SGN
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October 2016

Long Term Development Statement 2016

Network Capacity

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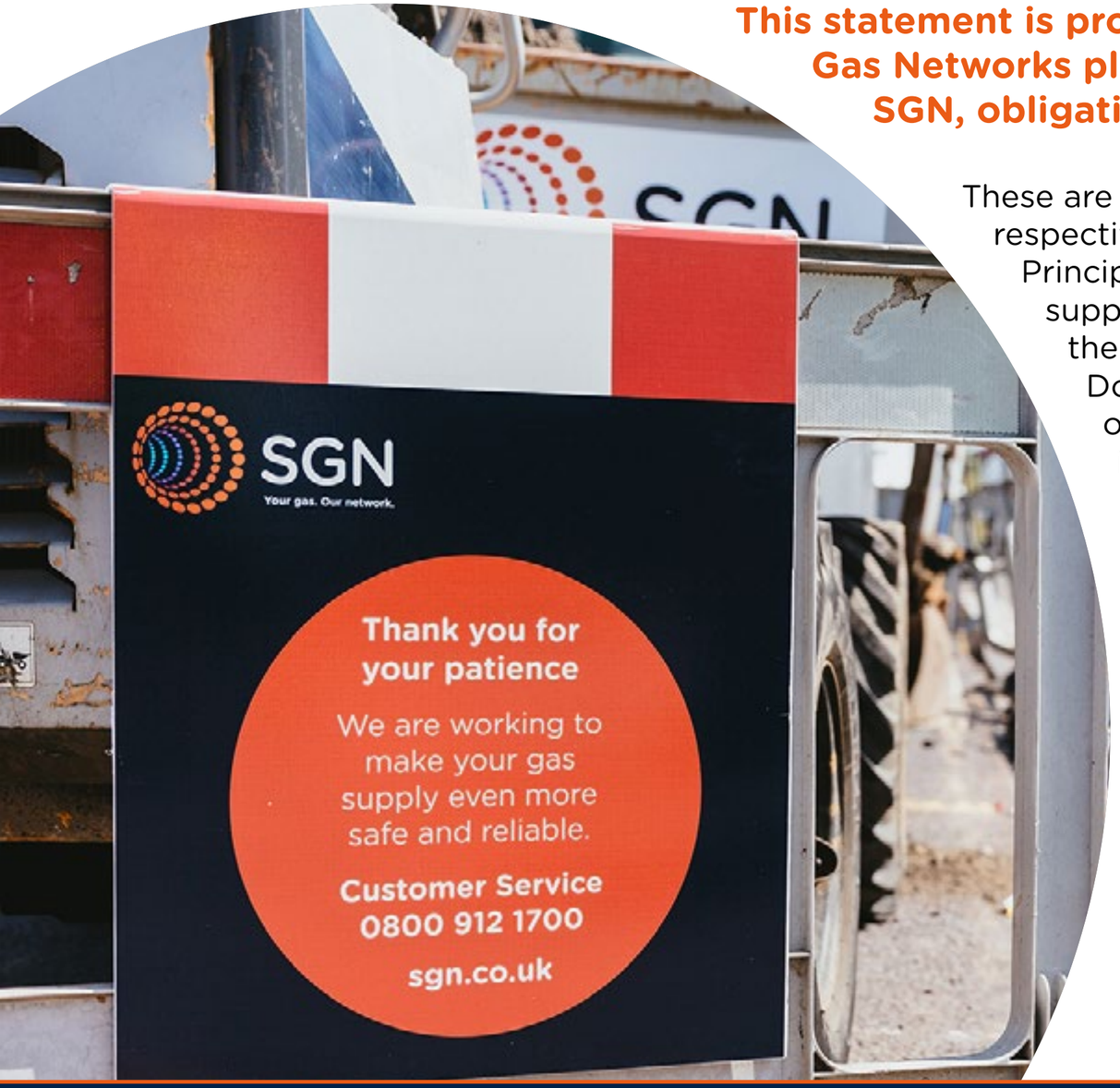

This statement is produced for the purpose of and in accordance with Scotland Gas Networks plc's and Southern Gas Networks plc's, collectively known as SGN, obligations.

These are Standard Condition 25 and Standard Special Condition D3 of their respective Gas Transporter Licence and Section O 4.1 of the Transportation Principal Document in the Uniform Network Code in accordance on 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 statement. This statement is not intended to have any legal force or to imply any legal obligations as regards capacity planning, future investment and the resulting capacity.

This document is intended to be read in conjunction with the SGN Demand Forecasting Document 2016.

Contents

Foreward

Paul Denniff,
Network Director

This 2016 Long Term Development Statement (LTDS) is the twelfth produced by SGN in accordance with Standard Condition 25 and Standard Special Condition D3 of our Gas Transporter Licences.

This requires that the LTDS, published annually, shall provide a 10-year forecast of transportation system usage and likely system developments that can be used by companies who are contemplating connecting to our networks or entering into transportation arrangements in order to identify and evaluate opportunities for doing so.

We have again chosen to present the information in two documents, which can be read in conjunction. The first document is the LTDS, but without the tables and graphs representing the actual year on year predicted load growth of annual and daily demands. This data is presented in a separate Demand Forecasting Document (DFD). The LTDS contains essential information on the planned major reinforcement projects and associated investment, significant completed projects and other developments within our networks in Scotland and Southern England. This document also explains the processes that are now in place between the Networks and National Grid, as the operator of the national transmission system (NTS), to exchange long-term planning information to facilitate the efficient and economic development of the overall transportation network.

I hope you will find both our 2016 LTDS and DFD informative. If you have any enquiries please contact me at **network.capacity@sgn.co.uk**, **paul.denniff@sgn.co.uk** or 01293 818 365.

Paul Denniff
Network Director

1. Executive Summary

[1]www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf

[2]www.britishchambers.org.uk/policy-maker/policy-reports-and-publications/q2-2016-quarterly-economic-survey.html

This document provides our view of the long-term development of our gas transportation systems in terms of future demand.

1.1 Context

This is our twelfth Long Term Development Statement (LTDS), and it provides an overview of the 10-year forecast of annual and peak day demands.

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

Development of our transportation network is primarily demand driven. The overall UK supply position and security of supply assessment is covered in detail by National Grid's 10-year statement for the national transmission system (NTS) and in its annual publication UK Future Energy Scenarios document. Separate to this the Energy Networks Association (ENA) has also commissioned a long term future report from KPMG[1]. These two documents examine a number of scenarios for change in gas demand. These can range from minimal change in behaviour or consumption to one of high levels of substitution of gas as a component in the energy mix. Our view is that we see the evolution of gas demand as one of slow progression in demand, in line with UK Future Scenarios. This approximates most closely to ENAs "Evolution of Gas Network" scenario. However, this outlook is only valid based on information available. Should evidence of major changes become apparent our demand outlook evolves to include new evidence.

The data and assumptions used to develop the 2016 demand forecasts were collated and compiled in the first half of 2016. By then the scale of the recession caused by the global economic crisis and the recovery to date had already had an impact on the overall demand levels. The timescales for the development of the Demand Forecasting Document are included in section 2.2.

1.2 Demand Outlook

There has been a material reduction in the 2016 demand forecasts when compared to the 2015 forecast. This is due to the lingering impact of the economic recession and changes in gas consumption by customers as a result of energy efficiency improvements.

There is predicted to be a little recovery in the economy during 2016[2] with some growth in specific areas. The primary drivers for changes in demand will be gas prices, levels of household growth, specific Government development initiatives and special events. There is uncertainty over the predicted strength and speed of economic recovery which will need to be closely monitored as this will impact on future demand forecasts. In addition, the introduction of government targets for renewable energy, policies to decarbonise the energy economy, growing low-carbon economy and smart metering are expected to result in an overall reduction of demand later in the forecast period. More specific figures relating to this are contained in the companion DFD but these are summarised in table 1 below. The changes in annual demand are a result of the above measures.

The reductions in peak day demand are influenced in Scotland by a number of sites transferring to biomass consumption. This uses gas to fire up a process on a small number of days. This results in a smaller effect on the peak day as they could be using gas on that day. In the south a number of large demands have ceased using gas consumption. This results in a larger decrease in the peak day in the south.

	Scotland	Southern
Annual Demand	-8.29%	-10.30%
Peak Day Demand	-5.46%	-6.56%

Table 1: Forecast changes in demand over 10-year period 2016-2025

1. Executive Summary continued

1.3 Investment Implications

We invest in our gas transportation infrastructure to provide sufficient system capacity and diurnal storage to meet the forecast levels of 1 in 20 peak day demand as required by our Licence. Investment during the current period will be less than previous years due to a gradual reduction in demand.

This document highlights significant projects that are currently forecast during the next 10 years and these are covered in section 5. It should be noted that these projects do not represent the total capacity related investment in our networks.

2. Background

2.1 Overview

SGN manages the gas network that distributes natural and green gas to 5.9 million homes and businesses across the south of England and Scotland. Whoever their supplier, our pipes deliver gas safely, reliably and efficiently to all of our customers. Our promises to our customers shape who we are. They ensure we employ the highest safety standards, strive for the best levels of service and put customers at the centre of everything we do. We also know we are expected to do our work in a way that causes minimum impact on our environment.

We deliver gas to our domestic, commercial and industrial customers. We have 1.9 million customers throughout Scotland. We also operate across the south and south-east of England. We supply 4 million customers from Dorset to Dover and as far north as Milton Keynes and south of the Thames in London.

2.2 Overview of the Demand Forecasting Process

The production of the LTDS and DFD is one part of our annual planning cycle.

The key input to the planning process is the demand forecasts, using data procured from recognised industry sources, econometric modelling and by National Grid. These demand forecasts are used to analyse the performance of our Local Transmission System (LTS) to predict flows, pressures and our offtake capacity and storage requirements. From this data, appropriate investment decisions can be made.

2.3 Timeline

The Uniform Network Code (UNC) provides a timeline for consultation between the distribution networks and National Grid Gas UK Transmission (NGG UKT) in the demand forecasting process within the gas year which is outlined below:

November	NGG UKT provides specification
February	DN provides pre-forecast information to NGG UKT
Parties meet to discuss pre-forecast information	
March	DN provide forecast information to NGG UKT
April	Parties meet to discuss forecast information
First week May	NGG UKT provides final forecast information
First week July	NGG UKT provide calorific value (CV) data
October	We publish our LTDS and DFD.

3. Demand

[3]Digest of UK Energy Stats (DUKES) July 2016.

[4]www.carbonbrief.org/uk-emissions-lowest-since-the-1920s-as-renewables-overtake-coallast-year/

3.1 Overview

UK primary energy consumption has reflected the economic levels of growth of the UK economy over the last few years[3]. However, there have been significant changes in the energy mix. The gas share of primary energy demand has grown significantly over this period, mainly at the expense of coal, due to the rapid growth of gas-fired power generation. The economic recession that commenced in 2007, the ongoing eurozone crisis and Britain's economic situation have affected overall consumption of energy. The use of large gas-fired power stations reduced from 2012 onwards due to the high price of gas as a fuel. This has led to an increase in the use of low carbon forms of generation such as renewables[4].

The demand changes in response to price fluctuations which took place between 2007 and 2011 have highlighted how sensitive gas consumers are to fuel price and general economic conditions. The effects of climate change and customers' increasing awareness of their environmental impact may also alter annual growth.

However, it is predicted that climate change will continue to produce extreme weather patterns as seen in the last few years, and the behavioural changes may take several years before they have a significant impact on the Peak Day demand.

Commercial and industrial demand drivers include the Climate Change Levy (CCL), Carbon Reduction Commitment (CRC), generation of electricity through renewable sources, combined heat and power capacity and the EU emissions trading scheme. Domestic energy efficiency and affordable warmth programmes contribute to a reduction in energy growth within the domestic sector. This will continue to be the case in future years as various government schemes are introduced that are aimed at reducing carbon emissions.

The eradication of fuel poverty remains one of the UK Government's objectives. As a socially responsible and sustainable energy company we recognise that across the country there are many households in fuel poverty. As such our stakeholder engagement team has actively promoted expansion of schemes to reduce fuel poverty. We have agreed an enhanced commitment to deliver on our Help to Heat scheme to provide over 27,000 connections to low-income and vulnerable customers during the course of the current eight-year Price Control Period (RIIO GD1). We will continue to actively engage with local authorities, housing associations, social and private landlords and independent gas transporters to seek measures that will enable our company to reach vulnerable and fuel poor customers to ensure that they have access to efficient and affordable energy sources.

3. Demand continued

3.2 Forecast Assumptions

3.2.1 Planning Assumptions

The process employed to develop the annual gas demand forecasts is based upon a combination of different techniques, including econometric modelling, monitoring of information from the enquiries for new loads and analysis of the consumption history of existing large demands and the main load bands. Detailed analysis of specific sectors of the market, are also carried out.

Each forecast is developed from a set of planning assumptions which, if necessary, can be developed to create alternative scenarios. In the case of gas demand, these assumptions have considered economic and fuel price factors, environmental legislation and government energy policy, and take account of those elements where there is a clear driver of gas demand behaviour.

Some of the data used to support the forecasts is obtained from publically available data sources (e.g. national and local government statistics and forecasts). The planning assumptions are subject to review and update in the period between each forecast.

The current retail gas price is forecast to fall in 2016 but is likely to rise for the remainder of the period of the plan. This reflects the current increases in forward prices for gas in the near term. It is assumed that the expected UK supply capacity surplus that is forecast to be sustained over the period of this LTDS will keep price increases close to the level of inflation. However, gas shippers and suppliers may not be able to sustain this and prices may escalate due to external factors. This is important as domestic gas price increases have had a major impact on annual consumption.

3.2.2 Economic Outlook and Market Drivers

(not in text)

3. Demand continued

3.2.3 Scotland

Scotland possesses a strong commercial and services sector base, accounting for around 78% of the Scottish economy, just below the UK figure of 81%. Financial and business 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 economic downturn did have a negative effect as banks consolidated offices and functions. The Scottish Government are keen to emphasise the impact that their economy has on UK GDP.

The Scottish manufacturing base is also strong, delivering 11.5% of Scotland's GVA, higher than the UK region average of 10%. The sector has however performed well showing a reasonable increase since 2013 compared to a small decline in 2012 in line with the rest of the UK. There is a good overall diversity of production spread over a number of sectors.

Continued reliance on public services[5] (21% of employment in 2016, down from 24% in 2012) may also be problematic as the UK Government continues to cut its spending plans in order to meet borrowing targets and reduce the budget deficit. Employment levels across the whole of Scotland have risen during 2016 to 74.1%. This does mean that there is some steady growth in sectors outside the public sector which is counteracting the losses in the public sector, but will still leave the Scottish Economy reliant on public services in the near future. Scottish Parliament reports have highlighted that the Scottish economy is probably over reliant on a small number of overseas markets and would be well advised to exploit opportunities in other emerging markets. An important point to note is that there is heavy reliance on exports to the EU (42% in 2014/15[6]) which could be affected by leaving the EU.

In the medium term, the Scottish economy will have development 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. The Scottish Government states that 21,000 jobs exist already in this sector in Scotland. Studies estimate that this figure could rise to 28,000 by 2020. However this value may well have to be revised downwards as the UK Government is likely to eliminate or reduce incentives which make this industry lucrative.

[5]www.gov.scot/Publications/2016/09/9083

[6]www.gov.scot/Topics/Statistics/Browse/Economy/Exports/ESSPublication

3. Demand continued

3.2.4 South East

In the south east, 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 the steady economic recovery following the downturn but the trickle of recent banking industry scandals is a real threat to that industry. This will be especially significant should confidence in London as a financial hub be adversely affected by the various enquiries into the banking sector, changes in regulation and the impact of the UK leaving the EU.

The pattern of development remains unbalanced, with economic hot and cold spots in the region. Manufacturing is still a major element of the South East economy at 8.8%, but there has been some decline since 2011, and it remains the lowest manufacturing base excluding London. The impact of the level of economic recovery on this sector could still be significant assuming there is to be continued recovery. The sector of the economy that has generally weathered the economic downturn the best appears to be the wholesale and retail sector (13% of South East GVA), which was only marginally affected by the recession in 2012. It is unclear how sustainable this position will be, especially if the UK, EU and global economies continue to be adversely affected by the prevailing economic uncertainty or slowdown in some countries. The impact of the result of the referendum on UK membership of the EU has unknown consequences.

Strong expansion of tourism, both internal and international provides opportunities for the South East region, given London's attraction as a tourist destination.

Growth in demand can be linked to housing and economic development. There are opportunities in the agriculture industry with efforts to "buy local" encouraging supermarkets to source high value fruit and vegetables in the UK. This in turn has led to industrial scale greenhouse agriculture which in turn generates demand, and coincidentally biomethane opportunities. Of particular note for gas demand forecasting is a number of companies within the construction sector now showing some recovery the demand for materials is increasing with some companies having previously operated on a care and maintenance basis now operating full time.

The Government continues to forecast that housing development will grow in the South East. A recent example of this is our taking a role in the recent Thames Estuary Commission which was announced in the March 2016 Budget.

3. Demand continued

3.2.5 South

In the south, 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. The south coast and rural areas of South LDZ continue to attract visitors boosting the local economies at a time when there has been some turndown in other areas.

Further changes by the Ministry of Defence will have some effect on the local economy due to the presence of several bases in the South LDZ. This may take the form of job cuts caused by closure or possibly employment opportunities due to the upgrading of living quarters. The commitment of the UK Government to 2% of GDP on defence is expected to provide some clarity and allow longer term planning. The impact of the cuts in public sector employment is not clear at this stage, but it is anticipated that it will have an impact on the South LDZ economy. Further job losses for London-based public sector employees will have a knock on effect within South LDZ where people living in the Thames valley are within commuting distance of London.

Although the region has many pockets of thriving economic growth, there are some threats to certain areas as a result of changes in other parts of the country. Other factors that may constrain growth are the fact that there are many pockets within the area that are protected from development; witness the lack of onshore wind farms in the area. In addition the road infrastructure has already reached its capacity limits, particularly the M4.

As in the South East LDZ, Government forecasts housing development growth, which will be boosted by the fact that money raised from the Right to Buy scheme for council houses will be used to build replacement houses. It is not clear how this will impact the number of new homes given that the discounts being offered to potential buyers will reduce the revenue.

3.3 Forecast Demands Overview

This section provides an overview of our latest annual and peak gas demand forecasts through to 2025. A more detailed view can be found in the Demand Forecasting Document which is the companion document to this LTDS and provides details of the forecasts for both annual and peak demand on a year-by-year and LDZ basis. These forecasts have been developed around the Uniform Network Code load band categories and relate only to gas that is transported through our systems.

3. Demand continued

3.4 Forecast Comparisons

The latest network annual demand forecasts are lower over the period of the plan than last year.

The lower forecasts are the result of higher gas price forecasts, slower economic recovery and the shutdown of some large customers. We believe there will be a modest decline in demands throughout the forthcoming forecast period.

Increases in household energy efficiency will also have an effect on the annual gas demand during the forecast period. Typical measures taken out by households include double glazing, loft insulation, cavity wall insulation and boiler replacements. These are administered by the UK Government's domestic energy efficiency schemes, the Green Deal and the Energy Company Obligation (ECO). The forecast rise in fuel 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. The UK Government has committed to producing 12% of heat from renewable sources as part of its overall 15% renewable energy target for 2020. This target is part of an EU package which also sets targets to reduce greenhouse gas emissions by 20%, and increase energy efficiency by 20% by 2020, relative to 1990 levels. The UK will also be working towards its own 2020 target of reducing carbon emissions by 34%. These initiatives could have an impact on both 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 but may not materialise in the near or possibly even mid-term future.

3.5 Demand Sensitivities

Demand sensitivities have been examined to identify where there may be a disproportionate impact on demand and the need for network investment. This is generally due to the magnitude of the load, but in some cases it may also be due to other factors such as location of the load within the network or atypical patterns of consumption. An example of such sensitivity may be the potential for the construction of gas-fired power generation. Should a project of this kind proceed, there could likely be a need for significant investment in the networks. This may take the form of reinforcement pipelines or PRI rebuild projects.

3.6 Impact of Climate Change

The Uniform Network Code requires us to review and, if necessary, revise weather variables used for demand estimation purposes, at least every five years. There was a review undertaken and the last weather variables were implemented in October 2015.

These forecasts have been historically based on the revised seasonal normal basis that was approved by the gas industry for use within demand attribution. The revision looked at historic weather and demand to assess the optimum length of time to be used as the basis for assessing 'average' weather conditions. Following a period of industry review this process from the Hadley Centre, part of the Met Office, is in use.

3. Demand continued

3.7 Smart Metering

It was observed by Ofgem in their December 2010 report for the Energy Demand Research Project (EDRP) that smart meters can be a vehicle for effective action to reduce domestic energy demand. At present, the roll-out programme has been delayed until beyond mid-2016 from the original date of summer 2014. The target date for full roll-out stays at the end of 2020. The public profile of this programme has been raised by TV and social media campaigns advertising to promote and inform on the programme. The overall impact of Smart Metering is difficult to quantify in isolation as changing consumer behaviour, relating to smart metering has not provided evidence of impact on gas demand.

4. Supply

4.1 Overview

Developments of our transportation networks are primarily demand driven. National Grid cover the overall UK supply position and security of supply assessment in detail for the NTS within its 10-year statement and in its publication Transporting Britain's Energy 2016; UK Future Energy Scenarios.

The vast majority of the gas entering the LDZs flows through national offtakes from the NTS. There are currently a number of other locations where gas flows directly into the LDZs and these are detailed below in section 4.2. 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. Currently, 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 Europe and Norway and while the dependency on these sources is expected to increase, there is also an increase in Liquefied Natural Gas (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 reduction in the price of gas to the UK consumer. The impact of the shale gas industry in the USA will 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. However, 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.

4.2 Gas Supply Facilities

4.2.1 Offtakes

The vast 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.

4.2.2 Isle of Grain Import Terminal (South East LDZ)

The Isle of Grain was formerly an LNG storage facility but has now been developed as an import terminal. The first shipment of imported LNG was unloaded in July 2005. Since then National Grid 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 SIU.

4.2.3 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.

4.2.4 Biomethane

Biogas (a renewable source of gas) can be produced from a number 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 cleaned, the resulting biomethane can be injected in to the gas network.

Please see section 6; Sustainable Networks for more information about entry connections.

4. Supply continued

4.2.5 Alternative Supply or Injection Methods

We are also interested in working with alternative sources of gas. This can include producers of landfill gas, coal bed methane, synthetic gas, flared gas and other unconventional sources. For further details please contact **colin.thomson@sgn.co.uk**

4.3 Storage Facilities

SGN does not have any third-party storage facilities. We would welcome proposals to connect sites to our networks. For further details please contact **colin.thomson@sgn.co.uk**

5. Investment in the Networks

5.1 Overview

We operate and maintain our LTS and distribution systems, which include connecting new customers and undertaking investment to ensure a continued gas supply to our customers. This can take the form of major projects that are likely to exceed a threshold of £1,000,000 on the local transmission system (LTS), or £500,000 on the below 7Barg system. Investment will be the result of general growth in specific locations.

5.2 LTS development plan

The LTS is designed for transmission and storage on the basis of ensuring there is sufficient capacity to meet the 1 in 20 peak day demand, based on demand forecasts. Major LTS projects to provide additional capacity (greater than £1,000,000) that have been approved to date or may have an impact in the forthcoming period are shown in the following tables.

5.3 Below 7Barg distribution system

The distribution systems are 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. The distribution system is usually reinforced for new housing estates and industrial or commercial development. This would be specific reinforcement not reflected in our forecasts. Detailed below are projects we need to complete to ensure we meet the peak demand conditions.

5.3.1 Projects over £500,000

(not in text)

5.3.2 <7Barg approved projects

(not in text)

5.3.3 <7Barg projects under construction in Southern England

Project	Build year	Scope
Bicester MP	2016/17	1km x 315 PE
Wavendon MP	2016/18	2.36km x 355 PE

Table 4: <7Barg projects under construction in Southern England

5.3.3 <7Barg projects under consideration in Southern England

Project	Build year	Scope
Andover MP	2017/18	2.2km x 500 PE
London IP	2018/19	0.5km x 24” ST

Table 5: Future <7Barg projects in Southern England

5. Investment in the Networks continued

5.3.4 <7Barg projects under consideration in Scotland

Project	Build year	Scope
Culduthel Rd, Inverness	2023/24	1.9km x355mm PE
Glasgow MP	2018/19	1.5km x 500mm PE
West Mains Rd, Edinburgh MP	2019/20	1km x 500mm PE
Balgray TRS Outlet	2021/22	1.9km x 450mm PE

Table 6: Future <7 Barg projects in Scotland

6. Sustainable Networks and Greening the Gas

6.1 Background

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.

We refer to any source of sustainable and low-carbon gas as 'green gas'. This can include synthetic gas and hydrogen however, currently most of the focus and growth is around biomethane.

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.

There are a number of independent studies which have shown that the gas networks can be a major component of a low carbon energy system. We also know from our own research that 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) which offers incentives to develop renewable heat technologies. The RHI is absolutely vital for green gas projects.

During 2016 we further expanded our portfolio of biomethane sites to 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 September 2016 is as shown in table 7 below.

Network	Number of sites	Total Expected Daily Volume of Biomethane (scm)	Equivalent number of houses supplied
Scotland	11	212,778	74,750
Southern	18	262,680	83,093

Table 7: Portfolio of biomethane sites

6. Sustainable networks and greening the gas

continued

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.

The Network Entry Facility can either be installed directly by our commercial department or the biomethane producer under the guidance of our Functional Design Specification. If installed by the producer we will adopt as a minimum the Remotely Operated Valve (ROV), the Remote Telemetry Unit (RTU) and the connecting pipeline to the network.

If you have a biomethane project and are interested in injecting into our network you can contact Colin Thomson, on 0131 469 1809, or email **colin.thomson@sgn.co.uk**, who will be happy to discuss the process for getting connected.

7. Regulatory and Commercial Developments

7.1 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 provided to its customers.

Revenue = Incentives + Innovation + Outputs

More information on the RIIO-GD1 price control can be found on Ofgem's website at:
ofgem.gov.uk/gas/distribution-networks/network-price-controls

7.2 UNC Developments

There have been a number of UNC modifications, or mods, and some key ones are detailed below:

Mod 390; 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; 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; we have begun the implementation of this mod to enable customers the ability to use gas outwith the winter peak. The process will allow customers to apply for summer capacity only. 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.

During mid-2015 a number of industrial and commercial customers have applied for seasonal capacity loads. From 1 April 2016, we have been accommodating 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.

7. Regulatory and Commercial Developments continued

7.3 Innovation; Opening the Gas Market

In the realm of commercial developments SGN has pioneered the opening of the gas market. In Scotland we have a number of discrete gas networks in outlying locations have no integration with the major distribution network in the rest of Scotland. These are the Scottish Independent Undertakings or SIU.

Gas consumed within the United Kingdom conforms to GS(M)R 1996 requirements which for historical reasons has a comparatively narrow range of requirements when set against other parts of Europe. If it could be demonstrated that these requirements could be significantly broadened, without compromising on safety, SGN and the UK in general could diversify the composition of gas.

In 2014, SGN began extensive trials based in Oban to test and demonstrate such development could take place. After testing typical examples of equipment under laboratory conditions we tested all appliances in use to ensure that they were first of all fit for use under current legislation. Any faulty appliances found were then replaced free of charge. Once this step was complete we applied for a specific exemption from HSE to allow deviation from GS(M)R.

We also undertook significant stakeholder engagement with the local community to explain the purpose of the trial. This included drop-in centres, sponsoring local events to increase awareness and even running a specific trailer at the local cinema. We also engaged in the wider gas industry including speaking to Ofgem, the HSE and DECC amongst those consulted.

Once this was complete we were ready to proceed with trials in mid-2015. A specific contract was signed to receive gas with a higher specification than normal. This was shipped from Zeebrugge in Belgium to Oban on the West coast of Scotland by road tanker. It was then introduced into the local gas network exactly the same as LNG is. This was, and indeed is, used by consumers exactly the same to all as if it was conventional natural gas.

To date this trial has performed without problems for the agreed 12-month period and we have trialled sample batches of gas from other LNG sources without incident.

To recap the purpose of the trial is to demonstrate that by using gas from a wider set of sources without expensive processing gas networks and appliances can still be used for the safe and efficient transportation of energy. To date this innovative project has met all technical and safety challenges. We will in the later part of 2016 disseminate learning points within the UK gas Industry and further afield.

One key objective of projects such as Opening the Gas Market is to demonstrate that the gas industry has a forward focused future geared towards improving energy supply and reducing the cost of gas. Such projects are aimed towards the potential benefits for UK plc in general and potentially can lead to the reduction in operation cost which ultimately will be seen by customers in their gas bills.

If you want to find out more, details of this project are found in our website at: **www.sgn.co.uk/Oban**

Appendix A - Gas Transportation System

Appendix A consists of diagrams of the general arrangement of the major pipelines and associated assets we operate. Please note that there is not a specific scale in use due to the differences in size between the areas covered by the differing LDZ. However the names of towns and cities are included as a means of reference. In addition we have published larger, more legible versions of the same schematics on our website which are intended to be printed at A3 size.

Should you require further information on the location of our assets please contact our plant control department at **plant.location@sgn.co.uk**

Scotland LDZ Schematic

IMAGE REDACTED - PLEASE REFER TO
https://www.linesearchbeforeudig.co.uk
FOR ANY PLANT LOCATION INFORMATION

Appendix A - Gas Transportation System

continued

South East LDZ Schematic

IMAGE REDACTED - PLEASE REFER TO
https://www.linesearchbeforeudig.co.uk
FOR ANY PLANT LOCATION INFORMATION

Appendix A - Gas Transportation System

continued

South LDZ Schematic

IMAGE REDACTED - PLEASE REFER TO
https://www.linesearchbeforeudig.co.uk
FOR ANY PLANT LOCATION INFORMATION

Appendix B - 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.

BEIS
Department for Business, Energy and Industrial Strategy. UK Goverment department which includes many of the roles of DECC. This includes climate change and energy supplies.

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.

Climate Change Levy (CCL)
Government tax on the use of energy within industry, commerce and the public sector in order to encourage energy efficient schemes and use of renewable energy sources. CCL is part of the UK Government's Climate Change Programme (CCP).

Connected System Exit Point (CSEP)
A connection to a more complex facility than a single supply point. For example a connection to a pipeline system operated by another Gas Transporter.

Cubic Metre (m3)
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 on a daily basis. These are further classified as SDMC, DMA, DMC or VLDMC according to annual consumption. Of these the most relevant is VLDMC which is defined further on.

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 gasholders, 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 and Industrial Strategy.

Appendix B - Glossary continued

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 12-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 12-month period commencing 1 October also referred to as a Gas Year.

Gemini
A computer system which supports Uniform Network Code operations, including energy balancing.

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

Interruptible Supply Point
A supply point that offers lower transportation charges where SGN can interrupt the flow of gas to the supply point and that is prepared to be interrupted if the Transporter needs it to.

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.

Load Duration Curve (Average)
The average load duration curve is that curve which, in a long series of winters, with connected load held at the levels appropriate to the year in question, the average volume of demand above any given threshold, is represented by the area under the curve and above the threshold.

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.

Appendix B - Glossary continued

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.

Non-Daily Metered (NDM)
A meter that is read monthly or at longer intervals. For the purposes of daily balancing, the consumption is apportioned using an agreed formula, and for supply points consuming more than 73.2MWh pa reconciled individually when the meter is read.

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.

Operating Margins
Gas used to maintain system pressures under certain circumstances, including periods immediately after a supply loss or demand forecast change, before other measures become effective and in the event of plant failure, such as pipe breaks and compressor trips.

OPN
Offtake Profile Notice. Method of notifying National Grid of the next day or future demand for gas at offtakes.

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.

Appendix B - Glossary continued

PRS
Pressure Regulating Station. An installation which reduces the supply pressure as gas passes either between different pressure rated tiers of the LTS or from the LTS to the below 7barg network or between different pressure tiers of the <7barg network.

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

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

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.

Supply Point
A group of one or more meters at a site.

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 off of four of the networks.

UKCS
United Kingdom Continental Shelf.

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 C - Links and Contacts

While we endeavour in the LTDS to provide points of contact for all related enquiries you have, there is always potential to have omitted the one you, the reader, may have wanted. With this in mind we have listed a few key industry contacts.

sgn.co.uk
Larger versions of the schematics drawings can be found on our website here. 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.

plantlocation@sgn.co.uk
Safety is our number one priority. Always dial us before you dig to find out the location of our pipework.

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 stakeholder engagement. This is how we look to improve the way we do things by listening to your feedback. You can tell us what you think.

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

Joint Office of Gas Transporters gasgovernance.co.uk
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.

DECC - decc.gov.uk
Department of Energy and Climate Change. Government Department with responsibilities for gas industry with respect to carbon emissions and energy policy.

Xoserve - xoserve.com
One of several service providers to the Gas Industry.

Smell gas?
Contact the National Gas Emergency Service if you have any concerns about gas safety on **0800 111 999**