The Electricity Pool

Objectives for the Electricity Trading Arrangements

Final Report
6 April 1998

Prepared by the Pool Review Steering Group
EXECUTIVE SUMMARY

This document summarises the outcome of the consultation process initiated by the Pool Review Steering Group’s second consultation document, issued on 9 February 1998. That document set out a proposed list of objectives to be used in the appraisal and design of alternative electricity trading arrangements. We have taken due account of the submissions received, and produced a revised list of objectives. The revisions build on suggestions from respondents to remove ambiguities in the meaning of the draft objectives. We have also provided specific clarifications where appropriate.

We received 37 submissions in response to the 2nd Consultation Document, from Pool Members, individual consumers and their representatives, and other organisations. The most widespread concern was a question about the degree to which the PRSG’s review will be integrated with the DTI/Offer review. The PRSG has resolved that its main contribution to the DTI/Offer review will be to provide a framework for an objective evaluation of alternative trading arrangements. We intend to offer this list of objectives and our subsequent appraisal of current and alternative trading arrangements for integration into the DTI/Offer review. The PRSG will also co-ordinate the effort of the Pool to respond to requests from Offer for technical advice.

We found almost unanimous support for the use of an objective evaluation referring to a list of objectives such as those we set out here. A wide range of respondents also agreed broadly with our proposed framework of objectives. The overall objective received strong support in principle, combined with varied comment in detail, much of which is reflected in the revised version now proposed:

"The trading arrangements should deliver the lowest possible sustainable prices to all customers, for a supply that is reliable in both the short- and long-run."

Almost all the other comments we received are now reflected in the subsidiary objectives, which now propose that the trading arrangements should:

- facilitate efficiency in the generation, transmission, distribution, trading and consumption of electricity;
- minimise entry and exit barriers for generators and traders of electricity;
- support the need for system security;
- maximise market participants' freedom of choice, subject only to limitations justified by other objectives in this framework;
- provide transparency in the operation of the pricing mechanisms and the market generally;
- minimise unnecessary and unmanageable commercial or regulatory risk (as should the process for changing them);
- minimise all related transactions costs, including those incurred by customers;
- be consistent with competition law and with other laws, but they should not be used as a vehicle for implementing policies extraneous to their scope, as defined in the other objectives above.
While the overall objective is regarded as the top priority or a high priority by almost everyone, a high proportion of the responses stress the importance of the efficiency objective. The priorities attached to the other subsidiary objectives are more varied, which reflects the fact that respondents have conflicting interests. We believe these conflicts can now be discussed more rationally and constructively within our agreed framework of objectives. We therefore commend this list of objectives to all those participating in the review of electricity trading arrangements.

The next stage in the process is to develop a performance framework which converts these objectives into a comprehensive set of appraisal criteria, and to evaluate competing proposals by reference to the performance framework.
1. BACKGROUND AND CONTEXT

1.1. The Pool Review Consultation Process

On 23 October 1997, the DTI announced a review of electricity trading arrangements. The Electricity Pool of England and Wales ("the Pool") set up the Pool Review Steering Group (PRSG) to co-ordinate its involvement in this review and also to manage a consultation process to ensure that its input into the review was as broadly based as possible. Both Pool Members and electricity consumers are represented within the PRSG, with the DTI and Offer attending in the role of observer. The PRSG has appointed an independent chairman to ensure its proceedings are conducted in an open and responsive manner.

The PRSG has resolved that its main contribution to the DTI/Offer review will be to provide a framework for an objective evaluation of alternative trading arrangements. (The Pool may also provide technical advice on the implications of different proposals.) To this end, the PRSG has initiated a process of open consultation and evaluation, which has the following stages:

- identify key objectives on the basis of wide consultation with interested parties;
- develop a performance framework which converts these objectives into a comprehensive set of appraisal criteria; and
- evaluate competing proposals by reference to the performance framework.

This process will support future decisions by Offer and the DTI on possible changes to the trading arrangements, by ensuring that decisions derive from clear reasoning. The aim is to maintain the confidence of electricity producers, traders and consumers in whatever trading arrangements emerge from the current review.

1.2. Previous Stages in this Process

On 23 October 1997, the PRSG issued a report by National Economic Research Associates ("the NERA report") on the objectives which determined the Pool's design in 1990, along with the 1st Consultation Document, requesting responses from interested parties.

On 9 February 1998, the PRSG issued a 2nd Consultation Document recording the responses and summarising them in the form of a draft list of objectives suitable for the current review. Attached to the 2nd Consultation Document was a questionnaire with requests for comments on specific issues. Meanwhile, Offer issued terms of reference for the DTI/Offer review, including some draft objectives (which, strictly speaking, apply to the review, rather than the trading arrangements). Offer has since confirmed these terms of reference, with the additional aim of taking into account the work of the PRSG.

The PRSG received 38 responses to the 2nd Consultation Document.1 The breakdown of respondents is as follows:

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1 Two respondents replied more than once. Two respondents indicated that they had no comments.
Appendix 1 lists the names of all the respondents. Their submissions have been filed and numbered at the Chief Executive’s Office. Copies are available to interested parties who request them. Enquiries should be directed to Liz Parminter at the Electricity Pool, telephone 0171-380-4126.

This report presents a final list of objectives, taking into account comments received on the draft list set out previously. Appendix 2 compares the final list of objectives with the draft list contained in the 2nd Consultation Document.

The secondary objectives now define the conditions which respondents consider more or less necessary to meet the overall objective. The PRSG is working with consultants to prepare a performance framework that can be used to appraise alternative electricity trading arrangements by reference to properties derived from the secondary objectives. The PRSG will report on this framework in April, at which point it can be used to appraise the proposals emerging through the DTI/Offer review. Use of the performance framework in this way will help to integrate the PRSG’s work with the DTI/Offer review, and will ensure that the outcome is decided on an objective basis which meets the needs of all interested parties.

1.3. Overview of Responses

The responses we received in this round of consultation were overwhelmingly supportive of the current exercise, and of the proposal to carry out a detailed and objective analysis of alternative trading arrangements. Almost every submission offered some contribution to the definition of objectives, and many indicated broad agreement both with the initial list of objectives and with the arguments used to develop it.

The most widespread concern was a question about the degree to which the PRSG’s review will be integrated with the DTI/Offer review. The PRSG understands this concern and is keen to ensure that the current effort by respondents feeds into the DTI/Offer process. The PRSG is in discussion with the DTI and with Offer over how it can best contribute to later stages. As stated above, the PRSG has commissioned consultants to convert the final list of objectives into a performance framework which can be used to appraise alternative trading arrangements. After we report on the development of this framework, we hope it will be used to evaluate proposals emerging within the DTI/Offer process.
Several respondents set out ideas about the future design of the trading arrangements. These ideas often helped to illustrate their comments on the objectives, but we have not in general seen any need to quote them, as discussion of specific proposals will take place after the development of a performance framework.

1.4. The Format of this Document

In reporting on the latest consultation, we are conscious of the need to reach a conclusion which commands broad support, so that we can move onto subsequent stages in the process. In particular, we need to be able to contribute to Offer's own review of the Pool in accordance with the relevant timetable. Having read the responses to our consultation, we are confident that we can meet the requirements of respondents with modest revisions to the content and structure of our objectives. No-one presented a compelling case for major changes, given the conflicting views we received from other respondents. However, the responses did indicate that the current formulations could be improved in several important respects:

1) some respondents suggested alternative wording which better represents respondents' original submissions;
2) some respondents could not see how their interests were represented by our objectives; and
3) some respondents pointed out that key concepts were open to misinterpretation.

We believe that this round of consultation has proven very useful in highlighting these deficiencies and we have tried to remedy them in the following ways:

1) where respondents presented clear and incontrovertible arguments in favour of a revised text which better captures the intended meaning, we have adopted their proposal;
2) where respondents indicated a concern about how to represent their interests within our framework, we have provided additional guidance;
3) where the statement of objectives remains open to interpretation, we have provided definitive clarification, which we intend to be read in conjunction with the stated objective itself.

We believe that the guidance and clarification offered in this document will perform several useful functions. First, the PRSG is now charged with developing a performance framework for appraising alternative trading arrangements. Clarifying the meaning of the objectives will help our consultants and other interested parties to identify the appropriate measures of performance.

Second, in later stages of the review, participants in the debate will present arguments for and against individual proposals (including the current system). Our guidance indicates how participants might structure their arguments in a common format, so that their interests can be fully and properly heard and understood.
1.5. Conclusions

In compiling the amended list of objectives set out in the remainder of this report, we have used our best endeavours to summarise the concerns of all the respondents. Inevitably, the interests of some respondents differ from those of others, never more clearly than in the relative prioritisation of objectives. It lies outside the scope of the PRSG's powers to reconcile these conflicting interests, so we have not tried to compile a definitive set of priorities. Instead, in section 3, we report as fairly as we can what respondents said their priorities were.

In some cases, respondents divided into two camps, those for the inclusion of a particular objective and those against. Our framework is intended not to close off any options at this stage. Where we received conflicting views, therefore, we have left the objective intact, but have noted that decision makers will have to decide what priority - if any - to give to it. (Giving an objective zero priority is equivalent to deleting it.) Respondents who feel that some objectives should be irrelevant will have another opportunity to argue their case, with those bodies who have final responsibility for decisions about future trading arrangements. The final list of objectives is presented in Table 1 overleaf.
### Table 1
The Final Set of Objectives

**Overall Objective:**

"The trading arrangements should deliver the lowest possible sustainable prices to all customers, for a supply that is reliable in both the short- and long-run."

**Subsidiary Objectives:**

"The trading arrangements should facilitate efficiency in the generation, transmission, distribution, trading and consumption of electricity."

"The trading arrangements should minimise entry and exit barriers for generators and traders of electricity."

"The trading arrangements should support the need for system security."

"The trading arrangements should maximise market participants' freedom of choice, subject only to limitations justified by other objectives in this framework."

"The trading arrangements should provide transparency in the operation of the pricing mechanisms and the market generally."

"The trading arrangements, and the process for changing them, should minimise unnecessary and unmanageable commercial or regulatory risk."

"The trading arrangements should minimise all related transactions costs, including those incurred by customers."

"The trading arrangements should be consistent with competition law and with other laws, but they should not be used as a vehicle for implementing policies extraneous to their scope, as defined in the other objectives above."
2. THE FRAMEWORK AND THE OVERALL OBJECTIVE

The first set of questions attached to the 2nd Consultation Document concerned the overall structure of the Objectives Framework. Respondents were asked whether the framework adequately reflects all objectives, whether any objectives were omitted, and whether they disagreed with any of the objectives. Answers were many and varied and helped to guide our approach to revising the list of objectives.

2.1. Objectives Framework

Nineteen respondents (out of the twenty who answered the question directly) agreed that it would be either useful or very useful to evaluate alternative trading arrangements by reference to a list of objectives such as those proposed.\(^2\) A wide range of respondents indicated their broad agreement with the framework as a representation of respondents' concerns,\(^3\) some indicated that the framework could be improved with some re-wording,\(^4\) and some indicated that they had specific concerns which were not adequately covered.\(^5\) A small number of responses indicated that the number of objectives could be reduced and others subsumed.\(^6\)

Several respondents argued that the Pool's Review must be integrated with the wider DTI/Offer review and that there would be little gained from establishing and prioritising objectives if they were not applied within the DTI/Offer Review.\(^7\)

Where respondents indicated dissatisfaction with the overall framework, they backed up their statements in nearly all cases with a detailed critique of specific objectives. These critiques helped the PRSG to understand their concerns and to decide how they might best be accommodated within the existing framework. We have therefore tried to ensure that each concern is addressed in the context of a particular objective, either by re-wording it or by clarifying the definition of terms to show how the concern is encapsulated within the current wording. Subject to these caveats we believe it is appropriate to keep the same broad framework.

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\(^2\) Yorkshire Electricity (YEG/053) disagreed, but for reasons which were repeated in many responses, namely that the evaluation would not be useful unless the objectives could be converted into unambiguous performance measures. The PRSG has already embarked on the task of defining a performance framework which draws on these objectives and aims to report on its findings in April.

\(^3\) BOC/049, PowerGen/050, National Right to Fuel Campaign (NRFC)/051, Scottish Power/054, Seeboard/061, The Chartered Institute of Purchasing & Supply (CIPS)/065, BNFL/068, ECC (Yorkshire)/071, and Chemical Industries Association (CIA)/079.

\(^4\) YEG/053, ECCCG/055, First Hydro/056 and East Midlands Electricity/064.

\(^5\) ECC (South East)/046, RJB Mining/048, Accord/052, British Gas Trading/057, Eastern Power and Energy Trading (EPET)/060, Energy Intensive Users Group (EUG)/063, ICI/066, Teesside/070 and IVO/076.

\(^6\) See ECC (South East)/046, BOC/049 and First Hydro/056.

\(^7\) See BOC/049, Nuclear Electric/059 and EUG/063.
2.2. Comments on Overall Objective

The questionnaire issued alongside the 2nd Consultation Document asked respondents whether they agreed that the following was a reasonable overall objective:

"The trading arrangements should deliver the lowest possible sustainable prices to all customers, without undue discrimination, for a supply that is reliable in both the short- and the long-run."

About half the respondents agreed with this phrasing. Most of the others suggested improvements of detail. Few argued for a very different approach, although Enron/067 [page 614] argued that efficiency should be the primary consideration and suggested the overall objective be replaced by the first subsidiary objective (as reliability is adequately covered by the third subsidiary objective). However, such views were not widespread. The Chartered Institute of Purchasing and Supply (CIPS)/065 even commented that "the POOL primary objective is preferred, and OFFER might consider changing to make an overall similar objective" [page 598].

As for the other respondents, whether they agreed with the objective or not, their comments fell into three broad categories:

1) concern that use of the term "sustainable" was out of place, or might be wrongly interpreted;
2) concern over use of the phrase "without undue discrimination"; and
3) proposals for more direct reference to "competition" or "trading processes".

We discuss each of these comments in turn.

2.2.1. "Sustainable" Prices

The 2nd Consultation Document was careful to define "sustainable" in a very narrow sense:

"All decisions about trading arrangements should consider the implications for both current and future prices. Hence, the objective should recognise that efforts to lower prices must be sustainable, in that they should not increase future costs by damaging the incentive for efficient operation, investment and innovation." 8 (emphasis added)

The 2nd Consultation Document explained that future costs could be increased by changes in the trading arrangements which increased perceptions of regulatory risk and which therefore raised investors' required rates of return. Given the potential for government and regulatory intervention in the trading arrangements (as evidenced by the current DTI/Offer review), regulatory risk remains a concern to many respondents. The importance of "sustainability" (as defined in the 2nd Consultation Document) was confirmed by First Hydro/056:

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8 2nd Consultation Document, section 2.3, review page 18.
"I agree with the overall objective, but would stress that the inclusion of the word 'sustainable' is important. Prices need to be at such a level that investment in generating plant is attracted for the future, as well as sustained for the present." [Page 462]

In this context, it is principally the desire to attract economically efficient investment in the future which constrains the potential for lowering prices now.

However, several respondents pointed out that the word "sustainable" was open to misinterpretation, or expressed concern over its inclusion, since it suggested that pricing rules needed to support the commercial viability of existing producers. It was not the intention of the PRSG to indicate that the trading arrangements should protect anyone from normal commercial risks. Seeboard/061 also suggested that it implied that prices should be "protected from true market dynamics and volatility" [page 524]. Again, this was not the intention of the PRSG. Our sole intention was to indicate that the overall objective could not be met simply by imposing price cuts now (for example by regulatory fiat), if the consequence was an increase in future costs and prices. Appraisal of alternative trading arrangements needs to take into account total benefits to customers, both now and in the future. Only British Steel/073 suggested that future prices were unimportant, but this view seems to relate to questions about price levels, international competitiveness and efficient consumption, which we take up later [page 733]. Clearly, some clarification is required to avoid giving a false impression.

British Steel also pointed out that future costs and benefits might be valued less highly than costs and benefits in the present, as in discounted cash flow analysis. This observation still awards some weight to the future implications of present day actions, but suggests that we should amend the definition of "sustainable" to refer to the "present value" of costs over all future periods. British Steel were concerned by the inclusion of the term "long run" in the overall objective as it could be covering the same point as "sustainable".

London Electricity/069 suggested that the word "sustainable" should be replaced by an explicit reference to the time dimension for delivering the lowest possible prices "in the short-term and long-term" [page 670]. The ECCCG/055 suggested using the phrase "lowest possible prices at all times" [page 441]. We can see some merit in adopting phrases of this type, but are not convinced that they would remove all of the ambiguities mentioned above. Instead, we have decided to retain the current form of words, but to follow the advice of British Steel/073 and Scottish Power/054 by setting out a definition of what is meant by "sustainable" in order to remove any doubt over its interpretation.

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9 See ECC (South East)/046, Scottish Power/054, ECCCG/055, Seeboard/061, Arjo Wiggins/062, British Steel/073 and IVO/076.
10 The ECCCG's response was combined with that of the ECC Southern Region.
2.2.2. “Without Undue Discrimination”

Many respondents argued that it was inappropriate to include this phrase within the overall objective, or that it would require further elaboration to be useful. Some respondents worried that the term was undefined, whilst some thought it might impose unnecessary restrictions on a competitive market. However, it was widely recognised that the trading arrangements may well include some monopoly elements where cost allocation will have to be discussed. The National Right to Fuel Campaign (NRFC)/051 was not alone in suggesting that “large customers should not benefit at the expense of small customers”, but could not suggest an alternative wording.

Several respondents believed that the Review should address the issue of the dominance of generators. However, First Hydro/056 wrote that there is a need to avoid discrimination in the treatment of generators as well as the avoidance of discrimination in prices to customers. (We return to this question in the definition of free entry and exit.) YEG/053 did not believe that the term “undue discrimination” adequately covers all free-riding issues such as covering losses, embedded generation and pooled and non-pooled generation.

An alternative approach was suggested by Seeboard/061, the Energy Intensive Users Group (EIUG)/063 and the Major Energy Users’ Council (MEUC)/078, who proposed that the trading arrangements should in any case be compatible with general competition law (rather than one specific aspect of it, ie non-discrimination requirements). We believe that many respondents would find this approach more appealing. We have therefore decided to delete the explicit reference to “undue discrimination” in the overall objective, and to state as a matter of clarification that the trading arrangements must meet all statutory requirements imposed on participants in the market (including, but not limited to, competition law). This approach has further implications for the expression of the final objective, on policy constraints, and we return to it in that context.

2.2.3. “Competitive Markets”

Several respondents wished to see a more explicit reference to the need for a competitive market. The EIUG/063, for example, asked for a “more simple, competition based statement” [page 551]. Eastern Power and Energy Trading (EPET/060) would prefer wording which talked of “market efficiency” rather than “lowest prices” [page 499]. YEG/053 argued for an objective which stated that “trading arrangements should efficiently discover market prices in a manner which is open and not subject to manipulation by any party” [page 390]. Similar comments arose from a number of respondents in their submissions on the efficiency objective (See section 4.2.2).

We recognise the need to take into account the desire for competitive markets and have given the matter a lot of consideration. However, it is not clear that there is any need to

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11 See ECC (South East)/046, Blue Circle/047, BOC/049, NRFC/051, Scottish Power/054, ECCCG/055, British Gas Trading/057, EPET/060, Seeboard/061, EIUG/063, ICI/066, Southern Electric/072, British Steel/073, EIUG/074, Major Energy Users’ Council (MEUC)/078, CIA/079 and Co-Steel Sheerness/080.

12 See for example Co-Steel Sheerness/080 page 775.

13 See for example CIPS/065.
amend the objectives framework substantially. We remain convinced that competition is a means to an end, and that the end is represented by our overall objective. Furthermore, the "competitiveness" of a market process means different things to different people and has to be judged by examining the efficiency of its outcome, the freedom of entry and exit, and the degree of decentralisation of choice. Each of these factors is captured in subsidiary objectives and we provide more detailed explanation of these factors in later sections, in particular section 4.2.2.

2.2.4. "Internationally Competitive Prices"

Some large consumers repeated their desire to see some reference to their need for "internationally competitive prices". The EIUG, for example, stated that:

"Trading arrangements should be competitive and must be able to deliver internationally competitive prices. It is vital energy trading keeps UK plc in line with its competitors worldwide." [page 551]

British Steel indicated that such prices would be needed to prevent some customers from closing down, given the ferocity of international competition. British Steel is particularly concerned that the ratio of prices for small customers to prices for large customers is much lower than in other European countries and regards this evidence as cause for a change in the pricing rules.

On the other hand, the ECCCG set out the argument that international comparisons were not relevant:

"ECCs do not share the concern to compare UK prices with those in Europe or further afield. Though we do understand the importance of price to large and intensive users, we regard international comparisons as the weakest case for reform and the weakest criteria on which to build new objectives.

In the opinion of ECCs, international energy prices (and most especially in Europe) are as much a function of exchange rate and local subsidy as cost reflective local competition. Any solutions for the UK must be based on processes and criteria which are robust and thorough on their own to win consumer confidence. UK competitiveness with EU prices will alter with exchange rates as European countries deregulate and reduce subsidies. We are not persuaded that UK industry should be subsidised now, nor in the longer term by domestic customers in order to achieve price comparability with the EU or any other country." [page 461]

The Association of Electricity Producers (AEP)/077 stated that "External observers of the UK industry note the security of supply we achieve and the fact that prices are low compared with equivalent supplies in other European countries...." [page 766].

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14 See BOC/049, EIUG/063, British Steel/073, EIUG/074, Co-Steel Sheerness/080.
15 British Steel/073, page 733.
16 ECCCG/055, page 461.
Obviously, these opposing views are impossible to reconcile with each other. There is certainly no universal support for including a reference to international price standards in the statement of objectives. We also feel that a general reference to internationally competitive prices would be difficult, if not impossible to reconcile with our whole framework of objectives. Such prices would be difficult to define and might bear little relation to domestic costs.

On the other hand, we doubt whether a reference aimed at achieving such prices for particular customer groups would be acceptable to many respondents. In practice, large customers are unlikely to favour an objective referring to international prices if such prices turn out higher than domestic costs, so this objective would have effect only when international prices were lower than domestic costs. In these conditions, other customers would have to make up the costs not covered by prices for large customers, which is incompatible with the desire to achieve the lowest possible prices for all customers.

We are also mindful that our definition of “sustainable” prices rejected any suggestion that electricity trading arrangements should protect electricity producers from the normal commercial risks that could drive them out of business. We believe that most respondents would find it equally inappropriate to constrain trading arrangements in order to support the profitability of large customers’ operations in the UK.

Regrettfully, therefore, we have concluded that direct references to “internationally competitive prices” cannot be accommodated within our objective framework and that large customers will need to pursue their interests by referring to other objectives.

2.2.5. Governance

Seeboard/061 noted the omission of governance from the Objectives Framework [page 522] and Enron/067 stated that “...unless governance issues are adequately addressed any solution adopted by the Pool is unlikely to command the full confidence of market participants.” [page 613] National Power/075 also stressed the need to ensure that decisions about trading arrangements should consider issues of “market confidence”. [page 738]

The governance of the trading arrangements should be obliged to further this framework of objectives.

2.2.6. Other concerns

Some respondents raised issues which, although not widely reflected in other submissions, deserve special consideration. The NRFC17 asked whether it was correct to refer to “customers” or “consumers”, on the grounds that the Pool’s customers, for instance, were generators and suppliers. The term “customers” has emerged as the standard industry term for final energy consumers. It serves to remind industry participants of their commercial

17 NRFC/051, page 340.
relationship with consumers and we see no reason to move away from this “customer focus”. We therefore wish to clarify that all references to customers in the 2nd Consultation Document refer to customers of the electricity supply industry, in other words to final consumers of electricity.

At various points in its submission, RJB Mining referred to a desire to avoid discrimination between generators by fuel type, and to implement trading arrangements which are consistent with government energy policy. Nuclear Electric/059 also believed that discrimination between fuel types should be avoided but that this objective may conflict with the desire for compatibility with wider Government objectives within the Offer/DTI Review. CIPS/065 suggested that both the Pool and Offer reviews should look closely at the cost of generation from various sources to ensure that more expensive fuel types are not being used ahead of cheaper sources (for example gas before coal). We intend to refer to these concerns below as aspects of the subsidiary objectives, by relating them to the definition of “free entry in generation”, “efficient despatch”, and “consistency with legal and policy constraints”.

East Midlands Electricity/064 suggested that the overall objective required some reference to “high quality customer service” [page 577], but we have accommodated this suggestion within the subsidiary objectives (Section 4.2.1). ECC (Yorkshire) /071 requested a definition of short-term reliability [page 706]; we note that a brief definition was offered in the 2nd Consultation Document (section 4) and we repeat it below for the sake of clarity.

2.3. Objective and Clarifications

In the light of the arguments set out above, we have revised the overall objective to read as follows:

“The trading arrangements should deliver the lowest possible sustainable prices to all customers, for a supply that is reliable in both the short- and long-run.”

For the purpose of clarification, the following statements should be read in conjunction with the objective:

1) All electricity trading arrangements must be consistent with the statutory obligations placed upon market institutions, electricity producers and traders, and customers.
2) The reference to “customers” means final consumers of electricity in all parts of the economy.
3) Lower prices are only sustainable if they do not increase the present value of total costs over all future periods. This requirement however does not imply that any existing producer can rely on being sustained. Nor does it mean that the trading arrangements should protect anyone from normal commercial risks.

18 RJB Mining/048, eg page 283.
19 Nuclear Electric/059, page 492.
20 CIPS/065, page 598.
4) A reliable supply has both short- and long-run dimensions. Short-run reliability (also defined in this document as "system security") means matching supply and demand to maintain the quality of supply (frequency, voltage etc) and to avoid outages. Long-run reliability requires adequate generation capacity to be built in anticipation of future demand.
PRIORITISATION OF OBJECTIVES

As many will have predicted, the prioritisation of objectives varied considerably between the submissions. There was broad agreement with our proposed structure, with one overall objective and several subsidiary ones, but relative priorities among the subsidiary objectives do not fall into any single pattern. The following section therefore reports some general results which may be used to structure future discussions. We believe it will be useful to discuss potential disputes over the priorities to be adopted within a rationally constructed and agreed framework of objectives, but we have not taken any view as to what priorities should actually be imposed on final decisions.

3.1. Table of Responses

In a number of cases, respondents commented on the inter-dependencies between the objectives and the resulting difficulty of assessing relative priorities. As a result, no clear order can be determined from their responses. Where respondents offered a prioritisation, it was not possible to detect any clear patterns, or any distinctions between different groups of respondent.

The most superficial examination of the responses provides two general conclusions. These are that the overall objective (objective 1) is indeed regarded as the primary aim and that a high proportion of respondents stress the importance of “efficiency in production, transport and consumption” (objective 2a). However, even on this matter, respondents are not unanimous.

To explore the ranking of the objectives further, we have produced a summary table (Table 2), showing the number of responses which gave an objective a particular priority. The table reports a number of variables. First, we show the number of respondents who awarded each objective the priority shown in each column. Hence, eight respondents gave objective 2a a priority of 2. Second, we show the “mode”, i.e. the value most commonly awarded. For example, most respondents awarded objective 5 (transparency) a priority of 4. The “mean” is the simple average score over all respondents and the variance (“Var”) is a statistical measure of the variation in responses. A large variance indicates that respondents awarded widely differing priorities to the objective in question.

To allow for the fact that some respondents gave equal priority to several objectives, we calculated the average priority. For example, four objectives of equal priority 4 substitute for priorities 4, 5, 6 and 7, which would result in an average priority of 5.5 and which has been listed in the table as a priority of 5. The priorities have also been adjusted for consistency between responses. For instance a response giving priorities 1, 1, 2, 2, 3 would be adjusted first to 1, 1, 3, 3, 5 and then to 1.5, 1.5, 3.5, 3.5, 5. Note that the same general prioritisation of objectives is obtained without making these adjustments, although there is a higher variance in the priorities which makes interpretation more difficult.
Table 2
Frequency of responses

<table>
<thead>
<tr>
<th>Priority</th>
<th>Mode</th>
<th>Mean</th>
<th>Var</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Price, quality &amp; non-discrimination</td>
<td>9 2 2 2</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>2a  Efficiency in production, transport and consumption</td>
<td>3 8 3 1 1</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>2b  Minimise entry and exit barriers</td>
<td>1 2 3 4 2 3 1</td>
<td>5.3</td>
<td>3.3</td>
</tr>
<tr>
<td>3  Support system security</td>
<td>2 2 5 5 2</td>
<td>3.2</td>
<td>1.5</td>
</tr>
<tr>
<td>4  Long term stability</td>
<td>1 2 3 1 2 3 3 1</td>
<td>4.8</td>
<td>4.6</td>
</tr>
<tr>
<td>5  Transparency</td>
<td>2 3 4 1 3 2 1</td>
<td>4.7</td>
<td>3.7</td>
</tr>
<tr>
<td>6  Risk management</td>
<td>2 6 6 2</td>
<td>7.6</td>
<td>0.7</td>
</tr>
<tr>
<td>7  Minimise transaction costs</td>
<td>1 1 1 4 4 3 1</td>
<td>6.5</td>
<td>3.0</td>
</tr>
<tr>
<td>8  Accommodate policy constraints</td>
<td>1 1 1 1 1 1 4 4</td>
<td>6.9</td>
<td>5.9</td>
</tr>
</tbody>
</table>

3.2. Individual Results

Table 1 shows that objectives 1 and 2a are, in the view of the majority of respondents, the first and second most important priorities respectively. It should be noted, however, that a number of respondents rank other objectives equally highly. For instance, RJB Mining and East Midlands Electricity consider the “Accommodation of Policy Constraints” (objective 8) of equal highest priority, although that objective is given a low rating by the majority. Seeboard ranks the efficiency objective (2a) unusually low down with a priority of 6, and places more emphasis on “System Security” and “Long Term Stability”.

“Support system security” (objective 3) has been given the third highest priority overall with a high degree of agreement from all respondents.

At the opposite end of the list of priorities, “Risk Management” (objective 6) is considered the least important objective overall, with considerable agreement from all respondents (ie a very low variance around the most common scores of 7 and 8).

The “Accommodation of Policy Constraints” (objective 8) is judged lower down the list of priorities than “Risk Management” by most respondents, however there is another group of respondents which judges this to be a relatively important objective, or a binding constraint. Hence this objective can only been assigned a low priority with qualification. The “Minimisation of Transaction Costs” is also viewed as low down the list by the majority of respondents but, again, a sizeable minority disagrees.

Between the “top” and “bottom” of the list of priorities, the ranking of responses is less definite (as can be seen from the relatively high variances associated with these objectives). To some extent, this result is to be expected, given the difficulty expressed about relative prioritisation.
3.3. **Summary of Numerical Responses**

It is difficult for the PRSG to say which order of priorities should apply. We will not therefore make any effort to establish a common order. Instead, in this section, we merely report the results of our survey, by grouping priorities using a numerical technique. The following breakdown divides objectives into "high priority" and "other" objectives, by merit of their popularity among respondents, as judged by their mean scores. It is noteworthy that the overall objective, efficiency objective and system security objective were not only awarded the highest average priority (mean score 0-4) but also have low variances, indicating a degree of agreement among respondents. Amongst the others, only the risk management objective has a low mean priority and a low variance, indicating widespread agreement that it deserves only a low priority.

**Table 3**

Ordering of Responses by Mean Numerical Priority

<table>
<thead>
<tr>
<th>Generally High Priority (Mean Priority = 0-4):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Price, quality and non-discrimination (objective 1)</td>
</tr>
<tr>
<td>• Efficiency in production, transport and consumption (objective 2a)</td>
</tr>
<tr>
<td>• Support system security (objective 3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mixed or Low Priority (Mean Priority = 4-9):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transparency (objective 5)*</td>
</tr>
<tr>
<td>• Long term stability (objective 4)*</td>
</tr>
<tr>
<td>• Minimise entry and exit barriers (objective 2b)*</td>
</tr>
<tr>
<td>• Minimise transaction costs (objective 7)*</td>
</tr>
<tr>
<td>• Accommodate policy constraints (objective 8)*</td>
</tr>
<tr>
<td>• Risk management (objective 6)</td>
</tr>
</tbody>
</table>

*Asterisk* *indicates a variance in priority greater than 2.*

Table 3 must only be viewed as indicative, since non-numerical responses were omitted from the analysis (and are discussed separately below). Furthermore, some objectives (especially those marked with an asterisk) are awarded widely different priorities, so some respondents are bound to take a different - and equally legitimate - view of relative priorities. The PRSG can derive appraisal techniques from the individual objectives but we will leave it to the DTI and Offer, as the ultimate decision makers, to decide what relative priorities should apply when making trade-offs between alternative options.
3.4. Summary of Other Responses on Priorities

Several respondents, especially those who did not provide a numerical ranking of priorities, nevertheless indicated either that some objectives were more important than others, or that the trade-offs between objectives were more subtle than a simple ranking could indicate. Some offered distinctive suggestions, with priorities and trade-offs more clearly identified:

- PowerGen/050 suggested that the main trade-offs were between “lowest sustainable price”; “system security” and “policy constraints”; “risk management” supported “system security”; “efficiency” contributed to achieving the “lowest sustainable prices”; all other objectives were merely contributing to “efficiency”. [page 333]
- The NRFC/051 recognised the difficulty of prioritising, but suggested that consumer interests should have a higher priority than the industry’s interests (which were identified as “long-term stability and risk management”). [page 342]
- First Hydro/056 said that the overall objective was correct (subject to minor revisions), and that the subsidiary objectives could be reduced to (in declining order of importance) “system security, competition, efficiency, minimise transactions costs”. [page 462/4]
- EPET/060 suggested “three tiers”, with “efficiency” at the top level (possibly subject to overriding policy constraints). “Price, quality, non-discrimination, transparency, risk management and minimisation of transactions costs” were required to deliver overall efficiency; “system security” and “long-term stability” were redundant, since they were covered by concepts of efficiency. [page 500]
- The ETUG/063 suggested that some objectives may be superfluous. The ETUG also stated that “This must be a key objective in delivering competitive prices, minimising barriers to entry, transparency etc. An explicit reference to general law should be included.” [page 553]

As these examples indicate, the desire to award an objective a low priority is often equivalent to a desire to delete it entirely. Often, we found that some respondents demanded that an objective be deleted, whilst other respondents commented, with equal strength, on its desirability. In cases where we received such conflicting advice, we have generally chosen to retain the objective, but to remark on the widely differing weights given to it by respondents.

Whilst there is some agreement on the importance of the overall objective and some of the subsidiary objectives, individual respondents’ priorities vary according to their particular circumstances. By completing this exercise, the differences in respondents’ priorities have been revealed. Disputes over priorities will be more rationally and constructively pursued within an agreed framework of objectives.

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22 NRFC/051, Accord/052, YEG/053, British Gas Trading/057, Seeboard/061, East Midlands Electricity/064 and IVO/076.
We believe we have managed to produce a framework of objectives which accommodates, in some way or other, most of the points of view put to us. Debate conducted within the terms of these objectives will therefore help to make clearer what exactly is in dispute, where the trade-offs are, and what are the practical consequences of the rival points of view.
4. **EFFICIENCY AND COMPETITION**

The 2nd Consultation Document proposed two objectives relating to efficiency and competition:

*The trading arrangements should facilitate efficiency in the production, transmission/distribution and consumption of electricity;*

*The trading arrangements should minimise entry and exit barriers, to facilitate the entry of competitive generators and suppliers;*

Respondents provided many useful comments which suggested a need to amend and clarify these objectives.

4.1. **Prices, Efficiency and Market Power**

Several respondents commented that the structure of the generation sector merited examination within the DTI/Offer review. However, there was widespread agreement with the view adopted in the 2nd Consultation Document, that control of market power lies outside the role of the trading arrangements. The trading arrangements themselves may not be able to guarantee lower prices, but can only facilitate lower prices by encouraging greater efficiency and minimising barriers to entry.

Several respondents commented that the trading arrangements ought not to facilitate "gaming". We do not disagree but, as in the 2nd Consultation Document, we regard the avoidance of gaming as a matter of transparency which contributes to the stability of the trading arrangements and to the efficiency of the outcome. Most of the discussion of efficiency and competition therefore focuses on the definitions of efficiency and competition, and their implications for the performance framework.

4.2. **The Concept of Efficiency**

Several respondents queried the definition of efficiency and it will probably help understanding of the following comments if we begin this section by stating clearly that this objective refers to "economic efficiency". Put simply, maximising economic efficiency in the electricity sector means *maximising the difference between:*

1) *the total value to customers of the bundle of goods and services produced by the electricity industry;* and
2) *the total costs of producing that bundle of goods and services.*

The difference between total value to customers and the total cost of production is sometimes called "total welfare". These concepts are explained further in Appendix 3.

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23 See, for example, CIPS/065.
24 See BOC/049, ECCCG/055.
25 See Midlands Electricity/045, ECC (South East)/046, Scottish Power/054, First Hydro/056 and ETUG/063.
Economic efficiency is affected by many factors. The total value to customers increases if the quantity or quality of the bundle of services increases. Total costs fall if productivity increases, or if the quantity or quality of the bundle of services decreases. Total welfare will increase if any of these factors change for the better, although usually factors do not alter independently. Improving economic efficiency is often a matter of finding the right trade-off between costs and values, usually through some method such as “cost/benefit analysis”.

In the context of the electricity sector, the bundle of goods and services covered by this review is a varied one. The trading arrangements themselves cover trade in electricity and associated “ancillary services”, such as reserve and reactive power. The energy product delivered to consumers incorporates the services of transmission and distribution, as well as “customer services” such as billing and metering. Achieving the lowest possible prices will require economic efficiency for the bundle as a whole, not just for one of these services.

We also recognise that efficiency has many dimensions in the production of any one service. In the 2nd Consultation Document, we identified several aspects of efficiency, ie:

- investment;
- maintenance;
- operations;
- despatch; and
- consumption.

Of all of these, the first is likely to have the most serious implications for total costs. Efficient investment in adequate generation capacity is also the means by which the long-run reliability of supply is ensured.

4.2.1. Application to respondents' concerns

The concept of economic efficiency is very broad and encapsulates a number of other concepts of efficiency:

- ECCCG/055 proposes “economic and technical efficiency”. Technical efficiency seems to be captured by recognising the desirability of reducing total costs by raising productivity, as discussed in Appendix 3.

- East Midlands Electricity/064 suggests an additional reference to the need to facilitate “high quality customer service and .... accurate and timely settlement of charges” [page 577]. We believe that the current review is limited to wholesale trading arrangements, whose contribution to customer service standards will be rather limited. However, increases in the quality of any goods and services would be recognised as an increase in economic efficiency, as long as the customer’s valuation of the higher quality service is greater than the additional cost of providing it. We return to the accuracy and timeliness of settlement in section 8.

- In this round and in the previous round of consultation, many large customers have presented claims for lower prices in terms of the effects on their own businesses in a competitive world. As mentioned in the 2nd Consultation Document, the validity or otherwise of these claims will rest on evidence that the value of additional electricity
consumption (to one or more customers, or to “UK plc”) is higher than the additional costs of production, and that the market is therefore not producing the most efficient possible outcome. It may be that their demand represents an area of unexploited opportunities (as represented by area W in Figure 1 of Appendix 3). If so, finding ways to exploit such opportunities would be consistent with the general concept of economic efficiency.  

Hence, we believe that the concept of economic efficiency is a powerful and adaptable one which will accommodate many of the concerns raised by respondents.

4.2.2. “Efficient and competitive markets”

Several respondents asked for an objective referring to the efficiency of “the market”, or the competitiveness of the trading process itself. We recognise the need to accommodate these views, but are concerned that what constitutes an efficient or competitive market is difficult to define. “Competition” is even more difficult to define, since competitive behaviour takes different forms in different industries and markets, as any examination of reports by the Monopolies and Mergers Commission and the Office of Fair Trading will demonstrate.

In practice, it is difficult to separate the efficiency of a market process from the efficiency of its outcome. In the 2nd Consultation Document, therefore, we divided our discussion of prices and competition into two parts.

First, we established that a privately owned industry cannot sustain prices which lie systematically below costs, without destroying incentives for efficient investment. To sustain low prices, therefore, the industry must keep unit costs to a minimum (after allowing for changes in the quality of service). The trading arrangements should encourage efficiency in investment and operations, as a pre-requisite for achieving the long-run objective of low prices. For the most part, therefore, we anticipate that the efficiency of alternative market processes will be appraised by reference to economic efficiency as defined above.

Second, we recognised that the structure of the industry might affect the degree of downward pressure on prices and hence whether efficiency gains would translate into lower prices. However, after considering respondents’ views on the role of the trading arrangements, we concluded that control of market power lay outside the scope of the trading arrangements, but that the trading arrangements could nonetheless contribute to several aspects of a competitive market which are already captured in the objectives.

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26 The PRSG cannot comment on the validity or otherwise of these arguments, or whether they would be consistent with the other objectives. We are merely indicating how the claims of large customers could possibly be presented within the proposed framework.

27 See, for example, ECC (South East)/046, BOC/049, YEG/053, EIUG/063, Enron/067, Co-Steel Sheerness/080.
• The 2nd Consultation Document discussed how the trading arrangements could promote competition by facilitating free entry and exit.

• We have also identified an objective on transparency, which is an important contribution to competition and liquidity in any market; in section 6.2, we define in much greater detail what transparency means in competitive markets.

• Finally, in the 2nd Consultation Document, we recognised a desire to avoid centralising trades in the context of system security; in this report, we place greater emphasis on this desire, by separating out an objective in relation to decentralisation of trades, i.e. allowing buyers a choice between competing sources of supply.

It seems to us that objectives relating to free entry and exit, transparency in the market process and decentralisation/choice effectively fulfil the intended purpose of a general reference to “competitive markets”.

However, even though we have suggested that proposed trading arrangements stand or fall largely by their results, the properties of the market process can also play a role in any appraisal. Buyers and sellers will trade in an item “efficiently” if they can agree a price which is below the value of the item to the customer and above the cost of producing the item. (When the latter exceeds the former, it is not efficient to trade.) Hence, the performance framework can say something about the efficiency of trading arrangements and of the resulting prices, by examining the process for setting prices and the relationship between price, cost, value and output.

We will therefore be developing a performance framework which looks both at the efficiency of outcomes and at the properties of the trading arrangements themselves (e.g., whether prices match costs or values in any sense). We expect that this form of performance framework will meet many of the concerns raised by respondents in relation to competition and the efficiency of markets.

4.2.3. Efficiency of Transmission (and Distribution)

The questionnaire attached to the 2nd Consultation Document asked for respondents’ views as to whether consideration of efficiency should include efficiency in transmission and distribution. Answers to this question divide into three categories:

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38 Accord/052 and British Gas Trading/057 asked for an explicit reference to “liquidity” to be included in the objectives framework. Unfortunately, liquidity seems to be a rather elusive concept. East Midlands Electricity/064 said that “liquid secondary markets would also facilitate competition” [page 582]. Enron/067 suggested that “transparency is a function of liquidity” [page 616]. On the other hand, London Electricity/069 argued that liquidity would be achieved by ensuring market stability [page 674]. These references suggest that the desire for liquidity is already covered by other objectives.

39 These efficiency properties are, strictly speaking, defined in terms of marginal values and marginal or opportunity costs.
• Those in Favour of Including Efficiency in Transmission and Distribution:
  NRFC/051, ECC (South East)/046, PowerGen/050, ECCC/G/055, British Gas
  Trading/057, Seaboard/061, CIPS/065, Enron/067, BNFL/068,
  ECC (Yorkshire)/071, Southern Electric/072 and Co-Steel Sheerness/080;\(^{30}\)
• Those Against Including Efficiency in Transmission and Distribution:
  YEG/053, Scottish Power/054, First Hydro/056, EIUG/063, MEUC/078,
  Teesside/070;
• Those With Intermediate Views:
  Midlands Electricity/045, EPET/060, East Midlands Electricity/064.

Some of those in favour also limited their support to efficient decisions about the location of
future investment in generation and consumption. Those with intermediate views pointed
out that the location of new generation and (to a lesser extent) consumption depends in part
on the relevant energy price each point on the network, i.e. on trading arrangements, and in
part on tariffs for use of transmission and distribution networks. Whether and how much
the design of trading arrangements needs to take account of locational incentives (and hence
efficiency in transmission and distribution) therefore depends upon the nature of
transmission and distribution tariffs. The view of Midlands Electricity is that:

“To prejudge whether or not incentives to minimise transmission costs (according to
agreed standards) best lies within trading arrangements is prescriptive. It is
necessary to first consider the wider implications of both market and administered
arrangements.”  [page 250]

We believe it would be wrong to draft any objective in a way which prescribed particular
trading arrangements. Midlands Electricity proposed adding a proviso to the end of the
objective, to the effect that trading arrangements should foster efficiency “in cases where
market forces are best able to prevail”. However, this form of words does not seem to cover
aspects of the trading arrangements which might not operate as a market, but which
nonetheless need to be efficient (such as arrangements for recovering the cost of ancillary
services).

Instead, taking into account the differing views on the importance of efficiency in
transmission and distribution, we believe the best approach is to leave the wording
unchanged. We would suggest, however, that the priority awarded to efficiency in
transmission and distribution depends upon the method of setting charges for transmission
and distribution. To the extent that transmission and distribution charges succeed in
encouraging efficient location of generation and demand, there is less need for the trading
arrangements to provide equivalent incentives.

\(^{30}\) The 2nd Consultation Document quoted Southern Electric as being in favour of a single wholesale electricity price
for the whole of England and Wales, and therefore opposed to locational pricing. In the most recent response,
Southern Electric points out that this reference misinterpreted their submission. Southern Electric states “The
intention of this statement was to argue for the retention of a national generation clearing price rather than
introducing pay at bid pricing in the interests of contract market liquidity. We are not arguing against locational
pricing signals (unless, of course, these signals were so unpredictable they acted as a barrier to liquidity, as
discussed previously).”  [page 730] We are pleased to be able to correct the impression given in the 2nd
Consultation Document. This correction does not affect our deliberations over the priority to be given to efficiency
in transmission and distribution.
4.2.4. Possible wording changes

Seeboard/061 asked whether the trading arrangements should "facilitate" or "promote" efficiency and the NRFC/051 advocated the adoption of "promote". In practice, we are not sure that the exact word chosen will make much difference to the contribution that trading arrangements should make to efficiency. The 2nd Consultation Document highlighted the views of several respondents that the trading arrangements themselves could or should not impose an efficient solution in the face of abuses of market power. It therefore seems unlikely that the trading arrangements can do more than facilitate efficiency.

Several suppliers suggested that the activities covered by the objective should be expanded to include "trading of electricity" (Accord/052, British Gas Trading/057, East Midlands Electricity/064). We presume that this suggestion refers to the efficiency of the parties carrying out trading activities, rather than the efficiency of the trading process itself (as discussed in section 4.2.2). On the other hand, ECC (Yorkshire)/071 argued that efficiency in consumption of electricity is not in the control of the Pool and should therefore be excluded.

It seems to us that, in principle, no activity in the electricity sector should be excluded from considerations of efficiency, if it is shown that the trading arrangements have some influence over it. We therefore believe it is right to expand the list of such activities to include trading, but recognise that the contribution of the trading arrangements may be limited for some activities and have low priority in others.

4.3. Free Entry and Exit

The questionnaire elicited widespread support for the objective as drafted,31 and no-one argued that the trading arrangements should be expected to play a major role in controlling market power. Nevertheless, many respondents agreed with the statement of the ECCCG/055, that "market power is a fundamental question which must be addressed elsewhere." [page 446] Most comments contained specific concerns or proposed amendments to the wording.

4.3.1. Application to respondents' concerns

Several respondents suggested a more specific form of words to replace the reference in the NERA report to a "level playing field":32

- RJB Mining/048 suggested that the list of objectives should explicitly "avoid discrimination against particular energy sources" [page 283] and that "new entry should not be given an 'inside track' over existing generation as to date, thus increasing costs and decreasing efficiency" [page 286];
- EPET/060 said it was essential to rule out discrimination against any particular energy source, as in Offer’s list of objectives [page 503];

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31 ECC (South East)/046, CIPS/065, Enron/067, BNFL/068, Teesside/070, IVO/076, CIA/079.
32 NERA/001, report page 12 [review page 24].
FUTC/063 stated that new entrants must compete on a level playing field with incumbents [page 556].

Having reviewed the comments on discrimination between consumers, the PRSG feels that it would be difficult to define discrimination against energy sources, except in terms of (a) exceptional barriers to entry which affected only certain energy types and (b) factors which reduce the efficiency of investment and despatch. We are therefore pleased to clarify that any meaningful definition of free entry and exit would rule out the type of barriers mentioned under (a), whilst the efficiency objective covers all the factors mentioned under (b). In particular, “efficient” entrants should be understood as those whose entry lowers the total cost of serving customers.

First Hydro/056 made a more detailed request:

“The Pool trading arrangements should facilitate competition on an equal basis. This as an objective should subsume and emphasise a number of other objectives, including:

- a single market price for all participants
- a level playing field
- transparency of market information to participants, allowing response to competitive pressures, and a discouragement of gaming
- minimal barriers to entry/exit, including stability of trading arrangements.”

[page 463]

These requirements seem to be covered by the objectives relating to (1) free entry and exit, (2) transparency and (3) stability. The need to combine these objectives does not seem to have been established.

4.3.2. Possible wording changes

As with the previous objective, Accord/052 suggested that the objective should cover not just generators and suppliers, but also “traders, risk managers, consumers and others”. British Gas Trading/057 proposed adding “traders and consumers”. We believe these suggestions can be accommodated without difficulty.

The wording in the 2nd Consultation Document derives from the existing licensing framework for the electricity sector, where traders of physical power must be licensed as either generators or suppliers; even consumers who wish to buy power from the pool must obtain a supply licence. The framework is different in the gas sector, where there are separate licenses for “shippers”, ie for traders moving and trading gas over the network at the wholesale level.

The objective should not anticipate a particular form of licence regime which might be changed in the near future. To cover all possibilities, we propose to amend the wording, so that the objective refers to “generators and traders of electricity”. We will also clarify the definition of “traders” to include “suppliers, brokers and any other intermediaries, licensed or otherwise, plus consumers wishing to trade electricity on their own behalf”.

25
4.4. Objectives and Clarification

The result of our deliberations over the current round of submissions is a slight revision of the wording of each objective, mainly to take into account the role of traders:

"The trading arrangements should facilitate efficiency in the generation, transmission, distribution, trading and consumption of electricity."

"The trading arrangements should minimise entry and exit barriers for generators and traders of electricity."

We would also like to issue the following definitions and clarifications:

1) The term "efficiency" used here refers to economic efficiency (as defined in Appendix 3).

2) The term "traders" includes suppliers, brokers and any other intermediaries, licensed or otherwise, plus consumers wishing to trade electricity on their own behalf.

3) Trading arrangements which favour one fuel or energy source over any other are incompatible de facto with the minimisation of entry and exit barriers.

4) The relative priorities of different aspects of efficiency have yet to be decided. Some aspects (e.g., transmission and distribution) may be given a low priority, if efficiency is adequately catered for by other arrangements (e.g., transmission and distribution charges).

In response to doubts expressed by respondents, we would also like to clarify the implications of the efficiency objective for evaluation of alternative trading arrangements.

The 2nd Consultation Document states that efficiency is a pre-requisite for lower prices and that the main contribution of the trading arrangements is to foster greater efficiency.\(^{33}\) Hence, any proposal for alternative trading arrangements must be appraised by checking whether it increases or reduces economic efficiency. Plans which lower prices but which result in higher costs in the short-term (despatch and operations) or longer term (investment), or which are achieved by reducing the quality of supply, cannot be regarded as obviously superior to the current arrangements. Of course, any full appraisal would also have to take account of the criteria derived from other objectives.

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\(^{33}\) 2nd Consultation Document, section 3.3.
5. SYSTEM SECURITY AND THE SCOPE OF MARKETS

Our original formulation of this objective was as follows:

*The trading arrangements should support the need to maintain system security, with trades administered centrally only to the extent that a reliance on bilateral trades would be insecure or inefficient.*

Many respondents indicated their agreement with this objective, subject only to the need to define what is meant by system security.\(^{34}\) The 2\(^{nd}\) Consultation Document broached this topic in section 4 and we have nothing to add at this stage. System security is “the need to match supply and demand in the short-term, in order to maintain the quality of supply (frequency, voltage, etc) and to avoid outages”.\(^{35}\)

We also received many comments on this objective to the effect that the two halves of the statement did not appear to be linked\(^ {36}\) and a number of queries about the relative emphasis on bilateral trades. We believe that these comments merit some revision to the objectives and some clarification of their meaning.

5.1. System Security and Centralisation

The reason for linking system security and bilateral trades in one objective was the unspoken assumption, common within the electricity industry, that the maintenance of system security requires a degree of central control. Central control invariably needs to be supported by a centralised trading system to put a price on the changes in output and consumption demanded by the system operator. The AEP/077 set out the case for linking system security with central control, and stressed its importance.

“NGC has the responsibility to ensure that available plant and demand management is correctly despatched to maintain a secure system but trading arrangements can influence NGC’s ability to meet its responsibility. Supply reliability is the highest priority for most electricity customers and the review objectives should reflect this.” [page 766]

Southern Electric/072 believed that security of supply was far too important an issue to leave to market forces without centralised co-ordination [page 729]. However, Seeboard/061 argued that “the sweeping statement that bilateral trading would be insecure or inefficient has not in our opinion been proved or tested even.” [page 531] First Hydro/056 suggested that the objective would serve its purpose if the phrase “with trades being administered centrally” were removed altogether [page 463]. The ETUG/063 argued that it is centralised knowledge, rather than centralised control, that is required [page 558].

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\(^{34}\) See RJB Mining/048, PowerGen/050, EPET/060 and ICI/066.

\(^{35}\) 2\(^{nd}\) Consultation Document, section 4.

\(^{36}\) See East Midlands Electricity/064, BNFL/068 and IVO/076.
At this stage, the PRSG would not wish to prejudice discussions of how much (if any) centralisation is required to support the requirements of system security. This is a matter for subsequent discussion in the evaluation of alternative trading arrangements.

5.2. Centralisation vs Decentralisation (eg Bilateral Trading)

Many respondents asked whether bilateral trading would be favoured or suggested that bilateral arrangements were receiving too much emphasis.\textsuperscript{37} On the other hand, the comments recorded in section 4.2.2 about the need for “competitive market processes” suggested that the objectives framework did not provide enough scope for decentralised markets.

The PRSG has no particular view of the correct degree of centralisation or monopoly versus decentralisation or choice, but recognises that a balance will have to be struck.\textsuperscript{38} Enron/067 stated that it should be for the advocates of centralisation to explain why bilateral trades or other decentralised systems will prove inadequate or less beneficial than centralisation [page 615]. This principle would go a long way towards meeting the concerns of those who wish to see the objectives reflect the need for “competitive market processes”. We note that the NERA report explained the central role awarded to the Pool in 1990 in terms of the needs of system security, so this approach appears to be applicable even for the current system (although we cannot say whether the same arguments still apply in 1998).

We favour breaking the objective into two subsidiary objectives, in order to remove any confusion that might arise from linking them. The second half of the current objective would then become an objective in its own right. However, we feel it would be inappropriate to express the objective, as before, in terms of the limited reasons for “centralisation”. Instead, we believe it will be more comprehensible, and more representative of submissions we have received on the desirability of “competition”, if the objective is phrased as a desire to \textit{maximise the degree of choice available to market participants}.

5.3. The Purpose of Constraining Choice by Centralisation

The original objective argued for centralisation only if a reliance on bilateral trades (ie choice) would be insecure or inefficient. Several parties objected to the inclusion of a reference to “inefficiency”, as a condition to be met by bilateral (ie decentralised) trading arrangements. BOC/049 argued that concerns over efficiency should be left to the market [page 318] and Teesside/070 responded that “It is unclear from where the reference to ‘efficiency’ originates. To the extent that trades are not administered centrally, the efficiency of these trades is a matter only for the parties to those trades.” London Electricity/069 wrote that they desire to ensure that the requirements of system security do not give “excessive or arbitrary powers to a system operator”. (The implications of this comment are picked up in section 6 on transparency.)

\textsuperscript{37} See Scottish Power/054. First Hydro/056. EPET/060.

\textsuperscript{38} Note that we now prefer to phrase the objective in terms of centralisation versus decentralisation or choice, as decentralisation can in principle include multi-lateral arrangements as well as bilateral trades. Also, most people find choice intrinsically more comprehensible and desirable as an objective than any reference to bilateral trades.
All these comments spring from the same concern, ie that extensive centralisation of trading may be justified by reference to efficiency requirements, but may lead to a lack of transparency. This discussion also took place during the recent discussion of restructuring in California, where the role and powers of the Independent System Operator were extensively debated.

On the other hand, EPET/060 suggested that the definitions of insecure and inefficient overlap and that “the reference to ‘insecure’ is either incorrect or redundant depending on the interpretation” [page 505]. In other words, EPET argues that the reference to “inefficient” covers the need for a reference to “insecure”.

In practice, we think it will be hard to avoid discussion of potential centralisation if there is a concern over the efficiency of decentralised trading. In addition, some demands for centralisation and limitations on choice will spring from the needs of system security. Furthermore, as suggested by London Electricity, demands for centralisation of trading powers will be constrained by the need to demonstrate sufficient transparency. All of these concerns are already covered by our objectives framework. It seems simplest to demand that those who propose limits on choice (eg centralisation of some activities) should show how the proposal would be beneficial in terms of the other objectives in the framework.

5.4. Other Concerns

5.4.1. Relative priority of system security

Respondents generally reacted favourably to the proposals from NGC/027 listed in section 4.2 of the 2nd Consultation Document, namely:39

- Physical constraints must be respected, so there must be some way of modifying flows to accommodate transmission constraints;
- There must be some means of maintaining a dynamic generation-demand energy balance, both under planned conditions and following ‘credible’ contingencies;
- There must be some means of trading residual energy imbalances;
- Transmission access and services must be offered to all users on a non-discriminatory basis;
- The costs of shared facilities and services, including those of the transmission system, must be allocated to all system users on a non-discriminatory basis;
- All trades across the system must be metered to standards agreed by all participants, so some central authority is needed to monitor and enforce standards.

Respondents were by and large prepared to accept at least the first three bullets as desirable properties for any set of trading arrangement.40

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40 Teesside/070 said that the third, fourth, fifth and sixth bullet points in NGC’s list needed to be considered further, to establish whether it properly derived from concerns of system security, rather than one of the other objectives.
However, several respondents noted that the need for centrally administered trades to meet these requirements had yet to be demonstrated.

5.4.2. Possible wording changes

The ETUG/063 suggests changing the wording from “with trades administered” to “notified” or “registered” [page 558] but we think that this wording would not cover the most important form of centralisation, that is trades made through some central market.

Scottish Power/054 suggested replacing “support the need for system security” with “encourage actions that maintain system security”. We agree that the intention is to ensure that trading arrangements provide mechanisms and incentives which allow the relevant parts of the industry to achieve the desired level of security. However, no-one else indicated that the drafting might be misinterpreted and the alternative text does not seem to offer any specific advantage over the existing text.

5.5. Objectives and Clarification

The comments we received from respondents suggested a need to divide the draft objective into two separate objectives:

"The trading arrangements should support the need for system security."

"The trading arrangements should maximise market participants’ freedom of choice, subject only to limitations justified by other objectives in this framework."

Interpretation of the first objective is subject to the following clarifications:

1) The role of trading arrangements is to provide incentives for all players to comply efficiently with the needs of system security.

2) System security is defined as the need to match supply and demand in the short-term in order to maintain the quality of supply (frequency, voltage and other dimensions) and to avoid outages.
6. STABILITY AND TRANSPARENCY OF MARKETS

When we issued the 2nd Consultation Document, we were conscious that our objective with regard to stability differed pointedly from the corresponding objective in Offer’s proposed terms of reference for the DTI/Offer review. Our original proposal was:

The trading arrangements should minimise perceptions of instability and unmanageable commercial or regulatory risk (as should the process of changing the trading arrangements).

The trading arrangements should provide transparency in the operation of the pricing mechanism and the market generally.

Offer proposed (and subsequently confirmed) that the review should “enhance the ability to respond flexibly to changing circumstances in future”. The desire for flexibility seems to conflict with the desire for stability.

Having considered the matter further in the light of comments received, we have concluded that the other objectives in this framework provide sufficient argument for flexibility, but that stability is an additional requirement. This stability applies to the trading rules, not the prices, although the rules cannot be permanently exempt from change. It is necessary that market participants never be given cause to fear arbitrary or unpredictable changes in the rules which would create unnecessary commercial and regulatory risk. These risks would disrupt commercial calculations and discourage investors from committing funds to long term investment.

To summarise, market participants must have confidence that the trading rules, when they change, will do so within an understood and hence predictable framework. That framework is provided by these objectives, precisely because they have emerged from comprehensive consultation. The requirement that any changes in the trading rules should evolve within a known framework is in effect a requirement that they should be transparent in a long term sense. Therefore, we have concluded that, provided the objectives include adequate references to avoidance of regulatory risk and to transparency, they do not need to refer to stability in addition.

6.1. Views on Stability

Many respondents argued directly against the inclusion of an objective relating to stability, on a number of different grounds. Some based their arguments on a possible misinterpretation of the objective. The PRSG intended “stability” to apply only to the trading arrangements, whereas respondents suggested that the objective might be applied to prices, or even to the profits of companies in the sector. Some clarification is therefore clearly required, in order to meet these criticisms.

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41 Offer, Review of Electricity Trading Arrangements: Advice on Terms of Reference, January 1998, p18, section 7.3. The objectives stated by Offer in section 7.3 apply to the review rather than to the trading arrangements. However, we assume that they would be used to evaluate alternative trading arrangements in the manner we have proposed.

Some respondents argued that long-term stability might be desirable as a factor contributing to efficient investment, but need not be specified in a separate objective. On the other hand, some respondents argued strongly in favour of retaining an objective of stability within the trading arrangements, as an explicit means of ensuring efficient investment. These respondents tended to award stability a relatively high priority. (See section 3.)

Overall, we feel that there is a need to amend the wording of this objective to clarify its intent, but that it reflects real concerns and should not be removed completely.

6.1.1. Clarification of Intent

The intended purpose of the objective was to suggest that the trading arrangements themselves, that is the rules governing trade between parties in the electric sector, should exhibit some stability, in order to avoid giving the perception that the electricity sector was subject to unnecessary and unmanageable risks which would discourage new investment, reduce efficiency, and raise costs and prices.

The mention of perceptions caused some concern. ECC (South East)/046 said that “A PR exercise will be pointless and perhaps counter productive.” [page 267] Scottish Power/054 Group commented that “Assessing whether ‘perceptions are minimised’ would be very difficult. [page 424]. Midlands Electricity/045 commented as follows:

“Within this objective, the word ‘perceptions’ implies that instability and some forms of risk may not be real, but rest within the expectations of the stakeholder. Expectations will become more accurate if the market is transparent. However, to ‘minimise a perception’ is purely subjective and therefore unrealisable in practice. It would perhaps be better to remove the word ‘perceptions’ from this objective on the basis that either there is avoidable instability or there is not.” [page 250]

British Gas Trading/057 also queried “[t]he use of the word “perceptions”. In reality they should minimise instability rather than just appear to do so.” [page 480]

Seeboard/061 implied that one possible interpretation of the objective would be a desire to stabilise prices by overriding market forces: “….stability must not prevent or interfere with natural liquidity and volatility in the market.” [page 533] RJB Mining/048 wished to relate the concept of stability to “government policies to achieve a secure, diverse and sustainable energy supply.” [page 294]

The current phrasing was intended merely to indicate that risks depend upon the perceptions of observers, but not that they could be dispelled by a mere PR exercise. Since all risks are a matter of perception by definition, nothing would be lost by deleting the term and its removal may avoid some confusion. Equally, the PRSG did not intend to suggest that this objective related to the stability of the prices or energy sources produced by any single trading arrangement.

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43 EPET/060, Enron/067.
44 First Hydro/056, Teesside/070.
The PRSG intended the concept of stability to apply only to the rules and procedures which make up the trading arrangements themselves, and to the process of changing those rules and procedures. After all, there is no point establishing a set of “transparent” trading arrangements to reduce risk, as discussed below, if there remains a risk that the whole set of rules could be changed unpredictably. In this sense, stability is merely “long-term transparency”.

The comment of First Hydro/056 in this respect is illustrative of this definition of “stability”:

“I would agree with the comments on transparency noted in the consultation paper, and the need to give confidence to investors with trading arrangements that are stable. One of the principal opportunities which the Pool and DTI/Offer Reviews present us with is that of securing trading arrangements which will not need to be changed for some time.” [page 463]

The need for this type of stability was supported by Seeboard/061: “....stability and robustness in the overall framework of trading arrangements is important” [page 533] Seeboard added “Sudden and significant shifts in government energy policy could create unmanageable risk”, citing recent discussions of coal as an example. [page 534] IVO/076 commented that the objective was “crucial if competition in generation and supply is going to be encouraged” [page 753] and mentioned (in relation to the objective framework) that “the costs of change do not seem to be given adequate emphasis” [page 742]. Teesside/070 wrote explicitly on the subject of “Long Term Stability” and its relation to cost conditions and long-term efficiency within the industry:

“We are pleased that our views on the need for an objective dealing with this matter have been reflected in the revised set of objectives. We fully accept that the England and Wales electricity market will be, by its nature, unpredictable and the market will evolve as a result of new build and closure decisions by market participants. Because of the large capital expenditure associated with the construction of power stations, there needs to be a balance between the short term and longer term incentives in the market with the need for stability to encourage such investment.” [page 676]

Several respondents explicitly noted the need for a balance between this objective and others. For example, EIUG/063 suggested that:

“There is a need to add in ‘unnecessary’ instability. Markets are flexible, subject to change as the macroeconomic environment changes.....There is a balance to be struck between stability and effective competitive pressure, including the market’s need to be capable of change in a timely way” [page 560]

East Midlands Electricity/064 came to broadly the same conclusion:
“Some change will be necessary. We suggest that ‘instability’ is replaced by ‘unnecessary’ in this objective; the arrangements must balance the need for change to respond to justifiable requirements with a need to not have unnecessary instability.” [page 586]

ECC (Yorkshire) 071 responded with “Agree, but should not be overstated to avoid change” [page 715]. ECCC0/055 explained that “ECCs only agree with this objective provided it is clearly understood that it does not prevent radical change to the trading arrangements. We agree that major changes must be positioned as manageable and, when made, must be seen to be stable and to be commercially viable” [page 450].

Several respondents wrote that stability would be as much a matter of implementing an objective change management process, as of the trading arrangements themselves:

- **YEG/053**: “Trading arrangements should evolve naturally with broad agreement, but with no party able to block progress” [page 400, emphasis added]
- **Scottish Power/054**: “If the change process is predictable and controlled, does that not satisfy the unmanageable risk criteria?” [page 424]
- **Seeboard/061**: “To fulfil this objective, it is agreed that discretionary elements and major regulatory interventions need to be minimised to reduce unnecessary commercial and regulatory risk.” [page 534].
- **ELUG/063**: “Transparency must also apply to all decision making and regulatory rulings. Again, this is a governance issue, but Offer’s lack of clarity recently has been extremely unhelpful and adds to inefficiency and inability to initiate timely change.” [page 563]
- **London Electricity/069** suggested that the problem is “the exercise of undue market power, and the perception of regulatory risk and that the objective should be reworded accordingly.” [page 672]

Midlands Electricity/045 commented as follows:

“The PRSG invited comments on the trade-off between ‘flexibility towards changing circumstances’ and ‘continued and unplanned change’. Flexibility could be provided for within future governance arrangements. By ensuring proposed trading arrangements are robust and properly thought through at each stage of the review process, it is possible to keep the number of revisions to a minimum. Discretionary regulatory intervention is destabilising and should be avoided where possible.” [page 251]

EPET/060 noted that “Market efficiency should never be compromised for long term stability. It may be that long term stability enhances efficiency. In particular, minimising regulatory risk leads to longer term stability and then to enhanced efficiency.” [page 508]

Several respondents argued equally strongly against the inclusion of any such objective, on the grounds that it would stifle innovation. However, it is clear from the quotations we

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45 See BOC/049, YEG/053, Enron/067.
have extracted above that other respondents dislike that idea of trading arrangements being subject to frequent and unpredictable changes at the behest of individual parties, particularly through regulatory interventions. Ultimately, the only defence against such risks is the avoidance of "discretionary elements and major regulatory interventions", principally by implementation of a "predictable and controlled" change process.

We therefore think that the correct representation of respondents' views would require an objective related to stability, but that the objective needs to be amended to avoid misinterpretation. Indeed, the direct reference to "stability" may be omitted as suggested by East Midlands Electricity, without losing the essential meaning.

6.2. Transparency

This objective, which is identical to Offer's, achieved widespread support and did not attract any major comments. The major themes to emerge from the comments were the varying definitions of transparency that apply in different circumstances.

For example, in relation to monopoly sectors, transparency means clear and indisputable procedures for allocating and recovering costs. In one submission, the EIUG/063 says, "All monopoly parts of the industry must be transparent in operation and charging." [page 563] In a second submission, EIUG/074, the EIUG even says that "Transparency is appropriate to regulatory decisions and monopoly pricing to energy trading (cf. the gas market) except to spot trading." [page 736]

In relation to centralised (mandatory) trading systems and price formulae, transparency should mean mechanisms that can be easily understood, as evidenced by the following exerts:

- Midlands Electricity/045: "Our interpretation of transparency would include a wide understanding by stakeholders (including customers) of how wholesale prices are derived..." [page 251]

- Scottish Power/054: "In our view, a single England and Wales price for energy arrived at in a simple and transparent manner would be the ideal...The determination of price need not be via a complex centralised price setting mechanism. [page 427]

- Enron/067: "Centralised price-setting algorithms should be simple and should not rely on complex, centralised scheduling and price-setting tools..." [page 616] "[T]ransparency is a function of liquidity which inter alia depends on the extent of competition in the underlying product market." [page 616]

- London Electricity/069: "We believe that the concept of transparency also covers to the extent to which a trading mechanism is comprehensible and, hence accessible to new traders. Therefore, the trading mechanism needs to be as simple as possible for given objectives." [page 673] London Electricity also argued that powers awarded to the system operator should not be exercised arbitrarily [page 672].

- Southern Electric/072: "...providing information on the workings of the pricing mechanisms and the market generally." [page 730]
As far as decentralised markets are concerned, transparency appears to mean objective and mechanistic price discovery:
- British Gas Trading/057: “market transparency is ideally not via a single centralised price setting mechanism, but discovery of transaction prices via voluntary price reporting for any bilateral trades and the publication of central residual prices.” [page 483]
- ECC (South East)/046: “Transparency should be about price discovery.” [page 271]
- Scottish Power/054: “In our view transparency should mainly refer to price discovery and if this can be achieved using easily understood price setting mechanisms, this is a bonus.” [page 426]

National Power/075 and IVO/076 both mentioned the need to retain the “confidence of traders” in any market, though neither offered a definition of the necessary conditions. With regard to policy interventions, respondents plainly articulated a desire for a clear understanding of government and regulatory interventions (to which we return later, in the discussion of policy constraints):

- Midlands Electricity/045“...clear definition of Government energy policy over the short and medium term; explicit guidelines for regulatory interaction; and unambiguous rules for participating in trading arrangements. Transparency should not be interpreted as synonymous with simplicity, yet unnecessary complexity should be avoided." [page 251]

There is some discussion as to whether the PRSG and the Pool have any influence over contract markets. BNFL/068 states that “...transparency outside the Pool is a matter for the regulation of the industry by Offer.” [page 661] However, there is no dispute of the need for transparency in these markets.

6.3. Objectives and Clarification

We conclude that both objectives appear to have some value to respondents and we do not feel able to delete either one. Most respondents value transparency highly and stability, as defined here, is only a matter of long-term transparency. However, we can see that the meaning of the stability objective may be clearer if the reference to perceptions is removed and the reference to instability is replaced by the term “unnecessary risk”. We also recognise that many respondents assign a low priority to this objective at the current time, but a higher one in relation to any future trading arrangements.

In line with the discussion in this section, therefore, we have amended the objective relating to stability in order to reduce the potential for confusion. We also think that the relationship between these two objectives is easier to understand if taken in the reverse order.

"The trading arrangements should provide transparency in the operation of the pricing mechanisms and the market generally."

"The trading arrangements, and the process for changing them, should minimise unnecessary and unmanageable commercial or regulatory risk."

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We would wish anyone proposing alternative trading arrangements to take note of the following clarifications:

1) Transparency of trading arrangements will take different meanings in different circumstances, as described in section 6.2.

2) Any powers given to the system operator or any centralised trader, to achieve system security or any other objective, should be exercised as transparently as practicable.

3) The benefits of any proposal to change the trading arrangements will be reduced if it creates perceptions of instability in the trading arrangements themselves or increases the risk of arbitrary interventions, and thereby discourages efficient investment.

4) Ultimately, the guarantee of an acceptable balance between stability and the other objectives (which all require a degree of flexibility) will be the ability to demonstrate a rational and inclusive process of identifying and agreeing a need for change. The aim of such a process is to prevent individual government agencies or market participants from wielding undue and unpredictable influence over the trading arrangements. Otherwise, government agencies would inject unnecessary and unmanageable regulatory risk, and individual market participants would inject unnecessary and unmanageable commercial risk.

This objective underpins the need for an objective performance framework, to ensure that proposed changes meet the needs of all involved in the industry. The objective also lends support to any open and rational process for changing the trading arrangements.
7. RISK MANAGEMENT

The 2nd Consultation Document proposed the following formulation:

The trading arrangements should centralise risk management on behalf of market participants, if and only if market failures prevent them from managing the risks efficiently themselves, through unilateral or bilateral actions.

This objective received a relatively low weight in the prioritisation of objectives and led respondents to offer one of three basic comments:

1) the objective is basically correct;\(^6\)
2) the objective is basically correct, but certain aspects need more or less emphasis;\(^7\) or
3) the need for the centralised risk management is not demonstrated.\(^8\)

These views do not necessarily conflict and can be reconciled by further consideration of the objective's intended purpose.

7.1. Scope of Centralised Risk Management

The objective has been phrased for the sake of clarity in a positive sense ("The trading arrangements should centralise risk management...."), but this positive instruction is subject to a strict condition. Risk management should be centralised if and only if market participants are prevented from managing risks in a decentralised way by some "market failure". A "market failure" is any defect in market arrangements which causes a market to operate inefficiently. The cause of such market failures may rest in:

1) the nature of the product being traded (eg the fact that everyone benefits from frequency control, even if they don't pay for it, so every trader has an incentive to free ride on the service provided by others); or
2) the nature of the market infrastructure (eg a lack of information about short-term fluctuations in supply and demand, because meters only measure half-hourly flows); or
3) the nature of market participants (eg some entrenched market power that enables individuals to affect prices and outcomes).

These market failures might justify a degree of central control, in order to achieve some objective better than decentralised trading does. However, market failures are not synonymous with the commercial failure of an individual market participant. In other

\(^6\) BNFL/068, Seeboard/061, East Midlands Electricity/064, London Electricity/069, Teesside/070.
\(^7\) ECC (South East)/046, Blue Circle/047, YEG/053, ECCC, 055, Eexon/067, Co-Steel Sheerness/080.
\(^8\) BOI/049, Scottish Power/054, British Gas Trading/057, First Hydro/056, ECCC/055, EITG/063.
words, the risks associated with market failures do not include the normal commercial risks of bankruptcy. Hence, this objective should not be interpreted as a justification for centralised protection of companies within the electricity sector, as several respondents seemed to fear. As the Chemical Industries Association (CIA)/079 states "All markets contain an element of risk which should be properly reflected in shareholders returns." [page 771] Given this interpretation, there seems to be no need to limit the scope of centralised risk management to final customers, as suggested by ECC (South East)/046 [page 272].

Enron/067 offered an interpretation of the objective which may shed further light on its position in the framework:

"The key here is that centralised risk management is only justified when market failures prevent participants managing their own risks efficiently. These market failures should be clearly identified, justified and consulted upon before any centralised risk management arrangements are adopted. The fact that participants do or do not manage specific 'risks' currently is not necessarily evidence of market failure - indeed it may provide evidence that the market is working." [page 617]

This statement may help to clarify the intentions of the PRSG. However, it would probably be unwise to use an expression such as "market failure" which submissions have shown to be capable of a wide range of interpretations.

Furthermore, on reconsidering the original objective, it seems to us that it is simply aimed at encouraging the maximum possible decentralisation of decisions, except in cases where considerations of efficiency (EPET/060) or system security (PowerGen/050) dictate a degree of centralisation. In this respect, decentralisation of risk management is no different from any other freedom of choice, which we have already discussed at length in section 5.51

We therefore feel that the explicit objective relating to risk management has been rendered unnecessary by the revision of our objective on system security and centralisation.

7.2. Objective and Clarification

This objective was awarded a low priority by all respondents. In the light of the amendments made under section 5, an explicit objective referring to freedom of choice or centralisation in the sphere of risk management would now be redundant. We have therefore removed it from the objectives framework.

50 ECC (South East)/046, ECCCG/055 and possibly Arjo Wiggins/062.
51 RJB Mining/048 suggested that centralised risk management should cover the security of fuel supply to certain gensets [page 299]. Centralising the management of this risk would be justifiable if it could be shown that the associated restrictions on freedom of choice would meet other objectives, such as efficiency or system security.
8. MINIMISING TRANSACTIONS COSTS

This objective elicited many comments, but does not represent a major source of potential conflict. Our original formulation was:

*The trading arrangements should minimise all related transactions costs, including those incurred by customers.*

This formulation is still appropriate, but its relative priority deserves clarification.

8.1. Summary of Responses

Many respondents argued that there was no need for a separate objective relating to transactions costs. For example, Midlands Electricity/045, BOC/049, First Hydro/056, EPET/060, Seeboard/061 and Enron/067 all suggested that the desire to minimise transactions costs would already be covered by the general focus on efficiency in all aspects of the sector. (Several referred to cost/benefit analysis, as discussed in section 4.2.)

Several other respondents argued that it would be wrong to minimise transactions costs, since higher transactions costs might provide other benefits. (See, for example, ECC (South East)/046, EIUG/063 and Teesside/070.) However, many respondents indicated their agreement with the objective.

Having reviewed all these comments, we believe that they can be reconciled by considering the relative priority to be awarded to this objective.

8.2. The Relative Priority of Transactions Costs

We agree that, in principle, transactions costs can be taken into account in any discussion of efficiency for the sector as a whole. We therefore believe that this objective should be regarded as an adjunct to any discussion of efficiency within or prices charged by the electricity sector. As the experience of “1998” shows, transactions costs can become a heavy burden on customers and need to be taken into account in all appraisals.52 Midlands Electricity suggests that “the ‘shoe leather’ costs associated with the time and effort searching for least cost supplies will be difficult to quantify.”53 However, if they were significant, they should definitely be taken into account in deciding what trading arrangements deliver the lowest sustainable prices. IVO/076 also maintained that any appraisal should examine the implication of financial trading for “the transaction cost of risk management/contract settlement by non-industry participants” [page 760].

The value of this objective derives from its role as a focus for particular concerns, as indicated by the comment of East Midlands Electricity/064: “[The overall objective] should additionally require facilitation of high quality customer service and for accurate and timely settlement of charges.” [page 577, emphasis added] It is difficult to explain exactly why accurate and timely settlement would be important without recognising that inaccurate and

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52 YEG/053, page 407.
53 Midlands Electricity/045, page 251.
Untimely settlement imposes costs on (mainly) the final consumers who have to chase up or query their electricity bills.

All too often, decisions in the electricity sector fail to take into account the true interests of final consumers. This point was made to us repeatedly in the earlier consultation and led to the inclusion of a customer-oriented overall objective. We feel that the same could be true of transactions costs, especially those incurred directly by the final consumers of electricity; a system will not be efficient if it imposes on customers a high level of "shoe-leather" or any other kind of transactions cost. We therefore believe that it is worth retaining this objective, if only as a reminder of costs incurred outside the industry.

At the same time, we recognise that transactions costs are only one of many types of cost in the industry and, as the ECC (South East) puts it, "more complicated deals may allow lower pricing." \(^{54}\) We cannot therefore see any reason why transactions costs should be given a different priority from any other cost in determining whether customers will receive lower prices. As Accord/052 suggests, this objective should be seen "in the context of the larger goal of maximising benefits to participants" [page 381].

8.3. Objective and Clarification

The objective should continue to be phrased as before:

"The trading arrangements should minimise all related transactions costs, including those incurred by customers"

The objective is subject to two clarifications:

1) Appraisals of alternative trading arrangements should give transactions costs equal weighting with other costs (and other determinants of price levels), unless otherwise stated.

2) Transactions costs includes the costs of both developing new systems and operating them.

\(^{54}\) ECC (South East)/046, page 274.
9. ACCOMMODATING POLICY CONSTRAINTS

Respondents generally agreed that the trading arrangements would be subject to some kind of policy constraint, but expressed many reservations about the current wording. Our original formulation was:

*The trading arrangements should reflect policy constraints, where appropriate.*

Many respondents feared that a general reference to "policy constraints" would allow the introduction of factors that conflicted with transparency, or indeed with any other objective. The objective therefore clearly needs to be amended, to allay these fears.

9.1. The Scope of Policy Interventions

The problem was summarised by EPET/060 as follows:

"This is not an objective, but a box to put objectives in. It roughly translates as 'and anything else we want to do'. It is meaningless without stating the policy constraints." [page 516]

Accord/052 expressed similar fears:

"This risk is of policy constraints which scupper any prospect of trading arrangements satisfying other objectives. In general terms, policy constraints should be pursued outside the trading arrangements." [page 385]

First Hydro/056 maintained that the policy constraints mentioned in the NERA report were still important, but were adequately covered by other objectives. On the other hand, RJB Mining/048 supported the explicit reference to policy constraints, provided it allowed for new items such as diverse energy sources, environmental and social issues, and avoiding discrimination against particular energy sources. ECC (South East)/046, YEG/053 and MEUC/078 all suggested that an objective relating to policy constraints was unnecessary and should be dropped.

Several respondents argued that government policies constraints might be inevitable, but should be as transparent as possible. For example:

- British Gas Trading/057: "Policy constraints should be dealt with externally to the trading arrangements via clear, transparent, statutory and regulatory routes." [page 488]
- ECC (Yorkshire)/071: "Agreed, provided that policy restraints are set out for public knowledge." (724)
- ECCCG/055: "It is important that:
  - policy constraints that are under say Government discussion and review are not reflected in the trading arrangements, and
policy constraints which exist, such as current support for coal, are openly recognised and that alternative more efficient commercial alternatives such as gas-fired generation are not hidden and prevented from being properly considered."

London Electricity/069: "To the extent that there is external policy intervention, we believe that its imposition ought to be clear and transparent and lies outwith these stakeholder objectives." [page 674]

Seeboard/061 noted that the trading arrangements would have to reflect and accommodate current and planned policy constraints, but that it would be difficult to accommodate sudden and/or significant changes in policy without compromising the desire for stability (ie without introducing unmanageable regulatory risk).\textsuperscript{55}

Some respondents went further and argued that policy constraints should lie entirely outside the trading arrangements:

- Scottish Power/054: "Trading arrangements (per se) should not be a means of implementing government policy, but neither should they prevent the policy from operating." [page 433]

- Nuclear Electric/059: "Whilst [the policies mentioned in Offer's proposed objectives] are legitimate matters for Government in the context of its overall energy policy, we don't believe the electricity trading arrangements should be distorted as a means to deliver them, and hence they should not form part of the review." [page 492]

- EIUG/063: "I do not feel this is an appropriate objective for a trading mechanism. If for example government wants to support a fuel type that should be a transparent subsidy not a reserved market share." [page 569] This comment was reinforced in EIUG/074: "Trading arrangements should be pure of policy constraints." [page 736]

To summarise, it appears that many respondents recognise the inevitability of policy constraints, but most would like their influence over the trading arrangements to be kept to a minimum, and to be applied through transparent means.

9.2. Proposed Amendment

The comments listed above seem to imply two general conclusions. First, that the trading arrangements should comply with competition law, and indeed with all laws. Subject to that, however, they should be policy neutral. They should not prevent any Government policy from being carried out; but nor should they be used as an instrument or vehicle for such policies. This point requires a rider. The trading rules are of course an expression of the Government's policy to stimulate competition in electricity generation and supply. In that limited sense they are inherently an instrument of policy, and it is that policy that defines their scope. But their ability to promote that policy objective depends on their not being pressed into the service of extraneous policies outside their scope.

\textsuperscript{55} Seeboard/061, page 542.
9.2.1. Limiting the requirement to legal obligations

In section 2.2.2, we suggested that the avoidance of "undue discrimination" should be seen as just one aspect of competition law. In a similar vein, it seems to us that policy constraints should be seen as another aspect of the legal obligations imposed upon market institutions and market participants. We believe that the most effective way to accommodate the need to recognise policy constraints, without compromising transparency, is to limit the design of trading arrangements by reference only to clearly defined legal instruments. This will avoid any suggestion that the design needs to be constrained by unstated or even anticipated government policies. We therefore propose to replace the phrase "policy constraints" with a reference to "laws". We will clarify the scope of laws to include licences and other statutory instruments, but not general statements of Government policy.

9.2.2. Avoiding unnecessary interventions

The comments of Scottish Power, Nuclear Electric and the EIUG go further than arguing that the trading arrangements should only accommodate constraints imposed by government through legal means. They also suggest that government should limit the extent to which it uses the trading arrangements as an instrument of policy. Of course, the creation of a competitive electricity market is already the product of a government policy decision, but it clearly lies within the scope of the other objectives within our framework. We therefore interpret the comments wishing to limit policy interventions as applying to policies with aims that lie outside our objectives framework, such as social policies.

9.2.3. Possible wording changes

BNFL/068 also queried the term "reflect", preferring "accommodate" or a similar word. Midlands Electricity/045 preferred a reference to "compatibility". In the light of the changing emphasis, it will be sufficient for the trading arrangements to allow market institutions and market participants to fulfil their legal obligations.

9.3. Objectives and Clarifications

Recognising the fears of respondents and the revised scope of this objective to cover legal, rather than policy constraints, we suggest the following revised text and classifications:

"The trading arrangements should be consistent with competition law and with other laws, but they should not be used as a vehicle for implementing policies extraneous to their scope, as defined in the other objectives above."

1) Laws include Parliamentary acts, as well as regulations and licences issued by government bodies, but not general statements of policy which are not enforceable in law.

2) Laws falling within the scope of other objectives include all those pertaining to competition policy, including any legally defined and imposed prohibitions on discrimination.
3) Laws falling outside the scope of the other objectives, which nevertheless affect the design of the trading arrangements, should be noted explicitly in order to meet the objective of transparency, as discussed in section 6.
10. OTHER CONCERNS

The questionnaire returned by respondents provided a space to highlight any areas of concern which had not been adequately addressed. In practice, many of the comments related to areas outside the objectives framework itself.

RJB Mining/048, ECC (South East)/046, ECC (Yorkshire)/071 and Co-Steel Sheerness/080 all made suggestions as to how the Pool, or other trading arrangements, should operate in future. These specific proposals did not bear directly upon our objectives framework.

YEG/053, National Power/075 and IVO/076 all made reference to the desirability of maintaining or restoring "confidence" in the trading arrangements or their "credibility". We feel that this concern is partly addressed by the objectives relating to transparency and stability (unnecessary and unmanageable risks). However, the main instrument for achieving confidence or credibility is the actual review process itself, if it manages to demonstrate that its outcome has taken all relevant interests into account. This point was made more explicitly by the CIPS/065.

British Gas Trading/057 identified some issues which were excluded or inadequately addressed. The list included: "supplier balancing requirement" which, although undefined, seems to relate to actual proposals; "freedom of contractual form", which is now covered by the objective on freedom of choice; "encouragement of liquidity", which we discussed under transparency; and "participation by consumers" which is covered by the wider scope of the objective on free entry.

London Electricity/069 "noted the absence of an objective relating to simplicity", but we feel that simplicity merely contributes to the transparency of the trading arrangements.

Southern Electric/072 pointed out that any evaluation will require trade-offs between each objective and it would be wrong to imagine that the factors mentioned in each objective can be optimised individually. We hope we have addressed this in our discussions of relative priority.

The AEP/077 pointed out that the scope of this review was limited to the price of wholesale energy, which was only one component of the price of energy delivered to final customers; this limits the scope for any reforms to achieve major price reductions. We would hope that our discussion of efficiency puts the scope of this review of trading arrangements into perspective.
11. CONCLUSION

Our initial list of objectives emerged from the submissions received in response to our first round of consultation, and likewise our final list from those received in response to our second. The final list contains several changes, which reflect many good arguments put to us. We believe that the revision responds, in one way or another, to nearly all the comments we have received.

At the same time, our revised list of objectives reflects the obvious fact that our respondents have conflicting interests. We have not of course tried to reconcile these conflicts here.

We have been able to provide a framework to clarify future debate. Conflicts of interest and opinion can, we believe, be pursued with greater clarity within a common framework of objectives. To a large extent, clashes of interest will reflect different priorities attached to different objectives. The objectives themselves are largely common ground. Debate conducted within the terms of these objectives will therefore help to make clearer what exactly is in dispute, where the trade-offs are, and what are the practical consequences of the rival points of view.

With this in mind, we have been glad to see emerging a framework of objectives which accommodates, in some way or other, most of the points of view put to us. The only view we have not been able to reconcile with the framework is the claim that “internationally competitive prices” should be one objective. Our views on this are set out in section 2.2.4 above. Unlike other comments of the large users’ representatives, this one simply appears to cut too sharply across other objectives.

Our specific conclusions are as follows:

- we found overwhelming, indeed almost unanimous, support for the use of a performance framework, operating by reference to a set of dispassionate criteria such as the objectives set out here;
- a wide range of respondents agreed broadly with the objectives framework proposed;
- the overall objective received strong support in principle, combined with varied comment in detail, much of which is reflected in the revised version now proposed;
- almost all the other comments we have received are now reflected in the subsidiary objectives;
- as to priorities, the overall objective is regarded as the top priority or a high priority by almost everyone;
- a high proportion of the responses stresses the importance of the efficiency objective;
- the priorities attached to the other subsidiary objectives are more varied and balanced, allowing scope for many different views to be expressed in subsequent debate.

We commend our final list of objectives to all those participating in the review of electricity trading arrangements. We will now carry these objectives forward into the design of a performance framework, to assist deliberations in later stages.
### APPENDIX 1. LIST OF RESPONDENTS

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Organisation</th>
<th>Abbreviation Used in Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>044</td>
<td>Consumers Association</td>
<td>Did not respond</td>
</tr>
<tr>
<td>045</td>
<td>Midlands Electricity plc</td>
<td>Midlands Electricity</td>
</tr>
<tr>
<td>046</td>
<td>ECC South East Region</td>
<td>ECC (South East)</td>
</tr>
<tr>
<td>047</td>
<td>BCI plc</td>
<td>Blue Circle</td>
</tr>
<tr>
<td>048</td>
<td>RJB Mining (UK) Ltd</td>
<td>RJB Mining</td>
</tr>
<tr>
<td>049</td>
<td>BOC Gases Europe</td>
<td>BOC</td>
</tr>
<tr>
<td>050</td>
<td>PowerGen plc</td>
<td>PowerGen</td>
</tr>
<tr>
<td>051</td>
<td>National Right to Fuel Campaign</td>
<td>NRFC</td>
</tr>
<tr>
<td>052</td>
<td>Accord Energy Limited</td>
<td>Accord</td>
</tr>
<tr>
<td>053</td>
<td>YEG plc</td>
<td>YEG</td>
</tr>
<tr>
<td>054</td>
<td>Scottish Power Group</td>
<td>Scottish Power</td>
</tr>
<tr>
<td>055</td>
<td>ECC Southern, ECCCG</td>
<td>ECCCG</td>
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<tr>
<td>056</td>
<td>First Hydro</td>
<td>-</td>
</tr>
<tr>
<td>057</td>
<td>British Gas Trading Ltd</td>
<td>British Gas Trading</td>
</tr>
<tr>
<td>058</td>
<td>National Grid Company plc</td>
<td>Did not respond</td>
</tr>
<tr>
<td>059</td>
<td>Nuclear Electric Ltd</td>
<td>Nuclear Electric</td>
</tr>
<tr>
<td>060</td>
<td>Eastern Power and Energy Trading</td>
<td>EPET</td>
</tr>
<tr>
<td>061</td>
<td>SEEBOARD plc</td>
<td>Seeboard</td>
</tr>
<tr>
<td>062</td>
<td>Arjo Wiggins Fine Papers Ltd</td>
<td>Arjo Wiggins</td>
</tr>
<tr>
<td>063</td>
<td>Energy Intensive Users Group</td>
<td>EIUG</td>
</tr>
<tr>
<td>064</td>
<td>East Midlands Electricity</td>
<td>-</td>
</tr>
<tr>
<td>065</td>
<td>The Chartered Institute of Purchasing &amp; Supply</td>
<td>CIPS</td>
</tr>
<tr>
<td>066</td>
<td>ICI Chemicals &amp; Polymers Ltd</td>
<td>ICI</td>
</tr>
<tr>
<td>067</td>
<td>Enron Gas and Petrochemicals Trading Ltd</td>
<td>Enron</td>
</tr>
<tr>
<td>068</td>
<td>BNFL, Magnox Electric plc</td>
<td>BNFL</td>
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<tr>
<td>069</td>
<td>London Electricity</td>
<td>-</td>
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<tr>
<td>070</td>
<td>Teesside Power Ltd</td>
<td>Teesside</td>
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<tr>
<td>071</td>
<td>ECC Yorkshire Region</td>
<td>ECC (Yorkshire)</td>
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<td>Southern Electric plc</td>
<td>Southern Electric</td>
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<td>073</td>
<td>British Steel plc</td>
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<td>Energy Intensive Users Group</td>
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<td>075</td>
<td>National Power plc</td>
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<td>076</td>
<td>IVO Energy Limited</td>
<td>IVO</td>
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<td>077</td>
<td>Association of Electricity Producers</td>
<td>AEP</td>
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<tr>
<td>078</td>
<td>Major Energy Users' Council</td>
<td>MEUC</td>
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<td>079</td>
<td>Chemical Industries Association</td>
<td>CIA</td>
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<tr>
<td>080</td>
<td>Co-Steel Sheerness plc</td>
<td>Co-Steel Sheerness</td>
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<tr>
<td>081</td>
<td>British Steel plc</td>
<td>British Steel</td>
</tr>
<tr>
<td>Original Objectives from 2nd Consultation Document</td>
<td>Revised Objectives for Electricity Trading Arrangements</td>
<td></td>
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<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------</td>
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<tr>
<td>• The trading arrangements should centralise risk management on behalf of market participants, if and only if market failures prevent them from managing the risks efficiently themselves, through unilateral or bilateral actions.</td>
<td>[This objective has been removed in light of the amendments made under system security and the scope of markets.]</td>
<td></td>
</tr>
<tr>
<td>• The trading arrangements should minimise all related transactions costs, including those incurred by customers.</td>
<td>• The trading arrangements should minimise all related transactions costs, including those incurred by customers.</td>
<td></td>
</tr>
<tr>
<td>• The trading arrangements should reflect policy constraints, where appropriate.</td>
<td>• The trading arrangements should be consistent with competition law and with other laws, but they should not be used as a vehicle for implementing policies extraneous to their scope, as defined in the other objectives above.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3. THE CONCEPT OF ECONOMIC EFFICIENCY

3.1. Measurement of Efficiency

The concepts of economic efficiency and total welfare are explained and illustrated graphically in this appendix. The graph below shows the number of units produced by an industry along the horizontal axis, and the cost and value of each unit on the vertical axis.

Figure 1:
Total Welfare as a Measure of Efficiency

![Graph illustrating total welfare as a measure of efficiency]

The line $VV$ shows the value to customers of each unit of production. The more units are produced, the less each successive unit is worth to consumers. This concept is relatively simple to relate to personal experience. Imagine the value to you (and your household) of one consumer good, say a television. For most people, it is a relatively high priority when setting up home. Imagine then the value to you of a second television: desirable but not essential. Imagine then the value of a third television within your household: a few consumers would be prepared to buy one to avoid family squabbles, but most would regard it as an unnecessary expense. Similarly, the value to any consumer of a fourth television would be much lower, and the value of a fifth lower still.

Alternatively, one might imagine an industry in which each customer wants a fixed number of units of the product. (This might reflect conditions in the electricity sector more accurately.) Some customers will place a very high value on the units they receive (and no value on additional units). Other customers will place a lower value on any units they
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receive. In this kind of market, one would be able to rank customers in order of the value they place on the product.

Either way, the general principle of declining value is shown by the downward sloping gradient of line VV.

The cost of producing each unit is represented by line CC. This line indicates that the unit cost of production increases as the industry tries to produce more. For some people, this flies in the face of conventional understanding, as they are used to costs declining as output increases. However, this graph just shows the additional ("marginal") cost incurred to produce each additional unit (ignoring overheads and other fixed costs). Profit-maximising producers seek out the lowest cost means of production first, so it follows that any attempt to increase production must cause them to turn to ever more expensive means of production. This is certainly true in the despatch of generators, where the system relies on generators with low fuel costs at times of low demand, and turns to generators with high fuel costs only when demand (and hence production) increases.

If line VV represents the value that consumers place on units they buy, and CC represents the cost of producing each of those units, the shaded gap between VV and CC represents "total welfare" achieved by production level Q. This area measures the level of efficiency achieved by the system.

Of course, costs and values vary from one period to another, especially in the electric sector. The value a consumer places on electricity during peak times, like a winter evening, may be quite different from the value the same consumer would place on electricity during off-peak times like the middle of a summer night. The lines VV and CC would therefore change position from one hour to the next. Furthermore, long-term investment decisions affect many different periods. Such decisions must be appraised by referring to value and cost conditions in each period. These considerations can complicate matters, but several techniques (principally cost/benefit analysis and discounted cash flow analysis) have emerged as ways to capture all of the necessary information. Applying the concept of efficiency is therefore a relatively normal technique in business.

3.2. Appraisal of Improvements

Figure 1 also illustrates what is meant by an increase in economic efficiency. The area marked "W" represents the maximum increase in total welfare that can be achieved by increasing production to M units. Up to this point, but not beyond, the value of the additional units exceeds the additional cost.

Total value to customers can also be increased by increasing the quality of output (as long as quality is measured in dimensions that are valued by consumers); increasing quality raises the value of production to consumers and lifts the line VV, thereby expanding the shaded area.
Total welfare also increases when the costs of production fall, leading to a downward movement in line CC, which also expands the shaded area. Producers can lower their costs of production by ensuring that they run their existing businesses better, by finding lower prices for their inputs, or by increasing productivity.

The "efficient level of output" is often defined as the one which exploits all possibilities to produce a unit of output whose cost is less than its value to consumers. In Figure 1, this level of output would be represented by the point at which lines VV and CC cross. However, few markets in any sector of the economy achieve such a perfect degree of efficiency, especially when business decisions are complicated by the need to recover fixed costs, by the long-term nature of investment (so that several periods have to be considered simultaneously), and by the presence of market power (even if only in the short-term). In practice, it is always necessary to appraise proposals for reform by comparing their relative efficiency, i.e., whether they will increase or decrease "total welfare" compared with the current situation. The same standard will apply to the evaluation of trading arrangements for the electricity industry.

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56 Strictly speaking, this condition applies to the "marginal" cost of producing an additional unit, compared with the "marginal" value of an additional unit to consumers.