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Scotland Gas Networks and Southern Gas Networks

Long Term Development Statement-
Demand Forecasting Document
October 2012

Disclaimer

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This document is intended be read in conjunction with the SGN Long Term Development Statement 2012.

Photographs

Front cover – Burnhervie Offtake in North of Scotland.

FOREWORD

Paul Denniff – Network Director

This 2012 Demand Forecasting Document (DFD) is produced by Scotia Gas Networks Limited in accordance with Standard Special Condition D3 of Scotland Gas Networks plc's and Southern Gas Networks' plc's respective Gas Transporter Licence.

This year we have chosen to present the information that was previously in the Long Term Development Statement (LTDS) into two documents which can be read separately or together. The Demand Forecasting Document (DFD) includes the tables and graphs representing the actual year-on-year predicted load growth of annual and daily demands. In addition it explains the background and methodology used to reach the forecasts. In comparison the LTDS contains essential information on the planned major reinforcement projects and associated investment, significant completed projects and other developments within our networks.

I hope you will find our 2012 Demand Forecasting Document and Long term Development Statement informative.

With a view to developing the document, we would welcome any comments on the style and content. You can leave comments using the stakeholder engagement form or you can contact me at network.capacity@sgn.co.uk or 01293 818154.

Paul Denniff
Network Director
Scotia Gas Networks
October 2012

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Introduction

Context

This document provides an overview of our ten-year forecast of annual and peak day demands. The data and assumptions used to develop 2012 forecasts were collated and compiled in the first half of the year which included the impact of the recession caused by the global economic crisis and the slow progress of the recovery.

The Demand Forecast Document is developed to be read in conjunction with our Long Term Development Statement (LTDS). They have been produced together in accordance with Scotland Gas Networks and Southern Gas Networks obligations in their Gas Transporter Licence and Section O of the Uniform Network Code; Transportation Principal Document.

Development of the SGN transportation networks is primarily demand driven. 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 Transporting Britain's Energy 2012 process.

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

The timescales for the development of the Annual and Peak Demand Forecasts are included as part of Chapter 1.

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Image 1;SGN's Gas Control Room

Chapter 1 – Summary and Document Scope

1.1 Summary

We expect there to be a small decrease in both annual and peak day demands during the period 2012-21. Small increases in demandare expected during the period 2012-15 due to anticipated, if slow, economic recovery. In the period 2016-21 there is expected to be decreases in demand as the effect of increased efficiencies and renewable incentives take effect.

The period figures are shown on Table 1 below.

Changes in overall demand in period 2012-21			
	Scotia	Scotland	Southern
Annual Demand	-2.68%	-1.81%	-3.13%
Peak Day Demand	-1.48%	-0.39%	-1.93%

Table 1; Overall change in demands

1.2 Overview of the Demand Forecasting Process

The production of the Demand Forecasting Document and Long Term Development Statements are essentially the output of the planning process for the current annual cycle.

The key input to the planning process is the demand forecasts, which are produced using data procured from recognised industry sources and through consultation with our stakeholders. These demand forecasts are used by ourselves to analyse the performance of the Local Transmission Systems (>7 barg) to predict flows, pressures, offtake capacity and storage requirements. From this data appropriate investment decisions can be made.

The Uniform Network Code provides for consultation between the Distribution Networks and National Grid Transmission in the demand forecasting process within the gas year, which is shown in the timeline in Table 2 below

1.3 Structure of Document

The document has been structured such that the main body of the document, Chapters 1 to 4, provides an assessment of the previous year's forecasting performance and sets out the key drivers and uncertainties affecting demand.

- Chapter 2 shows a LDZ specific outlook for the key factors that influence demand growth.
- Chapter 3 describes the forecasting methodology used this year.
- Chapters 4 details the annual and peak demand forecasts.

The Appendices provide details of the figures used for the forecasts, the actual flows encountered last year and general information useful for understanding the document.

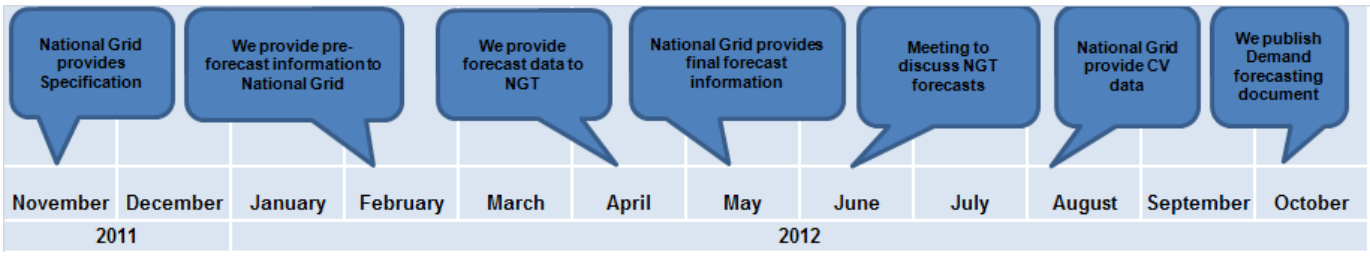


Table 2; Timeline of Demand forecasting process

Chapter 2 - Outlook for 2012

2.1 Medium to Long Term LDZ Economic Outlook

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

2.1.1 Inflation

After a period of relative low Consumer Price Index (CPI) during the first three quarters of 2009 CPI has been rising steadily until the end of the third quarter of 2011, but showing signs of a steep decline at the end of the year and at the beginning of 2012.

It has been assumed for the purposes of making adjustments to account for inflation that the rate of inflation used in these calculations is close to the rate used in the GDP deflator by DECC for 2011, 2.37%. The value of 2.4% is used for both 2012 and 2013, returning to 2% for 2014 onwards.

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 as with manufacturing there has been some recovery in GDP since that time.

The economic figures produced at the end of last year from the Office of Budget Responsibility (OBR) show a stuttering but generally declining economy during 2011. There was in fact a small recession in the last quarter of 2011 of -0.2%, followed by a further drop of -0.3% in the first quarter of 2012. This is despite some recovery during 2010. The fall in 2012 is believed to have been partially because of a greater decline in national construction activity than expected.

The latest Bank of England projections of GDP are very widely spread, as shown in Figure 1 below and to some degree reflect the recent dip in the economy.

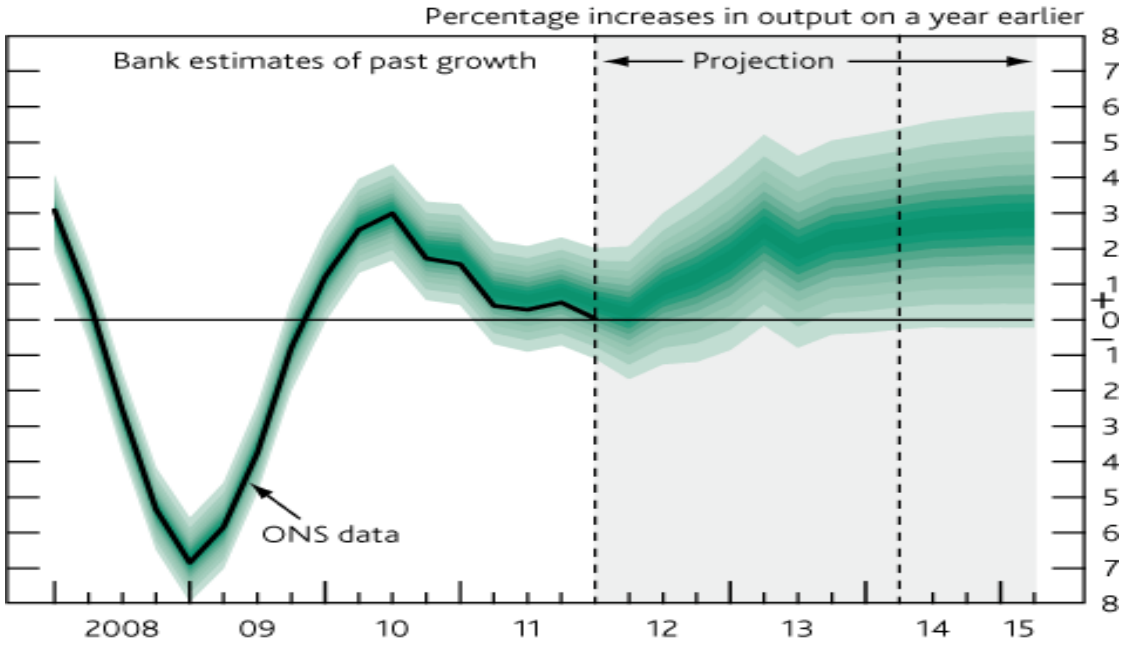


Figure 1; Bank of England estimates of GDP; From ONS.

2.1.2 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

2.1.3 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. The source of this data is the Office for National Statistics (ONS).

There have been reports of a decline in GDHI in real terms. This is borne out by the figures from the ONS which quote a national decline in 2010 of -0.2% and a forecast for 2011 of -1.4%. This has resulted in the regional assumptions for 2011, after correction to a base year of having zero growth.

2.1.4 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 been showing some recovery in 2010 and 2011 as the figures for the Manufacturing Index from the Office of National Statistics appear to show.

Figure 2: UK Manufacturing Index

2.1.5 Household Numbers

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

The forecasts of household numbers produced by the DCLG website appear optimistic as there has been a significant slowdown in housing construction in the short term. We have therefore adjusted the forecast of households within the LDZs to take account of this.

2.1.6 Employment

After a steady rise in employment for nearly 20 years there has been a decline in the number of workforce jobs between 2007 and 2010. However the latest figures for 2011 show that there was a significant increase in the numbers; 300,000 jobs of which 230,000 were employee jobs as opposed to self-employed. This pattern is mirrored in the commercial and services sector with the same number of jobs created as the total increase. Manufacturing has seen a steady decline since 1998. The figures for 2011 show a continued decline in this sector, with around 37,000 jobs lost, but this is more than compensated for by the rise in the commercial and services sector in absolute numbers.

2.1.7 Gas and Fuel Price

Prices in gas markets have shown significant 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. There is expected to be some shocks to the oil price given the current crisis in Syria and any knock on effects in the Middle East but there are commentators that suggest that the link to oil is being decoupled. There is still limited evidence of that at the moment. Last year gas prices did generally follow movements in the oil price and gas prices are expected to rise again during 2012 as a result of the forecast higher oil prices in the second half of the year.

Image 2; Stakeholder engagement has revealed that gas has a positive image as a reliable fuel source

2.1.8 Wholesale Price

There has been some significant fluctuation in the wholesale gas price over time as represented by the UK National Balancing Point (NBP) price but the general trend has been upwards. The forecast provided to 2015 is based on an average forward price as published by ICIS Heren. Forecasts beyond 2015 are escalated on the basis of the long term trend for average NBP prices.

2.1.9 Efficiency Improvements

Our experience, particularly in the 0-73Mwh per year load band, is that there is no need to make a specific assumption about future changes in energy efficiency. There has been a steady decline in average consumption per customer, driven by the rising trend in current gas price.

There are occasions when gas demand drops significantly in a year, but this is not specifically linked to a physical change to the premises (loft and cavity wall insulation for example) but a change in behaviour in response to either a step change in gas price or a sudden loss of income.

As a general observation it has been noted that gas demand has been declining in recent years, but 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.

It is a fact that there has been a steady and substantial programme of gas fired domestic boiler replacement for several years now and the high levels of efficiency achieved with these new boilers is a possible contributory factor in the decline in gas demand. However the increases in efficiency could have been used to provide higher comfort levels, especially in winter. There has also been a concerted effort by gas suppliers and other parties to encourage the use of loft and cavity wall insulation. This has been extensively used to reduce household consumption.

DECC published the position as of the end of 2011 as being 60% of homes with lofts have loft insulation and 59% of homes with cavities have cavity wall insulation.

The DECC statistics as at the end of 2011 show that there are only 122,000 homes with solid wall insulation which equates to 2% of the total properties that do not have a cavity wall. This figure is just under double the number of 2008.

2.1.10 Energy Act 2011

There is a range of provisions in the Act to encourage energy efficiency and to remove barriers to investment in energy efficiency.

2.1.11 Green Deal

This is intended to create a new financing framework to enable the provision of fixed improvements to the energy efficiency of households and non-domestic properties, funded by a charge on energy bills that avoids the need for consumers to pay upfront costs. This framework will include:

- powers to set parameters around the use of this facility to ensure consumer protection for both the originator of the work and subsequent occupiers;
- powers to limit access to the financial mechanism in the framework to the installation of measures that are expected to deliver savings exceeding the level of the charge; and
- obligations on energy companies to administer the charges and pass monies to the appropriate party.

Energy suppliers will be exempt from the Consumer Credit Act requirement to gain a credit licence when they collect Green Deal payments. Green Deal Providers will also be exempt from the requirement to hold a consumer credit licence in respect of Green Deal Finance offered to smaller businesses, to avoid segmenting the non-domestic market.

There has been a lot of interest from potential participants in the Green Deal but there is currently no indication of the level of interest from potential customers of the Green Deal. It is particularly interesting that the focus in all the DECC commentary on the Green Deal is electricity bills and very little mention is made of gas bills.

2.1.12 Smart Meters

The rollout of smart metering and the associated information provision to customers it was observed by Ofgem in their report for the Energy Demand Research Project (EDRP) from December 2010 that there is evidence to suggest that smart meters can be a vehicle for effective action to reduce domestic energy demand. However there was no distinction between gas and electricity reductions.

In the final reports produced in June 2011[1] the following conclusion was reached with respect to the impact of smart meters on gas consumption.

“The smart meter itself (e.g. the information provided on consumption and cost) or some aspect of the experience of getting a smart meter appears to be a positive mechanism, resulting in savings of around 3%. E.ON found that these effects were persistent into the first quarter of the second in-trial year (i.e. for 15 months) and for one or two further quarters in some groups. The literature and other EDRP findings indicate that this effect may require support over time from other interventions (e.g. advice or billing information) to be sustained for longer periods.”

We expect that any realistic assessment of the impact of smart meters should involve the comparison of weather corrected demand for periods throughout the year of a large sample of smart meter data. Ofgem have suggested that this data will be made available.

[1] http://www.ofgem.gov.uk/Sustainability/EDRP/Documents1/Energy%20Demand%20Research%20Project%20Final%20Analysis.pdf

We will keep this area under review until evidence is available to quantify the efficiency improvements derived from smart metering

2.1.13 Carbon Neutral Housing

The previous Government policy on carbon neutral new housing, sometimes called "zero carbon" housing, has been interpreted by some as being taken literally from the headline title. But the actual policy makes it clear that although carbon neutral is an objective for new housing, the proposed standards published in November 2009 are aimed at reducing energy consumption as much as possible and using renewable sources where possible. Given that this will come into force in 2016 and that gas consumption has already fallen significantly amongst the much larger existing housing market, it should not be necessary to make any specific adjustments to forecasts of household demand, but to keep this area under review for future forecasts.

2.1.14 Renewable Assumptions and Impacts

Image 3; Anaerobic Digestors at Didcot. UK's first biomethane injection point into gas network.

In March 2011 the government announced the Renewable Heat Incentive Scheme (RHI)[2].

The original RHI documentation is still considered to be a primary source of information for any study on renewables until analysis has been carried out on the effectiveness of RHI and the level of adoption of renewable energy. 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 vast majority of the renewable heat needed to meet the targets and represents the most cost-effective way of increasing the level of renewable heat.

In March 2012 the Government announced further plans for the delivery of the RHI including a timetable setting out what they intend to do and when for both the domestic and non-domestic sectors. They consulted on how support for renewable heating for households can be provided in the longer term during September 2012 and they will set out a firmer timetable for delivering this support at that point which is believed to be from summer 2013.

It is only in the second phase that opened on 1 May 2012 that homes not heated by mains gas will be the only households that can apply for grants for air-to-water-source and ground and water source heat pumps and biomass boilers. All householders can apply for grants for solar thermal.

To ensure the success of the non-domestic scheme launched in November 2011, they will prioritise the delivery of a cost control regime. A package of policy options will be developed that include modified pre-accreditation, degression and reviews. Consultation on proposals will take place in July 2012, with a view to laying regulations in November and for the policy to be implemented by the end of the current financial year.

The UK Government is committed to providing 12% of heat from all renewable sources by 2020. The total figure quoted is 73TWh, a reduction of 15 Wh from the original target of 88TWh.

We have analysed the impact of renewable energy sources on both annual and peak demand and can provide a range of possible outcomes depending on the level and phasing of take-up by consumers and the energy source that the renewable source is replacing. The focus has been on renewable heat sources for this analysis. Specific adjustments can be made to the annual and peak forecasts to take account of renewable energy and could result in changes to the annual/peak relationship over time.

Factors that have been considered in developing the potential impact of renewable energy include:

- The payback period for different types and the likelihood that subsidies or renewable heat incentives will be available or that the Green Deal will provide sufficient support to justify installation.

[2] DECC Renewable Heat Incentive – March 2011

- Restrictions in using biomass in many locations due to the Clear Air Act.
- Any circumstances where gas will still be needed as a back up to support renewable sources that cannot guarantee supply in winter, or are too expensive to run in winter (e.g. solar, wind and air and ground source heat pumps).
- Assumed that oil and coal users will be the target for early adoption on the basis that these are the most polluting, followed by either gas or current electricity users depending on what the objective becomes. If it is purely environmental then gas should be first, but the economics without subsidy favour gas over electricity.

Recent developments in the RHI and RHPP have not changed our analysis in any way as the 2020 targets have not been changed. A possible alternative approach could be to assume that the target slips to 2021.

2.2 Regional Economy

2.2.1 Scotland

Image 4; Olympic Flame outside Edinburgh Castle

Scotland LDZ possesses a strong commercial and services sector base, accounting for around 77% 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. However, the recent economic downturn could have a negative effect as banks consolidate offices and functions in the future. Conversely, an increase in the service sector in Scotland could occur following any consolidation process undertaken by the banks and financial services industry as they relocate certain activities to Scotland.

Scottish GDP does lag slightly below UK GDP but there are signs that this gap is narrowing slowly over time.

Offshore call centres in low-cost countries have previously constrained future employment prospects in Scotland, despite new initiatives such as the International Financial Services District in Glasgow. To date this has attracted 15,000 jobs of which over 1,000 were newly created.

The Scottish manufacturing base is also strong delivering 11% of Scotland's GVA, higher than the UK figure of 10%, ranking fourth nationally. The sector has however performed well showing a increase of 4.8% over 2011 (latest figures available) compared to all other parts of the UK. But this is showing a small slowdown in the first quarter of 2012. There is good diversity, with the top five exporting industries in 2011 being food and beverages, chemicals (including refined petroleum products), business services, electrical and instrument engineering and the mechanical engineering sector [3]. In addition, the importance of the whisky industry should not be understated as an employer outside of the Central Belt of Glasgow to Edinburgh.

An important point to note is that there is heavy reliance on exports to the EU (45% in 2010) which could be affected by any long term impacts of the current problems in the eurozone.

The latest population projections are based on the estimate of Scotland's population at 30 June 2010. These projections, based on existing trends and making no allowance for the future impact of government policies and other factors, show the total population of Scotland rising from 5.22 million in 2010 to 5.76 million in 2035[4]. Longer term projections show the population continuing to rise, which is a change of view from last year which had it peaking in 2031 and then slowly declining.

Heavy reliance on public services (24% of employment) may also be problematic as the UK Government looks to cut its spending plans in order to meet borrowing targets and reduce the budget deficit. Employment levels across the whole of Scotland have fallen in the first quarter of 2012 by 0.8% with job cuts in the public sector actually accounting for a 1.1% reduction. This does however mean that there is some very slow growth in the other sectors which is counteracting the losses in the public sector, but will still leave the Scottish economy heavily reliant on public services in the near future. Scottish Parliament reports have highlighted that the Scottish economy is probably

[3] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Regional+GVA

[4] Results of 2011 Census will be in December 2012

over reliant on a small number of overseas markets and would be well advised to exploit opportunities in the BRIC (Brazil, Russia, India and China) countries.

In the medium term, the Scottish economy has development opportunities in renewable technology with the Scottish Parliament targeting a potential 60,000 to 70,000 new job opportunities in these emerging areas of employment. Figures published recently suggest that at least 11,000 jobs have been created already,[5] but there are counter-claims that this has removed more than this in other sectors.

2.2.2 South East

Image 5; Olympic Flame on top of London Eye in South London

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. However the current economic downturn and the recent banking industry scandals are a real threat to the banking industries. This will be especially significant should confidence in London as a banking stronghold be adversely affected by the ongoing enquiries into the banking sector.

The pattern of growth and development remains unbalanced, with economic hot and cold spots in the region. Manufacturing is still a significant element of the South East economy and the impact on this sector of the economic downturn could be significant. However the sector of the economy that has generally weathered the economic downturn the best appears to be the wholesale and retail sector, which was only marginally affected by the recession. However, it is unclear how sustainable this position will be, especially if the UK, EU and world economies continue to be adversely affected by the prevailing economic downturns in some countries.

[5] http://www.scottishrenewables.com/news/figures-reveal-industry-investment-during-downturn/

Strong expansion of tourism, both internal and international provides opportunities for the South-East region, given London's attraction as a tourist centre.
There are some opportunities in the agriculture industry with efforts to buy local produce, encouraging supermarkets to source high value fruit and vegetables in the UK. Of particular note for gas demand forecasting is a number of companies, primarily brickworks, which supply the construction sector that are operating different work patterns to minimise costs. With the construction sector still in significant decline the demand for bricks will be depressed until this sector recovers. Many companies have shut down for long periods and have now restarted but are using short term manufacturing.

In the South East the UK government still forecasts housing development. These forecasts are however significantly out of date. Despite this there are signs of growth however with the Greenwich Peninsula developments, which are part of the Thames Gateway regeneration project; where there are plans to build riverside and parkside homes on the peninsula over the next twenty years.

2.2.3 South

Image 6; Olympic Flame in Dorset

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. 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. The recent announcement that sales of one car brand have risen by 22% in 2011 should be good news for the manufacturing plant which has, to date, been the major manufacturing site for this model. The parent company will be investing another £250m in addition to a recently announced £500m with the

end result of the local production lines operating at or close to current capacity in the near future.

Planned reduction in expenditure by the Ministry of Defence (MOD) will have some effect on the local economies in the vicinity of current naval and army facilities of which there are several in the South LDZ. 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. 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. Many high-tech industries could still face the threat from Silicon Valley in the United States as it continues to pull itself out of recession, and the growing economies of India and China. 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.

Housing development is forecast to grow by government, 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 substantial discounts being offered to potential buyers will reduce the revenue. Also constraints on development and infrastructure could further dilute the growth in new housing.

Image 7; Major gas pipeline project in progress

Chapter 3 – Forecasting Methodology

3.1 Annual Demand; General Assumptions

The production of the full set of demand forecasts commences with the annual average demand and the following general assumptions were used in the development of these forecasts.

- All forecasts are seasonal normal demands calculated using the latest Seasonal Normal Composite Weather Variable basis
- Historic annual demand data provided is on the same basis and daily demand data is available broken down by load band
- The historic data is corrected using the reconciliation data provided as part of the pre-forecast information.
- The small section of MP/IP mains supplying gas into Scotland from Northern Gas Networks is not incorporated into the Scotland LDZ.
- The Scottish Independent Undertakings (SIU) are not included in Scotland LDZ numbers. The SIU are a series of discrete gas networks which are not connected directly to the rest of Scotland Gas Networks. These are supplied by tankers which fuel local storage facilities. There are five of these networks in the North and West of Scotland centred on Cambeltown, Oban, Stornoway, Wick and Thurso.
- Shrinkage is forecast on a fixed daily basis irrespective of demand levels to be consistent with UNC
- Load band 0-73MWh is assumed to consist predominantly of households and that the behaviour patterns are linked to household behaviour
- Load band 73 to 732MWh is considered to be predominantly small commercial/retail premises with some small industrial units. 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 >732MWh and Interruptibles will be predominantly industrial and commercial premises and therefore exhibit behaviour related to these types of load.

3.2 General Methodology

Our service provider has refined the forecasting models for the different load bands 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 network ownership.

An important factor affecting recent demand levels has been the variation in the price of gas over the last year to eighteen months creating some uncertainty in energy costs for some customers. More recently there has been a steady loss of non-domestic customer numbers resulting in reduced demand, although there are some areas where growth is being seen. This may be partially a result of the fluctuations in the economy and gas prices. These fluctuations have been a fairly recent event and when combined with the effects of large scale public sector cutbacks we may see more fluctuations in the economy as the private sector attempts to fill the gaps left by the cutbacks.

The latest economic figures from the Office of Budget Responsibility (OBR), show a stuttering but generally declining economy during 2011 with the latest figures showing a small recession in the last quarter of 2011 of -0.2%, followed by a further drop in the first quarter of 2012.

On the basis of the current trend it would be expected that the economy may not show any signs of significant recovery until towards the end of 2012, despite the fairly optimistic forecasts of the Bank of England. The OBR published their central forecast in November 2011[6]. However, this may also be optimistic given the fact that the last quarter of 2011 and first quarter of 2012 saw negative growth.

It was proven during the review of the demand forecasting models last year that UK GDP growth is a key driver of certain elements of demand growth. It was agreed to use the OBR forecasts for GDP growth rates adjusted to take account of the last quarter figures from 2011.

With regard to energy efficiency we believe that further analysis is needed to develop a view on the impact in different sectors. Efficiency savings are already occurring but the extent is masked by the impact of gas price on demand. This is further complicated by the potential effects of the fluctuating energy prices as increased or decreased

[6] http://cdn.budgetresponsibility.independent.gov.uk/Autumn2011EFO_web_version138469072346.pdf

comfort levels are used in households, and in industry the decision to vary production as energy prices change. All these aspects were considered when developing a view on energy efficiency.

A further factor influencing annual demand is the gradual introduction of renewable sources of energy but the extent of this is not fully known at this stage. Clear assumptions regarding the impact of renewables are made within section 3.1.14.

3.2.1 0 to 73MWh Annual Demand

Inage 8; Gas is the preferred method of cooking in many households.

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 that are being built and completed. Of these completed the number of new gas supplies are derived from the number of new gas meters fitted.

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. In last year's analysis the best fit was a relationship between average consumption per gas customer and the current retail price.

Average consumer gas bills have risen in 2011 but are expected to fall in the first half of 2012. The UK gas market remains well supplied with gas having a well developed capacity of import infrastructure due to the completion of additional LNG import and storage facilities in recent years.

Variables that were reviewed include:-

- total households
- average household consumption
- average consumption per customer
- current and real retail gas prices
- household disposable income
- efficiency improvements
- GDP

As with last year, models were tailored to each LDZ, as customer behaviour proved to be materially different in each LDZ.

Our service provider has developed a current retail gas price forecast specifically for the purposes of this project each year. This was done again this year.

The impact of efficiency gains were not incorporated separately in this year's model as these are assumed to be driven by gas price.

3.2.2 73 to 732MWh Annual Demand

It has traditionally been assumed that this sector is generally influenced by energy prices and economic drivers. As a result of 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 national GDP/regional GVA and retail gas price for this sector (using a one year lag on both drivers). Scotland displayed a better fit to national GDP and the other LDZs to regional GVA.

We repeated the analysis this year with the new data from 2011. The following drivers were re-examined as part of this year's analysis.

- 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

The principles adopted are described in section 4.1 above.

3.2.3 >732MWh Annual Demand

As a result of detailed evaluation of alternative econometric models last year the best fit was achieved by using a multi-variable model that related annual gas consumption to a combination of regional GVA and retail gas price for this sector (using a two year lag on both drivers for Scotland LDZ and South-East LDZ and a one year lag for South LDZ).

However this sector can be significantly affected by the behaviour at a small number of large loads and therefore the forecasts will 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. The principles to be adopted are described in section 4.1 above.

3.3 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.

- It is assumed that 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 ourselves and our customers

3.3.1 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 that were used in this analysis, unless the weather demand analysis suggests that this should be considered.

3.3.2 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 a number of 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 the production of the base case peak day forecasts:

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

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

Chapter 4 - Forecasts

4.1 Average Annual Growth (2012-21)

4.1.1 Forecast Demands

This chapter provides an overview of our latest annual and peak gas demand forecasts from 2011/12 to 2021/22, supported by by detailed analysis in appendix 1 These forecasts are based upon the Uniform Network Code load band categories and relate only to gas that is transported through our networks.

4.1.2 Growth in Annual Gas Demand Forecast (2012–21)

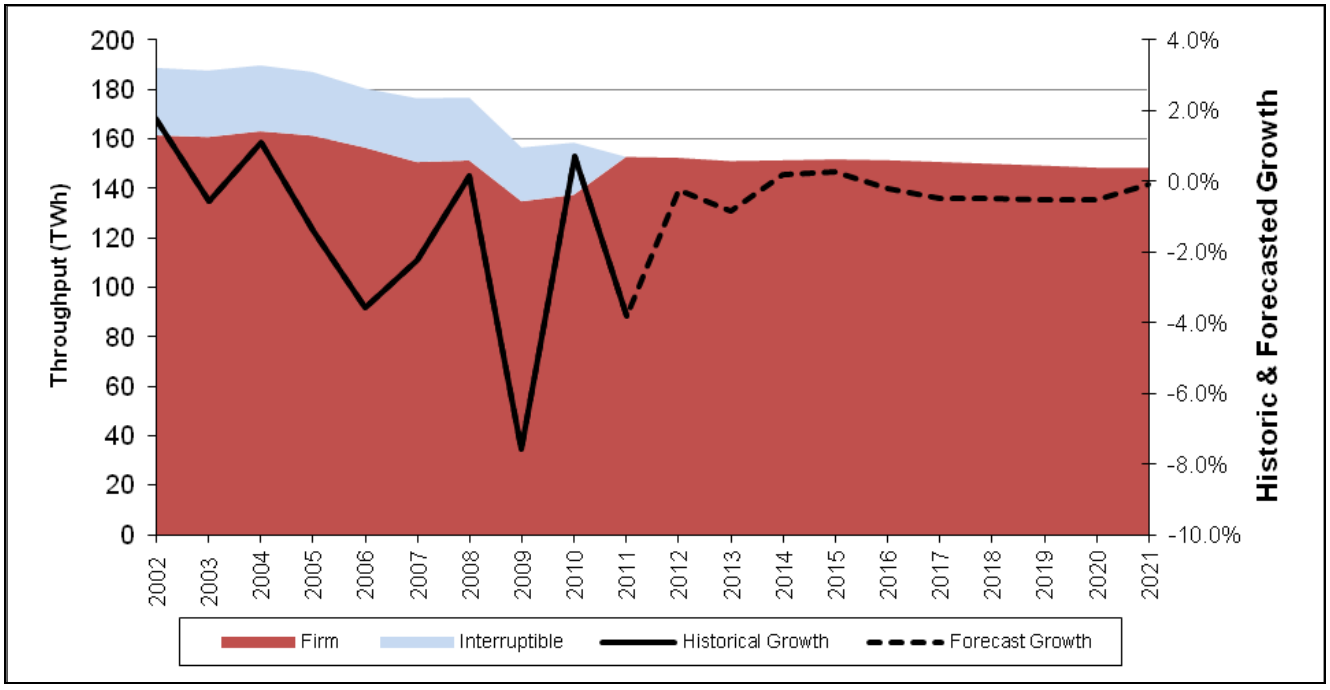
Table 3; Change in Annual Demand over period

	Scotia	Scotland	Southern
Demand Growth	-2.68%	-1.81%	-3.13%

4.1.3 Annual Demand

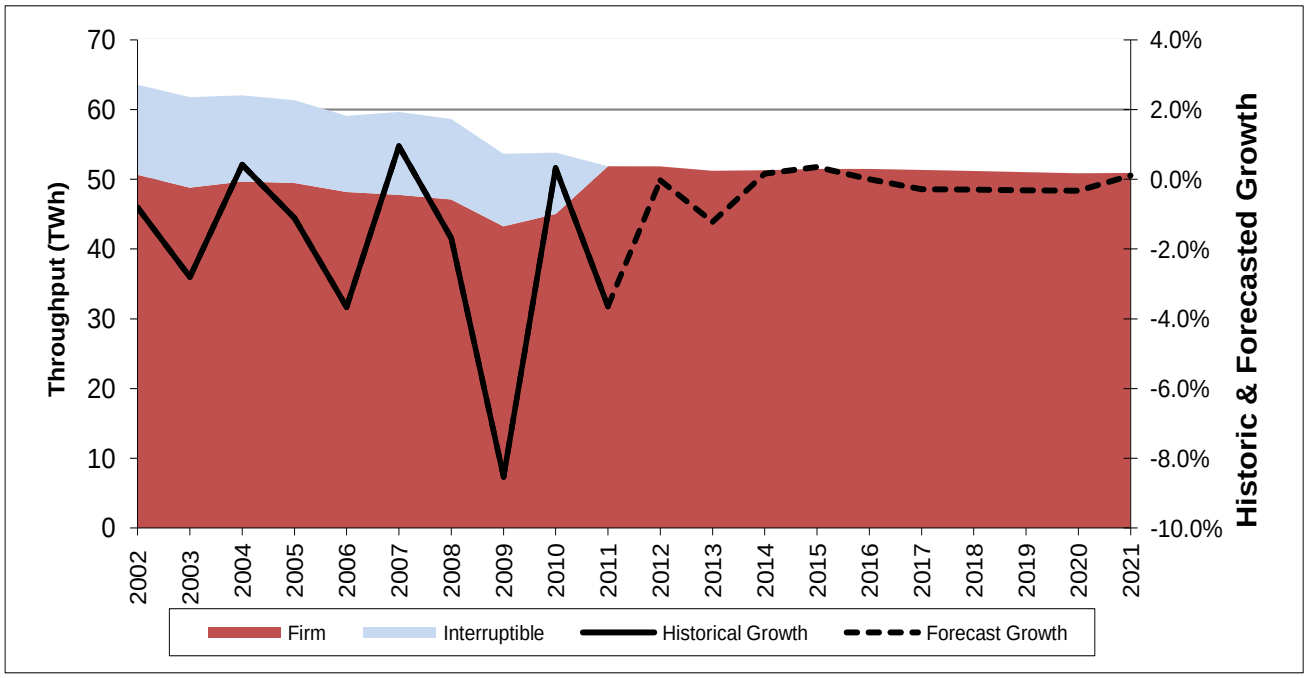
Figures 4.1.4A to 4.1.4C illustrate historical gas demand growth and the forecast going forward. Note specifically the sudden demand reduction in historical demand growth in 2009 followed by a recovery in 2010 and then a further decline in 2011 Attention is also drawn to the change in through put values as demands which were previously Interruptible became Firm in 2011 and this category is effectively removed.

FIGURE 4.1.4A – Historic Demand and Forecast Growth of Annual Gas Demand for Scotia Gas Networks



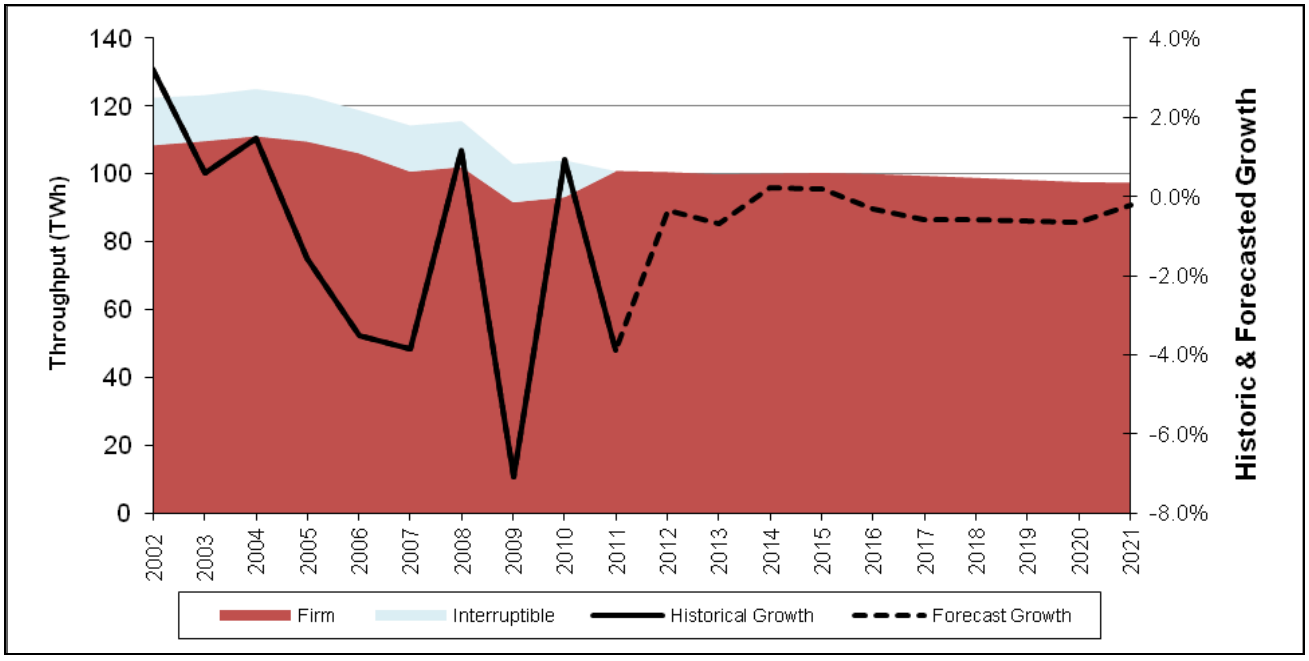
- Shaded areas are measured on the left hand side and represent throughput
- Forecast and historic growth is measured on the right hand side as a line.
- It is assumed that in the period 2012-15 there is a small increase in demands associated with economic recovery as shown in the forecast growth
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology

FIGURE 4.1.4B – Historic Demand and Forecast Growth of Annual Gas Demand for Scotland Gas Network



- Shaded areas are measured on the left hand side and represent throughput
- Forecast and historic growth is measured on the right hand side as a line.
- It is assumed that in the period 2012-15 there is a small increase in demands associated with economic recovery as shown in the forecast growth
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology

FIGURE 4.1.4C – Historic Demand and Forecast Growth of Annual Gas Demand for Southern Gas Network



- Shaded areas are measured on the left hand side and represent throughput
- Forecast and historic growth is measured on the right hand side as a line.
- It is assumed that in the period 2012-15 there is a small increase in demands associated with economic recovery as shown in the forecast growth
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology

4.2 Peak Demand

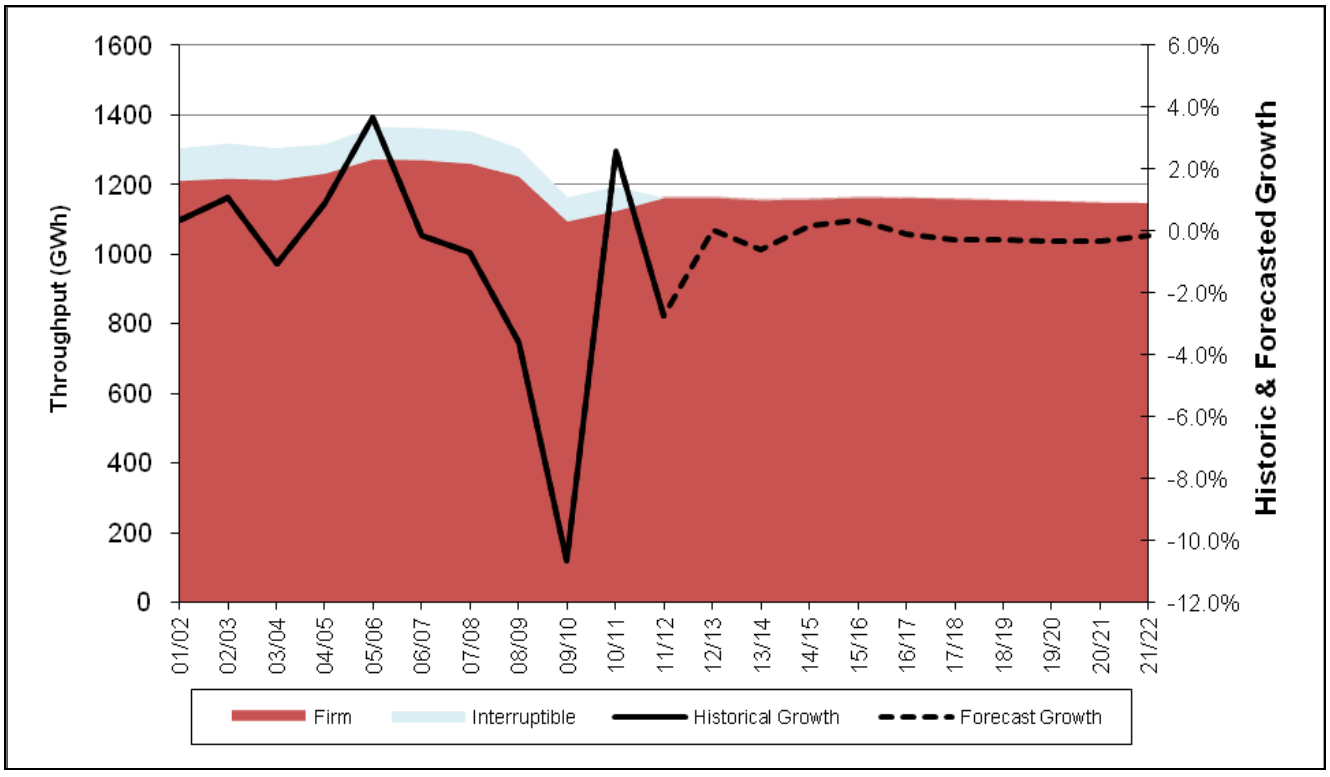
Figures 5.1.4A to 5.1.4C illustrate peak demand, the key driver for investment in our networks. Note again the down turn in historic demands in 2009-10 due to the recession followed by a recovery in 2010-11 and the effect of interruption reform.

4.2.1 Growth in Peak Demand Forecast (2011-12 to 2021-22)

Table 4; Change in Peak demand

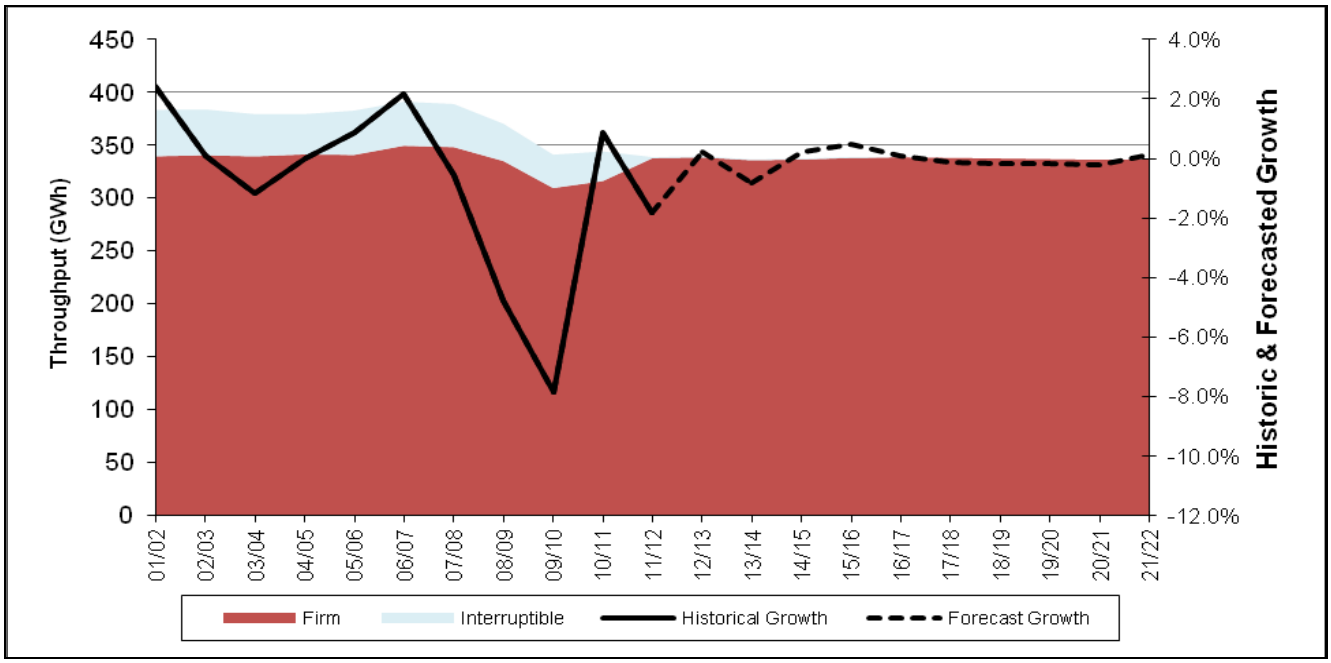
	Scotia	Scotland	Southern
Peak Demand Growth	-1.48%	-0.39%	-1.93%

FIGURE 4.2.1A – Historic Demand and Forecast Growth of Peak Gas Demand for Scotia Gas Networks



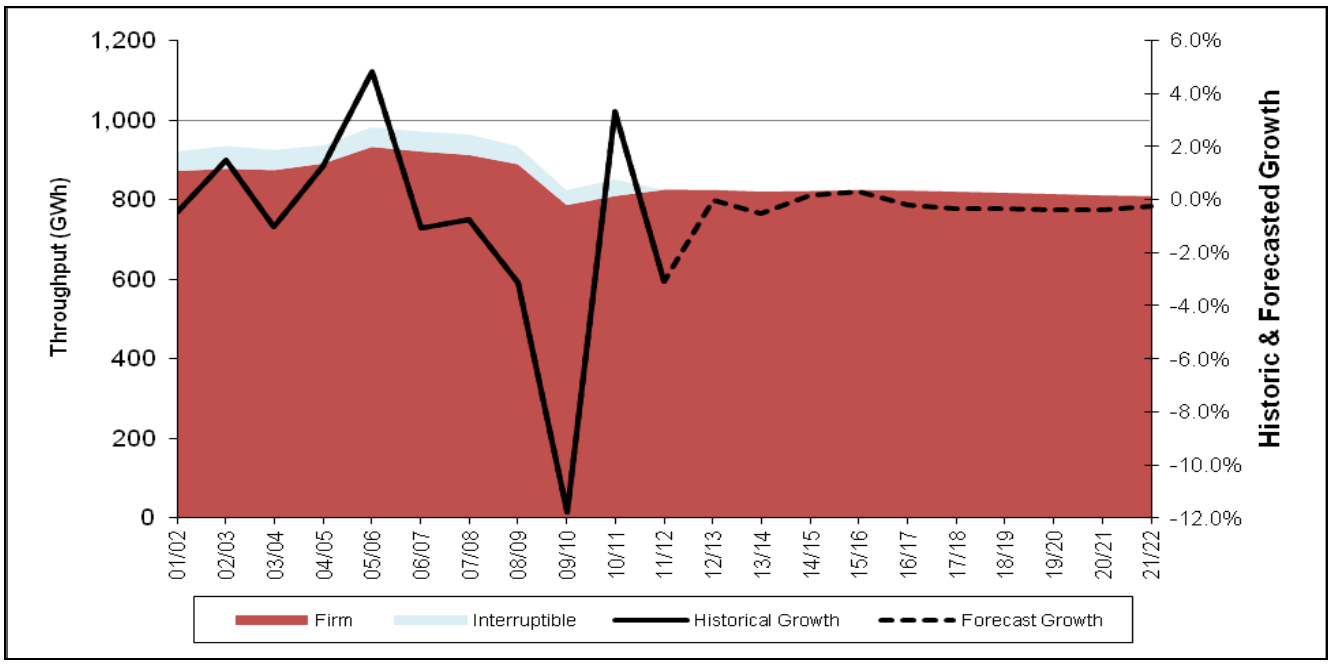
- Shaded areas are measured on the left hand side and represent throughput
- Forecast and historic growth is measured on the right hand side
- It is assumed that in 2012-15 there is a small increase in demands associated with economic recovery
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology

FIGURE 4.2.1B – Historic Demand and Forecast Growth of Peak Gas Demand for Scotland Gas Network



- Shaded areas are measured on the left hand side
- Forecast and historic growth is measured on the right hand side
- It is assumed that in 2012-15 there is a small increase in demands associated with economic recovery
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology

FIGURE 4.2.1C – Historic Demand and Forecast Growth of Peak Gas Demand for Southern Gas Network



- Shaded areas is measured on the left hand side
- Forecast and historic growth is measured) on the right hand side

- It is assumed that in 2012-15 there is a small increase in demands associated with economic recovery.
- It is assumed that the UK Government will meet its 2020 carbon target hence from the period 2016-22 there is a decrease in demands associated with increased energy efficiency measures and the uptake of renewable technology.

4.3 Forecast Comparisons

The following figures provide a comparison of the current forecasts with those that were produced in 2011.

The latest annual demand forecasts are lower over the period of the plan than last year's. The lower forecasts are due to the fact that there has been a substantial decline in gas demand during 2011, which has resulted in a lower starting point for this year's forecast.

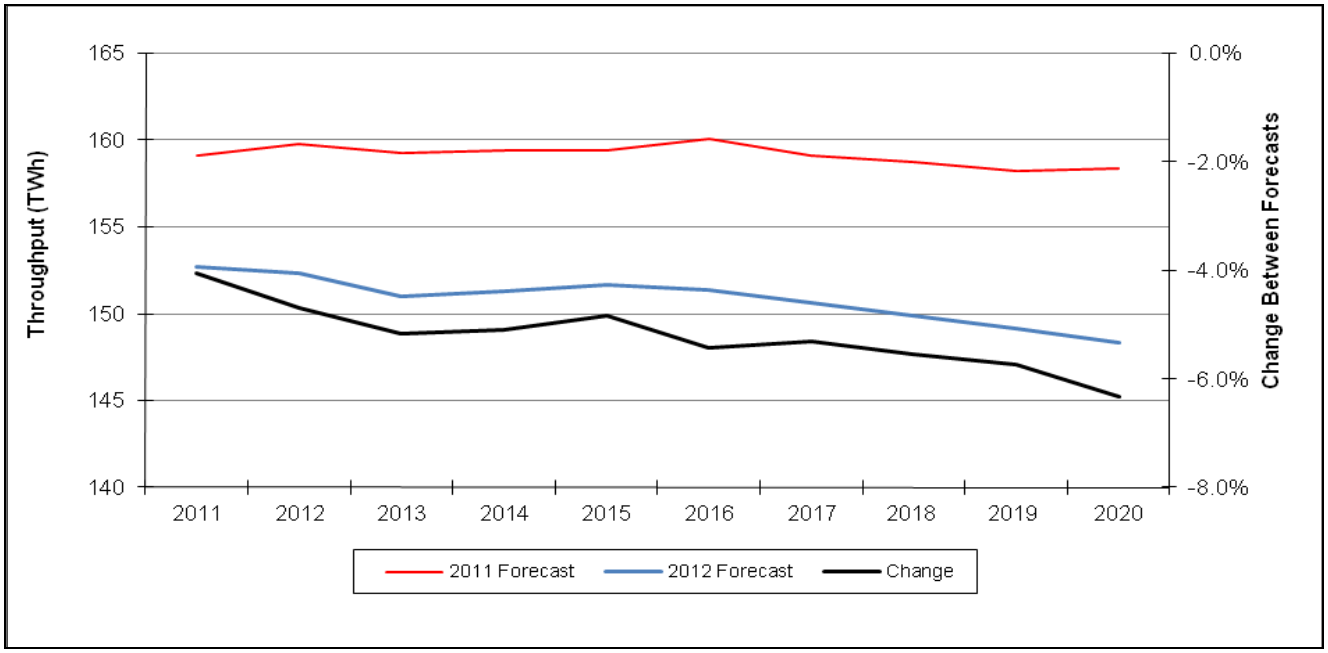
There is further reduction as a result of higher gas price forecasts, slower economic recovery than expected and the forecast shutdown of some large customers. This will result in a modest decline in demands throughout the forthcoming forecast period.

Greater consumer awareness of 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's domestic energy efficiency programme, CERT (Carbon Emissions Reductions Target) and community programme, CESP (Community Energy Saving Programme). 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, directives and legislation These will have an impact on non-domestic and domestic demand as gas is used more efficiently and 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.

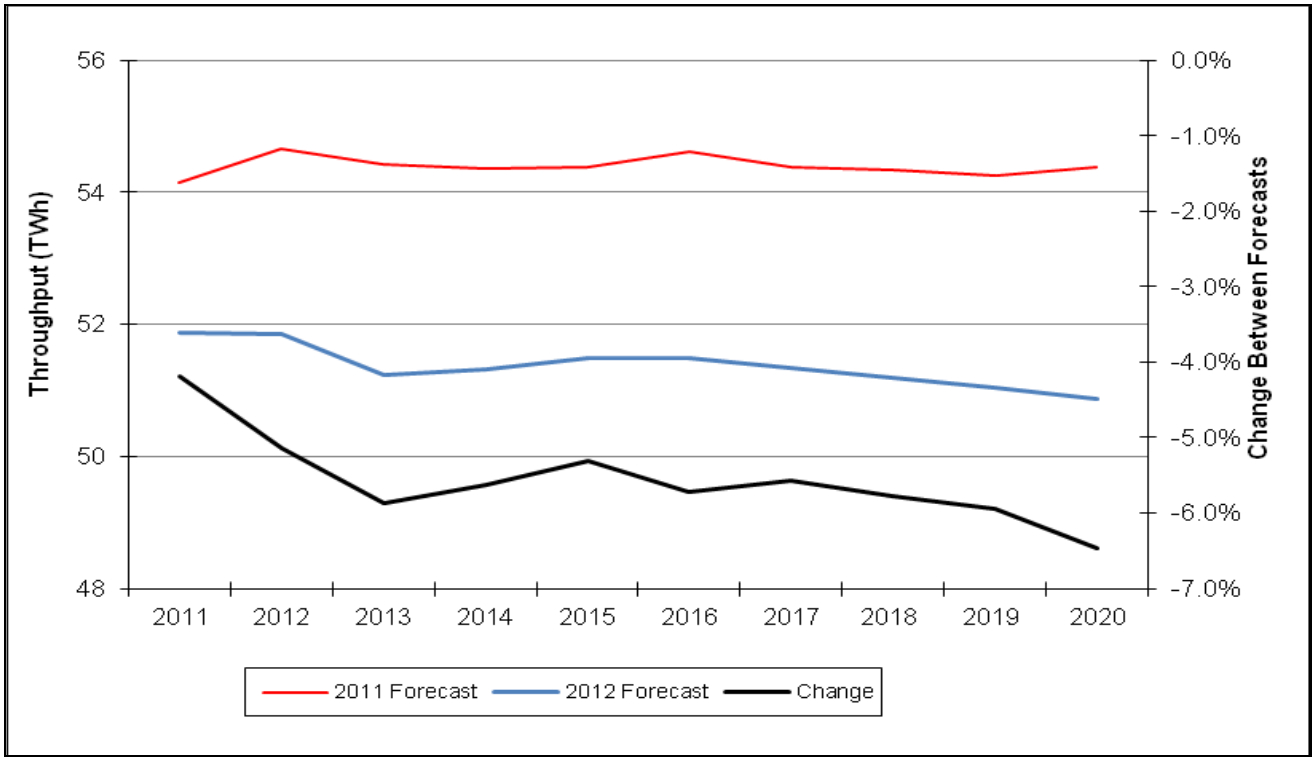
A small number of Interruptible customers, eight, in Scotland have contracted with Scotland Gas Networks to provide Interruptible capacity. However the annual demand forecasts presented in this statement incorporate all the current Interruptible annual demand as Firm from 2011.

FIGURE 4.3A – Comparison of Total Firm and Interruptible Annual Demand Forecasts – Scotia Gas Networks



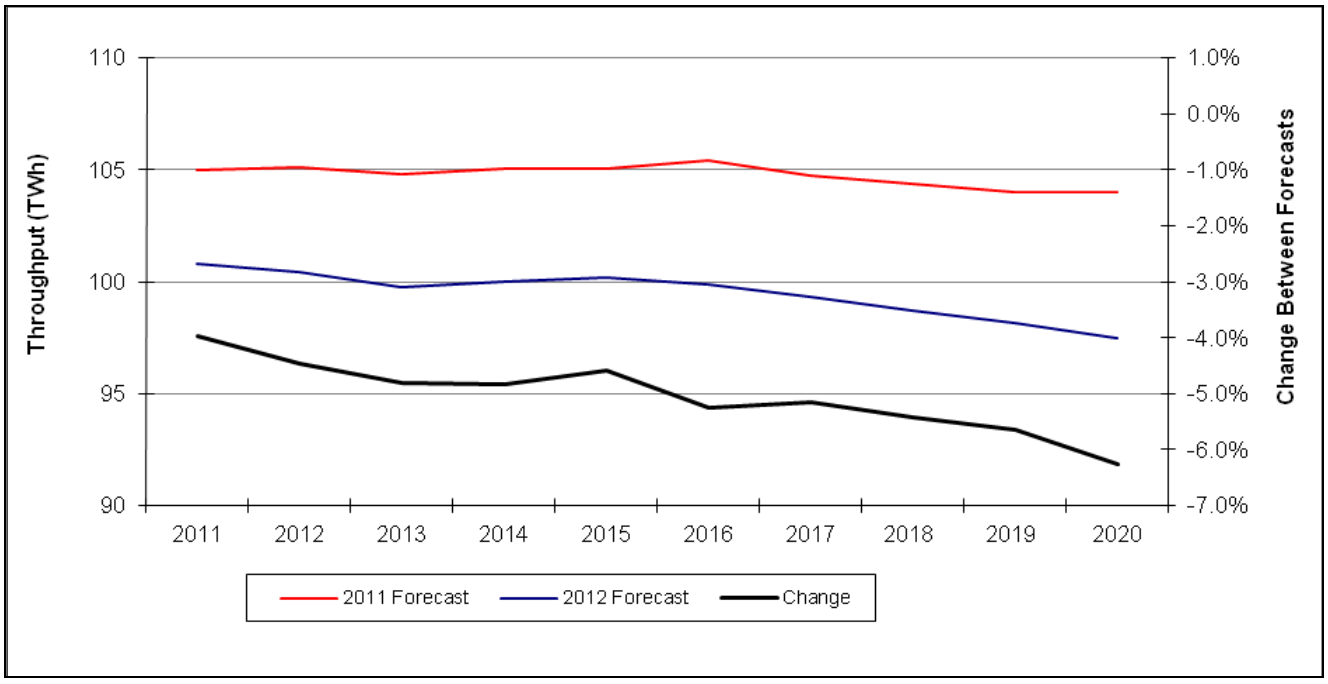
- 2011 and 2012 forecasts are measured on the left hand side
- The change between years' forecast demands are measured on the right hand side so on the above example a decrease in demand of 159TWh to 152TWh is a decrease of 4%

FIGURE 4.3A1 – Comparison of Firm and Interruptible Annual Demand Forecasts – Scotland Gas Network



- 2011 and 2012 forecasts are measured on the left hand side
- The percentage change between years' forecasts as measured on the right hand side

FIGURE 4.3A2 – Comparison of Firm & Interruptible Annual Demand Forecasts – Southern Gas Network



- 2011 and 2012 forecasts are measured on the left hand side
- The percentage change between years' forecasts as measured on the right hand side

Appendix 1 - Tables

A1.Annual Demand

TABLE A1.1A –Forecast Annual Demand– Scotia Gas Networks Load Categories (TWh)

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0 - 73.2 MWh	91.1	91.6	91.4	91.7	92.1	92.0	91.8	91.6	91.3	91.0	90.9
73.2 - 732 MWh	12.6	12.6	12.6	12.4	12.5	12.5	12.4	12.2	12.1	12.0	12.0
732 - 2196 MWh	6.7	6.6	6.4	6.4	6.4	6.4	6.3	6.3	6.2	6.2	6.2
2196 - 5860 MWh	4.7	4.6	4.5	4.5	4.5	4.5	4.5	4.4	4.4	4.4	4.4
Total Small User	115.1	115.4	114.9	115.1	115.5	115.4	115.0	114.5	114.1	113.6	113.4
Firm >5860 MWh	6.0	5.9	5.8	5.8	5.8	5.8	5.7	5.7	5.6	5.6	5.6
DM Firm Consumption	30.3	29.7	29.2	29.3	29.3	29.1	29.0	28.8	28.6	28.3	28.3
DM Interruptible Consumption	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Total Large User	36.7	36.0	35.2	35.3	35.3	35.1	34.8	34.5	34.2	33.9	33.9
Total LDZ	151.8	151.4	150.1	150.4	150.8	150.5	149.8	149.0	148.3	147.5	147.3
Firm Shrinkage	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
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	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Total Throughput	152.7	152.3	151.0	151.3	151.7	151.4	150.7	149.9	149.2	148.4	148.2
Gas Supply Year	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Total Throughput	152.4	151.4	151.2	151.6	151.5	150.9	150.1	149.4	148.6	148.3	147.9

TABLE A1.1B – Forecast Annual Demand – Scotland LDZ Load Categories (TWh)

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0 - 73.2 MWh	29.9	30.1	30.1	30.3	30.5	30.5	30.5	30.5	30.5	30.5	30.6
73.2 - 732 MWh	4.4	4.4	4.4	4.3	4.3	4.4	4.3	4.3	4.3	4.3	4.3
732 - 2196 MWh	2.7	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4
2196 - 5860 MWh	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Total Small User	38.9	39.0	38.9	39.0	39.2	39.2	39.2	39.1	39.1	39.0	39.0
> 5860 MWh	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4
DM Firm Consumption	9.8	9.7	9.5	9.4	9.4	9.4	9.5	9.4	9.3	9.3	9.3
DM Interruptible Consumption	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Total Large User	12.8	12.6	12.1	12.1	12.1	12.0	11.9	11.8	11.7	11.6	11.6
Total LDZ	51.6	51.6	51.0	51.1	51.2	51.2	51.1	50.9	50.8	50.6	50.7
Firm Shrinkage	0.3	0.2	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	51.9	51.9	51.2	51.3	51.5	51.5	51.3	51.2	51.0	50.9	50.9
Gas Supply Year	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Total Throughput	51.8	51.4	51.3	51.4	51.5	51.4	51.2	51.1	50.9	50.9	50.9

TABLE A1.1C – Forecast Annual Demand – South East LDZ Load Categories (TWh)

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0 - 73.2 MWh	37.6	37.8	37.6	37.7	37.9	37.8	37.7	37.5	37.4	37.3	37.2
73.2 - 732 MWh	4.9	4.9	4.9	4.8	4.8	4.8	4.7	4.7	4.6	4.5	4.5
732 - 2196 MWh	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0
2196 - 5860 MWh	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total Small User	46.2	46.2	46.0	46.0	46.2	46.1	45.9	45.7	45.4	45.2	45.1
Firm >5860 MWh	1.5	1.5	1.4	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
DM Firm Consumption	13.5	13.1	12.9	13.0	13.0	13.0	12.8	12.7	12.6	12.5	12.5
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	15.1	14.6	14.4	14.5	14.5	14.4	14.3	14.2	14.0	13.9	13.9
Total LDZ	61.2	60.8	60.4	60.5	60.7	60.5	60.2	59.8	59.5	59.1	59.0
Firm Shrinkage	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
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	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total Throughput	61.6	61.2	60.8	60.9	61.1	60.9	60.6	60.2	59.8	59.5	59.4
Gas Supply Year	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Total Throughput	61.3	60.9	60.9	61.0	60.9	60.7	60.3	60.0	59.6	59.4	59.2

TABLE A1.1D – Forecast Annual Demand – South LDZ Load Categories (TWh)

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0 - 73.2 MWh	23.6	23.7	23.6	23.7	23.8	23.7	23.6	23.5	23.4	23.3	23.2
73.2 - 732 MWh	3.4	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.2
732 - 2196 MWh	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
2196 - 5860 MWh	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
Total Small User	30.1	30.2	30.0	30.1	30.2	30.1	29.9	29.8	29.6	29.4	29.3
Firm >5860 MWh	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
DM Firm Consumption	6.9	6.9	6.8	6.8	6.8	6.8	6.7	6.7	6.6	6.5	6.5
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	8.9	8.8	8.7	8.7	8.7	8.6	8.6	8.5	8.4	8.4	8.4
Total LDZ	38.9	39.0	38.7	38.8	38.9	38.7	38.5	38.3	38.0	37.8	37.7
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	39.2	39.2	39.0	39.1	39.1	39.0	38.8	38.5	38.3	38.0	37.9
Gas Supply Year	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Total Throughput	39.2	39.1	39.0	39.1	39.0	38.8	38.6	38.4	38.1	38.0	37.8

TABLE A1.E – Forecast LDZ Annual Demands – LDZ by supply Type (TWh)

LDZ	Load Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Scotland	Firm Demand	51.5	51.5	51.0	51.1	51.3	51.3	51.3	51.2	51.0	50.9	50.9
	Interruptible Demand	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
	Total	51.9	51.9	51.2	51.3	51.5	51.5	51.3	51.2	51.0	50.9	50.9
South East	Firm Demand	61.6	61.2	60.8	60.9	61.1	60.9	60.6	60.2	59.8	59.5	59.4
	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	61.6	61.2	60.8	60.9	61.1	60.9	60.6	60.2	59.8	59.5	59.4
South	Firm Demand	39.2	39.2	39.0	39.1	39.1	39.0	38.8	38.5	38.3	38.0	37.9
	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	39.2	39.2	39.0	39.1	39.1	39.0	38.8	38.5	38.3	38.0	37.9
SGN Total	Firm Demand	152.3	152.0	150.8	151.1	151.5	151.2	150.7	149.9	149.2	148.4	148.2
	Interruptible Demand	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
	Total	152.7	152.3	151.0	151.3	151.7	151.4	150.7	149.9	149.2	148.4	148.2

A2.Peak Demand

TABLE A2.A – Forecast 1 in 20 Peak Day Firm Demand (GWh per day)

LDZ	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Scotland	338	339	336	337	338	338	338	337	337	336	337
South East	481	480	477	478	480	479	477	476	474	472	471
South	343	343	342	342	344	343	341	340	339	337	336
Scotia Gas Networks	1,162	1,162	1,155	1,157	1,161	1,160	1,157	1,153	1,150	1,146	1,144

TABLE A3.1E – Forecast 1 in 20 Peak Day Demand – Scotia Gas Networks' Load Categories (GWh)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
0 - 73.2 MWh	819.6	824.1	822.1	824.7	828.7	828.1	826.6	825.0	823.0	820.9	819.6
73.2 - 732 MWh	106.0	106.0	106.0	104.4	104.8	105.1	104.4	103.8	103.1	102.4	102.2
732 - 2196 MWh	52.4	51.5	50.4	50.6	50.6	50.4	50.1	49.9	49.7	49.4	49.4
2196 - 5860 MWh	33.3	32.7	32.0	32.1	32.1	31.9	31.8	31.6	31.5	31.3	31.3
> 5860 MWh	34.8	34.3	33.5	33.7	33.6	33.5	33.3	33.2	33.0	32.8	32.8
Total NDM Consumption	1046.1	1048.7	1044.0	1045.5	1049.8	1049.0	1046.3	1043.4	1040.3	1036.9	1035.4
DM Firm Consumption	112.1	109.9	107.7	108.3	108.2	108.6	108.1	107.5	107.0	106.5	106.5
Total Firm Consumption	1158.2	1158.6	1151.7	1153.8	1158.0	1157.6	1154.4	1151.0	1147.3	1143.4	1141.9
Firm Shrinkage	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Total Firm Demand	1272.8	1271.0	1261.9	1264.7	1268.7	1268.6	1265.0	1261.0	1256.8	1252.3	1250.8
DM Interruptible Consumption	0.9	0.9	0.8	0.8	0.8	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	0.9	0.9	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	112.1	109.9	107.7	108.3	108.2	108.6	108.1	107.5	107.0	106.5	106.5
Total Shrinkage	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Total LDZ Demand	1161.6	1161.9	1155.0	1157.1	1161.3	1160.1	1156.9	1153.5	1149.8	1145.9	1144.4

TABLE A3.1E1 – Forecast 1 in 20 Peak Day Demand – Scotland LDZ Load Categories (GWh)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
0 - 73.2 MWh	228.2	230.0	230.1	231.3	232.7	233.0	232.9	232.7	232.5	232.3	232.6
73.2 - 732 MWh	32.0	32.0	32.0	31.6	31.8	32.0	31.9	31.9	31.8	31.7	31.7
732 - 2196 MWh	18.5	18.3	17.6	17.6	17.6	17.5	17.4	17.4	17.3	17.2	17.2
2196 - 5860 MWh	12.7	12.5	12.0	12.0	12.0	12.0	11.9	11.9	11.8	11.8	11.8
> 5860 MWh	13.5	13.3	12.8	12.8	12.8	12.8	12.7	12.7	12.6	12.6	12.6
Total NDM Consumption	305.0	306.1	304.6	305.3	306.9	307.3	306.9	306.5	306.1	305.5	305.9
DM Firm Consumption	31.4	30.9	29.8	29.8	29.7	30.5	30.3	30.2	30.1	29.9	29.9
Total Firm Consumption	336.3	337.0	334.4	335.1	336.7	337.8	337.3	336.7	336.1	335.5	335.9
Firm Shrinkage	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total Firm Demand	368.4	368.6	364.9	365.6	367.1	368.9	368.3	367.6	366.9	366.1	366.5
DM Interruptible Consumption	0.9	0.9	0.8	0.8	0.8	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	0.9	0.9	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total DM Consumption	31.4	30.9	29.8	29.8	29.7	30.5	30.3	30.2	30.1	29.9	29.9
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 LDZ Demand	337.9	338.6	335.9	336.6	338.1	338.4	338.0	337.4	336.8	336.2	336.6

TABLE A3.1E2 – Forecast 1 in 20 Peak Day Demand – South East Load Categories (GWh)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
0 - 73.2 MWh	349.7	351.2	349.9	350.7	352.2	351.8	351.1	350.3	349.5	348.5	347.7
73.2 - 732 MWh	42.7	42.7	42.6	41.9	42.0	42.0	41.6	41.2	40.8	40.4	40.1
732 - 2196 MWh	17.7	17.2	16.9	17.1	17.0	17.0	16.9	16.8	16.7	16.6	16.6
2196 - 5860 MWh	10.5	10.2	10.0	10.1	10.1	10.1	10.0	10.0	9.9	9.9	9.9
> 5860 MWh	8.6	8.4	8.2	8.3	8.3	8.3	8.2	8.2	8.2	8.1	8.1
Total NDM Consumption	429.2	429.6	427.7	428.1	429.6	429.1	427.9	426.5	425.1	423.5	422.5
DM Firm Consumption	50.8	49.3	48.5	49.0	48.9	48.8	48.5	48.3	48.0	47.7	47.7
Total Firm Consumption	480.0	478.8	476.1	477.1	478.5	477.9	476.4	474.8	473.1	471.3	470.2
Firm Shrinkage	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total Firm Demand	531.8	529.2	525.7	527.1	528.5	527.8	526.0	524.1	522.2	520.1	519.1
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	50.8	49.3	48.5	49.0	48.9	48.8	48.5	48.3	48.0	47.7	47.7
Total Shrinkage	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total LDZ Demand	481.0	479.9	477.2	478.2	479.6	479.0	477.5	475.9	474.2	472.3	471.3

TABLE A3.1E3 – Forecast 1 in 20 Peak Day Demand – South LDZ Load Categories GWh)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
0 - 73.2 MWh	241.7	242.9	242.1	242.8	243.9	243.3	242.7	241.9	241.0	240.1	239.2
73.2 - 732 MWh	31.3	31.3	31.3	30.8	31.0	31.1	30.9	30.7	30.6	30.4	30.3
732 - 2196 MWh	16.2	16.1	16.0	16.0	16.0	15.9	15.8	15.7	15.7	15.6	15.6
2196 - 5860 MWh	10.1	10.0	9.9	9.9	9.9	9.9	9.8	9.8	9.7	9.7	9.7
> 5860 MWh	12.7	12.6	12.5	12.5	12.5	12.4	12.3	12.3	12.2	12.2	12.2
Total NDM Consumption	311.9	312.9	311.7	312.1	313.2	312.6	311.5	310.4	309.2	307.9	307.0
DM Firm Consumption	30.0	29.8	29.5	29.6	29.6	29.3	29.2	29.1	28.9	28.8	28.8
Total Firm Consumption	341.9	342.7	341.2	341.6	342.8	341.9	340.7	339.5	338.1	336.6	335.7
Firm Shrinkage	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Total Firm Demand	372.6	373.2	371.3	372.0	373.1	372.0	370.6	369.2	367.7	366.1	365.2
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	30.0	29.8	29.5	29.6	29.6	29.3	29.2	29.1	28.9	28.8	28.8
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 LDZ Demand	342.6	343.4	341.9	342.4	343.5	342.6	341.4	340.2	338.8	337.4	336.5

Appendix 2 – Actual Flows

This appendix describes annual and peak flows during the calendar year 2011. Where relevant, more up-to-date data from the subsequent winter period has been included to give gas supply year figures.

A2.1 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 1928-29, and 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 2011 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 A2.1A to A2.1D provides a comparison of actual and weather corrected demands during the 2011 calendar year with the forecasts presented in the 2011 LTDS. Annual demands are presented in the format of LDZ load bands/categories, consistent with the basis of system design and operation.

TABLE A2.1A – Annual Demand for 2011(TWh) – Scotia Gas Networks

Notes: Figures may not sum exactly due to rounding. Figures do not take into account Interruption Reform

	Actual Demand	Weather Corrected Demand	2011 LTDS Forecast Demand
0 - 73.2MWh	87.7	91.2	95.4
73 - 5860MWh	12.2	24.0	25.1
>5860MWh Firm	23.0	23.1	18.2
Interruptible	13.6	13.6	19.5
Total LDZs	136.4	152.0	158.2
Shrinkage	0.9	0.9	0.9
Total Throughput	137.3	152.9	159.1

TABLE A2.1B – Annual Demand for 2011 (TWh) – Scotland LDZ

	Actual Demand	Weather Corrected Demand	2011 LTDS Forecast Demand
0 - 73.2MWh	29.9	30.0	31.9
73 - 5860MWh	9.0	9.0	9.1
>5860MWh Firm	6.8	6.8	4.1
Interruptible	6.0	6.0	8.8
Total LDZs	51.8	51.9	53.9
Shrinkage	0.3	0.3	0.3
Total Throughput	52.0	52.2	54.1

TABLE A2.1C – Annual Demand for 2011 (TWh) – South East LDZ

	Actual Demand	Weather Corrected Demand	2011 LTDS Forecast Demand
0 - 73.2MWh	35.3	37.6	38.8
73 - 5860MWh	4.6	8.5	9.2
>5860MWh Firm	11.4	11.5	10.2
Interruptible	3.5	3.5	5.3
Total LDZs	54.8	61.2	63.5
Shrinkage	0.4	0.4	0.4
Total Throughput	55.2	61.6	63.9

TABLE A2.1D – Annual Demand for 2011 (TWh) – South LDZ

	Actual Demand	Weather Corrected Demand	2011 LTDS Forecast Demand
0 - 73.2MWh	22.4	23.6	24.7
73 - 5860MWh	3.2	6.5	6.9
>5860MWh Firm	4.8	4.9	3.8
Interruptible	4.0	4.0	5.4
Total LDZs	34.4	38.9	40.8
Shrinkage	0.3	0.3	0.3
Total Throughput	34.7	39.2	41.1

A2.2 LDZ Winter Severity Statistics

TABLE – A2.1 Scotia Gas Networks 6 month Winter Severities per LDZ

LDZ	1 in N
Scotland	>1 in 84, warm
South East	1 in 67, warm
South	1 in 78, warm
National	>1 in 84, warm

Notes: Sourced from National Grid report on Winter severity statistics 2011/2012 of May 2012

A2.3 Peak & Minimum Flows

A2.3.1 Maximum and Peak Day Flows

Table A2.3 below shows actual flows for each individual LDZ on the maximum demand day for gas year 2011/12 compared to the forecast peak flows.

TABLE A2.3A – Actual Flows on the Maximum Demand Day of Gas Year 2011/12

LDZ	Maximum Day 2011/2012	1 in 20 Forecast Peak for 2011/12 (% of peak)
Scotland	25.04 mscmd (2 February 2012)	33.07 mscmd (75.72%)
South East	35.89 mscmd (4 February 2012)	46.137mscmd (77.39%)
South	24.64 mscmd (3 February 2012)	34.79 mscmd (70.82%)

A2.3.3 Minimum Day Flows

TABLE A2.3B – Actual Flows on the Minimum Demand Day of Gas Year 2011/12

LDZ	Minimum Day 2011/12
Scotland	5.26 mscmd (18 August 2012)
South East	4.72 mscmd (19 August 2012)
South	3.20 mscmd (27 July 2012)

Appendix 3 – Gas Transportation System

Appendix 3 consists of diagrams of the general arrangement of the major pipelines and associated assets we operate. There has been no effort to include a consistent scale as the geographic areas covered are diverse. 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

South East LDZ Schematic

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

South LDZ Schematic

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

Appendix 4 – 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, i.e. relative to atmospheric pressure. One-millibar (mbarg) equals 0.001 bar.

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

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 government's Climate Change Programme (CCP).

Composite Weather Variable (CWV)
A single measure of weather for each LDZ, incorporating the effects of both temperature and wind speed. A separate composite weather variable is required for each LDZ and has been designed to provide a linear relationship with demand.

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 10^6 cubic metres, one billion cubic metres (bcm) equals 10^9 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. 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 networks within a defined geographical boundary, supported by a national emergency service 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, i.e. >7barg pipeline systems.

DECC
Department of Energy and Climate Change

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

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

Gas Transporter (GT)
Formerly Public Gas Transporter (PGT). GTs such as SGN, are licensed by Ofgem to transport gas to consumers.

Gasholder
A vessel used to store gas for the purposes of providing diurnal storage.

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

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 to.

Kilowatt hour (kWh)
A unit of energy used by the gas industry. Approximately equal to 0.0341 therms. One Megawatt hour (MWh) equals 10^3 kWh, one Gigawatt hour (GWh) equals 10^6 kWh and one Terawatt hour (TWh) equals 10^9 kWh.

Linepack
The usable volume of compressed gas within the National or Local Transmission System at any time.

Local Distribution Zone (LDZ)
A geographic area supplied by one or more NTS offtakes. Consists of High Pressure (>7 barg) 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.

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.

Own Use Gas (OUG)
Gas used to operate the transportation system. Includes gas used for preheating and the control of regulating systems.

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 most recent set returns for the period April 2008 to March 2013. The next 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.

PRS
Pressure Regulating Station. Generic term in Southern Gas Networks for 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 Demand (SND)
The Demand experienced for a day/year under seasonal normal weather conditions.

Seasonal Normal Composite Weather Variable (SNCWV)
The seasonal normal value of the CWV for a LDZ on a day is the smoothed average of the values of the applicable CWV for that day in a significant number of previous years.

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). 1 therm equals 29.3071 kWh.

Transporting Britain's Energy (TBE)
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.

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.

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 Site. A site which uses greater than 50,000,000 therms per annum.

Appendix 5 – Conversion Matrix

To convert from the units on the left hand side to the units across the top multiply by the values in the table.

	GWh	Mcm	Million Therms	Thousand toe
GWh	**1**	**0.092**	**0.034**	**0.086**
Mcm	**10.833**	**1**	**0.37**	**0.932**
Million Therms	**29.307**	**2.71**	**1**	**2.52**
Thousand toe	**11.63**	**1.073**	**0.397**	**1**

Note: all volume to energy conversions assume a CV of 39Mc/m^3

GWh = Gigawatt Hours

Mcm = Million Cubic Metres

Thousand toe = Tonnes of Oil equivalent