to provide frequency response, reserve and reactive power.

Black start capability is procured under long-term contracts that are subject to commercial negotiations between NGC and the service providers. Payments for Black start facilities are based on three main components – staged payments reflecting the investment costs of installing new Black start facilities, availability payments (£/hr) and utilisation payments (£/MWh).

Ancillary Service constraint contracts are also the result of bilateral negotiations.

Table A provides a breakdown of the annual average costs of Ancillary Services in England and Wales over the period 1996 to 1998.

⁶¹ There are also strong trade-offs between constraints and other Ancillary Services including reactive power and reserve.

Table A – Approximate Breakdown of Annual Ancillary Services Costs (£ million)

Service	Contract costs	Pool costs	Notes
Reactive power	50	Small	The costs of voltage constraints are included within constraints below.
Frequency response	35	40	
Regulating reserve	10	70	Regulating reserve covers all categories of reserve held on synchronised plant, excluding frequency response.
Standing reserve	5	10	The contract costs are option fees minus exercise rebates. The balance between contract and Pool costs is dominated by exercise rebates.
Constraints	< 1	35	In any year, there are very few ancillary constraint contracts.
Black start	10	< 1	

Note: Costs are rounded to the nearest £5m. Overhead and Miscellaneous costs have been excluded from this breakdown.

Source: The New Electricity Trading Arrangements, Volume 2. An Ofgem decision document/ NGC.

Appendix 3 Procurement Options under NETA

In the December Consultation, Ofgem considered the impact that six different procurement options might have with regard to both the prices of Balancing Mechanism bids and offers, and energy imbalance prices. These options are summarised below:

Option 1 – Purchase services only via the Balancing Mechanism. This option depends on there being a sufficient depth of Balancing Mechanism offers and bids with an adequate geographical spread and range of technical capabilities. One result of this option would be that essentially the full costs of both energy and system balancing would feed through to energy imbalance charges. Ofgem considers that the costs of system balancing should be recovered from all participants since participants that are in energy balance require system services. Moreover, it would leave the SO particularly exposed to participants who had market power over short timescales.

Option 2 – Purchase services under option contracts that only contain option/capability fees. Contracts of this type would ensure that the Balancing Mechanism bids and offers were sufficient to meet system services needs. However, participants with such contracts would still have complete freedom with regard to the prices at which they submit Balancing Mechanism offers and bids. Consequently, it seems unlikely that such contracts would be attractive to NGC if it were subject to appropriate incentives.

Option 3 – Purchase services under option contracts that are called outside the Balancing Mechanism. This option would result in the SO incurring costs to balance the system that were not reflected in the energy imbalance prices. However, it would mean that there were no artificial constraints, either direct or indirect, on the bid and offer prices submitted to the Balancing Mechanism. A further consideration is that, assuming that it is likely that the contracts would generally be called after contract notification for a trading period had occurred, participants with such a contract would be forced out of balance. Although this, in principle, could be dealt with by NGC providing compensation for imbalances caused by the exercise of these contracts, this would pose problems with regard to Ofgem's objective of including energy balancing contracts costs in the energy imbalance price. To avoid circularity in the calculation

process (the energy imbalance price depending on the compensation payments, which in turn depend on the energy imbalance price), the compensation payments would have to be excluded from the energy imbalance price.

Option 4 – Purchase services under option contracts that contain utilisation fees that act as hedges round Balancing Mechanism offers and bids. Under this option, participants would sign option contracts with NGC that have both an option fee element and an utilisation or strike price. Participants would place offers and bids into the Balancing Mechanism in the normal way. In the event these offers or bids were required NGC would call them and the participant would be paid its offer or bid price in the Balancing Mechanism. Outside the Balancing Mechanism, participants would pay or get paid by NGC a difference payment reflecting the difference between the accepted offer or bid price and the option contract strike price. The payment mechanism in this option is similar to that in some current Ancillary Services contracts. In principle, it still gives participants freedom over the prices at which they submit offers and bids into the Balancing Mechanism although in practice the utilisation price is likely to influence their decisions. The main disadvantage to this approach is that energy imbalance prices would be affected by bid and offer prices that would not necessarily reflect the costs incurred by the SO in accepting them. However, if this option was only applied to purchasing energy balancing services, this drawback would be removed since Ofgem believes that energy balancing contract costs should be included in the energy imbalance prices.

Option 5 – Purchase services under option contracts that specify the prices at which Balancing Mechanism offers and bids can be submitted. Under this option, the contracting decisions that the SO made would influence energy imbalance prices, at least to some extent. It is less obvious that it would unduly affect the prices submitted by other participants to the Balancing Mechanism. It is likely that the contracts would be struck at a range of different prices, reflecting different types and levels of service. Thus, even if the contract prices became known (either because they were published or flagged or from market observation), there would be no single price around which other participants could cluster their bids. This would particularly be the case if the prices at which bids/offers could be submitted to the Balancing Mechanism were linked to the prices prevailing in any short-term power exchange that emerges. If this approach were to be adopted (and NGC has indicated that it is considering this), it would be

particularly important that the process for procuring the contracts was open, transparent and competitive.⁶²

Option 6 – Purchase services under energy contracts. Under this option, the SO would effectively be trading energy in that the balancing services contracts would not be options but would be contracts covering the provision of specified volumes of a particular service e.g. energy, reactive power, frequency response. In some ways, this option is similar to option 3 in that the delivery of services would not involve the acceptance of Balancing Mechanism offers of bids. However, it would not automatically mean that participants with balancing services contracts were out of balance if the contracts specified when the service was to be delivered. Under this option, it would be necessary to allow the SO to sell back products if it became apparent that the balancing services contract volumes were likely to be too high in a particular period. This implies that NGC would need its own electricity account since it might be exposed to imbalance charges and it would probably need a supply licence exemption. It would also be desirable to prohibit NGC from selling back products in the Balancing Mechanism since this would give it too much power on both sides of the mechanism but it would be allowed to mitigate its position in any short-term power exchange (as Transco can in the on-the-day gas commodity market).

Although this option applies most obviously to purchasing reserve, it might also be applicable to other services if participants had to demonstrate that they could deliver a minimum level of service or had contracted with another participant to deliver the service.

To the extent that gate closure shortens, there may be a greater need for NGC to act outside Balancing Mechanism timescales and hence this option might be becoming increasingly appropriate. It might also encourage demand-side participation since it would be easier for customers to implement load reductions if their timing and duration was established well in advance. It can also be argued that having the SO as a trader (albeit only in relation to balancing services) would serve to mitigate the market power of other participants.

⁶² Ensuring contestability, as NGC does now for some services, would not be sufficient.

Appendix 4 Initial Draft of Procurement Guidelines and Balancing Principles

NGC has produced draft Procurement Guidelines and Balancing Principles for discussion and consultation. These are reproduced below.

Procurement Guidelines

PART A: INTRODUCTION

1. Purpose of Document

This document sets out the Procurement Guidelines (“Guidelines”) which the National Grid Company plc is required to establish in accordance with Licence Condition 7B of its Transmission Licence. The purpose of these Guidelines is to set out the kinds of Balancing Services which we may be interested in purchasing in the period until the next Guidelines must be produced, together with the mechanisms by which we envisage purchasing them.

The Guidelines are not prescriptive of every possible situation likely to be encountered by us, but rather represent a generic statement of procurement principles we expect to follow.

This document is structured in four parts. Part B sets out the broad definitions of Balancing Services, together with the general principles we intend to follow in procuring them. Part C describes the kinds of Balancing Services we expect to procure over the coming year, with Part D setting out the procurement mechanisms we expect to utilise in procuring such Balancing Services.

We have developed the Guidelines in consultation [with the Authority/Director]. The Guidelines may be modified in accordance with the processes set out in Transmission Licence Condition 7B. We will continuously monitor the validity of these Guidelines and intend [through meeting with the Authority/Director] to periodically review the form of these Guidelines and, where appropriate, make such revisions as necessary.

In the event that it is necessary to modify these Guidelines in advance of issuing an updated version of this document, then this will be done by issuing a supplement to these Guidelines.

These Guidelines make reference to a number of definitions contained in the Grid [and Balancing and Settlement] Codes. In the event that any of the relevant provisions in the Grid [or Balancing and Settlement] Codes are amended it may become necessary for us to modify the Guidelines in order that they remain consistent with the Grid [or Balancing and/or Settlement] Codes.

In any event where the provisions of the Grid Code and/or the Balancing and Settlement Code are considered inconsistent with any part of these Guidelines, then the Grid Code or Balancing and Settlement Code provision will take precedence.

PART B: GENERAL PROCUREMENT PRINCIPLES

1. Balancing Services

The services we need to procure to operate the transmission system constitute Balancing Services.

The Transmission Licence defines Balancing Services as:

- “(i) Ancillary Services; and
- (ii) offers made in the Balancing Mechanism; and
- (iii) other services to the Licensee which serve to assist the Licensee in operating the Licensee’s Transmission System in accordance with the Act or the Conditions and/or in doing so efficiently and economically.”

Ancillary Services:

These services are described in the Grid Code Connection Condition 8 and are services procured from Authorised Electricity Operators (AEOs) or persons that make Interconnector transfers.

Balancing Mechanism Offers:

These services are procured through the Balancing and Settlement Code, and as such, they do not fall within the scope of these Guidelines.

Other Services:

These are services not captured by the two definitions above, and will encompass services provided by persons who are not AEOs (or persons making Interconnector transfers), and may include the procurement of energy.

References within section 2 of this Part B, Part C and Part D to “Balancing Services” refer to Ancillary Services and to Other Services.

2. Procurement Principles

When procuring Balancing Services, we will apply the following principles.

- In contracting for the provision of Balancing Services we will purchase from the most economical sources available to us having regard to the quality, quantity and nature of such services at that time available for purchase.
- Without prejudice to the factors above and after having taken relevant price and technical differences into account, we shall contract for Balancing Services in a non-discriminatory manner.
- Where there is, or is likely to be, sufficient competition in the provision of a Balancing Service we will use some form of market mechanism for the procurement of such service where appropriate. In such instances we shall provide a statement indicating the processes and terms under which contracts shall be awarded.
- If we consider that there is insufficient competition in the provision of a Balancing Service (e.g. where there is some form of local monopoly) we shall contract for such provision on a negotiated bilateral basis as appropriate.

- If Balancing Services are required over a relatively long term, we shall advertise that requirement as appropriate.
- If a third party requires Balancing Services, and if we secure provision of such services on behalf of that party, the associated costs of provision will be fully recharged to the party requiring such services. *[This could apply to services required across Interconnectors or for potential CC6.3.3 Charge Out arrangements].*

PART C: BALANCING SERVICES REQUIRED

1. Introduction

This Part C sets out a description of the types of Balancing Services we expect to procure. The types of Balancing Services required are set out in section 2, with a description of those different Balancing Services given in section 3.

2. Types of Balancing Services

We are interested in procuring the following types of Balancing Services: -

Ancillary Services:

- System Ancillary Services (Part 1), the mandatory services, required from all licensed generators, of:-
 - reactive power; and
 - Frequency response; and

System Ancillary Services (Part 2), the necessary services, required from some generators, of: -

- Black start Capability; and
 - Fast Start Capability; and
- Commercial Ancillary Services. The following services, required from some generators, of
 - Enhanced Reactive Services; and
 - Commercial frequency response; and
 - Reserve; comprising of: -
 - Fast reserves; and
 - Standing reserves; and

Warming; and
Commercial Intertrip; and
Emergency Assistance.

Other Services

reactive power services, other than as provided as an Ancillary Service; and
Frequency response, other than as provided as an Ancillary Service; and
Standing reserve, other than as provided as an Ancillary Service; and
Demand Intertrip; and
Energy Related Products.

3. Description of Balancing Services

Ancillary Services

There are two broad types of Ancillary Service, as defined in the Grid Code. System Ancillary Services, which are divided into two parts: Part 1 System Ancillary Services are mandatory services required from all licensed generators; Part 2 System Ancillary Services are necessary services provided by some generators, on a site by site basis, to meet overall system requirements. Any Ancillary Service, which is not a System Ancillary Service, and which is provided by an AEO is termed a Commercial Ancillary Service.

System Ancillary Services comprise the services as set out in and described in Grid Code Connection Condition 8.1:

- Mandatory Services – All licensed generators are required to provide mandatory services, which ensure the provision of a minimum technical capability to deliver voltage and frequency response services.
- Necessary Services – Some generators are required to provide Black start capability and/or fast start capability services. Our requirements for these services depend on the actual and expected provision of such services by existing providers.

We would wish to retain the Black start Service with all existing providers with which we currently contract, and would also be interested to discuss new arrangements with potential new providers.

We would similarly wish to retain the current provision of a Fast Start Capability from all existing providers. However, there is no requirement for additional service capability from new service providers.

Commercial Ancillary Services comprise the services as set out in Grid Code Connection Condition 8.2. Given that this is not an exhaustive list, it is not possible to give a prescriptive list of all services that we will contract for. However the services we expect to procure are: -

- Enhanced Reactive Services – which are services that exceed the minimum technical requirement set out in Grid Code Connection Condition 6.3.2. We will contract for such services as further described in the relevant reactive power market arrangements (see Part D).

- Commercial frequency response Services – which are services that provide for combinations of different technical characteristics (compared to mandatory frequency response services) together with alternative pricing arrangements. We will contract for such services when the anticipated cost of such a service is lower than alternative mandatory or commercial service arrangements.

- Reserve – these are instructed services required over a variety of time frames to deal with the matching of generation with demand. The services we expect to procure can be broken down into the following components:-
 - Fast reserves – which are fast acting dynamic services, provided by synchronised plant, capable of delivery within 2 minutes, required to provide a load correction and frequency following service.

 - Standing reserve – which are services provided by plant that is not synchronised but which can start within a defined time period. The details of such service will be described in the detailed statements associated with its procurement via tender (see Part D).

 - Warming - which are services that may be required prior to Gate Closure. These may be required as a generation readiness service, such that if it appears there may be insufficient flexible plant prior to Gate Close, we may require plant to warm such that it can reduce its notice [to deviate from zero] and be available to submit a Balancing Mechanism Offer. Such services may be required where there is a reasonable expectation that generator technical dynamics are likely to exceed the timing of Gate Close.

- Commercial Intertrip – this service may be required to reduce the output of a generator following the tripping of a transmission line when a fault occurs. There is very limited requirement for such a service.
- Emergency Assistance – this service provides for mutual support of the transmission system with interconnected systems. These services are only required via Interconnectors.

Other Services

Services not provided by AEOs [or via Interconnector transfers] are classified as “Other Services”. By way of example, any service provided by a demand reducer will fall under this category. In addition, the purchase by us of any energy required to assist us in connection with operating the transmission system and/or in doing so economically and efficiently via an electricity forward or future contract will fall within this category.

PART D: PROCUREMENT MECHANISMS

1. Introduction

We expect to contract for Balancing Services through both arrangements derived from market mechanisms and bilateral contracts. These different processes are described in section 2 of this Part D and a summary of the mechanism used to purchase each service is set out in section 3.

2. Procurement Process

As indicated in Part B of these Guidelines, where sufficient competition exists, we will seek to contract for Balancing Services via some form of market mechanism.

Market mechanism

Such a mechanism will normally be a tender based process for the selection and award of service contracts. In each case, these mechanisms will include: -

- a statement of our service requirements;
- issuing Invitation To Tender documentation, providing sufficient information to allow the provision of a service offer to be made, including standard contract terms and conditions;
- Governance arrangements;
- a statement of principles and criteria that we will consider when evaluating the awarding contract of contracts;
- a report providing information on previous tenders.

We shall advertise such a tender process by contacting any parties that we believe may be interested in providing such services, including any existing or past service providers, and anyone that has expressed an

interest in providing such services in the future. [In addition it is expected that notification of the tender will be advertised in trade magazines and via the Internet.]

Bilateral Contracts

Bilateral contracts may be required where limited or no practical competition exists in the supply of a service. This may be due to special technical requirements of the desired service or where some form of local monopoly exists.

Where, in our view, there is some competition, we will

- contact those service providers we believe are capable of providing such service or who have expressed an interest in providing such service in order to establish whether they wish to enter into a contract for the service required; and
- offer non-discriminatory terms for the acquisition of such service; recognising
- if there is insufficient time to adequately contact other providers, contract as appropriate to meet that need.

Where, in our view, no competition exists (such as the provision of a locational service), we will

- offer non-discriminatory terms for the acquisition of such service; recognising that we
- contract as appropriate to meet that need.

3. Service Procurement Summary

This summary sets out the procurement mechanisms by which we expect or intend to procure those Balancing Services, set out in Part C, section 2 of these Guidelines.

Service	Means of Procurement
<p>ANCILLARY SERVICES</p> <p>Mandatory Services (i.e. Part 1 services)</p> <ul style="list-style-type: none"> • Reactive Power • Frequency response <p>Necessary Services (i.e. Part 2 services)</p> <ul style="list-style-type: none"> • Black start • Fast Start <p>Commercial Ancillary Services</p> <p>Enhanced Reactive Services</p> <p>Commercial Frequency response</p> <p>Reserve</p> <ul style="list-style-type: none"> • Fast reserves • Standing reserves • Warming <p>Commercial Intertrip</p> <p>Emergency Assistance</p> <p>OTHER SERVICES</p> <p>Reactive power services</p> <p>Frequency response</p> <p>Standing reserve</p> <p>Demand Intertrip</p> <p>Energy Related Products</p>	<p>Contracts derived from Market tender and Bilateral contracts [see MCUSA Schedule 5]</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Contracts derived from Market tenders [see MCUSA Schedule 5]</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Contracts derived from a Market tender</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Bilateral contracts</p> <p>Contracts derived from Market tenders [see MCUSA Schedule 5]</p> <p>Bilateral</p> <p>Market tender</p> <p>Bilateral</p> <p>Procured via Market/Bilateral</p>

Balancing Principles Statement

PART A: INTRODUCTION

1. Purpose of Document

This document sets out the Balancing Principles Statement, which we are required to establish in accordance with condition 7B of the Transmission Licence. The purpose of this Statement is to define the broad principles (the Balancing Principles) by which we will determine, at different times and in different circumstances, which Balancing Services we will use to assist in the operation of the transmission system.

This document is designed to indicate the broad framework against which we will make balancing action decisions.

Part B sets out a number of general principles relating to the development and application of this Balancing Principles Statement and Part C describes the broad principles by which we will utilise balancing measures. Part D describes the broad principles by which we undertake both the management of transmission constraints and response/reserve services and Part E sets out the processes that we will normally undertake at the day ahead and on the day to achieve system balance. Part F summarises our operational security standards that effectively define the requirements for balancing measures.

In the event that it is necessary to modify this Balancing Principles Statement in advance of us issuing an updated version of the document, then this will be done by issuing a supplement to the Balancing Principles Statement.

This Balancing Principles Statement has been developed and approved by the [Authority/Director]. This Statement may only be modified in accordance with the processes set out in Condition 7B. We will review

this Statement in accordance with paragraph 7(a) and provide the [Authority/Director] with relevant information in relation to such review in accordance with paragraph 7(b). In addition the [Authority/Director] will be provided with the relevant reports and statements in accordance with paragraphs (6) (a) and (b) of the Condition 7B of the Transmission Licence.

This Statement makes reference to a number of provisions contained in the Grid [and Balancing and Settlement] Codes. In the event that any of the relevant provisions in the Grid [or Balancing and Settlement] Codes are amended it may become necessary for us to seek to modify the Statement in order that it remains consistent with the Grid [or Balancing and/or Settlement] Codes.

In any event where our statutory obligations, provisions of the Grid Code and/or the Balancing and Settlement Code are considered inconsistent with any part of this Statement, then the relevant statutory obligation, Grid Code or Balancing and Settlement Code provisions will take precedence.

PART B: GENERAL PRINCIPLES

1 Licence Duties

The Balancing Principle Statement is written to be consistent with and to satisfy our licence obligation to “operate the Licensee’s Transmission System in an efficient, economic and co-ordinated manner” and our duty under our Transmission Licence not to discriminate in our procurement or use of Balancing Services.

Compliance to the Balancing Principles Statement by us is measured by two processes. Periodically delivering to the [Director/Authority] a report on the manner in which and extent to which we have, in using Balancing Services, complied with the Balancing Principles Statement. In addition we will be subject to an external audit to determine the extent to which we have, in using Balancing Services, complied with the Balancing Principles Statement. The audit statement will be made available to the [Director/Authority].

2 Information Sources

We will determine whether balancing measures will be employed by taking account of Balancing Mechanism Unit data, NGC’s forecast total system demand, the Transmission Outage Plan (our co-ordinated schedule of transmission plant outages) and actual system conditions (including weather conditions) and any other relevant information (where relevant is as specified in the Grid Code).

3 Balancing Measures

The balancing measures available to us constitute both Balancing Services and other actions defined in the Grid Code required for the maintenance of system security.

The Transmission Licence defines Balancing Services as:

- “(i) Ancillary Services
- (ii) Balancing Mechanism offers; and
- (iii) other services to the Licensee which serve to assist the Licensee in operating the Licensee’s Transmission System in accordance with the Act or the Conditions and/or in doing so efficiently and economically”.

This Statement will use the term ‘System Control Actions’ to mean:

those actions that we may need to take to ensure the safe and secure operation of all or part of the transmission system, but which do not fall within the Transmission Licence defined Balancing Services. Examples of ‘System Control Actions’ include Negative Reserve Active Power Margin (NRAPM) and Demand Control instructions issued in accordance with Grid Code.

4 Involuntary Reductions

Under certain circumstances we may need to take actions that will involve the involuntary reduction of generation or demand before all relevant Balancing Mechanism bids and offers have been accepted. Relevant Balancing Mechanism bids/offers are defined as those being located in the correct geographic location and/or having the required dynamic parameters to resolve the system problem in question. Reasons for such actions include:

- (i) where the call off of available offers would lead to an erosion of the system response holding below the required level. (It should be noted that an instantaneous generation loss occurring at a time of depleted response holding could lead to a frequency deviation outside of statutory limits. In the extreme case the system frequency could fall below the trigger point for automatic low

frequency demand disconnection – a minimum level of 6% of total system demand)

- (ii) where automatic curtailment measures have been initiated in response to an incident
- (iii) where the call off of relevant bid/offers would lead to the depletion of reactive reserves below the required levels
- (iv) where communication problems preclude the instruction of relevant bid/offers

PART C: PRINCIPLES UNDERLYING BALANCING MEASURES

- 1 We shall be responsible for making a forecast of the transmission system demand (including transmission losses) and the periodic release of these forecasts to 'the Market' in accordance with the timetable specified in the Grid Code/Balancing and Settlement Code.

- 2 Having regard to information provided to us by BSC Parties (including their forecast levels of electricity demand and availability of generation capacity) and to the requirements of the licensed transmission system security standards, we shall undertake operational planning for the timescales year ahead to day ahead:-
 - (a) for the matching of generation output (including, if achievable, a reserve of Balancing Mechanism Units to provide a security margin sufficient to maintain the pre NETA level of short term supply security) with forecast demand after taking into account:-
 - (i) Balancing Mechanism Unit availability;
 - (ii) transmission system capability;
 - (iii) electricity delivered to the transmission system from generation not subject to the submission of Physical Notification (PN) data
 - (iv) any other relevant information; and
 - (b) to enable maintenance on parts of the transmission system.

- 3 We will undertake balancing measures to maintain system security at all times.

- 4 We will achieve balancing measures through the:-
- (i) call off of bids and offers submitted by generation and demand to the Balancing Mechanism
 - (ii) call off of ancillary service contracts
 - (iii) call off of other services which serve to assist us in operating the transmission system.
 - (iv) instruction of System Control Actions and other involuntary reductions
- 5 We shall call off balancing measures defined in 4(i), 4(ii) and 4(iii) in economic order to maintain system balance. Under certain circumstances however this may not be possible. These circumstances include:
- (i) technical constraints on the transmission system;
 - (ii) the dynamic operating characteristics of available generation and demand Balancing Services;
 - (iii) other matters provided for in the Grid Code; and
 - (iv) failure of communication links.

PART D: TRANSMISSION CONSTRAINT MANAGEMENT AND RESPONSE/RESERVE HOLDING PRINCIPLES

The broad principles that we will normally employ for the management of transmission constraints and response/reserve holdings are detailed below. It should be noted that transmission constraint management involves an iterative process over all planning timescales with, where possible, continued optimisation of the system as updates to relevant information is received.

1. Transmission Constraint Management Principles

- Outage planning for the period year ahead to day ahead will be undertaken. In developing the outage plan for the transmission system co-ordination is required with the [Regional Electricity Companies].
- We will endeavour to place outages coincident with relevant generation outages in order to minimise constraint costs.
- As appropriate security analysis studies are undertaken to confirm system security and identify constraints.
- Forecasts of constraint costs are made and the outage plan re-optimised to minimise these where possible.
- Significant changes to forecast BMU availability and/or the transmission system may trigger a reassessment of the outage plan and where possible the outage plan will be re-optimised.
- We may negotiate Balancing Services contracts to manage the financial risks associated with potential high cost constraints.

- In calculating constraints we will take account of any pre and post fault actions available in order to minimise restrictions of transmission capacity.
- In resolving constraints we will call off Balancing Services on an economic basis. Where services can not be differentiated on cost the service that delivers the greatest reduction in transmission losses will be called.
- During periods of system difficulties we may modify constraint limits in accordance with level of system risk. In so doing consideration of the following criteria will be given:
 - (i) the likely duration of the system difficulties
 - (ii) the likely increase in probability of system faults arising from the system difficulties
 - (iii) the impact on system security of faults deemed likely to arise as a result of the system difficulties

2 Response/Reserve Holding Principles

The objectives of our reserve policy shall be to provide assurance that reasonably foreseeable levels of generation failure, shortfall and demand forecast error do not cause us to invoke involuntary demand reduction. In so doing we shall endeavour to adopt a reserve holding strategy that maintains the pre NETA level of short-term supply security.

- We will calculate response and reserve holding levels based on the following criteria:
 - (i) BMU loss statistics
 - (ii) the largest generation infeed being covered
 - (iii) demand forecast statistics

- (iv) system characteristics such as inertia and load response
 - (v) judgement of levels of demand volatility/uncertainty
 - (vi) judgement of levels of generation uncertainty
- We will allocate response and reserve holding with due regard to:
 - (i) cost
 - (ii) dynamics of delivery
 - (iii) transmission constraints
 - We will not normally allocate response/reserve to constrained BMUs if the delivery of that response/reserve would result in violation of the constraint.
 - During system difficulties we may strategically allocate response/reserve on a geographic basis to manage system risk. In so doing consideration will be given to the following criteria:
 - (i) the likely duration of the system difficulties
 - (ii) the parts of the system affected by the system difficulties
 - (iii) the likely increase in probability of response/reserve holding being affected by the system difficulties
 - At all times we will endeavour to maintain sufficient levels of response on the system in order that the loss of the largest generation infeed would not result in a violation of the security standards. The maintenance of these response levels may, in extreme circumstances, involve the involuntary reduction of demand.
 - Following an event that leads to the delivery of response we will, as soon as is practical, take action to regain the level of response holding on the system such that system security standards would not be violated following a further generation infeed loss.

- We will hold sufficient high frequency response on the system to ensure that security standards are not compromised following the loss of the largest potential demand loss on the system.
- In achieving the above we will ensure that there is a suitable level of downward regulation on the system to manage uncertainty.

PART E: DAY AHEAD AND WITHIN DAY BALANCING

Day Ahead Balancing Process – Scheduling Phase

- Step 1 - By 09:00 hours each day we will publish our day ahead demand forecast covering the period 05:00 hours day ahead to 05:00 hours day ahead + 1.
- Step 2 - By 11:00 hours we will receive PN and other data from all Balancing Mechanism Units (BMUs) covering the period 05:00 hours day ahead to 05:00 hours day ahead + 1 and default such data as is necessary.
- Step 3 - Using the submitted PN (and other BMU) data and NGC's demand forecast we will calculate the available national plant margin or shortfall (accounting for the reserve of BMUs to provide the required security margin) for each half hour period.
- Step 4 - Using the submitted the PN data, demand forecast and planned transmission outage information we will undertake security analysis studies to verify system security (Part E refers).
- Step 5 - By 12:00 hours each day we will issue the total system plant margin data to the market for the period 05:00 hours day ahead to 05:00 hours day ahead + 1.
- Step 6 - We will forecast constraint costs based on the submitted indicative PN (and other BMU) data and our estimation of FPN levels and bid/offer prices and volumes. Depending on the forecast the levels of these costs we will give consideration to the cancellation/deferral of transmission system outages.

- Step 7 - Where judged necessary we will call off the most economic Balancing Services contracts to ensure that BMUs required to maintain system security are available for selection in the Balancing Mechanism.
- Step 8 - Following 1100 hours we will continue to receive updated PNs from BMUs.
- Step 9 - Using this updated data we will revise the national plant margin data and publish this together with zonal margin data by 16:00 hrs.

Within Day Balancing Process – Control Phase

- Step 1 - At defined times, prior to gate closure, we will revise and publish half hourly averaged demand forecasts for a defined period.
- Step 2 - As participants become aware of changes to their physical position they will advise us.
- Step 3 - At defined times, using the latest demand forecast and PN (and other BMU) data, the zonal and national margins will be reassessed and provided to the market.
- Step 4 - Using the revised data we will undertake security analysis studies and reassess the requirements for the call off of Balancing Services contracts.
- Step 5 - At gate closure the PN data will become FPN data and we will have received Bid/Offer prices and volumes for those BMUs wishing to actively participate in the Balancing Mechanism.

Step 6 - In the Balancing Mechanism, using the revised demand forecast and validated FPN and Bid/Offer data, we will balance the system through the purchase of Balancing Services on an economic basis taking into account:

- (i) technical constraint imposed on the system from time to time or parts thereof;
- (ii) the dynamic operating characteristics of available generation and demand balancing services;
- (iii) uncertainty in demand at timescales within the Balancing Mechanism window;
- (iv) other matters provided for in the Grid Code

In extreme situations this may require the instruction of System Control Actions or other involuntary reductions.

PART F: SUMMARY OF OPERATIONAL SECURITY STANDARDS

1 Overview

We shall economically maintain security on the transmission system such that for normal and outage conditions, for a **secured event** there shall not be:-

- a loss of supply,
- a violation of the **system frequency control standard**,
- a violation of the **system voltage control standard**,
- system instability,
- unacceptable overloading of apparatus.

Excluding the exceptions below a **secured event** is defined as the fault outage of:-

- a single circuit overhead line,
- a double circuit overhead line,
- a designated pair of single circuit overhead lines concurrently during the defined winter season,
- a single circuit cable,
- a section of busbars or mesh corner,
- a supergrid transformer,
- a reactive compensator,
- the most onerous single system infeed.

For demand groups with a net export of up to 1500MW a **secured event** is defined as the fault outage of:-

- a single circuit overhead line,
- a single circuit cable,

a supergrid or grid transformer or reactor,
the most onerous single system infeed.

2 Exceptions

The standards may be relaxed for connections for which a derogation (approved by the [Director/Authority]) to Condition 12 of the Transmission Licence is in force.

For demand groups with a net export of less than 300MW and under outage conditions then for a **secured event** a loss of supply is acceptable.

Loss of supply for a **secured event** is also acceptable under planned outage conditions subject to a restoration strategy agreed between the SO and the relevant party.

3 System Frequency Control Standard

We shall economically purchase and schedule sufficient MW reserve and response such that:-

For a **significant event i.e.** any **secured event** which could result in sudden change between total mechanical power input and actual system demand which is in the range 300MW to 1000MW the system frequency shall not deviate by more than 0.5Hz and that for;

An **abnormal event i.e.** any **secured event** which could result in a sudden change between total mechanical power input and actual system demand which is in the range 1000MW to 1320MW the system frequency should not deviate by more than 0.8Hz.

For either significant or abnormal events any frequency deviation below 49.5Hz should not persist for more than 60 seconds, and system frequency should return to between operational limits within 10 minutes. If necessary we shall achieve,

in exceptional circumstances, frequency control by demand control – as required by the British Grid Systems Agreement and as specified in the Grid Code.

4 Voltage Control Standard

Under normal system conditions we shall purchase and economically schedule sufficient MVar reserves in order to maintain steady state voltage levels such that:-

- ◆ On the 400kV system each user connection site will normally remain within +/- 5% of the nominal value with a minimum/maximum range of +/-10% however voltages between +5% and +10% should not last longer than 15 minutes.
- ◆ On the 275kV and 132kV system each user connection site will normally remain within +/- 10%.
- ◆ Below 132kV the limits are +/- 6%.

In addition for any **secured event** we shall purchase and economically schedule sufficient MVar reserves in order to limit voltage step change to:-

+/-6% **at the user connection site** after a **secured event**, relaxed to +/-12% for loss of a double circuit, busbar or mesh corner. This voltage step change relates to a period about 5 seconds after fault clearance. It must be possible for us to restore voltage at GSPs to 95% following automatic and manual action within 20 minutes.

+/- 3% **at the user connection site** for planned switch operations

PART G: EXCEPTIONS TO THE BALANCING PRINCIPLES STATEMENT

This Statement does not cover all of the particular balancing measures to be employed by us in every possible operational situation. Although we will take all reasonable steps to carry out balancing measures in accordance with this Statement under certain circumstances it will be necessary to depart from the Statement. Principal reasons for departures from this Statement are listed below:

- (i) where circumstances exist where not to do so would prejudice the safe and secure operation of the transmission system or would be in breach of statutory obligations;
- (ii) where operational information indicates insufficient time is available to employ particular measures in accordance with the Statement if balancing is to be achieved; and
- (iii) where the Statement has been shown to be inappropriate and the Balancing Principles Statement modification procedures have been implemented but not completed.

Appendix 5 The Settlement of Directing Actions

This table has been taken from the paper 'Deemed bids and instructions: proposed way forward', NGC, 18th October 1999, although a number of amendments to the proposed pricing arrangements have been made by the NETA Programme. This table has also been presented to the DISG.

List of directing actions to be settled at Bid/Offer Price and Imbalance Price.

Action	Initial NETA Treatment	Discussion
BM Acceptance	BM trade @ bid/offer price	
Energy associated with delivery of Continuous frequency response	Imbalance	It is not proposed that frequency correction of accepted BM volumes will be implemented for initial NETA.
Energy associated with the delivery of Commercial LF frequency response	Imbalance. There may be an associated BM contract.	Treating as an imbalance would be consistent with the above.
'Back-stop' LF demand disconnections	Imbalance	These cover 60% of total system demand, and are initiated below 49 Hz.
Energy associated with the delivery of contracted reserve	Bid/Offer Price if purchased through BM. Imbalance otherwise – There may be an associated Balancing Services contract.	Treating as a BM Acceptance seems sensible, but may not be possible initially for some services (e.g. fast reserve / pump despatch).
Commercial inter-trips	As negotiated between NGC and the party concerned.	There are currently only a limited number of commercial inter-trips. Broadly speaking, commercial inter-trips are needed to meet operational standards, whereas non-commercial inter-trips are needed to meet planning standards.
Non-commercial inter-trips	Imbalance	
Transmission faults/ Transmission System disturbance resulting in a trip.	Imbalance	Will need to be reconsidered as part of Transmission access review.
Distribution Constraints	Imbalance	
Distribution faults	Imbalance	
Rota disconnection of demand	Imbalance	
Emergency action outside dynamics (e.g. rapid post-fault 'drops')	BM trade @ bid/offer price	Some further work to identify the relevant accepted volume is needed.

Appendix 6 Illustrative Example of the Removal of Constraints Trades from Energy Imbalance Prices

This paper was developed by NGC to enable transmission constraint and other system balancing costs to be 'tagged' and effectively removed from energy imbalance prices and it forms the basis of the proposal described in Chapter 4.

4th November 1999

Automatic 'trade-tagging' of Imbalance Cash-Out Prices

Proposal by NGC

The NETA Policy Phase Conclusions report concluded that it would be desirable to remove 'transmission constraints and other transmission related costs from energy imbalance prices'. The following is a proposal by which this could be achieved.

Objectives of Imbalance cash-out regime

The following objectives for the imbalance cash-out regime are assumed:

- The imbalance prices should provide a strong incentive to balance.
- Imbalance prices should be 'sensible'. This means that they should reflect the costs of energy balancing, and behave in an understandable manner (e.g. prices should increase with an increased (positive) imbalance volume.
- The calculation of imbalance prices should be as simple as possible. This will help with transparency and limit scope for any complex gaming of the price.
- NGC's ability to affect the imbalance price should be minimised, and restricted to areas which NGC are incentivised to achieve efficiently (such as the selection of bids and offers).

- As far as possible, the calculation of the imbalance prices should not include arbitrary factors.

Proposal for 'Automatic Trade Tagging'

The proposed method for calculating imbalance prices is based upon 'automatic trade tagging'.

In any particular half-period, the net imbalance volume will be in one direction (so that more offers are required than bids) or the other (so that more bids are required than offers). Most transmission constraints and other transport related costs involve the use of matched volumes of bids and offers (e.g. resolving a transmission constraint could involve accepting an Offer of 100 MW in one location, and a Bid of 100 MW in another location).⁶³

Automatic trade tagging works by tagging all the trades in the opposite direction to the net imbalance volume. (I.e. where more offers have been used, all the bids are tagged, and vice versa). In addition, equal volumes of trades in the other direction are also tagged, starting from the most expensive (i.e. the highest priced offers, or the lowest priced bids).

The result of this method is that in each half-hour period, there are only untagged trades left in one direction (i.e. all offers, or all bids). The next issue is how to derive a System Buy Price (SBP) and System Sell Price (SSP). There are several possible routes, but the one which best meets the objectives would be to set one price as the average of the untagged trades, while the other price as the price of the first trade (i.e. lowest offer or highest bid) that was tagged in the other direction.

The proposal is illustrated by the following example:

⁶³ The exception is that sometimes a constraint will result in a more expensive energy balancing trade being used. (E.g. a 100 MW Offer costing 30 £/MWh in one location is used instead of a 100 MW Offer of 20 £/MWh in another location). Separating this cost out is not possible by trade tagging – it requires the use of an EPUS.

Example 1: Balancing Mechanism trades in a half-hour period

Offers (Incs)		
	MW	£/MWh
1	50	19
2	50	23
3	100	24
4	100	27
5	100	35
6	100	55

Bids (Decs)		
	MW	£/MWh
7	50	16
8	50	15
9	50	10
10	50	8

In this example, there were 500 MW of offers accepted and 200 MW of bids. Therefore, the net imbalance volume was +300 MW.

All the bids 7-10 are tagged as 'Transport trades' (a total of 200 MW). The most expensive 200 MW of offers are also tagged as transport trades – trades 5 and 6.

The SBP is set at the average price of the untagged offers = 24 £/MWh.

The SSP is set at the price of the first tagged bid = 16 £/MWh.

Further refinements

Removal of arbitrage trades

A potential problem with the above method is if any of the bids used had higher prices than any of the offers. The use of the first tagged trade to set the price in one direction could lead to an unrealistic price being set, and even the SSP > SBP.

The solution is that any arbitrage trades (i.e. matched volume of accepted bids and offers where the bid price is higher than the offer price) should be removed from the stacks before the method is applied. (In fact, this should be done in order to remove the chance of SSP > SBP even if there were no trade tagging).

This is illustrated in the following example:

Example 2: Balancing Mechanism trades in a half-hour period

Offers (Incs)			Bids (Decs)		
	MW	£/MWh		MW	£/MWh
1	100	19	6	50	26
2	50	23	7	50	15
3	100	24	8	50	10
4	100	27			
5	100	35			

In this case there has been 50 MW of arbitrage gain between offer 1 and bid 6. These are therefore removed. The remaining 100 MW of bids (7 and 8) are tagged, together with offer 5.

The SBP is set as the average of the remaining trades. There is 50 MW of trade 1 remaining, together with trades 2, 3 and 4. The SBP = 24 £/MWh.

The SSP is set at the first tagged bid = 15 £/MWh. Note that if the arbitrage trades had not been removed, this would have been set at 26 £/MWh (higher than SBP).

Inclusion of a 'Notional Reserve' level⁶⁴

A further refinement to automatic trade tagging would be to set a level of 'opposite direction trades' which would not be tagged. Therefore, if this level was set at 200 MW and there were 500 MW of offers and 300 MW of bids accepted, then only the most expensive 100 MW of offers and bids would be tagged.

The two prices would then be set as the average of the remaining untagged offers and bids. (Again, arbitrage trades should also be removed).

In the case where there were less 'opposite direction trades' than the pre-set level, then no trades would be tagged.

If the pre-set level were set very high, then this method would result in no trade tagging (i.e. the current proposal). Conversely, if the pre-set level was set at zero, then the result is the same as the basic automatic trade tagging described above. (The approach of using the first tagged trade in the opposite direction to

⁶⁴ To avoid confusion with the understanding of Notional Reserve under the current arrangements, in Chapter 4 we have referred to this element of the tagging proposal as the "Balancing Reserve" level.

set one of the prices can be justified by considering the case of setting the level at an infinitesimally small value).

This method is illustrated in the following example:

Example 3: Balancing Mechanism trades in a half-hour period

Offers (Incs)		
	MW	£/MWh
1	50	19
2	50	23
3	100	24
4	100	26
5	100	35
6	100	55

Bids (Decs)		
	MW	£/MWh
7	50	26
8	50	15
9	50	11
10	50	8

In this example, the level is set at 100 MW.

Initially, offer 1 and bid 7 are removed as arbitrage trades. The remaining bids are tagged until 100 MW remains. Therefore, bid 10 is tagged, and 50 MW of offer 6 is tagged.

The SBP is now set at the average of the remaining offers (2-5 and 50 MW of 6) = 31 £/MWh

The SSP is set at the average of the remaining bids (8 and 9) = 13 £/MWh.

Justification for a 'Notional Reserve' level

A justification for a particular level could be developed based on which costs were felt should be in energy imbalance price, and which should not. The level would be set based on the expected volume (in the opposite direction to the net system imbalance) of the activities which were agreed should be in the imbalance price.

For example, it could be agreed that the following should be excluded from the energy imbalance price:

- Transmission constraints.
- Part-loading plant for frequency response (as this is a shared system service to which all participants should contribute).
- Within half-hour effects (as these are caused by all parties, not just those with a half-hourly imbalance).

However, part-loading plant for the provision of operating reserve could be viewed as a cost which should be borne by imbalances, because the main cause of the requirement is short-term imbalances. NGC could advise the BSC of the typical volume of bids/offers in the opposite direction to the overall system imbalance it expects to use for this reason. The process could be similar to that used currently for Notional Reserve, where an agreed set of values is used for a period (say 6 months), after which it is reviewed with input from NGC.

Conclusion

Automatic trade tagging provides a method of separating most constraint and other transport-related costs from the energy imbalance price, while meeting the objectives for imbalance pricing.

The basic method would be the simplest, but a 'Notional Reserve' concept could be introduced if there were certain reserve costs which it were felt should not be removed from the imbalance price.

Appendix 7 Illustrative Examples of Net Imbalance Volume

NGC proposes that the scope of the initial incentive scheme should be based on an ex-ante forecast of total balancing costs, subject to the removal of the net imbalance volume at a reference price. An illustrative example of this approach is presented below as Example 1.

Example 1: For a Positive Net Imbalance Volume i.e. the system is short of energy

Assume the Total Forecast Balancing Cost = £300m

Assume total outturn costs are as follows:

Total outturn costs = £300m (total balancing contract costs) + £200m (net costs of energy balancing in the BM based on a net 5TWh of offers accepted @ 40 £/MWh) = £500m

Under the proposed Net Imbalance Volume (NIV) approach, the incentive scheme target would be set as follows:

Assuming the Reference Price is equal to 35 £/MWh. Then:

*Target = Total forecast balancing cost (£300m) + [actual energy imbalance (5 TWh) * reference price (35 £/MWh)] = £475 m*

Then incentive scheme payments would be determined as follows:

*Incentive Payment = Sharing Factor * (outturn - target)*

*Incentive payment = Sharing Factor * (£500m - £475m) = SF * £25 m.*

Thus, NGC would pay out under its incentive scheme.

The example above demonstrates that NGC's exposure to a positive net imbalance volume (i.e. when the system is short) would be reduced (from £200m to £25m in the example shown). Similar examples can be constructed for a negative imbalance volume (i.e. the system is long). With a negative imbalance volume, the benefits NGC might otherwise enjoy of a negative net imbalance volume would be reduced. NGC would

therefore be incentivised to minimise the net imbalance volume (although NGC argued has argued that it has little or no control over this volume).

NGC has provided further worked examples of the impact of removing its exposure to the net imbalance volume and these are reproduced below.

NGC's Worked Examples on the Net Imbalance Volume

The scenarios below illustrate the effect of removing the cost of net Imbalance Volume (at a reference price) from the Balancing Services Incentive Scheme. They demonstrate that the incentive scheme becomes more focused under this approach whilst also ensuring that it is in NGC's best interests for the net Imbalance Volume to be as close to zero as possible.

In each scenario, we assume that we need to hold 100MW of headroom for response. The target cost is set to £1200 based on a zero net Imbalance Volume. When calculating incentive payments, the target is adjusted by adding a cost term for the imbalance, which is given by the imbalance volume times a reference price, i.e.

$$\text{Target} = \text{Target}_{v=0} + V_{\text{IMB}} \times P_{\text{ref}}$$

The reference price is set ex-ante to £20/MWh. Caps/Collars are set to £100k, and sharing factors to 50%. For illustrative purposes this note assumes a notional duration of 1 hour, thus units of MW and MWh become interchangeable.

The following INC's and DEC's are available:-

INC ₁ = £25/MWh	100MW	DEC ₁ = £15/MWh	-100MW
INC ₂ = £30/MWh	100MW	DEC ₂ = £10/MWh	-100MW
INC ₃ = £35/MWh	100MW	DEC ₃ = £0/MWh	-100MW
INC ₄ = £60/MWh	100MW		

Scenario 1 : System Balances

The target based on zero net Imbalance Volume is set to £1200. To provide the 100MW of headroom for response, the most economic 100MW of INC's and DEC's are selected, i.e.

$$\text{Balancing Cost} = £25/\text{MWh} \times 100\text{MW} - £15/\text{MW} \times 100\text{MW} = £1000$$

The outturn is compared to the target to give an incentive payment to NGC of £100, i.e.

$$\text{Incentive Payment} = 50\% \times (\text{£}1200 - \text{£}1000) = \text{£}100$$

The next three scenarios examine the effect on incentives if the system is short.

Scenario 2: System Short by 100MW

In this example, the system is short by 100MWh, giving a positive net Imbalance Volume of 100MW. An additional cost is incurred for balancing the system, i.e.

$$\text{Balancing Cost} = \text{£}1000 + \text{£}30/\text{MWh} \times 100\text{MW} = \text{£}4000$$

The Balancing Costs increases significantly as a result of resolving the net Imbalance. Volume However, NGC has no control over this volume, and incentive payments would be given by:-

$$\text{Incentive Payment} = 50\% \times (\text{£}1200 - \text{£}4000) = -\text{£}1,400$$

Rather than being paid £100 for efficient system balancing, NGC pays £1,400 as a result of an imbalance that it cannot control. To overcome this problem, the target is adjusted by adding a cost equal to the net Imbalance Volume times the reference price.

$$\text{Adjusted Target} = \text{£}1200 + 100\text{MW} \times \text{£}20/\text{MWh} = \text{£}3,200$$

$$\text{Incentive Payment} = 50\% \times (\text{£}3200 - \text{£}4000) = -\text{£}400$$

This scenario demonstrates how the exposure to net Imbalance Volume is reduced. However, with an incentive payment of £400, compared to the £100 received in scenario 1, it also illustrates that there is a mild incentive to minimise positive imbalance volumes. This is further illustrated in the next scenario.

Scenario 3: System Short by 200MW

In this example, the net Imbalance Volume is doubled to 200MW. An additional cost is incurred for balancing the system, i.e.

$$\begin{aligned} \text{Balancing Cost} &= \text{£}1000 + \text{£}30/\text{MWh} \times 100\text{MW} + \text{£}35/\text{MWh} \times 100\text{MW} \\ &= \text{£}7500 \end{aligned}$$

The target is adjusted by adding a cost equal to the net Imbalance Volume times a reference price.

$$\text{Adjusted Target} = \text{£}1200 + 200\text{MW} \times \text{£}20/\text{MWh} = \text{£}5200$$

$$\text{Incentive Payment} = 50\% \times (\text{£}5200 - \text{£}7500) = -\text{£}1,150$$

The incentive payment made by NGC increases from £400 to £1,150 as a result of a doubling of the net Imbalance Volume. This illustrates that exposure to net Imbalance Volume is not fully removed and a mild incentive to maintain net Imbalance Volume as close to zero as possible is retained.

Scenario 4: System Short by 200MW - Extra Expensive Inc

This example is similar to Scenario 3, except that a more expensive bid is called upon to balance the system. An additional cost is incurred for balancing the system, i.e.

$$\begin{aligned}\text{Balancing Cost} &= \text{£}1000 + \text{£}30/\text{MWh} \times 100\text{MW} + \text{£}60/\text{MWh} \times 100\text{MW} \\ &= \text{£}10,000\end{aligned}$$

The target is adjusted by adding a cost equal to the net Imbalance Volume times a reference price.

$$\text{Adjusted Target} = \text{£}1200 + 200\text{MW} \times \text{£}20/\text{MWh} = \text{£}5200$$

$$\text{Incentive Payment} = 50\% \times (\text{£}5200 - \text{£}10,000) = -\text{£}4,800$$

This example demonstrates that, although exposure to net Imbalance Volume is reduced, the incentive to resolve imbalances using the cheapest available bids is maintained. Calling the £60/MWh INC in preference to the cheaper £35/MWh INC results in the incentive payment made by NGC increasing from £1,150 to £4,800.

Scenario 5: System Long by 100MW

In this example, the system is long by 100MW, giving a net Imbalance Volume of -100MW. NGC sees a reduction in cost for balancing the system:-

$$\text{Balancing Cost} = \text{£}1000 - \text{£}10/\text{MWh} \times 100\text{MW} = \text{£}0$$

The Balancing Costs have reduced as a result of the net Imbalance Volume. If the target were not adjusted, NGC would receive an incentive payment as follows:-

$$\text{Incentive Payment} = 50\% \times (\text{£}1200 - \text{£}0) = \text{£}600$$

This provides an incentive for the system to be as long as possible, and is therefore inappropriate. The target is therefore adjusted by adding a cost equal to the net Imbalance Volume times the reference price.

$$\text{Adjusted Target} = \text{£}1200 - 100\text{MW} \times \text{£}20/\text{MWh} = -\text{£}800$$

$$\text{Incentive Payment} = 50\% \times (-\text{£}800 - \text{£}0) = -\text{£}400$$

This scenario demonstrates how the exposure to negative net Imbalance Volume (when the system is long) is reduced. However with an incentive payment of £400, compared to the £100 received in scenario 1, it also illustrates that there is a mild incentive to minimise negative net Imbalance Volume. This is further illustrated in the next scenario.

Scenario 6: System Long by 200MW

In this scenario, the negative net Imbalance Volume is doubled to 200MW. An additional cost is incurred for balancing the system, i.e.

$$\begin{aligned} \text{Balancing Cost} &= \text{£}1000 - \text{£}10/\text{MWh} \times 100\text{MW} + - \text{£}0/\text{MWh} \times 100\text{MW} \\ &= \text{£}0 \end{aligned}$$

The target is adjusted by adding a cost equal to the net Imbalance Volume times a reference price.

$$\text{Adjusted Target} = \text{£}1200 - 200\text{MW} \times \text{£}20/\text{MWh} = -\text{£}2,800$$

$$\text{Incentive Payment} = 50\% \times (-\text{£}2,800 - \text{£}0) = -\text{£}1,400$$

The incentive payment made by NGC increases as a result of the increase in negative imbalance volume. This demonstrates that a mild incentive to minimise negative volume imbalances is retained.