SGN

Your gas. Our network.

Long Term Development Statement 2017

Network Capacity

October 2017

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Foreword

Welcome to our Long Term Development Statement (LTDS) for 2017.

Each year we produce our LTDS and Demand Forecasting Document (DFD). These companion documents allow our stakeholders to identify and evaluate connection or transportation opportunities by detailing planned major reinforcement projects and associated investment, significant completed projects and network developments and our view of how demand may change over the ten year period.

This year we looked at ways to make the information more accessible. As a result, we have combined the LTDS and DFD into one publication and included links to allow you to explore the content more easily. We hopeyou will find this approach helpful.

If you would like to discuss the changes, or any aspect of capacity management, our network capacity team, which produces our LTDS each year, can be contacted at network.capacity@sgn.co.uk

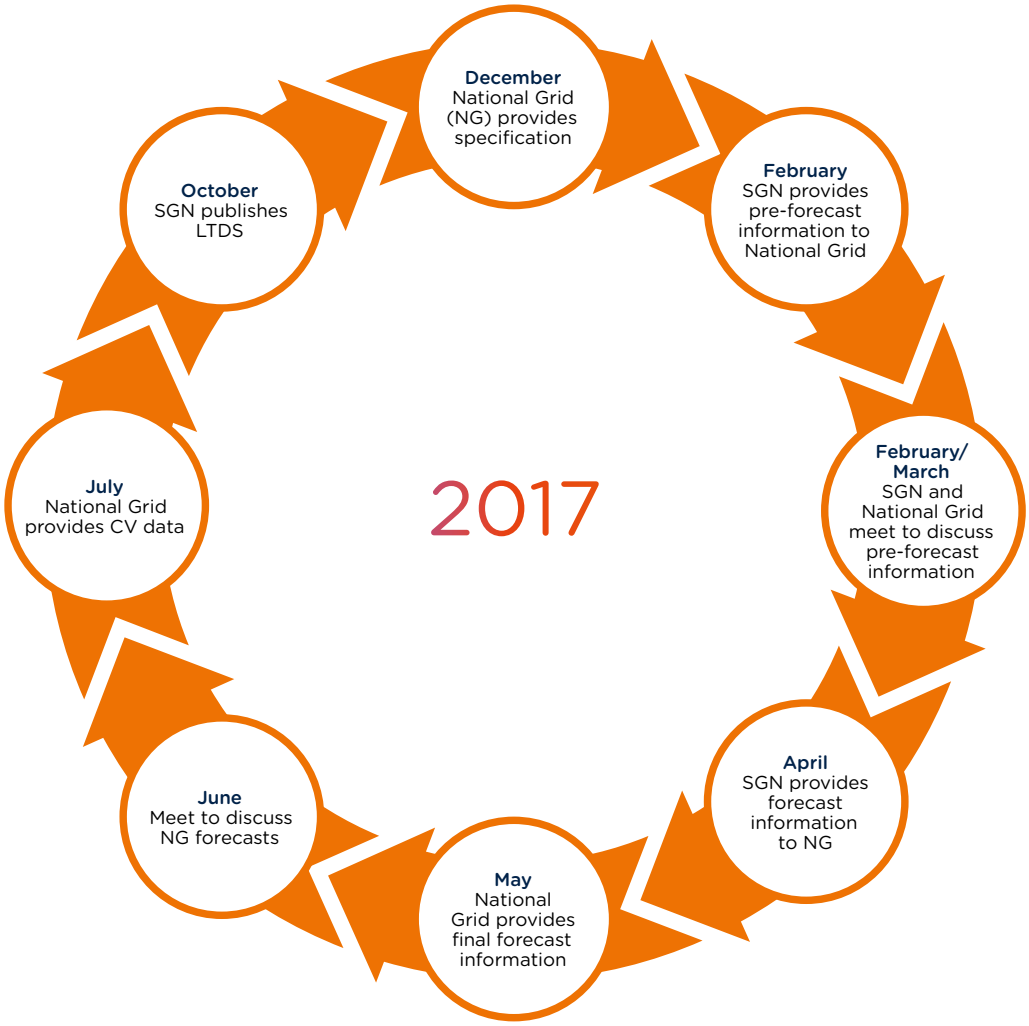
Paul Denniff
Network & Safety Director, SGN

Overview of LTDS process

The publication of our LTDS is the product of a yearly cycle of planning and consultations with our stakeholders.

The forecasts are updated each year with learning from the previous year applied to give a more accurate picture of what may occur.

This gives interested parties an understanding of how we see gas demand developing over the next ten years so they may plan accordingly with consideration to connection and transmission opportunities.



Introduction

The information within this document is presented within four sections.

The first section, ‘The next ten years’, supplies an overview of our forecasts and how we arrived at them.

The second section, ‘Further reading’, expands upon several items from section one.

The third and fourth sections, ‘More detail’ and ‘Appendix 1’, provides the background data and tables behind our forecasts.

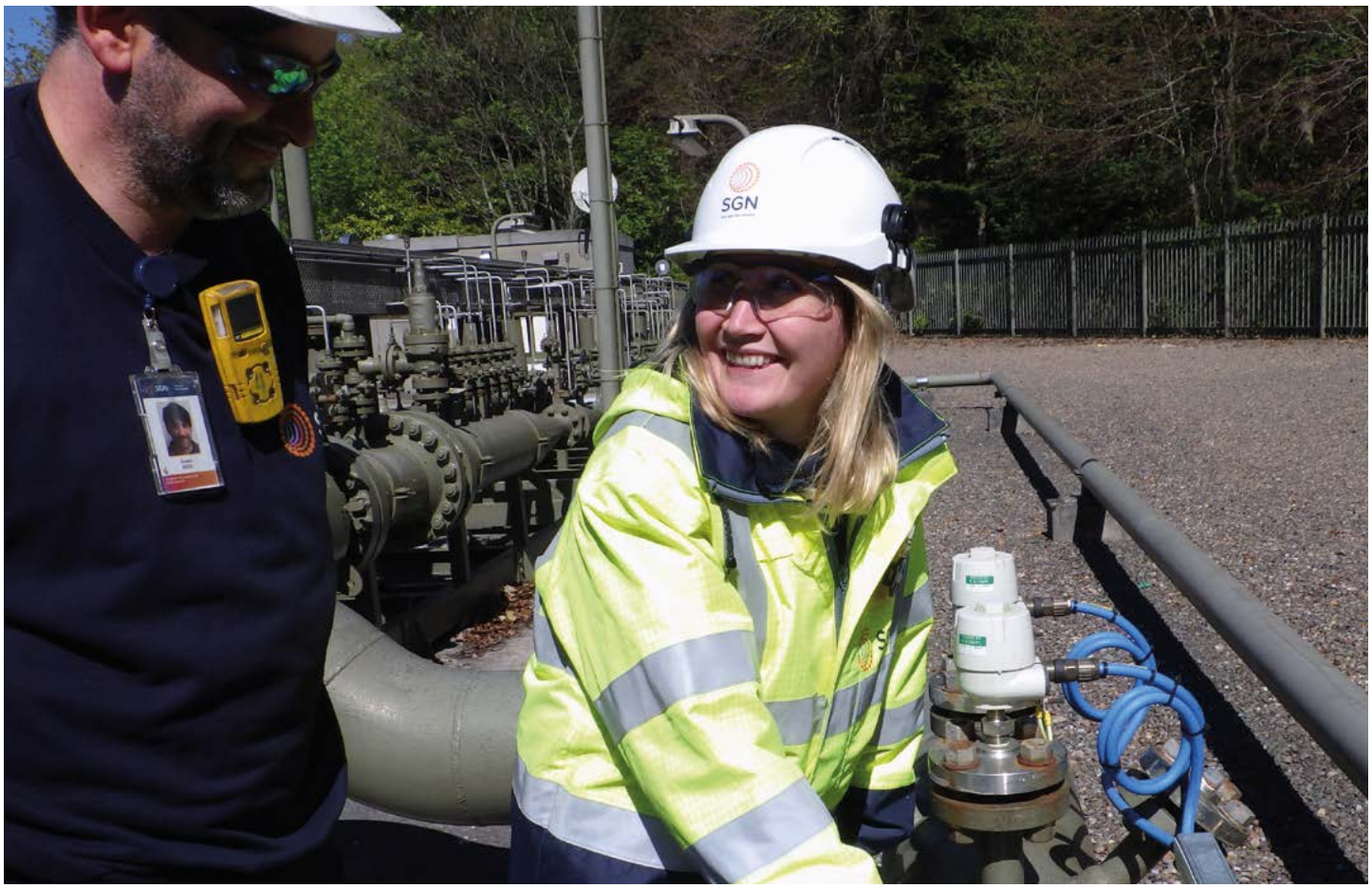
Look out for the blue circle links within the text to help you navigate between the sections allowing you to explore the information in greater detail then easily return to where you were previously reading.

Disclaimer

This document is produced for the purpose of and in accordance with Scotland Gas Network plc’s and Southern Gas Networks plc’s, collectively known as SGN, obligations.

These are Standard Condition 25 and Standard Special Condition D3 of their respective Gas Transporter Licences and Section O 4.1 of the Transportation Principal Document in the Uniform Network Code in accordance with information supplied pursuant to Section O of the Transportation Principal Document in the Uniform Network Code. Section O 1.3 of the Transportation Principal Document in the Uniform Network Code applies to any estimate, forecast or other information contained in this document.

This document is not intended to have any legal force or to imply any legal obligations as regards capacity planning, future investment and the resulting capacity.



The next ten years

At the end of the ten year forecast period we expect to have seen a net reduction in annual demand of 8.2% and Peak Day of 4.5% across our three LDZs.

In this first section, we will outline how we arrived at these figures and discuss some of the variables we have considered before finalising our forecast.

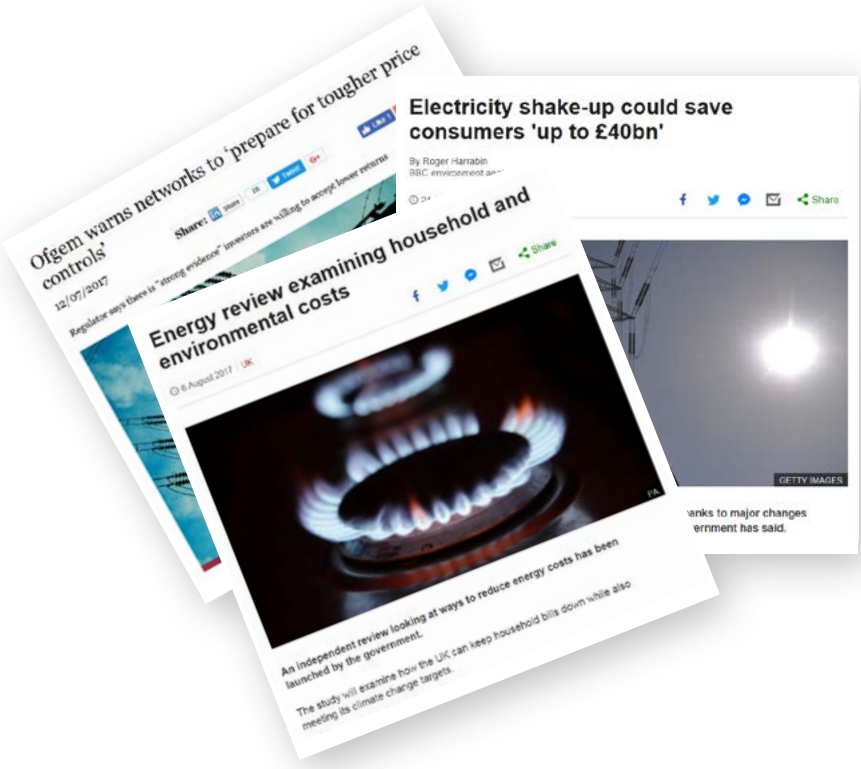
The key factors influencing our current forecasts are:

- Inflation and gas price impacting on domestic customer behaviour.
- GDP and manufacturing output as measures of economic growth and industrial activity.

Manufacturing
Forecasts predict production during 2017/18 show some minor increases.

GDP
The Office for Budget Responsibility (OBR) is forecasting growth of 2% for 2017. However, independent organisations forecast 1.5%.

Inflation
The latest forecast for 2017 is 2.4%, but is expected to fall to a target of 2% by 2019.



Our forecasts were produced in May prior to the June 2017 UK general election.

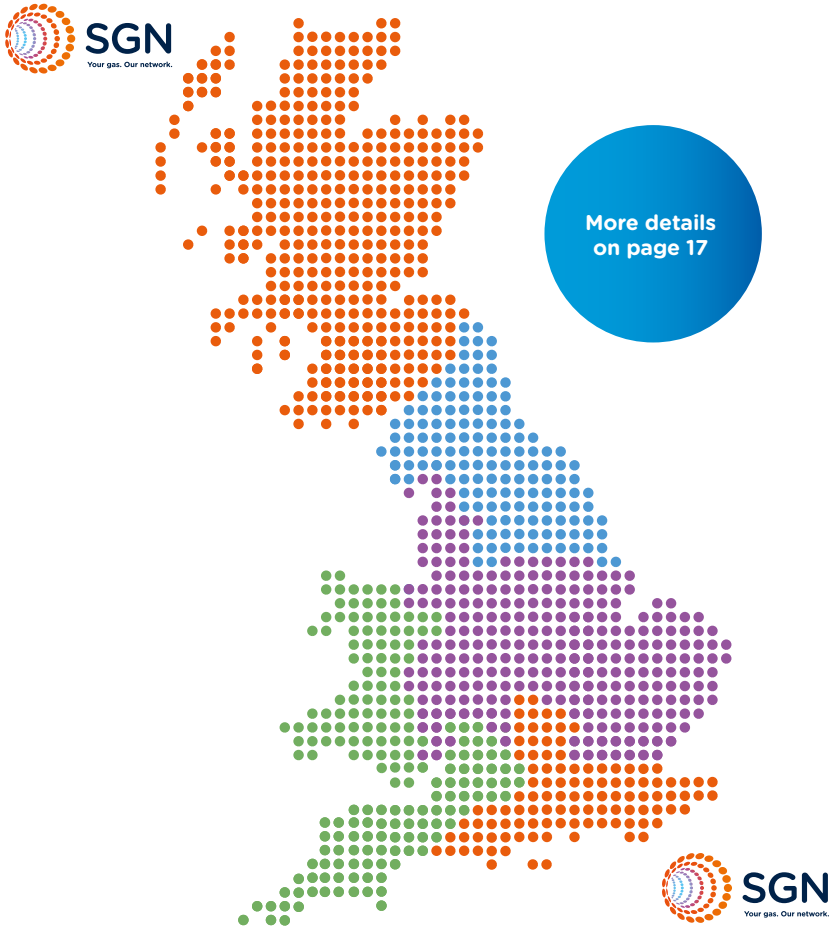
Following the general election, the government began consultations and released policy papers on energy and potential future energy strategies.

These policies indicate the future direction of change in the UK energy market and the potential to influence our forecasts, in the same way the existing UK Climate Change Act committing the UK to reduce emissions by 80% of 1990 levels by 2050, did.

However, until these translate into legislation or government strategy they cannot form part of our forecasting considerations.

We have not made a specific allowance within our forecasts for the potential impact of the UK leaving the EU.

We will continue to monitor events, revising our forecasts as required.



More details on page 17

We own and operate the gas networks in Scotland and the south of England comprising three Local Distribution Zones (LDZs).

Over the last year, we have seen an increase in house building across all three LDZs. However, despite this there has been an overall decrease in net demand.

Of note, Scotland continues to see a high number of requests for commercial and industrial connections whilst the south east's proposed garden villages, announced in 2015, continue to generate a lot of interest.

Although a change in government policy in 2016 removed the obligation of house builders to design within carbon neutral guidelines, a lot of work had already been done within the construction industry to incorporate the standards into new housing stock.

Until data is available to attribute the effect of this to a specific change in demand, we do not intend to make alterations to our approach in demand management nor make an allowance within our forecasts.

More details on page 21

At a local level we recognised the Greater London Authority (GLA) introduced a zero carbon policy for new homes and we will be monitoring the impact of this.

These figures show how we see demand altering year on year for the next ten years.

Scotland
Annual -0.76% av
Peak -0.34% av

South
Annual -0.90% av
Peak -0.54% av

South East
Annual -0.83% av
Peak -0.48% av

SGN Overall
Annual -0.82% av
Peak -0.45% av

The reasons for the demand reductions are:

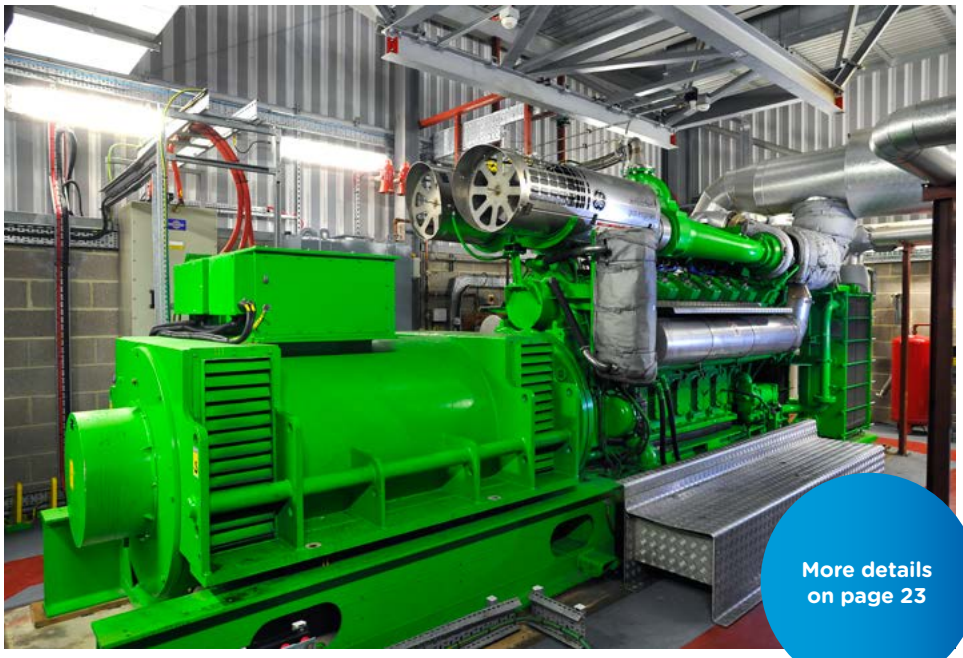
- Efficiency improvements to existing insulation and heating systems
- Increases in domestic and non-domestic gas bills resulting in changes to consumer behaviour
- Uptake of renewable technologies
- Changes to energy tariffs driving industry to manage energy more efficiently
- Government's commitment to climate change targets

More details on page 26

Government policy has resulted in many requests for embedded power stations across all three LDZs over the last year. However, not all requests have developed into actual connections.

These are a relatively new development intended to provide resilience within the local electricity power grid by generating electricity according to varying daily and yearly operational and market factors.

Once connected, due to the variations in operational profiles, these connections create further challenges when forecasting demand. We will continue to examine how this customer base grows before adjusting our forecasts.



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UK government has highlighted the importance Embedded Power Stations will play in the future energy mix. Embedded Power Stations are also referred to as STOR – Short Term Operational Reserve.

We have analysed the impact of renewable energy sources, primarily solar panels and heat pumps, on both annual and peak demand.

Specific adjustments have been made to this year's forecasts for both the annual and peak forecasts taking account of how renewable energy could impact over the ten year period.

It is probable we will need to make further adjustments to both the annual and peak figures, however, any adjustment to the Peak Day demand will be smaller as there is no guarantee renewables would be available at peak periods.

More details on page 21

More details on page 21

Image courtesy of anoukprodcuctions.com

The Queen's speech in June 2017 announced a Smart Energy bill restating that every consumer should be offered a smart meter by 2020.

We continue to support the deployment of smart meters, however with regards to our forecasts currently there is insufficient data to determine the specific impact this technology may have on demand profiles.

We will continue to monitor the evidence and review our approach as more information becomes available.

This is our view of demand over the next ten years along with the factors which we see as impacting upon any changes which might occur. As mentioned in the introduction, if you wish to discuss any aspect of what we discuss here, or network capacity in general, please feel free to get in touch with the team at network.capacity@sgn.co.uk

We will now show you some of the changes to our systems detailing investment and innovation projects. We will also supply details of how you may get in touch should you wish to discuss a connection opportunity.

The gas we distribute to our customers enters our networks via the National Transmission System (NTS) operated by National Grid, biomethane sites feeding green gas, Wytch farm and Grain LNG terminal which receives Liquefied Natural Gas (LNG) from overseas.

Currently there are no third party-owned storage installations connected to our networks. If you wish to discuss storage or biomethane injection opportunities with us please contact Joel Martin on 0131 469 1813 or alternatively email joel.martin@sgn.co.uk

All supply points are governed by Network Entry Agreements (NEAs). These include all biomethane sites injecting into our network.

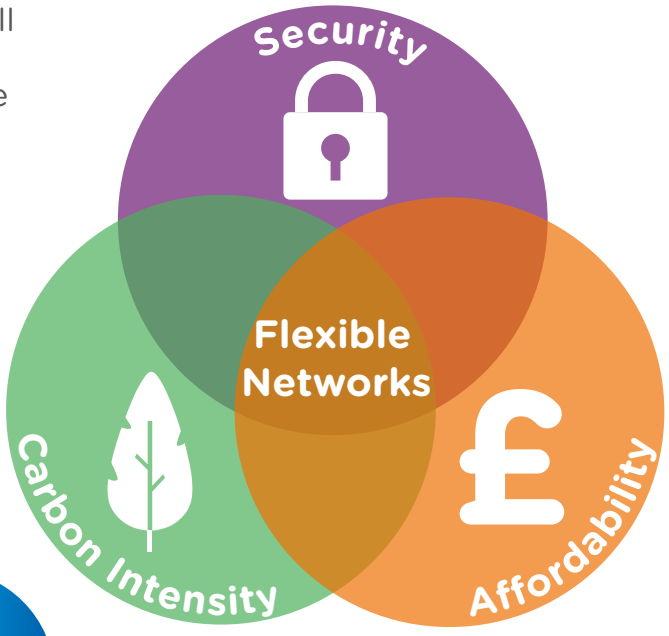
The Isle of Grain Import terminal is also a road tanker filling facility for supplying our SIU networks.

Further reading on page 12

Following the success of our Opening Up the Gas Market project in Oban, we are currently looking at how we can apply what we have learnt to our four mainland Scottish Independent Undertakings (SIUs).

For more information on Innovation visit SGNs website

The success of this project will not only ensure a cost-effective energy supply is available to our customers in these areas of our networks, but will also give further evidence to support changes to the gas quality specification contained within the Gas Safety Management Regulations (GS(M)R).



"Our strategy is very much shaped by our customers and stakeholders, and it's important we really listen to questions they may have about costs, how safe unconventional gases such as hydrogen will be, and how new replacement/maintenance technology might affect their daily lives. Their feedback ultimately helps shape our portfolio by validating the projects we decide to progress."

John Morea, CEO, June 2017

Further reading on page 13

During 2016/17 we spent £4.5m on Network Innovation Allowance projects and £5.4m on our three major Network Innovation Competition projects.

In a speech to the Utility Week energy summit in June 2017, our CEO John Morea highlighted the importance of green gas within the future energy mix.

"We realise no one solution fits all but modernising our gas networks gives us options which underpin the lower carbon UK economy of the future.

"The use of renewable gases will allow customers to continue to benefit from our valuable gas network infrastructure and, with the right incentives, will provide an affordable, low carbon solution we all want, with the security of supply we all need."

Further reading on page 14

If you have a biomethane project and are interested in injecting into our network you can contact Joel Martin on 0131 469 1813 or alternatively email joel.martin@sgn.co.uk who will be happy to discuss the process for getting connected.

At present, there are no large projects > £1m in planning across our Local Transmission System extending our network.

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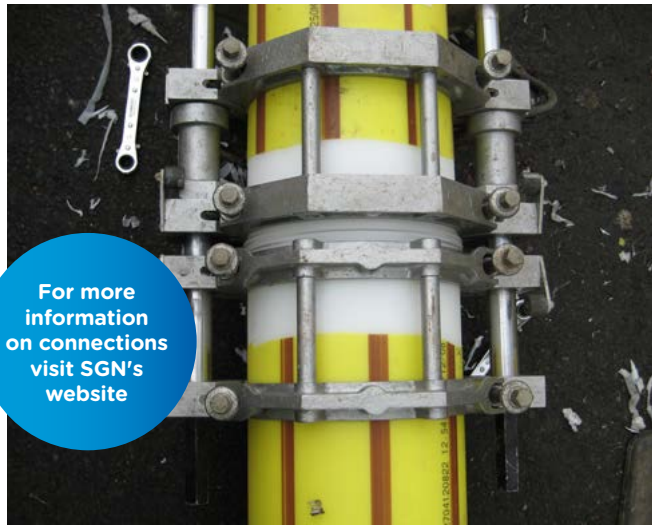

For more information on connections visit SGN's website

Customers looking to discuss making a connection to our systems should in the first instance contact our third party connections team at soe_gtuip_sgn@sgn.co.uk.

This team is our primary customer facing department in relation to Independent Gas Transporters (iGTs) and Utility Infrastructure Providers (UIPs).

Customers should be aware several areas across our systems are now subject to Planning and Advanced Reservation of Capacity Agreements (PARCAs).

For more information on PARCAs visit National Grid's website

Further reading on page 16

June 2017 saw the successful implementation of Project Nexus. This was the result of over two years of work on the replacement of a number of legacy systems over ten years old. The impact of this was throughout the gas industry, not just restricted to the distribution networks (DNs).

We operate in a regulated environment with an agreed licence that sets out the principles we must adhere to as we manage the network, the standards our customers should expect us to operate to and the industry codes through which we manage our networks.

We have commenced year five of the eight year price control period RIIO GD1 and have been consistently delivering defined regulatory outputs across the range of our activities. The current price control period will come to an end in April 2021. We are now starting to look forward to our next price control which will run from 2021 onwards. Our regulator, Ofgem, has set out the key principles that will govern the next price control period in an Open Letter in July 2017 and how it is looking to ensure network companies deliver value for money and services that consumers want and need. We will build on our existing engagement programme listening to our stakeholders to ensure we can reflect their feedback during the development of RIIO-GD2. If there is anything you would like to discuss with us regarding the next price control period, please get in touch by emailing lets.chat@sgn.co.uk.

We believe that in ten years' time, how the UK produces and uses energy will be very different to today, although, how fast that change happens and in what direction is still uncertain.

"Energy networks should prepare for tougher price controls" Link to Ofgem website

All players in the UK energy industry will need to be adaptive to new technology and ways of working to ensure UK consumers have the energy they need when they need it. We are working on a number of innovative projects to support credible options going forward.

Until the specifics of RIIO - GD2 are known, our forecasting approach is based on RIIO - GD1 with an awareness of existing government targets.

Further reading on page 16

Further reading

In this section, we further explore items covered in section 1 'The next ten years'.

Supply

Developments of our transportation networks are primarily demand driven. National Grid covers the overall UK supply position and security of supply assessment in detail for the National Transmission System (NTS) within its 10-year statement and in its publication Transporting Britain's Energy 2016; UK Future Energy Scenarios. The majority of the gas entering the LDZs flows through national offtakes from the NTS. There are currently several other locations where gas flows directly into the LDZs and these are detailed below.

These facilities are governed by Network Entry Agreements and the amount of gas flowing into the network is currently increasing as viable alternatives to conventional gas are explored. There are no third party-owned storage installations connected to our networks. The main source of gas supplies has predominantly been from the UK Continental Shelf (UKCS), however, this has changed as the gas available from the UKCS diminishes. The last few years have seen a higher level of gas imports from the European interconnector and Norway, and while the dependency on these sources is expected to increase, there is also an increase in LNG importation to meet the nation's requirement, notably at Isle of Grain in Kent and Milford Haven in Wales. The global demand for gas will ensure there is unlikely to be a significant reduction in the price of gas to the UK consumer. The impact of the shale gas industry in the USA is likely to be negligible as few export facilities currently exist and the impact may be felt by the spread of technology potentially allowing other countries to begin large scale production. It should be noted that by its nature as the main source of gas that can be sold to any market in the world, LNG is likely to remain susceptible to periods of short term price volatility.

Gas Supply Facilities

Offtakes

The majority of the gas entering the LDZs flows through 30 national offtake sites from the NTS. These sites are where gas is metered as it enters our networks. The gas pressure is then reduced in line with our requirements. It is also where odorant is added.

Grain LNG (South East LDZ)

Grain LNG, formerly the Isle of Grain storage facility, has now been developed as an LNG import terminal. The first shipment of imported LNG was unloaded in July 2005. Since then Grain LNG has steadily expanded the facilities. In late 2015 a new road tanker loading facility was commissioned and SGN use it as a source of LNG for our SIUs.

Wytch Farm (South LDZ)

The onshore oil and gas field at Wytch Farm in Dorset has been supplying gas into the LTS as a by-product of oil extraction for over 30 years. While gas is still being supplied in small quantities, these are much lower than the original flow-rates due to the field depleting.

Biomethane

Biogas (a renewable source of gas) can be produced from a variety of sources; the prevalent one being anaerobic digestion. Through this process organic material such as sewage, food waste and energy crops is broken down to produce biogas. Once the biogas is treated, the resulting biomethane can be injected into the gas network.

Back to 'The next ten years' - Supply

Innovation

Opening Up the Gas Market

We deliver gas safely and reliably to customers in Scotland and Southern England. The UK is reliant on its gas supply so we need to make sure that the supply is clean, secure and affordable. With the changes in gas supply, especially in the depletion of the North Sea, the UK is increasingly reliant on gas supplies from other countries, all of which have different compositions and therefore quality, depending on its source. While sources of new gas are numerous, the UK's specification for gas composition is prescriptive therefore, restricting the sources of gases that can be used in their pure form and thus limiting the gas market.

To prove the usability of other gas composition within the UK gas networks, SGN carried out a research project, 'Opening Up the Gas Market', which sets out to demonstrate that these regulations could be widened to accommodate more gases without the need for processing, but not compromising on safety. This looked to increase competition for network entry, improving energy security and reducing the cost of gas for customers. This was demonstrated through trials carried out in Oban.

Given the results of the trials this innovation project has been very successful. The outcome we are looking for is a change to the legislation which requires cross industry support. For this to happen, it is hoped the industry will come together and support the use of different gas blends.

If this can be achieved it will result in reduced costs to the customer through avoided composition processing and will have a wider impact on the gas market in terms of widening the number of sources.

The learning from this project should be disseminated through the Institute of Gas Engineers and Managers (IGEM) Gas Quality Standard Working group in support of the changes to GS(M)R.

Readers wishing to discover more about our opening up the gas market may do so at **sgn.co.uk/Publications/Innovation/**

Real-Time Networks

Our Real-Time Networks (RTN) project, funded by Ofgem through the Network Innovation Competition (NIC) scheme, aims to demonstrate how a more flexible and intelligent gas network will meet the needs of the changing gas industry in the UK.

The project follows a pilot trial methodology with the procurement and installation of innovative sensor technologies across pressure tiers in a representative section of the UK gas network. These technologies, combined with novel power and communications and a cloud-based data system, will help to create a comprehensive understanding of demand at a distributed level. The technology will be used to develop a prototype real-time energy model. From this we aim to demonstrate the viability and practical reality of a mixed-source, energy-centric gas network for the future.

The project, which commenced in 2016, is expected to deliver its initial outcomes and benefits in 2018 following successful sensor installation, data collection and real time model development.

100% Hydrogen Networks

The UK has an advanced and efficient gas network that currently supplies the energy to heat to over 80% of the UK's buildings also supplying the vast majority of the UK's industrial heat. This gas network delivers six to seven times more of the UK's peak energy than the electricity network. The gas network therefore has a major role to play in the journey to decarbonisation.

Reducing and eliminating carbon can be done in a variety of ways in the short, medium and long term. In the short term by substituting bio fuels such as biomethane for natural gas and by widening the range of gases the networks can accommodate without processing. In the medium term by blending zero carbon gas such as hydrogen, or in the long term by removing carbon completely and using hydrogen as the medium.

Through a proposed collaborative project with all the other DNs we are continuing to undertake, projects to support the future of energy in the UK, where we are looking to build on specific evidence in support of a future physical demonstration of a 100% hydrogen network. We are also progressing an additional hydrogen network innovation allowance (NIA) project.

Back to 'The next ten years' - innovation

Greening the gas

The UK has a legally-binding target to obtain 15% of its energy consumption from renewable sources by 2020, and the target for 2050 is to reduce greenhouse gas emissions by at least 80%, relative to 1990 levels. We believe there is significant potential benefit from the development of alternative sources of gas.

Biomethane is derived from biogas which is produced by anaerobic digestion. During this process, organic material is broken down in the absence of oxygen to produce biogas and digestate; a nutrient rich fertiliser.

The most efficient use for this biogas is to clean it up and inject it into the gas network. Biomethane is regarded as a low-cost and scalable form of renewable and low carbon heat, which can help towards the country's energy goals.

We believe the gas distribution networks will continue to play a crucial role in the domestic heating market and will provide the most cost effective path for low carbon transition with significant social benefits in terms of energy security and fuel poverty.

A number of independent studies have shown the gas networks can be a major component of a low carbon energy system. We also know from our own research people are generally happy using gas for heating and so, if we can decarbonise the gas flowing to people's homes this then saves households from switching to other more expensive forms of low carbon heat in the future while allowing carbon targets to be met.

Biomethane injection projects are currently supported by the government's 'Renewable Heat Incentive' (RHI). These key incentives have supported the development of renewable heat technologies allowing us to make considerable progress on our declared target of the equivalent of 250,000 houses supplied by biomethane by 2021.

Portfolio of biomethane sites		
LDZ	**Total**	**Equivalent houses**
Scotland	13	86,868
Southern	20	107,387
Total	33	194,255

Table 1: Portfolio of biomethane sites

During 2017 we further expanded the portfolio of biomethane sites in our networks. These sites can potentially provide an additional connected capacity in our networks. Further sites are currently in the process of construction and will be connected in the future. The portfolio as of end August 2017 is as shown in Table 1.

Biomethane for injection into the gas network is produced by cleaning and upgrading biogas that has been created through either an anaerobic digestion or gasification process.

The biomethane may need propane to be added by the biogas producer to ensure it has the required energy content, prior to injecting into the network. To ensure the biomethane meets the requirements for the gas grid, it passes from the producer's plant through a Network Entry Facility where it is checked for both gas quality and energy content, before being metered and odorised to give it the characteristic smell.

Before being injected into the gas network the biomethane must be sold to a gas shipper. Ofgem can provide details of licensed gas shippers.

Back to 'The next ten years' - Greening the gas

Below 7 Bar distribution system

The distribution system is designed and reinforced to meet a peak six-minute demand level, which is the maximum demand level (averaged over a six-minute period) that can be experienced in a network under cold winter conditions. We will continue to invest for reinforcement and new connections consistent with the change in Peak Day demand forecast in this document. Detailed below are the projects to ensure we deliver these conditions. These can be the result of localised growth in a given area.

<7Bar projects under consideration in Scotland		
Project	**Build year**	**Scope**
Glasgow MP	2018/19	2.0Km x 630mm PE / 24" ST
Edinburgh MP (Newcraighall)	2018/19	0.93Km x 500mm PE
Inverness IP	2018/19	1Km x 355mm HDPE / 12" sST
West Mains Rd, Edinburgh MP	2019/20	1km x 500mm PE
Haddington - Dunbar IP (Ph 1)	2019/20	1.8Km x 315mm HDPE
Aberlady - Gullane (Ph 1)	2020/21	2.6Km x 355 mm PE

Table 2: < 7Bar projects in Scotland under consideration

<7Bar projects under construction in southern England		
Project	**Build year**	**Scope**
Wavendon MP	2017/18	2.36km x 355 PE
Allington MP	2017/18	2.3Km x 400mm PE

Table 3: < 7Bar projects in southern under construction

<7Bar projects under consideration in southern England		
Project	**Build year**	**Scope**
London IP	2018/19	0.5km x 24" ST
Gosport MP	2020/21	0.6Km x 355mm PE + 1.6Km x 400mm PE

Table 4: Projects in southern under consideration

Back to 'The next ten years' - < 7Bar distribution system

Regulation and commercial developments

Gas Distribution Price Control (RIIO-GD1)

As a gas distribution company, our activities and revenues are subject to economic regulation by Ofgem. Periodic reviews, known as Price Control Reviews (PCR), are conducted by Ofgem. In April 2013, we entered a new PCR period known as RIIO-GD1. This will run until March 2021. RIIO encapsulates the direct link between the network company charges and the level and quality of the outputs and service provided to its customers.

Revenue = Incentives + Innovation + Outputs

For more information on RIIO - GD1 visit Ofgems website

Uniform Network Code (UNC) developments

As noted in the start of the document, we are obliged to operate the network in accordance with a set of rules, the UNC. There have been several UNC modifications, some key ones are detailed below:

- *Mod 90; Interruption Reform*. This review of interruptible loads resulted in all loads becoming firm as of 1 October 2011. However, where possible we can run annual or ad-hoc interruption tenders. This will allow us to consider specific areas where allowing certain large customers to tender for an interruption contract we can defer of eliminate the need to invest in reinforcement. These annual tenders occur in early June.
- *Mod 390; AQ Review*. This allows an annual review of hourly capacity values with large users through the shipper community. This process ensures that the end user hourly capacity values, used by us for network capacity management, are as accurate as possible and not over or understated. By achieving accurate values we not only protect the safety of the network and security of supply but also maximise the amount of capacity available for use.
- *Mod 420; New Connection*. This modification allows requests from new connection users in areas where their capacity requirements were not immediately available. This modification implemented an application process whereby customers wishing to connect to our network can apply to do so, on an interruptible basis until their full capacity is available.
- *Mod 458; Seasonal Large Supply Points*. We lead the development of this modification to create a process which enables customers to apply for summer capacity only, thus removing the barrier associated with potential reinforcement. This has been put in place to enable summer usage of gas for seasonal businesses, such as drying crops, and will potentially enable more new gas connections in areas of limited capacity and maximising the capacity usage on the network during the off-peak summer season while retaining the security of the network during the peak winter months. From 1 April 2016, we have accommodated a number of these loads. This mod has proven to be of interest to companies keen to improve their environmental credentials by reducing their dependence on heavy fuel oil and has also supported business by providing a wider choice of fuel sources.

Back to 'The next ten years' - Regulation

Project Nexus

Project Nexus was the largest industry change programme the gas industry has undertaken in many years. The scope of the programme was for Xoserve to replace its disparate end of life systems with a new centralised SAP solution. The new systems create improvements to data processing and settlement, resulting in more accurate allocation of energy, which in turn provides the consumer with a more accurate bill. The programme included changing and migrating all existing meter points into the updated systems.

This was an industry-wide programme which required extensive co-ordinated market trials testing. All GDNs had network obligations to deliver the programme within timeframe. Ofgem took over the formal programme sponsor's role in April 2016 and the programme was successfully delivered on 1 June 2017.

SGN mobilised an IT lead programme team to deliver Project Nexus for the business. The internal programme was complex covering five directorates, 293 functional requirements, development, testing and implementation to 16 downstream applications, and changes to 104 interfaces.

SGN was influential during Project Nexus, representing the gas networks at the monthly steering group meetings and risk advisory boards. We worked closely with Ofgem, Xoserve and assurance partners to support a successful implementation.

Back to 'The next ten years' - Project Nexus

More detail

This section with Appendix 1 provides details of the econometric assumptions used for the forecasts and more details of the demand forecasts.

The LTDS provides an overview of the ten-year forecast of annual and Peak Day demands we use. This is in accordance with the obligations within our Gas Transporter Licence and Section O of the Uniform Network Code Transportation Principal Document.

The Uniform Network Code Offtake Arrangements Document sets out the framework for exchanging the necessary information to assist transporters to generate long term demand forecasts. The publication of our LTDS forms part of this process.

Development of our transportation networks is primarily demand driven, although, there have been some onshore gas production enquiries in the past in the form of biogas which has necessitated capacity analysis and development.

The overall UK supply position and security of supply assessment is covered in detail by National Grid in its Ten Year Statement for the National Transmission System and in its various publications and consultations associated with the Future Energy Scenarios 2017 process.

The data and assumptions used to develop the 2017 demand forecasts were collated and compiled in the first quarter of the year when there has been continued growth in the UK economy. However, the impact on the economy of the decision to leave the European Union will depend heavily on the ongoing negotiations with the EU. This may affect the final demand that will be seen by the end of this year and subsequent years.

Demand forecasting performance

The following section provides an assessment of the forecast process used last year and outlines the conclusions that were reached regarding the performance of last year's process. It also outlines the high-level developments incorporated into this year's process as a result of the performance assessment. Each LDZ's load band is examined separately.

0 to 73 MWh – Domestic

In Scotland, we saw a rise in the level of demand in this sector (3.9%), compared to last year. Our analysis has shown this to be due to a lower than expected gas price.

In the south east, there has been no overall change in demand in this sector compared to a decline in demand last year of 3.7%.

The south LDZ has seen a small increase in the level of demand in the last two years of 0.5%.

73 to 732 & >732 MWh – Industrial/Commercial

There has been sustained growth in the economy during 2016 despite the referendum vote on the 23 June 2016 to leave the EU, with all four quarters showing quarter on quarter growth. This seems to have had an impact on the level of demand with all three LDZs showing growth in this sector, continuing the trend from last year.

The data on customer numbers appears to show a fall in the number between 2015 and 2016 for all LDZs, compared to a rise in the previous year.

This whole sector has seen some unexpected results where there are pockets of growth and decline, some counter to previous years' behaviour. This volatility is not particularly surprising in a period where the future stability of the economy is uncertain after the EU referendum, but gas prices are still falling, driven by the decline in oil prices.

UK Outlook

Medium to long-term LDZ economic outlook

This section provides a general overview of the UK economy to give some context to the data that is provided in this report. It also outlines some of the key econometric assumptions used to develop the forecasts.

Inflation

After a period of instability during 2009 to 2012 the Consumer Price Index (CPI) had started to stabilise in the 2 to 3 per cent range in 2013 and then fallen steadily to end up hovering around zero towards the end of 2015; see figure 1. However, during 2016 and into the first half of 2017 the CPI has steadily risen to around 2.5%.

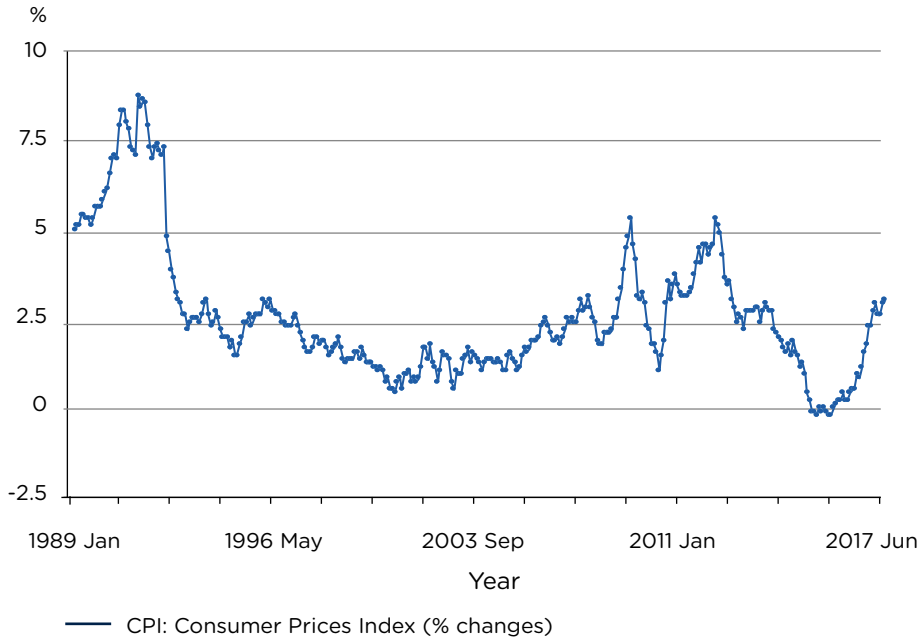

Figure 1: Change in rate of CPI

The latest forecast for the whole of 2017 as provided by the Office of Budget Responsibility (OBR) in March 2017 is 2.4%, but expected to fall to the target of 2% by 2019.

UK Gross Domestic Product (GDP) and Gross Value Added (GVA)

Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom. GVA is used in the estimation of Gross Domestic Product (GDP). GDP is a key indicator of the state of the whole economy and equates to GVA plus taxes on products minus subsidies on products. A significant decline in GDP occurred during 2008/9 set against a long period of growth from 1992. However, there has been some sustained recovery in GDP since that time.

The latest economic figures included in the graph taken from the Office of National Statistics show a sustained growth in the economy during 2016 of 1.8%. The Office for Budget Responsibility (OBR) is forecasting growth of 2% for 2017. Independent external forecasters are forecasting in the range 1.1% to 2.0% for 2017. The overall average of these external forecasters is a rather pessimistic 1.5%, presumably resulting from the ongoing uncertainty of the impact of the UK leaving the European Union.

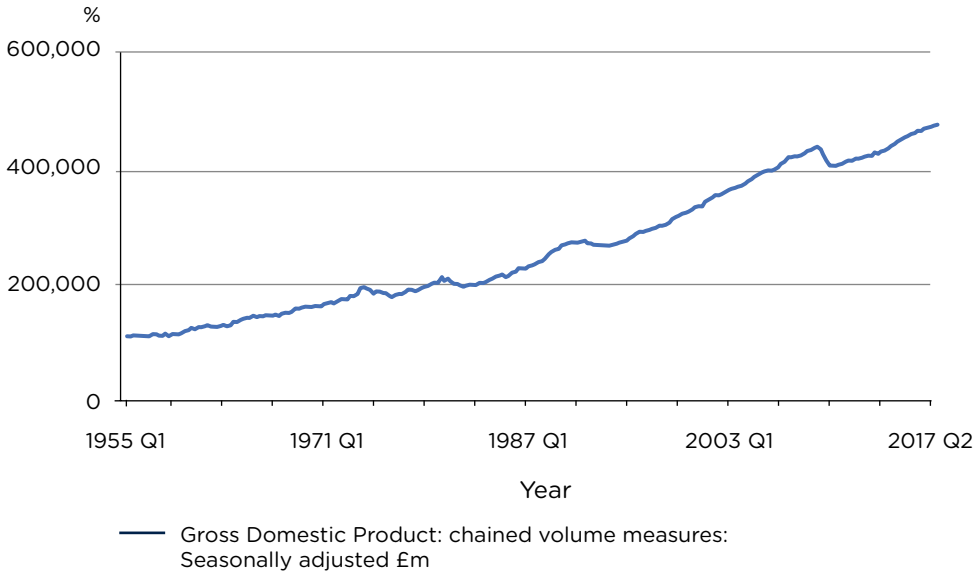

Figure 2: Change in GDP

The OBR published its central forecast for inflation in March 2017 which is shown in figure 3.

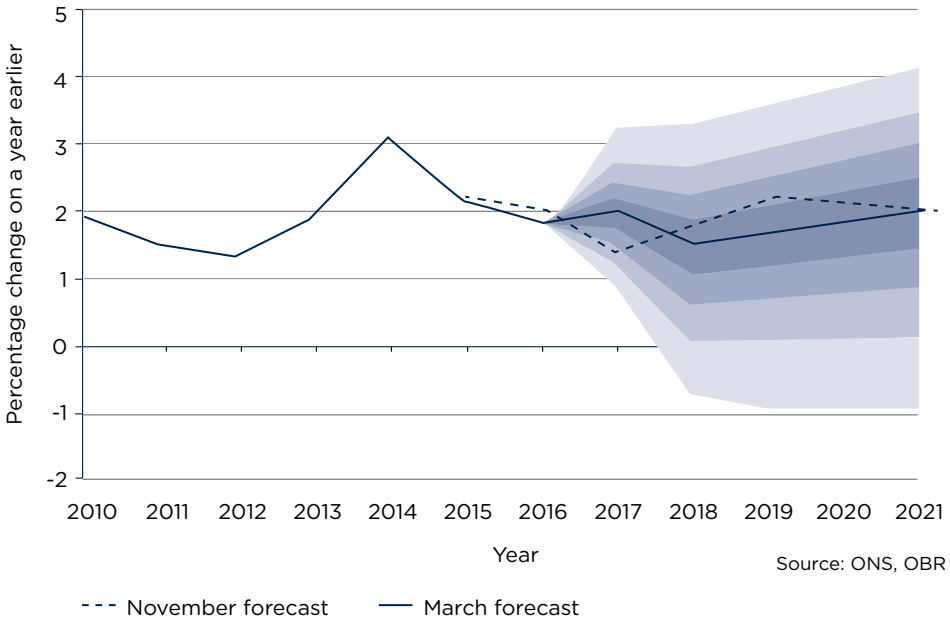

Figure 3: Forecast inflation rate

Gross Disposable Household Income (GDHI)

This can be used as an indicator of householders' ability to absorb rising energy prices and provides a reasonable indication of how affluent households are in a particular area.

Manufacturing output

Manufacturing output trends provide an assessment of how this type of industry is performing. There was a significant downturn in manufacturing during 2009 but it has shown recovery and decline since then. This can be seen in the figures for the Manufacturing Index from the Office of National Statistics.

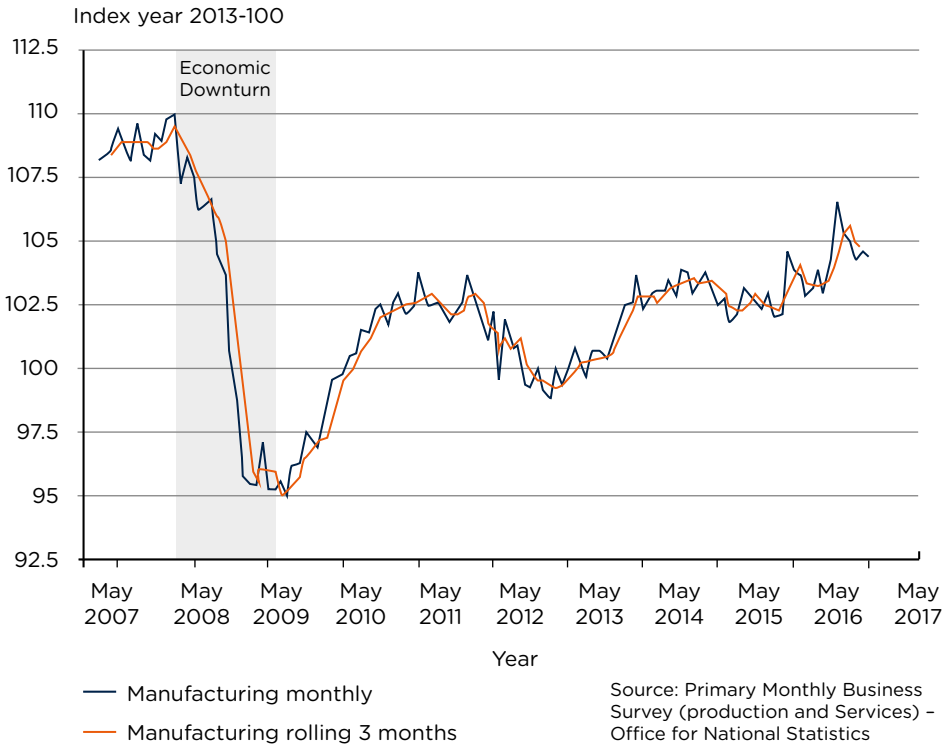

Figure 4: Change in rate of manufacturing output

Household numbers

The historical data provided is based on the Department for Communities and Local Government (DCLG) website reported data (mid-year) adjusted to year end and is broadly consistent with historical data provided by our data service provider last year.

Employment

After a steady rise in employment for nearly 20 years, there has been a quite steady decline in the number of workforce jobs between 2007 and 2009, with a small recovery in 2010 and 2011, dip in 2012 and stronger recovery in 2013 to 2015. In 2016 300,000 jobs were created of which 160,000 were employee jobs as opposed to self-employed. This pattern is reflected in the commercial/services sector with 247,000 jobs created. Manufacturing has seen a steady decline since 1998 after a period of small growth from 1992 to 1998. The figures for 2011 to 2014 however show a small rise of around 160,000 over the three years, but then a fall of 70,000 by 2016.

Regarding the future employment levels in the commercial/service sector we are expecting the level of rise in the number of jobs created in 2015 will not be repeated in the short term and therefore, there will be a pattern of growth that reflects the pattern that has been seen over the last 10 years.

Future employment levels in manufacturing are expected to decline in line with a pattern reflected over the last 10 years.

Gas/fuel price

Prices in all markets have shown, until very recently, rises from 2002 for households and effectively from 1999 in the non-domestic market. This has been driven by the wholesale gas price rises, which has in turn been driven by rising oil prices. However, this has been turned around significantly with the recent sharp decline in oil price, driven by the entry into the market of the shale oil in North America, decline in worldwide consumption and the refusal of OPEC to cut back production until recently.

On balance, it can be expected that oil prices may fluctuate a little before rising again slowly unless there is a major supply disruption, which would almost certainly see a significant rise in oil prices and hence wholesale gas prices. Any assertions made by commentators in the past regarding the delinking of gas prices from oil do appear to have been unfounded given the fact that wholesale gas prices have fallen broadly in line with oil prices although not as dramatically.

Efficiency Improvements

In general gas demand has been declining in recent years, although there are some instances of growth in some sectors in parts of the country, possibly driven by falling gas prices and the improving economy. However, it is difficult to separate the impact of efficiency improvements from the impact of variations in gas prices and the effects of variations in the number of supply points.

There has been a programme of gas fired domestic boiler replacement and improved insulation initiatives for many years. The higher levels of efficiency achieved with these is a contributory factor in the decline of gas demand. However, the increases in efficiency may in some circumstances have been used to provide warmer comfort levels resulting in higher than expected gas usage especially in winter.

Energy Bill 2011 (Updated 2017)

There are a range of provisions in the bill to encourage energy efficiency and to remove barriers to investment in energy efficiency:

Private rented sector

Powers established for the Secretary of State, which will, in the event of continued poor energy efficiency performance in the private rented sector, prevent private residential landlords from refusing a tenants' reasonable request for energy efficiency improvements to be undertaken in their properties, where a finance package is available. It will also require private landlords in the domestic and non-domestic sector to improve some of the least energy efficient properties where finance is available.

Energy Company Obligation (ECO)

This is the government's new domestic energy efficiency programme which has replaced the existing CERT and CESP programmes, both of which closed at the end of 2012. ECO works to provide additional support for packages of energy efficiency measures. ECO also provides insulation and heating packages to low income and vulnerable households and insulation measures to low income communities.

ECO creates a legal obligation on energy suppliers to improve the energy efficiency of households. The scheme is administered by Ofgem.

Further measures to improve energy efficiency

- Amendment of the smart meters powers in the Energy Act 2008
- Amendment of the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007
- Establish powers for the Secretary of State to require energy companies to provide information on the cheapest tariff on energy bills

As high level principles the provisions cannot be seen as providing the only solution to cut carbon emissions to the target levels. Relatively low cost measures to improve efficiency like boiler replacement and cavity wall and loft insulation benefit from some government incentives, but higher cost solutions like renewable heat or solid wall insulation would need to allow protracted payback periods (approaching 50 years or more) to be viable, unless a significant subsidy is obtained. This is noticeable when the Warm Homes Fund is examined. This is a fund aimed to provide heating solutions to fuel poor households who do not currently use gas. The current bidding round is due be announced in October 2017 and is heavily oversubscribed.

Back to 'The next ten years' - Demand forecasting

In summary it appears there are still some barriers to major investment in efficiency savings, although recent incentive developments have reduced these, but the key driver, at least in the short term, will be the price of gas when compared to the cost of installing new energy efficient appliances or means of reducing heat loss from premises.

Smart meters

Ofgem's report for the Energy Demand Research Project (EDRP) in December 2010 recognised the evidence suggesting smart meters can be a vehicle for effective action to reduce domestic energy demand. However, there was no distinction between gas and electricity meters.

The most recent formal update on the full roll-out programme was from the DECC 4 Annual Report. This stated that it had been delayed again until mid-2016 compared to the previous date of autumn 2015. The target date for completion of the full roll-out stays at the end of 2020 however the Queen's speech in June 2017 contained a Smart Meter Bill which restated every consumer should be offered a smart meter by 2020.

Back to 'The next ten years' - Smart metering

It is widely acknowledged that smart meters have the potential to alter how consumers use energy, however, as yet there is insufficient data available for us to alter our approach to demand forecasting.

Carbon neutral housing

The previous government policy on carbon neutral new housing, or sometimes called 'zero carbon' housing, has been interpreted by some as being taken literally from the headline title. This was planned to come into force but the current government axed this policy last year. It should therefore not be necessary to make any specific adjustments to forecasts of household demand for this issue but to keep this area under review for future forecasts. As many groups have been involved in trying to achieve carbon neutrality there could still be many new housing sites that will be developed as if the policy was still in place.

Back to 'The next ten years' - Carbon neutral housing

Renewables

In March 2011, the government announced the introduction of the Renewable Heat Incentive Scheme (RHI).

The RHI was aimed at helping to accelerate deployment of renewable heat sources by providing a financial incentive to install renewable heating in place of fossil fuels. Initially, in the first phase, long-term tariff support was targeted at the big emitters in the non-domestic sector. This sector, which covers everything from large-scale industrial heating to small business and community heating projects, was anticipated to provide the majority of the renewable heat needed to meet the targets and represents the most cost-effective way of increasing the level of renewable heat.

Under the revised domestic RHI scheme introduced in April 2014 there is financial support for renewable heat, targeted at, but not limited to, off gas grid households. The support is paid at a set rate per unit of renewable heat produced (kWh), for seven years, to the owner of the heating system.

The scheme is administered by Ofgem, to control costs a system of tariff reductions has been introduced, triggered as threshold spend figures are reached.

On 14 December 2016, the UK Government published its response to the consultation on the Renewable Heat Incentive scheme as a result the Department for Business, Energy & Industrial Strategy (BEIS) announced there will be further reductions in certain tariffs effective from 1 July 2017.

Back to 'The next ten years' - Renewables

Regional economy

Scotland

Scotland LDZ possesses a strong commercial and services sector base, accounting for over 75% of the Scottish economy. Financial and insurance services growth underpinned by the presence in Edinburgh and Glasgow of many leading financial institutions is the third largest in GVA terms in the UK behind London and the south east. The recent economic downturn did have a negative effect as banks consolidated offices and functions. There is some speculation that banks based in the UK could move their operations to another EU country when the UK leaves the EU and this could have an impact on the large number of banking and finance related jobs in Scotland.

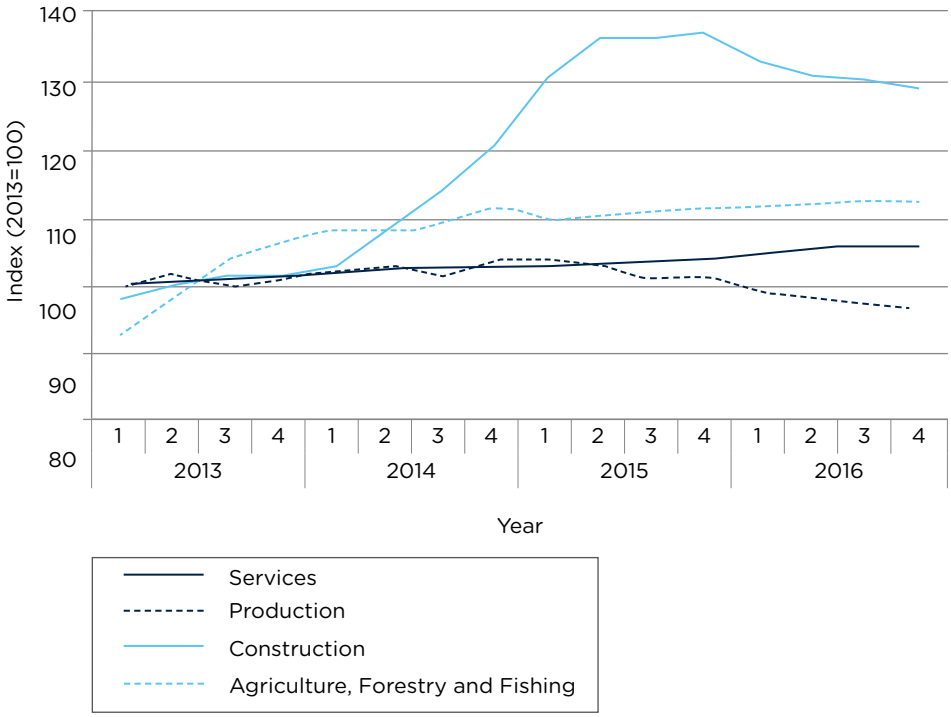

Figure 5: Change in activity in Scottish industry

The growth in the different sectors has been quite variable over the last few years with the greatest fluctuation in the construction sector, with exceptional growth in 2014 and 2015 as illustrated by the graph above. This is starting to downturn in 2016, however, but is still the largest and any economic upturn will be reflected in this sector as shown in figure 5.

There is reliance on exports to the EU (43% in 2015), the largest markets are those of the Netherlands, France and Germany. This trade could be affected by any sustained impacts of the ongoing economic problems in the Eurozone, and there could be greater uncertainty resulting from the exit of the UK from the EU. There could be some impact of the UK leaving the EU on this market, depending firstly on the result of new trade deals with the EU and secondly on the ability to set up new trade deals with the US. There is also significant potential for exports, particularly whisky, under new trade deals with India, China and possibly the USA. Whisky currently has a 150% tariff applied to it for sales to India.

In the medium term the Scottish economy will continue to develop opportunities in renewable technology with the Scottish Parliament targeting a potential 16,000 to 70,000 new job opportunities in these emerging areas of employment. It is estimated that 26,000 jobs are supported by the renewables industry which is driven largely by onshore wind if you exclude those in the hydro industry which accounts for nearly half of those jobs. These industries do however rely on the continuance of certain incentive schemes, which can be removed at short notice, but the Scottish Parliament has set a target of 50% renewables by 2030. There are concerns from the Scottish parliament that recent changes to subsidies for technologies which generate renewable electricity and uncertainty about future support have affected the confidence of investors in supporting the deployment of new generating capacity. The removal of the subsidy for onshore wind is of particular concern within this region.

South East

In South East LDZ, the strong representation in financial and business services and transport and communications, the best-performing sectors of the national economy, are further encouraged by favourable demographics. This should be boosted by a steady economic recovery. This will be especially significant should confidence in London as a banking stronghold be adversely affected by the various enquiries into the banking sector, changes in regulation and the impact of the UK leaving the EU. Some banks have already indicated their desire to move to another country within the EU but speculation of widespread moves seems to be unlikely given that London is still ranked as the highest financial centre in the world. The next ranked is Frankfurt at no. 23.

The pattern of growth and development remains unbalanced, with economic hot and cold spots in the region. Manufacturing is still an element of the south east economy at 7.8% with some small levels of growth in recent years followed by a small decline in 2015, but remains the lowest manufacturing base outside London. The impact on this sector of the level of economic recovery could still be significant assuming there is to be continued growth, but the uncertainty created by the UK leaving the EU could depress any economic growth. The sector of the economy that has generally performed the best appears to be the wholesale and retail sector (12.6% of south east GVA). This is noticeable with the agriculture trade in high value fruit and vegetables for supermarket and catering industries.

Strong expansion of tourism, both internal and international provides opportunities for south east region, given London's attraction as a tourist centre and the ongoing lower value of the pound against several currencies such as the dollar and the euro.

Housing development is forecast to grow by UK Government in this region, this includes the Thames Gateway regeneration project where there are plans to build river side and park side homes over the next 20 years.

South

In South LDZ, the rail, sea and airport links provide a favourable environment for investment opportunities and employment growth. This combined with a reasonably broad mix of commerce, industry, housing and tourism should create the ideal opportunity for sustained economic growth.

Further cuts by the Ministry of Defence to three sites in this area were planned for 2017 and this will have some effect on the local economies in the vicinity of these facilities in the South LDZ. However this also results in ex-MOD land becoming available for development as barracks are rationalised and regiments are merged. This is despite the continued commitment by UK Government to meet the NATO target of spending 2% of GDP on defence.

Housing development is forecast to grow, which will be boosted by the fact that money raised from the right-to-buy scheme for council houses may be used to build replacement houses. It is not clear how this will impact the number of new homes given the substantial discounts being offered to potential buyers will reduce the revenue. Constraints on development and infrastructure could further dilute the growth in new housing. A new development that may impact housing in the area is the inclusion of housing association tenants in the right-to-buy schemes. This will reduce the housing stock available for low income families which may result in pressure on government and local authorities to build more homes. The government has stated it is committed to building 1.5 million new homes, which would require at least a doubling of the current level of house building nationally. As with the south east there is growth in power and heat generation.

Embedded power and heat generation

Recent areas of growth across all three LDZs is embedded power and heat generation. Several power stations connecting to our networks are currently in progress or have connected for this winter coming. This is to provide back-up termed Short Term Operational Reserve, or STOR, to the electricity networks. These sites will be called on in periods of high electricity demand and will create challenges for our networks in terms of planning and running networks. A secondary aspect of this is the potential growth in bulk heating systems where a single Combined Heat and Power (CHP) system will provide heat and power for an estate or development. The combined effect these two developments will have on annual and peak demands is undefined.

Back to 'The next ten years' - Embedded power

Forecast methodology

General assumptions

The starting point for production of the full set of demand forecasts is the annual average demand. The following general assumptions were used to assist in the development of the annual forecasts.

- All forecasts are seasonal normal demands calculated using the latest Seasonal Normal Composite Weather Variable basis otherwise known as EP2
- Historic annual demand data provided by SGN is provided on the same basis and daily demand data is available broken down by load band
- The historic data was corrected using the reconciliation data provided by SGN as part of the Pre-forecast information.
- SIU demand is not incorporated into the Scotland LDZ numbers
- Shrinkage was forecast on a fixed daily basis irrespective of demand levels to be consistent with UNC
- Retail gas price forecasts used as part of the demand modelling process continue to be developed by our service provider and then agreed with ourselves
- Load band 0-73 MWh is assumed to consist predominantly of households and that the behaviour patterns are linked to household behaviour
- Load band 73 to 732 MWh is predominantly small commercial/retail premises with some small industrial. Although there are some households within this band it is assumed that the behaviour patterns will be linked to predominantly commercial/retail behaviour
- The load bands >732 MWh will be predominantly industrial and commercial premises and therefore exhibit behaviour related to these types of load

General methodology

The forecasting models for the different load bands have been refined over a number of years. The underlying principle is that the models make specific linkages between the load bands and traditional market categories like households and industrial and commercial customers. These models are tailored specifically to each LDZ, although the underlying approach is the same across the whole of our networks.

An important factor affecting recent demand levels has been the decline in the price of gas over most of the last two years, which has resulted in growth in some demands. Many consumers may have already taken action with regard to energy saving, including a switch to renewable energy sources, as a result of sustained price rises in earlier years. However, as a result of lower prices there may be some consumers who are retaining their comfort levels. Despite the loss of non-domestic customer numbers, there are pockets where growth is being seen. This may be partially a result of holding off investment in efficiency measures due to uncertainty about the future of certain businesses following the EU referendum or the fact that energy prices have been falling for some time.

The latest economic figures taken from the ONS show a sustained growth in the economy during 2016 of 1.8%. The Office for Budget Responsibility (OBR) is forecasting growth of 2% for 2017. Independent external forecasters are forecasting in the range 1.1% to 2.0 for 2017. The overall average of external forecasters is a rather pessimistic 1.5%, presumably as a result of the ongoing uncertainty of the impact of the UK leaving the European Union.

A further factor influencing annual demand is the gradual introduction of renewable sources of energy but the true extent of this is not fully known at this stage. Clear assumptions regarding the impact of renewables is made within the renewable section.

0 to 73MWh – Domestic

The primary driver in this sector is still believed to be the behaviour of households. Annual demand growth has traditionally been driven by the number of houses being built and how many will be using gas.

Data was collected on all aspects of the housing market and regression analysis was carried out to establish if there is any need to amend the models from last year.

Average consumer gas bills had fallen again in 2016 but some quite substantial price rises have been announced by two of the major suppliers in early 2017. The models were tailored to each LDZ, as customer behaviour proved to be materially different in each LDZ and a current retail gas price forecast specifically developed for the purposes of this project each year. Consideration will need to be taken, when analysing Scotland LDZ in future years, of a Scottish Parliament target that 80% of households should be heated using low-carbon technologies by 2032.

73 to 732MWh – Commercial

Traditionally this sector is influenced by energy prices and economic drivers. Following detailed evaluation of alternative econometric models as part of last year's analysis, the best fit was achieved by using a multi-variable model that related annual gas consumption to a combination of drivers:

- Current and real retail gas prices for this type and size of load
- Average non-domestic retail gas price
- GDP indices, actual GDP (seasonally adjusted) and GDP growth, regional GVA
- Manufacturing output
- Consumption per unit of GDP
- Efficiency improvements
- Impact of renewables

>732MWh – Large Industrial

This sector can be significantly affected by the behaviour at a small number of large loads and therefore the forecasts continue to be split into two elements. The large loads are forecast individually and separately from the rest of the market sector. The remaining demand is forecast as a whole. As mentioned earlier the increase in embedded power stations will have an impact.

Peak demand forecasts

General assumptions

The traditional primary basis for calculating the Peak Day demand in any market is the relationship between average daily demand and Peak Day demand, typically known as the load factor, where:

Peak Day Demand = Average Daily Demand divided by Load Factor

The following assumptions were made when producing the 1 in 20 Peak Day demand:

- The modelling method results in no additional requirements for demand diversity analysis
- The use of 1 in 20 CWVs, provided by Xoserve to calculate the 1 in 20 Peak Day meets the requirements of the licence and UNC with respect to the specified methodology for determining 1 in 20 peak day demand
- No allowance will be made in calculating the base case 1 in 20 Peak Day for the differences between the calculated peak demand and the SOQ booked by shippers for larger loads
- No demand reduction will be allowed associated with demand management products offered by Shippers
- No allowance will be made to take account of any capacity buy-back contracts that may have been negotiated between SGN and its customers

LDZ specific assumptions

All the general assumptions are applied across all the LDZs and there were no specific assumptions that relate to the individual LDZs used in this analysis, unless the weather demand analysis suggests this should be considered.

Methodology

Forecast base case Peak Day demands were calculated from projections of annual demands by using the following relationship:

Peak demand = (Annual demand/365)/load factor

The relationship was applied in each of several different market sectors, for which the load factor may be assumed to be constant over the forecast period. The following market sectors have been used as the starting point for producing the base case Peak Day forecasts:

- - NDM Firm 0 to 73.2 MWh
- - NDM Firm 73.2 to 732 MWh
- - NDM Firm >732 MWh
- - DM Firm Consumption

Load factors for each market sector were estimated from historical daily demand and other data.

Forecast demands

This section provides an overview of our latest annual and peak gas demand forecasts through to 2026/27. A more detailed view can be found in Appendix 1, which includes the forecasts for both annual and peak demand on a year-by-year and LDZ basis. These forecasts have been developed around the UNC load band categories and relate only to gas that is transported through SGN systems.

Annual demand

These figures show historical gas demand growth and the forecast going forward. Note specifically the sudden demand reduction in historical demand in 2009 followed by a minor recovery in 2010 and then a further decline between 2011 and 2014. Note that Interruption ceased to exist in 2011 as a standard type of load, this is shown in blue in these graphs.

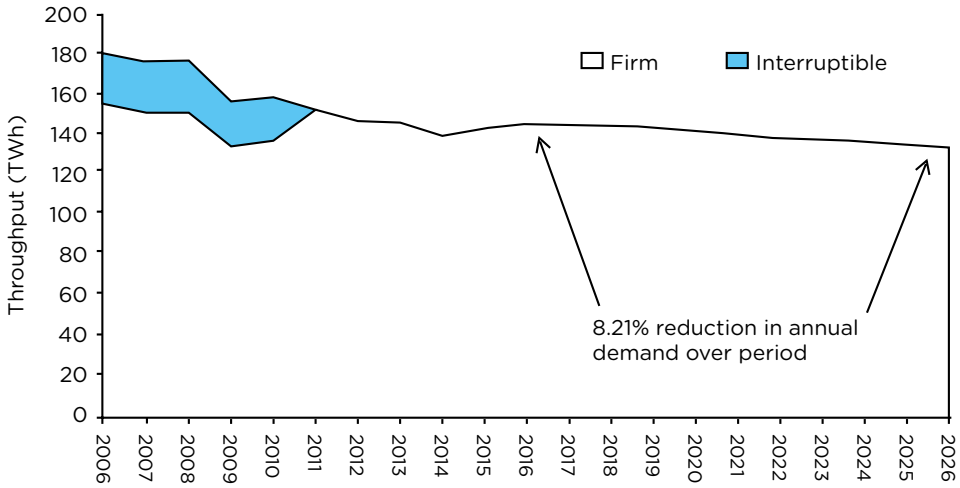

Figure 7: Change in historic and future annual demand – SGN overall

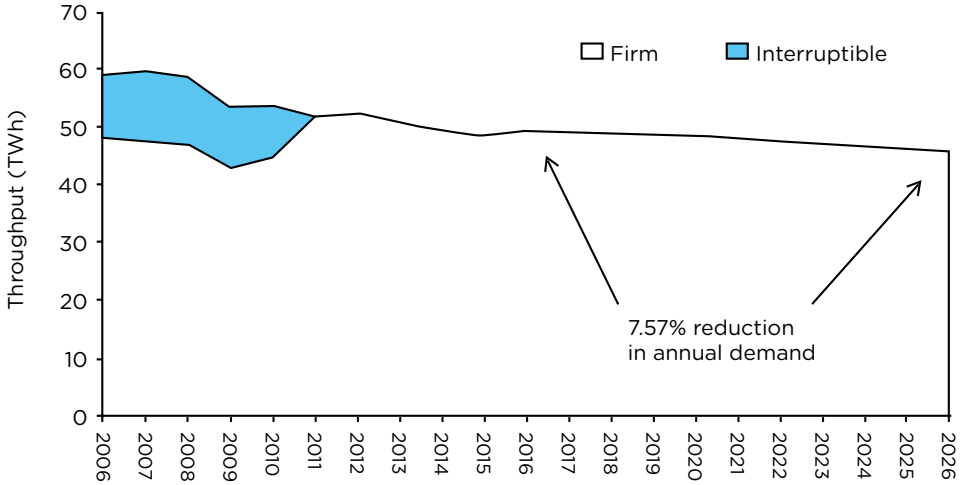

Figure 8: Change in historic and future annual demand – Scotland

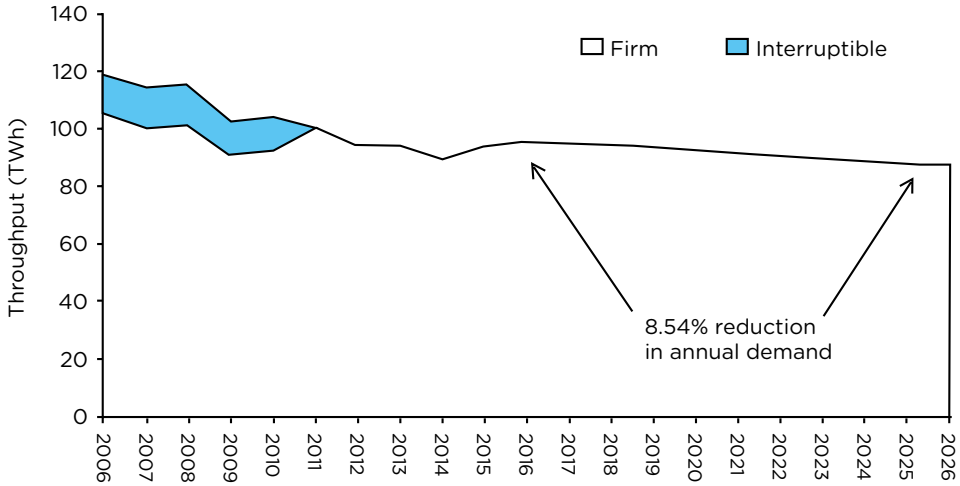

Figure 9: Change in historic and future annual demand – South & South East

Change in forecast annual growth (2017 – 2026)				
	SGN	Scotland	South East	South
Annual Demand Change	-8.21%	-7.57%	-8.26%	-8.96%

Table 5: Change in forecast annual growth (2017 – 2026)

Peak demand

The following figures show the equivalent view for peak demand, the key driver for investment in SGN. Note again the down turn in demands in 2009/10 due to the recession followed by a recovery.

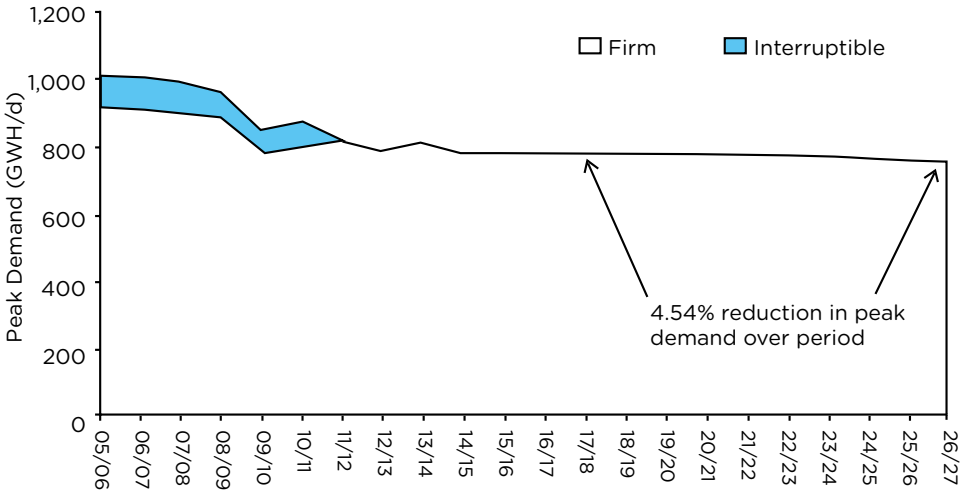

Figure 10: Historic demand and forecast change of peak gas demand – SGN overall

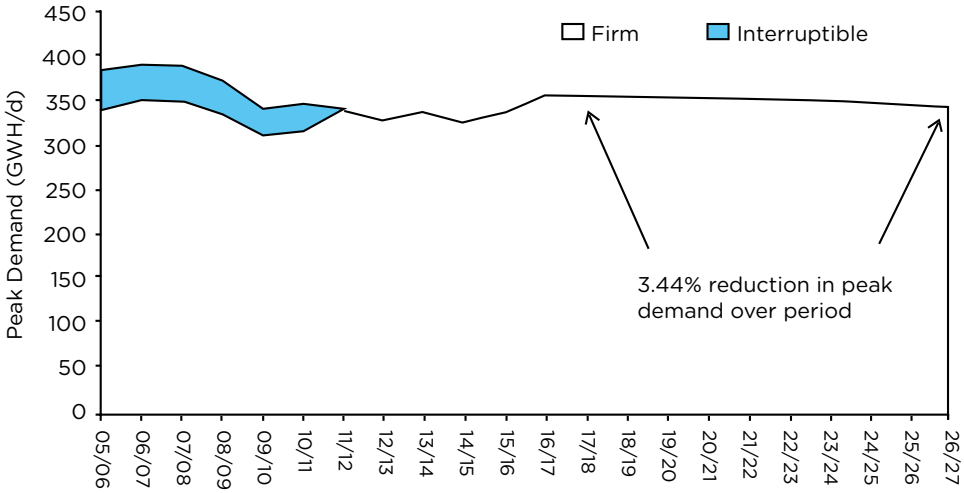

Figure 11: Historic demand and forecast change of peak gas demand – Scotland

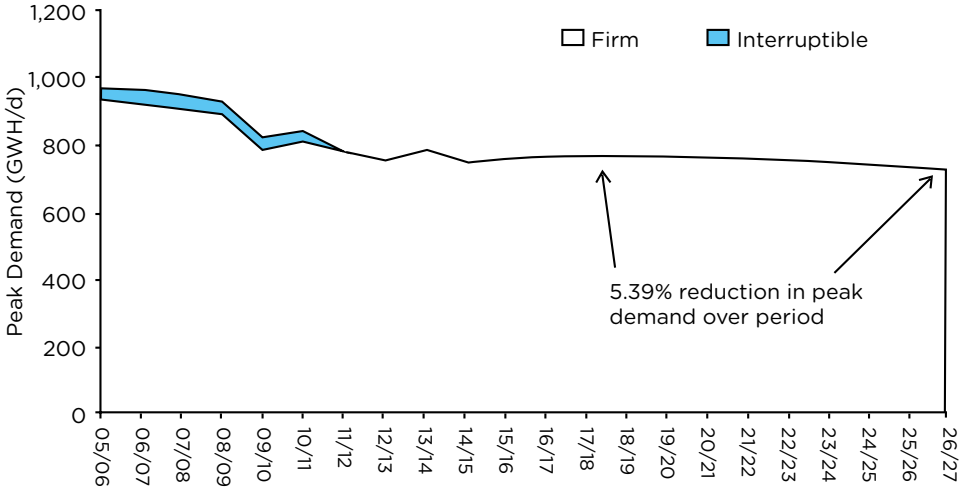

Figure 12: Historic demand and forecast change of peak gas demand – South & South east

Change in Peak Day demand (2016/17 – 2026/27)			
	SGN	Scotland	Southern
Peak Demand	-4.54%	-3.44%	-5.39%

Table 6: Change in Peak Day demand (2016/17 – 2026/27)

Forecast comparisons

The following figures provide a comparison of the current forecasts with those that were produced in 2016.

The latest annual demand forecasts for Scotland, southern and SGN in total are higher over the period of the plan than last year. The driver for the difference in the forecasts is primarily due to the fact that the 2017 forecasts have taken account of the difference between the forecast for 2016 and the actual demand in 2016.

There is some increase in the domestic and small commercial sector due to lower retail gas price forecasts and higher long term economic forecasts. The increase in demand driven by these factors is counteracted by marginally lower levels of housing growth forecasts in Scotland and southern than the previous year. There is forecast a modest decline in demands throughout the forthcoming forecast period.

Greater consumer awareness on environmental issues and their 'carbon footprint' will also have an effect on the annual gas demands during the forecast period. Typical measures for domestic consumers include double glazing, loft insulation, cavity wall insulation and energy efficient boilers. These are administered in the UK government domestic energy efficiency programme, CERT (Carbon Emissions Reductions Target) and community programme, CESP (Community Energy Saving Programme). The drop in gas price as a result of a combination of the reduction in the environmental levy and lower wholesale prices will affect all markets along with national and local government initiatives. Also of importance is the effect of UK and EU renewable energy targets such as '20 - 20 - 20 Targets'. This European Directive is to reduce the European Union's greenhouse gas emission by 20% below 1990 levels, ensure 20% of energy is generated from renewable sources and reduce primary energy use by 20% by improving energy efficiency. These initiatives should continue to have an impact on non-domestic and domestic demand as gas is used more efficiently and have a positive impact as new types of business are created to cope with emerging industrial opportunities.

This could have a substantial impact on consumption year to year or may not materialise in the near or possibly even mid-term future if gas prices remain low. The sustainability of lower gas prices in the long term may be dependent on the success of shale gas development, which is supported by the current government.

Back to 'The next ten years' - Demand forecasting

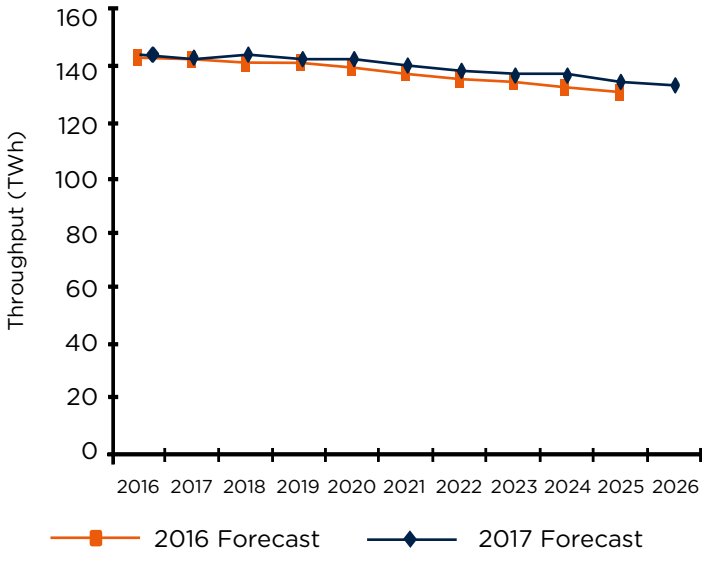

Figure 13: Comparison of total annual demand forecasts – SGN overall

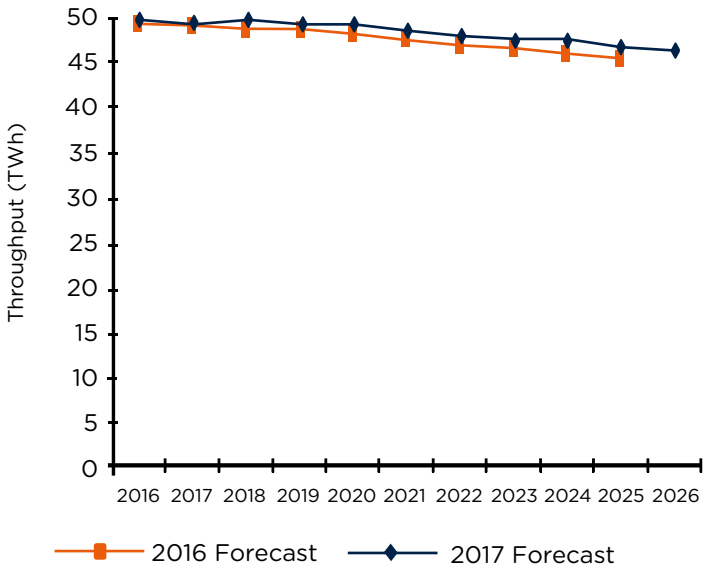

Figure 14: Comparison of annual demand forecasts – Scotland

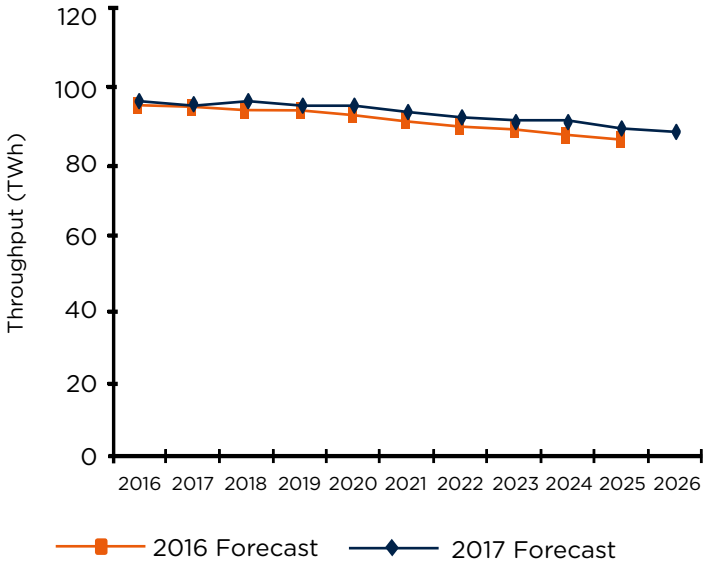

Figure 15: Comparison of annual demand forecasts – Southern

Appendix 1

Demand forecasts tables

Annual demand forecast by load category – SGN overall											
Calendar year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
0 - 73.2 MWh	89.2	89.1	89.0	88.8	88.9	88.1	87.6	87.2	87.2	86.4	86.0
73.2 - 732 MWh	13.6	13.9	14.0	13.9	13.9	13.7	13.6	13.5	13.4	13.3	13.2
732 - 2196 MWh	6.6	6.4	6.3	6.1	5.9	5.6	5.4	5.1	4.9	4.7	4.5
2196 - 5860 MWh	4.1	4.1	4.0	3.8	3.7	3.5	3.4	3.2	3.1	2.9	2.8
Total Small User	113.4	113.5	113.3	112.7	112.3	110.9	109.9	109.0	108.7	107.3	106.4
Firm >5860 MWh	7.3	7.2	7.0	6.8	6.5	6.2	6.0	5.7	5.5	5.2	5.0
DM Firm Consumption	24.0	23.0	23.5	23.1	22.9	22.6	22.3	22.1	21.9	21.6	21.3
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Large User	31.2	30.1	30.5	29.9	29.4	28.8	28.3	27.8	27.4	26.8	26.3
Total LDZ	144.7	143.7	143.8	142.5	141.7	139.7	138.2	136.8	136.0	134.1	132.8
Firm Shrinkage	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Shrinkage	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total Throughput	145.4	144.4	144.5	143.3	142.4	140.4	138.9	137.5	136.8	134.8	133.5
Gas Supply Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Total Throughput	145.2	144.6	143.7	142.9	140.9	139.3	137.9	137.1	135.3	133.9	132.6
Total Firm Demand	145.4	144.4	144.5	143.3	142.4	140.4	138.9	137.5	136.8	134.8	133.5
Total Interruptible Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 7: Forecast annual demand – SGN load categories (TWh)

Annual demand forecast by load category – Scotland LDZ											
Calendar year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
0 - 73.2 MWh	29.0	29.1	29.2	29.2	29.2	29.0	28.9	28.8	28.9	28.7	28.6
73.2 - 732 MWh	4.6	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.5	4.5
732 - 2196 MWh	2.7	2.6	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9
2196 - 5860 MWh	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.4	1.4	1.3
Total Small User	38.2	38.3	38.3	38.1	38.0	37.6	37.3	37.1	37.0	36.6	36.3
> 5860 MWh	3.2	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3
DM Firm Consumption	7.9	7.8	7.7	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Large User	11.1	11.0	10.8	10.6	10.5	10.2	10.0	9.8	9.7	9.4	9.3
Total LDZ	49.3	49.3	49.1	48.8	48.5	47.8	47.3	46.9	46.7	46.0	45.6
Firm Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Throughput	49.5	49.5	49.3	49.0	48.7	48.0	47.5	47.1	46.9	46.2	45.8
Gas Supply Year	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Total Throughput	49.5	49.4	49.1	48.9	48.2	47.7	47.2	47.0	46.4	45.9	45.5

Table 8: Forecast annual demand – Scotland LDZ load categories (TWh)

Annual demand forecast by load category – South East LDZ											
Calendar year	**2016**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2023**	**2024**	**2025**	**2026**
0 - 73.2 MWh	36.4	36.3	36.2	36.1	36.1	35.7	35.5	35.3	35.3	34.9	34.7
73.2 - 732 MWh	5.2	5.3	5.4	5.3	5.3	5.2	5.2	5.1	5.1	5.0	4.9
732 - 2196 MWh	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3
2196 - 5860 MWh	1.3	1.2	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8
Total Small User	44.9	44.9	44.8	44.5	44.3	43.7	43.3	42.9	42.7	42.2	41.8
Firm >5860 MWh	1.8	1.8	1.7	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
DM Firm Consumption	10.4	9.8	10.3	10.1	10.0	9.9	9.8	9.7	9.7	9.6	9.5
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Large User	12.2	11.6	12.0	11.7	11.6	11.4	11.2	11.0	10.9	10.7	10.6
Total LDZ	57.1	56.5	56.8	56.2	55.9	55.1	54.5	54.0	53.7	52.9	52.4
Firm Shrinkage	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Shrinkage	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Throughput	57.4	56.8	57.1	56.5	56.2	55.4	54.8	54.3	54.0	53.2	52.7
Gas Supply Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Total Throughput	57.3	57.1	56.7	56.4	55.6	55.0	54.4	54.1	53.4	52.8	52.3

Table 9: Forecast annual demand – South East LDZ load categories (TWh)

Annual demand forecast by load category – South LDZ											
Calendar year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
0 - 73.2 MWh	23.7	23.7	23.6	23.5	23.5	23.3	23.2	23.0	23.0	22.8	22.7
73.2 - 732 MWh	3.8	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8
732 - 2196 MWh	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.2
2196 - 5860 MWh	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7
Total Small User	30.4	30.3	30.2	30.0	29.9	29.6	29.3	29.0	29.0	28.6	28.4
Firm >5860 MWh	2.3	2.2	2.2	2.1	2.0	1.9	1.8	1.8	1.7	1.6	1.5
DM Firm Consumption	5.7	5.3	5.5	5.4	5.3	5.3	5.2	5.1	5.1	5.0	4.9
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Large User	7.9	7.5	7.7	7.5	7.4	7.2	7.0	6.9	6.8	6.6	6.5
Total LDZ	38.3	37.8	37.9	37.5	37.3	36.7	36.3	35.9	35.7	35.2	34.8
Firm Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Shrinkage	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Throughput	38.5	38.0	38.1	37.7	37.5	37.0	36.5	36.1	35.9	35.4	35.0
Gas Supply Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Total Throughput	38.3	38.1	37.9	37.6	37.1	36.7	36.3	36.0	35.5	35.2	34.8

Table 10: Forecast annual demand – South LDZ load categories (TWh)

1 in 20 Peak Day firm demand forecast – by LDZ											
Financial year	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
Scotland	354	355	355	354	352	351	349	347	346	344	342
South East	467	466	465	463	461	458	455	452	450	447	445
South	330	329	328	326	324	322	320	318	316	314	312
SGN	1,151	1,151	1,147	1,143	1,137	1,131	1,123	1,117	1,112	1,106	1,099

Table 11: Forecast 1 in 20 Peak Day firm demand (GWh per day)

1 in 20 Peak Day firm demand forecast – SGN overall by load category											
Financial year	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
0 - 73.2 MWh	813.3	812.9	812.9	812.0	810.5	808.6	805.5	803.7	802.0	799.6	796.7
73.2 - 732 MWh	118.2	121.8	121.6	121.7	121.4	121.0	120.6	120.0	119.7	119.5	119.1
732 - 2196 MWh	45.5	44.7	44.1	43.2	42.1	41.0	40.0	39.0	38.1	37.2	36.3
2196 - 5860 MWh	28.4	27.9	27.5	27.0	26.3	25.6	25.0	24.4	23.8	23.2	22.7
> 5860 MWh	50.4	49.5	48.8	47.8	46.6	45.4	44.3	43.2	42.2	41.2	40.2
Total NDM Consumption	1055.7	1056.9	1054.9	1051.7	1046.9	1041.8	1035.3	1030.3	1025.8	1020.7	1014.9
DM Firm Consumption	93.5	91.7	90.5	89.4	88.3	87.2	86.1	85.1	84.1	83.1	82.2
Total Firm Consumption	1149.2	1148.6	1145.4	1141.1	1135.2	1129.0	1121.5	1115.4	1109.9	1103.8	1097.1
Firm Shrinkage	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total Firm Demand	1151.2	1150.5	1147.3	1143.0	1137.1	1130.9	1123.4	1117.4	1111.9	1105.7	1099.0
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Interruptible Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	93.5	91.7	90.5	89.4	88.3	87.2	86.1	85.1	84.1	83.1	82.2
Total Shrinkage	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total LDZ Demand	1151.2	1150.5	1147.3	1143.0	1137.1	1130.9	1123.4	1117.4	1111.9	1105.7	1099.0

Table 12: Forecast 1 in 20 Peak Day demand – SGN by load categories (GWh)

1 in 20 Peak Day demand forecast – Scotland LDZ by load category											
Financial year	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
0 - 73.2 MWh	238.1	239.1	239.7	239.9	240.0	239.8	239.4	239.3	239.3	239.0	238.5
73.2 - 732 MWh	37.3	38.4	38.4	38.4	38.3	38.2	38.2	38.0	37.9	37.9	37.8
732 - 2196 MWh	17.1	16.9	16.6	16.3	15.9	15.6	15.2	14.8	14.5	14.2	13.8
2196 - 5860 MWh	11.9	11.7	11.6	11.3	11.1	10.8	10.5	10.3	10.1	9.8	9.6
> 5860 MWh	20.8	20.5	20.2	19.8	19.3	18.8	18.4	18.0	17.6	17.2	16.8
Total NDM Consumption	325.2	326.6	326.4	325.8	324.6	323.3	321.7	320.4	319.4	318.0	316.5
DM Firm Consumption	28.7	28.3	27.9	27.6	27.2	26.9	26.5	26.2	25.8	25.5	25.2
Total Firm Consumption	353.9	355.0	354.3	353.4	351.8	350.1	348.2	346.6	345.2	343.5	341.7
Firm Shrinkage	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Firm Demand	354.4	355.5	354.9	353.9	352.3	350.7	348.7	347.1	345.7	344.0	342.2
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Interruptible Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	28.7	28.3	27.9	27.6	27.2	26.9	26.5	26.2	25.8	25.5	25.2
Total Shrinkage	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total LDZ Demand	354.4	355.5	354.9	353.9	352.3	350.7	348.7	347.1	345.7	344.0	342.2

Table 13: Forecast 1 in 20 Peak Day demand – Scotland LDZ by load categories (GWh)

1 in 20 Peak Day demand forecast – South East LDZ by load category											
Financial year	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
0 - 73.2 MWh	344.3	343.2	342.8	342.0	341.1	340.0	338.4	337.3	336.3	335.0	333.6
73.2 - 732 MWh	45.1	47.2	47.0	46.9	46.6	46.4	46.1	45.7	45.4	45.2	44.9
732 - 2196 MWh	14.5	14.3	14.1	13.8	13.5	13.1	12.7	12.4	12.1	11.8	11.5
2196 - 5860 MWh	8.8	8.7	8.6	8.4	8.2	7.9	7.7	7.5	7.3	7.2	7.0
> 5860 MWh	12.5	12.3	12.2	11.9	11.6	11.3	11.0	10.7	10.4	10.2	9.9
Total NDM Consumption	425.3	425.6	424.6	423.1	421.0	418.7	415.9	413.7	411.6	409.4	406.9
DM Firm Consumption	40.7	39.8	39.4	39.1	38.8	38.4	38.1	37.8	37.5	37.2	36.9
Total Firm Consumption	466.0	465.4	464.0	462.2	459.7	457.2	454.0	451.5	449.1	446.6	443.8
Firm Shrinkage	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Total Firm Demand	466.8	466.2	464.9	463.0	460.6	458.0	454.9	452.3	450.0	447.4	444.6
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Interruptible Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	40.7	39.8	39.4	39.1	38.8	38.4	38.1	37.8	37.5	37.2	36.9
Total Shrinkage	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Total LDZ Demand	466.8	466.2	464.9	463.0	460.6	458.0	454.9	452.3	450.0	447.4	444.6

Table 14: Forecast 1 in 20 Peak Day demand – South East by load categories (GWh)

1 in 20 Peak Day demand forecast – South LDZ by load category											
Financial year	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
0 - 73.2 MWh	230.9	230.7	230.5	230.1	229.5	228.8	227.7	227.1	226.4	225.6	224.7
73.2 - 732 MWh	35.8	36.2	36.2	36.4	36.4	36.4	36.4	36.3	36.3	36.4	36.4
732 - 2196 MWh	13.8	13.5	13.3	13.0	12.7	12.4	12.0	11.8	11.5	11.2	10.9
2196 - 5860 MWh	7.7	7.5	7.4	7.2	7.1	6.9	6.7	6.5	6.4	6.2	6.1
> 5860 MWh	17.1	16.8	16.5	16.1	15.7	15.3	14.9	14.6	14.2	13.9	13.5
Total NDM Consumption	305.3	304.7	303.9	302.8	301.3	299.8	297.8	296.2	294.8	293.3	291.6
DM Firm Consumption	24.1	23.6	23.1	22.7	22.3	21.9	21.5	21.2	20.8	20.4	20.1
Total Firm Consumption	329.4	328.2	327.0	325.6	323.7	321.7	319.3	317.4	315.6	313.7	311.6
Firm Shrinkage	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total Firm Demand	330.0	328.8	327.6	326.1	324.2	322.2	319.9	317.9	316.2	314.3	312.2
DM Interruptible Consumption	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interruptible Shrinkage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Interruptible Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	24.1	23.6	23.1	22.7	22.3	21.9	21.5	21.2	20.8	20.4	20.1
Total Shrinkage	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total LDZ Demand	330.0	328.8	327.6	326.1	324.2	322.2	319.9	317.9	316.2	314.3	312.2

Table 15: Forecast 1 in 20 Peak Day demand – South LDZ by load categories GWh)

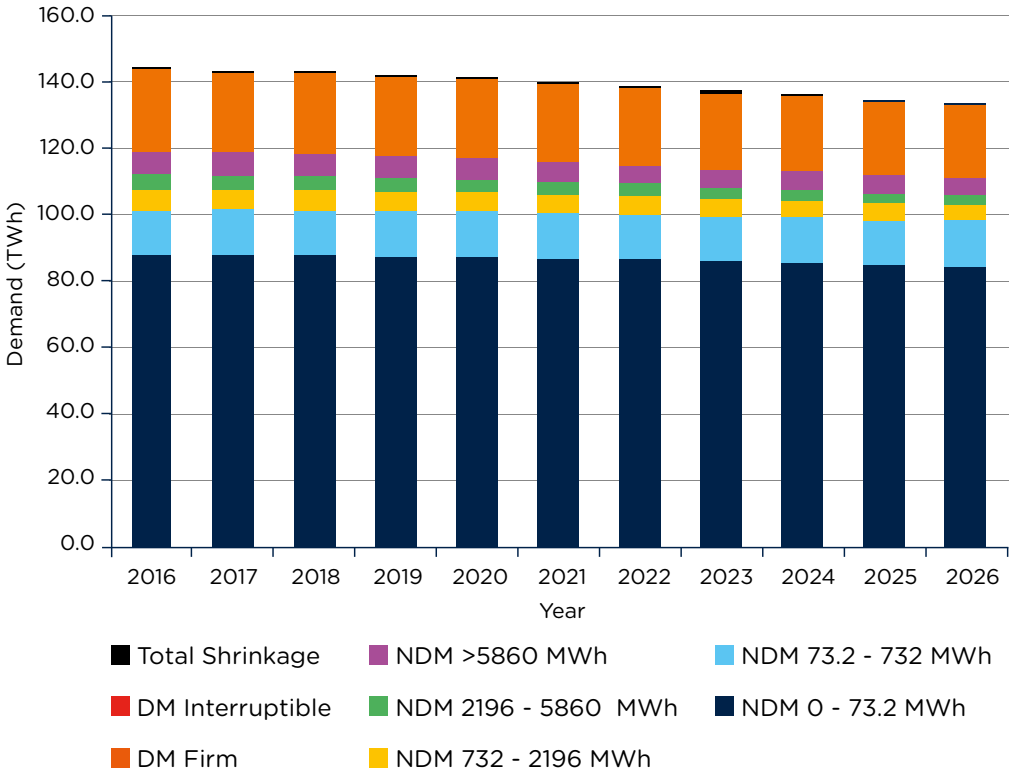

Figure 16: Annual forecast demand SGN overall

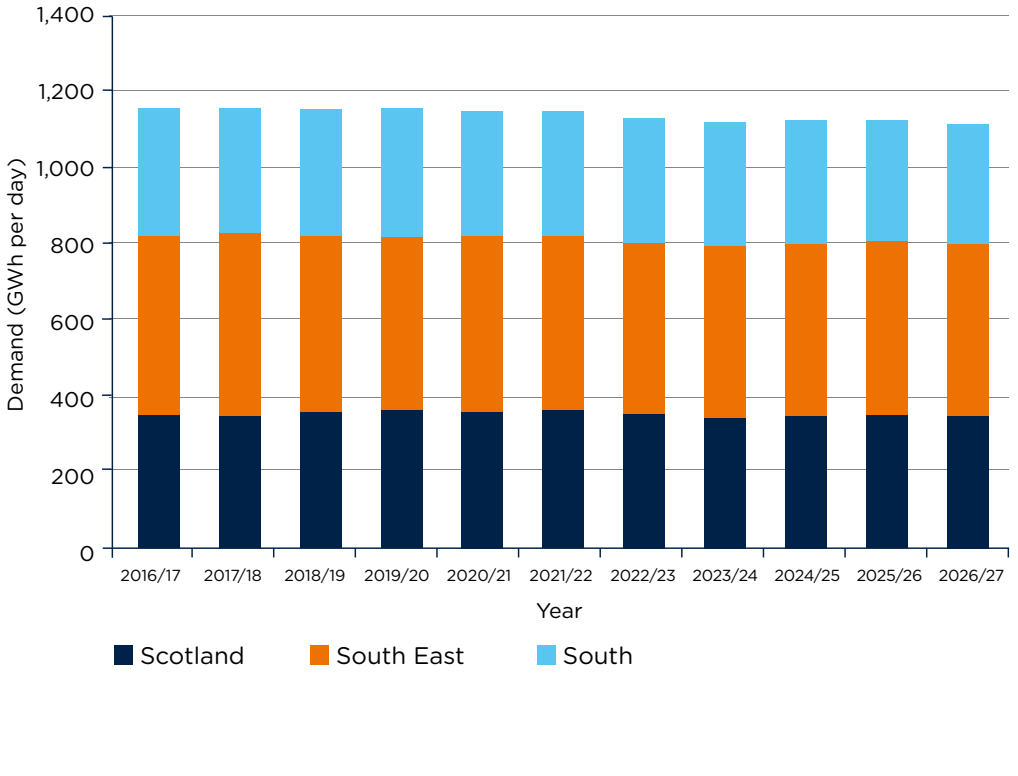

Figure 17: Forecast 1 in 20 Peak Day firm demand SGN overall

Back to 'The next ten years' - Demand forecasting

Appendix 2

2016 flows

This appendix describes annual flows during the calendar year 2016.

Annual flows
Forecasts of annual demand are based on average weather conditions. Therefore, when comparing actual demand with forecasts, demand must be adjusted to take account of the difference between actual weather conditions and seasonal normal weather. The result of this adjustment is the weather corrected demand.

Recent winters have included some of the warmest of any in the weather data history employed for demand modelling, dating back to 1960-61. Consequently, the basis of the average weather condition used for demand forecasting purposes has been adjusted to better reflect these conditions. Anecdotal evidence to the contrary is based on specific days or weeks and not the entire winter period. As a result of this, the 2016 weather corrected annual demands and forecasts are based on the industry's current view based on research in cooperation with the Hadley Centre, which is part of the Met Office.

Tables 16 to 18 provide a comparison of actual and weather corrected demands during the 2016 calendar year with the forecasts presented in the 2016 LTDS. Annual demands are presented in the format of LDZ load bands/ categories, consistent with the basis of system design and operation.

Note: Figures may not sum exactly due to rounding.

Annual demand for 2016 (TWh) – Scotland LDZ			
	Actual demand	Weather corrected demand	2016 LTDS forecast demand
0 - 73.2MWh	30.1	28.7	29.6
73 - 5860MWh	9.1	8.8	8.5
>5860MWh Firm	12.7	12.6	12.6
Total LDZs	51.9	50.1	50.7
Shrinkage	0.2	0.2	0.2
Total Throughput	52.1	50.3	50.9

Table 16: Annual demand for 2016 (TWh) – Scotland LDZ

Annual demand for 2016 (TWh) – South East LDZ			
	Actual demand	Weather corrected demand	2016 LTDS forecast demand
0 - 73.2MWh	38.7	36.7	36.1
73 - 5860MWh	8.8	8.4	8.3
>5860MWh Firm	9.3	9.2	11.5
Total LDZs	56.8	54.4	55.9
Shrinkage	0.4	0.4	0.3
Total Throughput	57.2	54.8	56.2

Table 17: Annual demand for 2016 (TWh) – South East LDZ

Annual demand for 2016 (TWh) – South LDZ			
	Actual demand	Weather corrected demand	2016 LTDS forecast demand
0 - 73.2MWh	24.5	23.2	22.7
73 - 5860MWh	6.8	6.5	6.2
>5860MWh Firm	8.5	8.4	8.7
Total LDZs	39.8	38.0	37.6
Shrinkage	0.2	0.2	0.2
Total Throughput	40.0	38.2	37.8

Table 18: Annual demand for 2016 (TWh) – South LDZ

LDZ winter severity statistics

Sourced from the May 2017 National Grid report on winter severity statistics 2016/2017. These statistics cover the gas industry interpretation of winter lasting from October to March inclusively.

By way of explanation a winter can be either warm, cold or average. The 1 in "X" is a measure of how far away from average it is and if it is either cold or warm. The most severe cold winter is the one that has happened once in the last 56 years. This would be a 1 in 56, cold winter and this occurred in 1962/63.

Winter 2016/17 was the ninth warmest winter recorded in the last 56 years.

1 in X winter severities per LDZ	
LDZ	1 in "X"
Scotland	1 in 9, warm
South East	1 in 5, warm
South	1 in 4, warm
National	1 in 6, warm

Table 19: 1 in X winter severities per LDZ

Maximum and minimum flows

Table 20 indicates the highest and lowest daily demands seen between October 2016 and September 2017 and when they occurred.

Actual flows on the maximum and minimum demand day of gas year 2016/17		
LDZ	Maximum Day 2016/2017	Minimum Day 2016/17
Scotland	23.30 mscmd (24 November 2016)	4.69 mscmd (27 May 2017)
South East	33.09 mscmd (26 January 2017)	4.57 mscmd (21 June 2016)
South	20.97 mscmd (10 February 2017)	3.44 mscmd (18 June 2017)

Table 20: Actual flows on the maximum and minimum demand day of gas year 2016/17

Percentage flows

Table 21 shows the forecast Peak Day flow. It then converts the maximum and minimum values from table 20 above to percentages of the peak flow. Demand in the South varied from 20.97mscm or 67% of Peak Day down to 3.44mscm or 1% of Peak Day.

Maximum and minimum percentage flows of gas year 2016/17			
LDZ	Forecast Peak Day for 2016/17 (% of peak)	Maximum Day 2016/17 as %age	Minimum Day 2016/17 as %age
Scotland	31.71 mscmd	73.5%	14.8%
South East	43.64 mscmd	75.8%	10.5%
South	31.28 mscmd	67%	11%

Table 21: Maximum and minimum percentage flows of gas year 2016/17

Appendix 3

Glossary

Annual Quantity (AQ)
The AQ of a supply point is its annual consumption over a 365 or 366-day year, under conditions of average weather.

Bar
The unit of pressure that is approximately equal to atmospheric pressure (0.987 standard atmospheres). Where bar is suffixed with the letter g, such as in Barg or mbarg, the pressure being referred to is gauge pressure, ie relative to atmospheric pressure. One-millibar (mbar) equals 0.001 Bar.

Biomethane
Biogas that has been cleaned in order to meet GSMR requirements.

Calorific Value (CV)
The ratio of energy to volume measured in Mega joules per cubic meter (MJ/m3), which for a gas is measured and expressed under standard conditions of temperature and pressure.

Cubic Metre (m^3)
The unit of volume, expressed under standard conditions of temperature and pressure, approximately equal to 35.37 cubic feet. One million cubic metres (mcm) are equal to 106 cubic metres, one billion cubic metres (bcm) equals 109 cubic metres.

Daily Metered Supply Point
A supply point fitted with equipment, for example, a data-logger, which enables meter readings to be taken daily.

Distribution Network (DN)
An administrative unit responsible for the operation and maintenance of the local transmission system (LTS) and < 7Barg distribution network's within a defined geographical boundary, supported by a national emergency services organisation.

Distribution System
A network of mains operating at three pressure tiers: intermediate (7 to 2Barg), medium (2Barg to 75mbarg) and low (less than 75mbarg).

Diurnal Storage
Gas stored for the purpose of meeting within day variations in demand. Gas can be stored in special installations, such as storage facilities, or in the form of linepack within transmission, ie > 7Barg pipeline systems.

DECC
Department of Energy and Climate Change. In 2016 absorbed into Department for Business, Energy & Industrial Strategy.

Embedded Entry Points
Entry point which is not an offtake from NTS. Can be a biomethane or other unconventional source of gas.

Exit Zone
A geographical area within a LDZ, which consists of a group of supply points, which on a Peak Day, receive gas from the same NTS Offtake.

Formula Year
A twelve-month period commencing 1 April predominantly used for regulatory and financial purposes.

Future Energy Scenarios (FES)
National Grid's annual industry-wide consultation process encompassing the Ten Year Statement, targeted questionnaires, individual company and industry meetings, feedback on responses and investment scenarios. Previously called Transporting Britain's Energy.

Gas Day
Used by gas industry for buying and selling gas on open market. Defined as running from 05:00 on one day to 05:00 on the following day.

Gas Transporter (GT)
Formerly Public Gas Transporter (PGT). GTs such as SGN, are licensed by the Gas and Electricity Markets Authority to transport gas to consumers.

Gas Supply Year
A twelve-month period commencing 1 October also referred to as a Gas Year.

GS(M)R
Gas Safety (Management) Regulations 1996.

HMG
Her Majesty's Government.

Interconnector
This is a pipeline transporting gas from or to another country.

Kilowatt hour (kWh)
A unit of energy used by the gas industry. Approximately equal to 0.0341 therms. One Megawatt hour (MWh) equals 103 kWh, one Gigawatt hour (GWh) equals 106 kWh and one Terawatt hour (TWh) equals 109 kWh.

Linepack
The usable volume of compressed gas within the national or local transmission system at any time.

Liquefied Natural Gas (LNG)
Gas stored in liquid form. Can be firm or constrained (CLNG). Shippers who book a constrained service agree to allow us to use some of their gas to balance the system.

Local Distribution Zone (LDZ)
A geographic area supplied by one or more NTS offtakes. Consists of high pressure (> 7Barg) and lower pressure distribution system pipelines.

Local Transmission System (LTS)
A pipeline system operating at > 7Barg, that transports gas from NTS offtakes to distribution systems. Some large users may take their gas direct from the LTS.

National Balancing Point (NBP)
An imaginary point on the UK gas supply system through which all gas passes for accounting and balancing purposes.

National Transmission System (NTS)
A high-pressure system consisting of terminals, compressor stations, pipeline systems and offtakes. Designed to operate at pressures up to 85Barg. NTS pipelines transport gas from terminals to NTS offtakes.

National Transmission System Offtake
An installation defining the boundary between NTS and LTS or a very large consumer. The offtake installation includes equipment for metering, pressure regulation, etc.

Odorisation
The process by which the distinctive odour is added to gas supplies to make it easier to detect leaks. Odorisation is provided at all Network Entry points.

Office of Gas and Electricity Markets (Ofgem)
The regulatory agency responsible for regulating the UK's gas and electricity markets.

Offtake
An installation defining the boundary between NTS and LTS or a very large consumer. The offtake installation includes equipment for metering, pressure regulation, etc.

ONS
Office for National Statistics.

Peak Day Demand (1 in 20 Peak Demand)
The 1 in 20 Peak Day demand is the level of demand that, in a long series of winters, with connected load held at the levels appropriate to the winter in question, would be exceeded in one out of 20 winters, with each winter counted only once.

Price Control Review
Ofgem's periodic review of Transporter allowed returns. The current period has been called RIIO and will cover April 2013 to March 2021.

PRI - Pressure Regulating Installation
The replacement term for PRS, district governor and all other local terms (such as STRS or TRS) when IGEM standard TD13 was introduced.

Seasonal Normal Temperature (SNT)
Seasonal Normal Temperature is the average temperature that might be expected on any given day, based on historical data.

Shipper or Network Code Registered User (System User)
A company with a shipper licence able to buy gas from a producer, sell it to a supplier and employ a GT to transport gas to consumers.

Shrinkage
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.

Supplier
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.

Supply Hourly Quantity (SHQ)
The maximum hourly consumption at a supply point.

Supply Offtake Quantity (SOQ)
The maximum daily consumption at a supply point.

Therm
An imperial unit of energy. Largely replaced by the metric equivalent: the kilowatt hour (kWh). One therm equals 29.3071 kWh.

Unaccounted for Gas (UAG)
Gas lost during transportation. Includes leakage, theft and losses due to the method of calculating the Calorific Value.

Uniform Network Code (UNC)
The Uniform Network Code covers the arrangements between National Grid, shippers and the DNs following the selling of four of the networks.

UK-Link
A suite of computer systems that supports Uniform Network Code operations. Includes Supply Point Administration; Invoicing, and the Sites and Meters database.

VLDMC
Very Large Daily Metered Customer. A site which uses greater than 50,000,000 therms per annum.

Appendix 4

Links and contacts

SGN contacts

sgn.co.uk
You can apply for a new gas connection online through our website and learn more about our Help to Heat scheme. You can also find further information about our planned and emergency works in your area.

network.capacity@sgn.co.uk
Our dedicated email address for any questions regards the Long Term Development Statement.

GT1.GT2@sgn.co.uk
Mailbox for requests for increased loads at existing sites where meter capacity may be an issue.

linesearchbeforeudig.co.uk
Safety is our number one priority, before you dig always request details of our pipework's location via this online service.

customer@sgn.co.uk
Our 24-hour Customer Service team can be reached by email or by calling 0800 912 1700.
You can also find us on Facebook or follow us on Twitter at @SGNgas.

lets.chat@sgn.co.uk
We are always interested in engaging with our stakeholders This is how we look to improve the way we do things by listening to your feedback.

paul.denniff@sgn.co.uk
Network & Safety Director

joel.martin@sgn.co.uk
Regulatory Finance Manager – point of contact for storage and biomethane enquiries.

External contacts

ofgem.gov.uk
Office of Gas and Electricity Markets. Regulating authority for gas industry and markets.

Joint Office of Gas Transporters
The Joint Office is where the UNC can be found. There are also details of live modifications to the document and the various working bodies relating to the gas industry.

BEIS - Department for Business Energy & Industrial Strategy
BEIS brings together responsibilities for business, industrial strategy, science, innovation, energy, and climate change. Formerly the department of Energy and Climate Change (DECC).

www.xoserve.com
One of several service providers supporting the UK Gas Industry.

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