

All Customers and Stakeholders

9th October 2017

Dear Colleague,

Gas Quality Consultation

National Grid Gas (National Grid) is seeking industry views via this consultation document on a number of aspects pertaining to NTS gas quality arrangements, including:

- Likely future demand to deviate from National Grid's indicative specification provided in its Gas Ten Year Statement (GTYS);
- The current process for changing gas quality limit values at existing NTS entry points;
- The current process for agreeing gas quality limit values for new NTS entry connections; and
- How National Grid should allocate available flexibility to accommodate increased gas quality limits where that flexibility is scarce.

We also wish to seek views about whether the industry may value the development of gas quality services provided by National Grid:

- To enable downstream market participants to manage issues associated with gas quality variation; and
- In the longer term, to enable operators upstream of the NTS to deliver wider specification gas, for National Grid to take on a role of blending or processing that gas to be within specification, either through the utilisation of existing assets or by new infrastructure investment.

This consultation opens on Monday 9th October 2017 and will close on Friday 17th November 2017. Should you have any queries or require further clarification in respect of this consultation, please contact Phil Hobbins at National Grid on 01926 653432 or at philip.hobbins@nationalgrid.com.

How to respond

Written responses may be sent by email using the consultation response template provided to [.box.gas.market.devel@nationalgrid.com](mailto:box.gas.market.devel@nationalgrid.com) and philip.hobbins@nationalgrid.com. If you wish the details of your response to be kept confidential, please indicate this clearly. Alternatively, if you wish to provide feedback verbally, please use the contact details above to make the arrangements for a meeting / conference call / video conference.

Regards

Phil Hobbins

Market Change Gas, National Grid

1.0 Current GB Gas Quality Management Arrangements

The legal limits for UK gas quality are set out in Schedule 3 of the Gas Safety (Management) Regulations 1996 (GS(M)R). In addition, National Grid publishes a supplementary indicative specification in Appendix 2 of its annual Gas Ten Year Statement (GTYS). Notable differences are that the GTYS specification provides a limit for carbon dioxide and a more stringent restriction on oxygen content than that which is legally required by the GS(M)R. Parameters for each NTS sub-terminal that delivers gas into the NTS are set out in Network Entry Agreements (NEAs) between National Grid and each sub-terminal operator. There are a few sub-terminals which do not have a NEA with National Grid and which operate on the basis of the gas quality limits that were in place in respect of that location the inception of Network Code in 1996.

The GS(M)R set out the technical specification for gas quality in the UK and establishes a legal obligation on UK gas transporters not to transport gas that does not comply with it. National Grid is therefore currently unable to agree to any relaxation of these requirements. The GS(M)R are in process of being reviewed and, in respect of the gas quality parameters, an IGEM-led working group is currently investigating whether the upper limit for Wobbe Index could be increased from its current level of 51.41 MJ/m³ to 53.25 MJ/m³.

Current responsibilities for NTS gas quality management may be summarised as:

- NTS entry sub-terminal operators are required under the NEAs to physically deliver gas to National Grid that is within the parameters applicable to their particular sub-terminal. Any processing or blending of gases to achieve compliance at the point of entry on each incoming pipeline is therefore the responsibility of that party.
- Shippers are responsible under the UNC for delivering gas of a compliant quality to the NTS. Since the NEAs define what 'compliant' means in respect of each sub-terminal, in practice, this obligation is discharged by each sub-terminal operator on behalf of the shipper.
- National Grid is responsible for only conveying gas that complies with the requirements of GS(M)R. In the event that non-compliant gas is presented for delivery at a sub-terminal, National Grid implements its Transportation Flow Advice (TFA) process to notify the terminal operator of the non-compliant flow and curtail its supply if the situation is not promptly remedied.

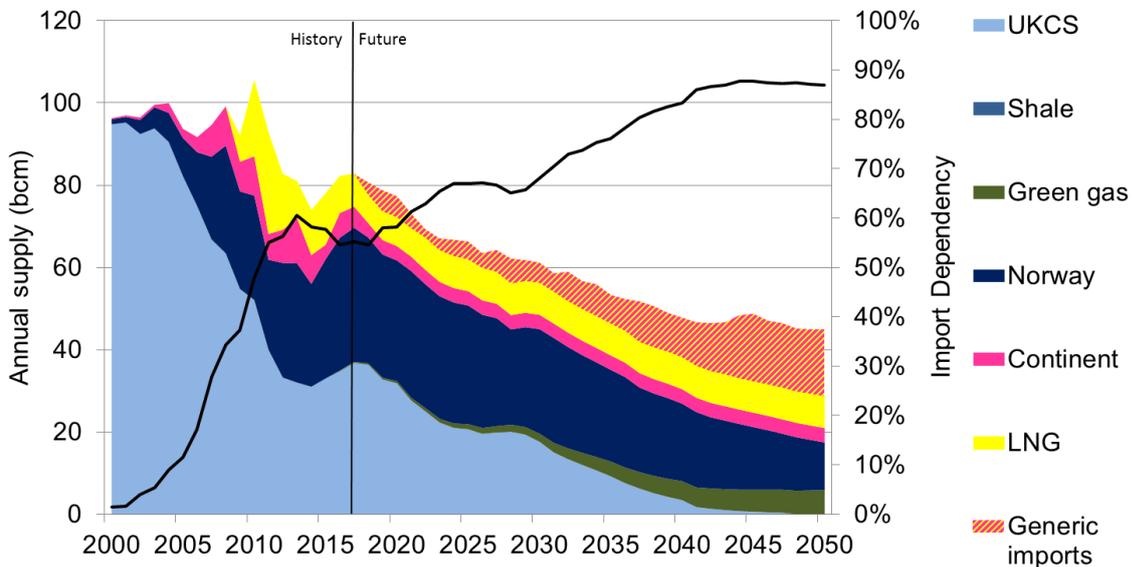
At some NTS entry points, gas from different terminal operators comingles within the National Grid terminal before entering the NTS pipelines that convey the gas into the network. However, at present, National Grid does not use such infrastructure to provide any active gas quality blending services; each terminal operator is required to comply with the specification applicable to that entry point on its incoming pipeline.

2.0 Changing NTS Supplies

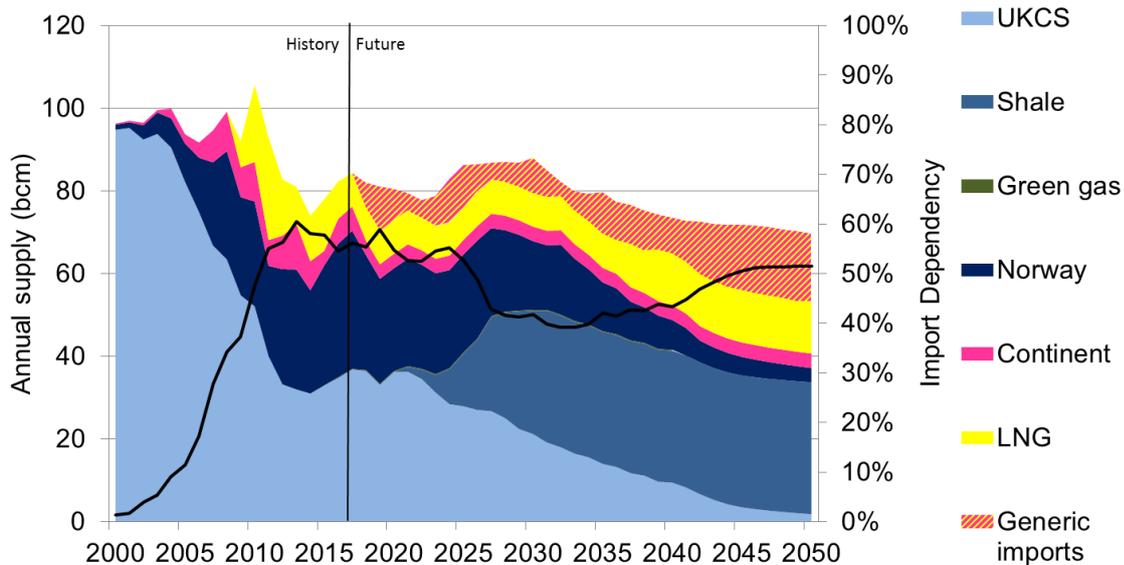
GB's import dependency has grown substantially in the past 15 years as UKCS supplies have declined from 95bcm in 2000 to 35bcm in 2016. Although the UKCS has enjoyed a

brief renaissance in recent years, we expect this trend to continue with the shortfall being made up with gas from Norway, continental Europe and LNG. Other indigenous sources of shale gas, biomethane and bio-substitute natural gas may be further developed, which National Grid's Project CLoCC¹ aims to facilitate from October 2018, although in three out of our four Future Energy Scenarios, imported gas will become even more important.

Annual supply pattern in 'Two Degrees' Scenario



Annual Supply Pattern in 'Consumer Power' Scenario



Source: Future Energy Scenarios, National Grid, July 2017

¹ For further information on Project CLoCC, please visit www.projectclocc.com

Against this backdrop, following on from the Wood Report² and the establishment of the Oil and Gas Authority, the government's Maximising Economic Recovery Strategy for the UK was published in 2015, whose central obligation is that "Relevant persons must, in the exercise of their relevant functions, take the steps necessary to secure that the maximum value of economically recoverable petroleum is recovered from the strata beneath relevant UK waters."

What National Grid is keen to understand is:

- What these future change drivers may mean for gas quality; in particular, whether requests to deliver GS(M)R-compliant gas into the NTS with limits outside our current GTYS parameters are likely to increase;
- The adequacy of current processes going forward in managing such requests for new and existing NTS entry connections;
- Industry preferences for how available gas quality flexibility should be allocated by National Grid where that flexibility is scarce; and
- Potential demand in the RIIO-2 period (post 2021) for National Grid to play an enhanced role in facilitating additional gas being brought to market through the provision of gas processing / blending services.

3.0 Current Change Process for Existing NTS Entry Connections

Whilst shippers have a UNC obligation to deliver compliant gas to the NTS, it is the NEAs that National Grid has in place with sub-terminal operators that define what 'compliant' means at each NTS entry point and where the technical parameters are defined. Therefore, the current change process needs to encompass both National Grid's contractual relationships with shippers through the UNC as well as those with the relevant sub-terminal operator through the NEA.

The current change process for an existing gas quality limit in a NEA is set out in the UNC Transportation Principal Document section I2.2 and is normally facilitated by a UNC party raising a UNC modification proposal. The alternative is for National Grid to obtain the written consent of all shippers holding NTS entry capacity at the relevant location but the UNC modification is usually the more practical and transparent route. Approval of the UNC modification provides the required industry consent for National Grid to make the NEA amendment with the relevant sub-terminal operator.

National Grid's current preference is that any such UNC modification would, if approved, incorporate the varied parameter into the UNC such that the revised limit would be available to all existing and potential customers, subject to agreement between the relevant operator and National Grid³. However, given the wider potential impact of raising a change in this way, industry parties have typically preferred to raise the change proposal only in respect of their specific NTS entry point.

² 'UKCS Maximising Recovery Review: Final Report', February 2014

³ This was done with UNC Mod 0049 'Optional Limits for Inert Gases at System Entry Points' which allowed National Grid to agree a carbon dioxide limit of up to 2.5mol% with any sub-terminal operator that requested such a change.

4.0 Recent UNC Gas Quality Modifications

A number of recent UNC modifications have proposed changes at individual NTS entry points for either oxygen or carbon dioxide content that are permissible under GS(M)R but are outside the GTYS limits. These are:

Modification	Nature of Proposal	Date Raised	Status
0498 - Amendment to Gas Quality NTS Entry Specification at BP Teesside System Entry Point	Increase the CO ₂ limit at BP Teesside from 2.9mol% to 4.0%	4 April 2014	Implemented on 25 September 2015, enabling the NEA change from 1 October 2020.
0502 – Amendment to the Gas Quality NTS Entry Specification at the px Teesside System Entry Point	Increase the CO ₂ limit at px Teesside from 2.9mol% to 4.0%	3 June 2015	Implemented on 25 September 2015, enabling the NEA change from 1 October 2020.
0561S – Amendment to the oxygen limit within the BBL /NGG Interconnection Agreement	Increase BBL oxygen limit from 10ppm to 200ppm	2 October 2015	Implemented from 11 December 2015
0581S – Amending the oxygen content limit specified in the Network Entry Agreements at Grain LNG	Increase the oxygen limit at Grain from 10ppm to 200ppm	8 April 2016	Implemented with effect from 12 August 2016
0607S – Amendment to Gas Quality NTS Entry Specification at the St Fergus NSMP System Entry Point	Increase the NSMP St Fergus CO ₂ limit from 4.0mol% to 5.5mol%	15 December 2016	Live modification

5.0 Current Process – New NTS Entry Connections

For a new NTS entry connection, National Grid agrees the gas quality specification bilaterally as part of the NEA development. There is no formal process for consulting shippers; effectively National Grid assumes that the limits agreed are acceptable both to the operator and to the shipper(s) that will be delivering gas into the NTS at that location.

6.0 Current National Grid Approach Towards GTYS Specification Deviation Requests

When assessing these requests, our current approach is to investigate any impact on NTS asset integrity and our ability to continue to meet our existing safety, legislative, regulatory and contractual obligations.

We may be able to accommodate a relaxation from a GTYS limit at one NTS entry point but would be unable to do so more widely if other terminal operators were to make similar

requests. This issue has arisen during the development of UNC Modification 0607S⁴ where our network modelling has shown that agreeing a 5.5mol% carbon dioxide limit for the NSMP terminal at St Fergus is not expected to affect our ability to meet our contractual obligation to make gas available within the carbon dioxide offtake specification at Bacton to IUK, but this ability could be compromised if other NTS entry parties were to also seek increases to their carbon dioxide limits at other locations.

Therefore, applying a 'first come first served' approach could result in National Grid refusing any such potential future requests and then being open to challenge on its Gas Act and Licence obligations to avoid any undue preference or undue discrimination in the terms on which it undertakes conveyance of gas and avoid conferring any unfair commercial advantage on any industry party.

At the time of writing, National Grid and the proposer of Modification 0607S are seeking a contractual solution to this issue to allow National Grid the ability to reduce the higher limit in the event that such flexibility becomes scarce. However, we recognise that such a resolution would bring a degree of uncertainty for the proposer and terminal operator and some shippers argue that this could set an undesirable precedent for the future.

7.0 Options for Facilitating Change

- 1) **Status Quo.** The current 'first come, first served' arrangements have worked effectively where National Grid has not faced a constraint on its ability to offer an amended limit at all other locations. However, where our ability to accommodate an increased limit is scarce, we are concerned about the potential for a future discrimination claim if another party makes a similar request in respect of another NTS entry point that we have to refuse. Some parties in the UNC Modification 0607S workgroup have considered that this should not be a concern because each case should be treated on its own merits and assessed against the UNC relevant objectives based on information available at the time. National Grid has so far taken the view that time-limiting the provision of flexibility, demonstration of an ongoing need by the requesting party and a right for National Grid to reduce the increased limit if other requests were to be made that could not otherwise be accommodated are necessary measures to ensure that undue discrimination is avoided.
- 2) **Window for other requests** - Under the PARCA process, National Grid opens a window of time each year in which market participants may signal demand for the reservation of NTS capacity. This concept could be extended to gas quality changes where National Grid receives a request to deviate from a GTYS limit that could not be accommodated at all locations. If no other parties came forward then National Grid could proceed to make the requested change, it being apparent that, at that time, no other party wished to access such flexibility. If further requests were to be made during such a window then these could be assessed on an equivalent basis by National Grid with a view to sharing the available flexibility on a non-discriminatory basis.

⁴ <https://www.gasgovernance.co.uk/0607>

- 3) **Lowest Common Denominator** – This option would permit gas quality changes to be made only where such a change could be accommodated by National Grid at all entry points. It would enable National Grid to comply with its obligation not to discriminate but could also lock gas out that could otherwise be accepted, particularly for the smaller-scale NTS connections that Project CLoCC seeks to facilitate.

8.0 National Grid Gas Quality Services

National Grid wishes to take the opportunity in this consultation to seek feedback on how market participants may be affected by variations in the gas quality that they receive from the NTS and what National Grid may be able to do to help manage those issues. National Grid has consulted on this topic previously and discovered that, for example, CCGT operators face a risk of their power station tripping if the calorific value of the gas offtaken is subject to fluctuation. This led to a number of requests for National Grid to publish real-time gas quality information at entry points to the NTS. National Grid investigated this but concluded that it is not viable at this stage due to confidentiality issues associated with publication of upstream data and the complexity of systems changes that would be required. Nevertheless, National Grid is keen to explore what else could be done in this area that would be of value to customers and stakeholders.

National Grid is also interested in the extent of any demand in the RIIO-2 period post 2021 to utilise its existing infrastructure or build new plant to provide blending / processing services to allow an upstream operator to deliver wider specification gas at the custody transfer point from where National Grid would bring it into compliance before it entered the NTS pipeline(s). This could potentially allow for relaxations in NEA gas quality specifications outside the GS(M)R limits as well as GTYS since National Grid would be responsible for treating or blending the gas with other sources to be GS(M)R compliant.

9.0 Questions for Consultation

Existing NTS Entry Connections

1. Do you expect the number of requests by existing NTS entry parties to amend gas quality limits in their Network Entry Agreements (NEAs) that are within GS(M)R but outside GTYS limits to increase in the coming years? Please provide your rationale.
2. Do you believe that National Grid's current method of assessment for individual NEA parameter changes is appropriate? If not, how could our approach be improved?
3. Which of the NEA change options detailed in section 7.0 for individual limit parameters do you prefer and why? Are there other options that should be considered?

New NTS Entry Connections

4. Do you believe that the process of agreeing gas quality limit parameters for new NTS entry connections requires reform? If so, what changes do you suggest?
5. Do you consider that the demand for new NTS entry connections to deviate from GTYS gas quality limits will grow in the future? If so, please provide your rationale.

Generic Questions

6. Where National Grid's ability to agree to higher gas quality limits is limited, e.g. a higher limit could be agreed at one NTS entry point but not more widely due to an impact at NTS exit point(s), how should National Grid manage and allocate the available flexibility?
7. Do you support further consideration of National Grid providing gas quality services to process and/or blend at NTS entry points in the RII0-2 period or do you believe that the responsibility to deliver compliant gas should continue to rest with upstream parties? Are there any specific projects / locations where this type of service could be valuable?
8. If your business is adversely affected by variations in gas quality, how could National Grid help you to manage those issues? (Note: at this stage we are not proposing to publish real-time gas quality data measured at entry points to the NTS).
9. Is there a case to treat smaller connections that Project CLoCC seeks to facilitate differently to larger coastal terminals in respect of gas quality arrangements?
10. The GTYS limit for oxygen is 200 times more stringent than that required by GS(M)R (10ppm compared to 2000ppm). Do you anticipate any adverse consequences if the GTYS limit were to be increased?

Appendix 1: Table of Gas Quality Parameters and Limits

Parameter	Gas Safety Management Regulations (GS(M)R) Limit	Gas Ten Year Statement Limit
Hydrogen sulphide (H ₂ S) content	≤5 mg/m ³	≤5 mg/m ³
Total sulphur content (including H ₂ S)	≤50 mg/m ³	≤50 mg/m ³
Hydrogen content	≤0.1% (molar)	≤0.1% (molar)
Oxygen content	≤0.2% (molar)	≤0.001% (molar)
Contaminants / Impurities	“Gas shall not contain solid or liquid material which may interfere with the integrity or operation of pipes or any gas appliance (within the meaning of regulation 2(1) of the 1994 Regulations) which a consumer could reasonably be expected to operate.”	“Gas shall not contain solid or liquid material which may interfere with the integrity or operation of pipes or any gas appliance within the meaning of regulation 2(1) of the Gas Safety (Installation and Use) Regulations 1998 which a consumer could reasonably be expected to operate.”
Hydrocarbon dewpoint and water dewpoint	“shall be at such levels that they do not interfere with the integrity or operation of pipes or any gas appliance (within the meaning of regulation 2(1) of the 1994 Regulations) which a consumer could reasonably be expected to operate”.	Hydrocarbon dewpoint ≤ -2° C at any pressure up to 85 barg Water dewpoint ≤ -10° C at 85 barg
Wobbe Number (WN)	(i) ≤51.41 MJ/m ³ , and (ii) ≥47.20 MJ/m ³	(i) ≤51.41 MJ/m ³ , and (ii) ≥47.20 MJ/m ³
Incomplete Combustion Factor (ICF)	≤0.48	≤0.48
Sooting Index (SI)	≤0.60	≤0.60
Carbon Dioxide	Not a GS(M)R parameter	≤2.5% (molar)