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Dear Lewis

Update consultation on National Transmission System (NTS) flexibility capacity

National Grid owns and operates the high voltage electricity transmission system in England and Wales and operates the Scottish high voltage transmission system. National Grid also owns and operates the gas transmission system throughout Great Britain and through its gas distribution business transports gas in the heart of England to approximately 11 million customers. In addition National Grid owns and operates substantial electricity and gas assets in the United States.

This response to Ofgem's update consultation on NTS flexibility capacity is submitted on behalf of National Grid Gas Distribution (NGGD). The response is not confidential and may be published on the Ofgem website.

NGGD supports the view that the energy outlook over the next ten years and beyond is extremely uncertain due to the increasing global demand for primary fuels and meeting government climate change targets. In gas, this will be seen in increasing supply diversity as the UK becomes more reliant on imports from varying sources and change in demand profiles due to the transition to renewables and phasing out of older generation plant including coal and nuclear power. This will fundamentally alter the movement of gas on the NTS and inter-action with GDNs as volumes will enter the system at different points to those used historically and demand will become more variable, requiring greater flexibility than has been the case in the past.

In this context, more information and commercial signals will be required on system flexibility and in particular, from a GDN perspective, in relation to individual off-takes and their inter-action with other off-takes within an exit zone. In addition, as both the NTS and GDN price controls are now taking place concurrently under the new RIIO framework, it is imperative that this opportunity is used to formulate efficient incentives across the interface that recognise the flexibility requirements and minimises costs for energy consumers.

NGGD's answers to the questions raised by Ofgem in each chapter of its consultation are provided as follows:

Chapter 1 – Flexibility Capacity on the NTS

Do you agree with our definition of system flexibility?

In general, we agree with Ofgem's definition of system flexibility. Although it refers to flexibility capacity at individual GDN off-takes and for NTS as a whole; the interaction between these is not fully addressed. For example, the level of diversity between off-take flexibility requirements and the locational/zonal nature of flexibility within the NTS needs to be considered in any definition.

NGGD requires both localised and aggregated tools to manage the diurnal or within day profiled consumption of its customers. These tools can take the form of physical assets or commercial instruments that directly control or enable such flows. Typically they are interruption of large industrial or commercial customers, the use of gas holders, line-pack depletion and subsequent recovery from the GDN's Local Transmission System or the National Transmission System.

NTS flexibility in the form prescribed under Uniform Network Code (UNC) currently provides such an alternative for NGGD, enabling the safe recovery of local distribution line-pack and pressures ahead of the following day's diurnal demand. However, it is unclear whether the flexibility product will continue to fulfil GDN's needs, as consumer behaviours change in response to environmental drivers and technical developments in insulation and generating heat. It is also questionable whether the flexibility product required by GDNs will be the same as TCCs or shippers who may be responding to commercial risk arising from electricity or gas balancing cash-out. Such responses may result in more dynamic and rapid changes in commodity flows and may be dramatically less predictable than a seasonal and weather based driver.

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 Customer (TCCs) Aggregate System Entry Point (ASEP) operators and gas shippers?

NGGD agrees that the ability to vary flows is of value. While different customers have different drivers, each should be able to place a financial value on a tool used for commercial or physical risk mitigation. In the case of GDNs, NGGD believes the valuation can be made against the opportunity costs of commercial interruption, replacement or ongoing maintenance costs of gas holders, or marginal investment in the Local Transmission System. For shippers, the ability to vary flows at entry as well as exit will be of commercial value.

Chapter 2 – System flexibility drivers and indicators

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

The indicators are useful measures of factors impacting on system flexibility, but are not sufficient in themselves to measure system flexibility. Most of the indicators are nationally-based measures and so will not provide information on locational changes to flexibility which is vital to system users.

Do you consider that the system flexibility indicators are capable of identifying future system flexibility needs?

NGGD does not agree that system flexibility indicators are capable of identifying future flexibility needs. It is difficult to understand how the indicators can anticipate the future demand for flow variation. This can only be accurately determined by those who forecast a need for it, value it sufficiently, and elect to rely upon it. Additionally, future system flexibility needs are relevant to particular locations or zones, not overall system flexibility (see below).

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?

NGGD agrees in part, as the factors are consistent with those identified through Project Discovery and the Energy Network Association's 2050 Gas Futures report. Additional factors not highlighted are the forecast changing mix of UK gas demand and potential changes to the locational mix of demand which can impact on flexibility in a similar manner to the identified supply changes. For example, it is expected that the GDN proportion of overall UK demand will reduce over the coming years; since this has particular flexibility requirements this will impact on system flexibility. This also adds to the importance of considering the flexibility requirements of GDNs and TCCs in a consistent manner.

While the impact of changes in sources of UK gas supply is highlighted, the potential impact of the varying locations of these sources is omitted. Indeed, the impact of location and the importance of defining flexibility with reference to a particular geographical zone or area is lacking in the analysis. In addition, it is possible that new supplies of unconventional gas such as bio-methane and shale

deposits could add further complexity. The system-wide references to flexibility capability do not provide a useful definition of flexibility to users.

Furthermore, it is important to consider the close relationship between gas pressure at NTS entry and exit points and how this affects the actual rate and profile of gas flows and corresponding capacity. GDN's ability to utilise LTS line-pack as a practical substitute to NTS line-pack is directly correlated to the delivery of pressures which enable the LTS line-pack or local stock to be recovered between the hours of 22:00 and 06:00 when consumers' demands are in aggregate, significantly lower. Pressures at NTS off-takes are a function of the supply configuration, pressures and profiles occurring at NTS entry points along with the off-take profiles of CCGT and storage operators at NTS off-take points. The ability to manage these dynamic changes is a function of the accuracy and timing of information provided to the NTS, its balancing tools, and the capability and availability of its compression.

Chapter 3 Prevailing exit flexibility capacity arrangements

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

This reflects NGD's understanding of how it manages its NTS exit flow variation requirement.

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

The UNC provides a process for allocating pressure and flat capacity, but there is a wider issue about the suitability of the commercial regime to balance operational issues with the need for appropriate investment signals. For example, the ability to use within day tools such as flow swaps is debateable and could lead to inefficient capacity booking.

NTS products underpin GDN's safe and secure operation mechanisms for the allocation and valuation of incremental products and may therefore need further consideration. For example:

- The inter-actions and trade-offs between pressures and flexibility are not recognised by the current suite of capacity products and daily operational processes and this may impose additional commercial and physical risk or inefficiencies for both NTS and GDNs.
- There is currently no process which enables the valuation and allocation of incremental flexibility or flow variation products.
- The timetables for the delivery of incremental products should realistically reflect the timescales associated with physical investment taking into account both planning and construction constraints.
- The timetables and processes should enable the transparent quantification of all NTS customer requirements and interactions such that these can be modelled and economically optimised.

Due to the potential variability of flows by off-take to a particular GDN it is possible that the summation of the individual off-take flexibility requirements relating to a GDN is greater than the overall flexibility requirement for the GDN. If GDNs were able to book flexibility at a zonal level or alternatively, if the ability to substitute flexibility bookings across nearby off-takes were available, then the apparent level of flexibility required by GDNs might decrease. We consider that it would be appropriate to explore such capability so as to better define users' flexibility requirements and capability prior to considering valuation and pricing mechanisms.

The delivery of assured pressures and flexibility needs close monitoring and scrutiny, as it's unclear whether these are realistically achievable across the load duration curve given the current NTS supply/demand diversity and the potential for significant future change. Given that NTS flexibility and pressures underpin GDN's safe and secure operation, an early warning of NTS's inability to deliver

assured pressures is critical to enable substitution with alternative commercial or physical tools. Ideally an allocation mechanism for GDNs to obtain assured pressure would be helpful in this regard.

Would it be appropriate for NGG to consider investment to provide GDN's with incremental exit flexibility capacity?

NGGD considers that it would be appropriate if it is the most efficient solution when compared against the alternatives. We also consider that the definition and potential substitutability of flexibility by location needs to be explored further prior to introducing valuation or pricing mechanisms for flexibility.

Chapter 4 – Next steps in the flexibility debate

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?

NGGD agrees that economic and efficient allocation of a finite amount to those who value it most is appropriate. Incremental flexibility should be valued according to the costs of provision, either marginally through pre-existing flat investment or, through incremental investment in pipe, or compressors and their operational costs.

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?

This is an option, but the key element is for NTS to provide a signal to GDNs and TCCs of the cost of the flexibility product, so efficient decisions can be made.

Do you agree that it would be appropriate for NGG to justify any system flexibility indicators and specific RIIO – T1 output measures?

NGGD agrees that it would be appropriate.

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?

NGGD agrees that NTS customers who impose entry/exit flow variations that have a material effect on costs are appropriately incentivised. However, it is important that rights and obligations are well-defined and are not subject to artificial constraints which might bias the availability or resultant charges. In addition, it is important that the complexity and cost of operation of any mechanism for defining usage and charges are considered, so that these are not disproportionate to any benefits obtained.

In addition, GDNs have long-term requirements for flexibility and plan their systems taking account of developments years ahead. It is important therefore, that any charging arrangements provide stable ongoing signals to GDNs, so that an effective trade-off between procuring flexibility from NTS and other options can be undertaken with confidence of the ongoing benefits to the GDNs and their customers.

I trust the information provided in this response is clear, but should you wish to discuss in more detail please contact David Mitchell on 01926 653438.

Yours sincerely

Paul Rogers
By email