NTS Exit Flexibility

A Report for the Gas Forum

29th August 2008

NTS Exit Flexibility

A Report for the Gas Forum

Executive summary

Overview

The Gas Forum has asked TPA Solutions to prepare a report that examines the Impact Assessment on offtake arrangements published by Ofgem on 21st July 2008, focussing specifically on exit flexibility.

Our analysis suggests that existing contractual arrangements, which differentiate between GDN and TCC offtakes, do not appear unduly discriminatory, particularly not in favour of TCCs.

We believe that the availability of flexibility has been estimated too conservatively by NG (National Grid Gas NTS), and that potential demand for flexibility is likely to be overstated. We note a significant increase in apparent demand for flexibility by GDNs (rather than TCCs) that should be worthy of Ofgem investigation.

However, in anticipation of any emergent genuine scarcity, we support Ofgem's suggestion of the development of non-discriminatory operational tools and procedures by NG, rather than the adoption of a new commercial product for TCCs. On the contrary, if any class of user needs to ration their use of flexibility then it would seem to be the GDNs. We recommend that NG's planned allocation of flexibility to GDNs in aggregate (or any other class of NTS users) should not exceed a fair threshold level based on peak capacity bookings.

We also conclude that even if it were considered necessary to depart from existing contractual arrangements for reasons of perceived "undue discrimination", then the universal application of the proposed flexibility product is not the right solution and more promising alternatives are available.

Ofgem's Impact Assessment

We have reviewed Ofgem's Impact Assessment document and summarise its key messages as follows:

1. The current flexibility arrangements are unduly discriminatory, in favour of TCCs and to the detriment of GDNs.
2. The new flexibility product has qualitative benefits associated with efficiency, transparency and avoidance of undue discrimination, which might outweigh the quantified net costs of implementation. These benefits materialise mostly when there is an imminent or actual scarcity of flexibility.
3. An important potential problem with the exit flexibility product concerns the linkage with entry flows, and it may not therefore be efficient or effective to address flexibility issues only at exit, as this might introduce the potential for discrimination between the treatment of entry and exit points.
4. NG has put forward a reasonable argument that scarcity is imminent and these concerns cannot be ignored – a means of managing flexibility capacity without introducing the flexibility product is needed.
5. An option involving development of entry and exit flow management tools enabling NG to manage flexibility constraints (should they arise) under an incentive scheme is being considered. This could extend to more commercial arrangements involving sale of flexibility services to manage emerging problems.

Are the existing arrangements discriminatory?

At a first reading of the IA we had strong reservations regarding the conclusion that the current flexibility arrangements "are unduly discriminatory between TCCs and GDNs". Our reservations were driven in part by the difficulty in defining exactly what "exit flexibility" constitutes in the context of NTS access, and its inter-relationship with the more traditional and better defined daily capacity product.

We therefore sought to examine the existing arrangements in more detail, focussing on the contractual rights and limitations on offtake flow rates, and the ability to vary rates within-day, as these appear to be fundamental to the concept of "flexibility". We have made an assessment and comparison of these provisions as they apply respectively to shipper users (at TCC and CSEP exit points) and DNO users (at GDN exit points), shown in the table below with advantages (in green) and disadvantages (in red italics):

<table>
<tr><th>Aspect</th><th>DNO users</th><th>Shipper users</th></tr>
<tr><td rowspan="3">Flexibility product</td><td>Must hold flexibility capacity where rate variations are required</td><td rowspan="2">No requirement to hold flexibility capacity</td></tr>
<tr><td>Product usage may be precluded on low demand days</td></tr>
<tr><td>Flexibility product used in conjunction with higher level of pressure commitment</td><td>Lower level of pressure commitment</td></tr>
<tr><td rowspan="2">"Higher rate" flexibility
(The ability to flow at rates above 1/24th of the booked (flat) capacity)</td><td>"Higher rate" flexibility accessed through flexibility capacity booking</td><td>"Higher rate" flexibility can only be accessed by increasing capacity booking (if available)</td></tr>
<tr><td>Can access additional "higher rate" flexibility on the day by requesting additional short term flexibility which NGG is obliged to provide (if feasible and no operational balancing requirement)</td><td>Additional "higher rate" flexibility can not be accessed on the day – no short term booking process</td></tr>
<tr><td rowspan="2">"Rate change" flexibility
(The ability to change flow rates by a certain amount on notice)</td><td>Less access to "rate change" flexibility due to prescribed rate change limitations</td><td>Greater access to "rate change" flexibility through prescribed rate change and notice period provisions</td></tr>
<tr><td colspan="2">Can request changes on shorter notice and NGG is obliged to provide (if feasible and no operational balancing requirement)</td></tr>
</table>

We have concluded that overall, there does not appear to be anything inherently unreasonable or unduly discriminatory about these two types of arrangements. It is not evident that one is significantly advantageous compared to the other, and/ or confers benefits to the class of user concerned to the detriment of the other class. If anything, DNO users might be viewed as benefiting from an ability to flow above the rate defined by their flat capacity booking.

How do the existing arrangements work in practice?

We have looked at the operation of the existing flexibility arrangements by considering the longer term planning process, the shorter term (daily) access mechanism and procedures for flexibility constraint management.

With regard to flexibility planning, we conclude that in the past the process has operated in a practical and non-discriminatory manner. However, there are aspects of the way in which the process is currently being operated that give cause for concern. In particular we are concerned that there may now be excessive pre-commitment to DNO users which could conflict with shipper user access to flexibility, and with NG's contractual obligations to provide such access.

The arrangements for short term flexibility access also appear to have operated satisfactorily – we understand that currently requests for short-term flexibility are nearly always met in full. However, we also note that potentially, the pre-commitments being made to provide flexibility to DNO users could conflict with short term flexibility access by shipper users in future. In particular we are concerned that as a result shipper users might not always be able to access a minimum level of short term flexibility to which they might reasonably be considered to be entitled.

The flexibility constraint management procedures appear to provide a practical means of ensuring continued safe system operation in the event of a constraint. We note that Ofgem has put forward a potential option that would introduce additional flexibility constraint management tools under an incentive scheme, as a means of managing the requirement for flexibility capacity without having to introduce a flexibility product of the type proposed by Mod.116V and such variants. We consider this would be a useful addition to the regime as it would provide NG with a further means of addressing flexibility constraints should they arise.

What is driving the increase in GDN demands for flexibility?

We have looked at the recent increases in GDN demand for NTS flexibility compared to expectations at or shortly after GDN sales and considered the various possible drivers for the increases.

We conclude that the rapidly increasing demands cannot be explained by increases in overall GDN requirements linked to forecast peak day demand. The increases therefore appear to signal a reduced reliance on flexibility provided within the GDNs, and this in turn could imply a surplus of capability to provide flexibility within GDNs, or even a reduction of that capability.

There are a number of possible drivers for this, including GDN capex and opex savings, incentive scheme performance and changes to the GDN interruption regime, but there is no visibility as to the actual cause, and it is therefore difficult to assess the extent to which the increased demands for NTS flexibility are appropriate.

These are regulatory matters which we would expect Ofgem to take a close interest in, irrespective of whether or not a flexibility product might be adopted. There is also an important interplay between the regulatory revenues and obligations of GDN owners on the one hand and NG as NTS owner on the other, that we do not feel has been sufficiently explored.

The increasing demands, in combination with the low NG estimate of available NTS flexibility, are giving rise to a perception of scarcity of NTS flexibility, and therefore need to be understood more fully. It would seem inappropriate, for example, if shipper users were subject to NTS flexibility constraints due to high GDN demands, at a time when there was surplus GDN capability to provide flexibility.

What is driving the perception of scarcity?

We have reviewed the NG assessments of available flexibility and projected usage which have led Ofgem to say that it cannot ignore NG's concerns that flexibility might become scarce in future.

Regarding availability, NG's assessment of 22 mcm appears to be very conservative in that it is based on the simultaneous occurrence of "worst case" events. Using NG figures and more realistic but still conservative assumptions a figure of 25-26 mcm would appear more appropriate. Further, we estimate an additional 1 mcm can be added to account for recent reductions in forecast peak day demand. We also believe that alternative compressor operation strategies could enhance availability and that this should be explored.

Regarding the projection of flexibility usage from historic data, we believe that NG's methodology is unreliable for a number of reasons. We suspect that high historical usage may have been experienced under favourable operating conditions when NG is able to make available large quantities of additional flexibility under the short term mechanisms. This would not appear to be a reliable indicator of usage under more stressful conditions when the contractual flexibility rules are adhered to and additional short term flexibility is not made available.

Comparing an extrapolation of data derived on this basis with the 22 mcm availability limit derived from analysis of the most adverse operating conditions appears to have limited value. We suggest that comparisons of this type should at the very least use actual usage data under similar operating conditions as those assumed in deriving the availability limit.

Whilst we have little confidence in NG's usage projections derived from historical data, the GDN demand signals made through the OCS process are very clear, although as we note in the previous section there is no visibility as to the cause and it is therefore difficult to assess whether they are appropriate. There is also an important question as to whether it is realistic to assume the signalled demands will all occur simultaneously, as NG appears to do, and this is an area that could be usefully explored if the necessary data were made available.

We conclude that the perception of flexibility scarcity is being driven by a combination of the conservative availability limit set by NG and the increased demands of, and allocations to, GDNs.

Why is the flexibility product not a universal solution?

Ofgem has suggested that extension of the proposed flexibility product to apply to shipper users as well as DNO users would address issues of discrimination and potential scarcity. Our analysis suggests that there is no compelling evidence for these concerns. However, even if our reservations were ignored, we are not persuaded that the universal adoption of the flexibility product is an appropriate course.

We believe that whilst the flexibility product may offer a pragmatic solution for DNO users, consistent with their requirements for a relatively simple planning tool and their lack of need for rapid offtake rate changes, its extension to shipper users as a universal application of a commercial product raises a number of potential problems (in addition to the direct costs and inconvenience of implementation):

- Creating additional complexity and risk for shippers, whilst still not fully addressing operational issues for the transporter

- Giving potentially misleading and unreliable signals of future investment requirements
- Causing unintended consequences for exploitation of the product, such as an incentive for TCCs to trim their capacity bookings (in a way that would not be available to similar loads embedded within GDNs)

Ofgem have themselves identified that there is a concern in extending the application of the flexibility product at exit when there is no equivalent initiative at entry. To this we would add that it appears inequitable to focus on the usage of NTS flexibility by shipper users and DNO users whilst ignoring the different use of flexibility by users within the GDNs.

We suggest that if, despite our reservations, it is considered essential to implement "common terms" at exit for all NTS users, then there are more promising alternatives than the flexibility product for consideration, as outlined in Appendix C.

What changes are required to cater for the future?

Having reviewed the existing flexibility arrangements in some detail we believe they form a sound platform for the future. The differentiation in contractual terms applicable to DNO users and shipper users appears to meet the practical needs of both user classes and their respective customers, and furthermore we believe from our analysis described earlier that such differentiation should not be viewed as unduly discriminatory.

We have identified the need for two modest amendments to address minor shortcomings relating to equitable apportionment of available flexibility. One would cap pre-commitments made to DNO users at an equitable level. The other, a corollary of the first, ensures shipper users as a class can access a minimum level of flexibility (the remainder after pre-commitments) through the short term processes. The applicable peak day exit capacity charges (reflecting capacity holdings) are used as a means of ensuring equitable apportionment of the flexibility by-product between shipper user and DNO user classes.

A further refinement concerns constraint management and builds on Ofgem's suggestion of introducing flow management tools under an incentive scheme. This would provide NG with capability to increase or decrease entry and exit flows reducing the demand for flexibility or increasing its availability accordingly.

We have also suggested that NG should be incentivised to provide more flexibility from within the NTS itself, for example by use of compressors to provide additional linepack and hence flexibility, where it is economic and efficient to do so. In this context there is a linkage between flexibility and the SO incentives covering linepack and the compressor fuel element of shrinkage, and accordingly we suggest that the flexibility incentive be considered in tandem with linepack and shrinkage incentives, whether as part of the ongoing review of SO incentives or through a separate process.

Finally we note that the increasing GDN demands for NTS flexibility are a key factor in the consideration of future usage and a much fuller understanding of the underlying drivers is required to establish whether the increases are consistent with the economic and efficient operation of the gas transportation system as a whole. We also suggest that the relative merits of NTS and GDN investment for flexibility provision should be explored to aid in consideration of future flexibility regime developments.

NTS Exit Flexibility

A Report for the Gas Forum

August 2008

Contents List

		Page
	Executive summary	2
1	**Introduction**	8
2	**What does the Impact Assessment say about flexibility?**	9
3	**Are the existing flexibility arrangements unduly discriminatory?**	14
4	**How well do the existing arrangements operate in practice?**	21
5	**What is driving the increase in GDN demands for NTS flexibility?**	28
6	**What is driving the perception of NTS flexibility scarcity?**	34
7	**Why is the flexibility product not a universal solution?**	39
8	**What changes are required to cater for the future?**	45
	Appendix A Examination of contractual rights under the existing flexibility arrangements	50
	Appendix B Significance of access to "higher rate" flexibility	60
	Appendix C Alternative offtake arrangements	61

1. Introduction

Ofgem Impact Assessment

1.1. Following on from the Competition Commission decision in July 2007 to quash Ofgem's earlier decision to implement modification proposal 116V, Ofgem is now considering a number of NTS exit reform proposals.

1.2. Ofgem has set out its initial views in an impact assessment and consultation document "Gas National Transmission System Offtake Arrangements, Initial Impact Assessment on modification proposals" (the IA) published on 21 July 2008.

Exit flexibility

1.3. An important aspect of the modification proposals is the treatment of flexibility at exit points - the ability to vary flow rates within-day.

1.4. In the past Ofgem has been a proponent of introduction of an exit flexibility capacity product, applicable to all NTS users, and three of the modifications under review adopt this approach.

1.5. Three other proposals advocate continuation of the existing flexibility arrangements, but with additional monitoring of flexibility usage. This approach has in the past been widely supported by industry participants.

1.6. The other proposal is a straightforward extension of the existing arrangements.

TPA Solutions role

1.7. The Gas Forum has engaged TPA Solutions to review the IA, focussing specifically on the issue of exit flexibility. We have also been asked to comment on the drivers and likely future requirements for flexibility, and the likelihood of a shortage emerging in the future. In addition we were asked to consider if there were potential changes to the existing regime that did not involve introduction of a new flexibility product that might address Ofgem's concerns over treatment of NTS exit flexibility.

Structure of this report

1.8. In undertaking our assignment we have set out to answer the questions appearing in each section heading, and these give a simple overview of the way we have structured our report:

1. Introduction
2. What does the Impact Assessment say about flexibility?
3. Are the existing flexibility arrangements unduly discriminatory?
4. How well do the existing arrangements operate in practice?
5. What is driving the increase in GDN demands for NTS flexibility?
6. What is driving the perception of NTS flexibility scarcity?
7. Why is the flexibility product not a universal solution?
8. What changes are required to cater for the future?

1.9. At the start of each section we have provided an italicised summary of the main points emerging, which has also been used in the Executive Summary.

2. What does the Impact Assessment say about flexibility?

In this section, following a brief description of the modification proposals under review, we set out what we read as the key points in relation to flexibility within the IA (with IA paragraph references). We also refer to Ofgem's presentation material[1] used at an industry workshop held on 22 July to discuss the content of the IA.

Our summary interpretation of Ofgem's key messages is as follows:

(1) The current flexibility arrangements are unduly discriminatory, in favour of TCCs and to the detriment of GDNs.

(2) The new flexibility product has qualitative benefits associated with efficiency, transparency and avoidance of undue discrimination, which might outweigh the quantified net costs of implementation. These benefits materialise mostly when there is an imminent or actual scarcity of flexibility.

(3) An important potential problem with the exit flexibility product concerns the linkage with entry flows, and it may not therefore be efficient or effective to address flexibility issues only at exit, as this might introduce the potential for discrimination between the treatment of entry and exit points.

(4) NG has put forward a reasonable argument that scarcity is imminent and these concerns cannot be ignored – a means of managing flexibility capacity without introducing the flexibility product is needed.

(5) An option involving development of entry and exit flow management tools enabling NG to manage flexibility constraints (should they arise) under an incentive scheme is being considered. This could extend to more commercial arrangements involving sale of flexibility services to manage emerging problems.

Modification proposals

2.1. Of the proposals under review, six involve significant changes addressing, in different manners, three important aspects of the exit regime. These are (i) user commitment for flat capacity (ii) interruption and (iii) flexibility. The seventh proposal advocates continuation of the existing regime. Key features of the proposals are summarised in the table below:

[1] Ofgem: Initial Impact Assessment for NGG Offtake Arrangements, Industry Workshop, 22 July 2008

<table>
<tr><th>Modification</th><th>Flat capacity</th><th>Flexibility capacity</th><th>Interruption</th></tr>
<tr><td>Mod 116V
Original National Grid proposal, implemented by Ofgem but decision quashed by Competition Commission</td><td rowspan="6">User commitment model for flat capacity applies to all NTS users</td><td rowspan="3">New flexibility product applies to all NTS users</td><td rowspan="5">Existing interruptible service withdrawn.
National Grid offers long term capacity buy back arrangements where unable to offer a firm service.
Day ahead UIOLI release via auction</td></tr>
<tr><td>Mod 116BV
RWE refinement of National Grid proposal</td></tr>
<tr><td>Mod 116VD
Scotia Gas Networks refinement of National Grid proposal</td></tr>
<tr><td>Mod 116CVV
British Gas Trading alternative removing flex product for non-DN users</td><td rowspan="3">Retention of existing flexibility arrangements
Monitoring of flexibility usage</td></tr>
<tr><td>Mod 195
RWE refinement of 116CVV, representing outcome of review group 166</td></tr>
<tr><td>Mod 195AV
E.On refinement of 195, amending the nature of the interruptible capacity product</td><td>“Off-peak” refinement offering prescribed quantities</td></tr>
<tr><td>Mod 116A
Initial E.On counter to original National Grid proposal</td><td colspan="3">Continue existing regime</td></tr>
</table>

Ofgem IA approach

2.2. In the IA Overview, Ofgem states that it has not set out a “minded to” view on any of the proposed modifications. Instead, Ofgem provides background to the assessment and then offers quantitative and qualitative analyses, set in the context of the Competition Commission findings. It then gives its current views on the three key elements within the proposals, namely, user commitment for flat capacity, interruption and flexibility.

Key Ofgem concerns

2.3. In its workshop presentation material Ofgem described its two main concerns with the existing regime:

- Lack of user commitment – potential for uneconomic and/or inefficient investment, and consequent customer exposure to risk that assets are not required
- Discrimination – different treatment for different types of users, particularly in relation to the flexibility product, the extent of user commitment and the treatment of firm and interruptible users. In

In Ofgem's view there is a consequent risk of inefficient outcomes in that those that value access most might be unable to obtain it

Unduly discriminatory exit flexibility arrangements

2.4. Ofgem has concluded that the current flexibility arrangements are unduly discriminatory, in favour of TCCs and to the detriment of GDNs (4.70-4.74).

2.5. The basis for this conclusion is that TCCs "purchase a bundled NTS product that allows them unlimited use of flexibility" whilst "the flexibility product restricts the extent to which GDNs can utilise flexibility".

2.6. The argument continues: "Given TCCs and GDNs impose the same costs on NGG for using flexibility and that under the current arrangements TCCs do not pay for flexibility but GDNs do, we concluded that the current arrangements are unduly discriminatory between TCCs and GDNs."

Qualitative benefits of introducing the new exit flexibility product

2.7. In the IA Ofgem identifies a number of qualitative benefits associated with the flexibility product, and these are summarised from the workshop presentation material:

- Efficiency – where flexibility is scarce, auctions ensure that flexibility is awarded to parties that value it most highly. Efficient use of scarce resources leads to lower prices for consumers. Also the arrangements will signal demand for additional flexibility
- Transparency – the arrangements will provide clarity on scarcity or otherwise of NTS flexibility (for example a signal of NTS availability may enable GDNs to defer projects to provide flexibility from within the GDN)
- Non-discrimination – there would be no differential treatment of GDNs and other NTS users with respect to flexibility

Quantitative benefits and costs relating to flexibility product

2.8. In the Conclusion Chapter of the IA (6.1-6.9) Ofgem notes the quantified net costs of around £18-96 million in present value terms for those proposals that introduce a flexibility product (this is some £35-£62 million greater than proposals having no flexibility product).

2.9. It also notes that there are several important benefits of a flexibility product that it has identified but been unable to quantify and which it considers a relevant and material consideration, particularly in view of the uncertainties associated with quantifying the benefits.

2.10. Ofgem goes on to say that the most significant potential qualitative benefit is that GDNs and other market players will be able to make more efficient investment decisions regarding flexibility investments, and that there is the possibility that if GDNs are exposed to the costs of flexibility they will take measures to reduce their demand for flexibility.

2.11. In this context, and using assumptions relating to the efficient capital cost of flexibility, Ofgem indicates that the cancellation 1.6 mcm/d of new flexibility would offset the net costs of the proposals incorporating the flexibility product.

Potential problems with the proposed flexibility product

2.12. The workshop presentation material describes the flexibility product as having undesirable features; "Benefits uncertain and costs may be material" and "Problems with the product", the latter referring a linkage with entry flows.

2.13. In the IA, Ofgem accepts that there are a number of potential problems (other than costs) associated with the flexibility product and that the most important of these is the fact that the abundance or scarcity of demand does not just depend on the behaviour of users at exit – it is significantly affected by the variability of entry flows (4.25-4.26).

2.14. As a consequence, Ofgem says it may not be efficient or effective to address flexibility issues only at exit (4.26). Further, modifications that include the exit flexibility product might introduce the potential for discrimination between the treatment of entry and exit points (4.87).

Scarcity of flexibility

2.15. Ofgem acknowledges that the efficiency benefits associated with the flexibility product mostly arise when there is a scarcity of flexibility or when prices indicate a likely scarcity in the future (4.5).

2.16. Ofgem notes that NG analysis indicates that the current maximum flexibility availability of 22 mcmd is likely to be exceeded by winter 2012/13 and that NG has described a number of scenarios (deemed plausible by NG) where the maximum could be exceeded earlier (4.9).

2.17. Ofgem acknowledges that respondents to its consultation on NG's assessment generally considered that NG's views on the likely scarcity of flexibility were over-pessimistic and reflected a "worst case" scenario that was not very credible (4.11).

Addressing flexibility concerns

2.18. Ofgem says that given its statutory duties, it cannot ignore concerns expressed by the TSO that flexibility might become scarce in future. If it were to adopt a "wait and see" approach it would need to be confident that there would be sufficient warning of impending scarcity to allow development and implementation of mechanisms addressing the problem before flexibility actually became scarce (4.30).

2.19. Ofgem is currently considering if there is a way to manage the requirement for flexibility capacity without having to introduce a flexibility product of the type proposed by Mod.116V and such variants (4.31).

2.20. The IA sets out (4.32) one potential option involving establishing operational arrangements and an incentive scheme for NG so that they can:

a) Manage any flexibility constraints that do emerge by taking actions, in a non-discriminatory way either at entry or at exit; and

b) Have an incentive to move to more commercial arrangements to manage any emerging problems by introducing flexibility (or linepack) services in future should this be justified.

2.21. The workshop presentation material describes this alternative for addressing flexibility issues, noting that there are currently limited

tools to manage within day flows, and that there is a difference between entry and exit arrangements. NG would develop and use operational tools to manage flow, and there would be benefits from an incentive on NG to:

- Sell flexibility products
- Manage cost of curtailing flows within day

Summary interpretation of Ofgem's key messages

2.22. Below we succinctly summarise our interpretation of Ofgem's key messages relating to flexibility:

(1) The current flexibility arrangements are unduly discriminatory, in favour of TCCs and to the detriment of GDNs.

(2) The new flexibility product has qualitative benefits associated with efficiency, transparency and avoidance of undue discrimination, which might outweigh the quantified net costs of implementation. These benefits materialise mostly when there is an imminent or actual scarcity of flexibility.

(3) An important potential problem with the exit flexibility product concerns the linkage with entry flows, and it may not therefore be efficient or effective to address flexibility issues only at exit, as this might introduce the potential for discrimination between the treatment of entry and exit points.

(4) NG has put forward a reasonable argument that scarcity is imminent and these concerns cannot be ignored – a means of managing flexibility capacity without introducing the flexibility product is needed.

(5) An option involving development of entry and exit flow management tools enabling NG to manage flexibility constraints (should they arise) under an incentive scheme is being considered. This could extend to more commercial arrangements involving sale of flexibility services to manage emerging problems.

3. Are the existing flexibility arrangements unduly discriminatory?

At a first reading of the IA we had strong reservations regarding the conclusion that the current flexibility arrangements "are unduly discriminatory between TCCs and GDNs". Our reservations were driven in part by the difficulty in defining exactly what "exit flexibility" constitutes in the context of NTS access, and its inter-relationship with the more traditional and better defined daily capacity product.

We therefore sought to examine the existing arrangements in more detail, focussing on the contractual rights and limitations on offtake flow rates, and the ability to vary rates within-day, as these appear to be fundamental to the concept of "flexibility". We have made an assessment and comparison of these provisions as they apply respectively to shipper users (at TCC and CSEP exit points) and DNO users (at GDN exit points).

We have concluded that overall, there does not appear to be anything inherently unreasonable or unduly discriminatory about these two types of arrangements. It is not evident that one is significantly advantageous compared to the other, and/ or confers benefits to the class of user concerned to the detriment of the other class. If anything, DNO users might be viewed as benefiting from an ability to flow above the rate defined by their flat capacity booking.

Closer examination of existing flexibility arrangements

3.1. Our source document in the main has been the Uniform Network Code (UNC), although we have had to rely on industry input concerning the general nature of relevant provisions contained in agreements that are not publicly available, for example Network Exit Agreements (NExAs).

3.2. The tables in Appendix A summarise the results of this examination. We have grouped the provisions as they apply to shipper users (at TCC and CSEP exit points) and DNO users (at GDN exit points) according to a number of the generic features of the regime with a commentary highlighting key similarities and differences.

3.3. Generic features of the regime that were subject to examination are listed below:

Table A1: Exit and Offtake Capacity

Table A2: Flexibility acquisition processes

Table A3: Maximum rates

Table A4: Rate changes and notice periods

Table A5: Tolerance on prevailing rates; Ramp rates

Table A6: Short term acquisition - relaxation of rules

Table A7: NTS rights

Table A8: Pressures

Table A9: Capacity charges

Table A10: Overruns

3.4. We have used these tables to summarise what we regard as the key aspects in relation to use of flexibility in the commentaries below.

Existing shipper user flexibility arrangements

3.5. Shipper users book a single traditional exit capacity product. The product defines not only the maximum quantity that can be offtaken over any day but also, crucially, the maximum rate at which gas can be offtaken at any time within the day. Booked daily capacity must be 24 x the maximum instantaneous rate required (the SHQ, which is expressed as an hourly flow quantity).

3.6. The product also provides an ability to change offtake rate by a certain amount on certain notice, but subject always to the maximum hourly rate, which cannot be exceeded. A shipper user can also seek to change rate at less than the prescribed notice and NG must comply, if feasible and no operational balancing requirement arises.

Existing DNO user flexibility arrangements

3.7. DNO users book what have been termed "flat" and "flexibility" capacity products. The flat product gives rights to offtake a quantity over a day up to the maximum defined by the booking, at a uniform (or flat) rate during the day. The flexibility product needs to be booked in most cases where deviations from uniform rate are required.

3.8. However, the flexibility product does not simply replicate the rate change capability afforded to shipper users under their traditional single capacity product – it gives additional rights to DNO users to flow at rates above the instantaneous rate defined by the flat capacity booking.

3.9. The DNO user has a higher instantaneous rate limit than the equivalent shipper user – the increase in rate limit is calculated as the flexibility capacity holding (F) divided by 4. Although this higher maximum rate cannot be sustained throughout the day because of the limitations imposed by the flexibility and flat capacity bookings, the DNO user is nevertheless also entitled to operate during the first 16 hours of the day at an average rate some F/16 rate units higher than the equivalent shipper user.

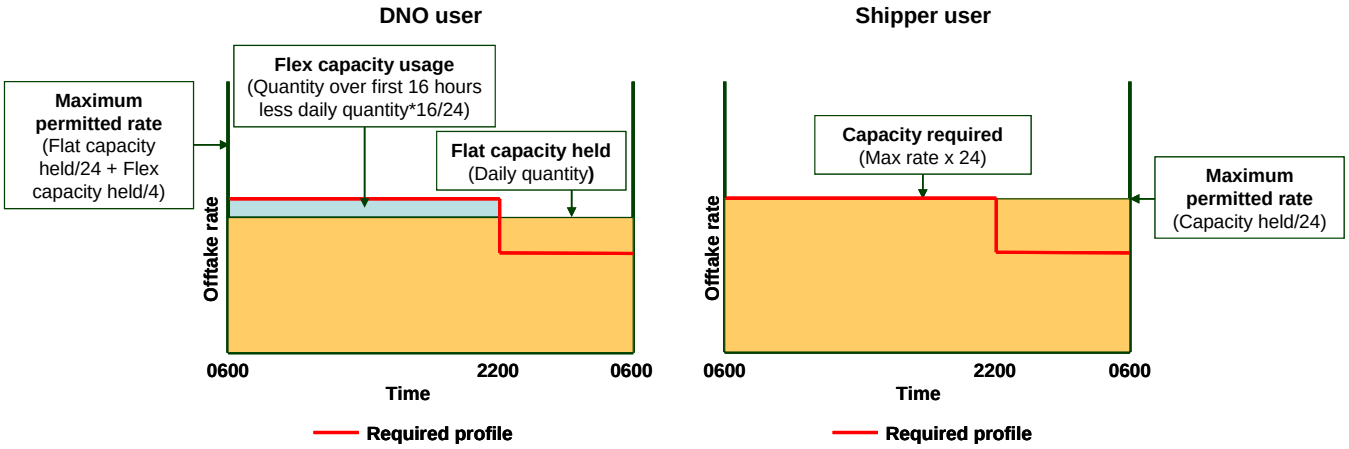
3.10. The DNO user thus gains access to what we term "higher rate" flexibility, which a shipper user cannot access without increasing its booked daily capacity. Further, the DNO user can gain access to such additional flexibility on the day by requesting incremental flexibility capacity, which NG must provide, if feasible and no operational balancing requirement arises.

3.11. On the other hand, DNO users are more constrained than shipper users in terms of rate changes. Provisions at individual exit points are similar for DNO users and shipper users, typically allowing changes of up to 50% of booked capacity on expiry of a 2 hour notice. However, for DNO users there is a further limit on the aggregate rate changes allowable for all NTS exit points serving an LDZ, which are restricted to 5% of the prevailing rate per hour on 2 hours notice. In this sense DNO users would appear to have less access to what we have termed "rate change" flexibility. In addition, DNO users face the prospect on low demand days of NG in effect withdrawing the flexibility product.

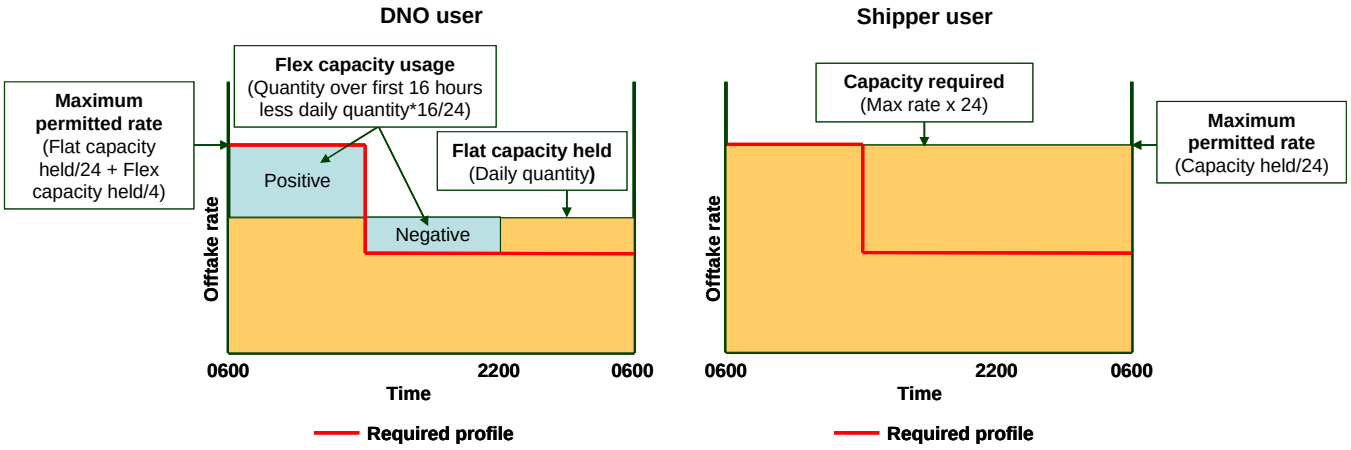
3.12. Finally, there is a further key difference concerning pressure provision. DNO users receive a higher level of commitment to pressure than shipper users, and this is used in conjunction with the flexibility product to enable DNO users to offtake at the required profile.

Significance of maximum offtake rate provisions

3.13. The different offtake rate provisions applicable under the two types of arrangements have significant implications on the required capacity booking levels. For example, a shipper user wishing to flow at higher rates in the first 16 hours of the day, in the same way that DNO users holding flexibility capacity are permitted to do, would need to book more capacity than the flat capacity held by the DNO user:

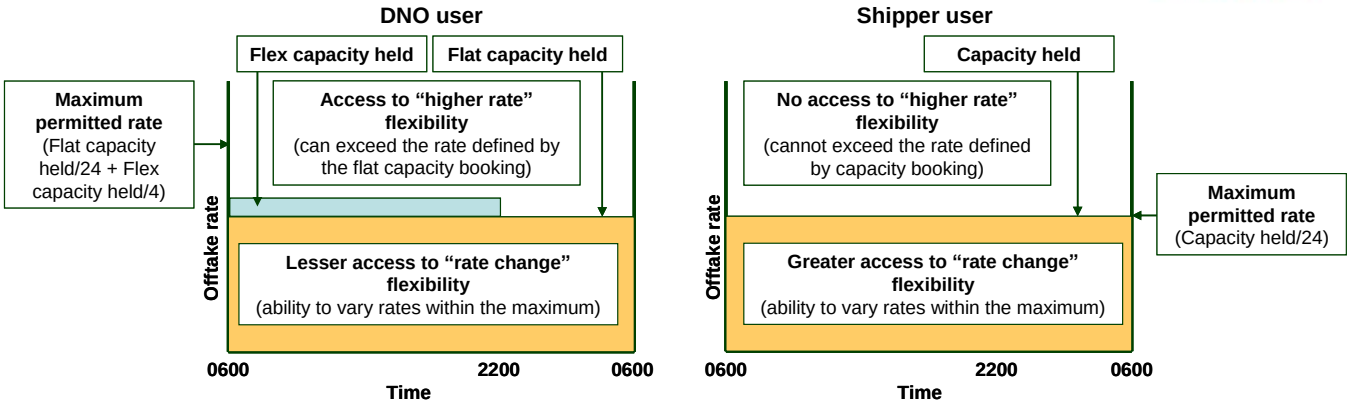


3.14. In some senses this example is conservative in that it assumes the DNO user does not make full use of the maximum rate available to it. If it does so, a shipper user wishing to flow to the same profile would need to book even more capacity:



3.15. In either case the costs attributed to capacity provision to the DNO user (i.e. the flat capacity held x the applicable rate) are less than they are for the shipper user. Both have access to "higher rate" flexibility but the DNO user has more restrictions on rate variations than the shipper user. In other words the shipper user is paying through its higher capacity charges for the additional flexibility it has to vary rates within the maximum defined by its capacity booking (its "rate change" flexibility).

3.16. We can look at this from another perspective, where a DNO user has the same (flat) capacity booking as a shipper user:



3.17. In this case, the DNO user has some advantages in that it can exceed the rate implied by its flat capacity booking (it gains access to "high rate" flexibility), but it also has some disadvantages in that it has more restrictive rate change provisions (less "rate change" flexibility), and the flexibility product may not be available on low demand days.

3.18. We have attempted to gain an insight into the significance of access to "higher rate" flexibility by calculating the flow rates available to DNO users based on an estimate of flat capacity bookings and actual flexibility capacity holdings for 2010/11. We have then calculated the capacity that DNO users would need to book under the shipper user arrangements to access these rates. Details of these calculations are shown in Appendix B.

3.19. The results show that significantly enhanced bookings would be required:

(i) More than 6% extra exit capacity is required to flow at the maximum constant rate available to DNO users over the first 16 hours of the day (Flat/24+Flex/16)

(ii) Almost 25% extra exit capacity is required to flow at the maximum permitted rate (Flat/24+Flex/4) available to DNO users

3.20. We have not attempted to assess in a similar manner the significance of the disparity in access to "rate change" flexibility via the different prescribed rate change provisions, and we are not aware of attempts by NG or others to do so. In any event, we understand that current and projected medium term usage of "rate change" flexibility by shipper users is close to zero[2], so there does not appear to be much (if any) use made of any contractual "rate change" flexibility advantages.

3.21. We feel it would be inappropriate to read too much into our attempts at quantitative assessment – we believe it better to characterise the position by acknowledging that the two sets of arrangements are different, and whilst both have certain advantages and disadvantages, it is not possible to state definitively that one is more advantageous than the other.

[2] Applies to NTS connected consumers – see UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, p10, para f)

Comparison summary

3.22. Without the benefit of the above assessment, one might be tempted to conclude that the requirement to acquire a flexibility product to cater for rate variations places DNO users at something of a disadvantage compared to shipper users. However, the following comparison table shows that the respective advantages (in green) and disadvantages (in red italics) of the arrangements are relatively evenly distributed between DNO user and shipper user classes:

<table>
<tr><th>Aspect</th><th>DNO users</th><th>Shipper users</th></tr>
<tr><td rowspan="3">Flexibility product</td><td>Must hold flexibility capacity where rate variations are required</td><td rowspan="2">No requirement to hold flexibility capacity</td></tr>
<tr><td>Product usage may be precluded on low demand days</td></tr>
<tr><td>Flexibility product used in conjunction with higher level of pressure commitment</td><td>Lower level of pressure commitment</td></tr>
<tr><td rowspan="2">“Higher rate” flexibility</td><td>“Higher rate” flexibility accessed through flexibility capacity booking</td><td>“Higher rate” flexibility can only be accessed by increasing capacity booking (if available)</td></tr>
<tr><td>Can access additional “higher rate” flexibility on the day by requesting additional short term flexibility which NG is obliged to provide (if feasible and no operational balancing requirement)</td><td>Additional “higher rate” flexibility can not be accessed on the day – no short term booking process</td></tr>
<tr><td rowspan="2">“Rate change” flexibility</td><td>Less access to “rate change” flexibility due to prescribed rate change limitations</td><td>Greater access to “rate change” flexibility through prescribed rate change and notice period provisions</td></tr>
<tr><td colspan="2">Can request changes on shorter notice and NGG is obliged to provide (if feasible and no operational balancing requirement)</td></tr>
</table>

3.23. Overall, there does not appear to be anything inherently unreasonable or unduly discriminatory about these two types of arrangements. It is not evident that one is significantly advantageous compared to the other, and/ or confers benefits to the class of user concerned to the detriment of the other class. If anything, DNO users might be viewed as benefiting from access to “higher rate” flexibility.

3.24. We make this assessment based solely on a comparison of terms and their impact on the NTS, although are aware that it can also be argued that the quite different nature of the classes of DNO users (acting as

regulated aggregating agents) and shipper users (operating in a competitive market) might demand that different arrangements apply.

3.25. The apparent neutrality of the existing arrangements is perhaps borne out by the attitudes of the different classes of user. We are not aware that members of either class have expressed a wish to be granted the flexibility terms applicable to the other. Both classes appear to be content with the arrangements as they stand, and this position appears to be reflected in the unanimous panel support for Mods.195 and 195A which largely retain the existing flexibility arrangements.

Ofgem's views in the context of our assessment

3.26. In light of our analysis we do not agree with Ofgem's view expressed at paragraph 4.71 of the IA that shipper users "purchase a bundled NTS product that allows them unlimited use of flexibility" whilst "the flexibility product restricts the extent to which GDNs can utilise flexibility".

3.27. It is clear that shipper users, by contrast with DNO users, have no entitlement to use flexibility above the rate defined by the capacity booked, unless they book and pay for additional capacity.

3.28. From a DNO user perspective, it is true that the flexibility product can restrict usage, but it also provides access to "higher rate" flexibility, above the rate defined by the flat booking.

3.29. We agree with the general thrust of Ofgem's comment in paragraph 4.72 that DNO users and shipper users impose the same costs on NG for using flexibility[3]. All other things being equal (same offtake profile, location etc.) the costs of provision of flexibility to, say, a power station and a GDN should be the same. However, we disagree with Ofgem's subsequent reasoning and therefore its conclusion:

> "Given TCCs and GDNs impose the same costs on NGG for using flexibility and that under the current arrangements TCCs do not pay for flexibility but GDNs do, we concluded that the current arrangements are unduly discriminatory between TCCs and GDNs".

3.30. We set to one side for the moment the fact that GDNs (i.e. DNO users) pay neither for flat nor flexibility capacity, whilst TCCs (i.e. shipper users) pay for NTS exit capacity.

3.31. Our view is that, for shipper users, the costs assigned to capacity provision (which cover the maximum daily quantity and any flexibility provided) are reflected in the exit capacity charge payable, calculated as the capacity booked multiplied by the applicable rate.

3.32. For DNO users there are no actual payments, but the costs of capacity provision should again be reflected in the notional capacity charge calculated as the flat capacity booked multiplied by the applicable rate. This includes an element for flexibility.

3.33. The applicable rates for exit capacity charges are all calculated according to the same methodology based on maximum daily quantities and apply to all NTS exit points, irrespective of the user. Implicitly they include an element covering provision of flexibility - there is no separate applicable rate for flexibility capacity.

[3] Clearly different types of TCCs (such as storage and Interconnectors) might have different patterns of usage and are therefore may impose different costs on the NTS.

3.34. In summary therefore, it is not the case that "TCCs do not pay for flexibility but GDNs do". Shipper users pay for flexibility within their exit capacity charges. DNO users do not make any actual payments, but a cost of flexibility provision to DNO users is included within the notional charge calculated for flat capacity.

3.35. Given that the costs of flexibility provision are assigned to both shipper and DNO users and, as we note above, it is not evident that one set of arrangements is significantly advantageous compared to the other, we disagree with Ofgem's conclusion that "the current arrangements are unduly discriminatory between TCCs and GDNs".

4. How well do the existing flexibility arrangements operate in practice?

We have looked at the operation of the existing flexibility arrangements by considering the longer term planning process, the shorter term (daily) access mechanisms and procedures for flexibility constraint management.

With regard to flexibility planning, we conclude that in the past the process has operated in a practical and non-discriminatory manner. However, there are aspects of the manner in which the process is currently being operated that give cause for concern. In particular we are concerned that there may now be excessive pre-commitment to DNO users which could conflict with shipper user access to flexibility, and with NG's contractual obligations to provide such access.

The arrangements for short term flexibility access also appear to have operated satisfactorily – we understand that currently requests for short-term flexibility are nearly always met in full. However, we also note that potentially, the pre-commitments being made to provide flexibility to DNO users could conflict with short term flexibility access by shipper users in future. In particular we are concerned that as a result shipper users might not always be able to access a minimum level of short term flexibility to which they might reasonably be considered to be entitled.

The flexibility constraint management procedures appear to provide a practical means of ensuring continued safe system operation in the event of a constraint. We note that Ofgem has put forward a potential option that would introduce additional flexibility constraint management tools under an incentive scheme, as a means of managing the requirement for flexibility capacity without having to introduce a flexibility product of the type proposed by Mod.116V and such variants. We consider this would be a useful addition to the regime as it would provide NG with a further means of addressing flexibility constraints should they arise.

The flexibility product as a planning measure

4.1. Flexibility provision forms an element in NG's long term planning process for the NTS. The UNC capacity application provisions, as they apply to DNO users and shipper users respectively, provide inputs into the planning process.

4.2. We recognise that flexibility product arrangements are in place for DNO users and that product usage is an important consideration in the planning process undertaken by NG, which needs to address usage by both DNO users and shipper users.

4.3. However, we consider that it is sufficient to address flexibility usage by shipper users at the aggregate level for that class of user, rather than at the level of the individual shipper user. As we make clear elsewhere in this document, we do not see the need for, or merit in, application of contractual flexibility product rules for shipper users at an individual level.

Investment and NTS flexibility

4.4. Before we look in more detail at the relevant UNC provisions relating to flexibility planning it is helpful to highlight an NG policy that forms an important backdrop to the flexibility planning process. NG has said that it has not, and does not, invest directly to provide NTS flexibility. The

existing IExCR (Incremental Exit Capacity Release)[4] processes reflect this - applications for incremental flexibility capacity that would require reinforcement are rejected under this policy.

4.5. As we understand it, the policy is based on a traditional belief that where additional flexibility is required to serve load within a GDN it is more efficient to invest in GDN assets to provide it. This emphasis on 'local' flexibility provision was reflected in the past investment decisions under the previous common ownership of the NTS and GDNs, presumably on the assumption that such investments were economically efficient. To our knowledge neither NG as NTS owner nor the GDN owners have provided information that would confirm (or otherwise) this assumption.

4.6. Addressing this issue requires a much better understanding of the relative costs and efficiency of flexibility provision within the NTS and flexibility provision within the GDNs. There is also an important interplay between the regulatory revenues and obligations of the respective parties that we do not feel has been sufficiently explored. In the absence of firm information on these issues we feel it inappropriate to speculate on the merits of the current NG policy in this area.

4.7. As a result of this policy, the existing planning, application and allocation processes for flexibility deal with what is in effect a by-product of investment designed to provide peak day NTS capacity, and which might at some stage become limited in supply.

Planning for provision to DNO users

4.8. The Offtake Capacity Statement (OCS) process enables DNO users to apply for flexibility capacity four years into the future. It also facilitates shorter notice (down to one year) increases (and decreases) to established quantities, again on application by the DNO user.

4.9. NG can only reject (or accept in part only) an application to the extent it determines it would not be feasible to make gas available in accordance with the application, and in doing so takes account of exit capacity applications from both DNO and shipper users.

4.10. Once NG has committed to a particular amount of flexibility capacity for a particular year it cannot later unilaterally reduce this commitment

4.11. The OCS process ensures that the minimum level of flexibility capacity available to a DNO user is known three years in advance, enabling the DNO user to plan for self-provision if necessary.

4.12. Ofgem appears to regard these arrangements as discretionary – paragraph 1.8 of the IA says that a DNO user "…is able, at NGG NTS's discretion, to book NTS exit flexibility capacity…" We are of the view that that there is a much stronger and more substantive requirement on NG to operate in accordance with these provisions, as they are contractual UNC obligations.

Planning for provision to shipper users

4.13. For other NTS exit points, the contractual rights governing use of "rate change" flexibility comprise the evergreen NExA provisions for rate

[4] See for example Section 8.4 Transmission Planning Code 2008, DRAFT FOR CONSULTATION (issue 0.2), National Grid

changes on particular notice periods. As far as we are aware, there is no formal UNC mechanism whereby shipper users can apply to amend these provisions. Further, we are not aware of any initiatives seeking to introduce improved terms – shipper users appear to be content with the contractual provisions as they stand.

4.14. In planning for flexibility usage on the system as a whole, NG must make an assessment of the extent to which shipper users might exercise their contractual rights and, as we note below, current projections for the shipper user class as a whole appear to be zero.

4.15. To the extent new (shipper user) loads connect to the system, or existing load seeks greater access to "higher rate" flexibility, this is covered by shipper user applications for NTS exit capacity, and these are subject to feasibility tests and lead times for capacity provision if necessary.

2007 planning process

4.16. In its response to Ofgem on issues regarding flexibility availability, NG provides some information on the 2007 planning process[5].

4.17. NG characterises the amount of flexibility capacity taken by CCGTs historically as "manageable" and goes on to say that "present availability of up to 22mcmd of flexibility capacity for use by GDNs has been made on an assumption that directly connected CCGTs and other Very Large Daily Metered Customers (VLDMC) will take gas of a flat daily profile.

4.18. However, NG also expresses concerns that due to changes in the generation mix and the mode of operation of CCGTs there may be a greater need for flexibility capability to be utilised in maintaining gas supplies to power stations, without quantifying the likely usage or indicating timescales.

4.19. Similar concerns are raised over flexibility usage by new storage developments although again the potential impact is not quantified, and in this case NG acknowledges that storage operations could also be a source of additional flexibility.

4.20. In the same document NG sets out the flexibility capacity allocations resulting from the 2007 OCS process:

Final Flexibility Capacity Allocation to GDNs – 2007 OCS Process

Flex (mcmd)	2007/08	2008/09	2009/10	2010/11	2011/12
UNC Section B Request	15.88	15.63	15.74	17.47	17.47*

* The allocation for 2011/12 is indicative only and at this stage only reflects National Grid Transmission's commitment for 2010/11.

4.21. NG is also concerned that there is a trend of increasing demand for flexibility from DNO users and has subsequently indicated[6] that it expects requests of 26.5 mcm for 2011/12, although it will restrict release to 22 mcm.

[5] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid

[6] Summary of the Incremental Exit Capacity in the transitional period from 1 October 2008 to 30 September 2012, National Grid, 28th May 2008

Projected shipper user utilisation

4.22. NG appears to have extended its stated projections of zero flexibility usage by CCGTs and VLDMCs to all types of NTS exit points (other than GDNs), including interconnectors and storage. This is the logical conclusion drawn from NG's apparent willingness to commit all the available flexibility to DNO users for 2011/12.

4.23. In summary therefore, it would appear that NG projects collective shipper user utilisation of flexibility capacity to remain at zero for all years up to and including 2011/12.

Pre-commitments to DNO users

4.24. DNO users currently (2008/9) enjoy pre-committed rights to use almost 16 mcm of the 22mcm flexibility capacity that NG says is available. This will rise by almost 2 mcm by 2010/11 and it appears that NG intends to allocate the full 22 mcm to DNO users for use in 2011/12.

Pre-commitment as a concept

4.25. We see nothing inappropriate or unreasonable about pre-committing volumes of flexibility to one class of user so long as this does not prejudice access by the other class.

4.26. The planning process appears in the past to have delivered an equitable outcome in that flexibility has been pre-committed to DNO users three years in advance enabling appropriate GDN planning processes to be conducted, whilst contractual "rate change" flexibility commitments to individual shipper users have also been maintained, ensuring that the needs of their customers can continue to be met.

Potential for excessive pre-commitment

4.27. There is clearly the potential that flexibility pre-commitments made through the planning process to one class of user prejudice access to flexibility by the other class of user.

4.28. Given the recent demand from DNO users and the limited availability of flexibility calculated by NG, we should (despite our reservations regarding over-stated demands and understated availability set out elsewhere in this document) consider whether excessive pre-commitment is currently an issue.

Pre-commitment marker level

4.29. In the absence of any other clear rationale, we suggest that a reasonable marker on the flexibility pre-commitment level could be derived by an apportionment of the available product to the different classes of user based on the aggregate peak day demand of the respective classes. In effect, we are using peak day demand as a proxy for the capacity costs associated with capacity holdings.

4.30. We have used peak day demand figures for 2010/11 taken from the current Ten Year Statement (4634 GWh Total LDZ – DNO users, 1466 GWh total NTS – shipper users) as a basis for apportioning the 22 mcm flexibility capacity NG says is available, to give the following figures:

DNO users	16.7 mcm (76%)
Shipper users	5.3 mcm (24%)

Note: Shrinkage volumes excluded from calculation

4.31. This suggests that pre-commitments to DNO users above 16.7 mcm for 2010/11 might be regarded as "excessive" in that the commitments could conflict with shipper user access to flexibility that might be needed to serve their customers in that year and to which they have legitimate prior claim.

Existing pre-commitments and the marker level

4.32. The 2007 OCS allocation to DNO users already puts them above this marker level by almost 0.8 mcm.

4.33. Of greater concern is that NG has signalled it intends in the 2008 OCS process to release all 22mcm of available flexibility to DNO users for use in 2011/12. This would extend pre-commitments well above the marker level of 16.5 mcm for that year.

Conclusions regarding flexibility planning

4.34. In conclusion we note that until recently the flexibility planning process has operated in a practical and non-discriminatory manner. NG has made significant flexibility pre-commitments to DNO users, facilitating appropriate system planning processes within GDNs, and this has not been to the detriment of shipper users.

4.35. However, there are aspects of the manner in which the process is currently being operated that give cause for concern. In particular we are concerned that there may now be excessive pre-commitment to DNO users which could conflict with shipper user access to flexibility, and with NG's contractual obligations to provide such access.

4.36. We consider this further in section 8 where we recommend modest amendments to the planning process to address the issue.

Access to short term flexibility

4.37. Table A6 in Appendix A sets out the means by which flexibility is applied for and made available on a short term basis, just ahead of or during the day. In short the key features are:

- Both shipper users and DNO users can ask for rate changes at shorter than the prescribed notice and NG must comply if in its judgement it is feasible to do so without an operational balancing requirement arising.
- A similar obligation on NG applies where DNO users request additional quantities of flexibility capacity via an OPN.
- Where there are multiple requests for changes within notice periods and/or for additional flexibility capacity, NG will consider these together in accordance with a published allocation methodology.

Short term flexibility usage

4.38. We are not aware of any public information regarding the extent to which NG is requested to exercise these rules or the frequency with which it does so, and it would certainly assist in consideration of the wider flexibility issues if this information was available.

4.39. However, we understand that NG rarely implements its 'System Flexibility Restriction Notice' (SFRN) process under which short-term access to flexibility through the above provisions would be restricted (see below).

4.40. This perhaps indicates that currently requests for short-term flexibility (whatever the extent and frequency) are nearly always met in full, and that there is generally no excess of demand for short term flexibility over supply.

4.41. It appears perfectly reasonable that in the absence of any constraint, requests for short term flexibility are met in full, irrespective of the class of user taking advantage of the availability.

Pre-commitments conflicting with short term flexibility access

4.42. We noted earlier that pre-commitments to DNO users could conflict with shipper user access to short term flexibility and suggested a means of identifying a pre-commitment marker level above which further pre-commitment might be regarded as "excessive". There is a related point here regarding minimum levels of shipper user access to short term flexibility.

4.43. For shipper users as a class, pre-commitments are neither given nor sought, and such users rely solely on access to short term flexibility. A reasonable marker on the minimum short term flexibility that should be available to the shipper user class can be derived using the same peak day demand apportionment methodology described earlier. For 2010/11, the methodology apportions the 22 mcm of available flexibility to the two classes of user as follows:

DNO users	16.7 mcm (76%)
Shipper users	5.3 mcm (24%)

Note: Shrinkage volumes excluded from calculation

4.44. This suggests that the short term flexibility available to shipper users should not be less than a minimum of 5.3 mcm of the 22mcm available, consistent with a maximum pre-commitment to DNO users of 16.7 mcm.

Conclusions regarding short term flexibility access

4.45. In conclusion we note that arrangements for short term flexibility access appear to have operated satisfactorily. Although we do not know the extent to which NG is requested to provide short term access or the frequency with which it does so, we understand that currently requests for short-term flexibility (whatever the extent and frequency) are nearly always met in full, and that there is generally no excess of demand for short term flexibility over supply.

4.46. However, we also note that potentially, the pre-commitments being made to provide flexibility to DNO users could conflict with short term flexibility access by shipper users in future. In particular we are concerned that as a result shipper users might not always be able to access a minimum level of short term flexibility to which they might reasonably be considered to be entitled.

4.47. We consider this further in section 8 where we recommend modest amendments to the short term access process to address the issue.

Flexibility constraint management

4.48. NG has described[7] the way in which it would manage a transportation constraint that impaired its ability to make flexibility available to NTS users. NG says the actions (shown in the following table) would be taken in the order best suited to ensure safe system operation in the most cost effective manner:

Measure	Comments
GDN offtake flow swapping	NG uses rights to request flow swapping under UNC (Offtake Arrangements Document)
System Flexibility Restriction Notice	Requires compliance of both shipper users and DNO users with prescribed rate change and notice period provisions
Interruption	Interruption at interruptible NTS and LDZ supply points
Constrained LNG	Use of Avonmouth to resolve constraint in the south-west
OCM Locational Market	Request made for locational offers at entry and exit points downstream of constraint. Appropriate supply (turn-up) and demand (turn down) offers accepted.
Operating Margins Gas (OMG)	OMG used to extent required to maintain minimum pressures until other actions take effect.
Network Gas Supply Emergency Procedures	Emergency procedures invoked if other actions are insufficient to resolve the constraint

Usage of flexibility constraint management procedures

4.49. We are not aware of any public information regarding the extent to which NGG has needed to make use of these procedures. However, as we note above, we understand that NG rarely implements the 'System Flexibility Restriction Notice' (SFRN) process and this would suggest that the other measures are presently rarely used. This again perhaps indicates that that in terms of current daily operations there is generally no excess of demand for flexibility over supply.

4.50. The flexibility constraint management procedures appear to provide a practical means of ensuring continued safe system operation in the event of a constraint.

Additional flexibility constraint management tools

4.51. We note that in the IA Ofgem has put forward a potential option that would introduce additional flexibility constraint management tools, as a means of managing the requirement for flexibility capacity without having to introduce a flexibility product of the type proposed by Mod.116V and such variants.

4.52. This would involve operational arrangements and an incentive scheme under which NG would manage any flexibility constraints that do

[7] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, Appendix 11, National Grid

emerge by taking actions, in a non-discriminatory way either at entry or at exit.

4.53. We consider this would be a useful addition to the regime as it would provide NG with a further means of addressing flexibility constraints should they arise. We expand on our thinking on this in section 8.

5. What is driving the increase in GDN demands for NTS flexibility?

We have looked at the recent increases in GDN demand for NTS flexibility compared to expectations at or shortly after GDN sales and considered the various possible drivers for the increases.

We conclude that the rapidly increasing demands cannot be explained by increases in overall GDN requirements linked to forecast peak day demand. The increases therefore appear to signal a reduced reliance on flexibility provided within the GDNs. This in turn could imply a surplus of capability to provide flexibility within GDNs, or even a reduction of that capability.

There are a number of possible drivers for this, including GDN capex and opex savings, incentive scheme performance and changes to the GDN interruption regime, but there is no visibility as to the actual cause, and it is therefore difficult to assess the extent to which the increased demands for NTS flexibility are appropriate.

These are regulatory matters which we would expect Ofgem to take a close interest in, irrespective of whether or not a flexibility product might be adopted. There is also an important interplay between the regulatory revenues and obligations of GDN owners on the one hand and NG as NTS owner on the other, that we do not feel has been sufficiently explored.

The increasing demands, in combination with the low NG estimate of available NTS flexibility, are giving rise to a perception of scarcity of NTS flexibility, and therefore need to be understood more fully. It would seem inappropriate, for example, if shipper users were subject to NTS flexibility constraints due to high GDN demands, at a time when there was surplus GDN capability to provide flexibility.

Recent GDN flexibility demands compared with expectations

5.1. The table below shows how in the two year period following GDN sales in 2005 the flexibility quantities requested by, and allocated to GDNs rose substantially above the original expectations:

GDN requirements for NTS flexibility/ mcm				
Gas year	**Initial allocation**	**Incentive target (average)**	**2007 allocation**	**2007 request**
2005/6	8.9	9.5	–	–
2006/7	8.5	9.5	–	–
2007/8	8.9	9.8	15.9	23.1
2008/9	9.1	10.4	15.6	22.5
2009/10	–	11.2	15.7	22.5
2010/11	–	13.0	17.5	23.5
2011/12	–	No target	17.5*	28.2

*Indicative allocation. Other evidence suggests the figure for 2011/12 may rise to 22 mcm in the 2008 OCS process[8].

5.2. The first two columns are an indicator of expectations. The first shows the original quantities allocated by NG at the time of GDN sales[9]. The

[8] Summary of the Incremental Exit Capacity in the transitional period from 1 October 2008 to 30 September 2012, National Grid, 28th May 2008

second shows the target booking levels generated by Ofgem and used in the NTS exit capacity and interruption incentive applicable to GDNs[10]. The third and fourth represent the present situation, showing the requests and allocations resulting from the 2007 OCS process[11].

5.3. Requests for flexibility in the 2007 OCS process were in a range around 80-160% greater than expectations, and whilst the eventual allocations, arrived at after of a process of discussion with NG are somewhat lower, they are still 35-76% greater than expectations.

Flexibility requirements and peak day demand

5.4. Within GDNs, the overall requirements for flexibility are a function of connected load, and we would expect these requirements to vary broadly in line with peak day demand.

5.5. Traditionally, the requirements have been met through a combination of provision within GDNs (gas holders, high pressure bullets and linepack) and provision from the NTS via offtake volume profiling. We understand the typical mix in the past, on a national basis, has been of the order 85-90% GDN provision and 10-15% NTS provision with variations from year to year reflecting changes in GDN capability.

5.6. Given retention of a similar ratio of GDN and NTS provision, we would also expect GDN demand for NTS flexibility to vary broadly in line with GDN peak day demand. Indeed, Ofgem generated its incentive targets using a similar methodology.

5.7. The table below shows that GDN peak day demand forecasts have actually fallen over recent years, and one would therefore expect, all other things being equal, a commensurate fall in GDN demand for NTS flexibility compared with the expectations in 2005:

Gas year	**Ten Year Statement (Tables A2.1 C)** Forecast 1 in 20 Peak Day Firm Demand (Total LDZ including shrinkage) GWh			% reduction from 2005 to 2007 forecast
	2005	**2006**	**2007**	
2005/6	4655	4461	**-**	**-**
2006/7	4751	4397	4385	7.7
2007/8	4839	4414	4427	8.5
2008/9	4922	4492	4482	8.9
2009/10	5004	4602	4559	8.9
2010/11	5066	4733	4664	7.9

[9] Ofgem: National Grid Transco – Potential sale of gas distribution network businesses, Initial proposals on interim incentive schemes supporting the offtake arrangements, March 2005, Appendix 2

[10] Final proposals on extended transitional NTS Exit capacity and interruption incentive and formal licence consultation under section 23 of the Gas Act 1986, Ofgem, June 2007, Appendices to section 23 notice

[11] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, paras 3)a) and b)

5.8. The 2007 requests and allocations clearly show that GDN demand for NTS flexibility is far in excess of what might be expected based on changes in forecast peak day demand. Below we examine possible reasons why this might be the case.

DN incentive scheme

5.9. Under this scheme GDNs are set performance targets for the levels for booked (or allocated) NTS exit capacity (both flat and flexibility). There is also an element covering GDN interruption, and GDNs are expected to trade off the costs of interruption with flat NTS exit capacity requirements.

5.10. In developing the schemes Ofgem described one of the design objectives as mitigation of "a potentially rational tendency for the DNs to overbook NTS offtake (flat) capacity and NTS offtake (flexibility) capacity……as without appropriate incentives, DN shippers would bear the full cost of all additional NTS offtake rights requested by the DNs."[12]

5.11. We would expect GDNs to attempt to maximise performance under this scheme, in part through optimising the mix of flat and flexibility capacity booking levels to meet system demands. Ofgem highlighted that that substitution between zones had already occurred in response to the incentive scheme in late 2005[13], and it would be logical to extend this to product substitution if feasible. It may be that flexibility capacity (which as we described in section 3 provides access to rates above that implied by the flat capacity booking) can to an extent be used as a substitute for flat capacity, in which case an increase in flexibility bookings relative to target might be expected.

5.12. We do not have access to the information (GDN flat and flexibility requests and allocation data from previous years' OCS processes, and GDN performance to date under the incentive scheme) that would enable a further assessment of this area, and we are not aware that it is made publicly available.

5.13. A further important point relating to the incentive scheme concerns the absence of a target from 2011/12 onwards. Ofgem consulted on a further extension of the scheme as part of the GDPCR[14] process and decided not to incentivise flexibility capacity bookings in the period October 2011 to March 2013 "based on the clear view expressed by industry… that there is no shortage of flex capacity and that demand for the product is not anticipated to increase significantly".

5.14. Ofgem said that GDNs should instead be required through their licence to write to Ofgem in advance of submitting an increase in their flexibility bookings by more than 10 per cent per annum and that step changes in bookings would be expected to be mirrored by observable changes in the use of alternative capacity management options available to the GDNs on their own networks. Ofgem also said it would

[12] Ofgem: National Grid Transco – Potential sale of gas distribution network businesses, Initial proposals on interim incentive schemes supporting the offtake arrangements, March 2005, para 4.44

[13] Ofgem: Initial proposals on transitional incentive schemes supporting the offtake arrangements, September 2005, para 4.15

[14] Ofgem: Gas Distribution Price Control Review, Final Proposals, 3 December 2007, paras 6.42-6.49

review this decision if there was evidence that a flexibility constraint could reasonably be expected to arise.

5.15. The OCS process for 2008 should reveal how these new arrangements operate, but it should be noted that the absence of a target removes any financial mitigation relating to what Ofgem previously described as "the potentially rational tendency for the DNs to overbook…".

5.16. Given the step changes that have occurred to date we would expect Ofgem to have examined the use made by GDNs of what it described as alternative capacity management options at a much earlier stage. In the context of perceived scarcity of NTS exit flexibility there is clearly a role for the regulator in determining the cause of the rapidly increasing demand from a single class of (regulated) user.

GDN capex and opex influences on demand for flexibility

5.17. An ability to take increasing quantities of flexibility from the NTS can provide GDNs with benefits in a number of areas:

- Downsizing, deferral or cancellation of GDN projects providing flexibility has capex benefits
- Reduced usage, mothballing or decommissioning of existing GDN assets capable of providing flexibility may give rise to opex benefits.

5.18. We have compared data on GDN flexibility provision obtained from the PB Power report for the GDPCR[15] with flexibility requests and allocations during the 2007 OCS process, in an attempt to gain an understanding of how the proportion of flexibility provided from within GDNs might be changing. For the purposes of this exercise it is assumed that the total GDN flexibility requirements are unchanged from the GDPCR figures as the latest published peak demands are almost identical for the year analysed. The results are shown below:

Flexibility provision to meet GDN requirements 2008/9						
	NTS provision		**GDN self provision**		**Total**	
	mcm	%	mcm	%	mcm	%
GDPCR	12.9	17	55.5	83	68.4	100
2007 Allocation	15.6	23	52.8	77	68.4	100
2007 Request	22.5	33	45.9	67	68.4	100

5.19. Whilst this analysis only covers requirements in 2008/9, it is clear from the requests and allocations for subsequent years that the trend of reduced GDN self provision and increased reliance on NTS flexibility continues.

5.20. This appears to indicate that the means by which GDNs provide flexibility themselves may be used less, and may reflect a reducing

[15] GDPCR 5 Year Control (Capex/Repex) Update Report, 5 October 2007, Appendices 1-8

capability within GDNs, as a result of some asset decommissioning and/or changes in operating strategy or may even reflect greater uncertainty in future requirements.

5.21. Whilst it is appropriate that GDNs should seek to minimise the cost of flexibility provision this should not be at the expense of flexibility provision to other NTS users. It would be unacceptable if the flexibility capability nationally (NTS and GDNs) were to fall below the national requirement. This reinforces the points made elsewhere that there is a role for Ofgem in understanding the changes at a GDN level, and the need for fair apportionment of NTS flexibility.

Interruption

5.22. A revised regime for interruptible load within GDNs has been implemented and the new arrangements will have effect from 2011/12. These may involve a change in the relative proportions of firm and interruptible load within GDNs and could have a consequent impact on flexibility requirements.

5.23. There is an argument that interruptible load switching to firm status will require additional flexibility. However, we do not accept this will always be the case and increased flexibility requirements will be dependent on the nature of the interruptible load in question, in particular whether it is a network sensitive load (NSL) or not.

5.24. Existing interruptible load that is not categorised as NSL is by definition not subject to specific transportation constraints that can trigger interruption by the GDN. Under today's regime the load will therefore remain on under most high demand conditions and be provided with the necessary flexibility. We would therefore expect comparatively low additional flexibility to be required when the load formally switches to firm status under the revised arrangements.

5.25. On the other hand we would expect network sensitive loads that need to be interrupted at high demands to require additional flexibility on switching to firm status.

5.26. NG states[16] that it views the interruptible arrangements as one reason for the 4.7 mcm step change in GDN requests for 2010/11 and 2011/12. Our calculations show that even in the very worst case this change can not be fully attributed to revised interruption arrangements.

5.27. In aggregate the required interruption for GDNs in 2011/12 has been stated as being 251.6 GWh/d. The average diurnal storage requirements for GDNs is around 16% of peak day demand based on the information provided to Ofgem under the GDPCR, so under the very worst case assumption that all interruptible sites will go firm the additional linepack requirement after interruption reform will only be 3.6 mcm.

5.28. Furthermore, with few exceptions, existing interruptible load tends to be higher load factor with limited flexibility requirements so the averaged assumption of 16% of peak will lead to an overstatement of requirements. In the case of a continuous process load for example

[16] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, p9, para d)

there is likely to be very limited diurnal variation and hence flexibility requirements would be close to zero.

5.29. We conclude that changes to the interruption arrangements should not be a major driver of the recent increases in GDN flexibility demand.

Conclusions regarding GDN flexibility demands

5.30. The rapidly increasing demands of the DNO user class for NTS flexibility cannot be explained by changes in overall GDN requirements linked to forecast peak day demand.

5.31. The increases therefore appear to signal a reduced reliance on flexibility provided within the GDNs. This in turn could imply a surplus of capability to provide flexibility within GDNs, or even a reduction of that capability.

5.32. There are a number of possible drivers for this, including GDN capex and opex savings, incentive scheme performance and changes to the GDN interruption regime, but there is no visibility as to the actual cause, and it is therefore difficult to assess the extent to which the increased demands for NTS flexibility are appropriate.

5.33. These are regulatory matters which we would expect Ofgem to take a close interest in, irrespective of whether or not a flexibility product might be adopted. There is also an important interplay between the regulatory revenues and obligations of GDN owners on the one hand and NG as NTS owner on the other, that we do not feel has been sufficiently explored.

5.34. The increasing demands, in combination with the low NG estimate of available NTS flexibility, are giving rise to a perception of scarcity of NTS flexibility, and therefore need to be understood more fully. It would seem inappropriate, for example, if shipper users were subject to NTS flexibility constraints due to high GDN demands, at a time when there was surplus capability within the GDNs.

6. What is driving the perception of flexibility scarcity?

We have reviewed the NG assessments of available flexibility and projected usage which have led Ofgem to say that it cannot ignore NG's concerns that flexibility might become scarce in future.

Regarding availability, NG's assessment of 22mcm appears to be very conservative in that it is based on the simultaneous occurrence of "worst case" events. Using NG figures and more realistic but still conservative assumptions a figure of 25-26 mcm would appear more appropriate. Further, we estimate an additional 1 mcm can be added to account for recent reductions in forecast peak day demand. We also believe that alternative compressor operation strategies could enhance availability and that this should be explored.

Regarding the projection of flexibility usage from historic data, we believe that NG's methodology is unreliable for a number of reasons. We suspect that high historical usage may have been experienced under favourable operating conditions when NG is able to make available large quantities of additional flexibility under the short term mechanisms. This would not appear to be a reliable indicator of usage under more stressful conditions when the contractual flexibility rules are adhered to and additional short term flexibility is not made available.

Comparing an extrapolation of data derived on this basis with the 22 mcm availability limit derived from analysis of the most adverse operating conditions appears to have limited value. We suggest that comparisons of this type should at the very least use actual usage data under similar operating conditions as those assumed in deriving the availability limit.

Whilst we have little confidence in NG's usage projections derived from historical data, the GDN demand signals made through the OCS process are very clear, although as we note in the previous section there is no visibility as to the cause and it is therefore difficult to assess whether they are appropriate. There is also an important question as to whether it is realistic to assume the signalled demands will all occur simultaneously, as NG appears to do, and this is an area that could be usefully explored if the necessary data were made available.

We conclude that the perception of flexibility scarcity is being driven by a combination of the conservative availability limit set by NG and the increased demands of, and allocations to, GDNs.

Availability of NTS exit flexibility

6.1. In the IA Ofgem appears to accept the premise that the availability figure of 22 mcm put forward by NG[17] should form the basis for assessing scarcity. This value has been assessed making a specific set of assumptions with regard to supply and demand patterns, the location of demand for flexibility and the operational behaviour of connected systems.

6.2. We re-iterate our previous comments[18] that the NG assessment appears very conservative because it seems to take the most

[17] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid

[18] Commentary on National Grid NTS note "UNC0116: Enduring Offtake – Information request on the availability of NTS exit flexibility capacity", TPA Solutions, February 2008

pessimistic stance when examining the different assumptions that are used to model the availability.

6.3. Below we offer alternative approaches using NG figures that suggest a worst case figure of less than 25 mcm for 2010/11 cannot be justified, and 26 mcm would still be conservative.

6.4. Further we estimate an additional 1 mcm can be added to account for recent reductions in forecast peak day demand.

6.5. We then provide some commentary on pressure assumptions and compressor usage which we believe could lead to further increases in flexibility availability.

Alternative Methodologies

6.6. One approach would use the NG minimum peak day figure for flexibility availability with balanced distribution (26 mcmd), on the basis that this is a clear design figure. We assume under this approach that differences in supply and demand patterns or entry back loading that might occur coincidently with the peak day are either already accommodated within the design flow margin, or accounted for by the fact that there are no allowances in the NG methodology for diversity of flat and flexibility requirements between GDNs.

6.7. A second alternative approach could be to take the NG figure of 30mcmd for availability at a demand level of 400 mcmd, a typical demand day in winter (this is obtained by taking the average of the 31 mcmd for day 68 on the load duration curve and 29 mcmd for day 1 = 30 mcmd). Then, given that there is a much higher probability of this demand level occurring at the same time as a loss of the Isle of Grain terminal (IOG) or high east coast flows, apply the reduction as a result of one of these events to give a pragmatic assumption of the availability of flexibility. This would give a value of 30 – 4 = 26 mcmd should there be no IOG flows. Should it still be felt necessary to accommodate the most onerous supply pattern (high east coast flows) then this reduces to 25 mcmd. Dealing with the issue of backloading at the same time would seem to be one coincident event too far, and the flow margin has a specific provision designed to deal with this aspect anyway.

6.8. A third approach involves different assumptions regarding flows from IOG. NG state that the 22 mcm availability could in fact be 26 mcm if there could be a guaranteed maximum flow from IOG. They also however state that under 25% flow conditions the value is 25 mcm and at 50% flow conditions the linepack levels would increase to 27 mcm. In the commentary on this they acknowledge that there could be circumstances where a preferential supply pattern could occur which would give higher levels of flex as illustrated by the 50% flow example. Unfortunately NG does not say what that best case could be for judgement to be made. However, given the fact that the IOG is being expanded considerably the probability of no flow from the site would be significantly reduced and hence a more appropriate assumption would be to take the figure associated with 25% of peak flow which is 25 mcm.

Impact of forecast peak day demand reductions

6.9. There has been a substantial decline in NG peak day demand forecasts as set out in the recent TBE documentation[19]. Taken from the NG material it would seem that forecast 1 in 20 peak day demand for 2010/11 has fallen from 586 mcmd to approximately 540 mcmd.

6.10. The 22 mcm flexibility availability limit is based on the 586 mcmd peak day. NG quotes a higher flexibility availability of 29 mcm at 490 mcmd. It would therefore be reasonable to assume availability of 23 mcm at the revised peak of 540 mcmd, an increase of 1 mcm over the current availability limit.

Pressure assumptions

6.11. Within NG's response to Ofgem there is some commentary regarding pressure guarantees which warrants mention. NG has stated that as they offer higher pressure guarantees to GDNs then the available linepack will decline.

6.12. It should be noted however that there is a compensating benefit to GDNs as higher pressure assumptions lead to an increase in flex availability within the GDNs or avoidance of investment by GDNs for flexibility.

6.13. WWU have confirmed this in their recent Long Term Capacity Statement (page 6) – "Should the pressures as requested by WWU through the offtake capacity statement process result in higher assured pressures by NGG in the future, a significant reduction in the requirement to construct pipelines to supplement our linepack capability would be possible."

6.14. It is not possible to quantify these benefits in general terms as they are specific to the upstream and downstream networks at the point of offtake, but it would be reasonable to assume that there will be on average no net loss of linepack across the entire gas network.

6.15. Overall, therefore, we believe NG pressure commitments should make little difference to the aggregate availability of flexibility.

6.16. There is a further concern that the picture presented of future flexibility scarcity arises because of inconsistent pressure assumptions made by NG and GDNs, which serve to depress NTS availability and inflate GDN flexibility requirements. GDNs will no doubt base flexibility requirements on the minimum offtake pressures committed to by NG. However, NG may be assuming higher pressures in their chosen scenario, which would give an artificially low figure for NTS flexibility.

Compressor operation

6.17. An amount of flexibility is created by the way that compressors are operated. Whilst increased compressor usage to provide flexibility obviously incurs additional cost, we believe that there may be scope to create trade-offs between compressor operation strategy and the management of linepack and hence flexibility. We explore this in more detail in the context of incentive schemes in section 8.

6.18. A related point is that the existence of the flow margin creates a small surplus of compressor power at every compressor station over and

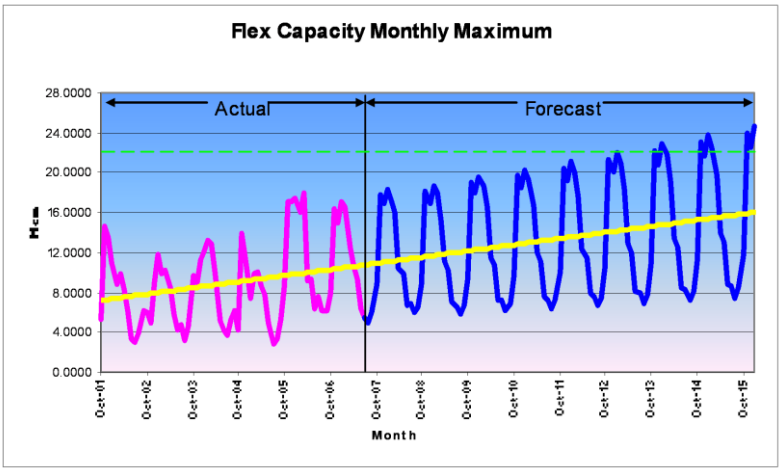
[19] Transporting Britain's Energy 2008: Development of NTS Investment Scenarios, National Grid, 10 July 2008

above the 1 in 20 peak day design capacity. This would suggest that at peak demand conditions there would be the opportunity to generate more flexibility than the current stated availability of 22 mcm. We would like to understand how much extra flexibility could be generated by this and whether it could be utilised by NG.

NG flexibility demand projections from historic data

6.19. In the IA Ofgem appears to accept NG's forecasts of total flexibility usage which indicate that usage is likely to exceed availability by winter 2012/13 or possibly earlier.

6.20. These forecasts are generated from a model which uses analysis of historical flexibility usage to project future usage. This model essentially takes the historical usage over a number of years to develop a trend line which is then projected forward to plot future usage:



Source: National Grid, UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity

6.21. The graph predicts that the 22 mcm of flexibility which NG has assessed as "available" will be exceeded in 2012/13.

6.22. We believe that this methodology is unreliable as it is not possible to validate in the first instance that the trend is genuine, given that it is a conversion from actual usage to forecast usage using a very basic trend analysis. It takes no account of historical conditions that lead to the usage, future changes in the market mix and usage patterns, and most importantly the impact of the current downward trend in GDN peak day demand.

6.23. In particular we suspect that high historical usage may have been experienced under favourable operating conditions, for example where there is high pressure cover or where frontloading of supplies occurs. In these circumstances NG is able to make available large quantities of additional flexibility under the short term mechanisms. This would not appear to be a reliable indicator of usage under more stressful conditions when the contractual flexibility rules are adhered to and additional short term flexibility is not made available.

6.24. Comparing an extrapolation of data derived on this basis with the 22 mcm availability limit derived from analysis of the most adverse operating conditions appears to us to be of limited value.

6.25. We therefore have little confidence in the trend line and projections of future usage. We suggest that comparisons of this type should at the very least use actual usage data under similar operating conditions as those assumed in deriving the availability limit.

Effect of cold weather

6.26. NG presents further analysis of the impact of severe weather on GDN usage of flexibility. This implies that the actual usage trend-line should be increased by around 6.5 mcm to account for severe weather.

6.27. NG has derived future flexibility usage under severe weather conditions using a combination of historical flexibility usage and a simplistic model of the flexibility/CWV relationship.

6.28. We do not believe this is a reliable methodology, as there is no actual data on the impact that severe weather would really have on flex usage to validate the modelling. The last occurrence of severe weather was in 1985/6 and NG has not presented actual flex usage in that year as presumably it was not recorded at the time. Without the actual usage data it is not possible to validate the output from NG's simulated LDZ flow flex for 1985/6 which shows a peak requirement of 18 mcm.[20]

6.29. The regression analysis carried out by NG correlating flex usage against CWV does not have particularly high confidence levels and when translated into a 1 in 50 severe winter usage exhibits significant variability.

6.30. Furthermore the usage data relates to recent benign weather conditions. We would expect that as weather approaches severe conditions there will be a reduction in diurnal variation as space heating reaches its upper operational limits and runs continuously to maintain comfortable inside temperatures.

6.31. Also the design peak day may never be achieved as some commercial load management may occur as spot gas prices rise dramatically. Also some commercial and industrial operations may close down due to staff shortages resulting from the inability of employees to travel to work (see Transco/NERA study)[21]. This would free up capacity which could then be used to meet flexibility requirements.

Non-coincident flexibility demands

6.32. Whilst we have little confidence in NG's demand projections derived from actual usage, the GDN demand signals made through the OCS process are very clear, although as we note in the previous section there is no visibility as to the cause and it is therefore difficult to assess whether they are appropriate.

6.33. There is an important question as to whether it is realistic to assume the signalled demands will all occur simultaneously, as NG appears to do. This is an area that could be usefully explored although we are not aware of any publicly available information that would allow an independent analysis of this issue.

[20] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, p37, para 16

[21] "Study to investigate the likelihood of firm load self-interruption in a severe winter - A final report for Transco plc", Prepared by NERA, May 2002

7. Why is the flexibility product not a universal solution?

Ofgem has suggested that extension of the proposed flexibility product to apply to shipper users as well as DNO users would address issues of discrimination and potential scarcity. Our analysis suggests that there is no compelling evidence for these concerns. However, even if our reservations were ignored, we are not persuaded that the universal adoption of the flexibility product is an appropriate course.

We believe that whilst the flexibility product may offer a pragmatic solution for DNO users, consistent with their requirements for a relatively simple planning tool and their lack of need for rapid offtake rate changes, its extension to shipper users as a universal application of a commercial product raises a number of potential problems (in addition to the direct costs and inconvenience of implementation):

- *Creating additional complexity and risk for shippers, whilst still not fully addressing operational issues for the transporter*
- *Giving potentially misleading and unreliable signals of future investment requirements*
- *Causing unintended consequences for exploitation of the product, such as an incentive for TCCs to trim their capacity bookings (in a way that would not be available to similar loads embedded within GDNs)*

Ofgem have themselves identified that there is a concern in extending the application of the flexibility product at exit when there is no equivalent initiative at entry. To this we would add that it appears inequitable to focus on the usage of NTS flexibility by shipper users and DNO users whilst ignoring the different use of flexibility by users within the GDNs.

We suggest that if, despite our reservations about the need for fundamental reform of exit arrangements, it is nevertheless still considered essential to implement "common terms" at exit for all NTS users, then there are more promising alternatives than the flexibility product for consideration, as outlined in Appendix C.

General considerations

7.1. The design of any transportation regime requires a choice to be made concerning the extent to which arrangements are explicitly contractualised between transporter and network user. Specifically, what products should be defined (and how) for sale and purchase, and what matters should be left within the operational remit of the transporter. (The absence of contractualisation need not mean unfettered discretion for the transporter – for example there may be licence obligations, operational guidelines, transparency requirements and/or financial incentive schemes supervised by the regulator.)

7.2. As a guiding principle, too little (or too simple) contractual definition and there is a risk of the operator's "discretionary" remit being too broad, and the potential behaviour of shippers giving rise to costs that may not be properly targeted. At the other end of the spectrum, greater contractual definition in pursuit of more accurately describing network operations creates the risk of excessive implementation costs and/or transactional complexity, as well as potential unintended consequences.

7.3. A key concern with the proposed flexibility capacity product is the ephemeral nature of the product and its dependency on installed peak day capacity as well as ullage in the system. The adopted definition of flexibility is simplistic

and essentially arbitrary and at best can only be a crude approximation of the underlying issue of diurnal variability of pipeline utilisation. "Flexibility" is clearly not a distinct product in the same sense as "flat" capacity and this makes it difficult to provide for, both from an investment and a linepack management perspective.

7.4. Ironically, the proposal is by turns creating extra contractual complexity (and commercial risk) for shippers yet is still too simplistic to address fully the underlying operational issue. The transporter will still need to exercise considerable operational discretion (perhaps subject to new regulatory oversight and/or incentivisation) because the proposed contractual product is an inadequate description of flexibility.

7.5. Furthermore, as with any introduction of a new defined commercial product, there are key issues of determining product availability and methods of apportionment (and consequences of any emergent scarcity). There is an almost inevitable tendency for the operator to err conservatively in its estimation of product availability, in order to minimise operational and/or commercial risk, or to maximise opportunities from potential incentive schemes.

7.6. There may also be a risk that users err on the side of caution and overbook capacity, especially where they are not exactly sure of their requirements. This tendency may be compounded by the aggregation of bookings by the transporter without allowance for coincident demand, thereby contributing to the perception of scarcity.

7.7. Risk is exacerbated by the extent to which the new product only partially addresses operational realities – by limiting the quantity of new product made available the transporter preserves some margin against the potential for real world demands to exceed the contractual. Opportunities arise from the prospect of financial incentive schemes designed to encourage "efficient behaviour" by the transporter, and in particular to address the perceived prospect of product scarcity.

7.8. Put simply, we should not be surprised that a transporter tends to both exaggerate the prospect of operational difficulty and to understate the availability of product and capability.

Relevance of flexibility product to the system operator

7.9. At best, the flexibility product is a pale imitation of the physical flexibility managed by the system operator, adopting an artificial and highly simplistic measure of the underlying capability and operation of the system.

7.10. The product compounds this inherent weakness by assuming an unchanged impact on the system for each day of the year, irrespective of the prevailing demand or linepack situation.

7.11. It also fails to deal with rate changes, currently addressed contractually via ramp rate restrictions, and rate change/notice period limitations, and which would still be required for use in conjunction with the flexibility product.

7.12. This makes the system operator role more complex – rather than dealing with flexibility in an holistic manner the SO is required to honour its commitments to make the artificial commercial product available whilst also managing all the other practical facets of system flexibility not covered by the product.

7.13. Such an approach unnecessarily creates potential operational uncertainty, introducing risks and inefficiency into the linepack management process.

Signalling investment requirements

7.14. An obvious observation is that the proposed arrangements do not explicitly contemplate NTS investment to provide flexibility – indeed, the availability of the flexibility product is deliberately capped.

7.15. However, it should be acknowledged that in theory, as with any product, an excess of demand over supply could be signalled and the proposed arrangements could then be further revised so that NTS investment to meet the need for flexibility was made in response. This would not be an altogether surprising development given Ofgem's attachment to the so-called "user commitment" model elsewhere in the commercial regime.

7.16. Whether such a signal would lead to an efficient outcome depends on a number of other factors:

- Is the signalled scarcity (or adequacy) real or artificial?
- Is the "scarce" commercial product well defined and clearly aligned with an appropriate investment response?
- Is there a better way of addressing any genuine requirement for more system flexibility?

7.17. There are a number of reasons to be concerned about the efficiency of outcomes in this context:

- System users able to make longer term commitments may tend to overbook flexibility rather than risk being exposed to constraints, thereby creating a false signal of scarcity. This tendency may be compounded by the difficulty of making allowance for co-incident demand for flexibility.
- Conversely, some users may avoid making longer term commitments and rely on short term availability (and non-coincident demand), thereby not providing an advance signal that can be met by an investment response.
- Even where there is genuine potential scarcity, it may not be sensible to rely on a user commitment model to drive investment decisions because:
  - the inherent difficulty of matching the commercial product with the investment response, especially given that diurnal flexibility has traditionally been a by-product of investment to meet peak demand
  - consequently, how should incremental investment costs be apportioned between meeting flexibility and peak "flat" demands?
- Unlike with entry capacity, where only shippers are bidding who have no alternative means of providing such capacity, GDN operators may signal demand for NTS exit flexibility that might be more cost effectively met from within their own networks.

7.18. These potential problems suggest a need for regulatory incentives and/or oversight to ensure sensible outcomes. Given this requirement, and the other failings of the flexibility product, it would seem far more sensible to rely on such regulatory approaches and avoid the expense and risks associated with operating a universal flexibility product in parallel.

Potential unintended consequences of flexibility product

7.19. We have already alluded to the risks of artificial scarcity (or conversely unmet demand) associated with the introduction of, and reliance upon, a flexibility product with uncertain requirements, prices and availability.

7.20. These are not unfounded concerns, as the experience of the NTS entry capacity regime over the years has demonstrated, and this in spite of a far more clearly defined and understood product than that proposed for exit flexibility.

7.21. The early auction experience at St. Fergus highlighted the dangers of users being stampeded into demanding a product that has suddenly become rationed, with consequent market distortion and loss of confidence.

7.22. The responses to this perceived scarcity (immediate introduction of discounted firm and interruptible short term products, and subsequent raising of the total quantity of product offered) ironically then helped to create conditions in which many shippers saw no point in booking capacity in advance and instead relied upon shorter term availability.

7.23. This culminated in the recent problems of scarce entry capacity at Easington, where the operator has taken the absence of sufficient advance user bookings of long term capacity as a justification for not making adequate new investments in a timely manner.

7.24. It can be argued that the operator need not rely exclusively on user signals, and indeed this had been understood to be the case with entry capacity investment prior to the Easington problem. However, Easington has demonstrated the dangers of combining the user commitment model with more traditional operator planning methods.

7.25. This would be of particular concern should a genuine flexibility shortage arise at a pinch-point on the system that the system operator had failed to address due to a lack of "demand signal". The prospect of loads with sufficient peak day (flat) capacity being restricted in their operation due to an (understandable) inability to signal advance demand for a nebulous flexibility product is alarming.

7.26. It should also be borne in mind that the stakes for the individual consumer may well be higher at exit rather than entry. A failing of the entry capacity regime may result in some general pricing disturbance and inefficiency, but at least it should still be possible for consumer demand to be met. However, a failure at exit, due to the typically lesser substitutability, can deny the consumer access to the full quantities of gas required at the times when they are needed.

7.27. Another possible unintended consequence of the proposed flexibility product concerns potential changes in capacity booking levels by TCCs. If the flexibility product is extended to them, then there is the opportunity for shipper users to trim their "flat" capacity bookings compared with their current daily exit capacity bookings (which are 24 times peak hourly rate). This is because (as explained in section 3) the flexibility product affords considerable scope to increase peak offtake rates for parts of the day without incurring the capacity charges that would currently be faced by a TCC.

7.28. This could have the effect of increasing the pre-booked demand for the flexibility product whilst simultaneously reducing income from flat capacity sales, which will need to be recovered from other users, presumably via increased flat capacity charges for DNO users (and flat offtake TCC loads).

7.29. Furthermore, large loads embedded within the GDNs would not enjoy the same opportunity to exploit the flexibility product rules to reduce their capacity charges, even if they wished to operate in exactly the same manner as directly connected transmission loads.

7.30. As discussed in earlier sections, DNO users are already potentially able to reduce flat capacity bookings by increasing flexibility holdings. Whilst bringing little or no benefit to individual GDN customers, this facility could be of benefit to DNOs (including those retained by NG) in optimising their income under the regulated incentive schemes governing NTS exit capacity booking.

7.31. Perhaps we should not be altogether surprised that NG are already seeking to allocate the "full" availability of flexibility product to GDNs (including those in their ownership), whilst simultaneously expressing concern that TCCs might not wish to operate at the uniform rates that have been assumed.

Rationale for focus on NTS exit flexibility

7.32. Ofgem's proposals have been designed to address concerns about potential cross-subsidy and undue discrimination between GDNs and TCCs. Whether or not Ofgem's concerns in this regard are well founded, there are a number of other areas where they do not appear to have brought the same focus to bear.

7.33. Differential use of NTS flexibility

There appears to be no recognition of, or intention to address, the different requirements for NTS exit flexibility of customers within a GDN. Instead, the GDN operator is expected to take an aggregate view of requirements across the network as a whole. This contrasts sharply with Ofgem's intention to address perceived cross-subsidies between GDNs as a whole and TCCs. How have Ofgem determined that this represents a more pressing issue than say the relative use of NTS flexibility by residential customers compared with I&C loads within GDNs?

7.34. Use of GDN flexibility

Building on the point above, there is no attempt to identify differential use within the GDN of the flexibility provided by the GDN itself. What is the basis for concentrating solely on the use of NTS flexibility rather than that provided by the GDN, especially since such diurnal flexibility provision is one of the core functions of a distribution network?

7.35. Linkage with gas balancing

The explanation for this rather curious focus of regulatory interest may well be traced back to Ofgem's longstanding reservations concerning the gas balancing regime in GB. Ofgem has previously argued strongly for shorter balancing periods in the GB gas regime, apparently motivated by a desire to "narrow the gap" between the gas and electricity regimes so as to limit the scope for arbitrage between regimes by gas fired generators. Whilst it is outside the scope of this note to address the basis of such concerns and the proposed "solution", it may explain why Ofgem continues to focus narrowly on the use of NTS flexibility by connected loads such as power stations rather than address such issues from a more holistic perspective.

We note in this context that Ofgem decided not to immediately pursue balancing reform but to institute and monitor a "range of indicators that could indicate that further reform in this area was necessary" (as

acknowledged at para 4.29 of the IA). It would be very helpful to see what the results of this monitoring have been, and what bearing they have had on Ofgem's thinking in relation to the perceived need for reform of exit capacity arrangements as a proxy for revisiting the balancing arrangements more directly.

Conclusions

7.36. The potential application of the flexibility product to shipper users raises concerns of implementation costs, transactional complexity, operational risk, unreliable investment signals and unintended consequences.

7.37. We believe that flexibility is an issue that is best managed by the system operator taking a holistic perspective, rather than by creating an artificial user-facing product, demand for which would need to be signalled by shipper users who are uncertain of their precise requirements and can have little understanding of its availability.

7.38. The question of whether or not the existing "dual category" arrangements are unduly discriminatory has been considered elsewhere, and we do not accept Ofgem's premise. Furthermore, we would contend that the proposed flexibility product is likely to create as many potential problems of discrimination as it is claimed to address.

7.39. We suggest that if, despite our reservations about the need for fundamental reform of exit arrangements, it is nevertheless still considered essential to implement "common terms" at exit for all NTS users, then there are more promising alternatives than the flexibility product for consideration.

7.40. One such alternative would involve allowing NTS users to choose between "hourly" and "daily" capacity products. Another would be the universal adoption of terms similar to those currently applying to TCC offtakes, with appropriate operational tools such as buy-back arrangements for NGG. Appendix C provides a summary of these two alternative approaches.

8. What changes are required to cater for the future?

Having reviewed the existing flexibility arrangements in some detail we believe they form a sound platform for the future. The differentiation in contractual terms applicable to DNO users and shipper users appears to meet the practical needs of both user classes and their respective customers, and furthermore we believe from our analysis described earlier that such differentiation should not be viewed as unduly discriminatory.

We have identified the need for two modest amendments to address minor shortcomings relating to equitable apportionment of available flexibility. One would cap pre-commitments made to DNO users at an equitable level. The other, a corollary of the first, ensures shipper users as a class can access a minimum level of flexibility (the remainder after pre-commitments) through the short term processes. The applicable peak day exit capacity charges (reflecting capacity holdings) are used as a means of ensuring equitable apportionment of the flexibility by-product between shipper user and DNO user classes.

A further refinement concerns constraint management and builds on Ofgem's suggestion of introducing flow management tools under an incentive scheme. This would provide NG with capability to increase or decrease entry and exit flows, reducing the demand for flexibility or increasing its availability accordingly.

We have also suggested that NG should also be incentivised to provide more flexibility from within the NTS itself, for example by use of compressors to provide additional linepack and hence flexibility, where it is economic and efficient to do so. In this context there is a linkage between flexibility and the SO incentives covering linepack and the compressor fuel element of shrinkage, and accordingly we suggest that the flexibility incentive be considered in tandem with linepack and shrinkage incentives, whether as part of the ongoing review of SO incentives or through a separate process.

Finally we note that the increasing GDN demands for NTS flexibility are a key factor in the consideration of future usage and a much fuller understanding of the underlying drivers is required to establish whether the increases are consistent with the economic and efficient operation of the gas transportation system as a whole. We also suggest that the relative merits of NTS and GDN investment for flexibility provision should be explored to aid in consideration of future flexibility regime developments.

Existing arrangements as a platform for the future

8.1. In our view a key objective of the flexibility arrangements going forward is to ensure that flexibility within the NTS is made available to NTS users in a pragmatic, practical and equitable manner, enabling users of whatever class to serve customers effectively and efficiently.

8.2. We consider that issues of pragmatism and practicality are already satisfactorily dealt with under the existing arrangements through the differentiation in contractual terms as between shipper users and DNO users.

8.3. Members of each class appear broadly content with structural aspects of the contractual arrangements – for DNO users the flexibility product enables forward planning to meet the needs of connected GDN load, whilst for shipper users the shorter term rate change and notice period provisions facilitate variable flows in accordance with the needs of their downstream customers.

8.4. Further, we believe that such differentiation should not be viewed as unduly discriminatory, based on our detailed examination of contractual terms set out in section 3.

8.5. It therefore appears to us that the existing flexibility arrangements constitute a structurally sound and pragmatic platform for the future. We have identified the need for some modest amendments (which we describe below) to address minor shortcomings relating to equitable apportionment and constraint management.

8.6. We therefore consider that, with appropriate refinements, those modification proposals that largely retain the existing flexibility arrangements (Mods.116CVV, 195, 195A) could form the basis for an appropriate future regime.

Refinements to existing flexibility arrangements

8.7. There are two key aspects of the existing flexibility arrangements that form an important backdrop to consideration of refinements. Firstly, NG does not invest specifically to provide flexibility – rather, available flexibility is a by-product of investment to provide peak day capacity. Secondly, and consistent with the above, there is no separate charge for flexibility – it is included within the applicable peak day exit capacity charges (the peak day capacity held multiplied by the applicable rate for the exit point).

8.8. Given this, it appears reasonable and logical to use applicable peak day exit capacity bookings as a means of ensuring equitable apportionment of the flexibility by-product between shipper user and DNO user classes, and accordingly this is what we propose in two of the refinements described below.

Refinement 1: Pre-commitment maximum

8.9. We noted in section 4 that under the existing arrangements there was the potential for excessive pre-commitment to DNO users which could conflict with shipper user access to short term flexibility, and with NG's contractual obligations to provide such access.

8.10. We suggest that this could be addressed by capping pre-commitments made through the OCS process at a maximum level. The level would be derived by apportioning the available flexibility between DNO user and shipper user classes based on the applicable exit capacity bookings for each class of user.

8.11. In paragraph 4.30 we showed how a similar methodology (using peak day demand as a proxy for applicable capacity levels) would, if applied during the 2007 OCS process, result in an apportionment of the 22 mcm of available flexibility for 2010/11 as follows:

DNO users	16.7 mcm (76%)
Shipper users	5.3 mcm (24%)

Note: Shrinkage volumes excluded from calculation

8.12. With this refinement, allocations to DNO users would have been capped at 16.7 mcm (somewhat lower than the 17.47 mcm actually allocated) ensuring the remaining 5.3 mcm was available for use by shipper users accessing flexibility through the short term mechanisms.

8.13. The methodology may need further development to deal with issues of zonal availability and allocation, again using the principles of equitable apportionment described above.

8.14. Further consideration could be given to the approach in situations where demand from DNO users is in excess of the maximum allocation limit – a situation similar to that described by NG in relation to the 2007 OCS process. We suggest that a better understanding of the drivers for GDN flexibility

demand increases (see below) would inform debate on this issue. Possible solutions include the process currently used by NG, involving the "equitable reduction" of demands across the constrained location.[22]

Refinement 2: Short term access minimum

8.15. In some senses this is a corollary of the refinement described above. If there is an equitable maximum level of flexibility pre-commitment to DNO users there should also be an equitable minimum of flexibility accessible to shipper users through the short term processes.

8.16. Using the same example as above, the equitable minimum apportioned to shipper users for 2010/11 would be 5.3 mcm.

8.17. The minimum would be given effect through the short term flexibility access rules. These would be amended to state that shipper user requests to vary rates more quickly than the prescribed rate change and notice period limits are to be accepted, provided flexibility usage by the shipper user class as a whole does not exceed the equitable minimum.

8.18. To the extent the equitable minimum remained unused by shipper users, it could be made available to DNO users through the short term access processes.

8.19. The application of these rules would require NG to monitor collective flexibility usage by shipper users. We do not see this as an onerous task – flow rates at all NTS exit points are already continuously monitored and NG receives offtake profile notices setting out intended changes. In effect NG would need to apply the same monitoring procedures as it presumably does at GDN exit points, where the flexibility product forms a key part of the contractual arrangements.

8.20. We recognise that collective shipper user flexibility usage (as measured using the flexibility product) may not always reflect the capability of the NTS to accommodate large rate changes at short notice at a particular exit point. Indeed, one of our key concerns with proposals that involve universal application of the flexibility product is that the product does not deal adequately with all aspects of system flexibility – in particular "rate change" flexibility (we expand on this point in section 7).

8.21. It may therefore be necessary to include provisions within the short term flexibility access rules that afford NG legitimate protection in these circumstances. Likewise, there may be zonal considerations that need to be factored into the rules.

8.22. Irrespective of these detailed considerations, we believe that the principle of reserving an equitable amount of flexibility for short term shipper user access is sound, and the case for such arrangements is strengthened on the introduction of a user commitment approach to peak day exit capacity booking.

8.23. Shipper users, in making a forward commitment to peak day capacity, are implicitly also making a forward commitment to flexibility, because the capacity charges incorporate an element covering flexibility. In such circumstances it is reasonable for NG to make a reciprocal commitment that an appropriate amount of flexibility will be available for use by the shipper user class as a whole.

[22] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, p 18, 8) and Appendix 10

Refinement 3: Flexibility constraint management tools

8.24. Ofgem has put forward a potential option that would introduce additional flexibility constraint management tools, as a means of managing the requirement for flexibility capacity without having to introduce a flexibility product of the type proposed by Mod.116V and such variants.

8.25. This would involve operational arrangements and an incentive scheme under which NG would manage any flexibility constraints that do emerge by taking actions, in a non-discriminatory way either at entry or at exit.

8.26. We consider this would be a useful addition to the regime as it would provide NG with a further means of addressing flexibility constraints should they arise.

8.27. As we see it, the operational arrangements could be given effect through contracts enabling flows at entry or exit points to be increased or decreased. This could have the effect of either reducing the demand for flexibility or increasing its availability. Contracts could be put in place on a forward or option basis, as well as through on-the-day processes.

8.28. Particular attention would need to be paid to ensuring the contracts deliver the required absolute rate change at an entry or exit point, irrespective of the presence of multiple users. Careful contract design is required to avoid the performance validation problems associated with locational OCM balancing actions.

8.29. The funding of any flexibility incentive scheme also requires careful consideration to ensure equitability. It would not seem appropriate for example, where the collective utilisation of one class of user was consistently less than its equitable apportionment, for users in that class to fund constraint management actions incurred solely due to the behaviour of members of the other class.

8.30. We would expect incentive scheme funding to be of particular concern to shipper users, whose collective utilisation apparently remains at zero and is projected by NG to do so for a number of years. There is a reasonable degree of headroom before the indicative apportionment level of 5.3 mcm usage might be approached. By contrast, DNO user allocations for flexibility already exceed the indicative apportionment level. This may suggest that, to the extent flexibility constraint management actions are required in the short to medium term, DNO user utilisation may well be the cause.

Flexibility availability

8.31. We believe that NG should also be incentivised to provide more flexibility from within the NTS itself, as well as having access to the operational tools described above. In this context there is a linkage between flexibility and the SO incentives covering linepack and the compressor fuel element of shrinkage. Additional compressor usage can provide eztra linepack which in turn can provide additional flexibility. Consideration should be given to other means whereby NG could enhance available flexibility where it is economic and efficient to do so, and incentive arrangements that might be appropriate.

8.32. We suggest that the flexibility incentive be considered in tandem with linepack and shrinkage incentives, whether as part of the ongoing review of SO incentives or through a separate process.

8.33. Close monitoring of actual flexibility usage and information on the use or otherwise of short term access provisions may help clarify availability further, and would provide useful inputs to inform this debate.

GDN demands

8.34. The increasing GDN demands for NTS flexibility are a key factor in the consideration of future usage. A much fuller understanding of the underlying drivers is required to establish whether the increases are consistent with the economic and efficient operation of the gas transportation system as a whole.

8.35. We suggest that the relative merits of NTS and GDN investment for flexibility provision should also be explored to aid in consideration of future flexibility regime developments.

Appendix A

Examination of existing flexibility arrangements

Table A1: Exit and Offtake Capacity

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Exit and Offtake Capacity	TPD B 1.2.3 (b)	**NTS Exit Capacity** is capacity in the NTS a shipper user is treated as using **in offtaking gas**	**NTS Offtake (Flat) Capacity** is capacity which a DNO User is treated as utilising in causing or permitting gas to flow from the NTS **at a rate which is even over the course of a Day**	TPD B 1.2.3 (d) (i)	These rules provide a conventional daily capacity product for shipper users, and introduce separate flat and flexibility capacity products for DNO users. The latter requires DNO users to book flexibility quantities where they wish to flow at variable within-day rates (in particular at rates higher than the average over the first 16 hours of the day), whereas there is no such requirement on shipper users.
			NTS Offtake (Flexibility) Capacity is capacity which a DNO User is treated as utilising or releasing from utilisation, in causing or permitting gas to flow from the NTS **to the extent that the rate of offtake or flow is not even over the course of a Day** Flex usage=(quantity offtaken up to 2200 hrs less 1.5% tolerance) less (quantity offtaken over dayx16/24)	TPD B 1.2.3 (d) (ii) B 6.5.5	

Examination of existing flexibility arrangements (continued)

Table A2: Flexibility acquisition processes

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Flexibility acquisition processes	–	No separate rules for flexibility acquisition – flexibility is provided via contractual rights associated with NTS Exit Capacity	Flat and flexibility capacity (and assured pressures) made available for up to four years in advance, subject to feasibility test, through Offtake Capacity Statement (OCS) process	TPD B 6.2 and 6.3	For shipper users, flexibility is provided via contractual rights associated with holding NTS exit capacity, which once acquired is available to the user on effectively an evergreen basis. For DNO users, the OCS process determines the annual level of flat and flexibility capacity holdings for up to four years in advance
	TPD B 3.2, 3.9, 4 and G5	NTS Exit Capacity for supply points and CSEPs can be registered on relatively short notice, subject to a feasibility test and reduction provisions addressing seasonal profiling, and is then available on, in effect, an evergreen basis			

Examination of existing flexibility arrangements (continued)

Table A3: Maximum rates

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Maximum rates	TPD J 4.5.2	Offtake Profile Notice (OPN) rates not to exceed Permitted Offtake Rate (Permitted Offtake Rate is Supply Point Offtake Rate (SPOR) for supply points, as per NExA for CSEPs, J 3.10.2 for DNOs)		TPD J 4.5.2	These provisions limit shipper users at all times of the day to the rate defined by the capacity booking (i.e. capacity/24). For DNO users holding flexibility capacity the limit on the instantaneous rate at any time is higher than the equivalent for shipper users by an amount calculated as the Flex capacity holding divided by 4. This higher maximum rate cannot be sustained throughout the day because of the limitations imposed by the flexibility and flat capacity bookings. Nevertheless a DNO user holding an amount of flexibility capacity (F) is entitled to operate during the first 16 hours of the day at an average rate higher than the equivalent shipper user by some F/16 rate units. As we explain in the main body of the document this provides DNO users with access to "high rate flexibility" that is denied to shipper users unless they book more capacity.
	TPD G 5.4.1	Booked capacity is 24 x Supply Point Offtake Rate (SPOR) is Capacity/24 for NTS supply points i.e. SPOR is Capacity/24	Max permitted rate = Flat/24 + Flex/4	TPD J 3.10.2	
	TPD J 3.8	Must not exceed SPOR (DM supply points)	OPN would not result in flex or flat overrun (governs maximum average rate over first 16 hours and day as a whole respectively)	TPD J 7.2.2	
	TPD J 3.9	Must not exceed max permitted rate for user (CSEP NExA)			

Examination of existing flexibility arrangements (continued)

Table A4: Rate changes and notice periods

Feature	Shipper users		DNO users		Commentary
	Ref.	**Description**	**Description**	**Ref.**	
Rate changes and notice periods	TPD J 4.5.5	OPNs to be in accordance with rate change/ notice period provisions		TPD J 4.5.5	The rate change and notice period provisions are, on the face of it, fairly similar for shipper users and DNO users at an individual exit point level. However, DNO users are significantly constrained at an LDZ level such that changes to the aggregate rate from all offtakes are limited to 5% of the prevailing rate per hour, on two hours notice.
	TPD J 4.5.4	Typically Increases > 50% = 4 hours > 25% <50% = 2 hours <25% = 1 hour Decrease = 1 hour	**Individual offtake** Increase>50% max on 4hrs 50%> Increase >25% max on 2hrs Increase <25% max on 1hr Decrease on 1hr Where max = flat/24	OAD I 2.3	
			LDZ as whole Change in aggregate flow limited to 5% of prevailing rate per hour on 2hrs notice	OAD I 2.3	

Examination of existing flexibility arrangements (continued)

Table A5: Tolerance on prevailing rates; Ramp rates

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Tolerance on prevailing rates	TPD J 4.6	Tolerance (as per Network Exit Provisions) on prevailing rates in OPNs Typically 3%	Offtake level tolerance 10% of prevailing rate LDZ tolerance level tolerance 3%of prevailing rate	OAD I 3.1	In this case DNO users have a significantly wider tolerance than shipper users at an individual exit point level but at an LDZ level the tolerance is reduced to the shipper user level.
Ramp rates	TPD J 4.7	Typically Increase 50,000kW/min Increase 100,000kW/2mins Decrease 50,000kW/min	May have ramp rates (but not usual?)	OAD I 3.2	As we understand it ramp rates are designed in most cases to protect offtake equipment from surges in gas flows (although in certain isolated cases they may be needed to protect nearby compressor equipment). The importance of the provisions to NG therefore largely depends on whether it owns the offtake equipment, which in the case of many exit points (particularly GDNs) it does not. We do not therefore believe ramp rates are a material issue in the context of NTS exit flexibility

Examination of existing flexibility arrangements (continued)

Table A6: Short term acquisition - relaxation of rules

<table>
<tr><th rowspan="2">Feature</th><th colspan="2">Shipper users</th><th colspan="2">DNO users</th><th rowspan="2">Commentary</th></tr>
<tr><th>Ref.</th><th>Description</th><th>Description</th><th>Ref.</th></tr>
<tr><td rowspan="6">Short term acquisition - relaxation of rules</td><td>TPD
J 4.5.6</td><td colspan="2">NG to provide rate changes within notice periods if requested and feasible with no operational balancing requirement</td><td>TPD
J 4.5.6</td><td rowspan="6">Both shipper users and DNO users can ask for rate changes at shorter than the prescribed notice and NG must comply if in its judgement it is feasible to do so without an operational balancing requirement arising.
A similar obligation on NG applies where DNO users request additional quantities of the flexibility product via an OPN.
NG uses a published allocation methodology in considering multiple requests.
There is a provision applicable to DNO users within the OAD, which specifically provides for NG, at its discretion, to waive OPN restrictions if requested.
Shipper users can also obtain relaxations pertaining to specific circumstances of inter-tripping, forced outages and requirements for power station frequency response. Given the short duration and/ or infrequent occurrence of these events we do not believe they are material.</td></tr>
<tr><td>N/A</td><td>N/A</td><td>NG to provide short term additional flex capacity if requested and feasible and no operational balancing requirement would result</td><td>TPD
J 7.3</td></tr>
<tr><td>TPD
7.3.2</td><td colspan="2">Where there are multiple requests for changes within notice periods and/or for additional flex NG will consider in accordance with a published allocation methodology</td><td>TPD
7.3.2</td></tr>
<tr><td>TPD
J 5.7</td><td>Inter-tripping and forced outages
Notice periods and ramp rates disapplied (supply points)</td><td rowspan="2">Waiver
Can submit OPN that does not comply with rules as a request , and NG can agree to waive restrictions</td><td rowspan="2">OAD
I 2.6</td></tr>
<tr><td>TPD
J 5.8</td><td>Frequency response
Tolerance on OPN rates, notice periods, ramp rates disapplied (supply points)</td></tr>
</table>

Examination of existing flexibility arrangements (continued)

Table A7: NTS rights

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
NTS rights	N/A	N/A	NG can require the DNO user not to use the flex product (at an LDZ rather than individual offtake level) if demand <50%peak The DNO user can only refuse if in its reasonable opinion to comply would significantly prejudice security of supply or the safe operation of the LDZ:	OAD I 2.5	Publication of information regarding the extent to which such rights are exercised (and complied with or refused) would be helpful in the consideration of flexibility issues more widely.
			NG can request flow swapping between offtakes, so long the as the OPN for the LDZ as a whole remains the same	OAD I 2.4	As this provision does not affect the overall provision of flexibility to DNO users we do not consider it material.

Examination of existing flexibility arrangements (continued)

Table A8: Pressures

Feature	Shipper users		DNO users		Commentary
	Ref.	**Description**	**Description**	**Ref.**	
Pressures	TPD J 2.1	Applicable offtake pressure (statutory minimum)	Assured Offtake Pressures Cannot be reduced for a particular year once committed to	TPD J 2.5	The pressure commitments made to DNO users are more complex and we understand generally higher than those for shipper users. The pressure provisions are important to DNO users in making use of booked flexibility capacities – without pressure commitments DNO users would be uncertain as whether they would be able to flow at the profile rates required
	TPD J 2.2	Special offtake pressure and anticipated normal offtake pressure (ANOP) Can be reduced on notice	More on assured pressures – pressure requests	OAD I 4	

Examination of existing flexibility arrangements (continued)

Table A9: Capacity charges

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Capacity charges	TPD B 3.5	Capacity charges are payable	Capacity charges not payable by DNO user	TPD B6.4	In contrast to shipper users, DNO users do not currently pay NTS exit charges. Instead the NTS exit charges at GDN offtakes are recovered from shipper users offtaking gas in the GDNs, based on the capacities of their site portfolio in the appropriate exit zone. Nevertheless we believe that for a particular GDN offtake the DNO user's flat capacity booking multiplied by the applicable capacity charge rate should represent the capacity costs attributed to that offtake, in same way that shipper users' capacity charges are intended to reflect capacity costs.

Examination of existing flexibility arrangements (continued)

Table A10: Overruns

Feature	Shipper users		DNO users		Commentary
	Ref.	Description	Description	Ref.	
Overruns	TPD B3.6	Overrun charges payable	Flat overruns – calculated at an individual offtake level but not charged	TPD B 6.5	For DNO users flat and flexibility overrun quantities are calculated, but charges are not payable. It would assist the assessment of flexibility provision if the frequency and extent of these overrun quantities was better understood. In particular it would be helpful to understand the extent to which overrun quantities are avoided by short term relaxation of the rules in accordance with the provisions described above.
			Flex overruns– calculated at an individual offtake level but not charged	TPD B 6.5	

Appendix B

Significance of access to "higher rate" flexibility

Flat capacity held by DNO users for 2010/11

Assume aggregate flat capacity bookings of DNO users for 2010/11 are the same as the Forecast 1 in 20 Peak Day Firm Demand (Total LDZ) specified in the 2007 Ten Year Statement[23] as **4634 GWh**

Flexibility capacity held by DNO users for 2010/11

Final Flexibility Capacity Allocation to GDNs – 2007 OCS Process[24] was 17.47 mcm or (using a conversion factor of 10.83) **189.2 GWh**

Rate available to DNO users over first 16 hours of day

= Flat capacity/24 + Flex capacity/16

= 204.9 GWh/h

Capacity needed to be booked under shipper user rules to obtain this rate

= Rate x 24

= 4918 GWh

Excess over flat capacity held by DNO users

= 4918 – 4634 = 284 GWh

Excess as % of flat capacity held by DNO users

= 284/4634 = 6.1%

Maximum rate available to DNO users (over first 8 hours of day)

= Flat capacity/24 + Flex capacity/4

= 240.4 GWh/h

Capacity needed to be booked under shipper user rules to obtain this rate

= Rate x 24

= 5769 GWh

Excess over flat capacity held by DNO users

= 5769 – 4634 = 1135 GWh

Excess as % of flat capacity held by DNO users

= 1135/4634 = 24.5%

[23] Gas Transportation Ten Year statement 2007, National Grid, Table A2.1B, p91

[24] UNC 0116: Enduring Offtake - Information request on the availability of NTS exit flexibility capacity, National Grid, p9, para 3)b)

Appendix C

Alternative offtake arrangements

Overview

C.1. The main body of this report explains why we do not believe that the current contractual arrangements at NTS offtakes represent undue discrimination. We recommend principles for fair allocation of flexibility between different classes of users and propose other refinements that should provide for a pragmatic and effective offtake regime.

C.2. If, however, the non-discrimination requirement were interpreted to require rigidly that all classes of user must be offered identical terms, then we would suggest that there are better means of achieving this than the proposed flexibility product. These alternatives can be made demonstrably non-discriminatory as between TCCs and GDNs.

C.3. One such alternative approach involves providing a choice of exit capacity products at each exit point, effectively a choice between the product currently available to TCCs (the "Peak Hour Product") or that currently available to GDNs (the "Peak Day Product")

C.4. The second approach is the universal application of the Peak Hour Product.

Approach 1 - Choice of Peak Hour or Peak Day Products

C.5. The Peak Hour Product limits peak hourly offtake rates to 1/24th of daily exit capacity held (i.e. sets booked capacity at 24 x the required peak rate), and provides for rate changes, subject to reasonably generous ramp rate and rate change/notice period restrictions.

C.6. In contrast, the Peak Day Product allows peak hourly offtake rates to exceed (within limits) 1/24th of daily exit capacity held, but is somewhat more restrictive in terms of rate changes.

C.7. Both products employ the same unit capacity charge derived from common methodology reflecting peak day throughput:

- but the Peak Hour Product requires capacity booking of 24x the required peak hour rate required;
- whereas the Peak Day Product allows capacity booking of the peak day requirement (i.e. less than 24x the peak hour rate)

C.8. By allowing a choice of product to all NTS users we avoid any suggestion of discrimination and allow the market to direct what sort of flexibility it requires.

C.9. Aspects of this approach that would need to be developed further include:

- Whether the choice of product is made at a individual user or exit point level
- Finer definition of the Peak Day Product to establish:
  - the extent to which rates can exceed 1/24th of capacity and for what duration; and
  - the appropriate limitations on offtake rate changes

- Protections for system operator (where demonstrably necessary) such as:
  - Ramp rate or rate change/ notice periods
  - Capacity or rate buy back arrangements
- These protections would be based on objective criteria such as size of load, and/or product choice and/or location but **not** on type of user, thereby avoiding any suggestion of discrimination.

Approach 2 - Universal application of the Peak Hour Product

C.10. This involves universal application of the Peak Hour Product (i.e. current TCC arrangements involving exit capacity sales with booked daily exit capacity set at 24 x the maximum hourly offtake rate).

C.11. Since this would effectively confer greater offtake rate flexibility for GDNs compared with the status quo which might challenge network capability, we advocate that NG should be allowed to buy back flexibility from GDNs (and/or any other willing parties) in such a way that the offtake profiles that can be accommodated are created.

C.12. We would suggest that with a little effort this model could be developed further to incorporate potential safeguards to address any legitimate NG concerns regarding possible overselling to DNO users and associated buy back risk. This might include some ceiling on buy back prices, perhaps based on the typical cost of DNOs providing flexibility locally within the GDN rather than obtaining it from the NTS.