Issue	Revision
1	0

Gas Feasibility Study Application Guide

June 2010

nationalgrid

About this Document

In the majority of cases a preliminary study (e.g. Conceptual Design Study or Feasibility Study) will be required in advance of the detailed design and/or physical works associated with the amendment to a current connection to the high pressure National Transmission System (NTS).

The aim of this document is to act as guidance to customers who require National Grid to undertake such a Feasibility Study in relation to the modification of an existing exit NTS connection governed by a Network Exit Agreement (NExA).

By returning all of the requested information within this document, it is anticipated that National Grid will be able to progress to a Feasibility Study as soon as possible. In some cases additional information may be required in order to successfully begin or complete a Feasibility Study and where this is the case the customer will be contacted at the earliest opportunity.

Appendix B of this document also provides applicants with an initial high level view of the potential timescales and costs associated with a Feasibility Study.

This statement is effective from [1 June 2010]

This document has been published by National Grid in support of the Statement and Methodology for Gas Transmission Connection Charging.

If you require further details about any of the information contained within this document can contact us via email at;

mailto:[email]@uk.ngrid.com

Or by post to:

[Gas Access and Charging Manager]
Transmission Commercial
National Grid plc
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
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How to use this document

This document requires applicants to submit a range of information to National Grid which will form the scope of a Feasibility Study Agreement.

[Certain information requested is compulsory and other information is “additional”, i.e. it is not compulsory but will aid National Grid’s understanding of the required change.] Customers are encouraged to include as much information within this document as possible to ensure National Grid clearly understand the required change. Failure to complete all relevant parts of this document may cause a delay in conducting the Feasibility Study.

Contents

SECTION ONE – Request for a Modification to an Existing NTS Exit Connection

Introduction

The nature of the change that National Grid NTS can assess within a Feasibility Study is limited to whether National Grid is solely the owner of the connection to the NTS i.e. the Remotely Operable Valve (ROV) or whether ownership also extends to the metering installation. If you are unsure of whether NTS owns your Metering Installation please refer to your NExA or alternatively contact the National Grid Gas Customer Team using the contact details on page two.

As a general rule, the following table applies

National Grid NTS infrastructure ownership	ROV Installation	ROV and Metering Installation
Available changes to consider within Feasibility Study	• Flow Rates • Ramp Rates	• Flow Rates • Ramp Rates • Pressure • Temperature

It is important to note therefore that whilst National Grid is happy to discuss all aspects of a potential project with a customer, the scope of a Feasibility Study will be limited to the connection infrastructure within National Grid's ownership. If National Grid does not own the metering installation at a site, responsibility to ensure the safe operation of the metering installation following a change to an ROV remains with the customer and metering provider.

Completing Section One

All customers wishing National Grid to undertake a Feasibility Study must first complete all of the **compulsory information** required within **Part A**. Once this section is complete customers should then complete one or more of the following sections that is relevant for the modification requested.

For a requested change to **Flow Rates** to your connection please complete **Part B.**

For a requested change to **Ramp Rates** to your connection please complete **Part C.**

For a requested change to the **gas Pressure** at your connection please complete **Part D***

For a requested change to the **gas Temperature** at your connection please complete **Part E***

*Please note as per the above section that these changes can only be considered by National Grid where it is the owner of the metering installation at your connection.

Part A - Exit Connection / Site Information

Please complete all of the following compulsory fields.

Name of facility		
Facility operator		
Name of existing connection point (i.e. the location where the NTS ends)	(e.g.?)	
Type of connection (e.g. entry, exit or storage)		
Number of gas turbines (if applicable)		
Is National Grid the owner of the metering installation for your site?[1]	(Yes / No)	
Preferred date of final project completion		
Current contracted maximum flowrate through the National Grid installation.		Scmh[2]
Outline description of the system configuration downstream of the National Grid installation/point of connection onto the NTS system including a description of what plant and equipment is incorporated into the gas pipework system		

Downstream Diagram

Please provide a schematic diagram outlining the system configuration downstream of the existing National Grid installation/point of connection onto the NTS including an indication of what plant and equipment is incorporated into the gas pipework system, pipe sizes and lengths.

[1] If you are unsure whether National Grid is the owner of the Metering Installation to your site please contact the National Grid Customer Team on [contact details]

[2] The volumetric flow of gas in thousands of cubic metres per hour at the metric standard conditions of temperature at 15 degrees Celsius and a pressure of 1.01325 bar.

Part B – Changes to the Flow Rate

If you require a change to the Flow Rate to your connection please respond to the following data requirements and additional requirements;

Parameter	Details	Units	Comments
Maximum flow required		Scmh	
Normal operating flow level		Scmh	
Minimum flow required		Scmh	

In addition please provide the following information as an appendix to this completed form:

1. The daily load profile detailing how the flow will change through the day and the duration that the facility will be operating at the maximum flow required.
2. The annual load profile detailing how the flow will change throughout the year and the duration that the facility will be operating at the maximum flow required.

Part C – Changes to the Offtake / Ramp Rate

If you require a change to the Offtake / Ramp Rate to your connection please respond to the following data requirements and additional requirements;

[Part C.1: Nature of Change]

Please pick from one of the following options;

Offtake / Ramp Rate requirement is from the National Grid Metering Installation	(Yes / No)
Offtake / Ramp Rate requirement is from an NTS connection arrangement	(Yes / No)

Part C.2: Detailed Information

Parameter	Details	Units	Comments
Offtake / Ramp up rate requirements			
Current contracted offtake/ramp up rate through the National Grid installation		MW/minute	
		scmh/minute	
Offtake/ramp up rate required		scmh/minute	
Time to maximum flow from zero flow		minutes	
Shut down/ramp down requirements			
Current shut down/ramp down rate		MW/minute	
		scmh/minute	
Time to shut down/ramp down from maximum flow to zero flow		minutes	
Emergency Shut Down (ESD) requirements			
Time to ESD from maximum flow to zero flow		minutes	
Flow changeover for storage connection applications (if applicable)			
Time to change from entry flow to exit flow		minutes	
Time to change from exit flow to entry flow		minutes	

Please provide the following information as an appendix to this competed form:

1. A description of the typical power station start up and operating sequences that will be used. Such as what are the power station gas turbine operating sequences (e.g. if there are four gas turbines, will they all be brought on line in a set sequence? Can or will the gas turbines be ramped up simultaneously? What operating configurations/sequences will be used? etc.).
2. A graph of flow against time showing the gas profile for the start up sequence(s) to be used with supporting data.
3. A description of the typical power station shut down sequence for all planned/controlled load reduction scenarios.
4. A graph of flow against time showing the gas profile for the shut down sequence for all planned/controlled load reduction scenarios to be used with supporting data.
5. A description of the typical power station shut down sequence for all unplanned load reduction scenarios.

6. A graph of flow against time showing the gas profile for the shut down sequence for all unplanned load reduction scenarios to be used with supporting data.
7. Data on current operating profiles (e.g. base load, one on/off cycle per day with a normal operation lasting "*X*" hours with an off period of "*Y*" hours etc.).
8. Data regarding the future anticipated gas turbine operating profiles (e.g. base load, one on/off cycle per day with a normal operation lasting "*X*" hours with an off period of "*Y*" hours etc.).

Part D - Change to in Outlet Pressure from National Grid Metering installation

If you require a change to the Outlet Pressure from the Metering Installation please respond to the following data requirements and additional requirements;

Parameter	Details	Units	Comments
Current contracted outlet pressure from the National Grid installation		Barg[4]	
Maximum outlet pressure required under steady state conditions (i.e. during continuous power station operation)		Barg	
Normal outlet pressure required under steady state conditions (i.e. during continuous power station operation)		Barg	
Minimum outlet pressure required under steady state conditions (i.e. during continuous operation)		Barg	
Safe Operating Limit (SOL)[5] for the third party system downstream of the National Grid installation		barg	
Maximum Operating Pressure (MOP) for the third party system downstream of the National Grid installation		barg	
Maximum Incidental Pressure (MIP) for the third party system downstream of the National Grid installation		barg	

In addition, please provide the following process parameters;

Parameter	Details	Units
Acceptable operating pressure range under transient flow conditions (i.e. during startup).		barg
Does the above operating range change with the flow level?	(Yes / No)	
Acceptable operating pressure range under short term transient flow conditions (e.g. during load changes from 60% to 80%).		barg
Does the above operating range change with the flow level?	(Yes / No)	
Acceptable operating pressure range during step changes in supply.		barg
Does the above operating range change with the flow level?	(Yes / No)	
Acceptable operating pressure range during a ramp up in supply.		barg
Does the above operating range change with the flow level?	(Yes / No)	
Acceptable operating pressure range during a ramp down in supply.		barg
Does the above operating range change with the flow level?	(Yes / No)	

[4] The unit for pressure, which is the force per unit area. The SI unit of pressure is the pascal (Pa). 1 Pa = 1 Newton per square metre (N/m^2) and 1 bar = 1 x 10^5 N/m^2.

[5] The internal pressure Safe Operating Limited (SOL) for the pipework system is as defined by the *Pressure Systems Safety Regulations 2000*.

Part E - Change to in gas Temperature from National Grid Metering installation

If you require a change to the gas Temperature from the Metering Installation please respond to the following data requirements and additional requirements;

Parameter	Details	Units	Comments
Current contracted minimum gas temperature at the National Grid installation/power station plant interface point under steady state conditions (i.e. during continuous operation)		°C	
Minimum gas temperature required at the National Grid installation/power station plant interface point under steady state conditions (i.e. during continuous operation)		°C	

In addition, please provide the following process parameters;

Parameter	Details	Units
The minimum gas temperature at the National Grid installation/power station plant interface point under transient flow conditions (i.e. during start up).		°C
The minimum gas temperature at the National Grid installation/power station plant interface point under short term transient flow conditions (e.g. during load changes from 60% to 80%).		°C
The minimum gas temperature at the National Grid installation/power station plant interface point step changes in supply.		°C
The minimum gas temperature at the National Grid installation/power station plant interface point during a ramp up in supply.		°C
The minimum gas temperature at the National Grid installation/power station plant interface point during a ramp down in supply.		°C

SECTION TWO - Additional Data Required to Undertake Feasibility Study

[Further work to be undertaken to provide clarity on when the following info will be required]

In addition to the information required in the previous sections, the following information and data is also required:

Part A – Pipework Information (including Drawings)

Please provide the following details on the third party system downstream of the National Grid installation/connection onto the NTS as an appendix to this completed form.

1. Piping and Instrumentation Diagrams (P&IDs)/Engineering Line Diagrams (ELDs) for the downstream third party pipework system provided in Acrobat/**.**pdf format.

2. Dimensioned detail design drawings for the downstream third party pipework system between the outlet of the existing National Grid installation/connection onto the NTS up to and including the inlet pipework to each gas turbine provided in Acrobat/**.**pdf format, to assist in identifying the:

    a. Basic route of all pipework.
    b. Position of all main plant items (i.e. ESD valves, filter(s), separator(s), metering system(s), gas pre heaters etc.).
    c. Gas control valve arrangement(s)/skid(s) (i.e. up to the last pressurised valve connected to each gas turbine during shutdown).

NOTE - Sufficient dimensional information is required to accurately identify pipework run lengths and pipe internal diameters, such as horizontal and vertical lengths, pipe outside diameter and wall thickness etc.

3. Detailed information on the main plant items incorporated in the downstream third party pipework system (e.g. filter(s), separator(s), gas pre heaters such as water bath heater gas coils etc.) between the outlet of the existing National Grid installation/connection onto the NTS up to and including the inlet pipework to each gas turbine. The list is to include, but not be limited to, the following for each plant item:

    a. Size.
    b. Type.
    c. Model number.
    d. Valve travel/operation times.

4. Process design specification (i.e. reference flowrate, pressure, differential pressure etc.) for the main plant items incorporated in the downstream third party pipework system (e.g. filter(s), separator(s), gas pre heaters etc.).

5. Pressure set points of all safety devices/creep relief valves including:

    a. Nominal diameter of valve.
    b. Type of valve.
    c. Model number.
    d. The pressure set point.
    e. Valve opening/reaction time.

f. Valve sensitivity.
g. Location on the pipework system.
h. Location of sensor points on the pipework system.
i. Sensitivity/tolerance on sensors.

Part B – Details on the Emergency Shut Down valve/safety system for unplanned emergency events (e.g. the High Integrity Pressure Protection System (HIPPS) etc.) including:

Parameter	Details	Units
Nominal diameter of valve		
Type of valve		
Model number		
Valve characteristic (e.g. linear, equal percentage, quick opening etc.)		
The pressure set point		
Valve closure operating time		
Valve sensitivity		
Where is the location of sensor points on the pipework system		
Sensitivity/tolerance on sensors		

Part C – Details on gas turbine operating parameters including:

Parameter	Details	Units
Low gas turbine supply temperature alarm and trip limits (if applicable)		
Where is the location of the sensor point on the pipework system?		

Part D – Archive process data

Archive process data from at least two separate points on the downstream third party pipework system (preferable at either end of the pipework system) to assist with transient model validation. This shall include flows, pressures and temperature information for high and low demand conditions over the same time duration.

Part E – Combined System Exit Points

Note that for Connected System Exit Points (CSEPs) which incorporate multiple parties being supplied from a single point of connection onto the NTS. Information will be required on each of the downstream exit points in order to consider any proposed modifications to existing operating parameters for a single party. It is the requesting party's responsibility to obtain all the information and data required by National Grid to facilitate the study work proposed.

Appendix A – Application Checklist

Please feel free to use the following checklist to ensure that your application includes all the required information.

Data Requirement	Yes / No

Section One

Part A - Exit Connection / Site Information completed?	
Downstream Diagram included?	

Part B – Flow Rate Change information completed?	

Part C – Ramp Rate Change information completed?	

Part D – Pressure Change information completed?	

Part E – Temperature Change information completed?	

Section Two

Part A – Pipework Information included?	
Part B – Unplanned Safety Event information included?	
Part C – Gas Turbine Information included?	
Part D – Archive Information included?	
Part E – Combined System Exit Points	

Appendices

Details of supporting information provided	**Appendix Reference**

Appendix B – Indicative Time / Cost matrix

The table below provides indicative information on the three main typical connection types. Using the information provided in Section Two above applicants can determine the indicative timescales and costs for their Feasibility Study:

Category	Uncomplicated	Intermediate	Complex
Description	None of the following are satisfied: • The connection proposed is in the vicinity to a compressor station. or • The connection proposed is in the vicinity to existing entry points. or • The connection proposed is in the vicinity to existing exit points. or • The offtake/ramp up rate required is >50 MW/minute. or • There are multiple operating parameters.	One of the following are satisfied: • The connection proposed is in the vicinity to a compressor station. or • The connection proposed is in the vicinity to existing entry points. or • The connection proposed is in the vicinity to existing exit points. or • The offtake/ramp up rate required is >50 MW/minute. or • The connection proposed is on an extremity to the NTS. or • There are multiple operating parameters.	• Involves changes in operational requirements to an existing National Grid Above Ground Installation/Pressure Reduction Installation. One or a combination of the following are satisfied: • The connection proposed is on or in close proximity to a compressor station. and/or • The connection proposed is on an existing entry point/onshore terminal facility or in close proximity to existing entry points. and/or • The connection proposed is on or in close proximity to existing exit points. and/or • The offtake/ramp up rate required is >50 MW/minute. and/or • The connection proposed is on an extremity to the NTS. and/or • There are numerous or a combination of operating parameters.
Approximate cost range	£10k to £50k	£50k+	£100k+
Approximate timescales	3 to 6 months	6 to 9 months	6 to 12 months

NOTE

1. The categories above are provided for guidance only and are not intended to cover every likely eventuality.
2. The following operational parameters will also be considered in assessing which category is most appropriate:

    - Are there multiple flow paths, e.g. is the NTS duplicated or triplicated within the area of the proposed connection.
    - Variability of pressure profile in the NTS, i.e. is there minimal changes in the prevailing NTS pressure in the area of the proposed connection.
    - NTS plant configurations, e.g. does the NTS plant within the area of the proposed connection have several operating configurations to satisfy the various supply and demand scenarios.

3. The cost and timescales information are indicative and will depend on the particular scope and nature of the work required.