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Dear Lewis

Ref 161/10 Update consultation on National Transmission System (NTS) flexibility capacity

This document is issued by National Grid in its role as Gas Transporter Licence holder in respect of the NTS ("NGG NTS").

Thank you for the opportunity to comment on the above Ofgem document.

NGG NTS recognises that Users have a range of requirements with respect to the utilisation of flexibility on the NTS, and that these requirements are evolving, creating an increasing demand for a more flexible NTS. Flexibility, both now and in the future, will undoubtedly mean different things to different Users. Whilst the consultation document quite correctly states that "National Grid Gas (NGG) uses system flexibility to meet National Transmission System (NTS) users' needs to vary the rates at which they enter and exit gas from the NTS", this does not represent the complete picture. There are other facets to consider including the flexibility to meet national and local supply and demand imbalances, day-to-day changes to national and locational supply and demand patterns, management of linepack (and the time lag / notice period issues that this brings with it) and consideration of Security of Supply and safe control of operations.

All Users currently take advantage on a daily basis of the flexibility of the NTS through the variation in flow rates away from a 1/24th flat profile, however, only the Distribution Networks (DNs) explicitly 'book' their requirement for flexibility off the NTS (through the existing UNC Offtake Capacity Statement (OCS) process to signal their requirements for the NTS Exit (Flexibility) Capacity product), with other Users effectively signalling their profile or flexibility requirements in the short term via their Offtake Profile Notice (OPN) and Daily Flow Notification (DFN) submissions (which in the case of OPNs, NTS has the opportunity to reject if they do not meet defined criteria in the UNC). Historically, it can be seen that this combination of processes, combined with the inherent capability of the NTS, has delivered the levels of flexibility that Users require on the vast majority of days.

Going forwards, however, we believe that changing patterns of supply and demand will drive a requirement from Users for a level of flexibility from the NTS that cannot be satisfied by the combination of short-term access to inherent flexibility that is currently in place. Drivers for this evolving change are:

- the increase in storage, LNG supply and interconnection (both recent and new) and the inherent price driven behaviour of these sites when compared to UKCS;

- the potential for rapid changes in supply and demand patterns and flow directions driven by these projects and the impact this has on wider System flows;
- the consequential impact of renewable electricity generation intermittency on gas generation demand; and
- the ongoing requirement for conventional flow profiling from DN diurnal demand profiles.

As stated above, a key driver of future NTS flexibility requirements is anticipated to be the implications on the NTS of the changing electricity generation pattern. If gas fired generation represents the primary balancing and reserve option (as opposed to sharing this with coal as at present) then given the increasing level of renewable electricity generation, and particularly wind power, then there will be periods of rapid changes in gas demand as a result of changes in wind power output and other unexpected short term changes on the electricity system.

The potential for more dynamic gas demand and greater European interconnectivity, along with greater reliance on LNG importation, has also contributed to greater interest in gas storage development. This will require network flexibility to facilitate rapid flow rate changes in LNG and storage flows at both higher rates and more frequently than experienced from beach terminals.

All the changes outlined above will require the provision of accurate and timely information with regards to gas flows to ensure that the System can continue to be operated in the most safe, economic and efficient manner.

We believe that increased User requirement for the NTS to operate in a more flexible manner will lead to a requirement for additional NTS investment (coupled with enhanced operational capability and potential changes to the commercial regime). Ideally, User Commitment linked to RIIO-T1 output measures should be sought to underpin expenditure on the System and efficient pricing signals should be generated to enable User choice. The challenge will be to identify and map investment on to the provision of specific services and output measures, as in many cases it will be difficult to map the deep network investment required to provide flexibility to a single connection to the network. This is particularly so where the problem may be caused by, say, groups of CCGTs responding to wind intermittency rather than a single site creating the investment requirement.

However, there will be many instances where investment for flexibility provides multiple benefits which may be linked to more than the provision of specific services and products but rather to the interacting requirements of a number of Users. Given this, it may be better to view network flexibility investment as a shared benefit rather than targeted against individual Users. In addition, the timescales for delivery of any physical and / or commercial solution, both in terms of implementation and lead-times for delivery, also need to be considered. It may be that an ‘anticipatory’ investment approach (as has been deployed for time critical investments on the electricity system) is more appropriate.

NGG NTS has received feedback via its Transporting Britain’s Energy (TBE) process and through initial stakeholder engagement that, in general, customers value the ability to be able to vary their gas flows as it gives them the opportunity to optimise their operations and / or meet other markets’ requirements. However, NGG NTS is undertaking further stakeholder engagement to determine whether Users believe that the current arrangements under the UNC meet their requirements and to understand their willingness to pay for the costs of any subsequent additional investment.

More detailed responses to the questions laid out in the consultation document are included in the accompanying Appendix.

Please do not hesitate to contact me if you wish to further discuss any aspect of this response.

Yours sincerely,

Paul Whittaker

Appendix – Detailed Response

CHAPTER: One

Question 1: Do you agree with our definition of system flexibility?

The document states "National Grid Gas (NGG) uses system flexibility to meet National Transmission System (NTS) users' needs to vary the rates at which they enter and exit gas from the NTS". Whilst NGG NTS agrees at a high-level with this statement, there are other facets to consider including the flexibility to meet national and local supply and demand imbalances, day-to-day changes to national and locational supply and demand patterns, management of linepack (and the time lag / notice period issues that this brings with it) and consideration of Security of Supply and safe control of operations.

These requirements for flexibility need to be seen within the context of the NTS being designed to support predictable and largely consistent 1-in-20 peak demand flows, supported by stable and predictable supplies from UKCS and stable DN demand (due to the DNs' use of its own diurnal storage capability including LTS linepack, gas holder storage capability and other diurnal storage devices). The flexibility that the NTS therefore provides for Users is very much a by-product of the design criteria in place to meet Users' peak requirements, and is not in itself something that the NTS has been explicitly designed to provide. It is also worth noting that the evolving supply pattern on the NTS, e.g. St. Fergus flow levels, may be significantly different from the assumptions that were made when the original System design was carried out and therefore the flexibility that was inherent in parts of the System may no longer be available, or indeed be available elsewhere.

It is also important to note that although the consultation document appears to refer to system flexibility in terms of the System as a whole, system flexibility is locational and is determined by the pattern and profile of the flows on the Network. This means that as Users vary their flow profiles the result will be a change in the Network flows and the locational capability to meet Users' requirements for flexibility.

Additionally, it should be noted that not all Users of the System are faced with the same choices regarding their system flexibility requirements. DNs need to manage the daily peaks in gas consumption on their networks as part of their underlying Safety Case and will generally have a variety of options as to how they can achieve this; flexibility off the NTS being only one option. By way of a contrast, other types of Exit User can only achieve the flexibility that they require from one source, i.e. the NTS, and this need is either driven by commercial drivers or electricity market interaction, rather than the need to meet supply obligations and Safety Case requirements.

NGG NTS now believes that the combined effect of Users' changing requirements (in terms of the mix of supplies anticipated going forwards, CCGT usage, storage requirements and the DNs' decommissioning of gas holders) will place new demands on the Network. With this in mind, NGG NTS considers the increasing demand for network flexibility going forwards will be driven by the ability to reconfigure the NTS to meet Users' locational supply and demand profiles and to provide the resilience required to satisfy the evolving physical System requirements without compromising safety or security of supply.

Question 2: Do you agree with our view that the ability to vary gas flows on entry and exit is valued by Gas Distribution Networks (GDNs), Transmission Connected Customers (TCCs), Aggregated System Entry Point (ASEP) operators and gas shippers?

NGG NTS has received feedback via its Transporting Britain's Energy (TBE) process and through initial stakeholder engagement for RIIO-T1 that, in general, customers value the ability to be able to vary their gas flows as it gives them the opportunity to optimise their operations and / or to meet other markets' requirements for rapid delivery and flexibility in supply (i.e. the electricity balancing mechanism). It is also clear that on any day most Users, at both entry and exit, might vary their flow rates away from a flat $1/24^{th}$ profile and are therefore utilising that system flexibility.

However, NGG NTS wants to ensure that Users' flexibility requirements from the NTS, as well as how Users themselves intend to deal with the evolving challenges, are clearly understood, so that a clear

direction, and associated options, risks etc, for managing these challenges can be mapped out from a holistic industry perspective. With this in mind we are in the process of facilitating an ongoing industry debate on this subject. A stakeholder engagement workshop, under the umbrella of RIIO-T1, has been scheduled on the 2nd March to discuss the specific issues surrounding "Gas Transmission Network Flexibility".

In our current view there are a number of evolving issues that may impact the need for increased / different levels of network flexibility which form part of the backdrop to the wider industry debate which we are facilitating; these include:

- An increase in the number of entry and exit points to the NTS leading to uncertainty of network flows;
- An increase in the number and size of single credible supply losses and an increased risk of supply shock and reduced security of supply;
- Increasing within day flow volatility as a consequence of price driven behaviour at both entry and exit leading to an inability of the network to accommodate the rates of change;
- Higher levels of fast re-cycle gas storage leading to a constraining inability to meet gas injection or export rates;
- Individual and groups of gas fired power generation stations operating intermittently as 'backfill' for renewable wind generation; and
- Increasing requirements from DNs to access the Diurnal Storage requirement that they need to manage their network from the NTS as they decommission their existing gas holders.

These can in many ways be summarised down into three key drivers of the need for system flexibility:

1. Varying flow patterns and profiles as a consequence of a changing supply mix and the effect of price driven behaviour on both supply and demand (including storage);
2. CCGT intermittency driven by electricity market interactions; and
3. DN Diurnal Storage requirement.

Of course, all of these also need to be seen in the context of the decline in UKCS supplies, and the subsequent change to fundamental flow patterns on the NTS.

In order to ensure that flexibility on the Network can be properly valued and charges appropriately allocated, NGG NTS is committed to working with the Industry to investigate the options available and to deliver the most appropriate changes to the commercial regime to achieve this.

CHAPTER: Two

Question 1: Do you agree with the system flexibility indicators developed by NGG?

NGG NTS developed the system flexibility indicators in response to Ofgem's recommendations, as set out within the UNC mod 0195AV decision letter, following discussions with Ofgem and the Industry during 2009.

NGG NTS believes that whilst the indicators offer a useful historical overview of the changing requirements of the System, they do not, in themselves, provide any indications of the capability of the NTS to provide system flexibility and do not provide a forward looking view of future requirements for flexibility.

The indicators were presented as being split into two groupings; "leading" and "lagging". It should be noted that this terminology referred to whether the category of indicator being observed provided a view as to what was or may happen on the System ("leading") or whether it represented that an action had been taken on the System ("lagging"). Hence the indicators themselves are not forward looking and in that way are not, in themselves, capable of identifying future investment needs.

In order to provide appropriate context around Users' existing levels of system flexibility utilisation and the implications that this has on operational actions, NGG NTS will continue to monitor the appropriateness of the existing set of indicators and will look to work with the industry to develop them as is deemed necessary to provide the industry the best information available to inform the debate.

Question 2: Do you consider that the system flexibility indicators are capable of identifying future system flexibility investment needs?

As noted above, NGG NTS does not believe that the system flexibility indicators are capable of identifying investment needs on their own (especially given the likely lead times of some of the potential investment), but considers that they can be used as a supporting measure to other analysis of future investment requirements. NGG NTS feels that more detailed Industry engagement is needed to ensure that the most appropriate solutions for Users' requirements are identified and a route to delivery defined, whether this be through investment, amendments to the commercial regime or a combination of both.

Question 3: Do you agree with our high-level analysis of the factors likely to affect future gas flows on the NTS? Are there important trends which we have not considered?

NGG NTS firmly believes that gas flows on the System have and continue to change and are likely to become more dynamic due to the changing nature of the use of the System, especially in view of:

- An increase in the number of entry and exit points to the NTS leading to uncertainty of network flows;
- An increase in the number and size of single credible supply losses and an increased risk of supply shock and reduced security of supply;
- Increasing within day flow volatility as a consequence of price driven behaviour at both entry and exit leading to an inability of the network to accommodate the rates of change;
- Higher levels of fast re-cycle gas storage leading to a constraining inability to meet gas injection or export rates;
- Individual and groups of gas fired power generation stations operating intermittently as 'backfill' for renewable wind generation; and
- Increasing requirements from DNs to access the Diurnal Storage requirement that they need to manage their network from the NTS.

It is likely that the changing supply mix will behave in a more price responsive manner than more traditional supplies such as the UKCS. Additionally as the UK market becomes more closely linked to Europe, it is expected that a greater level of unpredictability of supplies will be seen in the future. These changing supplies contribute towards the variability of future gas flows expected on the System.

It is important to note that the recent changing mix of gas supplies to the UK has been driven by factors such as the global influence of LNG, the interaction of Norwegian gas supplies between the Continent and the UK, behaviour of the Interconnector (IUK) and the impact of international events such as the Russia-Ukraine dispute and the nuclear plant outage in Japan. It is NGG NTS' view that trends such as this are starting to be observed via the System Indicators, although we recognise that this has only been seen over a short period of time and is therefore not a statistically significant trend.

NGG NTS also notes that under the Enduring exit regime there has been a substantial increase in the obligations placed upon NGG NTS via its GT licence to release firm NTS (Flat) Exit Capacity which needs to be taken into account when considering the capability of the System. In addition, it is anticipated that the receipt of any additional NTS Exit (Flat) Capacity signal from large commercial storage sites will also have significant effects on the flows on the System and hence on the availability of NTS Exit (Flexibility) Capacity.

CHAPTER: Three

Question 1: Do you agree with Ofgem's representation of how shippers and TCCs manage their NTS exit flow variation requirements?

As Ofgem has noted, the UNC only currently contains a process for DNs to book their flexibility requirements (via the OCS process) with other exit and entry Users effectively signalling their profile or flexibility requirements in the short term via their Offtake Profile Notice (OPN) and Daily Flow Notification (DFN) submissions (which in the case of OPNs, NTS has the opportunity to reject if they

do not meet defined criteria in the UNC). As part of the RIIO-T1 and RIIO-GD1 processes, the DNs and NGG NTS have been meeting to discuss the DNs' flexibility requirements during the Capacity Output Workshops. These meetings have been useful to further understand the DNs' requirements and NGG NTS and the DNs are working together to improve the current OCS process. However, as noted above, NGG NTS believes that further engagement with Users is needed to ensure that all Users' requirements are fully understood and considered when planning and operating the System, and where appropriate, mechanisms are in place to trigger and fund these requirements.

At present, Users other than DNs do not formally book their flexibility requirements; they access flexibility by submitting OPNs or DFNs. However, it is important to note that OPNs and DFNs can change innumerable times during the day and indeed at short notice as there is no concept of "gate closure". This means that significant changes between such subsequent flow notifications may mean that decisions taken on the basis of the prevailing views of future gas flows on the System need to be re-assessed in short timescales. In addition to the timeliness of such flow notifications, their accuracy also affects the ability to determine the efficient delivery of flexibility on the System. Up to now this process has been broadly manageable with most Users getting the profiles they require on most days; however, with the drivers for increased dynamic requirements discussed earlier, it is unlikely that this arrangement will meet Users' requirements in the future (although as previously stated further stakeholder engagement is needed to develop understanding in this area).

Question 2: Do you have any views on the effectiveness of the existing UNC Offtake Capacity Statement (OCS) process applying to GDNs' NTS exit (flex) capacity bookings and do you consider that the UNC adequately supports shippers' flexibility capacity needs?

As part of the discussions held with the DNs and Ofgem as part of the Capacity Output Workshops, both NGG NTS and the DNs have suggested that improvements could be made to the OCS process in order to ensure that the most economic and efficient investment decisions are taken over the System as a whole (i.e. over both the NTS and the DNs' networks).

It is NGG NTS' view that the OCS process could be improved by taking into account:

- the relationship between NTS Exit (Flexibility) Capacity and Assured Offtake Pressures:
    - the efficient provision of the DNs' capacity requirement may be possible by consideration of a lower pressure in conjunction with an request for additional NTS Exit (Flexibility) Capacity;
- the different DN requirements and the ability of NGG NTS to meet such requirements at different demand levels:
    - the current arrangements only specify one level of obligation for each day of the year (based on the DN's peak requirements);
    - however, it is not clear that DNs need the same amount of NTS Exit (Flexibility) Capacity and / or Assured Offtake Pressure at demand levels below peak;
- the level of interaction between requests; and
- the consideration of the cost implications of additional NTS Exit (Flexibility) Capacity requests:
    - the current process only allows additional NTS Exit (Flexibility) Capacity requests to be granted if these can be accommodated within the current capacity of the System.

However, changes such as those outlined above will require additional steps to be added into the OCS process which would therefore necessitate additional time for the process to be carried out by both NGG NTS and the DNs. These changes are being considered within the Capacity Working Group meetings between the DNs and NGG NTS.

As noted above, there is a strong relationship between NTS Exit (Flexibility) Capacity and Assured Offtake Pressures. Given the current (and predicted) changing flow patterns on the System (particularly the decline in the flows at St. Fergus), NGG NTS has started to identify the need for investment on the System in order to continue to meet the current obligations in relation to combinations of NTS Exit (Flexibility) Capacity and Assured Offtake Pressures. In view of this, NGG NTS believes that there should be a review of the current Assured Offtake Pressure obligations within the UNC (which are ultimately used for planning purposes) in order to determine the most economic solution across the Networks as a whole.

From an operational perspective, under the UNC, an increased flexibility requirement from a DN may be accommodated by NGG NTS on the day if System conditions allow. However, this may also require that within day pressure requirements at offtakes are reduced and agreed with the DN. This represents a short term approach and depends on a number of factors including the wider system environment rather than just the local region.

At previously noted, Shippers gain access to flexibility via the terms (including Notice Periods) set out in the relevant contractual agreement (e.g. NExA, SCA, IA) and via OPN / DFN submissions on the day. NGG NTS is undertaking further stakeholder engagement to determine whether Users believe that the current arrangements under the UNC meet their requirements, and is also doing further work to understand the wider implications of all Users' flexibility requirements on network investment, and therefore it is too early to determine if (or how) the UNC would need to be modified until these more detailed discussions have taken place and Users' requirements have been fully understood.

Question 3: Would it be appropriate for NGG to consider investment to provide GDNs with incremental exit flexibility capacity?

As part of the debate during the Exit Reform discussions, NGG NTS noted that flexibility on the System is generally created as a by-product of investments made to deliver transportation capacity. This was primarily due to the fact that investment on the NTS to provide additional system flexibility was generally more expensive than providing it on the DN networks. However, if there was investment taking place for other reasons (i.e. for transportation purposes) then the flexibility requirements would be considered at the same time and investment would be optimised over the Network as a whole. As investment was previously considered in this way, the marginal cost of providing flexibility via the NTS was low and hence, under the current arrangements, no DN specific charging arrangements are in place.

As noted above NGG NTS believes that the OCS process could be amended to consider investment on the System to support the additional NTS Exit (Flexibility) Capacity requirements from the DNs (in conjunction with the pressure requirements), but the ability to provide this will be dependent on the other requirements of the System and therefore would require consideration of appropriate lead times and revenue recovery mechanisms. Consequently, there would need to be some form of User Commitment provided by the DNs to underpin any such outlay; however, the provision of costs associated with additional NTS Exit (Flexibility) Capacity requirements from NGG NTS should allow the DNs to be in the position to properly determine where the most economic and efficient provision of flexibility would be (i.e. on their own Networks or from the NTS).

Additionally, NGG NTS considers that other Users may also value the ability to signal their additional flexibility requirements and therefore is undertaking wider consultation on this issue[1] to understand whether Users would place value on such flexibility.

CHAPTER: Four

Question 1: Do you agree with our view of the principles and objectives which should apply to the further development of the system flexibility capacity arrangements on the NTS?

NGG NTS agrees that system flexibility should be allocated in an economically efficient manner and that it should be provided to the party that values it the most. In principle this means that Users should be in a position to signal their willingness to pay for their flexibility requirements, but it should be noted that the needs of the different exit Users (or indeed entry Users) are not all the same.

DNs have a requirement for system flexibility in order to underpin the storage requirements on their Networks (which feeds into their Safety Case); other exit Users do not have the same need, but will have a range of other drivers, including the need to meet generation requirements on the electricity system. In many cases, DN flexibility requirements can be offset by the provision of higher pressures

[1] A workshop, under the umbrella of RIIO-T1, has been scheduled to discuss the specific issues surrounding "Gas Transmission Network Flexibility" on the 2nd March

from the NTS (which in turn provides additional flexibility in their Networks), whereas other Users' flexibility requirements will generally be only available off the NTS directly. It is therefore not clear that one set of principles will fit all types of User.

Question 2: Do you agree that it would be appropriate to introduce an obligation on NGG to report on system flexibility indicators under the RIIO-T1 framework?

Under the RIIO-T1 framework, it is clear that NGG NTS will need to consider how any investments to support flexibility on the System could be linked to appropriate output measures. Therefore NGG NTS is committed to the development of such output measures and will work with both Ofgem and the Industry to that end. For these reasons, NGG NTS does not believe that an obligation to report on system flexibility indicators is necessary, although we do see them as a useful indicator of flexibility usage and intend to continue to publish and develop them (with appropriate industry engagement).

Question 3: Do you agree that it would be appropriate for NGG to justify any system flexibility investment proposals under RIIO-T1 with reference to flexibility capacity system indicators and specific RIIO-T1 output measures?

As noted above, it is clear that NGG NTS will need to consider how any investments to support flexibility on the System could be linked to appropriate output measures. However, it may not be possible to link all investments to specific output measures on their own as other supporting information may be needed in order to fully justify the investment. With this in mind, NGG NTS will continue to work to develop the appropriate output measures to be used within its Business Plan submission to Ofgem.

Question 4: Do you agree that the commercial and use of system charging arrangements should reflect any costs imposed on the system by NTS users' needs to vary entry and exit flows?

In order to ensure that the existing contractual obligations can continue to be met, it is likely that investment in the System will need to be undertaken. Under the current charging and funding arrangements there is no clear mechanism to remunerate this additional expenditure.

For future additional contractual obligations, the relevant supply and demand assumptions should be examined such that the charging and funding arrangements can be set in an appropriate manner.

NGG NTS believes that the system charging arrangements should be set to reflect the investment costs incurred where this is possible and allocate the costs accordingly. However, it should be noted that it may not be achievable to disaggregate all such costs between the different Users as the ability to provide flexibility on the NTS is highly dependent on the particular supplies and demands on the System seen on the day. Given this, it may be that an 'anticipatory' investment approach (as has been deployed for time critical investments on the electricity system) is more appropriate.