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Ofgem's Final Impact Assessment of Mod 116 A Review for the Gas Forum

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Executive Summary

Ofgem has now issued a “Final Impact Assessment” (FIA) on proposed modifications 116V, 116A, 116BV, 116CV and 116VD to the Unified Network Code. These proposed modifications would all reform the arrangements for NTS exit capacity (except Mod 116A, which indefinitely prolongs the current arrangements). In the FIA, Ofgem states that it will not deal with some comments contained in the Gas Forum report (prepared by NERA Economic Consulting in December 2006) until the final decision. However, Ofgem has responded to some parts of that report where it sees fit.

The FIA does not revise the estimate of benefits associated with the modifications to any great extent. Ofgem’s list of potential benefits remains as subjective – and therefore as difficult to appraise – as before. However, Ofgem has not made any adjustment for the criticisms set out in the Gas Forum report, which indicated that even subjective estimates based on figures from 2004 should be adjusted downwards for changes since then. Ofgem actually recognises one of the arguments made in the Gas Forum report – that non-discrimination will be possible both before and after the introduction of the new offtake arrangements – but perversely uses this argument to reject criticisms of its approach, rather than to reduce its estimate of the benefits.

Ofgem has now received submissions from a variety of sources indicating that the costs of the proposed modifications are higher than estimated in the IA of June 2006. Ofgem concludes that the proposed modifications have positive net benefits, but this result is dependent upon (1) the inclusion of certain benefits which remain highly dubious or uncertain and (2) the exclusion of many costs explicitly stated by respondents.

When carrying out a cost-benefit analysis, or appraising the impact of a proposal on efficiency (which is the same thing), there are no economic grounds for excluding costs or benefits by reference to who is bearing them. I do not understand the legal grounds upon which Ofgem has decided to exclude the costs of gas transporters and the costs of those using the Irish interconnector.

The FIA concludes that all the proposed modifications offer a net benefit apart from Mod 116A, to which Ofgem (like NERA) assigns a zero net benefit. However, Ofgem’s finding would be reversed in favour of Mod 116A by even a small reduction in benefits and/or by the inclusion of costs Ofgem has omitted from the analysis.

Given the impact of these uncertainties, a more detailed investigation of benefits and costs would be needed to provide a reliable indication as to whether or not the proposed modifications meet the relevant appraisal criteria. Without this more detailed investigation, the FIA does not provide a robust basis for concluding that any of the proposed modifications is preferable to Mod 116A.

1. Introduction

On 7 February 2007, Ofgem published its “Final Impact Assessment” (FIA) on the proposed modifications to the offtake arrangements for the national transmission system (NTS) of National Grid Gas (NGG).¹ This document followed Ofgem’s publication in June 2006 of a draft Impact Assessment (the IA) as part of the Transmission Price Control Review.² The FIA acknowledges and comments on a “Gas Forum report” of December 2006 (which the Gas Forum actually commissioned from NERA Economic Consulting).³ In this report, I comment on the FIA, in the light of the NERA report submitted by the Gas Forum in December 2006.

In the FIA, Ofgem says that the FIA is not intended to comment in detail on the conclusions the Gas Forum report (paragraph 1.9) except in so far as it considers the cost benefit analysis (paragraph 1.10). As a result, the FIA does not contain any discussion of a major point in the Gas Forum report, namely that the “entry-exit” system of defining transmission capacity does not closely represent reality and that signals relating to demand for entry or exit capacity tell NGG little about the need for investment in gas pipelines. This separation of access terms from reality means that attempts to reform signals relating to entry and exit capacity will not improve the efficiency of investment in real pipelines. However, the FIA ignores this comment and continues to base the estimated benefits of the modifications on forecasts of supposed efficiency gains in future investment. Although the FIA does not discuss this part of the Gas Forum report, I have had to take these conclusions into account when commenting on the FIA.

The structure of this report is as follows.

Section 2 comments on chapter 2 of the FIA (“Background”).

Section 3 discusses the Quantitative Analysis of Benefits, i.e. the first part of chapter 3 of the FIA.

Section 4 then considers the Quantitative Analysis of Costs, i.e. the rest of chapter 3 of the FIA.

Section 5 comments on the FIA chapter 4 on the Qualitative Analysis of Costs and Benefits.

Section 6 contains a summary of the conclusions reached in the main body of this report.

¹ Ofgem (2007), *National Grid Gas – Offtake Arrangements: Final Impact Assessment on modification proposals*, Ref: 23/07, 7 February 2007.

² Ofgem (2006), *TPCR 2007-2012 Initial Proposals, Draft Enduring Offtake Impact Assessment*, Ref: 104d/06, June 2006.

³ NERA (2006), *Reform of the NTS Gas Offtake Arrangements: Report for the Gas Forum*, London, 7 December 2006

2. Background

Chapter 2 of the FIA is largely taken up with a description of the current (“transitional”) offtake arrangements and the proposed modifications to them (116V, 116A, 116BV, 116CV and 116VD). I have no issue with these descriptions, but a couple of sections of chapter 2 merit comment.

2.1. Conditions of the GDN Sale

In paragraph 2.4, Ofgem mentions that the (Gas and Electricity Markets) Authority gave NGG consent to sell some GDNs (Gas Distribution Networks) in January 2005 on condition that NGG introduce the proposed NTS offtake arrangements from September 2005. That deadline has already passed, but in any case it is not clear to me how NGG could have made an undertaking to fulfil this condition. The procedure for implementing modifications to the Unified Network Code is not a matter of negotiation between NGG and Ofgem alone, but involves a consultative process managed by the industry. NGG could not therefore guarantee to implement any particular modifications, only to submit them as proposals to the review procedure. The modification that emerged from this review procedure might include the one submitted by NGG, but it might have been amended, or replaced by a variant. Furthermore, any NGG proposal would need to be approved by the Authority, and Ofgem’s statement seems to assume that approval would be given, before the decision was presented to the Authority.

Ofgem seems to have taken these conditions into account in assessing the impact of Mod 116 – in particular by proposing to omit the costs of the GDNs. However, I do not know on what legal authority these conditions were imposed on NGG, or how they affect the appraisal process. The Gas Forum report therefore made no adjustment to cost estimates in relation to these conditions and I have not made any allowance for the conditions in this report.

2.2. Relevant Objectives

Moreover, in paragraph 2.31, Ofgem states that “The test applied by the Authority in assessing a UNC modification proposal is whether the proposal will better facilitate, consistent with the licensee’s duties under section 9 of the Gas Act, the achievement of the relevant objectives of the UNC.” Ofgem then lists these relevant objectives from NGG’s gas transporter licence as follows [sub-paragraph numbers added by NERA]:

- (a) The efficient and economic operation of the pipeline system to which the NGG NTS licence relates;
- (b) So far as is consistent with sub-paragraph (a), the coordinated, efficient and economic operation of (i) the combined pipe-line system, and/or (ii) the pipe-line system of one [or] more other relevant gas transporters;
- (c) So far as is consistent with sub-paragraphs (a) and (b), the efficient discharge of the licensee’s obligations under the licence;
- (d) So far as is consistent with sub-paragraphs (a) to (c), the securing of effective competition:
 - between relevant shippers

- between relevant suppliers; and/or
- between DN operators (who have entered into transportation arrangements with other relevant transporters) and relevant shippers.

In paragraph 2.32, Ofgem also states that the assessment refers directly to section 9 of the Gas Act and NGG's obligations thereunder to develop and maintain an efficient and economical pipe-line system for the conveyance of gas and to avoid undue preferences or undue discrimination in connections of the terms for conveyance of gas.

In paragraph 2.33, Ofgem states that "Following an assessment of a proposal against the relevant objectives", the Authority must also consider its "wider statutory duties, including those arising under European law". In paragraph 2.34, Ofgem states the "the final state of the assessment process is to determine which of the options available to the Authority is best calculated to further the Authority's principal objective of protecting the interests of consumers, both present and future, wherever appropriate through the promotion of competition".

2.3. Implications for Impact Assessment

I am not able to offer any legal opinion, but an economic interpretation of the assessment criteria set out by Ofgem seems to me to conflict with some of the approaches adopted by Ofgem later in the FIA.

For instance, the criteria in paragraph 2.31 refer repeatedly to the need to increase efficiency ("efficient and economic operation of the pipeline system", "coordinated, efficient and economic operation", "efficient discharge of the licensee's obligations under the licence") and say nothing about preconditions relating to the sale of the GDNs. Any consideration of efficiency would need to take account of all the costs (and benefits) caused by a proposed modification. It is therefore not obvious to me how these criteria allow the conditions of the GDN sale to be relevant to appraisal of the proposed modifications. More importantly, the criteria in paragraph 2.31 seem to me to provide no grounds for Ofgem to give less weight to:

- § The costs that will be incurred by the GDNs (as proposed in paragraph 3.77) or
- § The costs incurred by respondents operating in areas outside the Authority's jurisdiction (as proposed in paragraph 3.86).

In assessing the implications of the proposed modifications for *efficiency*, all of these costs are relevant. Some cost-benefit analyses are limited in scope, and only consider costs and benefits within a certain area, such as Britain.⁴ However, the obligation stated in item (b) above does not seem to authorise any such distinction. The obligation to further the coordinated, efficient and economic operation of "(i) *the combined pipe-line system, and/or*

⁴ Even in these cases, defining the limits on costs and benefits to be taken into account can involve arbitrary distinctions. For instance, an appraisal of costs and benefits arising inside Britain would omit costs falling on British citizens outside Britain, and would include costs falling on non-British citizens inside Britain. The grounds for adopting such a distinction are not clear. However, limiting the scope to British citizens would also be extremely difficult, since it is rare for costs and benefits to be distinguished by the citizenship of the person who is ultimately affected, especially in the case of corporate persons (shippers, gas transporters, transmission connected customers) who may have many owners.

(ii) the pipe-line system of one [or] more other relevant gas transporters” does not seem to be limited to any particular jurisdiction, or to require the exclusion of respondents operating on pipelines outside Britain, for instance in Ireland.

I note the reference to consumers’ interests in paragraph 2.34, which may be limited to Britain, but Ofgem implies that this criterion only applies in a “final stage”, after appraisal of the modifications by the criteria listed in section 9 of the Gas Act. I presume that means that any proposed modifications entering this final stage should already have been appraised by the relevant objectives and those that do not meet the required standard would have been rejected. The need to protect consumers’ interests would then act only as a secondary filter. Indeed, it seems to me that, if (British) consumers’ interests took precedence over the relevant objectives, the latter would be redundant.

2.4. Conclusion

I cannot say how the Authority should or will balance these multiple obligations. However, in economic terms, there is no reason for a consideration of efficiency, or of economic operation of pipelines, to omit (1) the costs of the GDNs or (2) the costs of parties in other jurisdictions or (3) costs that will be borne by parties other than consumers. As a result, my comments below consider all these costs as valid components of a cost-benefit analysis or impact assessment.

3. Quantitative Analysis of Benefits

Chapter 3 of the FIA sets out Ofgem's quantitative assessment of costs and benefits of the proposed modifications. I consider first the discussion of benefits.

3.1. Quantitative and Qualitative Benefits

Paragraph 3.5 says that Ofgem wishes to take account of the less measurable or "qualitative" impacts of the proposed arrangements, as well as the quantifiable effects. In practice, most of the qualitative impacts listed in Chapter 4 of the FIA merely restate impacts that Ofgem has already quantified in Chapter 3. In general, however, it is not possible to take account of "qualitative" impacts without giving them some quantitative value, at least *implicitly*.

For instance, suppose that net benefit of proposal X is £10 million less than the net benefit of proposal Y, but that the Authority chooses proposal X on the basis of "unquantifiable" benefits. This choice either represents a subjective and arbitrary decision, unsupported by any evidence, or else it means that the Authority believes that proposal X has "qualitative" benefits worth *at least* £10 million more than the qualitative benefits of proposal Y. This implicit valuation can in principle be reviewed and may be capable of assessment against known facts, to see if it is plausible. (For instance, if both proposals offer the same qualitative benefits, it cannot be true.)

Thus, in practice, identifying a benefit as "unquantifiable" need not mean that an assessment is unsupported by quantified evidence.

3.2. Ranking of Proposals

The ranking of the proposals by net benefit emerges from Ofgem's calculation of costs and benefits, but merits some comments.

Proposed modification 116A (henceforth, Mod 116A) is significant, since it effectively represents the option of "no change". Ofgem has followed the approach adopted in the Gas Forum report of assigning zero net benefit to Mod 116A. Its position relative to the other proposed modifications depends upon their net benefits. Whereas the Gas Forum report assigned negative net benefits to all the other proposals (putting Mod 116A in first place), Ofgem has awarded positive net benefits to all the other proposals (putting Mod 116A in last place). The relative ranking of Mod 116A is therefore only as robust as the calculation of net benefits for the other proposed modifications.

3.3. "Efficient NTS Investment Signals"

Ofgem's IA of June 2006 calculated the supposed gains from more efficient investment in the NTS as a particular percentage (6.5%) of forecast capex for exit capacity. The FIA applies the same percentage. The Gas Forum report criticised the use of this figure, since it derives from some arbitrary working assumptions made in 2004 which (a) have never been justified and (b) have in any case been outdated by changes in circumstances since 2004. The report suggests an appropriate percentage would now be lower than in 2004 – and that in any case the supposed efficiency gains are dubious.

3.3.1. Source of the gains

The Gas Forum report questioned whether the proposals would provide any better signals for investment than at present, because entry-exit capacity is a poor representation of the underlying investments. Ofgem does not comment on this argument in the FIA and so does not explain the source of the estimated benefits.

The Gas Forum report also pointed out that the “transitional arrangements” have already introduced similar provisions for the GDNs, so that any estimate of the potential benefits ought to be lower than before their introduction. Ofgem acknowledges this argument in paragraph 3.13, but does not adjust the figures to allow for this change since 2004. Instead, Ofgem merely asserts in paragraph 3.20 that the figure of 6.5% is “appropriate”.

In paragraph 3.20 of the FIA, Ofgem also states that “We concur with the Gas Forum report that, by its very nature, this figure is subjective and that there is some uncertainty in quantifying the level of these benefits.” In fact, the Gas Forum report does not say that all such estimates are “by their very nature” subjective, which would imply that only subjective estimates were possible. In contrast, the Gas Forum report says, “It may be difficult to quantify precisely the benefits arising from the proposals (although more work could be done to clarify the source of such benefits), but Ofgem’s approach would at least need to be transparent and consistent. Unfortunately, Ofgem’s approach raises a number of doubts on this score and requires urgent attention.”⁵ Thus, the report says that *Ofgem’s* estimates were unduly subjective (lacking in transparency and consistency) but that further work *would* improve their objectivity.

3.3.2. Supposed evidence on capex efficiency

In paragraph 3.16, Ofgem records recent events in the Transmission Price Control Review as support for the potential for “market signals” to create efficiency gains. In fact, the evidence undermines Ofgem’s case.

Ofgem describes a recent decision it took to disallow certain capital expenditure on transmission capacity at the St Fergus entry point, on the grounds that NGG ignored “key market based information” provided by long-term capacity auctions. Ofgem claims that this example shows the benefit of the introducing “user commitment models”. However,

- Ofgem disallowed the capex on grounds of inefficiency, which (if true) indicates that the market signals did *not* prevent NGG’s capex from being inefficient;
- Ofgem *disallowed* recovery of this capex but did not reverse or avoid the costs of this (apparently) inefficient investment, so the example does not show any reduction in actual costs or any gain in *efficiency*.

Ofgem seems to believe that its ability to disallow costs represents a true efficiency gain, as shown by paragraph 3.17, which discusses how disallowing the costs would have been more difficult without a long term auction regime for entry capacity. However, disallowed costs do not count as a benefit when assessing efficiency, since the decision to disallow the costs does

⁵ NERA (2006), section A.3, page 62.

not remove or avoid the costs, but merely prevents the company from explicitly recovering them from someone else.

The evidence from this case does not therefore provide any support for the potential efficiency gains claimed by Ofgem, but rather indicates that inefficiency persists even after the introduction of long-term capacity auctions.

Similarly, in paragraph 3.23, Ofgem reports analysis by TPA Solutions, conducted as part of the transmission price control review, that concluded NGG had overestimated the cost of 9 exit related projects. If this analysis was at all robust (as it must be to qualify for use in the FIA), it must also provide a basis for amending NGG's capex forecast. This reduction in capex forecasts would count as an efficiency gain, if translated into a genuine (and beneficial) reduction in actual capex. However, if Ofgem can already amend NGG's capex forecasts (and hence constrain NGG's capex) through today's price control review procedures, there is little to gain from a system of capacity auctions. Such a system would only replace the current constraints on NGG's capex.

Ofgem may believe that disallowing costs provides some quantifiable benefit, because (1) it stops NGG from explicitly recovering the costs from consumers and (2) *only costs borne by consumers matter*. There seem to be no grounds for adopting the second of these beliefs, given the relevant objectives and Gas Act criteria listed above. However, Ofgem has used this belief to exclude costs borne by GDNs. In relation to the costs at St Fergus, however, Ofgem cannot even argue that disallowing them will necessarily reduce costs to consumers. NGG may continue to take investment decisions without reference to market signals (primarily because the market signals derived from entry-exit capacity provide little information about real investment needs). However, henceforth NGG will have to allow for the possibility that Ofgem will disallow the explicit recovery of such costs. The result will be either that NGG requires a higher cost of capital (or additional revenue from another source) to compensate for this risk, or else that NGG does not carry out the efficient investments that Ofgem might disallow. In either case, future consumers will end up implicitly bearing higher costs in another form.

Hence, even Ofgem's (apparently unjustified) approach of focusing on costs to consumers is insufficient justification for treating as a benefit those costs incurred by NGG, but disallowed by Ofgem.

3.3.3. Conclusion

Ofgem has still not provided an objective basis for estimating the potential efficiency gains. Instead, Ofgem continues to use an entirely arbitrary working assumption adopted some years ago, even though conditions have changed since then in ways which would have led to a lower figure. According to Ofgem, the Gas Forum report says that such estimates are inevitably ("by their very nature") subjective, but the report said no such thing, only that Ofgem's approach was subjective and needed further work. Ofgem has tried to provide evidence in support of the supposed gains, but this evidence merely confirms the opposite – that a similar scheme applied to entry capacity did not promote efficiency.

3.4. “Non-Discriminatory Allocation of Capacity Products”

At paragraph 3.29, the FIA records arguments put forward in the Gas Forum report. Ofgem discusses some of these arguments in the paragraphs that follow. However, Ofgem omits one important argument raised in the Gas Forum report and misrepresents another.

3.4.1. Argument omitted: continued potential for discrimination

Paragraph 3.29 of the FIA summarises the points made in section A.4 of the Gas Forum report, which accuse Ofgem of using entirely subjective and unsupported assumptions. However, this section of the Gas Forum report also makes the following comment about Ofgem’s estimates of potential benefits (emphasis added):

“More seriously, they rest upon the assumption that the new arrangements will reduce or eliminate the potential for National Grid to discriminate between different users. However, National Grid will still possess the ability to discriminate by other means, namely in its decisions over when to buy back firm exit capacity and how much to pay for it.”⁶

Ofgem’s summary of the arguments simply omits this point, which is the most important argument in this section of the Gas Forum report (“More seriously...”). The FIA contains no discussion of the potential for continued discrimination in NGG’s allocation or pricing of buy-back.

Paragraph 3.32 accepts the point made by the Gas Forum report that pricing of “capacity products” could also permit discrimination – but concludes perversely that it is not relevant for the purpose of this IA “because the possibility also exists at the moment under the present offtake arrangements”. This conclusion is perverse because it is precisely the basis of the criticism in the Gas Forum report. If discrimination is possible both before and after introduction of the proposed modification, the modification will not change the situation and Ofgem should not attribute any benefit to a reduction in discrimination.

Although these comments relate to NGG’s arrangements for buying back capacity, paragraph 3.32 also highlights the tenuous basis for Ofgem’s faith in the non-discriminatory pricing of NGG’s “capacity products”. Ofgem refers to a forthcoming consultation on the pricing arrangements for capacity “which will, no doubt, consider the issue of transparency of the manner in which pricing for capacity is derived”. It is only on this basis – a belief that a forthcoming consultation will “no doubt consider” the issue of transparency – that Ofgem reaches its conclusions about non-discrimination. However, the inability to discriminate depends not on whether a consultation considers the issue of transparency, but on whether the resulting pricing methodology is in fact transparent. Ofgem’s FIA does nothing to allay the concerns on this score raised in the Gas Forum report.

⁶ NERA (2006), page 67, para 2.

3.4.2. Argument misrepresented: benchmarking

Paragraph 3.29 summarises an argument made in the Gas Forum report. The summary says that some the benefits are based on an assumption that comparative regulation between GDNs will bring benefits to consumers – a position that had “no basis in observable fact, accepted theory, or general experience”. In reply, paragraph 3.30 says that there is “a wide body of academic evidence and from other regulated industries – most notably the water industry” to support the view that the ability to compare similar monopoly businesses creates benefits for customers, compared with regulation of a single monopoly. Ofgem refers to statements about this possibility in a report by the Competition Commission.

Ofgem has misrepresented the argument in the Gas Forum report on this topic and has missed the major points set out in section A.4 on page 67:

“Finally, paragraph 1.39 [of the June IA] piles one unreliable assumption upon another. Ofgem assumes, without any justification, that potential discrimination will reduce the potential benefits of the GDN sale by 5%. However, those potential benefits derive entirely from Ofgem’s assessment of the supposed benefits of benchmarking or comparing GDNs, which themselves had no basis in observable fact, accepted theory, or general experience.”

This paragraph in the Gas Forum report criticises the subjective and unsupported nature of Ofgem’s choice of a 5% parameter. Ofgem has not responded to this point in the FIA. Moreover, the statement about the lack of “basis in observable fact, accepted theory or general experience” does not apply to comparative regulation in general, but to attempts to benchmark or compare the four independent gas network companies - NGG (4 GDNs), Scotia Gas Networks (2 GDNs), Northern Networks (1 GDN) and Wales and West Utilities (1 GDN). Many people (including the Competition Commission in the report to which Ofgem refers) have written about using statistical methods to benchmark or compare a *large* number of companies. However, no-one, to my knowledge, has ever explained how Ofgem will be able to use data from a mere four companies to achieve major efficiency gains.⁷

The problem with comparing a *small* number of companies is that the number of exogenous differences between them is too large to allow the regulator to separate the effect of inefficiency from justifiable differences in costs. Even Ofgem’s own assessment of the DN sale was silent as to how a comparison of GDNs would save costs.⁸ Thus, the criticism in the Gas Forum report is targeted at the specific benefits of comparing GDNs as the basis for the 5% figure. Ofgem has not responded to this point in the FIA.

⁷ Ofgem’s writings are often ambiguous as to whether comparisons (1) will encourage companies to make additional cost savings, (2) will allow Ofgem to anticipate future cost savings more accurately and hence to set revenues lower, or (3) will enable Ofgem to disallow more costs. Of these arguments, only (1) would have any relevance to a cost-benefit analysis.

⁸ I gave a seminar on this aspect of the DN sales at the London Business School in January 2005. The audience was universally sceptical about the potential benefits of comparing three or four companies and of Ofgem’s valuation of these benefits.

3.4.3. Conclusion

Ofgem continues to ignore important arguments in the discussion of potential benefits from eliminating discrimination. Ofgem actually acknowledges that the possibility will exist before and after the introduction of a proposed modification, but uses this argument perversely to deflect criticism, rather than to set the benefits to zero, as it should. Ofgem has also failed to respond to criticism of the unsupported assumption of 5% as the scale of the potential savings.

3.5. “Reduced Incidence of ARCAs”

Ofgem’s comments on this point are no more than assertions of faith about the future system (despite the key elements being undefined at present). Moreover, Ofgem has not considered some of the arguments made in the Gas Forum report.

In paragraph 3.43, for instance, Ofgem says that NGG’s NTS pricing methodology and NExAs will have the same propensity to provoke disputes after introduction of Mod 116. The Gas Forum report, however, suggested that disputes now arising under ARCAs would continue to arise, but would find a different route of expression, such as the NTS pricing methodology or NExAs, leading to more disputes over these items. Ofgem has not considered this possibility.

Paragraph 3.44 says that “the proposed enduring arrangements and the incentives agreed through the TPCR process should increase transparency relative to the current arrangements”. However, Ofgem does not and cannot say that the new arrangements *will* increase transparency (only that they “should”) because these arrangements are not yet known in detail. The statement is no more than a declaration of faith in the future impact of the modifications.

In the same paragraph, Ofgem also claims that the new arrangements will help to reveal “the true level of capacity on the network and substitutability between nodes and zones”. So far, NGG’s published papers on the level and allocation of flexibility capacity have not been transparent, but have merely summarised the results of a “black box” method of calculation that remains unexplained. No entry-exit system can reveal the “true” level of capacity, because it does not reflect the underlying reality. Therefore, it is unlikely that NGG will ever be able to publish a transparent methodology that does not rely on a number of subjective assumptions.

3.6. Implications for Calculation of Benefits

The calculation of benefits in Ofgem’s FIA is open to the same criticisms as the calculations in the IA of June 2006, because Ofgem has not taken account of important arguments raised in the Gas Forum report. In particular, the arguments on non-discrimination seem particularly subjective, since (1) NGG will continue to have scope for discrimination after the introduction of the proposed modification and (2) the most important plank of Ofgem’s case for non-discrimination is the introduction of a flexibility capacity product, for which the methods of allocation and pricing remain utterly opaque and open to discrimination by NGG. Ofgem has acknowledged point (1), but used it perversely (and incorrectly) to reject criticisms of its assessment.

The Gas Forum report showed how even minor revisions to the estimate of benefits would turn a net benefit into a net cost, and that further work was therefore required to substantiate the benefits. Ofgem has chosen to assert that the benefits are, by their very nature, subjective, rather than to investigate the benefits in greater detail. However, Ofgem accepts a higher estimate of costs in the FIA than previously (see below), so an even smaller reduction in benefits is needed to achieve the same effect. Given the greater uncertainty over whether the net benefit is positive or negative, the need to investigate the benefits in detail is also greater than before.

4. Quantitative Analysis of Costs

Chapter 3 of the FIA also contains Ofgem's assessment of costs associated with the proposed modifications. This assessment has been updated since the IA in June 2006 using submissions received in response to a consultation, and the figures which NERA collected around the same time for inclusion in the Gas Forum report. Ofgem's estimates tend to be towards or below the lower bound of the range in the Gas Forum report, but the differences may be due to detailed scrutiny of the submissions (and rejection of costs that do not belong in a cost-benefit analysis), or to different information about the number of affected parties. There is not enough information in the FIA to permit a full reconciliation of the two sets of estimates.

4.1. Shipper Costs

The costs to shippers reported in table 3.8 of the FIA are broadly in line with the estimates prepared for the Gas Forum report, subject to the following comments:

- § Ofgem's estimates are lower than shown in the Gas Forum report. Some of the difference is due to Ofgem assuming that there are 14 shippers, whereas the estimate in the Gas Forum report assumes that there are 16. Other differences are unexplained.
- § Ofgem shows a significantly lower cost to shippers of implementing Mod 116CV – only £8.5 million, compared with £14.2-19.2 million in the Gas Forum report.
- § Ofgem shows Mod 116BV as cheaper to implement than Mod 116, whereas the Gas Forum report showed the opposite result.

In paragraph 3.63, Ofgem sets out a number of arguments that these figures overstate the costs. However, these arguments remain only conjecture without any objective basis and in some cases are irrelevant to cost-benefit analysis (i.e. to efficiency and economy). I review these arguments further below.

4.1.1. Selective use of shipper costs

The first bullet in paragraph 3.63 suggests that some shippers might not be able to pass through all their costs to consumers. Ofgem argues that it would be better to use only a subset (cluster) of lower cost shippers because, in a competitive market, "less efficient shippers will absorb additional costs rather than pass on the full costs to customers". Even if this observation were true, it is not relevant to a cost-benefit analysis, which does not differentiate costs according to who bears them.

Moreover, even if this observation were relevant, it is not clear that Ofgem has correctly characterised the way costs are passed on to consumers in a competitive market.

In a purely competitive market, "price equals marginal cost", which means that the market price for a product or service is defined by the cost of the highest cost unit of production required to serve demand. The highest cost unit of production may be efficiently or inefficiently produced, but efficiency per se has no impact on the pricing rule. Applied to the data in figure 3.1 of the FIA, this theory implies that the cost imposed on consumers would

equal the cost of highest cost shipper left in the market and there are no grounds for concluding that the costs borne by consumers will fall below this level.

In fact, Ofgem's estimate is the average cost for the whole range of shippers. Thus, if this average represents the amount shippers will pass on to consumers, Ofgem's rule already assumes that some shippers (those with a higher than average cost) will not recover all their costs from consumers. Ofgem's belief that some shippers will not recover all their costs provides no justification for applying an even lower average of an arbitrarily chosen subset of shippers.

The Gas Forum report also adopts the average of shipper costs, though not for the reasons given by Ofgem. A proper consideration of costs and benefits (as required by the efficiency criteria in the relevant objectives) would not include or exclude costs depending on who was bearing them (e.g. it would not only include costs that consumers bear). Second, the Gas Forum report assumes no prior knowledge about the degree to which inefficiency is built into the cost estimates or any reason why costs should be discounted just because they are incurred inefficiently. (If that were true, cost-benefit analysis would identify the same level of costs – the efficient level – in all cases, a patently ridiculous outcome.)

Instead, the Gas Forum report regards the range of shipper costs received from respondents as a set of estimates subject to forecasting errors, and adopts the average as the best estimator of the true value. This approach is logically coherent, requires no view on the theory of pricing in gas markets, and correctly assesses all costs regardless of who bears them in the first instance. The costs calculated by Ofgem, which are based on this average level, are equally defensible and merit no adjustment for subjective beliefs about inefficiency.

4.1.2. Costs of flexibility

The second bullet point says that traders have overestimated the cost of dealing with flexibility capacity, because the need will very rarely arise. This analysis overlooks the problem that shippers could be exposed to an increase in the need for flexibility at any time, and that NGG could invoke the overrun charge for flexibility (when a constraint applies) at any time. Ofgem's observation that the amount of flexibility has been sufficient to meet all needs so far is not supportive to the introduction of Mod 116. Either the situation could change at any time – in which case the shippers are correct to anticipate a need for constant vigilance – or else the surplus of flexibility capacity will persist – in which case the introduction of a rationing mechanism for flexibility capacity will offer little or no future benefit. Ofgem cannot simultaneously (1) say that flexibility capacity will be in excess supply and (2) assign major benefits to the "market-based" allocation of flexibility capacity.

4.1.3. Misunderstanding of costs of delay

The third bullet point discusses a case where connection of a CCGT is delayed for unforeseen reasons, so that under the proposed modifications the developer has to bear additional charges for capacity booked in advance but not used. As Ofgem notes, "given that the pipeline would have been constructed and the costs incurred", the commitment to pay the charges merely reallocates charges between different shippers. However, having had the chance to discuss this case with a representative of EON, I believe that Ofgem has not yet understood the problem – perhaps because no-one has so far explained it correctly to Ofgem.

The problem lies in the assumption that “the pipeline would have been constructed and the costs incurred”. In fact, a delay in (or cancellation of) the connection of a new CCGT could allow NGG to delay (or avoid) the cost of constructing the pipeline. Under the current arrangements, the developer and NGG manage the commitment to connect a new CCGT through an ARCA, which they can agree to vary through bilateral negotiations. At any time before NGG starts to construct the pipeline needed for the connection, the parties can agree to delay or cancel the project, thereby avoiding unnecessary costs. However, under all the proposed modifications except Mod 116A, the CCGT’s developer will be obliged to reserve the capacity well in advance, but will have limited opportunities to reduce the capacity booking if the project is delayed or cancelled. NGG may therefore face a demand for new investment which the connected party would willingly drop, but cannot. The developer can notify NGG informally that the CCGT project will be delayed or postponed, but NGG will face mixed incentives for responding efficiently to this information. Ofgem has already penalised NGG for not following “market signals” in connection with capacity bookings at St Fergus (see above), which suggests NGG should invest in accordance with capacity bookings. On the other hand, such investment would be inefficient, if NGG knew that it would not in fact be needed.

Hence, the new arrangements run the risk of either requiring NGG to override information from capacity bookings, in favour of informal market intelligence, or of triggering unnecessary investment (or of triggering investment unnecessarily early). In the first case, the proposed modifications will not alter investment procedures or produce any gain in the efficiency of investment. In the latter case, the proposals would even lead to inefficient expenditure (or to additional and unnecessary cost of capital on premature investment).

This argument – and the implications for shipper costs or the potential efficiency of investment – appears to be a new one, which has not been put to Ofgem in clear terms and which Ofgem has therefore not addressed.

4.2. TCC Costs

Ofgem attributes costs of £16.8 million to 55 Transmission Connected Customers (TCCs), whereas the Gas Forum assigns a cost of £33.7 million to 69 TCCs. Scaling the latter figure down from 69 to 55 TCCs would reduce it to £26.8 million, still £10 million more than Ofgem’s estimate.

Given the small number of TCC respondents, any estimate of total costs for TCCs in the Gas Forum report is subject to a wide margin of error and Ofgem’s sample appears to be no larger than that used in the Gas Forum report. The lower estimate of costs in table 3.9 may therefore represent a different source of input data, but is subject to the same uncertainty.

In paragraph 3.72, Ofgem implies that TCCs should not incur any major costs, since the task of interfacing with NGG will fall to shippers. This assertion implies a misunderstanding of their respective roles. Although shippers will be the formal counter-party to NGG in sales of capacity products, they will only do so as agents of the final users, the TCCs. Only the TCCs will have the data needed to estimate their needs and only TCCs will be able to control their usage of gas in order to manage their requirements for flat and flexibility capacity. Shippers will therefore need to interact closely with TCCs and TCCs will need to understand the implications of the new system. However, TCCs can replace their shippers at any time, so it

is unlikely that shippers will build dedicated systems and databases relating to a particular TCC – or, if they do, they will make the TCC pay for the systems so that they can be transferred to other shippers in due course. Thus, TCCs will be liable for many of the costs of implementing the proposed modification. There is no duplication in the calculation of ongoing costs (as Ofgem suggests), unless suppliers’ costs include the costs of constructing the necessary systems for individual TCCs.

4.3. Storage Operator Costs

Ofgem’s estimates are lower than those set out in the Gas Forum report, but the reasons are not clear from the FIA. Ofgem’s treatment of an apparent outlier – to exclude it from the calculation of average costs per storage operator, but to add it on explicitly as the cost of just one operator – is unorthodox. The same level of higher costs might have applied to some of the other storage operators, with the same characteristics as this “special case”. Depending upon the identify of this storage operator, comparable cases might be:

- § storage operators with many users
- § storage operators with no exemption from Third Party Access who are required to offer capacity to all-comers;
- § storage operators using a similar technology, or
- § storage operators who specifically intend to operate storage in “peak shaving” mode.

It would therefore have been useful to investigate the reason for the difference in cost estimates, rather than to treat it as a special and entirely idiosyncratic case.

4.4. Costs to Gas Transporters

As stated in paragraph 3.75 of the FIA, the Gas Forum report only summarised a tentative estimate of the costs to be incurred by gas transporters, including GDNs. In the end, Ofgem has arrived at a very similar estimate (about £60 million for Mods 116V, 116BV and 116VD, and somewhat less for Mod 116CV). Inclusion of these costs would wipe out the net benefit of all the proposed modifications, as calculated by Ofgem.

Paragraph 3.82 notes that estimates vary widely between the GDNs and paragraph 3.81 suggests that the gas transporters have overstated the costs of Mod 116CV. However, the suggestion is a supposition and does not appear to be the result of detailed investigations.

Paragraphs 3.76 to 3.80 discuss Ofgem’s position on whether these costs should be taken into account or not. Since inclusion of these costs would wipe out the net benefit that Ofgem attributes to each of the proposed modifications, this debate is important. In June 2006, the IA stated that these costs would not be borne by consumers and so should be ignored; the FIA is more circumspect, acknowledging the possibility that a forthcoming price control review may permit some pass-through. However, as discussed above, there are no grounds for including or excluding costs in a cost-benefit analysis (or an appraisal of efficiency) depending on who bears them, or because they are subject to a particular agreement. A contribution to economic efficiency is measured by the benefits of a scheme less the costs it imposes, relative to some baseline. I do not know on what grounds the Gas and Electricity

Markets Authority would decide that some costs should be omitted from an appraisal based on “efficiency and economy”.

4.5. Conclusion

Ofgem has now assembled information on costs from a variety of sources. The figures are higher than in the IA of June 2006 and are closer to the estimates presented in the Gas Forum report. The difference between Ofgem’s current figures and those in the Gas Forum report may be due to different input data and different methods of aggregation (“scaling up to industry level”), but the FIA does not provide enough information for a detailed reconciliation.

Ofgem’s main comments indicate a suspicion that costs have been overestimated, but Ofgem has not provided any evidence to support any correction to the information it received. Ofgem’s discussion of delays in CCGT developments indicates a need to revisit the issue, as it does not appear to have been explained clearly to date.

The most important factor seems to be Ofgem’s proposal to omit the costs that gas transporters will bear (regardless of whether they are allowed to recover them from consumers). Including these costs would tip the balance for all the proposed modifications from a net benefit into a net cost. Any appraisal of efficiency and economy – i.e. a cost-benefit analysis – would take such costs into account. There are no economic grounds for omitting such costs and I do not understand the basis for Ofgem’s proposal that they should be omitted.

5. Qualitative Analysis of Costs and Benefits

Although Ofgem purports to analyse additional, non-measurable benefits and costs in Chapter 4 of the FIA, Ofgem identifies many benefits that have been quantified in Chapter 3 (such as investment efficiency) and several factors on which the proposed modifications have little or no impact (such as social policy). These sections merit only a few comments.

5.1. Efficient Network Development and System Operation

Paragraph 4.3 suggests that new CCGTs may be able to access the network earlier than at present, with consequent benefits for the electricity market. I am not aware of any CCGTs that have been delayed by problems over gaining access to the gas transmission system, so I cannot appraise this argument. Also, as explained in section 4.1.3, early booking of capacity may cause inefficient investment, if CCGT projects are delayed.

Paragraph 4.4 suggests that CCGTs may be disadvantaged in gaining access to flexibility, if the process of allocation is not non-discriminatory. However, until Mod 116 is introduced, CCGTs do not need to gain access to flexibility, but rather have access automatically and at no cost, so this effect of Mod 116 cannot be treated as a benefit of the proposed modification.

Paragraph 4.5 raises the topic of how the proposed modifications affect the cost of balancing the gas system. If this is a major effect of the proposed modifications, it ought to be quantified. NGG has not indicated that the current estimate of benefits omits such savings.

Paragraph 4.6 discusses the potential benefit of longer advance notice for termination of usage. In fact, if decisions on termination are taken at short notice, many users will not notify NGG of a termination any further in advance of plant closure than at present; the only effect of the proposed modification is to make the user pay for unutilised capacity for a little longer. As Ofgem has pointed out at various points in the FIA, the effect of this continued payment of exit charges is only a transfer between customers, not a net benefit. The paragraph also mentions certain obligations on NGG to use spare capacity rather than investing; the effect of these obligations seems to be unrelated to the introduction of Mod 116 or its variants.

Ofgem concludes that these benefits are skewed more towards Mod 116V, 116BV and 116VD, and less towards Mod 116CV. However, until these benefits are quantified, they provide no objective basis for revising the ranking of the proposed modifications.

5.2. Promotion of Competition

Ofgem considers the creation of auctions for flat and flexibility capacity to be a contribution towards competition. It is not clear what Ofgem means by an increase in competition and Ofgem does not explain how this would increase rivalry between shippers, or other members of the industry. Merely creating competitive auctions is not the same as promoting competition between shippers and GDNs. Competition is a process that maximises efficiency, so any process that diminishes efficiency ought not to be counted as promoting competition. Introducing an auction cannot be counted as promoting competition in all cases, or else Ofgem could create a number of auctions for entirely fictitious products and then claim that competition had increased. Bidding for products like flat and flexible capacity (which do not bear a close relationship to real capacity when defined for entry and exit points) does not

constitute an increase in competition, unless it has a positive benefit for efficiency as shown by the cost-benefit analysis.

5.3. Appropriate Allocation of Risk

Paragraph 4.12 mentions the reallocation of risk as contributing to a net benefit of the proposed modifications. However, this section does not identify any new or additional benefit, only a possible source of the supposed gain in investment efficiency that is already included in the quantified benefits.

Paragraph 4.13 assumes naively that the proposed modifications will transfer risk from consumers to “NTS users and shippers”. In fact, even if they bear more risk in the first instance, many NTS users and shippers will use contractual and regulatory means to transfer the risk back to consumers – particular shippers, who have no interest in bearing long term risk and who only act as agents of their customers. The proposed modifications may impose some additional risk on GDNs in the first instance, but they will want to pass the associated costs back to consumers connected to their low pressure networks. If Ofgem acts to prevent them from doing so explicitly, shareholders will require a higher return or other sources of revenue to compensate for the under-recovery of costs associated with risk, so consumers will pay in the long-run.

Paragraph 4.14 concerns the risk of disputes over ARCAs. Ofgem implies that the proposed modifications will resolve such disputes by providing transparent market signals over the need for investment. However, Ofgem has not considered here (or anywhere else in the FIA) new connections that require new exit points, for which auctioning existing capacity provides no market signal. A parallel case arose over the new (entry) connection at Milford Haven, which constitutes NGG’s biggest single investment in the NTS at present. Since Milford Haven is a new entry point, no auctions for other entry capacity provided any guidance as to the need for this investment. Similar concerns will arise over new exit points.

5.4. Simplicity and Transparency

Ofgem notes that the proposals have been discussed and, allegedly, simplified and that this simplification “should potentially save costs for users”. However, these cost savings are only measured relative to earlier estimates of the cost of implementing Mod 116 and its variants, not relative to the status quo (Mod 116A). These cost savings are already built into the latest estimates of quantified costs.

5.5. Ensuring Security of Supply

This section merely discusses the supposed improvement in NGG’s planning procedures, which has yet to be demonstrated, and which is already covered by the quantified benefits of more efficient investment. This section therefore contains no additional benefits, only a different way of describing the same benefits.

5.6. Preventing Undue Discrimination

This section mainly discusses the supposed reduction in potential discrimination, which has yet to be demonstrated, and which is already covered by the quantified benefits under that

heading. This section therefore contains no additional benefits, only a different way of describing the same benefits. It does however contain a confused and naïve discussion of tariff policy for interruptible capacity which suggests that the author is entirely ignorant of gas network cost conditions and regulatory tariff policy.

The discussion implies that charges for interruptible service are discriminatory if the charges do not vary with the probability of interruption. However, as explained in chapter 5 of the Gas Forum report, interruptible customers do not impose any costs of capacity on the network as long as they are prepared to be interrupted whenever the capacity is congested. *This observation applies regardless of how often interruptible customers are actually interrupted.* Hence, there is no justification for tariffs based on costs to charge any interruptible customers any cost of building capacity.

Paragraph 4.34 suggests that the “discount” on firm tariffs should somehow be related to the value of the interruptions to the system operator. It is a sign of the perverse thinking of the author that the paragraph discusses tariff policy in terms of “discounts” to other tariffs, and their value to the system operator, rather than in terms of the costs imposed by the user. The author may be envisaging a system of interruptible contracts in which charges are based on users’ willingness-to-pay and the assumption that users are willing to pay more to be interrupted less. However, a tariff policy based on willingness-to-pay is the ultimate in economic discrimination. Given Ofgem’s stance on non-discrimination, it seems unlikely that Ofgem would favour such a policy if the consequences were fully understood.

On the other hand, perhaps Ofgem is prepared to tolerate economic discrimination in interruptible tariffs based on users’ willingness-to-pay and the value of interruptions to the system operator. In that case, it is hard to see how Ofgem can place such a large value on removing the scope for similar kinds of discrimination in the allocation of firm and flexibility capacity.

Paragraphs 4.36 to 4.41 note examples where different users face different conditions for access to the network, but do not consider whether such differences matter, or whether there might be an objective justification for the differences. As an analysis of discrimination, therefore, this section is of no value.

Paragraph 4.42 expresses a hope that the proposed modifications will prevent discrimination between NGG’s retained and independent GDNs. However, this expression of hope overlooks the potential for discrimination that remains the many non-transparent decisions that would still remain within NGG’s control, such as the initial allocation of flexibility capacity between zones and areas, the reserve prices for flexibility capacity within each zone and area, and the prices at which NGG chooses to buy back firm capacity from users.

5.7. Distributional Impacts

This section of the FIA notes some distributional effects, but does not identify any clearly adverse impacts. It is difficult to say objectively whether one distribution of benefits among NTS users is any better than another.

This section of the FIA mentions the possibility that under the current system users might convince NGG to build capacity for firm use, and then switch to interruptible status to avoid

paying the costs. Data from NGG's 10 year statement shows no such trend for users to switch to interruptible status.

Table 5.1 shows the volume of NTS exit capacity provided for different types of load: firm and interruptible loads served via GDNs (i.e. via Local Distribution Zones or LDZs) and firm and interruptible loads served direct from the NTS (i.e. TCCs). The volume of interruptible NTS exit capacity required for LDZ loads has risen slightly since 2002/03, but the interruptible NTS exit capacity required for NTS loads hardly changed since 2003/04. Taking LDZ and NTS loads together, the proportion of NTS exit capacity required for interruptible loads has remained almost constant at 26-27% of total NTS exit capacity for the last five years. These data therefore provide no evidence that users are disproportionately switching to interruptible capacity.

Table 5.1: Firm and Interruptible NTS Exit Capacity

Exit Capacity Type		2002/03	2003/04	2004/05	2005/06	2006/07
Firm						
LDZ Loads	GWh/d	4633	4713	4782	4844	4897
NTS loads	GWh/d	1488	1529	1592	1653	1691
Total	GWh/d	6121	6242	6374	6497	6588
Interruptible						
LDZ Loads	GWh/d	521	548	576	595	619
NTS loads	GWh/d	1073	1141	1142	1147	1148
Total	GWh/d	1594	1689	1718	1742	1767
Interruptible as % of total						
LDZ Loads		11%	12%	12%	12%	13%
NTS loads		72%	75%	72%	69%	68%
Total		26%	27%	27%	27%	27%

Source: NGG 10-Year Statement 2006, Tables A6.4A and A6.4B.

5.8. Other Items

With respect to the impact on small businesses, environmental and social objectives, Ofgem identifies no significant effects. However, the need for a new safety assessment (paragraph 4.52) could impose additional costs of implementation and it is not clear whether the current estimates include these costs. Ofgem also notes that additional costs would increase barriers into entry into the shipping and supply businesses, with detrimental effects for competition, but does not draw any firm conclusions from this observation.

6. Summary of Conclusions

Ofgem has updated its appraisal of the proposed modifications since the IA June 2006. The update has changed many of the figures, but Ofgem has not revised its overall approach in the light of criticisms directed against it in the Gas Forum report.

6.1. Method of Appraisal

I cannot say how the Gas and Electricity Markets Authority should or will balance its many obligations when reaching a decision on the proposed modifications. However, in economic terms, there is no reason for any consideration of efficiency, or of economic operation of pipelines, to omit (1) the costs of the GDNs or (2) the costs of parties in other jurisdictions or (3) costs that will be borne by parties other than consumers.

6.2. Quantification of Benefits

Ofgem has still not provided an objective basis for estimating the potential efficiency gains. Instead, Ofgem continues to use an entirely arbitrary working assumption adopted some years ago, even though conditions have changed since then in ways which would have led to a lower figure. Ofgem has tried to provide evidence in support of the supposed gains, but this evidence merely confirms the opposite.

Ofgem continues to ignore important arguments in the discussion of potential benefits from eliminating discrimination. Ofgem actually acknowledges that the possibility will exist before and after the introduction of a proposed modification, but uses this argument perversely to deflect criticism, rather than to set the benefits to zero, as it should. Ofgem has also failed to respond to criticism of the unsupported assumption of 5% as the scale of the potential savings.

The Gas Forum report showed how even minor revisions to the estimate of benefits would turn a net benefit into a net cost, and that further work was therefore required to substantiate the benefits. Given the greater uncertainty over whether the net benefit is positive or negative, the need to investigate the benefits in detail is also greater than before.

6.3. Quantification of Costs

Ofgem has now assembled information on costs from a variety of sources. The figures are higher than in the IA of June 2006 and are closer to the estimates presented in the Gas Forum report. The difference between Ofgem's current figures and those in the Gas Forum report may be due to different input data and different methods of aggregation ("scaling up to industry level"), but the FIA does not provide enough information for a detailed reconciliation.

The most important factor seems to be Ofgem's proposal to omit the costs that gas transporters will bear (regardless of whether they are allowed to recover them from consumers). Including these costs would tip the balance for all the proposed modifications from a net benefit into a net cost. Any appraisal of efficiency and economy – i.e. a cost-benefit analysis – would take such costs into account. There are no economic grounds for omitting such costs.

Ofgem's discussion of delays in CCGT developments indicates a need to revisit the issue, as it does not appear to have been explained clearly to date.

6.4. Other Impacts

Although Ofgem purports to analyse additional, non-measurable benefits and costs in Chapter 4 of the FIA, Ofgem identifies many benefits that have been quantified in Chapter 3 (such as investment efficiency) and several factors on which the proposed modifications have little or no impact (such as social policy). Ofgem mentions potential cost savings in system operation, but NGG has not indicated that the current estimate of benefits omits such savings.

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