

Modification Report
URGENT Modifications Reference Number 218, 220 and 222

This Modification Report is made pursuant to Rule 9 of the Modification Rules and follows the format required under Rule 8.12.4.

This document contains Modification Reports (which have been combined, for convenience) in connection with Modification Proposals 218, 220 and 222.

It has become apparent that Modification Proposal 221 was not properly a modification proposal since it did not require any modification to the Network Code. BG has therefore withdrawn that proposal and this report does not relate to that Modification Proposal.

For clarity, in this document 'Transco' has the meaning under the Modification Rules, i.e. the licensee under BG plc's PGT Licence.

1. Circumstances Making these Modification Proposals Urgent

In accordance with Rule 9.2(a) Ofgas has agreed that these Modification Proposals should be treated as Urgent in order to minimise any delay in the Annual Storage Invitation and in allocating capacity.

2. Procedures Followed

Transco agreed with Ofgas (and has followed) the following procedures for these Proposals:

- 6/3/98 Ofgas decision on urgency.
- 6/3/98 Transco circulated the modification proposals
- 12/3/98 Close out of representations on proposals.
- 16/3/98 Final Modification Report by Transco to be sent to Ofgas.
- 18/3/98 Latest date for Ofgas decision.

3. The Modification Proposals

The three Modification Proposals are:

**Modification Proposal ref number 218 - An Auction of Rough Services 1998/9
Raised by NGC**

The Modification Proposal would require BG to offer a Firm, 30-day withdrawal, 50-day injection service and an Interruptible service (with 50-day withdrawal rights) through an auction. The auction rules could include a reserve price, provided it was deemed necessary to avoid accusations of predatory pricing. Deliverability would be allocated in order of bid price, highest first. All successful tenderers would pay the Clearing Price. The firm service would have priority over all other services with 2 hours' notice. The interruptible service would have priority over all other services except firm.

The Modification Proposal would allow the sale of unused and available capacity to the highest bidder on a daily basis.

The Modification Proposal would allow flexibility bids to be made using all services.

The Modification Proposal allows for any under recovery against "allowed" revenue to be recovered through Balancing Neutrality at the end of the Storage Year.

**Modification Proposal ref number 220 - Rough Services 1998/9 (Core)
Raised by Transco**

The Modification Proposal would:

- remove the distinction between Space capacity under Firm and Space Only Services: All Space would be allocated 1/50th interruptible deliverability.
- when necessary, scale back the rate of interruptible withdrawal in proportion to available space.
- allow Interruptible deliverability to be used to place flexibility bids, but the bidder would be exposed to overrun charges (as amended by mod 158) to the extent that the interruptible deliverability is interrupted.
- remove the V factor: Interruptible deliverability could be used regardless of System demand (subject to availability).
- change the allocation of capacity to ensure that deliverability is allocated first, and space is allocated to successful applications for deliverability. Remaining space at Rough would be available for space only.
- continue to allow BG to offer Special Storage Capacity which may affect the availability of interruptible deliverability - as per section R3.9

**Modification Proposal ref number 222 - Rough Storage Tender 1998/99 Raised
by Enron**

The Modification Proposal proposes:

1. A two stage auction. The first stage would auction a firm 30 day service. The market clearing price would be the price at which all deliverability is sold. Successful applicants would pay the market clearing price; Stage 2 would offer remaining space as a space only service. Again the market clearing price would determine the price paid by all parties. There would be no reserve price, but negative bids will be invalid.
2. Space would be allocated 1/50th interruptible deliverability.
3. When constrained, use of interruptible deliverability would be scaled back in proportion to Available Space.
4. Interruptible deliverability would be accessible regardless of system demand.

5. BG would offer Special Storage Capacity deliverability and injectability, including when shippers hold firm rights over capacity but are not using it to flow gas. Posting a flexibility bid would not constitute use until it was accepted. Special Capacity would be interruptible if firm holders required it, at any time. Special deliverability would take precedence over interruptible deliverability. BG would make Special Capacity available on a first come first served basis. BG would be required to accept a bid priced at 1/365th of the equivalent annual firm rate for any available deliverability, but would not be required to accept a lower bid.
6. An award of more than 70% of the available space or deliverability to any shipper company (including affiliates) would be subject to Ofgas approval to avoid potential abuse of a dominant position.

4. Transco's opinion

Transco's opinion in respect of Modification Proposals 218 and 222 is set out in Attachment A. For the reasons given in that Attachment, those Modification Proposals should not proceed.

Transco's opinion is that the modification under Modification Proposal 220 would better achieve the relevant objectives and should be made.

As noted above, Modification Proposal 221 was ineffective and has been withdrawn. However, Transco proposes to change the Storage Pricing Methodology in the way described in that proposal.

5. Extent to which the proposed modifications would better facilitate the relevant objectives

For the reasons set out in Attachment A, neither Modification Proposal 218 or 222 are valid Network Code modifications and even if they were they do not better facilitate the relevant objectives. Modification Proposal 220 does better facilitate the relevant objectives for the reasons specified in Attachment A.

6. The implications for Transco of implementing Modification Proposal 220

Transco's opinion is that neither Modification Proposal 218 or 222 is a valid Network Code Modification, and therefore the implications for Transco of implementing them have not been considered and the remainder of this Modification Report address only Modification Proposal 220.

a) implications for the operation of the System and any BG Storage Facility

The removal of the V factor ensures that all deliverability is available in the market.

b) development and capital cost and operating cost implications

None identified

- c) **extent to which it is appropriate for Transco to recover the costs, and proposal for the most appropriate way for Transco to recover the costs**

None identified.

- d) **analysis of the consequences (if any) this proposal would have on price regulation**

Modification Proposal 220 taken in conjunction with the proposal to modify the Storage Pricing Methodology is consistent with Licence Conditions 3 and 4 and Special Condition 9D.

7. **The consequence of implementing Modification Proposal 220 on the level of contractual risk to Transco under the Network Code as modified by the Modification Proposal**

None identified.

8. **The development implications and other implications for computer systems of Transco and related computer systems of Relevant Shippers**

None have been brought to Transco's attention.

9. **The implications of implementing Modification Proposal 220 for Relevant Shippers**

Implementing Modification Proposal 220, together with the proposed Storage Pricing Methodology modification achieves the range of objectives which have been broadly agreed with the industry through the consultation process, including:

- It makes all capacity at Rough available to storage customers.
- It is simple to understand, implement and operate.
- It is consistent with the Network Code balancing regime.
- It emphasises the role of storage in meeting peak and seasonal demand.
- It gives storage customers a choice between higher cost firm and lower cost interruptible services

10. **The implications of implementing Modification Proposal 220 for terminal operators, suppliers, producers and, any Non-Network Code Party**

Modification Proposal 220 removes the artificial constraint of the V factor and increases the availability of peak gas.

11. **Consequences on the legislative and regulatory obligations and contractual relationships of Transco and each Relevant Shipper and Non-Network Code Party of implementing Modification Proposal 220**

Modification Proposal 220 is consistent with legislative and regulatory obligations.

12. **Analysis of any advantages or disadvantages of the implementation of Modification Proposal 220**

These are detailed in the rest of the Modification Report.

13. **Summary of the Representations (to the extent that the import of those representations are not reflected elsewhere in the Modification Report)**

There have been 21 representations on the Proposed Modifications. Several of the respondents expressed concern that the process did not allow sufficient time to consider fully all the issues and the long term impacts. There was concern expressed that there is a lot of uncertainty moving forward with the development of competition in the domestic market and that suppliers to end users will not be able to rely on using storage but will become dependent on the uncertainty of a trading market. The other major uncertainty is the nature of the Energy Balancing Regime for the forthcoming winter and therefore any changes should be made once any new regime is established.

Auction versus Fixed Price

8 of the respondents favoured a fixed price for Rough services whilst 11 favoured an auction (8 in favour of Proposed Modification 222 and 3 in favour of a hybrid of Proposed Modifications 218 and 222). 2 of the respondents were unsure.

The majority of the responses were opposed to a levy being charged to recover any under recovery of income against BG's revenue cap, in the event of an auction - one respondent gave support to a levy. There was much wider acceptance that BG should be allowed to carry any under recovery forward through the N mechanism.

The ability of an auction to deliver market values was supported by some of the respondents. However, others expressed the opinion that an auction process was being used to drive the Rough Storage prices down to allow high trading rewards on the secondary market - at the expense of BG and suppliers of gas to end users.

Rule Changes

There was unanimous support for the removal of the V factor

There was general support for the provision in Modification Proposal 222 which dealt with the situation where one storage user has a dominant position. There were various views on the percentage market share that should be used to define dominance (between 25% and 70%)

There was no clear agreement as to whether Special Services should take precedence over interruptible services, however the majority of respondents were in favour of Special Services being offered, to ensure that all the deliverability is available on any day.

14. The extent to which the implementation is required to enable Transco to facilitate compliance with safety or other legislation

Implementation of Modification Proposal 220 is consistent with the ability of Transco to properly discharge its duties under the Gas Act, the Licence, the Network Code and the PGT Safety Case.

15. The extent to which the implementation is required having regard to any proposed change in the methodology established under Standard Condition 3(5) of the statement; furnished by Transco under Standard Condition 3(1) of the Licence

The proposal to modify the Storage Pricing Methodology is based on the services covered by Modification Proposal 220.

16. Programme of works required as a consequence of implementing Modification Proposal 220

Storage tenders are ready for issue.

17. Proposed implementation timetable (inc timetable for any necessary information systems changes)

March 20th	Storage invitations to tender circulated
April 17th	Tender closes
April 23rd	Allocation of capacity confirmed
April 28th	Deadline for requesting May injection capacity
April 30th	May injection programmes confirmed

18. Recommendation concerning implementation of the Modification Proposal

It is recommended that Modification Proposal 220 is implemented on Wednesday 18 March.

19. Restrictive Trade Practices Act

If implemented this proposal will constitute an amendment to the Network Code. Accordingly the proposal is subject to the Suspense Clause set out in the attached Annex.

20. Transco's Proposal

This Modification Report contains Transco's proposal to modify the Network Code in accordance with Modification Proposal 220 and Transco now seeks direction from the Director General in accordance with this report.

21. Text provided pursuant to Rule 9

In view of the points set out in this Modification Report, text is provided only in relation to Modification Proposal 220. This text is set out in Attachment B.

Signed for and on behalf of Transco

Signature:

John Lockett
Manager, Network Code

Date:

16. 3. 98

Director General of Gas Supply Response

In accordance with Condition 7 (10) (b) of the Standard Conditions of Public Gas Transporters' Licences dated 21st February 1996 I hereby direct Transco that the above proposal (as contained in Modification Report Reference 218, 220 and 222 version 1.0 dated 16 March 1998 be made as a modification to the Network Code.

Signed for and on behalf of the Director General of Gas Supply.

Signature:

Kyran Hanks
Director of Transportation Regulation

Date:

The Network Code is hereby modified, with effect from _____, in accordance with the proposal as set out in this Modification Report, version 1.0.

Signature:

Process Manager - Network Code
Transco

Date:

ANNEX

Restrictive Trade Practices Act - Suspense Clause

For the purposes of the Restrictive Trade Practices Act 1976, this document forms part of the Agreement relating to the Network Code which has been exempted from the Act pursuant to the provisions of the Restrictive Trade Practices (Gas Conveyance and Storage) Order 1996. Additional information inserted into the document since the previous version constitutes a variation of the Agreement and as such, this document must contain the following suspense clause.

1. Suspense Clause

1.1 Any provision contained in this Agreement or in any arrangement of which this Agreement forms part by virtue of which this Agreement or such arrangement is subject to registration under the Restrictive Trade Practices Act 1976 shall not come into effect:

- (i) if a copy of the Agreement is not provided to the Director General of Gas Supply (the "Director") within 28 days of the date on which the Agreement is made; or
- (ii) if, within 28 days of the provision of the copy, the Director gives notice in writing, to the party providing it, that he does not approve the Agreement because it does not satisfy the criterion specified in paragraph 2(3) of the Schedule to The Restrictive Trade Practices (Gas Conveyance and Storage) Order 1996.

provided that if the Director does not so approve the Agreement then Clause 1.2 shall apply.

1.2 Any provision contained in this Agreement or in any arrangement of which this Agreement forms part by virtue of which this Agreement or such arrangement is subject to registration under the Restrictive Trade Practices Act 1976 shall not come into effect until the day following the date on which particulars of this Agreement and of any such arrangement have been furnished to the Office of Fair Trading under Section 24 of the Act (or on such later date as may be provided for in relation to any such provision) and the parties hereto agree to furnish such particulars within three months of the date of this Agreement.

**Transco's Opinion
in relation to
Network Code Modification Proposals 218, 220, & 222**

Introduction

1. This paper and its appendices contain the opinion of Transco in respect of the three urgent Network Code Modification proposals numbers 218, 220, and 222. Modification Proposal 221 was a proposal to modify the Storage Pricing Methodology and not a Network Code Modification and could not therefore be considered under the modification process. It has now been formally withdrawn from the modification process. For the avoidance of doubt, it remains as a proposal to modify the Storage Pricing Methodology to be considered in conjunction with BG's Modification Proposal 220.
2. It appears from Nick Fincham's letter to Martin Kinoulty, dated 6 March 1998, that on its current thinking Ofgas would support an auction alongside BG making unused capacity available on the day, and without any revenue protection mechanism. It therefore appears that, on its current thinking, Ofgas would be minded to give directions under Standard Condition 7(10)(b) for modifications in accordance with Modification Proposal 222, proposed by Enron (the function of the Director under Condition 7(10)(b) being to choose as between alternative notified proposals and the existing code provisions, rather than to devise modifications of her own).
3. Modification Proposal 222 ('the Enron Proposal'), would fatally undermine the ability of BG to earn the return on its storage assets that the MMC held to be appropriate in its report of May 1997. BG believes it is difficult to reconcile the Enron proposal with the Director's duty under Section 4(1)(b) of the Gas Act 1995. It would deprive BG of the ability that it currently has to determine its own charges for Rough storage. And it would create massive risks and uncertainties in the attempt to implement an auction system that has not been thought through.
4. Whilst in theory Modification Proposal 218 (the 'NGC Proposal') would protect the ability of BG to earn the appropriate return through the revenue protection mechanism proposed, it is unclear as to whether this would achieve such an objective in practice. BG's concerns in respect of the Enron proposal apply equally to the NGC proposal.
5. The Director could not lawfully give directions under Condition 7(10)(b) in respect of either the Enron Proposal or the NGC Proposal. First, the proposals relate to matters outside the scope of the Network Code and the Director would be acting *ultra vires* if she were to give directions in relation to either of them. Secondly, even if the proposals related to matters within the scope of the Code, they are insufficiently particularised to be the subject of a proper notice under Condition 7(10), and thus cannot properly be the subject of directions under Condition 7(10)(b). Thirdly, even if the proposals were within the scope of the Code and had been notified with proper particulars, neither proposal would better facilitate the achievement of the relevant objectives under Condition 7 as compared with Modification Proposal 220 (the 'BG Proposal') and the proposed Storage Pricing Methodology.

The Enron Proposal and the NGC Proposal are outside the scope of the Code

6. In accordance with Standard Condition 7(1) and (2), the Network Code sets out the terms of BG's transportation arrangements in respect of matters other than those to which Standard Conditions 3 and 4 relate. The matters to which Standard Conditions 3 and 4 relate are the charges to be made in pursuance of transportation arrangements (which include the storage arrangements in respect of Rough) and the methods by which and principles on which those charges are determined.
7. The Enron and NGC Proposals relate directly to matters falling within Condition 3 and 4. They both seek to specify the methods by which the charges by BG for the Rough storage arrangements are to be determined, to deprive BG of the ability to determine such charges for itself and to require them to be determined by auction. Indeed, Ofgas' own assessment of the proposals, as set out in Nick Fincham's letter of 6 March to Martin Kinoulty, is based on the supposed desirability of having prices set by auction.
8. Any modification of the Network Code must relate to matters properly within the Code. A proposal that relates to matters falling outside the scope of the Network Code cannot lawfully be the subject of a direction under Condition 7(10)(b).
9. The Network Code currently contains, as envisaged by Condition 3(9)(b), provisions entitling BG to opt to allocate capacity on the basis of a price tender, and to determine its charges in accordance with such a tender. However, that plainly does not bring other matters relating to storage charges within the scope of the Code. The exclusion, pursuant to Condition 3(9)(b), of certain charges from the licensee's duties under Condition 3 is a matter between the licensee and the Director, dependent upon the Director's acceptance of a proposal by the licensee. 'Accepted' in Condition 3(9)(b) necessarily involves a bilateral relationship and not a unilateral act of the Director, and in the context of Condition 3 the other party must be the licensee. Condition 3(9)(b) cannot reasonably be construed as giving the Director carte blanche to remove from regulation under the licence conditions any charging arrangements that she, or other interested parties, may like to have within the Network Code.
10. Further, condition 3(9)(b) applies only to the extent that the Director has accepted that charges should be determined by the provision of the Code. The only matters accepted by the Director in that connection leave BG to decide when and whether to proceed by price tender, with BG free to determine reserve prices and all other prices. The Enron and NGC Proposals go way beyond that extent, would wholly deprive BG of the ability to set charges and would require BG to accept the market clearing price. The proposals relate to matters that remain within Condition 3 and 4 and are therefore outside the scope of the Network Code.
11. The Network Code modification procedure cannot and does not provide a backdoor route for imposing on BG, without its consent, new and different methods for regulating its charges in respect of transportation and storage arrangements. Last year's MMC inquiry, and the recently settled Special Conditions 9C and 9D which resulted from it, would have been an unnecessary charade if the Director had, as now seems to be suggested, the power to direct that such matters be dealt with under the Code. The suggestion runs counter to the whole scheme of the regulatory arrangements.

Lack of proper particulars of the Enron Proposal and the NGC Proposal

12. For the reasons set out above, given their content the proposals cannot lawfully be the subject of a direction under Condition 7(10)(b). Even if they could otherwise be the subject of such a direction, in the present circumstances insufficient particulars have been given of the proposals for Transco to be in a position to give proper notice under Condition 7(10)(a) which would be capable of triggering the exercise of powers under Condition 7(10)(b) in relation to the proposals. Even in the case of urgent modification proposals, it is only the modification procedures under the Modification Rules that may be waived, proper notice is still required under Condition 7(10), and that includes the requirement for particulars to be given.
13. In relation to the Enron and NGC Proposals, the particulars given are wholly inadequate to enable any fully informed assessment of the proposals to be made or any fully informed representations to be submitted. It is implicit in Standard Condition 7 that sufficient particulars should be given of a proposed modification to enable parties and the Director to understand it fully so that they can comment on it and form a view as to its appropriateness both in its own right and as compared with other proposals. In particular, the proposals give rise to the questions set out in Appendix A hereto, including:
 - The exact nature of the services to be offered.
 - The processes and procedures for implementing any such services
 - The interaction with the current provisions of the Network Code
 - In the case of the NGC Proposal, the manner in which the revenue protection mechanism would be calculated and implemented.
14. In those circumstances, and leaving aside the issues of the scope of the matters to which the proposals relate, neither the Enron Proposal or the NGC Proposal could lawfully be the subject of a direction under Condition 7(10)(b) since a proper notice is a prerequisite to such a direction.

Neither the Enron Proposal nor the NGC Proposal would better achieve the Relevant Objectives

15. Even if the Enron or NGC Proposals were ones which could properly be made under Condition 7 and had been sufficiently particularised, the Director could direct that the Code be modified in accordance with one of the proposals only if she were satisfied that it would better facilitate the achievement of the relevant objectives than the existing provisions of the Code or any alternative proposal. Both the Enron Proposal and the NGC Proposal would not in fact better facilitate the relevant objectives but would both run counter to them. There is no reasonable basis on which the Director could reach a contrary view.

16. The relevant objectives, as set out in Condition 7(1), give priority to the efficient discharge of BG's obligations under the licence over securing effective competition between shippers and between suppliers. If, as is the case, the Enron or NGC Proposal would prejudice the efficient discharge of BG's obligations while the BG Proposal and the proposed Storage Pricing Methodology would not, then the Director cannot rely upon any supposed greater facility in securing effective competition as a grounds for preferring either the Enron or NGC Proposal over other modification proposals.
17. It is in fact clear that the Enron Proposal would run counter to the prior objective of achieving the efficient discharge of BG's obligations under the licence. The efficient discharge of BG's obligations is dependent on BG earning an adequate rate of return on the assets that it employs in discharging those obligations. In respect of its storage obligations, the MMC in its May 1997 report concluded that revenues of £160 million would be needed to provide a rate of return sufficient to finance the carrying on of BG's storage activities.
18. If BG were required to implement an auction for its Rough services, it is clear, for the reasons set out in Appendix B hereto that it would be unlikely to achieve revenues of £160 million or anything approaching that figure. The Enron Proposal contains no mechanism to make up the shortfall.
19. Whilst the NGC Proposal refers to 'any under recovery or over recovery being charged/rebated at the end of the year' it is unclear what the basis is for calculating the under or over recovery and what the mechanism is for payment or collection. BG believes that the Director should only direct adoption of a proposal if it is clear that it will deliver the return regarded as appropriate by the MMC. That is not true of the NGC Proposal.
20. The Enron and NGC Proposals would also adversely affect the ability of Transco to fulfil its 'Top-Up' obligations and therefore again would fail to facilitate the achievement of the prior relevant objective. The BG Proposal and the proposed Storage Pricing Methodology would not have that effect. Appendix C details the impact of the Enron and NGC Proposals on Top Up.
21. Proposals which would have the effects of depriving BG of the return needed to finance its storage activities, and also of jeopardising Transco's 'Top-Up' obligations, cannot reasonably be regarded as better facilitating the prior objective of achieving the efficient discharge of BG's obligations than would the BG Proposal and the proposed Storage Pricing Methodology that do not have those effects.
22. The Enron and NGC Proposals would not in fact better facilitate the securing of effective competition than the BG Proposal and the proposed Storage Pricing Methodology. It has been claimed that an auction is a move in a competitive direction and that it will secure 'market related prices'. Appendix D contains two appendices commenting on the Enron Proposal and Nick Fincham letter of 6 March to Martin Kinoulty by Professor Ken Binmore, Director of ELSE, Economics Department University College London, and a paper which demonstrates that such claims are not true in principle and in the current case are demonstrably not correct given the market dominance of British Gas Trading (BGT).

23. Finally it is possible that the Enron Proposal and NGC Proposal would not only result in BG failing to recover sufficient revenue to finance its storage activities but could even result in it recovering less revenue than its one year avoidable costs incurred in operating the Rough facility. It is difficult to reconcile such an outcome with the Directors duties under Section 4(2) Gas Act 1995.

Conclusion

24. For the reasons set out above, the Director would not be entitled to, and in any event should not, give directions under Condition 7(10)(b) requiring the adoption of either the Enron Proposal or the NGC Proposal. Both proposals are ultra vires, are procedurally defective and would run counter to the relevant objectives. In any event, BG's Modification Proposal 220 together with its proposed Storage Pricing Methodology would better facilitate the achievement of the relevant objectives and should be implemented.

Appendix A

Clarification required in respect of Enron's Modification Proposal number 222 "Rough Storage Tender for 1998/9"

Auction

1. Clarification is required on the timing of the two-stage process.
2. It is not clear whether 'Firm' Space receives 1/50th interruptible withdrawal rights. If it does not, then the existing difficulty that different services are inter-convertible by storage transfers remains.
3. Clarification is required as to how Stage 1 determines the clearing price for deliverability. It currently appears to determine a bundled price for deliverability plus space.
4. It is unclear whether the price of space determined in Stage 2 applies to all space under both auctions.
5. Is it intended that successful bidders in Stage 1 have priority in Stage 2.
6. The auction does not determine separate prices for space and deliverability, but these are needed to calculate space and deliverability overrun charges, and failure payments. How is this to be done. One option would be to re-write the relevant sections of the Network Code to avoid reliance on these prices but this would be a major exercise and the principles which apply would need to be defined.
7. The question of pre-emption rights for previous year holders has not been addressed. Their rights need to be defined and potential problems addressed. For example, they may currently be entitled to a 50 day service but the modification would appear to mean that only a 30 day service is available.
8. Clarification is required in respect of the impact of the modification on Transco's requirement for operating margins. If deliverability were auctioned with no pre-emption rights being allowed, Transco may have to bid higher than ideal prices to guarantee that Operating Margins can be provided. If pre-emption rights are permitted then Transco could influence the Higher Weighted Average Price paid by those customers with pre-emption rights that were unsuccessful with their bids.
9. The lead-times for nominations and interruption under the Interruptible Service and Special Services need to be agreed and specified.
10. In order to sell special injectibility it would be necessary to carry out a complete revision of the Network Code injection regimes for winter (weekly process) and summer (monthly process).
11. Clarification is required as to when special capacity can be sold, for example, is the intention that it is possible for a customer to book in May for the following February.

12. What principles govern bids above 1/365 of annual rate. Is the intention that they must be automatically accepted or rejected or is some discretion intended.
13. It would appear that rather than pay for annual capacity, shippers may buy special capacity at 1/365th of the annual price on the 60 to 80 days days they need it. The daily price of 1/365th of the annual price does not recognise the much higher value in winter - is this the intention. This would appear to be a fixed price not a so called 'market related' price, is this the intention.
14. The manner in which special capacity is advertised and made available needs to be defined. Principles covering the timing of sales and nominations need to be specified.
15. Agreement is required as to the effect of plant failure on special services.
16. What is the interaction with the requirement to obtain transportation entry capacity from Transco or other sellers of entry capacity.
17. It is unclear whether following acceptance of a flexibility bid, the resultant flow is subject to interruption. If it is, flexibility bids using interruptible deliverability may not provide incremental flow to the Transco system. Further Network Code rules are needed to clarify what happens on interruption and to identify the charges which will apply.

70% limit on capacity awarded to one Company

18. Clarification of the details and procedures applying to this apparently arbitrary limit is necessary, in particular:
 - Does the limit just apply to award through the initial tender or to late bookings and transfer as well.
 - If one company gained say 71% in the auction or at a later date, what are the consequences.
 - Is the limit applied separately to space and deliverability.

Customer Choice

19. BG's experience is that its storage customers want a range of different services; this proposal offers only two. In particular, there is only a 30-day firm service instead of the current available range from 30 to 120 days. If customers want (say) a 50-day service, they have to apply for additional space only service, and may not be successful. Is the intention to give such customers any priority.

Summary

As defined, the proposals are not capable of being implemented in a workable manner.

Clarification required in respect of NGC's Modification Proposal number 218
"An Auction of Rough Services 1998/9"

Auction

1. It is not clear whether 'Firm' Space receives 1/50th interruptible withdrawal rights. If it does not, then the existing difficulty that different services are inter-convertible by storage transfers remains.
2. It is not clear what is meant by a "50-day injection service". If it is intended to mean that space can be filled in 50 days, this is physically impossible. Filling the space takes approximately 160 days. It is not clear how injection capacity is to be allocated. If all the injection capability is allocated to the firm service, it is unclear how holders of space under the interruptible service fill their space.
3. BG does not understand what is meant by "50-day withdrawal rights"
4. The proposal appears to envisage a reserve price but it is unclear what this is or how it is to be established.
5. Under the proposal there are 30 units of space associated with each unit of deliverability. It is unclear whether shippers bid for 1 unit of deliverability together with associated 30 units of space, or 1 unit of space with associated 1/30th unit of deliverability.
6. The auction does not determine separate prices for space and deliverability, but these are needed to calculate space and deliverability overrun charges, and failure payments. How is this to be done. One option would be to re-write the relevant sections of the Network Code to avoid reliance on these prices but this would be a major exercise and the principles which apply would need to be defined.
7. On the timing of the auction, it is not clear whether the Interruptible service is to be auctioned at same time as Firm, or later.
8. The question of pre-emption rights for previous year holders has not been addressed. Their rights need to be defined and potential problems addressed. For example, they may currently be entitled to a 50 day service but the modification would appear to mean that only a 30 day service is available.
9. Clarification is required in respect of the impact of the modification on Transco's requirement for operating margins. If deliverability were auctioned with no pre-emption rights being allowed, Transco may have to bid higher than ideal prices to guarantee that Operating Margins can be provided. If pre-emption rights are permitted then Transco could influence the Higher Weighted Average Price paid by those customers with pre-emption rights that were unsuccessful with their bids.
10. It is not physically possible to be on 2-hours notice for all deliverability and injectability.

11. The lead-times for nominations and interruption under interruptible and tertiary services need to be agreed and specified.

Tertiary Services

12. “Unused” and “Available” need to be defined and in particular it must be clear whether they include flexibility bids which are posted but not accepted.
13. BG requires detailed principles and agreements which define processes including:
 - When BG should post availabilities
 - How often these should be posted
 - What the consequences are if BG fails to post availability
 - What the rules and processes for bidding are

There is a danger of creating either an enormous work load or an ineffectual capacity allocation mechanism. The timing of nominations and renominations will require review to ensure availability of tertiary capacity is known, and so that successful bidders can make their nominations.

14. AT-Link does not have the facility for posting such information. Modifications to AT-Link are costly and have long lead-times. How is this to be addressed.
15. Posting and selling injectability would require a complete revision of the Network Code injection regimes for winter (weekly process) and summer (monthly process).
16. Is it intended that bids should be audited and if so, how.
17. Is the intention that the tertiary service (or options) can be sold in advance.
18. Agreement is required as to the effect of plant failure on tertiary services.
19. In principle, can BG make available further Special Services (R3.9), and if so, can they take precedence over tertiary services.
20. What is the interaction with the requirement to obtain transportation entry capacity from Transco or other sellers of entry capacity.

Flexibility Bids

21. It is unclear whether following acceptance of a flexibility bid, the resultant flow is subject to interruption. If it is, flexibility bids using interruptible deliverability may not provide incremental flow to the Transco system. Further Network Code rules are needed to clarify what happens on interruption.
22. Storage overrun charges are 150% SMP it is unclear whether NGC are unaware of this or are proposing a change to the overrun charges to SMP.

Under/over-recovery

23. Clarity is required in respect of the defined terms and the process. Issues which need to be addressed include:

- A definition of 'actual income' and 'allowed revenue'.
- Details of how and when the recovery or rebate mechanism would operate.

'V' Factor

24. One of the main concerns expressed by BG and the industry during the consultation process has been the operation of the V factor, the proposal put forward by NGC does not include the abolition of V. Is this the intention.

Customer Choice

25. BG's experience is that its storage customers want a range of different services; this proposal offers only two. In particular, there is only a 30-day firm service instead of the current available range from 30 to 120 days. If customers want (say) a 50-day service, they have to apply for additional space only service, and may not be successful. Is the intention to give such customers any priority.

Summary

As defined, the proposals are not capable of being implemented in a workable manner.

Appendix B

BG Revenue Expectations Under an Auction

Introduction

One of BG's principal concerns with the proposed Rough auctions is that they are likely to raise significantly less revenue than the level envisaged by the MMC in 1997. This appendix explains why BG believe this to be the case.

The Revenue Requirement for Rough Capacity in 1998/9

The 1997 MMC and subsequent PGT Licence modifications instituted a revenue cap for Storage Revenue in condition 9D of BG plc's PGT Licence. The cap provides for an annual revenue of about £160m, with a carry forward mechanism between years for any under or over recovery. Of the £160m, £96.5m is attributed to the Rough capacity which it is proposed to sell by auction. For 1998/9 this amount is expected to be reduced by up to £13m as a result of over recovery in the 1997/8 year of the revenue cap. BG therefore require a revenue of approximately £83m from Rough capacity in 1998/9.

The Dominance of BGT as a Buyer

BGT still supply over 90% of the domestic market. Compared to other sectors of the gas market, domestic load has the greatest difference between summer and winter demand levels, and hence generates the greatest requirement for seasonal gas storage as provided by Rough. It follows that BGT are easily the most important buyer of Rough services. In 1997/8 BGT bought over 99% of all Rough firm deliverability booked by shippers.

This gives BGT tremendous market power in any auction exercise. The auction's market clearing price will be substantially determined by the BGT bidding strategy. Obviously, as a buyer, BGT would benefit from a low price so is likely to adopt a bidding strategy that results in that outcome. The economics of this are well understood and explained in Professor Binmore's paper "Auctions and Market Power", page 8 onwards which is attached as Appendix D hereto.

In their consultation response dated 24/02/98 BGT say that, "Moreover the likely outcome of any auction with no reserve price, or with a very low one would be a very low market clearing price ...". This clearly demonstrates that BG is right to be concerned about the revenue that an auction would raise.

It should be noted that the auction in proposed Network Code Modification 218 includes a revenue protection mechanism for BG, albeit rather vague. As Professor Binmore explains on page 11 of his paper, a robust revenue protection mechanism could result in incentives for BGT to ensure a high clearing price at the auction. Such a mechanism would therefore have both a direct and indirect effect in ensuring adequate storage revenue.

Comparison with Hornsea Prices in 1997/8

The 1997/8 storage prices at Hornsea were determined by auction. This auction can be used to infer an expectation of what might happen if Rough is auctioned in 1998/9.

The 1997/8 Hornsea auction set a price for Hornsea storage of £2.36 per peak day therm. If the Rough auction generated this price then the total Rough capacity revenue would be £37m.

However this is almost certainly an overestimate. If Rough were to be auctioned as well as Hornsea there would be three and a half times more deliverability available through auction than in 1997/8. This would inevitably lead to a lower price for both Rough and Hornsea price in 1998/9. Also, overall UK demand for storage is expected to be lower in 1998/9 than in 1997/8. This is because additional beach gas supplies such as those from the Armada field have reduced the amount of gas that the UK requires from storage on high demand days. The supply demand forecasts in Transco's "Base Plan Assumptions 1998" document illustrate this clearly.

As a storage facility, Rough has a longer "duration" than Hornsea. This means that there is more space for each peak day therm of deliverability. In other words, if the facility was full, then withdrawals could be sustained for a longer period before the facility was empty. The market would be prepared to pay slightly more than the Hornsea price for Rough because of the additional space. In 1997/8 Rough space was priced at 4 p/therm, and 85% of the space was sold. If an auction resulted in all space over and above that equivalent to the Hornsea service, being sold at say 3 p/therm this would raise a further £24m. Again this is likely to be an overestimate because of the reduced UK storage requirement in 1998/9.

In summary, by comparison with the Hornsea auction in 1997/8, it would be unreasonable to expect a Rough auction in 1998/9 to raise more than £61m. Realistically a much lower figure could be expected.

Appendix C

Transco's Opinion as Top-up Manager

Of the various service options presented, Transco believe that fixed price is the best option for enabling the future provision of medium and long term storage services and other peak services to contribute to the UK's requirements for security of supply. Fixed prices provide more certainty, but possibly higher price, for the users of the service and also set a benchmark for competing peak service providers. The auction/levy could lead to uncertainty and volatility in the prices charged and make development decisions for peak service providers more difficult, leading to the delay or postponement of these developments and reduced incentives on producers to provide swing at the beach.

Allowing the freedom for market prices to develop as competition in storage/peak services extends will better ensure the medium and long term viability of all these services. As the auction creates volatility in prices there will be greater uncertainty in shipper behaviour with regard to their use of storage to support interruptible customers. This will result in a greater uncertainty in the Top-Up calculations and hence the forecasts of Top-Up requirements will be less reliable. There will also be a greater number of actions being taken by the Top-Up manager to maintain gas stocks within the security monitor, which will increase the Top-Up costs.

Finally with regard to the observation that the auction will remove the need for Top-Up, this does not necessarily follow as users may simply switch their requirements from other services into Rough. If shippers as a consequence also reduce their constrained LNG bookings there is a greater chance that the Top-Up manager will need to book Top-Up at these sites to maintain minimum constrained stocks.

Appendices

A Response to Enron

In a letter of 26 February, 1998 to Ofgas, Enron Europe argue in favour of the auctioning of storage rights without a levy to assure that BG Storage can recover its fixed costs. In response to their bullet points:

- Everyone agrees on the importance of removing artificial barriers to gas flow at peak, but it does not follow that an auction is necessarily the ideal way forward.
- One repeatedly hears that “an auction is the best means of ensuring that storage is priced at competitive market rates” from buyers who would benefit from storage at lower prices. However, an auction without an adequate reservation price or an accompanying levy could not possibly achieve the competitive aim of making prices reflect the true cost structure of the industry. The reason is that a system would have been created that allows no room for input on BG Storage’s cost structure. Storage would therefore be provided at a price determined only by the demand for storage without any attention being paid to the costs of supplying storage.

The fact that Enron are as confused about the implications of running an auction as the rest of the industry appears in their attempt on page 3 to catch me contradicting myself. The sentence they quote actually refers to a discriminatory-price auction (which I doubt that they plan to advocate) and does not imply that the addition of a third bidder solves anti-competitive problems that arise only in auctions with two bidders. An attempt to claim expertise that is capable of such a howler does not easily command respect.

On page 3, Enron consider the possibility that an auction would assign undue market power to a dominant shipper, but suggest that this problem be dealt with later if it arises. One might similarly suggest stepping off the kerb without looking and dealing later with the problems that may arise if there is any traffic.

- I do not know the industrial history behind this criticism of the storage revenue formula. However, it does seem odd to an outsider that a levy to sustain BG Storage revenue should be raised as a tax on transportation. As for the comments on page 4 about the need to assess BG Storage's revenue requirements accurately, presumably this point is not in contention.
- The observation about the timing of an auction in relation to reform of the energy balancing regime seems very apt. If nothing else, this issue should militate in favour of accepting BG Storage's half-price offer for the coming year so that a properly researched permanent solution can be implemented next year.
- This point seems to suggest that if BG Storage costs have to be paid by someone it had better be through a tax on the domestic customer. This is an anti-competitive suggestion!

B Response to Ofgas

In a letter of 6 March, 1998 to BG Storage, Ofgas comments on the consultation exercise that has been proceeding over the method by which storage is sold in the gas industry. It seems useful for me to comment on items 4a, 4b and 4c.

4a A fixed price methodology that truly produced a take-it-or-leave-it price that BGT had no choice but to take would certainly have nothing to recommend it. However, the fixed price is not so fixed that BG Storage are unwilling to halve the current price for next year's trading in order that breathing time can be found to hammer out a properly researched permanent solution. Nor are the prices of previous years insensitive to market forces. In essence, the current price for firm availability at Rough is a compromise that reflects the relative bargaining power of BG Storage and BGT.

The observation that an auction will reflect more accurately the value that shippers place on storage is contentious. Nobody doubts that the price at an auction will be much lower than the current price. (Presumably those shippers who urge an auction believe that the price will be less than half the current price, or else they would be snapping up BG storage's alternative offer.) But we already know that BGT value the firm availability they

currently purchase at no less than the price they currently pay—otherwise they wouldn't be willing to pay for it at that price. Perhaps they value the firm availability they currently purchase because the 85% rule allows them a corner on availability at times of peak demand. If not, then BGT will be buying a substantial chunk of storage availability in the auction at much less than the price history shows they value it.

It must also be remembered that markets have two sides. To operate efficiently, they need to take account of the economic costs and benefits to both the buyers and the sellers. The price at which storage is sold should therefore reflect not only the value placed upon it by the shippers, but also BG Storage's cost of supplying it. (Such costs of supply include the market return on capital invested.) Some of the suggestions that have been made, notably by Enron, close off *all* channels to the market for economic signals about BG Storage's costs. How can a market that does not internalize costs on the supply side be said to be competitive?

Ofgas make three points in responding to concerns that have been raised about the possible anti-competitive implications of running an auction under the circumstances that apply at Rough.

1. Unlike some commentators, Ofgas understand that an auction will not guarantee the "true" market price. They are tentative in suggesting that an auction is likely to be less anti-competitive than a fixed price regime. I think this is because nobody has thought through the transfer of market power from BG Storage to BGT that an auction may engineer if appropriate safeguards are not put in place. Perhaps the ELSE report to which these comments are appended may focus some reflection on this issue. If the issue is not properly researched before an auction is enforced and BGT does turn out to be able to exercise the market power of a classical price leader, then BG Storage would presumably have a powerful legal case.
2. The suggestion that a reservation price should be allowed that permits BG Storage to recover what Ofgas call its one-year avoidable costs is to be welcomed. But this leaves the recovery of the much larger fixed costs unsettled.
3. It is suggested that the market power problem will be reduced by trading in unused capacity. It is true that the market power BGT can

use against rival shippers by its current cornering of firm availability at Rough can be reduced by various measures—notably removing the 85% rule (the *v* factor constraint). However, BGT may choose to purchase more firm availability than is efficient in order to maintain its current corner to some extent. It would be hard to police an effective use-it-or-lose-it regulatory policy because BGT has the option of manipulating input from Morecombe. But to concentrate on this aspect of market power is to overlook another aspect that is of primary importance to BG Storage. An auction is likely to transfer some market power from BG Storage to BGT. This market power can be exercised by forcing an artificially low price for Rough storage. The market for storage substitutes would then also be distorted even if a levy is used to keep BG Storage in business.

4b I comment only on the Ofgas response to the second of the three concerns mentioned. It is true that any test of discriminatory pricing should properly be based on costs and the extent of competition in the market. The latter consideration means that it is hard to predict what judgements about discriminatory pricing would be made if BGT turns out to be assigned a great deal of market power by the enforcement of an auction.

In response to the four points bulleted at the end of the section:

- The point that an auction is more likely to reflect the value the shippers place on storage services has been commented on under item 4a.
- Any deliverability that would otherwise be unused will be available daily. Is this not covered by the removal of the 85% rule? More generally, my impression is that the impact of removing this rule seems to be underestimated—both on revenue raised when auctioning firm availability and on underuse of storage capacity at times of peak demand.
- Hoarding has also been mentioned above. I don't see how the regulator will be able to detect anything but the crudest of distortions of the storage market and the accompanying distortions of the markets for storage substitutes.

- What constraints count as artificial is a matter of perspective. After all, an auction is an artificial market that will assign BGT artificial market power.

4c This section is concerned with how BG Storage should be fined or subsidized should its revenues be too high or too low under a new regime. I think the first possibility can be discounted. Two points on this subject from the ELSE paper need to be emphasized. The first is that any levy is likely to be anti-competitive because of its distortionary effect on other markets. The second point is that the designers of a levy must not neglect its distorting impact on the auction for storage if the amounts levied on bidders are partly determined by their bidding behaviour in the auction.

Auctions and Market Power

An ELSE Report for BG Storage

by Ken Binmore FBA PhD BSc
Director of ELSE
Economics Department
University College London
Gower Street
London WC1E 6BT

This report explains the elementary economics of industrial organization relevant to gas storage in simple terms. It then comments on how the imposition of an auction for firm deliverability at the Rough facility should be expected to alter the balance of market power.

Auctions and Market Power

by Ken Binmore

1 Introduction

There has recently been much debate in the gas industry about the method used to sell firm availability of gas from the Rough storage facility operated by BG Storage. Legitimate concern has been expressed that the current method can result in the facility not been used to capacity at times of peak demand. The removal of the 85% rule goes some way towards meeting these concerns, but Ofgas are insistent that an auction at Rough (modeled on the auction currently run successfully at BG Storage's much smaller facility at Hornsea) would address the problem at its root by moving the price at which firm availability is sold towards the competitive market price. It seems to be accepted that an auction cannot correct the imbalances of market power built into the current ownership structure of the gas industry, but it is thought that the current pricing methodology used by BG Storage to determine a fixed price for firm availability generates a substantially less competitive outcome.

My own view is that BG Storage's offer to lower its current price by half represents such good value that the industry would be unwise not to take advantage of it for the coming year. Even if all firm availability were not sold at this knock-down price, the removal of the 85% rule would make it likely that availability would be used to capacity at times of peak demand. Such a temporary resolution of the problem would allow time for a properly researched permanent alternative to be put in place for the following year. In support of this view, this report points out difficulties with the currently envisaged arrangements for an auction that seem to have been overlooked in the rush to get something done in a hurry.

Section 1 reviews some simple notions from economics textbooks, since some of the dust kicked up by the debate seems to arise from a failure to

appreciate that concepts invented for the study of perfectly competitive markets are not necessarily relevant in markets that are very imperfect. Section 2 suggests that the current form of industrial organization within the gas storage industry is best seen as a bilateral monopoly. An auction will reorganize the industry as a price leadership. Section 3 attempts to clear up some misconceptions about what auctions can and cannot do. It also points out that the manner in which a levy is raised to cover BG Storage's fixed costs in the event that an auction is imposed can have a serious strategic impact on bids in the auction.

Because of uncertainty about the levy and the extent to which markets for gas-related products other than storage are manipulable, it is not possible to say that Ofgas are definitely wrong in guessing that the price for firm availability will move in a competitive direction after the introduction of an auction. However, if the levy were raised in a strategically neutral fashion and markets elsewhere were unaffected, then the essential question would be whether a bilateral monopoly is more "anti-competitive" than a price leadership—to which the answer is *no*.

2 Perfect Competition and Monopoly

Much of the propaganda that seeks to influence the regulation of imperfectly competitive markets contrasts the utopian ideal of a perfectly competitive market with the horror of a monopoly. To appreciate how misleading it can be to think in such simplistic terms, it is necessary to appreciate how limited these textbook paradigms are.

Perfect competition. A perfectly competitive market has large numbers of small buyers and sellers of a single well-defined commodity. In such circumstances, the market power any agent can exercise is negligible. No action any individual agent can take will have any significant effect on market aggregates, and hence cannot effect the market price. Each agent is therefore a *price-taker*, who chooses how much to buy or sell on the assumption that his decision will leave the price unchanged. If trading is unconstrained, information on the prices at which different agents are trading flows freely, and the transaction costs are slight, theory and experience both predict that the market will then settle into an equilibrium in which number of sellers and

buyers willing to trade at the going price are equal. This market-clearing price therefore equates supply and demand.

Economists discuss the market-clearing price in terms of aggregate demand and supply curves. Price goes on the vertical axis and quantity on the horizontal axis. The demand curve slopes downward and the supply curve slopes upwards. For each price, a supply or demand curve shows the total quantity of the good that will be supplied or demanded at that price. The market-clearing price occurs where the supply and demand curves cross, since demand is then equal to supply.

The aggregate supply curve in a perfectly competitive market is obtained by summing the supply curves of all the individual producers. An individual producer's supply curve is determined by his costs. If the price is high enough to allow the producer to recover his fixed costs—those he has to pay regardless of how much he produces—output will continue to be sold until the price per unit falls below the extra cost of producing one more unit (price equals marginal cost). For prices that are not too low, a producer's supply curve is therefore the same as his marginal cost curve. More generally, a producer's competitive supply curve is always determined entirely by his costs.

Regulators are enthusiastic about perfectly competitive markets because they are economically efficient under certain conditions. This means that someone loses if an allocation other than that obtained by using the market mechanism is imposed. There is therefore a sense in which a perfectly competitive market does not waste resources. Producers may nevertheless earn economic rents, when revenue exceeds running costs and the market return on capital (which economists regard as another type of cost). But free entry by new producers will erode these rents, eventually reducing price to the long-run average cost.

Monopoly and Price Leadership. In a classic monopoly, there are many small buyers but only one seller. (In a monopsony, there are many small sellers and only one buyer.) A monopolist therefore has market power. If unregulated, he is a *price-maker*. If he knows the demand curve of each individual buyer, the monopolist can appropriate all the gains from trade by selling each unit to each buyer at the maximum price that the buyer is just willing to pay for that unit. The small size of each individual buyer makes him helpless in the face of such take-it-or-leave-it offers. A refusal to trade at

the monopolist's price hurts the buyer while having only a negligible impact on the monopolist. If the monopolist does not know the demand curve of each individual buyer, he may still sell different units of output to different buyers at different prices by operating a system of quantity discounts. However, classical studies of monopoly concentrate on the case when the monopolist must sell each unit of output to each buyer at the same price. To maximize his profit, the monopolist then *restricts* his output—as in the famous case of De Beers, the diamond producers. It is true that the monopolist then has less to sell, but this loss is amply covered by the fact that he is then able to sell each unit at a price above marginal cost.

A *price leader* is not a full-blown monopolist because he competes with a number of price-taking sellers whose aggregate capacity is small compared with his. Such a collection of price-taking rivals is called a competitive fringe. The price leader makes the price like a monopolist. The only difference is that he computes his profit on the assumption that the competitive fringe will undercut his price slightly and so sell as much as they can before any of his product is bought. He therefore replaces the demand curve that a monopolist would face by a residual demand curve obtained by subtracting the amount the competitive fringe will supply at a given price from the total demand at that price. International Business Machines (IBM) was the standard example of a price leader before the appearance of microcomputers.

The knee-jerk bad press for monopolies leads to monopolists denying that they run monopolies because goods are traded in other markets that can substitute to a greater or lesser effect for the monopolist's good. For example, Railtrack denies that it is a monopoly on the grounds that it competes with air and road transport. A monopolist will certainly be unable to earn as high an economic rent when goods that are partial substitutes for his product can be bought in other markets. The existence of markets for such partial substitutes makes the buyer's demand curves more elastic (flatter), so that aggregate demand will be less at each price that the monopolist may fix. Nevertheless, the monopolist is still a monopolist because he can set a take-it-or-leave-it price, which his customers must pay or do without his product.

Regulators dislike monopolies because the extraction of economic rents by a classical monopolist creates an economically inefficient system. All agents could be better off with a different allocation scheme. This traditional piece of theory doubtless weighs heavily with Ofgas when they observe BG Storage fixing a price for firm availability at Rough that results in substantially less

than full capacity being bought.

Why are monopolies not swept away by new firms entering the industry to take advantage of the economic rents being earned? After a privatization, the reason may simply be that it takes time for entrepreneurs to see the opportunities and to get organized. Sometimes artificial barriers to entry are maintained through unwise or corrupt legislation, or through the exercise of improper political influence. Even without such legislation, the monopolist may inhibit entry by keeping his price just low enough to make the advantages of entry doubtful. (When a would-be monopolist tries to drive a competitor out of the industry in this way, it is called "predatory pricing".) The use of such spoiling techniques is so widespread that regulators are understandably suspicious of the motives of any action that a monopolist may propose.

Although regulators are endemically suspicious of monopolies, they recognize that monopolies in some areas cannot be avoided. A *natural* monopoly occurs when physical or economic circumstances beyond anyone's control dictate that only one producer is feasible. For example, if there were only one possible underground storage facility, then its operator would necessarily constitute a natural monopoly. More commonly, natural monopolies arise because the fixed costs of a firm in the industry are so high that there is not enough demand to cover two sets of fixed costs simultaneously. Consider, for example, the return on capital needed to justify a rival gas pipeline system or an alternative rail network.

A regulator would like to replace a monopoly by a perfectly competitive market. He cannot simply demand that the price be set where the demand and supply curves cross, because it is meaningless to speak of the supply curve of a monopolist. Only price-takers have a supply curve. However, the regulator can make the monopolist into a price-taker by assuming control of the price at which the good is traded. The regulator will then wish to set price equal to marginal cost to replicate the efficient outcome achieved in a perfectly competitive market. But he then faces two problems. The first problem is crucial to BG Storage. It makes sense for the regulator to set price equal to marginal cost only when the price is high enough to cover fixed costs, but enough revenue to cover fixed costs will not be raised when price equals marginal cost in a natural monopoly (or a natural oligopoly). To prevent the natural monopolist going out of business, the textbooks therefore advocate setting price equal to *average* cost. The firm can then just survive without earning a positive economic rent. But the regulator then runs into

his second problem. Whether he sets price equal to marginal or average cost, he needs to know the monopolist's cost structure, but monopolists are seldom cooperative in providing information about their true cost structure when they know the information will be used to their disadvantage.

3 Oligopoly and Bilateral Monopoly

The kind of name-calling involved when an industry accused of monopolistic practices is urged to change itself into a perfectly competitive market may have some rhetorical value, but it does not assist at all in pointing the way to a practical resolution of the regulatory problem in an industry in which competition is intrinsically imperfect. There are an infinite number of ways in which an imperfectly competitive industry may be organized and it can be very misleading to try to separate these multifarious forms of industrial organization into competitive sheep and monopolistic goats. Even in those exceptional cases when the industrial organization of an industry fits fairly neatly into one of the standard textbook categories, there seems no point in criticizing it as anti-competitive if nothing can be done to alter the balance of market power.

Oligopoly. In spite of the appearance of new entrants, the England and Wales electricity supply industry is essentially a duopoly, with market power at times of peak demand divided between *two* generators, National Power and Powergen. As long as the price at which electricity is sold is determined in a market rather than being determined by the regulator, the fact that they are operating a duopoly guarantees that National Power and Powergen will enjoy positive economic rents that *cannot* be eliminated. Bad design of the trading rules in the electricity supply industry allows National Power and Powergen to earn *more* than these minimal economic rents, but no amount of tinkering with the rules of the system is capable of reducing the economic rents to zero. In particular, a multi-unit auction like the Electricity Pool does not and cannot eliminate market power. It is true that the producers bid "supply curves" into the system that determine an aggregate "supply curve" which crosses the estimated aggregate demand curve at the price which "clears" the market, but this price is *not* the competitive price because the "supply curves" bid into the auction are not determined simply by the generators'

costs as in a perfectly competitive market. The generators exercise their market power by choosing the “supply curves” strategically.

One might argue that Offer should force the generators to bid their true supply curves, but if the electricity regulator knew what he would need to know to enforce such a regulation, he could simply choose the price himself. Economists rightly urge the use of auctions when the organizer of a market does not have access to information held by agents who buy and sell in the market that he needs to fulfil whatever his objective may be. Auctions allow the bidders to be played off against one another with the result that information is revealed that the bidders would prefer the organizer not to know. An optimally designed auction can be thought of as maximizing the value to the organizer of the information revealed in this way. However, the no-free-lunch principle guarantees that the benefit to the organizer is accompanied by a cost. The cost is that, even with an *optimally* designed auction, the duopolists in the electricity industry would still earn economic rents. These economic rents would be as small as it is possible for them to be without changing the ownership structure of the industry, but they would still be “anti-competitively” positive—albeit substantially smaller than at present.

Since the distributors who buy electricity from the generators do not currently bid “demand curves” into the Pool, they are price-takers without market power. The electricity supply industry is therefore reasonably close to the ideal of what economists call an oligopoly—a market in which the independently chosen actions of a small number of sellers determine the price, so that the oligopolists act as joint price-makers. (Collusive price-fixing is not uncommon, but is not implied by saying that the sellers are joint price-makers.)

Bilateral monopoly. Characterizing industries as competitive or monopolistic clearly misses the mark in the case of an oligopoly. How is one to classify an industry with four or five sellers of roughly equal size? The paradigm goes even further astray when market power is exercised simultaneously by both buyers and sellers.

The textbook case that comes closest to fitting the current market for gas storage in Britain is called a *bilateral monopoly*. In a bilateral monopoly, there is just one buyer and one seller. Both buyer and seller therefore exercise

market power. Together, they act as joint price-makers. Neither the seller nor the buyer is therefore a monopolist or a monopsonist in the classical sense, since the other side of the market is not a helpless price-taker. The price at which the good sells is therefore negotiated between the buyer and the seller and its value reflects the relative bargaining power of the two agents.

In the case of firm availability at the Rough storage facility, the seller is BG Storage and the buyer is British Gas Trading (BGT). (It is easy to lose track of ownership in the privatized British gas industry because everybody hangs onto the label "British Gas" in some form or other. But BG Storage and BGT are separately owned.) Limited alternative storage facilities exist elsewhere, but these facilities are all currently owned by BG Storage. The existence of partial substitutes for storage improves BGT's bargaining position. The existence of alternative buyers to BGT similarly improves BG Storage's bargaining position, but only to a limited extent since the aggregate demand for firm availability from these alternative buyers is small. One might therefore refer to the market currently operating as a bilateral monopoly with a competitive fringe on the buying side.

One might object to characterizing the current industrial organization of the gas-storage industry as a bilateral monopoly on the grounds that BG Storage currently offers firm availability at a fixed price determined by a methodology approved by the regulator. However, this price cannot really be a take-it-or-leave-it price, because BG Storage would have to find some excuse to lower the price if nobody were willing to buy at the price it first attempted to fix. In fact, the series of compromises that have historically determined the methodology that currently determines the supposedly fixed price are best seen as a kind of supervised negotiation between BG Storage and BGT, as envisaged in models of bilateral monopoly.

What will happen if the method of determining the price of firm availability at Rough is altered from a compromise between BG Storage and BGT determined by their relative bargaining power to an auction? It would be misleading to take the currently auction at the Hornsea facility as a guide. Hornsea capacity is small compared with Rough. There are also technological differences. The result is that demand is probably sufficiently strong to prevent the exercise of significant market power by the bidders. But one cannot expect the same to be true of an auction for firm availability at Rough.

It is in the nature of an auction that the seller gives up his opportunity to participate in making the price after the rules of the auction have been

settled. He becomes a price-taker whose price is determined by the auction process. If demand is sufficiently high and the auction is well designed, the price the seller has to take from the auction may be high enough to compensate for abandoning his price-making powers. But no time is available to tailor an auction design to the circumstances of Rough availability. A uniform-price auction as run at Hornsea seems the only practical option. Even if time were available to design a new auction, no amount of ingenuity in writing its rules could eliminate the brute facts of market power. Whatever auction format were used, BGT would have the power to determine the price at which most units of firm availability were sold because their demand is much higher than the aggregate demand of all the other potential buyers.

In a uniform-price auction, it will be BGT who essentially determines the price at which all units of firm availability are sold. The competitive fringe will no longer necessarily be cut out of the picture. They will be able to buy as much as they want at the auction at the price determined by BGT. All the capacity may well be sold, but what are the grounds for arguing that the price achieved in the auction is more competitive than a price obtained by negotiation between BG Storage and BGT? In essence, the auction simply transfers some market power from BG Storage to BGT by replacing a bilateral monopoly with a competitive fringe with a price leadership in which BGT is the price leader. Without other accompanying changes in industrial organization, the result will be that firm availability is sold for a much lower price than at present. But lowering the price by making BGT into the equivalent of a monopsonist is not necessarily a step in a more competitive direction. Under perfect competition, prices adjust to reflect the true cost of providing goods and services. However, imposing an auction in which BG Storage is not allowed to set a reservation price divorces the price-setting procedure from BG Storage's cost structure. It is therefore *impossible* for the auction to generate a competitive price. This is recognized by Ofgas, who propose that the auction be supplemented with a levy on the industry that is calculated from BG Storage's costs.

Most likely, the revenue raised at the auction will be inadequate to cover BG Storage's fixed costs. Without a supplementary source of income, BG Storage would therefore eventually go out of business. Since this eventuality is clearly economically inefficient, it is proposed that shortfall in revenue needed to keep BG Storage in business be raised using a levy on the gas industry. Nobody will dispute that such a levy is an anti-competitive mea-

sure. Depending on how the levy is raised it will distort the market in two different ways. If fixed lump sums are extracted from companies trading in gas, the levy will not distort the way sellers bid into the Rough auction, but it will make storage artificially cheap compared with substitute products because bidders at the auction will treat the levy as a sunk cost. Probably, this method will not be used because of the difficulty of guessing what how big a fixed levy should be. However, a levy whose size depends on the shortfall between the revenue needed by BG Storage and the revenue raised at the auction will not only distort the markets for gas-storage substitutes, it may also seriously distort the way BGT bids at the Rough auction.

When BGT contemplates buying firm availability at Rough, it will see that it has to pay twice: once through the auction and once through the levy. If it pays less than its "fair share" of the levy, it will force the auction price down to ensure that it pays mostly through the levy. If it pays more than its "fair share" of the levy, it will force the auction price up to ensure that it pays mostly through the auction. The distortions in the latter case may be particularly severe.

4 Auctions

This section seeks to correct some misconceptions about auctions that have become apparent in the debate about the organization of the gas storage industry. Professional economists can verify the claims that are made by consulting the publicly available paper "Uniform versus Discriminatory Auctions" written by ELSE for the Bank of England. In particular, it is not true that the "supply" or "demand" curves bid into an auction are necessarily the same as the supply and demand curves that economists use when discussing perfectly competitive markets. There is therefore no particular reason why it should be thought that an auction will reveal the "true" competitive price of the good being sold. Nor is it true that a discriminatory-price (pay-your-bid) auction will necessarily raise more revenue than a uniform-price auction (as used at Hornsea).

In the standard kind of multi-unit auction, buyers and sellers bid curves that say how much they would be willing to supply or demand at a given price. The price is then found which equates total demand and total supply. Each seller then contributes the number of units he said he would offer at that

price and each buyer receives the number of units he said would accept at that price. In the Electricity Pool, only sellers bid—demand being estimated using historical data. In the Hornsea auction or the contemplated Rough auction, only buyers bid—the assumption being that BG Storage will supply all firm availability no matter how low the price. From now on, it will therefore be taken for granted that bidders are buyers submitting a “demand curve”.

The three auction types briefly surveyed below differ only in how much each buyer and seller pays or is paid. In a uniform-price auction like that operated at Hornsea or the discriminatory-price auctions run by the Bank of England, bidders will learn to shade their bids *downwards* for strategic reasons. Misrepresenting demand in this kind of way is often dismissed as “gaming” behaviour that can be regulated away. But the regulator would not need to organize the industry with the help of an auction if he knew the information necessary to tell when a bidder with market power is gaming.

It cannot be repeated too often that there is no way to design an auction to prevent such gaming. One can create market power by designing the rules badly, but even the best design can only reduce the economic rents of those the ownership structure of the industry endows with market power to an irreducible minimum.

In the case of multi-unit auctions with only buyers bidding, the rules of a Vickrey auction serve to ensure that the bidders have nothing to gain by understating their demand for the good being auctioned—but they still earn positive economic rents through the system that determines how much they pay for the amount of the good they are allocated. It is pointless to complain that a Vickrey auction is therefore anti-competitive. Nothing better can be done given the information available to the regulator and the ownership structure of the industry. A Vickrey auction is economically efficient.

Still less in there any point in urging the virtues of a uniform-price auction because this would replicate a perfectly competitive market if the bid supply and demand curves were the true supply and demand curves. The bidders will exercise their market power by choosing their bids at the auction *strategically*. If the regulator knew enough to prevent such gaming, we wouldn’t need to run an auction in the first place.

Uniform-price auctions. The Hornsea auction provides a standard example. Supply is taken to be the full capacity of the facility. Each bidder then

submits a “demand curve”. As in all the auctions considered, the “market-clearing” price that equates supply and demand is then used to determine who gets how many units. Each buyer then pays the clearing price for each unit he is allocated.¹

This auction format is popular with regulators because it seems to mimic the operation of a perfectly competitive market. But the fact that buyers will shade their demand downward in such an auction means that there is no guarantee that the outcome will be close to the competitive outcome, or even that the outcome will be economically efficient. Using such an auction certainly does not eliminate market power.

Discriminatory-price auctions. Discriminatory-price (pay-your-bid) auctions are widely used to sell government bonds. In Britain, only discriminatory-price auctions are used for this purpose. The bank announces the number of bonds for sale, thereby determining the “supply” and each bidder then submits a “demand curve”. As in all the auctions considered, the price that equates supply and demand is then used to determine who gets how many bonds. But the buyers do not pay this price for each bond. For each extra bond they are allocated, they pay the maximum price their announced “demand curve” says they are willing to pay

It is especially obvious that no buyer will wish to bid his true demand curve in a discriminatory-price auction. His interest lies in bidding a *flat* “demand curve” which claims that he is only willing to pay the clearing price for each bond he is allocated in the auction. No bidder will then pay more than he would in a uniform-price auction. The theory that a discriminatory-price auction will necessarily generate more revenue than a uniform-price auction is therefore mistaken. In fact, the bad press for discriminatory-price auction is entirely based on misconceptions of this kind. A regulator might very well consider a discriminatory auction on the grounds that if their true demands are common knowledge among the buyers (although not

¹Sometimes the price at which units are sold is called the marginal price, since it is said to be just high enough for no bidder to want to buy one extra unit at that price. This is nearly as misleading as saying that the price is the market-clearing price. In both cases, one is tempted to forget the all-important fact that buyers will understate their true demand. In general, each buyer *will* want to buy one more unit at the “marginal” price. It only seems otherwise because one confuses the “demand” curve he announces with his true demand curve.

the regulator), then the outcome will indeed mimic the competitive outcome after the bidders have ceased gaming.

Vickrey auctions. The Nobel prize-winner, John Vickrey, invented a Vickrey auction as a device to induce buyers to bid their true demand curves. Supply is assumed to be given. Each bidder then submits a “demand curve”. As in all the auctions considered, the “market-clearing” price that equates supply and demand is then used to determine who gets how many units. The twist is that the way the bidders pay for the units allocated to them provides an inducement for them to bid their true demand curves. It is easiest to think of the units being assigned to buyers one by one as the price is raised from zero. Eventually it will reach a price at which the removal of one buyer from the scene just balances supply and demand. At higher prices, we cannot clear the market without this buyer. He is therefore allocated a unit *at the price which clears the market without him*. After this unit has been assigned, the auction continues in the same way until all units have been allocated.

If the buyers follow their incentives and so bid their true demand curves, each receives his true competitive allocation and the price at which the last unit is sold is the true competitive price. But recall that all previous units were sold more cheaply. This is the cost of providing an incentive scheme that induces each buyer not to understate his demand.

5 Summary

Selling firm availability at Rough by auction is not necessarily a move in the competitive direction. Without a levy to secure BG Storage’s revenue, there is no cost input into the system from BG Storage and so there is no way that the price determined at the auction can reflect economic costs accurately. A simple analysis suggests that the effect of the change would be to replace a bilateral monopoly with a competitive fringe by a price leadership model with BGT as the leader. That is to say, market power that BG Storage currently shares with BGT will be transferred to BGT.

With an auction, a levy would be necessary to keep BG Storage in business. A levy is an anti-competitive device in itself that will have a strategic impact on how BGT bids into the auction that has not be properly appreciated.

An auction cannot eliminate market power. The fact that a uniform-price auction has the appearance of a perfectly competitive market is highly misleading. Buyers exercise their market power in such a forum by gaming—by shading their demands downwards to make the price lower.

Ken Binmore is Leverhulme Research Professor of Economics at University College London. He directs the Centre for Economic Learning and Social Evolution (ELSE), funded by the Economic and Social Research Council. He is the author of ten books and more than fifty papers on various topics in mathematics, economics and other social sciences. ELSE has advised the Bank of England on auctioning government bonds and is currently advising the Radiocommunications Agency on the auctioning of radio spectrum.

MODIFICATION 0220

ROUGH SERVICES 1998/99 (CORE)

Proposed legal text

SECTION R: BG STORAGE FACILITIES

Amend paragraph 2.3:

"2.3 Rough - Space Only"

Replace paragraph 2.3.2:

"2.3.2 The entitlement of a User to withdraw gas from the Rough Facility in excess of the User's Available Storage Deliverability is limited in accordance with paragraph 6.4."

Delete paragraphs 2.3.3, 2.3.4 and 2.3.5.

Amend paragraph 2.4.1:

2.4.1 "...of the Storage Capacity applied for or registered as held by a User..."

Amend paragraph 3.1.2:

"3.1.2 For each BG Storage Facility the Storage Operator may invite (as to the whole of the Maximum Storage Capacity), applications for Storage Space and/or Storage Deliverability either:..."

Amend paragraph 3.1.3(ii) by deleting "and in the case of" to the end.

Amend paragraph 3.1.8:

"3.1.8 ...included in the Annual Storage Invitation pursuant to paragraph 3.1.3(~~x~~) shall be..."

Amend paragraph 3.2.1:

"(iii) in the case of the Rough Facility, whether Storage Deliverability is being applied for;

(iv) the amount of the Storage Space and the amount of the Storage Deliverability within the Storage Duration limits in paragraph 2.4.2 for which the application is made;"

Replace paragraph 3.2.2:

"3.2.2 In respect of the Rough Facility an application for Storage Space but not Storage Deliverability must be separate from an application for Storage Space and Storage Deliverability."

Amend paragraph 3.4.1:

"3.4.1 This paragraph 3.4 applies where the Annual Storage Invitation in respect of Storage Deliverability or Storage Space in a BG Storage Facility was made under paragraph 3.1.2(i), and references in this paragraph 3.4 to Storage Capacity are references to Storage Space, Storage Deliverability or both, as appropriate."

Amend paragraph 3.4.3:

"(ii) subject to paragraph 3.4.9, between all Users..."

Amend paragraph 3.4.4:

"(ii) subject to paragraph 3.4.9, allocate the balance..."

Add paragraph 3.4.9:

"3.4.9 In respect of the Rough Facility, after allocations to Preceding Year Users in accordance with paragraphs 3.4.3(i) and 3.4.4(i), the Storage Operator shall allocate Storage Space:

- (i) first, to those Users who applied, pursuant to paragraph 3.2, for Storage Deliverability, in accordance with those applications, but subject to paragraph 3.4.10;
- (ii) thereafter, as to the amount (if any) of the Maximum Storage Space remaining unallocated, to those Users (if any) who applied for Storage Space but not Storage Deliverability, pro rata to the amounts of Storage Space applied for by such Users in accordance with those applications."

Add paragraph 3.4.10:

"3.4.10 Storage Space shall be allocated to each User so that the following conditions are satisfied:

- (i) the aggregate allocated Storage Space shall be equal to the Maximum Storage Space;
- (ii) Storage Space shall be allocated in priority to the inverse of implied Storage Duration (so that applications with lower implied Storage Durations are allocated in priority to those with higher implied Storage Durations);

- (iii) the resulting Storage Durations, for all Users who (by reason of paragraphs (i) and (ii)) are not allocated the whole amount of Storage Capacity applied for, shall be equal;

where for any User implied and resulting Storage Duration are Storage Durations determined on the basis of the Storage Capacity allocated pursuant to paragraph 3.4.9 and respectively the Storage Space applied for or (as the case may be) allocated under this paragraph."

Amend paragraph 3.5.1:

- "3.5.1 This paragraph 3.5 applies where the Annual Storage Invitation in respect of Storage Deliverability or Storage Space in a BG Storage Facility was made under paragraph 3.1.2(ii), and references in this paragraph 3.5 to Storage Capacity are references to Storage Space, Storage Deliverability or both, as appropriate."

Amend paragraph 3.5.6:

- "3.5.6 ...for Storage Space and Storage Deliverability (where the Annual Storage Invitation in respect of both is made under paragraph 3.1.2(ii)), "...

Amend paragraph 3.9.2:

- "3.9.2 The Storage Operator may not enter into arrangements in respect of Special Storage Capacity:
- (i) which would conflict in any material way with the rights (other than rights pursuant to paragraph 6.4) under this Section R..."

Amend paragraph 6.2.3:

"...greater than the available withdrawal rate (whether or not determined under paragraph 6.2.5(a)(ii)), the User shall pay..."

Amend paragraph 6.2.5(a):

- "(a) the "available withdrawal rate" is the rate (in kWh/hour) determined as the sum of:
- (i) the Available Storage Deliverability divided by 24; and
 - (ii) the lesser of:
 - (1) the maximum permissible Interruptible Storage Nomination Quantity (under paragraph 6.4.1) divided by 24;
 - (2) where paragraph 6.4.6 applies, the quantity which would be determined under that paragraph, if the proviso to that paragraph did not apply, as

the Users revised Interruptible Storage Nomination Quantity divided by the period (in hours) from the time which the revision takes effect until the end of the Gas Flow Day;

- (iii) where the User is a party to an arrangement for Special Storage Capacity, the lesser of:
- (1) the maximum permissible Nomination Quantity thereunder divided by 24;
 - (2) following any reduction to the Nomination Quantity, the Users reduced Nomination Quantity divided by the period (in hours) from the time which the revision takes effect until the end of the Gas Flow Day."

Amend paragraph 6.4:

"Withdrawals in excess of Available Storage Deliverability"

Amend paragraph 6.4.1:

"6.4.1 Subject to paragraph 6.4.2 a User holding Storage Capacity in the Rough Facility may make Storage Withdrawal Nominations for a Nomination Quantity which exceeds that User's Available Storage Deliverability if any (the excess being the "Interruptible Storage Nomination Quantity"), provided that the Interruptible Storage Nomination Quantity shall not exceed on any Day 1/50 of the User's Available Storage Space."

Amend paragraph 6.4.2:

"6.4.2 The entitlement of a User (an "Interruptible Storage User") who makes a Storage Withdrawal Nomination pursuant to paragraph 6.4.1 is subject..."

Amend paragraph 6.4.3:

"...as a result of the submission of any Storage Withdrawal Nomination (including pursuant to any arrangement for Special Storage Capacity) or of the circumstances in paragraph 6.4.4:"

Amend paragraph 6.4.6(a):

"6.4.6 In the circumstances in paragraph 6.4.3:

- (a) Users' Interruptible Storage Nomination Quantities will be revised so that (insofar as may be secured by such revision):"...

"(iii) no User's Interruptible Storage Nomination Quantity is increased,"

"(iv) the revised Interruptible Storage Nomination Quantities are in the same proportions as each User's Available Storage Space;

provided that no Interruptible Storage Nomination Quantity which is a Flexibility Quantity shall be so revised."

Delete paragraphs 6.4.7 and 6.4.8.