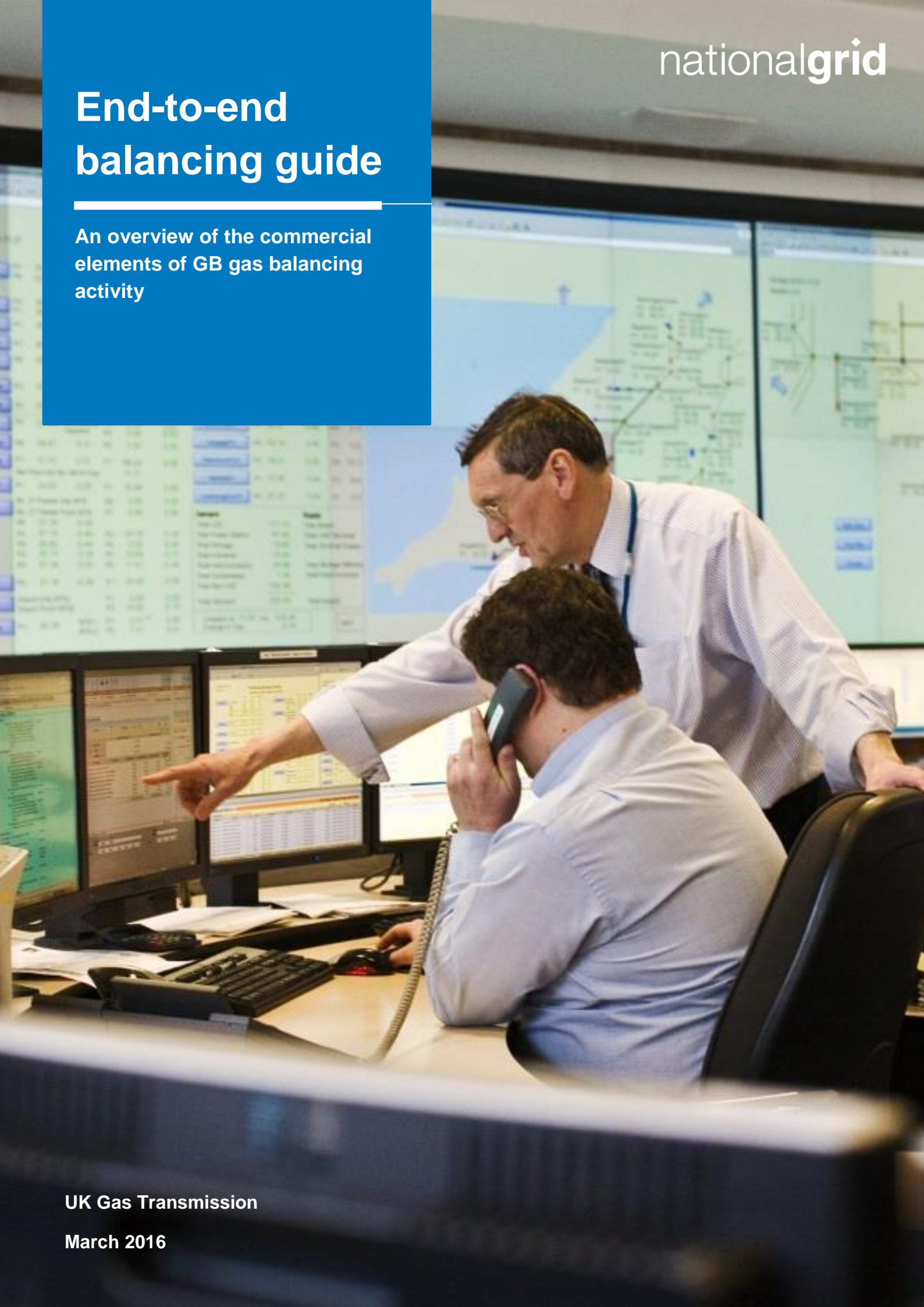


# End-to-end balancing guide

An overview of the commercial  
elements of GB gas balancing  
activity



|   |           |
|---|-----------|
| <b>Introduction</b> .....                                       | <b>3</b>  |
| <b>Background</b> .....   | <b>4</b>  |
| <b>Setting the scene</b> .....                                  | <b>5</b>  |
| National Grid Gas is a regulated business .....                 | 5         |
| The commercial framework .....                                  | 5         |
| <b>Balancing the market</b> .....                               | <b>6</b>  |
| What are gas shippers? .....                                    | 6         |
| When does the gas market need to be balanced? .....             | 6         |
| What is the residual balancer? .....                            | 6         |
| Gas trading overview .....                                      | 7         |
| The On-the-day Commodity Market (OCM) .....                     | 7         |
| Shrinkage provider .....  | 8         |
| <b>The flow of information</b> .....                            | <b>9</b>  |
| Information that we provide .....                               | 9         |
| <i>Demand forecasts</i> .....                                   | 9         |
| <i>System and imbalance information</i> .....                   | 9         |
| Information coming to us.....                                   | 10        |
| <i>Nominations</i> .....  | 10        |
| Predicted closing linepack .....                                | 11        |
| <b>Encouraging gas shippers to balance</b> .....                | <b>13</b> |
| How are gas shippers encouraged to balance the gas market?..... | 13        |
| Imbalance charges.....  | 13        |
| <i>'Long' shippers – over delivery of gas</i> .....             | 13        |
| <i>'Short' shippers – too little gas</i> .....                  | 13        |
| Scheduling charges .....  | 14        |
| What happens to the balancing charges? .....                    | 14        |
| <b>Our role as residual balancer</b> .....                      | <b>16</b> |
| Market-balancing actions .....                                  | 16        |
| Operating margins.....  | 16        |

|  |           |
|--|-----------|
| How are financial costs and benefits associated with residual balancing managed? ..... | 17        |
| National Grid's incentives .....   | 17        |
| <i>Residual balancing</i> .....  | 17        |
| <i>Demand forecasting</i> .....  | 17        |
| <i>Operating margins</i> .....   | 17        |
| <i>Information provision</i> .....   | 18        |
| <i>Shrinkage</i> .....   | 18        |
| How do we report the balancing actions we've taken? .....                              | 18        |
| <b>Summary .....</b>   | <b>19</b> |
| <b>Contact details .....</b>   | <b>19</b> |
| <b>Glossary .....</b>  | <b>20</b> |

The information contained in this document is provided by National Grid Gas plc ("National Grid") in good faith. However, no warranty or representation or other obligation or commitment of any kind is given by National Grid, its employees or advisors as to the accuracy or completeness of any such information or that there are not matters material to the arrangements and matters referred to therein other than is contained or referred to in this document. Neither National Grid nor its employees or advisors shall be under any liability for any error or misstatement or as a result of any failure to comment on any information provided by National Grid. Other than in the event of fraudulent misstatement or fraudulent misrepresentation, National Grid does not accept any responsibility for any use which is made of the information contained within this document.

# Introduction

---

## Introduction

This document outlines the commercial elements of GB gas balancing activity. We hope this guide is concise and easy to follow while giving an overview of gas transmission network balancing activity in Great Britain. We want this information to be accessible for new customers wishing to connect to the network and for customers who are more familiar with the balancing regime.

If you still have questions, please email us at:

[Box.gas.market.devel@nationalgrid.com](mailto:Box.gas.market.devel@nationalgrid.com)

All references to 'National Grid' in this document refer to National Grid Gas plc in its role as holder of the gas transporter licence in respect of the gas National Transmission System (the 'Licence').

# Background

## Background

National Grid Gas plays a pivotal role in the GB gas market. We own and operate the gas National Transmission System (NTS), a high-pressure gas network that transports gas throughout England, Scotland and Wales.

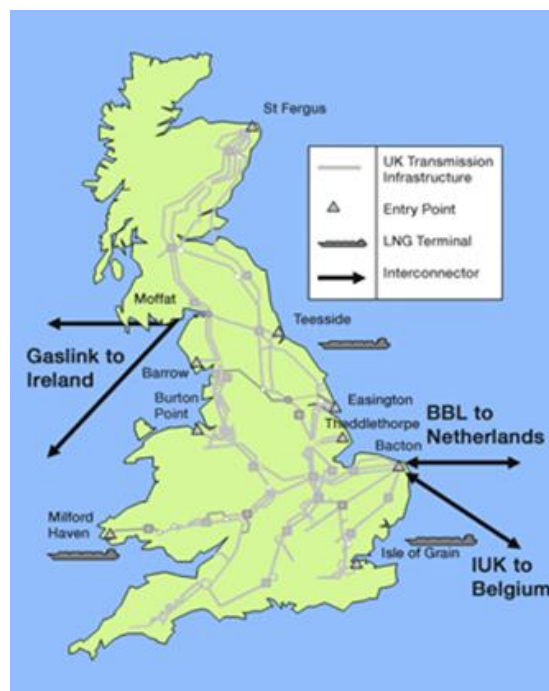
The NTS network is a crucial link in the gas market supply chain; once upstream natural gas produced in offshore gas fields reaches our shores, the NTS takes it to lower-pressure distribution networks (DNs). The gas is then delivered to the businesses and homes that use it.

Natural gas arrives in GB from many sources, such as offshore gas fields in the North Sea, direct pipelines from countries such as Norway, Belgium and the Netherlands, and large liquefied natural gas (LNG) tankers.

The companies that use this gas and transport it through our pipeline network are called gas shippers – and there are many of them. Similarly there are many industries, businesses and homes that consume this gas. Shippers must make sure that every day they put as much gas into the system as their customers take out. This is called balancing. We only step in when the shippers don't keep the system in balance.

This document outlines how shippers balance the system, particularly the incentives that encourage them to balance the gas market every day. It also explains what we can do if that doesn't happen.

A map of the gas National Transmission System



# Setting the scene

## Setting the scene

As the owner and System Operator (SO) of the NTS, our primary concern is safety. It's crucial that we make sure that NTS gas pressures stay within safe and acceptable limits. For instance, if more gas comes in than goes out, the pressure will increase. On the flip side, too little gas and the pressure will drop.

One of the challenges of our role is that gas moves slowly through the system. This means, for example, that if gas is needed in Plymouth but has been delivered in Scotland, theoretically it would take around 23 hours to reach its destination.

To meet any changes in demand we generally compress and expand gas within the pipeline system to make sure that it is always available. The amount of gas within the system at any time is known as 'linepack'. The acceptable range over which the amount of gas in the network can vary and the ability to further compress and expand this gas is generally referred to as 'linepack flexibility'. However, this flexibility has limits, so to maintain acceptable gas quantities and support its distribution there are other balancing tools we can use.

## National Grid Gas is a regulated business

National Grid Gas is the Transmission System Operator (TSO) and we run a natural near-monopoly of the British high-pressure transmission pipeline network. We don't trade gas, other than to maintain the integrity of the system.

A monopoly in this instance creates an efficient, level playing field and a competitive trading market. This is because we manage and allocate all the transmission pipeline capacity within the system using an approach called 'Third Party Access' (TPA). This means that all organisations that want to use some of that capacity have an equal and fair chance of getting it.

It is a regulated business; with Ofgem (the GB gas and electricity regulator) setting the amount of money we can charge the users of our pipelines.

## The commercial framework

Any company wanting to trade gas, and transport this gas via the NTS, must sign up to an important legal document called the Uniform Network Code (UNC). It forms the basis of the commercial contract arrangements between gas transporters and shippers and a few other clearly defined parties. It defines the commercial rights and responsibilities of all providers and users of the gas transportation system. It also gives all parties equal access to available transportation services.

# Balancing the market

## Balancing the market

Now that we've set the scene for the wider framework, we can highlight the responsibilities of the major market players and the part gas trading plays in keeping the system in balance.

### What are gas shippers?

The GB gas market contains a number of players, such as producers that own and operate the offshore gas production facilities, and gas suppliers that sell the gas to small businesses and domestic households.

In terms of gas market balancing, the major player is the gas shipper. Gas shippers are essentially the middle men who buy gas from producers and sell it to gas suppliers. Importantly, they need to use the NTS to transport the gas between these two players: this means they have a critical role to play in its overall balance.

### When does the gas market need to be balanced?

Shippers have incentives to balance inputs and outputs each day – what goes in must equal what comes out. And we have incentives that encourage us to make sure that the whole NTS is balanced for each 'Gas Day' (5am to 5am), so that the linepack at the end of the day remains within incentivised tolerance levels.

### What is the residual balancer?

In addition to making sure that the system is safe, we act as the residual balancer of the GB gas market. In other words, we monitor gas supply and gas demand, making sure the NTS remains within efficient operational limits so that we can deliver the level of service that we have agreed with each of our customers.

If, on any given day, we're not confident that shippers will balance the gas market, we may step in and take action to influence them, to make sure linepack levels remain within acceptable limits. The actions we can take are described in the chapter titled '[Our role as residual balancer](#)'.

Ofgem monitors what we do to make sure that we're working in an efficient and cost-effective way, and minimising the effect we have on the gas market. Further details on the incentive regime and how these influence the decisions we take can be found in the section titled '[National Grid's incentives](#)'.

## Gas trading overview

There are numerous ways in which shippers and National Grid can make sure that the NTS is balanced. For instance, shippers can sign long-term bilateral gas supply contracts with gas producers.

This summary document doesn't cover all the different ways in which market participants can balance their gas portfolios. But given the importance of gas trading – especially within a Gas Day – the following paragraphs outline how gas trading can be used to balance the gas market on any given day.

Shippers can trade between themselves on various gas markets, linked to the National Balancing Point (NBP – see below), in order to balance their portfolios. This can be over the long, medium or short term. Most of these markets must be used ahead of the Gas Day, and each of the participants can see who they are trading with.

Any trades that take place outside of the OCM (see below) are considered as Over The Counter (OTC) trades, and must be matched on the commercial system. OTC trades are enacted through a broker or an informal agreement made directly between two parties, which is then accounted for on the Commercial System.

The NBP is a virtual location originally created by the Uniform Network Code to support the balancing of the system. However, it evolved to also become a trading point. This is where shippers nominate their buys and sells, and where we carry out our daily balancing activity.

### The On-the-day Commodity Market (OCM)

The balancing market, which is called the On-the-day Commodity Market (OCM), is operated by the ICE Endex exchange as appointed by National Grid. The OCM is the only market we can use for gas trading<sup>1</sup>, and so this is the platform we use in our role as residual balancer.

Here, day-ahead and within-day trades occur anonymously, with market participants able to post bids or offers for volumes of gas. The aggregate price traded for a specific delivery day is used to formulate a system average price (SAP).

This SAP is then used to calculate charges for shippers who do not balance their portfolio (see section titled 'Imbalance charges'). The OCM is open until 2:35am for any Gas Day, leaving just over two hours of any given day in which no trade can occur.

---

<sup>1</sup> Except for in an emergency, when we can also use the OTC.



There are three types of trades that market participants can make on the OCM:

- **title trade** – this is the transfer of title of gas between market participants and takes place at the NBP. This may result in a change to the physical flow rate of gas
- **physical trade** – the bid originator will identify the location(s) at which gas will be delivered, or taken, after the trade has taken place. This is the physical transfer of gas between market participants. It will change the physical flow rate of gas
- **locational trade** – a single entry point or exit point at which gas is bid for/offered. It will change the physical flow rate of gas.

### Shrinkage provider

Shrinkage is energy used in operating the system and other energy that can't be charged to consumers or accounted for in the measurement and allocation process. We buy shrinkage in three components to compensate for these areas.

**Compressor fuel usage** is the energy used to run compressors to manage pressures within the gas transmission system. This can either be gas or electricity, depending on the power source for the specific compressor.

**Calorific value shrinkage** is gas that cannot be billed under the Gas (Calculation of Thermal Energy) Regulations 1996 (amended 1997).

**Unaccounted for gas** is the remaining quantity of gas that is unallocated after taking into account all measured inputs and outputs from the system.

The cost of shrinkage is recovered through the NTS commodity charge rates for shippers as published on 1 April and 1 October each year: <http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Charging-Statements/>

Data on these volumes can be found under NTS Actual and NTS Procurement on the following web page: <http://www2.nationalgrid.com/uk/industry-information/gas-transmission-operational-data/data-item-explorer/>

# The flow of information

## The flow of information

Information is crucial. Without it, National Grid and shippers cannot understand the status of the gas market, and cannot take the actions needed to balance the market. The availability of supply and demand information in close to real time is also a crucial factor for the continued success of NBP trading.

We update and publish public domain gas flow information at transmission system entry points in near to real time. This means that market participants can react quickly to any change in market conditions.

### Information that we provide

We provide a suite of information to help shippers balance their inputs and outputs. This information is available on our [website](#) and is known as Market Information Provision Initiative (MIPI). The main information items we provide are summarised below.

#### Demand forecasts

A large amount of the gas usage in GB depends on weather conditions, particularly wind speed and temperature, and we need to forecast gas demand to make sure that the gas transmission system can be operated safely and reliably.

Gas demand forecasts are made for the total system and for each of the local distribution zones (LDZs) at regular times each day, but further forecasts may be made if the weather forecast or demand changes. We use the information we receive to provide shippers with an estimate of the forecasted non-daily metered (i.e. small businesses and domestic consumers) gas demand.

We have incentives from Ofgem that encourage us to provide accurate and timely forecasts (there's more on incentives in the chapter titled '[National Grid's incentives](#)').

#### System and imbalance information

The individual shipper's projected end-of-day balance position is available electronically to them throughout the Gas Day. This information is based on the shipper's gas flow nominations (more information below) and notified trades. We also provide, on our website, system status information, which includes the opening linepack, projected closing linepack (PCLP) and predicted NTS demand. This report is published hourly.

We also publish on our website instantaneous flows delivered to the NTS within the Gas Day. This information is updated every 12 minutes (with data steps at two-minute intervals).

## Information coming to us

To manage the entire pipeline network, all shippers need to regularly tell us what they expect to supply or consume on a given Gas Day. In this way, we can forecast whether supply will cover demand and whether further action needs to be taken. Shippers provide this information through a nomination process.

### Nominations

A shipper must tell us through a gas flow nomination of how much gas it intends to either input or offtake at each separate entry or exit point on the system. A shipper can record its initial gas flow nominations up to 30 days in advance and can also change them at any time up to 3am<sup>2</sup> on the Gas Day (i.e. two hours before the end of the Gas Day).

Shippers cannot withdraw the nomination, although they can change them to any value (including zero), subject to the implied flow rate rule<sup>3</sup>.

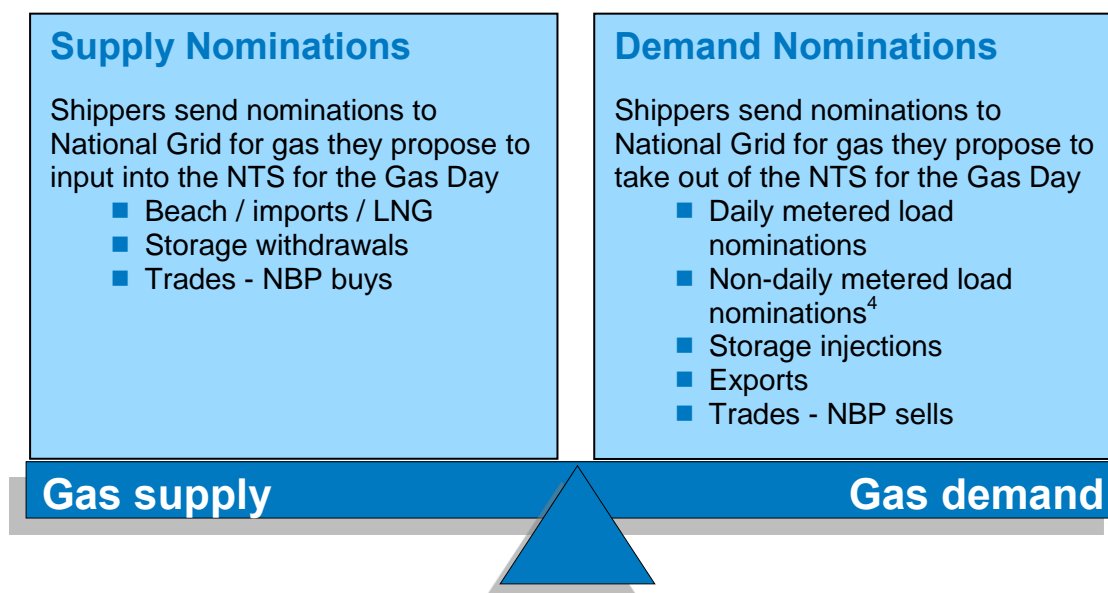
We can reject a nomination for a few reasons, mainly related to the format rather than the quantity contained in the nomination. We don't carry out any type of confirmation or matching process for the majority of gas flow nominations and an accepted nomination will take immediate effect unless it is rejected. The exception is at interconnection points where nominations are subject to a matching process prior to becoming definitive. In all cases we cannot change a shipper's gas flow nomination unless we're asked to do so by the relevant shipper.

---

<sup>2</sup> 2am at Interconnection Points

<sup>3</sup> The implied nomination flow rate rule gives an expectation that the gas will be delivered into the system on a flat basis (1/24<sup>th</sup>). This rule makes sure that a shipper cannot re-nominate to a level less than what would be expected to have already entered the system.

This diagram highlights the type of information that shippers send to us.



In addition to nomination data, we receive information on expected flows from entry terminals, storage facilities, interconnection points and large end consumers, such as gas-fired power stations. For sites that directly offtake gas from the NTS (NTS offtakes), such as large industrial sites and distribution network offtakes, we need an hourly breakdown of the daily gas demand so we can make sure that any changes we make to linepack flexibility deliver customers' requirements and don't have an impact on safety.

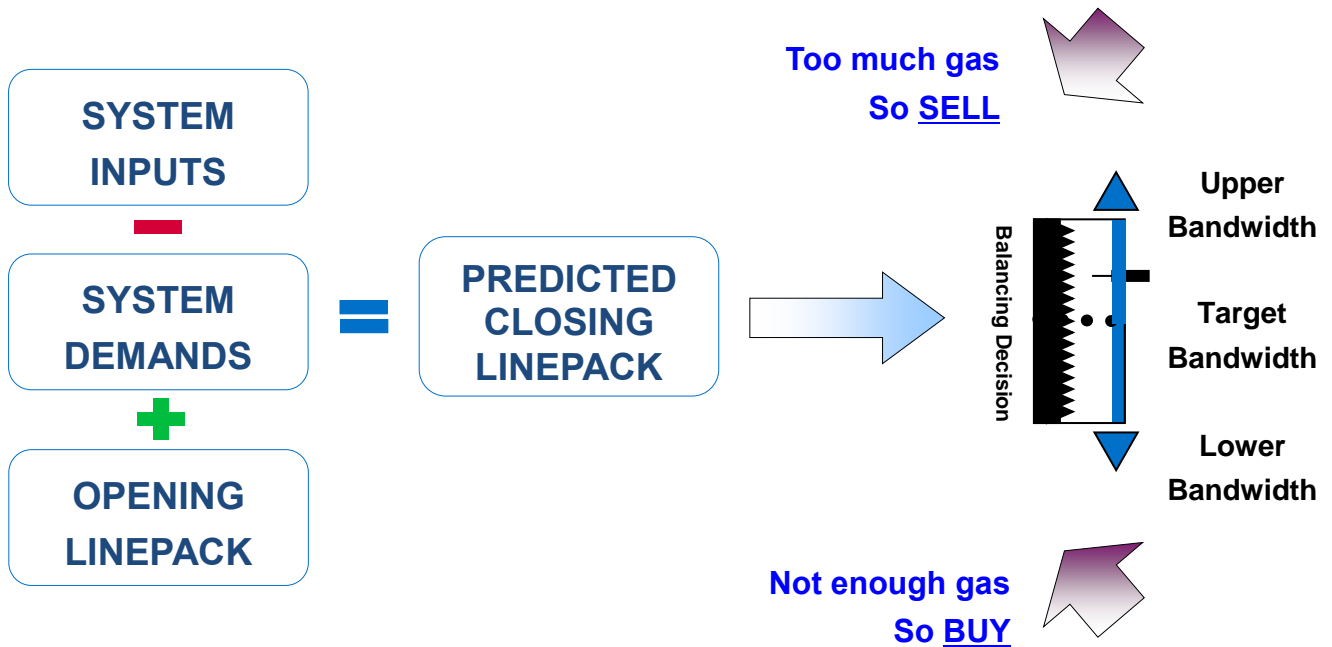
### Predicted closing linepack

By assessing the predicted inputs and offtakes we can determine whether the system is likely to be within the acceptable operational range of 'balance' throughout the Gas Day. We publish a predicted closing linepack (PCLP) at regular intervals during a Gas Day based on the information we receive from industry parties.

---

<sup>4</sup> Non-daily metered nominations are submitted by National Grid NTS on behalf of shippers.

The diagram below demonstrates how we forecast and use PCLP.



By providing nomination data to the entire market (in anonymous form) and by publishing our own demand forecasts, all those trading at the NBP have the tools necessary to maintain Britain's security of supply.

# Encouraging gas shippers to balance

## Encouraging gas shippers to balance

This chapter explains the financial incentives that shippers have to balance the system.

### How are gas shippers encouraged to balance the gas market?

The UNC sets out the framework to make sure that shippers have commercial incentives to flow gas on and off the NTS in a predictable and reliable way. This is important because it reduces the need for us to step in as residual balancer. When we do this, it can have a further financial impact on the market.

Shippers face two balancing charges when they're flowing gas onto the NTS:

- **imbalance charges** – encouraging shippers to balance their physical flows of gas on and off the system
- **scheduling charges** – encouraging shippers to accurately nominate the amount of gas that they flow on and off the system.

### Imbalance charges

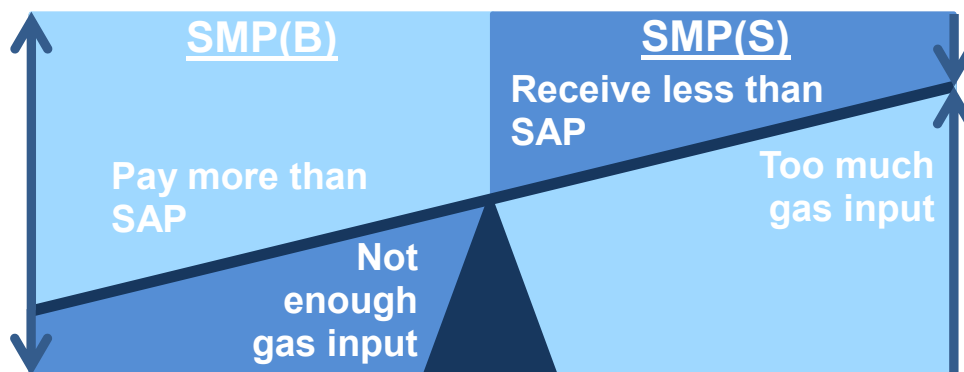
#### 'Long' shippers – over delivery of gas

When shippers over deliver (put too much gas into the NTS), they will receive a payment for each unit of their excess gas. Shippers have incentives that encourage them to balance because the unit charge will be less than the average daily price of gas. This means they're earning less than if they had sold it for themselves. The price shippers receive for each unit of over-delivered gas is the System Marginal Price Sell (SMPs) price.

#### 'Short' shippers – too little gas

Where shippers under deliver (put too little gas into the NTS), they will have to pay for each unit of their under delivery. Shippers have incentives that encourage them to balance because this unit charge will be higher than the average daily price of gas. This means they're paying more than if they had bought it for themselves. The price shippers are charged for each unit of under-delivered gas is the System Marginal Price Buy (SMPb) price.

The diagram below provides an overview of the prices paid for shipper imbalance.



### Scheduling charges

In addition to imbalance charges, the UNC sets an additional financial incentive for gas shippers to make sure that they accurately forecast, through their nominations to us, how much gas they will flow on and off the NTS. It is calculated by taking the difference between the nominated values and the actual flows.

### What happens to the balancing charges?

The 'balancing neutrality' mechanism makes sure that we, as Transmission System Operator (TSO), don't make or lose any money through carrying out our role as the system residual balancer, or through settling shippers' imbalance charges.

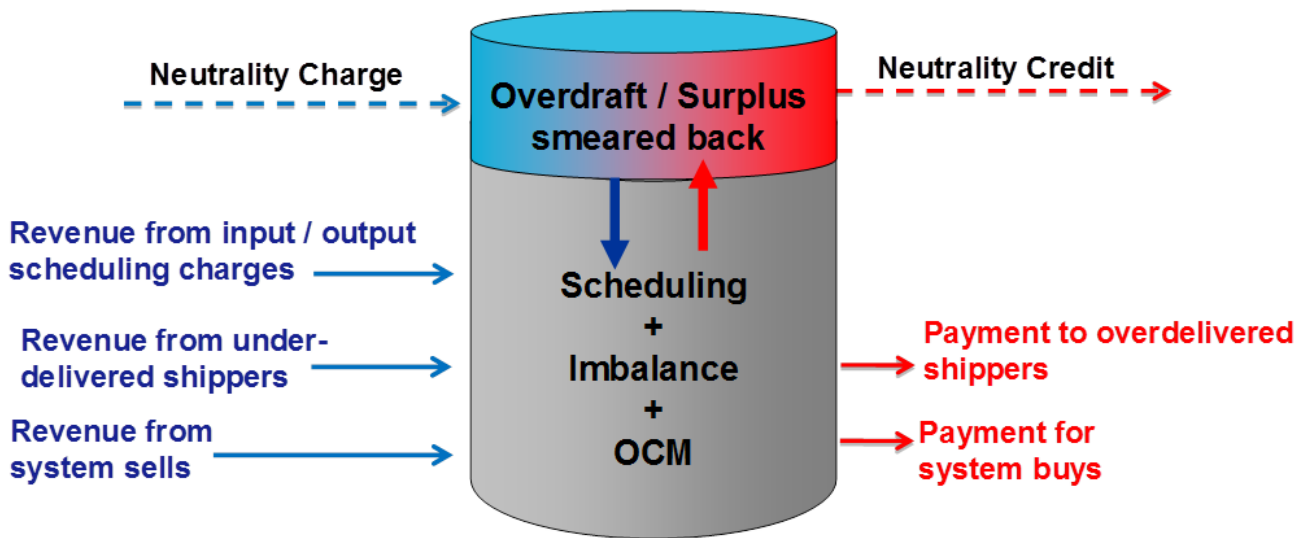
All the money that changes hands during the imbalance settlement process, and any TSO market-balancing actions costs, feeds into a 'neutrality pot'. Other charges, such as scheduling charge payments, may also be added. The balance, whether positive or negative, is redistributed back to shippers based on their usage of the system.

The balancing neutrality charge to be recovered from or credited to shippers is the difference between the amounts received and the amounts payable by National Grid in relation to all the applicable balancing charges.

For each balancing period (Gas Day) we work out:

- a **net neutrality amount**, which is all balancing payments made by us, minus all receipts due to us as part of the system-clearing process (this can be a positive or negative value)
- a **neutrality unit price**, which is the net neutrality amount divided by the sum of the total physical gas throughput (all system inputs and outputs) for all shippers
- a **shipper's proportion of the neutrality costs** (or revenues) is calculated by multiplying the neutrality unit price by the shipper's total physical gas throughput (system inputs and outputs) in the balancing period.

We don't directly gain or lose from the costs of our balancing actions, but we can gain or lose through our incentive schemes (see more in the chapter titled 'National Grid's incentives'). These costs or revenues aren't part of the neutrality mechanism.



The diagram below provides an illustration of that mechanism.



# Our role as residual balancer

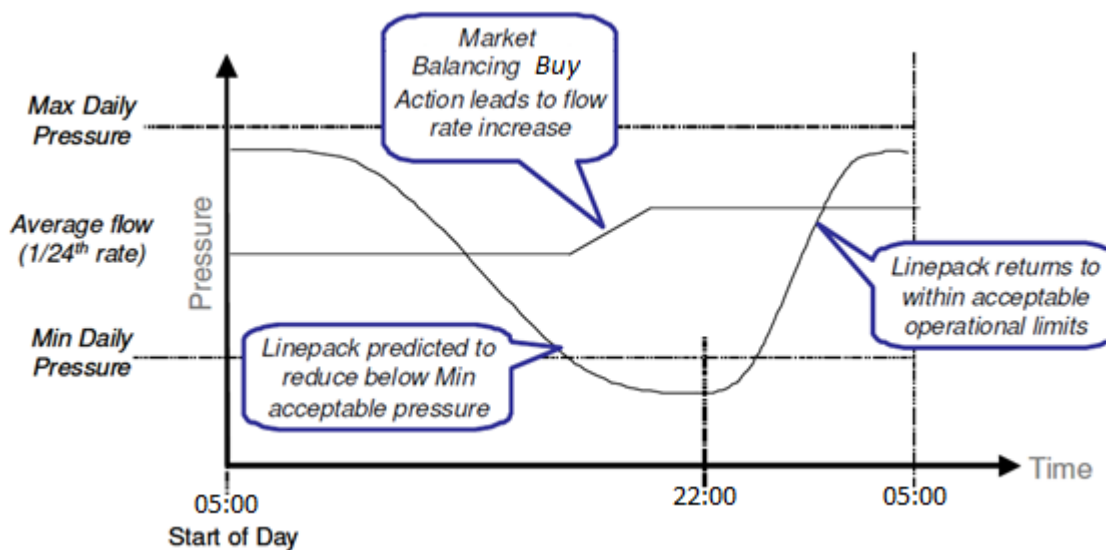
## Our role as residual balancer

This chapter gives an overview of the actions we can take to keep the NTS operating safely.

### Market-balancing actions

In our role as residual balancer, we can carry out a market-balancing action if we think the system is likely to move outside of the acceptable range of balance, either during the day or by the end of the day.

This means we can trade on the open gas market to buy gas to cover an overall negative imbalance (also referred to as a short system), or sell gas to try to reduce a positive imbalance (a long system). When we carry out a market-balancing action, we're attempting to change the physical flows of gas into or from the system through market trades.



There are other tools we can use as well. For example, in order to manage the location-specific constraints of the system, we can buy back the right to flow gas or carry out location-specific gas trades. We can also agree contracts for flexibility gas in order to provide a short-term solution to system problems normally experienced at the extremities of the system. These flexibility contracts are known as 'operating margins' (OM).

### Operating margins

OM gas can be called upon at short notice and supports the system for a short period of time until shippers deliver a more sustainable solution.

It provides us with flexible gas when the market actions are not expected to be delivered in time to keep the system within its safe operational limits.

We only use OM gas on rare occasions to maintain NTS pressures in the immediate period following operational stresses and before market-balancing measures become effective. Some OM is also held in reserve to manage the orderly run-down of the system if there's a network gas supply emergency. These services have an 'option and exercise' element. The exercise element has not been used since January 2010.

### **How are financial costs and benefits associated with residual balancing managed?**

As we mentioned in the previous sections, there are monetary values associated with market-balancing actions and the cash-out process. For market-balancing actions the net daily cost or benefit is 'smeared' (via neutrality) back to shippers that used the system on the day the action was taken. A shipper's individual portion of this cost or benefit will depend on the amount of gas it delivers and/or offtakes from the system. In both circumstances, National Grid NTS won't earn or lose money.

### **National Grid's incentives**

To imitate the commercial pressures that would normally apply to a company in a fully competitive market, we have a number of performance incentives. These System Operator incentives aim to maintain and improve our daily operational efficiency and are renegotiated at set intervals. The incentives are developed by Ofgem and then agreed with us.

These are some of the incentives that relate to balancing activity.

#### Residual balancing

This financial incentive encourages us to balance supply and demand on the Gas Day and to minimise the impact we have on the market when we need to trade gas to balance the network.

#### Demand forecasting

We publish national gas demand forecasts over a range of timescales to help industry organisations make efficient decisions around balancing their supply and demand positions. Financial incentives in this area measure the accuracy of these forecasts and encourage us to improve the accuracy of these forecasts.

#### Operating margins

Operating margins is the gas used to manage the short-term impact of operational stresses (such as a supply loss) before the market responds. This avoids the need to declare a gas deficit emergency. We have a reputational incentive to buy our operating margins

requirements in an economic and efficient way, and to promote competition in the provision of operating margins to the licensee.

#### Information provision

We provide operational and forward-looking information to the market. This incentive requires us to publish information on our website in a timely way and to include information on what the outlook will be for the coming summer and winter (as appropriate) for gas, forecast levels of demand, forecast levels of supply; plus information on the National Transmission System and the overall security of supply position, and operational data that will aim to reduce market uncertainty and increase transparency.

#### Shrinkage

The NTS shrinkage incentive scheme encourages us to minimise the energy costs associated with operating the network. As shrinkage provider we are responsible for managing the end-to-end service of forecasting, accounting for, procuring and supplying energy to satisfy the daily NTS shrinkage components. See '[Shrinkage provider](#)' for more.

### **How do we report the balancing actions we've taken?**

We write a System Management Principle Statement (SMPS) that describes how we will determine when a system-balancing action is needed and the appropriate balancing tool to use. The SMPS recognises that we have a licence obligation to operate the system in an efficient, economic and co-ordinated way and that we have a suite of commercial incentive schemes to encourage and reward such actions. The SMPS is reviewed annually with our stakeholders.

The SMPS sets out the principles and criteria by which we will determine, at different times and in different circumstances, which system-management services we will use. These tools are designed to deliver flow-rate changes for management of the system and include balancing.

The SMPS indicates which system management tools we should prioritise, may deploy, and the timing of such actions. We also make our operational decisions based on information from a number of sources within the Gas Day, including shipper nominations and their own assessments of system demand.

The procurement guidelines provide information on the system-management services and tools that we may buy as part of our residual balancer role. The guidelines cannot cover every possible situation that we may encounter, but they represent a generic statement of the procurement principles and tools that we will use in respect of gas, energy and/or capacity management.

# Summary & contact details

---

## Summary

National Grid Gas plays a pivotal role in the GB gas market. We own and operate the gas National Transmission System (NTS), a high-pressure gas network that transports gas throughout England, Scotland and Wales. As owner and System Operator (SO), our primary concern is the safe operation of the NTS.

Through the commercial regime, gas shippers have incentives that encourage them to balance inputs and outputs every day – what goes in must equal what comes out. In our role as residual balancer, if we think the system is likely to move outside of the acceptable range of balance, we can carry out a market-balancing action. When we do this, we're attempting to change the physical flows of gas into or from the system through market trades. This places a greater financial incentive on gas shippers to balance the system themselves.

In our role as residual balancer we have incentives that encourage us to balance supply and demand on the Gas Day and to minimise the impact on the market when it's necessary to trade gas to balance the network.

Finally, information is essential. Without it, neither we nor shippers can understand the status of the gas market, and so can't take the appropriate actions needed to balance it. The market needs supply and demand information in close to real time, so we publish public domain gas flow information at transmission system entry points in that timescale. This means that market participants can quickly react to any change in market conditions.

---

## Contact details

For any questions about this document or balancing the NTS, please contact [box.gas.market.devel@nationalgrid.com](mailto:box.gas.market.devel@nationalgrid.com)

# Glossary

## Glossary

|  |  |
|--|--|
| <b>DM – daily metered</b>                  | Typically large industrial customers whose daily gas consumption is measured and transmitted to shippers or to National Grid.  |
| <b>Distribution system</b>                 | A lower-pressure network of mains, owned and operated by a number of different companies.  |
| <b>DN – distribution network</b>           | A gas transportation system that delivers gas to industrial, commercial and domestic consumers within a defined geographical boundary. There are currently eight DNs, each consisting of one or more local distribution zones (LDZs). DNs typically operate at lower pressures than the NTS. |
| <b>DNO – distribution network operator</b> | DNOs own and operate the distribution networks that are supplied by the NTS.   |
| <b>Gas Day</b>                             | A period of 24 consecutive hours starting at 5am on a given calendar day and ending at 5am on the next.  |
| <b>Gas producer</b>                        | A company that explores for gas, drills the wells, and flows the gas from the sea bed. It sends the gas along undersea pipelines and hands it over to terminal operators.  |
| <b>GT – gas transporter</b>                | Formerly public gas transporters (PGTs), GTs, such as National Grid, are licensed by the Gas and Electricity Markets Authority (GEMA) to transport gas to consumers.   |
| <b>Interconnector</b>                      | A pipeline transporting gas to another country. The Irish Interconnector transports gas across the Irish Sea to both the Republic of Ireland and Northern Ireland. The Belgian Interconnector transports gas between Bacton and Zeebrugge. The Belgian                                       |

|   |   |
|---|---|
|   | Interconnector is capable of flowing gas in either direction. The Dutch Interconnector (BBL) transports gas between Balgzand in the Netherlands and Bacton. It is currently capable of flowing only from the Netherlands to the UK. |
| <b>Linepack</b>                                       | The volume of gas within the National or Local Transmission System at any time.   |
| <b>Linepack flexibility</b>                           | The acceptable range over which the amount of gas in the network can vary and the ability to further compress and expand this gas.  |
| <b>LNG – liquefied natural gas</b>                    | Gas stored and/or transported in liquid form.   |
| <b>LDZ – local distribution zone</b>                  | A geographic area supplied by one or more NTS offtakes. Consists of LTS and distribution system pipelines. There are 12 LDZs that take gas from the high-pressure transmission system for onward distribution at lower pressures.   |
| <b>Market-balancing action</b>                        | An action taken by National Grid to change the gas flows onto and/or off the transmission network.  |
| <b>MIPI – Market Information Provision Initiative</b> | A publication platform that gives gas participants a wide-ranging view of data relevant to the operational behaviour of the gas network.  |
| <b>NBP – National Balancing Point</b>                 | An imaginary point on the UK gas supply system through which all gas passes in accounting and balancing terms.  |
| <b>NTS – National Transmission System</b>             | A high-pressure gas transportation system consisting of compressor stations, pipelines, multi-junction sites and offtakes. NTS pipelines transport gas from terminals to NTS offtakes.  |
| <b>Natural gas</b>                                    | Gas consisting of methane and ethane. Occurs naturally in the earth's crust.  |
| <b>Nominations</b>                                    | A request for National Grid to receive or deliver gas to or from its system. Shippers submit daily (and sometimes within-day) nominations for the quantity of gas they wish to input to the system at                               |

|  |   |
|--|---|
|  | each entry point, and the quantity of gas their customers are expected to take off the system.  |
| <b>Nominations Matching Process</b>                  | The Nominations Matching Process is the exercise of comparing (and aligning where such values are different) Nomination quantities for a Shipper at both sides of a specific interconnection point, which results in consistent Nomination quantity for use by both Transmission System Operators at that Interconnection Point.    |
| <b>NDM – non-daily metered</b>                       | All customers that do not have a daily meter-reading facility. We estimate demand for NDM customers based on a number of factors (including weather), and explain NDM demand to shippers accordingly. Differences between actual metered demand and deemed demand may be resolved after the day through the reconciliation process. |
| <b>NTS offtakes</b>                                  | Sites that directly offtake gas from the NTS, such as large industrial sites and distribution network offtakes.   |
| <b>OCM – On-the-day Commodity Market</b>             | This market constitutes the balancing market for GB and enables anonymous trading between market participants. Trading is cleared on the day.   |
| <b>Ofgem – Office of Gas and Electricity Markets</b> | The regulatory agency responsible for regulating Great Britain’s gas and electricity markets.   |
| <b>OM – operating margins</b>                        | Gas we use to maintain system pressures under certain circumstances, including periods immediately after a supply loss or demand forecast change, before other measures become effective and in the event of plant failure, such as pipe breaks and compressor trips.   |
| <b>OTC – Over The Counter Trading</b>                | A decentralised market, without a central physical location, where market participants trade with one another through various channels such as the telephone, email and electronic trading systems.   |
| <b>PCLP – projected closing linepack</b>             | Linepack is the volume of gas stored within the NTS. Throughout a Gas Day, linepack levels fluctuate due to imbalances between supply and demand. As residual balancer of the UK gas market, we need to make sure that there is an  |

|                             |  |
|-----------------------------|--|
|                             | end-of-day market balance where total supply equals, or is close to, total demand. The PCLP metric is used as an indicator of end-of-day market balance.   |
| <b>Residual balancer</b>    | If balance on the market is not expected to be achieved on any given day, then the System Operator, as residual balancer, will enter the market and carry out trades (buys or sells) to try to resolve any imbalance on the system.  |
| <b>RIIO-T1</b>              | RIIO relates to the current Ofgem price control period which runs from 1 April 2013 to 31 March 2021. We refer to this as RIIO-T1.   |
| <b>Shipper</b>              | A company with a shipper licence that is able to buy gas from a producer, sell it to a supplier and employ a GT to transport gas to consumers.   |
| <b>Shrinkage</b>            | Gas that is input to the system but is not delivered to consumers or injected into storage. It is either own-use gas or unaccounted-for gas.   |
| <b>Storage facility</b>     | Seasonal gas storage comprises depleted gas fields, aquifers, salt cavity storage, mined caverns and disused mines. Peak storage includes gas holders, linepack, lengths of pipeline buried specifically for storage use, and LNG storage. Storage sites can be used to meet variations in gas demand, whether within-day or seasonal. These sites will often buy gas over the summer whilst the price is low, and then sell it over the winter while the price and demand are high. |
| <b>Supplier</b>             | A company with a supplier's licence contracts with a shipper to buy gas, which is then sold to consumers. A supplier may also be licensed as a shipper.  |
| <b>SO – System Operator</b> | We are the System Operator of the National Transmission System (NTS) and have responsibility to transport gas from NTS supply points to NTS offtakes, subject to operational obligations in relation to safety and system resilience, environmental aspects, and supporting efficient market operation.  |



|   |  |
|---|--|
| <b>System average price</b>               | The volume weighted average of trades on the OCM. Also referred to as WAP (weighted average price).  |
| <b>SMPb – System Marginal Price Buy</b>   | The greater of SAP plus a differential value (revised and published each year by National Grid), or the highest priced National Grid trade on the OCM on that day. Shippers that are short of gas on the day (their customers' offtakes exceed their inputs) must pay SMPb for short imbalances. |
| <b>SMPs – System Marginal Price Sell</b>  | The lesser of SAP minus a differential value (revised and published each year by National Grid), or the lowest priced National Grid trade on the OCM on that day. Shippers that are long on gas on the day (their inputs exceed their customers' offtakes) are paid SMPs for long imbalances.    |
| <b>TPA – third-party access</b>           | Open and non-discriminatory access to the networks by those who do not own the physical network infrastructure.  |
| <b>Transmission system entry point</b>    | The point at which gas is delivered into the National Transmission System.   |
| <b>TSO – Transmission System Operator</b> | Operator of a gas transmission network under licence issued by the Gas and Electricity Markets Authority (GEMA) and regulated by Ofgem.  |
| <b>UNC – uniform network code</b>         | The UNC is the legal and commercial framework that governs the arrangements between the gas transporters and shippers operating in the UK gas market. It is made up of different documents including the Transportation Principal Document (TPD) and Offtake Arrangements Document (OAD).        |