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Dear Robert

**Information request on the availability of NTS exit flexibility capacity**

We are writing to you in response to your request for comments on National Grid's paper "*UNC 0116: Enduring Offtake – Information request on the availability of NTS exit flexibility capacity.*" Given the limited time available to respond, it has not been possible to provide a detailed assessment of National Grid's response however we have provided a commentary the conclusions that might be drawn from National Grid's work.

In our opinion it would be wrong for the Authority to conclude that the application of a flexibility capacity product to shippers as well as gas distribution networks (GDNs) (as proposed under 0116V) would improve efficiency in investment or operation of the NTS, GDNs or the combined system. This is because we do not consider that scarcity of diurnal flexibility should arise provided transporters adequately invest in their respective systems. Nevertheless should the GDNs be driven to acquire excessive disproportionate amounts of NTS exit flexibility capacity, this could have a detrimental impact on transmission connected customers (TCCs) and the operation of the wholesale gas and electricity market.

Before any decision can be made to approve a modification that includes an exit flexibility product applied to shippers as well as GDNs the Authority will in our view have to describe in detail the mechanisms through which efficiency and competition benefits will be realised and why the 'scarcity' that appears to be demonstrated by National Grid is 'real' rather than 'artificial'. Should these additional benefits be demonstrated they would have to at least offset the quantified negative cost-benefit for 116V set out in Ofgem's final impact assessment and now adjusted to reflect the costs the Competition Commission said should be added back in (a present value of £48.9m).

**Conservative analysis likely to underestimate the availability of flexibility capacity**

National Grid's analysis appears to be based on a worst case approach and a number of the scenarios described seem improbable because they would require an unlikely coincidence of events. The paper produced by TPA solutions for the Gas Forum describes some these scenarios in greater detail.

It is also quite striking that the disadvantages of “back-loading” is emphasised whilst the advantages of “front-loading” – the more common pattern – is ignored. Also storage to the extent that it uses flexibility, will do so during off-peak periods where there is more flexibility ‘headroom’ anyway..

What is interesting about the National Grid analysis is the extent to which exit flexibility capacity availability varies with the geographical distribution of gas supplies and the profiling of gas deliveries. This is hardly surprising but clearly demonstrates the fact that the flexibility of the NTS varies with both the pattern of entry as well as exit flows.

This suggests to us that a more meaningful measure of NTS system “flexibility” should be linepack (or more realistically zonal linepack given the relatively slow speed for transporting gas). Modification proposals 195 and 195A both require the publication of zonal linepack information which would allow the industry to monitor whether there is likely to be scarcity of this system “flexibility” in future. Under the 116V proposal shippers could have faced charges for the use of NTS exit flexibility capacity at a TCC whilst at the same time increasing flows by an equivalent amount at an adjacent entry terminal. Under such circumstances it would be unreasonable to impose such charges as that shipper’s use of zonal linepack would have remained constant.

As the exit flexibility capacity product ignores profiling of gas flows at entry we do not believe the exit flexibility capacity product applied to all exit users can ever efficiently or fairly allocate the use of real NTS system flexibility (i.e. NTS linepack). A linepack service, a system balancing concept more in keeping with the shipper role and would in our view be more appropriate product, but of course its implementation would be prohibitively expensive as this would require the establishment of shorter gas balancing periods.

National Grid’s analysis also omits to explore how the amount of flexibility might be increased, and to what degree, by greater usage of compression.

### **Linepack is not equivalent to exit flexibility capacity**

To understand whether there is likely to be future scarcity of exit flexibility capacity it is necessary to understand the nature of the product and whether it in fact helps transporters to plan and operate their systems efficiently. E.ON’s position as part of the DN sales process was always that the networks should continue to be managed as if they continued to be one system for the benefit of all customers irrespective as to which system they happen to be connected to.

As part of the Competition Commission case we described for “The Group” why the flexibility capacity concept (which seeks to define the rights of users to vary the offtake of gas at exit points) and linepack which reflects the ability to store gas in a pipeline. The former describes an access right and the latter is an energy balancing concept. Attachment A provides the relevant extracts from one of E.ON’s Witness Statements and the Glossary of Terms agreed with Ofgem which together seek to provide a layman’s explanation of these related but different concepts.

Under the previous integrated industry structure the NTS linepack was used to support TCCs as well as providing some diurnal flexibility for DNs to support flow variation to customers connected to the GDNs. It is our understanding that, in the main, new investment in diurnal flexibility to support GDN connected customers was made within the GDNs. However, from time to time GDNs would use greater amounts of NTS linepack, on a temporary basis as new investment within the GDNs took place. This makes sense given the “lumpy” network investment - fewer large projects rather than many small projects providing for more efficient development of the network.

### **Artificial DN demand for NTS exit flexibility capacity**

A regime that actively encourages GDNs to take as much NTS flexibility as possible rather than invest in their own system does not appear to be the right way forward given that it removes NTS flexibility that would otherwise help facilitate the efficient operation of gas and electricity wholesale markets. National Grid comment in their response:

*“We agree with Ofgem’s comment in paragraph 6.32 of the consultation document 226/0, “Gas*

*Distribution Price Control Updated Proposals” that it should “not conclude from the current industry consensus that there is no current scarcity of flex and that a scarcity of the service could not and may not develop in future.” Indeed, we would argue that such scarcity is more likely to develop in the future if capex restrictions are placed on GDNs such that they are left with little alternative but to request increasing quantities of flexibility from the NTS. It should also be recognised that the flexibility product is currently offered at zero price and that Ofgem is proposing to remove the incentive concerning flexibility usage on the GDNs which means that, in general with all other things being equal, the efficient decision for GDNs will be to take increasing quantities of the zero priced product.....”*

It would appear that the fear of having revenue disallowed is making GDNs apply for NTS exit flexibility whereas under the previous integrated world when all the GDNs were owned by National Grid the drivers were on optimising the whole system to meet the 1 in 20 demand of all firm customers connected across the whole system.

This is not a choice between investing in the GDNs or the NTS because it generally accepted that investment in the NTS to provide new linepack flexibility is more expensive than investing within the GDN to provide an equivalent level of diurnal flexibility. It is more a question of whether it is appropriate for the GDNs acquire what might appear to be ‘spare’ linepack at the possible expense of market participants operating in the gas and electricity wholesale markets.

The flexibility capacity auction set out in 116V was intended to allocate this capacity should it become ‘scarce’. It was not intended to provide signals for investment as NTS exit flexibility capacity, as National Grid has previously stated, is essentially a bi-product of investment in NTS exit flat capacity

GDNs that find themselves having to rely on NTS linepack because they have chosen not to invest in diurnal flexibility in their own system will have no choice but to outbid shippers for such capacity (the 1 in 20 obligation must be met). Unlike GDNs who are regulated monopolies, generators operating in the competitive sector will ultimately choose to limit when they generate thereby affecting the amount of generation capacity that can be made available to the electricity wholesale market. If the stated GDN flexibility applications turn out to be genuine we believe questions should be asked about the desirability of such a fundamental change in the pattern of flexibility usage and whether a different approach is warranted.

The National Grid paper fails to mention the fact that GDN requests for flexibility capacity are further exacerbated by the fact that flexibility is a nodal concept whereas in fact GDNs in reality require exit flexibility (or more accurately a share of NTS linepack) on a zonal level. No allowance appears<sup>1</sup> to be made for the diversity affect (i.e. it is not likely or even feasible for a GDN to make use of the all their nodal flexibility capacity request for each of the NTS exit points serving a particular GDN simultaneously).

The paper does not comprehensively describe the level historical levels of flexibility capacity usage – provisions of this information would allow comparisons to be made between the pre and post DN sales world. A more detailed break down of OCS requests by GDN may also offer clues as to whether there is a systematic difference in approach between different GDNs and indeed whether requests are in fact ‘overstated’

### **Impact on competition in gas and electricity wholesale markets.**

The benefits to customers of efficient wholesale markets cannot be underestimated. Efficient investment in infrastructure to facilitate the efficient operation of these markets is essential – this means sufficient flexibility needs to be available in the system to ensure energy (both gas and electricity) can be brought to market. Unduly restricting the size of networks or artificially inducing some users to use excessive amounts of capacity could indirectly impact wholesale market prices.

Ensuring there is adequate availability of network flexibility can potentially provide wholesale market benefits. It is not possible in this response to determine how the level of inherent system flexibility

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<sup>1</sup> Scotia Gas Networks have suggested at transmission workstream meetings that it would be better if flexibility capacity were to be offered to GDNs on a zonal rather than a nodal basis.

can impact wholesale prices but even relatively small price reductions could easily offset the cost of bringing forward investment in diurnal flexibility. With an annual UK gas demand of around 4 btherm/annum, a 0.25p/therm change in gas prices is worth £10m to consumers.

### **The need for cost reflective administered charges for the sale of exit flexibility capacity to GDNs**

During Ofgem's GDN sales evaluation process (before Ofgem had originated the exit flexibility capacity concept) E.ON suggested that it should be possible for linepack flexibility to continue to be efficiently allocated between the NTS and GDNs based on establishing administered prices for additional incremental requests by GDNs for such flexibility..

GDNs could be allowed an increase in linepack flexibility from the NTS in line with anticipated load growth. We understand the theoretical average cost of providing 1 mcm of additional linepack flexibility on the NTS is in excess of £5m per annum and charges could be set at this level (or perhaps locational differentiated using raw LRMC values giving an average charge of £5m).

Such an approach would provide costing signals that would more closely mimic the 'whole system' investment appraisal of a pre sales integrated business, and simultaneously preserve the current level of flexibility available to the competitive markets (i.e. shippers supplying TCCs and direct TCC generators supplying electricity).

Such an approach would in our view be more likely to achieve efficient economic outcomes in terms of investment in system flexibility in the right networks as well maintaining well functioning wholesale energy markets. This must be better approach than creating artificial 'competition' for flexibility capacity between shippers operating in a competitive environment and GDNs acting as regulated monopoly network businesses.

### **Questions for the Authority**

Based on our initial assessment of the National Grid response we believe the Authority should consider a number of questions which are relevant to the possible future 'scarcity' of flexibility capacity and the consequences to the operation of competitive gas and electricity markets.

1. Is it reasonable for assessments on the availability of flexibility capacity to be made on the basis of 'worst case' analysis rather than on probabilities?
2. Could higher levels of exit flexibility capacity be made available by making greater use of existing compressors?
3. What is really driving the GDNs requests for increased flexibility capacity?
4. Would application of cost reflective administered charges to GDNs significantly reduce the level of requests?
5. Should GDN requests for additional flexibility capacity be limited to the relevant GDN's load growth (with 05/06 being the base year)?
6. How would the supply and/or demand for gas be affected by any reductions in the availability of NTS flexibility to TCCs resulting from GDNs acquiring proportionately more rights to NTS linepack? How might this impact gas and electricity wholesale prices?
7. If wholesale prices are higher than they might otherwise have been the case, to what extent is this offset by any reduction in lower levels of investment in diurnal flexibility in the GDNs?
8. What are the consequences to the electricity wholesale market if the competition between GDNs and shippers means that generators are forced to withdraw generation capacity from the electricity market?

## Way forward

One of the key Competition Commission appeals debates was whether it was appropriate for the regulator to prescribe prophylactic medicine (flexibility capacity) to treat a disease (scarcity of NTS linepack) that may or may not exist. The evidence for the existence of the disease may now be slightly more compelling but the cause appears to be man made driven by the artificial demands of GDNs. Unfortunately the probable side-effects of the medicine (adverse consequences on the health of both gas and electricity wholesale markets) mean that the medicine is likely to be worse than the cure.

We remain of the view that exit flexibility capacity product should not be applied to shippers, but consider that with the right regulatory incentives and administered pricing arrangements exit flexibility capacity can be a valid mechanism for sharing diurnal flexibility between the NTS and GDNs. A single 'bundled' product for TCCs including flexibility up to the maximum hourly quantity (MHQ) multiplied by 24) remains the most appropriate product not least because this means equivalent users connected to the GDN or NTS have access rights defined in a similar way.

The recent alternative proposals 195 and 195A provide for the publication of flexibility capacity and more importantly NTS linepack information which will allow the 'real' use of NTS flexibility to be monitored over the next few years. Further changes to the code can be proposed by industry participants if this flexibility needs to be rationed in future

In our view the artificially induced increased GDN demand for flexibility capacity does not provide adequate evidence to 'trump' the negative quantitative cost-benefit of Ofgem's own final impact assessment for of 116V (which now stands at -£48.9m after adding in the cost that the Competition Commission considered should be included such as transporter costs).

We do not believe it is appropriate for GDNs to rely more heavily on the NTS than they have in the past. If flat and flexibility charges are be applied to GDNs (as was advocated by Ofgem as part of the GDN sales process) we would suggest that administered charges (as described above) be applied to incremental flexibility capacity requests above the 2005/06 levels adjusted for general load growth.

We trust the Authority will have the opportunity to see E.ON UK's initial evaluation of National Grid's response. In particular we believe it would be helpful for the Authority to consider the impact of the GDNs future applications for flexibility capacity on the functioning of wholesale gas and electricity markets?

Please give me a call if you wish to discuss particular points further.

Yours sincerely

Peter Bolitho  
Trading Arrangements Manager

**Attachment A – Extracts from Witness Statement of Peter Bolitho and Glossary of Terms provided as part of the Competition Commission Appeals**

**Layman's guide to flexibility, flexibility capacity, linepack and diurnal storage**

36. Another concept which it may be helpful to explain at this stage is "linepack". The NTS is sometimes described as a 'bulk' transportation system, designed to be operated 'flat'. What I mean by this is that at any given point in time, input flows should broadly match output flows. In reality this is far from the truth because input and output flows are not uniform throughout the day nor do they match each other hour by hour or minute by minute. Consumers offtake gas at a rate of flow that varies over the course of the gas day. A profile for domestic consumers, for example, is that gas consumption will be high during the day and very little overnight. Similarly, flexible gas-fired electricity generation necessarily requires the offtake of gas to vary through the day in response to changes in the electricity market.
37. The ability of gas transporters to provide gas at varying rates of flow depends on the existence of "diurnal storage": instead of the gas flowing out of the pipeline at a uniform rate, gas is stored when the rate of offtake is lower and then released

when the rate of offtake increases. Linepack is one form of diurnal storage. The capability of the NTS to offer linepack (diurnal storage in the NTS<sup>4</sup>) can be viewed in one sense as spare capacity in transmission pipes.

38. Key elements in determining linepack availability in the NTS are the physical size of the pipes that make up the NTS and how gas flows both within it and in and out of it. The latter is ultimately determined by shipper input flows and also by how NGG NTS chooses to 'push' gas around its system using compressors and 'direct' gas around its system by adjusting the settings of flow control valves.
39. The greatest need for diurnal storage is in the GDNs, so that GDN Shippers can in turn offtake gas to their customers at a variable rate of flow. GDNs meet this need through the use of some NTS linepack (by choosing to vary flows at GDN exit points) but mainly through the use of storage facilities (high pressure storage bullets and low pressure gas holders) and linepack within the GDN itself.
40. Under the current daily gas balancing regime it is not possible to allocate quantities of linepack or indeed other forms of diurnal storage to shippers. Linepack therefore remains essentially a tool for the transporters to efficiently manage the flows of gas across the whole system.
41. The word "flexibility" can be used in a number of senses. First, it can refer to the linepack or diurnal storage capacity itself. Second, it can refer to the ability (of a network user) to vary his rate of offtake over the course of the gas day (by reason of diurnal storage). In its various consultation documents, Ofgem usually defines "flexibility" to have this second meaning. Third, the Decision introduces a new product called a "Flexible Capacity" product.
42. It is important to avoid confusion in the use of the term "flexibility". For example, the ability to vary one's profile of offtake does not correlate directly with the availability of linepack in the pipeline. Similarly, it is E.ON's belief that the "Flexibility Capacity" product does not correlate directly with either (1) the ability

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<sup>4</sup> There is usually some difference in the total level of linepack held in the NTS from one day to another.

to vary one's offtake profile or (2) linepack. For clarity, where I use the word "flexibility" in lower case in this witness statement, I am using it simply to mean the ability of a user to vary his rate of offtake of gas over the course of the day. Where I am referring to the new "Flexibility Capacity" product which this Decision will introduce, I will use the upper case. Where I am referring simply to linepack or diurnal storage, I will use those terms instead of "flexibility".

Diurnal Storage	Storage capability within the gas transportation network used by gas transporters to support within-day offtake flow variations. Linepack is an example of diurnal storage.
Flexibility	Can refer to Diurnal Storage or to the ability of users to offtake gas from the NTS according to a profile that varies over the gas day
Flexibility Capacity product	This product gives users the right to vary their rate of offtake from the NTS. It is defined relative to the flat capacity product. In summary, the amount of Flexibility Capacity product require is calculated by subtracting 2/3 of the user's total end of day allocated quantity from the cumulative allocated quantity it has offtaken between 06:00 and 22:00 including a tolerance of 1.5% on measurements of the cumulative flow.
Linepack	In broad terms, linepack is the capability of a pipeline system to store gas and is used by gas transporters to support offtake flow variations. Linepack depends on a number of factors, including the size of the pipelines that make up the relevant system, the maximum operating pressure of those pipelines, input flows and how each gas transporter chooses to compress gas and direct gas around its own system.
Maximum Daily Quantity	Under the "interim" and "transitional" offtake arrangements, the maximum quantity of gas which an NTS Shipper may offtake from the NTS [exit point] during a given day. Calculated as 24 times the maximum hourly quantity of offtake permitted to a TCC.