

Appendix 2 – Customer connections and capacity information

2.1 Additional Information specific to system entry, storage and interconnector connections

We require a network entry agreement, storage connection agreement or interconnector agreement, as appropriate, with the respective operators of all delivery, storage and interconnector facilities.

These agreements establish, among other things, the gas quality specification, the physical location of the delivery point and the standards to be used for both gas quality and the measurement of flow.

2.1.1 Renewable gas connections

We are committed to environmental initiatives that combat climate change. During the last year, an increasing number of customers have asked about entry into our pipeline system for biomass-derived renewable gas. We have also received requests for gas entry from unconventional sources, such as coal bed methane.

We welcome these developments and would like to help connect these supply sources to the network, but note that all existing network entry quality specifications, as detailed in the following section, still apply.

It should be recognised that the pressure requirements of biomass-derived renewable gas mean it may need to be connected to

the gas distribution networks instead of the National Transmission System. For information about connections to the gas distribution networks, please read the documents for the relevant distribution network.

The twelve local distribution zones (LDZs) are managed within eight gas distribution networks. The owners of the distribution networks are:

Scotland and South of England (South LDZ and South East LDZ) are owned and managed by Scotia Gas Networks – operating as Scotland Gas Networks and Southern Gas Networks respectively. For information visit <http://www.scotiagasnetworks.co.uk/>

Wales and the West (Wales LDZ and South West LDZ) is owned and managed by Wales and West Utilities. For information visit <http://www.wwutilities.co.uk/>

North of England (North LDZ and Yorkshire LDZ) is owned by Northern Gas Networks, who have contracted operational activities to United Utilities Operations. For information visit <http://www.northerngasnetworks.co.uk/>

North West, London, West Midlands and East of England (East Midlands LDZ and East Anglia LDZ) are owned and managed by National Grid.

To contact National Grid-owned DNs about new connections please go to www.nationalgrid.com

2.1.2 Network entry quality specification

For any new entry connection to our system, the connecting party should tell us as soon as possible what the gas composition is likely to be. We will then determine whether gas of this composition would be compliant with our statutory obligations and our existing contractual obligations. From a gas quality perspective our ability to accept gas supplies into the NTS is affected by a range of factors including the composition of the new gas, the location of the system entry point, volumes provided and the quality and volumes of gas already being transported within the system.

In assessing the acceptability of the gas quality of any proposed new gas supply, we will consider:

- our ability to continue to meet statutory obligations (including, but not limited to, the Gas Safety (Management) Regulations 1996 (GS(M)R))
- the implications of the proposed gas composition on system running costs
- the implications of the new gas supply on our ability to continue to meet our existing contractual obligations.

For indicative purposes, the specification overleaf, is usually acceptable for most locations. This specification encompasses, but is not limited to, the statutory requirements set out in the GS(M)R.

Appendix 2 – Customer connections and capacity information

*Table A2.1
Gas Quality Specification*

Gas Element	Quality Requirement
Hydrogen sulphide	Not more than 5mg/m ³
Total sulphur	Not more than 50mg/m ³
Hydrogen	Not more than 0.1% (molar)
Oxygen	Not more than 0.001% (molar)
Hydrocarbon dewpoint	Not more than -2°C at any pressure up to 85 barg
Water dewpoint	Not more than -10°C at 85 barg
Wobbe number (real gross dry)	The Wobbe number shall be in the range 47.20 to 51.41MJ/m ³
Incomplete combustion factor (ICF)	Not more than 0.48
Soot index (SI)	Not more than 0.60
Carbon dioxide	Not more than 2.5% (molar)
Contaminants	The gas shall not contain solid, liquid or gaseous material that might 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, that a consumer could reasonably be expected to operate
	Ofgem agree that No NGG action required
Organo halides	Not more than 1.5 mg/m ³
Radioactivity	Not more than 5 becquerels/g
Odour	Gas delivered shall have no odour that might contravene the statutory obligation not to transmit or distribute any gas at a pressure below 7 barg that does not have a distinctive and characteristic odour
Pressure	The delivery pressure shall be the pressure required to deliver natural gas at the delivery
	point into our entry facility at any time, taking into account the back pressure of our system
	at the delivery point, which will vary from time to time
	The entry pressure shall not exceed the maximum operating pressure at the delivery point
Delivery temperature	Between 1°C and 38°C.

Note that the incomplete combustion factor (ICF) and soot index (SI) have the meanings assigned to them in Schedule 3 of the GS(M)R.

In addition, where limits on gas quality parameters are equal to those stated in GS(M) R (hydrogen sulphide, total sulphur, hydrogen, Wobbe number, soot index and incomplete

combustion factor), we may require an agreement to include an operational tolerance to ensure compliance with the GS(M)R. We may also need agreement on upper limits of rich gas components such as ethane, propane and butane in order to comply with our safety obligations.

2.1.3 Gas quality developments

At the end of its 'three-phase' gas quality exercise, initiated in 2003, the UK Government reaffirmed in 2007 that it will not propose any changes to the GB gas specifications in the GS(M)R to the Health and Safety Executive until at least 2020. The Government's forward plan proposed continued engagement with the European Commission (EC) and Member States on gas quality, with particular regard to the CEN (Comité Européen de Normalisation, the European committee for standardisation) mandate M/400. Under this mandate, CEN was invited to draw up the broadest possible standards for natural gas quality, within reasonable costs.

Following public consultation in 2014, the Wobbe Index proposals for the standard were removed and the standard proceeded to national vote on the remaining parameters in September 2015, resulting in a majority vote to adopt it. Of itself, this does not require any change to GB gas quality arrangements; however the European Commission has indicated that it will seek to make the standard binding on member states via an amendment to the EU Interoperability Network Code. It is not yet clear how this will happen and what the consequences for GB gas quality arrangements will be but we will continue to monitor developments and keep the industry informed.

Under the Interoperability Code, TSOs are obliged to engage with domestic stakeholders to explore whether enhanced information provision for parties that are sensitive to changes in gas quality would be desirable and achievable. We plan to commence our engagement on this topic shortly.

Carbon dioxide limits have been the subject of GB industry debate (UNC Modification Proposals 0498 and 0502) in seeking to bring additional gas to market from the UKCS. This debate centred on whether a higher limit at the Teesside entry terminals would be more economic and efficient than upstream installation of CO₂ removal plant and operating it when necessary. The other side of the debate included consideration of potential impacts for operators downstream of NTS exit points in terms of potential costs for plant integrity, operation, and emissions. In September 2015, Ofgem directed that these Modifications should be implemented.

The development of shale gas is still in its infancy in the UK and at present there is uncertainty over the quality of such gas until wells are drilled. We will continue to work with customers and monitor developments in this area.

Appendix 2

The PARCA Framework Process

2.2

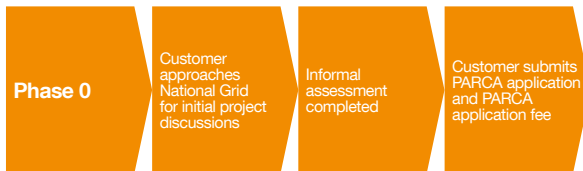
The PARCA Framework Process

The PARCA framework is split into four logical phases: Phase 0 to Phase 3. This phased structure gives the customer natural decision points where they can choose whether to proceed to the next phase of activities.

Regardless of these natural decision points the PARCA process is flexible enough to allow the customer to leave the process at any time before full financial commitment to the capacity through capacity allocation.

2.2.1 Overview of the four phases

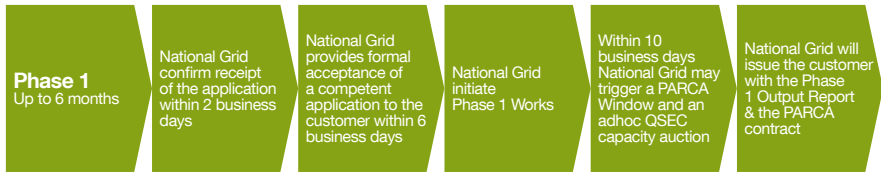
Phase 0 – Bilateral Discussions (no defined timescales)



This phase is a bilateral discussion phase between the customer and National Grid with no defined timescales. It allows the customer and National Grid to understand each other's processes and potential projects before the customer decides whether to formally enter the PARCA process. If the customer wants to proceed into the PARCA process after these

discussions they must submit a valid PARCA application form and pay a PARCA application fee. Our PARCA application form can be by using the following link:
<http://www2.nationalgrid.com/UK/Services/Gas-transmission-connections/PARCA-framework/PARCA-Framework-1/>

Phase 1 – Works and PARCA contract (up to six months)



When we receive a valid PARCA application form and payment of the application fee from the customer, we will tell them their PARCA application has been successful and Phase 1 of the PARCA process will begin. During Phase 1 we will publish relevant information to the industry and, through the opening of a PARCA window, invite PARCA applications from other customers.

In our desktop study, we will explore a number of ways of delivering the capacity. This may be wholly through (or a combination of) existing network capability, substitution of capacity, a contractual solution or physical investment in the NTS. We will complete these works within six months of the start of Phase.

We also release long-term NTS capacity through established UNC capacity auction and application processes, more specifically:

- Long-term NTS entry capacity that is sold in quarterly strips through the Quarterly System Entry Capacity auction (QSEC) held annually in February and

- Long-term NTS Exit Capacity that is sold as an enduring evergreen product through the Enduring Annual NTS Exit Application process held annually in July.

So it's important to bear in mind that existing system capacity that could be used to fully or partly satisfy a PARCA request may also be requested by our customers through those processes detailed above. As such it may not be appropriate to initiate the Phase 1 works of a PARCA while the QSEC or enduring annual processes are running because it may not be clear how much existing capacity will be available to satisfy a PARCA request for the purposes of the Phase 1 studies.

The timetable below (Figure A6.1) shows the annual QSEC auction and enduring exit capacity application and potential periods where we decide not to start Phase 1 PARCA Works:

Figure A2.1 Annual Entry and Exit capacity application windows

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Annual QSEC Auction		QSEC invitation	QSEC bid window	Allocation of QSEC bids								
Entry Capacity PARCA Annual		Phase 1 of an entry capacity PARCA may not be initiated if there is an interaction with the ongoing annual QSEC auction process										
Enduring Exit Application						Exit invitation	Exit capacity window	Allocation of exit capacity				
Exit Capacity PARCA						Phase 1 of an entry capacity PARCA may not be initiated if there is an interaction with the ongoing annual Exit capacity application window						

Appendix 2 The PARCA Framework Process

PARCA Window

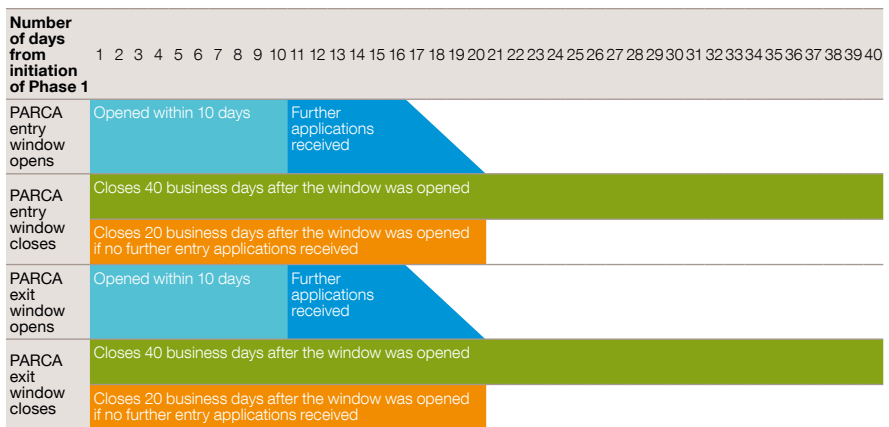
The purpose of the PARCA window is to encourage those customers considering applying for a PARCA to submit their application at this time, so that we can assess how to meet their capacity need alongside other potential projects.

For any PARCA application deemed competent outside a relevant PARCA window, within 10 business days of the initiation of the Phase 1 works of that PARCA we will open (where a window is not already open) either a PARCA entry or exit window, a notice will be published on our PARCA webpages, which can be found by using the following link: <http://www2.nationalgrid.com/UK/Services/Gas-transmission-connections/PARCA-Framework/>

We guarantee to consider together all PARCA applications submitted and deemed competent within this window. However, it is important to note that if you wish to be considered for capacity alongside other PARCA applications, in order to ensure we can conduct our competency check within the PARCA window timescales, please endeavour to submit your application as early as practically possible.

The diagram below (figure A2.2) shows the PARCA Window timeline:

Figure A2.2
PARCA window timeline



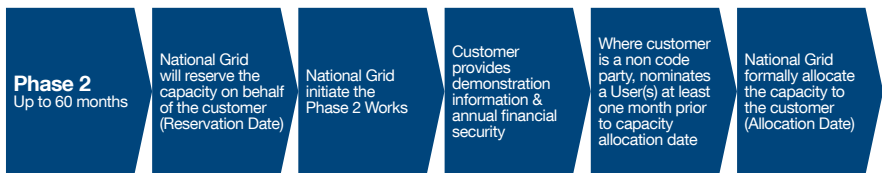
The PARCA window is open for a maximum of 40 consecutive business days but will close after 20 consecutive business days if no further PARCA applications have been received within that time. There are two types of PARCA window:

- Entry window – triggered if a PARCA requests NTS entry capacity
- Exit window – triggered if a PARCA requests NTS exit capacity.

Only one entry and/or exit PARCA window can be open at any one time. So if a PARCA application requesting entry/exit capacity is deemed competent within an open entry/exit PARCA window, an additional PARCA window will not be triggered.

On completion of the Phase 1 works we will provide the customer with a Phase 1 output report, which will include a need case report (establishes and documents the potential need case for investment, a technical options report and a PARCA contract.

Phase 2 – (up to 60 months)



When the contract is counter-signed, we will reserve the capacity on the customer’s behalf, from the date provided in the Phase 1 output report.

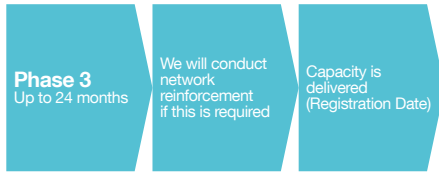
If the Phase 1 output report shows that physical reinforcement of the NTS is needed to provide the customer with their capacity, we will start the statutory planning consent at this stage; either the Planning Act or Town & Country Planning. If no physical reinforcement is needed we will continue to reserve the capacity in accordance with the timelines provided as part of the Phase 1 output report.

Phase 2 ends when the reserved capacity is allocated to the customer or, where the customer is a non-code party, a nominated code party(s). Once allocated and the capacity is financially committed to, the PARCA contract ends and we begin the capacity delivery phase (Phase 3).

Appendix 2

The PARCA Framework Process

Phase 3 – (up to 24 months)



Once the capacity is formally allocated, the PARCA contract expires and the capacity delivery Phase 3 is initiated. This is where we carry out necessary activities, such as reinforcing the NTS to deliver the allocated capacity. Please note that on allocation of any reserved NTS capacity, the Uniform Network Code (UNC) user commitment applies.

The PARCA allows you to reserve capacity but it does not provide you with an NTS connection.

If you need a new connection to the NTS, or a modification to an existing NTS connection, you will need to go through the application to offer (A2O) process.

The A2O process typically takes three years from application to the construction of the physical connection.