Northern Gas Networks

29 October 2010

Long Term Development Statement 2010

Northern Gas Networks

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Long Term Development Statement 2010

Foreword

The Long Term Development Statement, published annually, provides a ten-year forecast of transportation system usage and likely system developments that can be used by companies contemplating connecting to our system or entering into transport arrangements, to identify and evaluate opportunities. It is produced in accordance with Standard Condition D3 of Northern Gas Networks' Gas Transporters Licence.

The Statement explains our latest volume forecasts, system reinforcement projects and investment plans. It has been published at the end of the 2010 planning process following an appraisal of the current market conditions.

Layout

The Statement contains essential information on actual volumes and the process for planning the development of the system, including demand and supply forecasts, system reinforcement projects and associated investment. The main body of the document provides an overview of the key issues, with all details contained in the appendices.

Background

This document is the sixth edition to be published by Northern Gas Networks. The document sets out our assessment of the future demand and supply position for natural gas in Northern Gas Networks and outlines proposals for investment in the Local Transmission and Distribution Systems.

Northern Gas Networks manages the development, operation and maintenance of the High Pressure and below 7bar Distribution Networks. These extend from the Inlet Valves of the Pressure Regulating Installations at the National Transmission System interface, to the outlet of the consumer's Emergency Control Valve in the North East of England, northern Cumbria and West, North and East Yorkshire.

The restructuring of the gas industry during 2005 led to the formalisation of relationships between various parties, not least between the Distribution Networks and National Grid Gas (NGG). Network staff have been involved in the development of key documents, which describe this relationship and the resulting processes. In order to fulfil its Licence obligation as a Gas Transporter, Northern Gas Networks is required to confirm to NGG the quantity of gas required at a number of different demand levels. This is stated as a request for Offtake Daily Quantity (Flat Capacity) and the amount of Storage (Flexibility) at each offtake. We also indicate the Peak Hourly Flow and associated Minimum Inlet pressure required for each point in the Network where gas is offtaken from the National Transmission System. After discussion between the two parties, NGG allocates these quantities in the Offtake Capacity Statements.

The forecasts described within this document have been prepared by Northern Gas Networks (NGN). The methodology for production of the forecasts is compliant with the demand forecasting requirements of Section H of the Uniform Network Code Offtake Arrangements Document.

Chapter One - Demand

1.1 Overview

This Chapter describes the forecast for gas demand ten years ahead for each LDZ within Northern Gas Networks. It also includes discussion on how current forecasts relate to previously published forecasts. Further information is provided in Appendix 2.

Demand forecasts have been prepared as part of an exchange of information that is intended to inform respective capacity planning processes between the Independent Distribution Networks and NGG. These forecasts are compliant with the demand forecasting requirements of Section H of the UNC Offtake Arrangements document.

1.2 Demand Forecasts

This section provides an outline of our latest gas demand forecasts and the key underlying assumptions.

The demand forecasts are based on planning assumptions derived from market observations and the view of specialist consultancies.

As forecasts are made without knowledge of what weather conditions will prevail into the future they are made at seasonal normal temperatures. In order to compare actual throughput with forecast values the impact of weather needs to be removed from the figures. This is known as weather corrected demand.

Network Code requires a revision to seasonal normal values every five years and as such the basic seasonal normal temperatures were revised during 2009/10 and implemented on the 1st October for gas year 2010/11. These values reflect the generally warm weather that has been experienced over the past decade and also look forward for the first time using long term weather forecasts supplied by the Met Office in conjunction with the Hadley Centre for Climate Prediction and Research. Derivation of the seasonal normal values is designed to reflect the most accurate statistical relationship between demand and weather. It does not attempt to estimate any potential impact of global warming and as such the peak 1 in 20 weather values have not altered.

Prior to 2005 this was done using 35 years of weather data and this was revised and implemented in 2005 using 17 years of data.

The models have again been influenced by the recent demand patterns impacted by factors such as the warm weather, financial state of the economy, improved energy conservation and continuing high fuel prices.

1.2.1 Forecast Demands

This section provides an overview of our latest gas demand forecasts through to 2018/19. A more detailed view can be found in Appendix 2, which includes our forecasts for both annual and peak demand on a year-by-year basis. On a Network basis gas demand is forecast to grow by 4.65% over the next 10 years.

At LDZ level, North East’s trend suggests growth over the whole forecast period of 4.15%.

North LDZ forecast suggests growth across the whole forecast period of 5.21%.

Peak demand is forecast to rise by 2.05% per annum over the 10 year period within North LDZ and 1.96% in North East. This compares with respective figures of 1.04% and 0.7% for these LDZ's in 2009.

Table A1.2.1 – Northern Gas Networks Forecast Annual Demand – By Load Category

Load Band	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0-73 MWh	42.35	42.86	43.25	43.42	43.68	43.93	44.41	44.45	44.68	44.93
73-732 MWh	5.66	5.83	5.89	5.85	5.88	5.92	5.96	5.97	6.02	6.05
732-5860 MWh	4.62	4.67	4.74	4.71	4.73	4.76	4.82	4.81	4.85	4.87
Small User	52.63	53.36	53.88	53.98	54.29	54.60	55.19	55.23	55.55	55.85
Firm> 5860 MWh	14.63	15.36	27.49	25.31	25.37	25.40	25.63	25.56	25.68	25.65
Interruptible < 1465 GWh	10.62	7.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Large / V. Large User	25.25	23.12	27.49	25.31	25.37	25.40	25.63	25.56	25.68	25.65
LDZ Consumption	77.88	76.49	81.37	79.29	79.66	80.00	80.82	80.80	81.24	81.50
LDZ Shrinkage	0.51	0.51	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.53
LDZ Demand	78.38	76.99	81.88	79.80	80.17	80.52	81.34	81.32	81.76	82.03

Note
- Figures may not sum exactly due to rounding.
- All figures in TWh

1.2.1.1 Annual Flows

Annual forecasts are based on average weather conditions. Therefore, when comparing actual demand with forecasts, demand has been adjusted to take account of the difference between the actual weather and the seasonal normal weather.

The result of this calculation is the weather corrected demand.

The basis for any calculation of future demand is the accuracy of the previous forecast.

Table A.1.2.1.1 provides a comparison of actual and weather corrected throughput during the 2009 calendar year with the forecast demands presented in the 2009 Demand Statement. Annual forecast demands are presented in the format of load bands/categories, consistent with the basis of system design and operation.

Table A1.2.1.1

Northern Gas Networks	Actual	Weather Corrected	Forecast	Corrected v Forecast (%)
0-73 MWh	41.30	43.06	45.56	-5.48
73 – 732 MWh	5.48	5.74	6.35	-9.57
>732 MWh	19.54	19.80	16.20	22.22
Interruptible	10.48	10.52	10.25	2.69
LDZ Shrinkage	0.51	0.52	0.50	2.48
LDZ Total	77.31	79.64	78.85	1.00

Historical Throughput & Forecast Annual Gas Demand by Load Band.

Figure 1.2A

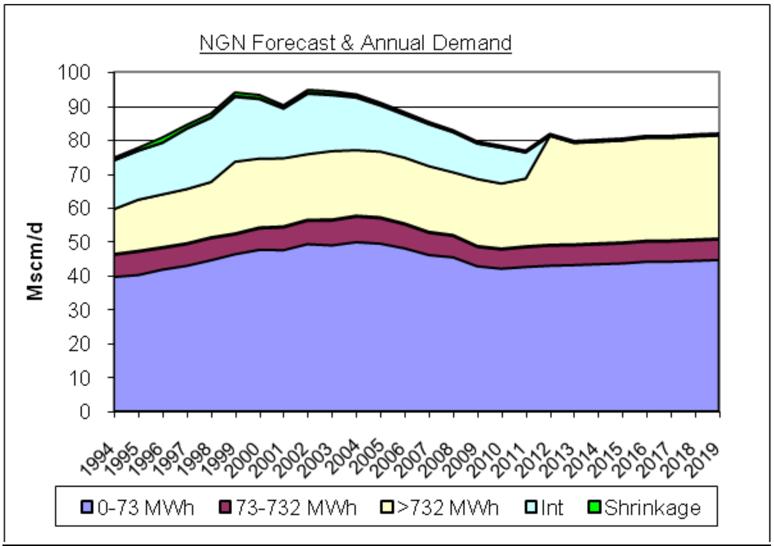


Figure 1.2B

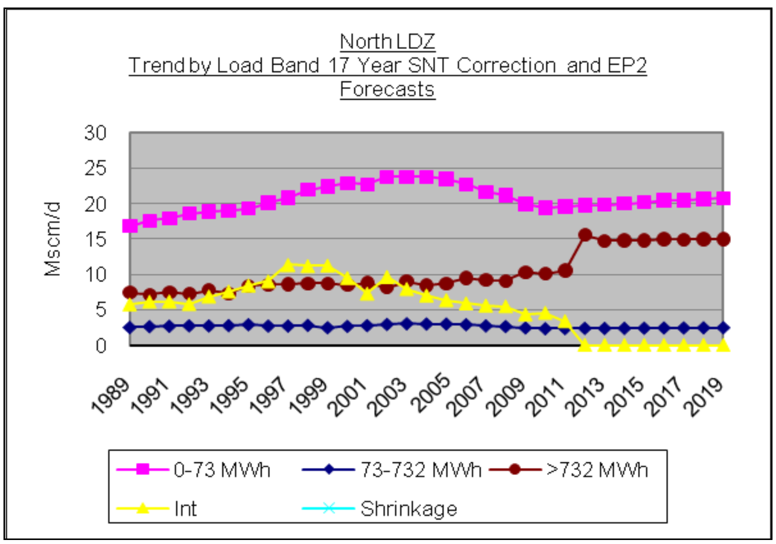
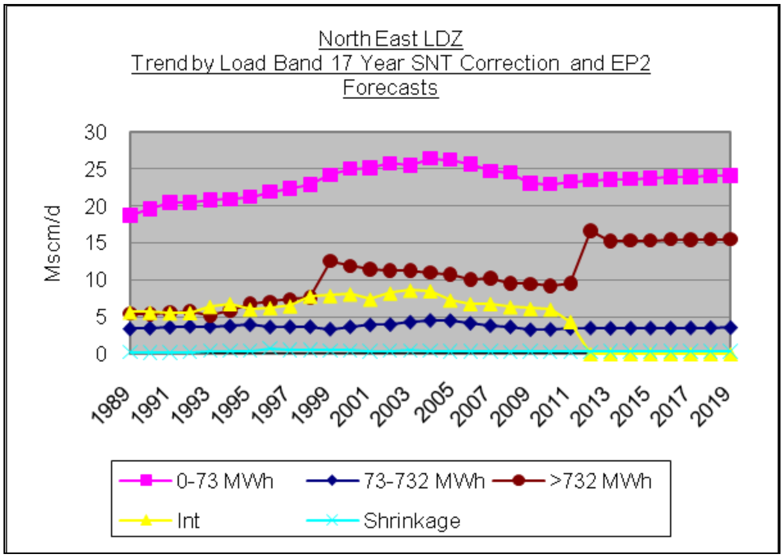


Figure 1.2C



The trend graphs above show energy by load band category for North and North East LDZ since 1987. The values from 1987 to 2009 are weather corrected throughput, and thereafter, the figures are taken from the 2010 Forecast Demand Statements.

Chapter Two - Supply and Storage

2.1 Supply

Gas is brought into the network through offtakes, above ground installations that are connected to the National Transmission System, which typically operate with inlet pressures in the range 70 – 85bar. Gas then passes through the Local Transmission System, into the Distribution System and onward to consumers.

The amount of gas NGN requires to satisfy its 1 in 20 Peak Day Firm commitment is requested from NGG on an annual basis.

Format showing latest requests for North LDZ in the 2010 Plan to NGG.

NO LDZ

DN **2010/11**

Statement of Forecast Offtake Data

i **Planning CV =** 40.440

All figures in mcm/d are at the above CV.

Volumetric (V) or Pressure Controlled (P)	Standard notice period & rate change (hours : %)	SOD time	EOD time	OFFTAKE		Demand Range 1 (1:20 peak day)				
				Name	NTS Group	Demand mcm/d	Storage needed mcm/d (sec'dary)	Peak Rate mcm/h (primary)	SOD Pressures	EOD Pressures
V	2 : 5	6:00	22:00	BISH	NO1	4.300	0.464	0.212		
P	2 : 5	6:00	22:00	COLD	NO1	0.183	0.027	0.011		
P	2 : 5	6:00	22:00	CORG	NO1	0.007	0.001	0.000		
V	2 : 5	6:00	22:00	COWP	NO1	3.905	0.502	0.199		
V	2 : 5	6:00	22:00	ELTN	NO1	3.990	0.667	0.221		
P	2 : 5	6:00	22:00	GUYZ	NO1	0.150	0.022	0.009		
P	2 : 5	6:00	22:00	HUMB	NO1	0.014	0.002	0.001		
P	2 : 5	6:00	22:00	KELD	NO2	0.127	0.023	0.008		
P	2 : 5	6:00	22:00	LBUR	NO1	1.410	0.212	0.085		
P	2 : 5	6:00	22:00	MELK	NO2	0.028	0.035	0.002		
P	2 : 5	6:00	22:00	SALT	NO1	0.593	0.089	0.036		
V	2 : 5	6:00	22:00	SLWK	NO1	4.300	0.461	0.212		
P	2 : 5	6:00	22:00	THRN	NO1	0.475	0.071	0.028		
P	2 : 5	6:00	22:00	TOWL	NO2	0.040	0.006	0.002		
V	2 : 5	6:00	22:00	WETH	NO2	2.041	0.306	0.103		
				OFFTAKE TOTAL		**21.563**	**2.889**			

This process involves the Network requesting an Offtake Daily Quantity (Flat Capacity) and an amount of Storage (Flexibility) for each offtake. We also indicate the Peak Hourly Flow and associated Minimum Inlet pressure required for each offtake. After discussion between the two parties, NGG will allocate these products in the Offtake Capacity Statement (OCS) with a firm commitment until September 2015 and an indicative view for one year. The pressures quoted in the OCS are then modelled for each offtake to determine if any upgrade work is necessary.

Format showing latest requests for North East LDZ in the 2010 Plan to NGG.

NE LDZ

DN **2010/11**

Statement of Forecast Offtake Data

i **Planning CV =** 40.320

All figures in mcm/d are at the above CV.

				OFFTAKE		Demand Range 1 (1:20 peak day)				
Volumetric (V) or Pressure Controlled (P)	Standard notice period & rate change (hours : %)	SOD time	EOD time	Name	NTS Group	Demand mcm/d	Storage needed mcm/d (sec'dary)	Peak Rate mcm/h (primary)	SOD Pressures	EOD Pressures
P	2 : 5	6:00	22:00	ASSL	NE1	0.235	0.044	0.015		
P	2 : 5	6:00	22:00	BALD	NE1	0.077	0.012	0.005		
V	2 : 5	6:00	22:00	BURL	NE1	1.361	0.000	0.057		
P	2 : 5	6:00	22:00	GANS	NE2	1.695	-0.176	0.104		
V	2 : 5	6:00	22:00	PANL	NE1	10.822	1.536	0.560		
P	2 : 5	6:00	22:00	PAUL	NE2	3.611	0.363	0.197		
V	2 : 5	6:00	22:00	PICK	NE2	0.665	0.024	0.029		
P	2 : 5	6:00	22:00	RAWC	NE1	0.232	0.045	0.015		
V	2 : 5	6:00	22:00	TOWT	NE1	5.040	0.000	0.210		
				OFFTAKE TOTAL		**23.738**	**1.848**			

An example of the Offtake Capacity Statement is shown below.

NO LDZ

2010/11

STATEMENT OF CAPACITY REQUESTED

40.440 MJ/m3

All figures in mcm/d are at the above CV.

Offtake Name	Demand (mcm/d)	Maximum Capacity Required	Pressure Requirements	
		Storage needed mcm/d (sec'dary)	SOD	EOD
BISH	4.300	0.464	41.0	38.0
COLD	0.183	0.027	53.2	51.5
CORG	0.007	0.001	45.0	38.0
COWP	3.905	0.502	53.9	38.0
ELTN	3.990	0.667	53.1	52.8
GUYZ	0.150	0.022	45.0	38.0
HUMB	0.014	0.002	45.0	38.0
KELD	0.127	0.023	45.0	38.0
LBUR	1.410	0.212	45.0	38.0
MELK	0.028	0.035	45.0	38.0
SALT	0.593	0.089	48.0	47.1
SLWK	4.300	0.461	48.0	47.1
THRN	0.475	0.071	51.5	49.4
TOWL	0.040	0.006	45.0	38.0
WETH	2.041	0.306	45.7	45.7
OFFTAKE TOTAL	**21.563**	**2.889**		

Appendix Four gives more information about the Network's offtakes.

2.2 Storage in the Network

Gas is stored at various facilities within the Network, to be used on a daily basis.

The oldest form of storage is Low Pressure Gas Holders, which are normally situated nearest to the centre of demand in towns and cities. This type of storage is usually kept for times of peak daily demand i.e. early morning and early evening.

We also have two sites with above ground HP Bullet Storage. There are 6 storage vessels in total at these sites with a combined total volume of 47,000 scm.

Chapter Three - Investment in the Distribution Networks

3.1 LTS Development Plan

The LTS is designed for transmission and storage of gas on the basis of satisfying the 1 in 20 peak day firm only forecast demands. The system is developed, based on demand and supply forecasts, to ensure that this capability is maintained.

Major projects above £0.5m currently in the 2010 Plan are shown below: -

LDZ	Project Name	Authorised / Unauthorised	Initial Start Date	Construction Year	Total Project Cost (£m)
NO	Scremerston PRI Upgrade	A	2010	2011	0.933
NO	New Greatham Regulator	A	2010	2011	1.59
NO	Elton Offtake Upgrade	A	2010	2011	0.414
NE	New Tyersal Regulator	A	2011	2012	2.8
NO	Wetheral Offtake Upgrade	U	2013	2014	1.26
NO	West Cumbria Reinforcement	U	2013	2014	23.15
NE	Whitehall Rd PRI Upgrade	U	2018	2019	1.4
NE	East Bierley PRI Upgrade	U	2018	2019	1.4

3.2 Below 7barg Distribution System

The NGN below 7barg system is designed to operate between levels of pressure defined by statute, regulation and safe working practices.

We continue to develop our below 7barg Distribution system, investing in mains, services and associated plant and machinery to meet the needs of providing capacity to customers wishing to connect to our network and other Gas Transporters' requests for transportation services.

The Distribution systems are designed and reinforced to meet a peak six-minute (Pk6) 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.

NGN continues to invest in capital for reinforcement and new connections consistent with the growth in peak day demand forecast in this document.

We also continue to invest in the replacement of our transportation network assets, primarily for the renewal of mains and services within Distribution systems. This includes expenditure associated with the Enforcement Policy initiated by the HSE for decommissioning all iron gas mains within 30 metres of buildings within a 30-year period. Ofgem has agreed funding arrangements for the first 5 years of the programme.

Chapter Four - Commercial Developments

The major area of commercial development that is anticipated for the twelve months starting 1 October 2010 is expected to be:

- NTS/DN Offtake Arrangements.

4.1 NTS / DN Offtake Arrangements

The proposal to introduce new arrangements for taking gas off the National Transmission System (NTS) – otherwise referred to as '*offtake*' or '*gas exit*' – was first raised during the process which preceded the sale by National Grid Gas (NGG) of some of its gas distribution networks (GDNs). This sale was completed in June 2005.

Prior to the sale of the networks, the interface between the transmission and the distribution networks was managed within a single company. However, the sale of the GDNs implied that, in the future, this interface would be between separately owned transmission and distribution businesses. At the time of the transaction, the Authority (Ofgem) considered it important that through the change of ownership, the sale did not create the potential for inefficient investment or operational decisions to occur on either the transmission or the distribution networks. In light of this concern, the Authority sanctioned the introduction of a proposed enduring offtake framework as a condition of consent to the sale of the GDNs.

On the 19th January 2009 Ofgem gave its consent to modification proposal 0195AV with a recommended implementation date of 1 April 2009.

Their decision to approve UNC 0195AV as against the 0116 variants which introduced a flexibility product was based on NGG NTS progressing two future strands of work:

- Consideration of whether a move from a nodal to a zonal capacity allocation mechanism for capacity would enhance the competitiveness of the allocation regime, alongside a move from the rules-based scheme of 0195AV to an incentive based discretionary allocation scheme. We consider that this should be done within two years of implementation of this decision
- Reviewing the impact of entry and exit on the availability of system-wide flexibility and instigating procedures for managing the availability of flexibility. Ofgem's initial view is that this could be affected by clarifying and simplifying NGG's existing operational tools to limit shippers' ability to vary flows at entry and exit, and establishing an incentive scheme for NGG NTS on the management of system wide flexibility. They expect this work to be progressed such that any necessary UNC modification proposals and/or licence changes to facilitate these can be in place by October 2009.

NGN and the other Networks are currently in talks with NGG on a range of issues relating to Offtake Arrangements. They include operating rules, operational flows, flow swopping, offtake profile notices (OPN) and the DN processes that feed into them and all these issues feed into the Offtake Capacity Statements. Both parties are in discussions at present to fully understand these issues from both sides both now and into the future and it is anticipated that some form of agreement will be reached so that all parties will mutually benefit from any changes made to UNC.

Appendix One - Process Methodology

A1.1 Demand

The purpose of this section is to give a brief overview of the methodology that is adopted to develop forecasts of annual and peak demand. The methodology can be categorized into three main modelling areas; annual demand, demand/weather and peak demand modelling.

A1.1.1 Annual Demand Modelling

The development of annual gas demand forecasts considers a wide range of factors, from complex econometrics to an assessment of individual load enquiries. For any forecasting process a set of planning assumptions is required, which if necessary can be flexed to create alternative scenarios. In the case of the forecasts presented in this document, assumptions include economic, fuel prices, environmental and tax policies. A number of these assumptions are based on data from independent organisations.

These forecasts are also benchmarked against the work of a number of recognised external sources, such as the DTI.

A1.1.1.1 LDZ Modelling

LDZ demand is split into four market sectors according to load size and supply type (i.e. firm or interruptible). For each sector, models have been developed that make allowance for economic conditions, local demand intelligence, new large load enquiries, relative fuel prices, potential new markets and other factors, such as the Climate Change Levy, that could affect future growth in demand. By adopting this approach we are able to take account of varying economic conditions and specific large loads within different LDZs.

A1.1.1.2 Industrials

The production of forecasts within this sector is dependent on forecasts of individual new and existing loads based on recent demand trends, Transporting Britain's Energy feedback, load enquiries and commercial sources.

A1.1.2 Demand/Weather Modelling

Due to the temperature sensitivity of LDZ markets, forecasts of annual demand are based upon an assumed average weather condition to allow underlying year-on-year changes to be identified. The related demand models, developed for overall LDZ demand and a number of sub-LDZ load categories, are based on factors known as Composite Weather Variables (CWVs). The CWVs are derived from temperature and wind speed data, defined and optimised for each LDZ, and give a straight-line relationship between demand and weather.

There is an obligation to review, at least every 5 years, the definition and seasonal normal basis of all CWVs. To meet this obligation, a comprehensive review was completed in 2005 in consultation with the Network Code Demand Estimation Sub-Committee (DESC). As agreed by DESC, the CWV definition for each LDZ was revised and includes a new seasonal profile that improves the seasonal shape of the CWV for demand modelling purposes. The SNCWV for LDZ demand has also been revised using 17 gas years of weather data (1987/88 to 2003/04) to take account of the effects of climate change on average demand. The annual demand forecasts produced since 2005 have been calculated using 17 year SNCWVs.

However, in 2006, the Met Office and three leading energy companies launched a pioneering scoping study into climate change and its potential impacts on the UK energy industry. The study was the first nationwide attempt to identify how climate change will affect energy generation; distribution and transmission, and demand. As well as initial indications on how climate change could impact the industry over the next century, it also identified areas where further research was required.

Following the scoping study an industry-funded project Energy Phase 2(EP2) was set up, involving 11 UK energy companies, focusing on the priorities identified by the earlier study. The EP2 process for weather correction not only takes into account historical weather trends but also uses long term weather forecasts to try to predict how gas demand will be influenced by environmental factors.

This basis for weather correction was again considered in 2009 and with input from the shipper community it was agreed to use a weather forecasting tool EP2 developed by the Met Office in conjunction with the Hadley Centre for Climate Prediction and Research. This basis for weather correction has been implemented for our forecasts in 2010.

The impact on annual demand is a reduction of around 3.5% when compared with the previous basis.

This change has had no impact on the 1 in 20 peak day demands or the 1 in 50 severe load duration curves which continue to be calculated, as per the relevant statutory and licence obligations, from a longer period of weather data, in this case 1928/29 to 2008/09.

A1.1.3 Peak Day Demand Modelling

Once the annual demand forecasts and daily demand/weather models have been developed, a simulation methodology is employed, using historical weather data for each LDZ, to determine the peak day (in accordance with statutory/Licence obligations) and severe winter demand estimates.

A1.2 High Pressure Tier Planning

Although the development of DN's Local Transmission Systems (LTS) is largely demand led, LTS capacity planning processes are not dissimilar to those utilised for the development of the NTS. GDNs use forecast demand to model system flow patterns and produce capacity plans that take account of anticipated changes in system load and within-day demand profiles.
The options available to relieve LTS capacity constraints include:

- Uprating pipeline operating pressures;
- Uprating offtakes from the NTS, regulators and control systems;
- Constructing new pipelines or storage; and
- Constructing new supplies (offtakes from the NTS), regulators and control systems.

As well as planning to ensure that LTS pipelines are designed to the correct size to meet peak flows, there is a requirement to plan to meet the variation in demand over a 24-hour period. Diurnal storage is used to satisfy these variations and may consist of gas held in linepack, low-pressure gasholders, high-pressure vessels and salt cavities.

A1.3 Lower Pressure Tier Planning (<7 barg)

The lower pressure tier system (distribution system) is designed to meet expected gas flows in any six-minute period, assuming reasonable diversity of demand. Lower tier reinforcement planning is based on LDZ peak demand forecasts, adjusted to take account of the characteristics of specific networks.

Network analysis is carried out using a suite of planning tools with the results being validated against a comprehensive set of actual pressure recordings. The planned networks are then used to assess future system performance to predict reinforcement requirements and the effects of additional loads. Reinforcement options are then identified costed and programmed for completion before the constraint causes difficulties within the network. Reinforcement is usually carried out by installing a new main or by taking a new offtake point from a higher-pressure tier. In general, the reinforcement project is of such a size that the work can be completed and operational before the following winter.

A1.4 Investment Procedures and Project Management

All investment projects must comply with our Investment and Disposals Guidelines, which set out the broad principles that should be followed when evaluating high value investment or divestment projects.

The investment guidelines define the methodology to be followed for undertaking individual investments in a consistent and easy to understand manner. Together with the planning and budgeting methodology, they are used to ensure maximum value is obtained. For non-mandatory projects, the key investment focus in the majority of cases is to undertake only those projects that carry an economic benefit.

For mandatory projects, such as safety-related work, the focus is on minimising the net present cost whilst not undermining the project objectives or the safety or reliability of the network. The successful management of major investment projects is central to our business objectives.

Our project management strategy involves:

- Determining the level of financial commitment and appropriate method of funding for the project;
- Monitoring and controlling the progress of the project to ensure that financial and technical performance targets are achieved; and
- Post project and post investment review to ensure compliance and capture lessons learnt.

When a Transmission project is approved, a multi-discipline team prepares an Invitation to Tender in accordance with the EC Utilities Directive. For major projects, specialist consultants with experience of preparing and evaluating tender documents are used.

Tenders are received and evaluated against previously agreed technical, quality, safety, financial and programme criteria. They are compared on a cost basis with a database of capital projects. An award is then made to the most economically advantageous tender consistent with these criteria.

The successful contractor completes the project in accordance with an agreed programme of works. It remains the contractor’s responsibility to manage and supervise the works. We monitor the work on a day-to-day basis and manage the funding of the project by careful cost control.

Following completion, a Post Completion Review is carried out to provide feedback to management on project performance and to improve future decision making processes.

Our project management of major investment projects is designed to ensure that they are delivered on time, to the appropriate quality standards at minimum cost. The project management process in particular makes use of professional consultants and specialist contractors, all of whom are appointed subject to competitive tender.

Appendix Two - Gas Demand Forecasts

A2.1 Demand

During the next ten years annual gas demand is forecast to grow by 5.21% in North LDZ and by 4.15% in North East.

Table A2.1A

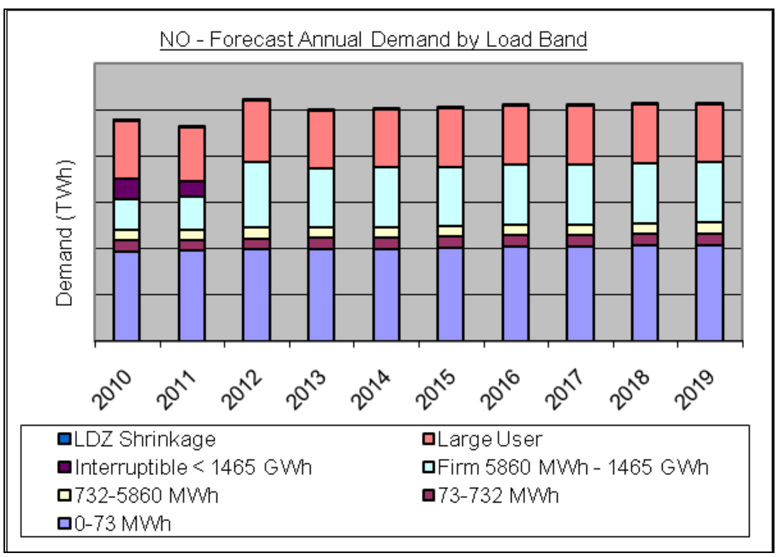
Forecast Annual Demand by Load Category by LDZ from 2010 Demand Statements. (TWh)

North.

Load Band	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0-73 MWh	19.39	19.55	19.79	19.85	20.00	20.18	20.46	20.50	20.63	20.79
73-732 MWh	2.35	2.37	2.41	2.40	2.42	2.43	2.47	2.47	2.49	2.51
732-5860 MWh	2.18	2.21	2.24	2.23	2.24	2.25	2.29	2.28	2.30	2.31
Small User	23.92	24.13	24.44	24.47	24.65	24.86	25.22	25.25	25.43	25.60
Firm> 5860 MWh	7.91	8.33	13.34	12.51	12.55	12.57	12.68	12.65	12.72	12.69
Interruptible < 1465 GWh	4.57	3.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Large / V. Large User	12.48	11.72	13.34	12.51	12.55	12.57	12.68	12.65	12.72	12.69
LDZ Consumption	36.40	35.86	37.78	36.99	37.20	37.43	37.90	37.90	38.14	38.29
LDZ Shrinkage	0.22	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.24
LDZ Demand	36.62	36.08	38.01	37.22	37.43	37.67	38.14	38.14	38.38	38.53

Note

- Figures may not sum exactly due to rounding.

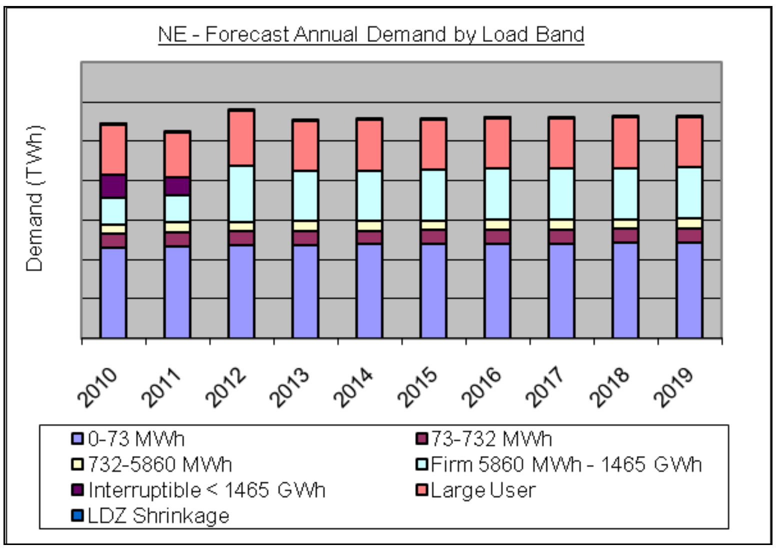


North East.

Load Band	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0-73 MWh	22.96	23.31	23.46	23.57	23.68	23.75	23.95	23.95	24.05	24.15
73-732 MWh	3.31	3.45	3.48	3.45	3.47	3.48	3.49	3.50	3.53	3.54
732-5860 MWh	2.44	2.46	2.50	2.48	2.49	2.51	2.53	2.53	2.55	2.56
Small User	28.71	29.23	29.44	29.51	29.64	29.74	29.97	29.98	30.13	30.25
Firm> 5860 MWh	6.72	7.03	14.15	12.80	12.82	12.83	12.95	12.91	12.97	12.95
Interruptible < 1465 GWh	6.05	4.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Large / V. Large User	12.77	11.40	14.15	12.80	12.82	12.83	12.95	12.91	12.97	12.95
LDZ Consumption	41.48	40.63	43.59	42.30	42.46	42.57	42.92	42.89	43.09	43.20
LDZ Shrinkage	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.29
LDZ Demand	41.76	40.91	43.88	42.59	42.74	42.85	43.20	43.18	43.38	43.49

Notes

- Figures may not sum exactly due to rounding.



Forecast 1 in 20 Peak Day Firm Demands by LDZ from the 2010 Demand Statements

1 in 20 Peak Day Demand (GWh)										
LDZ	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
North	238	255	257	258	260	262	264	265	267	269
North East	258	283	285	286	287	288	289	290	292	293
Total	**496**	**538**	**541**	**544**	**547**	**550**	**553**	**555**	**559**	**562**

Notes

- Figures may not sum exactly due to rounding.
- All figures in GWh.

The past eighteen months have seen unprecedented levels of volatility in both the energy markets and the world financial markets. This has seen a rapid decline in the UK and other economies, resulting in a recession. The effect of the economic downturn on energy demand has been significant with a decline in gas demand in the traditional market sectors in 2009.

Weather-corrected throughput in the North LDZ fell by around 3.4% in 2009 when compared with 2008, the eighth consecutive year of gas demand falling. In North East LDZ weather corrected throughput fell by 4.8% the fifth consecutive year of falling gas demand.

Weather-corrected throughput in NGN for the first seven months of 2010 was 1.14% higher than for the corresponding period in 2009. North LDZ weather-corrected throughput was 2.7% higher, and North East LDZ was 0.2% lower.

Since the start of 2009 oil prices have generally been rising slowly, principally linked to views of economic recovery and increased demand, notably from China. However, these increases have had little effect on the UK gas price, with oil indexation reduced as increased indigenous production of unconventional gas in the United States has resulted in greater levels of LNG available to the market.

The UK emerged weakly from an 18 month recession in the fourth quarter of 2009 with GDP contracting by 4.9% during 2009. We expect a slow economic recovery, constrained by an uncertain global background and public and private sector debt problems. GDP is expected to grow by only 1% in 2010, returning consistently to the historic trend rate of between 2% to 2.5% pa only in 2013.

Lower fuel prices are predicted in the short term driven by the global supply and demand fundamentals highlighted above. Fuel prices are forecast to grow over the medium to long-term with some return towards oil indexation and the impact of the push towards a low carbon economy.

2.2 Forecast Comparisons

The following charts provide a comparison of the current forecasts with those published in 2009 Demand Statements.

Figure 2.4A – North LDZ Total Annual Forecast Demand

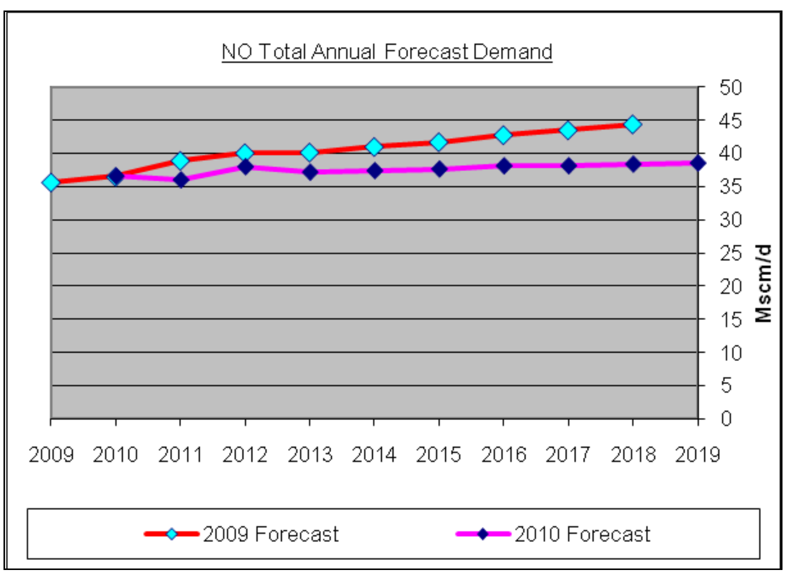
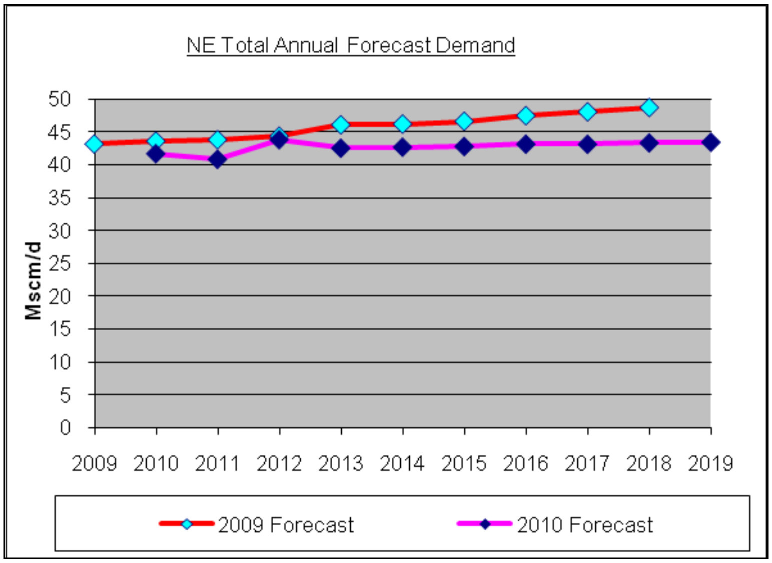


Figure 2.4B – North East LDZ Total Annual Forecast Demand



The graphs above show our Annual Forecasted Demand for the duration of the plan. The link to GDP growth is not as visible as last year because of the depressed growth associated with the economic downturn.

Appendix Three - Actual Flows 2009

A3.1 Annual Flows

Annual forecasts are based on average weather conditions. Therefore, when comparing actual throughput with forecasts, throughput has been adjusted to take account of the difference between the actual weather and the seasonal normal weather.

The result of this calculation is the weather corrected throughput.

The weather corrected throughput and forecast demands are shown assuming a weather condition based on weather data from 17 years.

Actual throughputs have incorporated a reallocation between load bands based on reconciliation processed.

The basis for any calculation of forecast demand is the accuracy of the previous forecast.

Tables A.3.1.1 and A3.1.2 provide a comparison of actual and weather corrected throughputs during the 2009 calendar year with the forecast demands presented in the 2009 Demand Statements. Annual demands are presented in the format of LDZ and NTS load bands/categories, consistent with the basis of system design and operation.

Table A3.1.1

NORTH 2009	Actual	Weather Corrected	Forecast	Corrected v Forecast (%)
0-73 MWh	19.02	19.96	20.61	-3.18
73 – 732 MWh	2.34	2.47	2.70	-8.51
>732 MWh	10.20	10.35	7.60	36.14
Interruptible	4.35	4.37	4.55	-3.98
LDZ Shrinkage	0.23	0.23	0.23	2.86
LDZ Total	36.14	37.38	35.69	4.73

Table A3.1.2

N.EAST 2009	Actual	Weather Corrected	Forecast	Corrected v Forecast (%)
0-73 MWh	22.29	23.11	24.95	-7.38
73 – 732 MWh	3.14	3.27	3.65	-10.35
>732 MWh	9.33	9.45	8.60	9.92
Interruptible	6.13	6.15	5.69	8.02
LDZ Shrinkage	0.28	0.28	0.28	2.16
LDZ Total	41.17	42.26	43.16	-2.09

Looking at the throughput in comparison with the forecast we can see that in the smaller load bands, the forecast for both the 0-73 and the 73-732MWh markets were overstated within both LDZs.

For the larger consumer sectors, North LDZ saw an understatement and North East saw an overstatement in the >732MWhs and the Interruptible Market. In North LDZ this large increase in the >732MWh load band was attributed to a much larger take than forecast from one very large customer.

A3.2 Peak Flows

The day of highest total throughput in the Network was 7th January 2010, (20.29mscm in North East LDZ). The highest total throughput for the North LDZ was 18.39mscm on the 8th January 2010.

The total throughput on 7th January equated to 97.5% of peak day firm only forecast demand for North East LDZ. On the 8th January total throughput equated to 94% of peak day firm only forecast demand in North LDZ.

Record total throughput in North LDZ is 21.08mscm on 30th January, 2003, and in North East LDZ the record stands at 24.42mscm on 28th January, 2004.

During the next ten years, average annual peak forecast demand growth is 2.05% in North and 1.96% in North East.

Figure 3.2a – Historical Throughput & Forecast Peak Day Firm Demand for North LDZ.

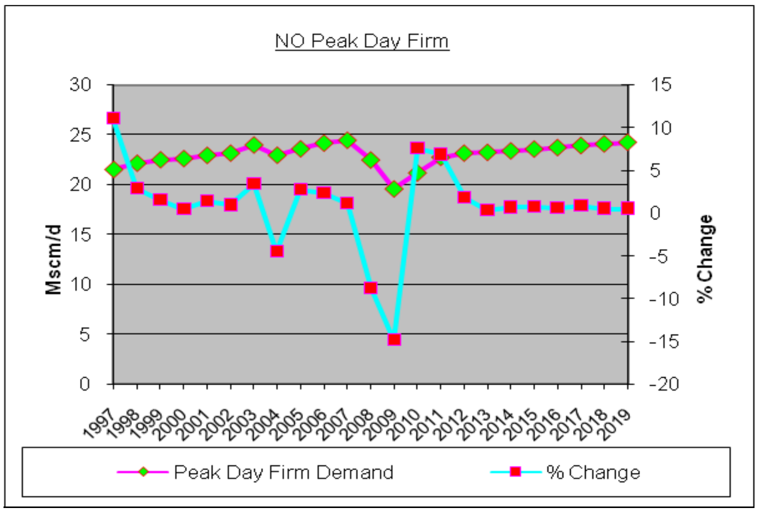
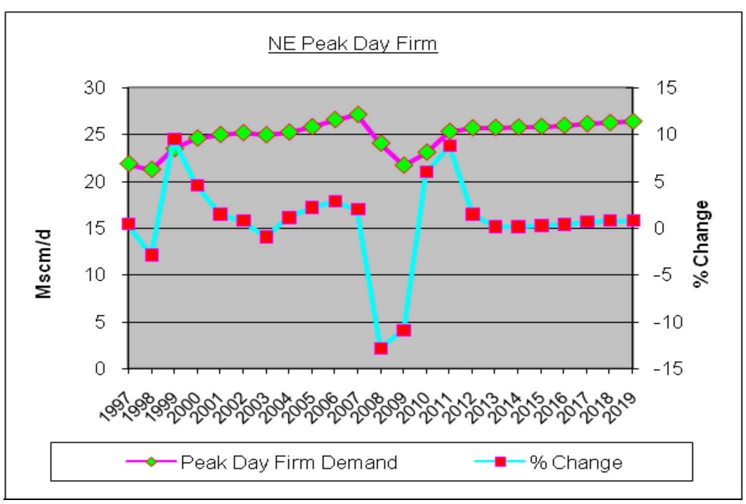


Figure 3.2b – Historical Throughput & Forecast Peak Day Firm Demand for North East LDZ.



Appendix Four - Offtakes

As an indication of available capacity at the Network's offtakes, the 2012 requested Peak Flow from NTS has been plotted against the Maximum Offtake Capacity in 2010.

Figure 4.0a – NO Small Offtakes 2012 Flow Vs Maximum

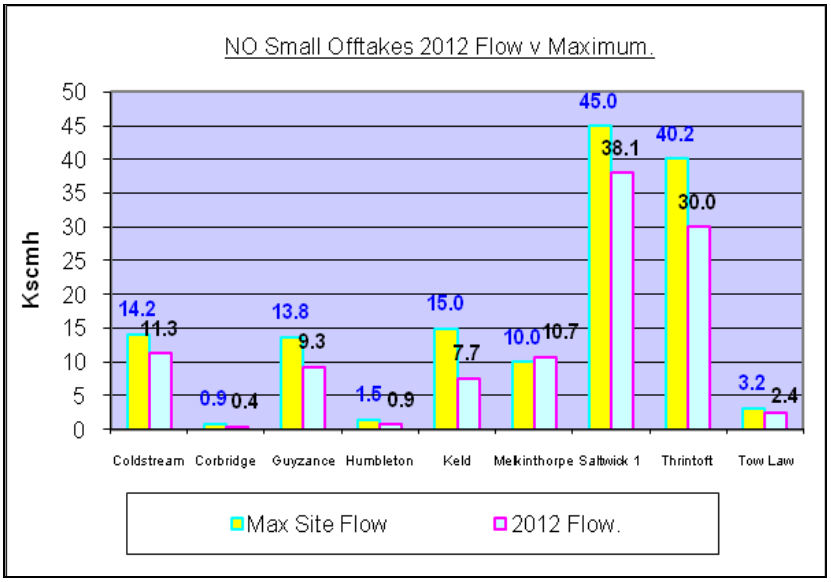


Figure 4.0b – NO Large Offtakes 2012 Flow Vs Maximum

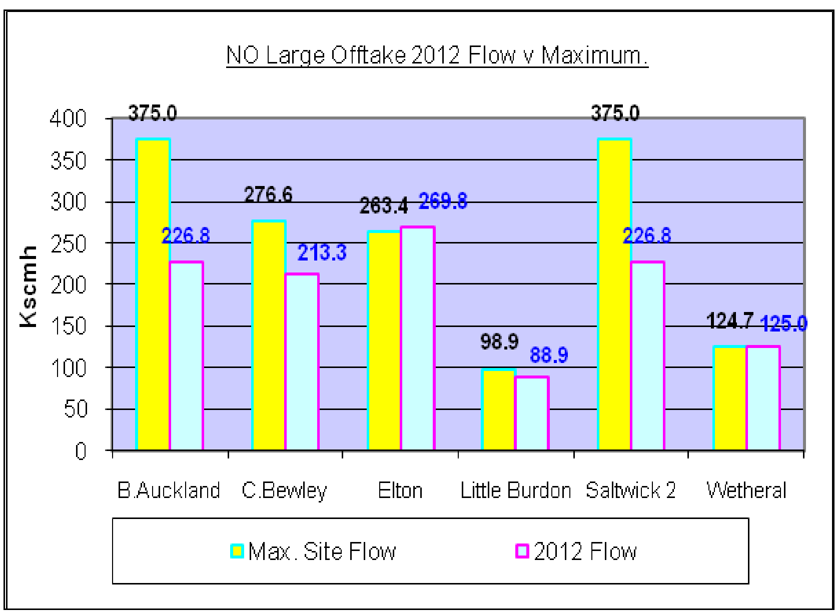


Figure 4.0c – NE Small Offtakes 2012 Flow Vs Maximum

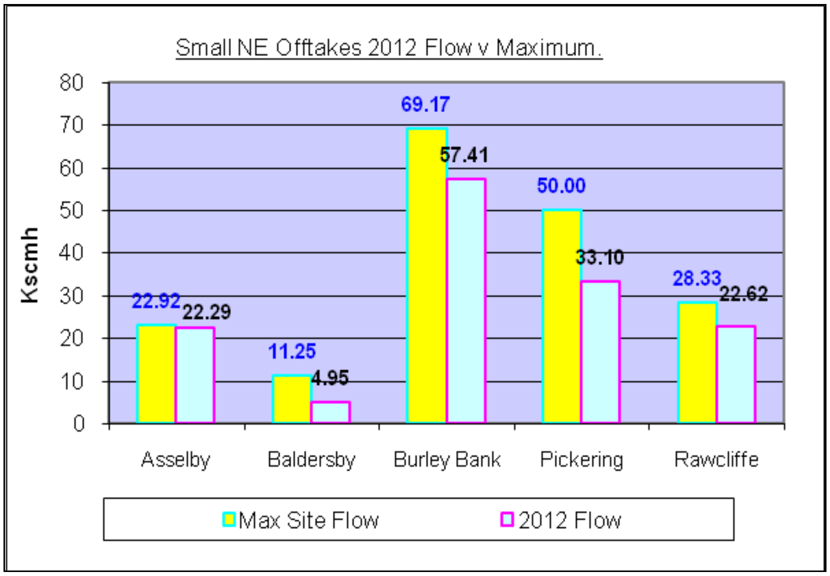
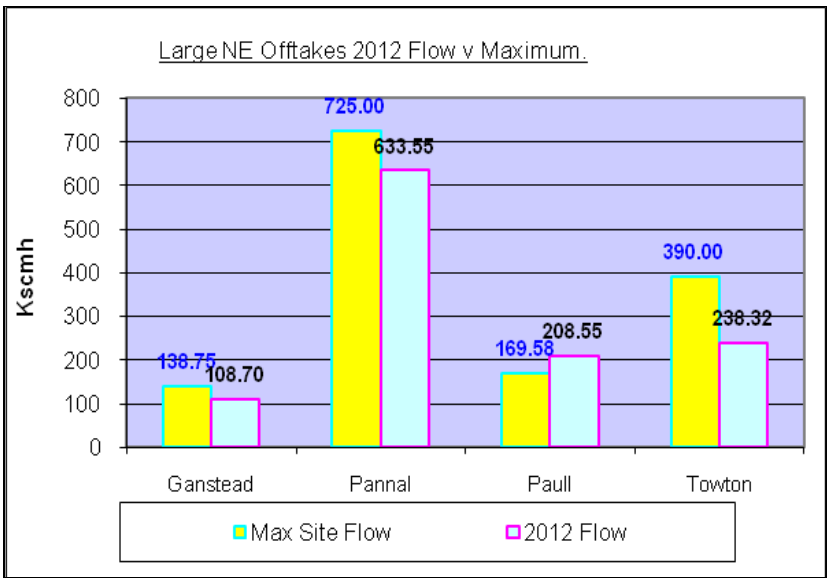


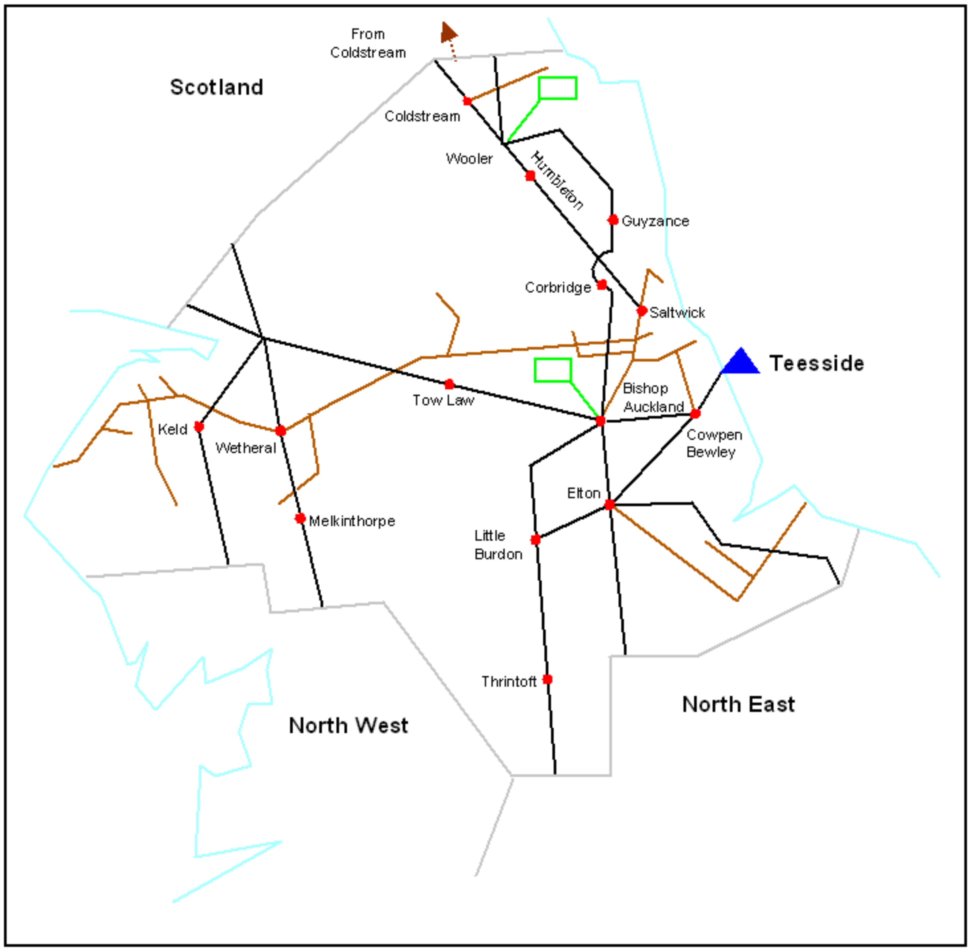
Figure 4.0d – NE Large Offtakes 2012 Flow Vs Maximum



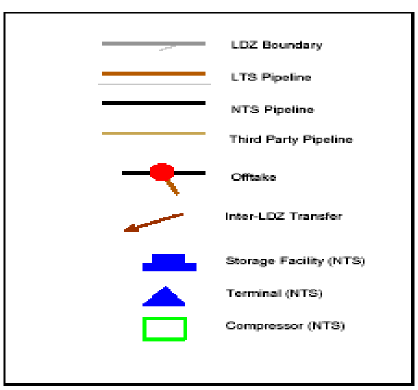
Elton offtake will be upgraded in 2010/11. Paull offtake is part of a multi junction complex and parts of the site are owned by NGG and NGN. We are in discussion with NGG to determine the best solution to the issues we have.

Appendix Five - The Gas Transportation System

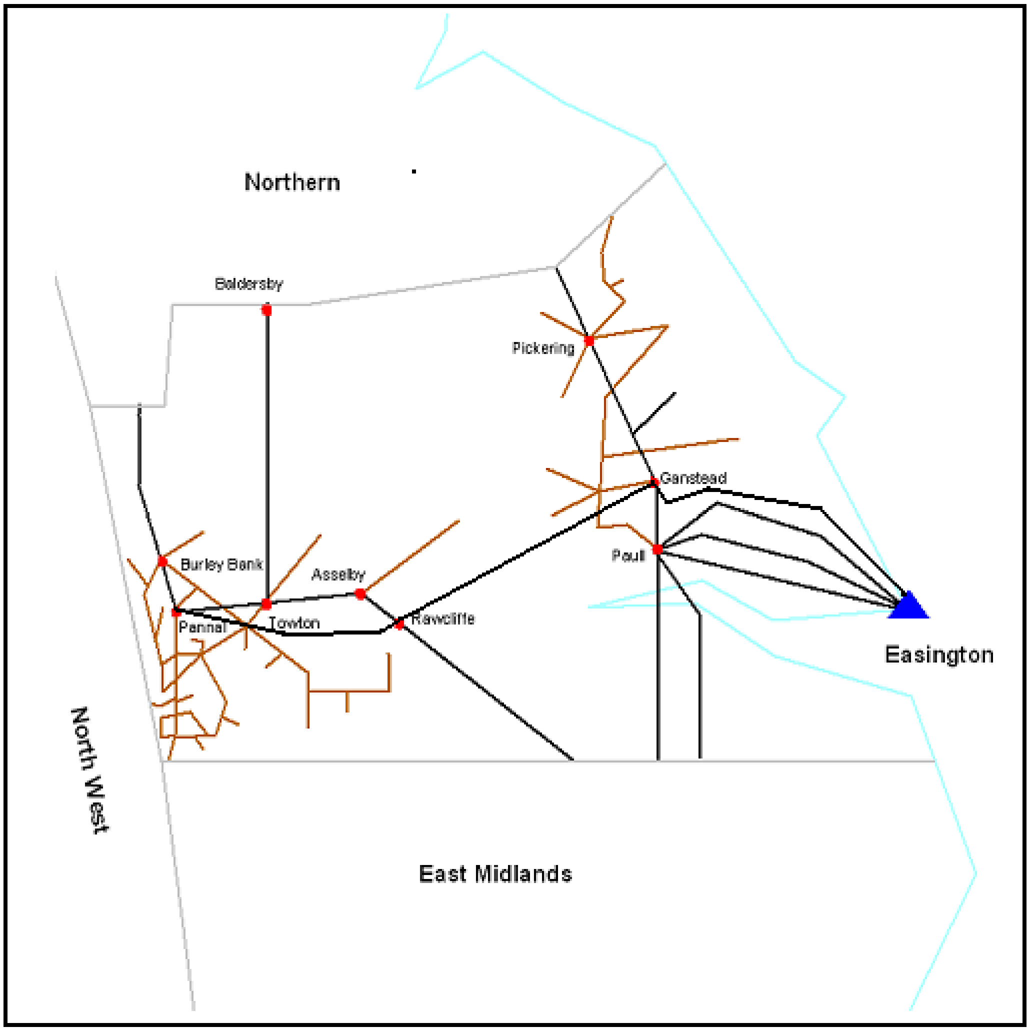
North LDZ



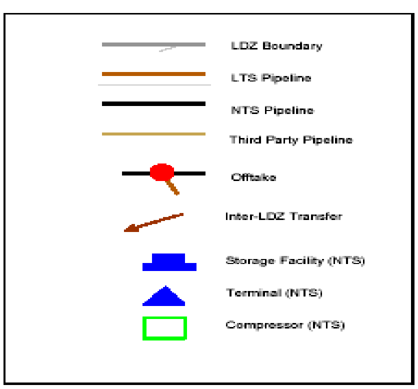
Key - Network Code LDZ Map



North East LDZ



Key - Network Code LDZ Map



Appendix Six - Connections to our System

A6.1 Introduction

Within the space of a few years, the gas industry in Britain has evolved from a situation where one company provided all new connections, to one where many alternative connection services are now available on a competitive basis.
Indeed, whilst Northern Gas Networks continues to offer connection services in line with our Gas Act obligations, customers and developers have the option to choose other parties to build their facilities, have the connection vested in or adopted by the host gas transporter (depending upon circumstances), pass assets to a chosen system operator, transporter, or retain ownership of them.

The following are the generic classes of connection.

- Entry Connections: connections to delivery facilities processing gas from gas producing fields or, potentially in the future, LNG vaporisation (i.e. importation) facilities, for the purpose of delivering gas into the NGN system.
- Exit Connections: connections that allow gas to be offtaken from our system to premises (a 'Supply Point') or to Connected System Exit Points' (CSEPs). There are several types of connected system including:
    - A pipeline system operated by another gas transporter;
    - Any other non-NGN pipeline transporting gas to premises consuming more than 2,196MWh per annum; and
    - Storage Connections: connections to storage facilities for the purpose of temporarily offtaking gas from our system and delivering it back at a later date.

Please note that storage may both deliver gas to the system and offtake gas from the system and therefore specific arrangements pertaining to both Entry and Exit Connections will apply. In addition to new pipes being termed connections, any requirement to increase the quantity of gas delivered or offtaken is also treated as a new connection.

It should be noted that any person wishing to connect to our system, or requiring increased flow, should contact us as early as possible to ensure that requirements can be met on time, particularly if system reinforcement is required as outlined in A6.7.

A6.2 Additional Information Specific to System Entry and Storage Connections

We require a Network Entry Agreement or Storage Connection Agreement as appropriate, with the respective operator of all delivery and storage facilities to establish, among other things, the gas quality specification, the physical location of the delivery point and the standards to be used for both gas quality and the measurement of flow.

A6.2.1 Network Entry Quality Specification

For any new entry connection to our system, the connecting party should notify us as soon as possible as to the likely gas composition. We will then determine whether the gas can be accepted, taking into account our existing statutory and contractual obligations.
The ability of Northern Gas Networks to accept gas supplies into the system is affected by, among other things, the composition of the new gas, the location of the system entry point, volumes entered and the quality and volumes of gas already being transported within the system.

In assessing the acceptability of any proposed new gas supply, we will take account of the following.

a) Our ability to continue to meet statutory obligations (including, but not limited to, the Gas Safety (Management) Regulations 1996 (GS(M)R)).

b) The implications of the proposed gas composition on system running costs.

c) Our ability to continue to meet our contractual obligations.

For indicative purposes, the specification set out below is usually acceptable for most locations and encompasses, but is not limited to, the statutory requirements set out in the GS(M)R.

1. Hydrogen Sulphide
    - Not more than 5mg/m3

2. Total Sulphur
    - Not more than 50mg/m3

3. Hydrogen
    - Not more than 0.1% (molar)

4. Oxygen
    - Not more than 0.001% (molar)

5. Hydrocarbon Dewpoint
    - Not more than -2°C at any pressure up to 85barg

6. Water Dewpoint
    - Not more than -10°C at 85barg

7. Wobbe Number (real gross dry)
    - The Wobbe Number shall be in the range 47.20 to 51.41MJ/m3

8. Incomplete Combustion Factor (ICF)
    - Not more than 0.48

9. Soot Index (SI)
    - Not more than 0.60

10. Gross Calorific Value (real gross dry)
    - The Gross Calorific Value (real gross dry) shall be in the range 36.9 to 42.3MJ/m3, in compliance with the Wobbe Number, ICF and SI limits described above. Subject to gas entry location and volumes, we may set a target for the Calorific Value within this range.

11. Inerts
    - Not more than 7.0% (molar) subject to Carbon Dioxide: not more than 2.0% (molar)

12. Contaminants
    - The gas shall not contain solid, liquid or gaseous material that may interfere with the integrity or operation of pipes or any gas appliance within the meaning of regulation 2(1) of the Gas Safety (Installation and Use) Regulations 1998 that a consumer could reasonably be expected to operate.

13. Organo Halides
    - Not more than 1.5 mg/m3

14. Radioactivity
    - Not more than 5 Becquerel/g

15. Odour
    - Gas delivered shall have no odour that might contravene the statutory obligation not to transmit or distribute any gas at a pressure below 7 barg, which does not possess a distinctive and characteristic odour.

16. Pressure
    - The delivery pressure shall be the pressure required to deliver natural gas at the Delivery Point into our Entry Facility at any time, taking into account the back pressure of our System at the Delivery Point as the same shall vary from time to time.
    - The entry pressure shall not exceed the Maximum Operating Pressure at the Delivery Point.

17. Delivery Temperature
    - Between 1°C and 38°C

Note that the Incomplete Combustion Factor (ICF) and Soot Index (SI) have the meanings assigned to them in Schedule 3 of the GS(M)R. In addition, where limits on gas quality parameters are equal to those stated in GS(M)R
(Hydrogen Sulphide, Total Sulphur, Hydrogen, Wobbe Number, Soot Index and Incomplete Combustion Factor), we may require an operational tolerance to be included within an agreement to ensure compliance with the GS(M)R.

Due to continuous changes being made to the system, any undertaking made by us on gas quality prior to signing an agreement will normally only be indicative. We are working with the Government and Ofgem in assessing the compatibility of existing specifications (both statutory and contractual) with the longer term needs of the UK in respect of additional gas supplies, and the European Association for the Streamlining of Energy Exchange (EASEE-gas) in the development of a Gas Quality harmonisation Common Business Practice. The outcomes of these projects could ultimately result in changes to our network entry quality specifications in the future.

A6.3 Additional Information Specific to System Exit Connections

Any person can contact us to request a connection, whether a shipper, operator, developer or consumer. However, gas can only be offtaken where the Supply Point so created has been confirmed by a shipper, in accordance with the Network Code.

A6.4 National Transmission System (NTS) Connections

The Applicable Offtake Pressure for the NTS, as referred to in UNC Section J2.1 is normally 25barg. Although system pressure is typically higher, it will be subject to variation over time and location on the network. We currently plan normal NTS operations with start of day pressures no lower than 33barg, but such pressure cannot be guaranteed as pressure management is a fundamental aspect of operation of an economic and efficient system.
NTS offtake pressures at any location will vary due to the following.

- Gas demand
- Gas supply pressures at entry points
- Compressor operation
- Pipeline sizes and maximum operating pressures
- Special operations such as maintenance and system development works

Offtake pressure also varies within day, from day to day, season to season and year to year. As a general rule, NTS offtake pressures tend to be higher at pressure sources such as entry points and outlets of operating compressors, and lower at the system extremities and inlets to operating compressors.

A6.5 Distribution Network Connections

Gas will normally be made available for offtake to consumers at a pressure that is compatible with a regulated metering pressure of 21mbarg. Information on the design and operating pressures of distribution pipes can be obtained by contacting the appropriate office.

A6.6 Self Lay Pipes or Systems

In accordance with Section 10(6) of the Gas Act, and subject to the principles set out in the published Licence Condition 4B Statement and the terms and conditions of the contract between us and the customer in respect of the proposed connection, where a party wishes to lay their own service pipe to premises expected to consume 2,196MWh per annum or less, ownership of the pipe will vest in us once the connection to the our system has been made.

Where the connection is for a pipe laid to premises expected to consume more than 2,196MWh per annum or the connection is to a pipe in our system which is not a relevant main, self laid pipes do not automatically vest in us. However, subject to the principles set out in the published Licence Condition 4B Statement and the relevant contractual terms and conditions, we may take ownership of pipes to such premises.

Parties considering laying a pipe that will either vest in us or is intended to come into our ownership should refer to the published Licence Condition 4B Statement and make contact with the appropriate office prior to the planning phase of any project.

A6.7 Reasonable Demands for Capacity

Operating under the Gas Act 1986 (as amended 1995), we have an obligation to develop and maintain an efficient and economical pipeline system and, subject to that, to comply with any reasonable request to connect premises, provided that it is economic to do so.

However, in many instances, specific system reinforcement may be required to maintain system pressures for the winter period after connecting a new supply or demand. Details of how we charge for reinforcement and the basis on which contributions may be required can be found in the published Licence Condition 4B Statement. Please note that dependent on scale, reinforcement projects may have significant planning, resource and construction lead-times and that as much notice as possible should be given. In particular, we will typically require three to four years' notice of any project requiring the construction of high pressure pipelines or plant, although in certain circumstances, project lead-times may exceed this period.

Glossary

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.

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 defined for each LDZ.

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.

Diurnal Storage
Gas stored for the purpose of meeting, among other things, 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.

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 Northern Gas Networks, are licensed by the Gas and Electricity Markets Authority 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.

Interruptible Service
A service that offers financial incentives to customers but under which we can interrupt the flow of gas to the supply point.

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 volume of gas within the National or Local Transmission System at any time.

Load Duration Curve (1 in 50 Severe)
The 1 in 50, or severe, load duration curve is that curve which, in a long series of years, with connected load held at the levels appropriate to the year in question, would be such that the volume of demand above any given demand threshold (represented by the area under the curve and above the threshold) would be exceeded in one out of fifty years.

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 offtakes. Consists of LTS and distribution system pipelines.

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

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

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. We provide odorisation at our offtakes.

Own Use Gas (OUG)
Gas used by us to operate the transportation system. Includes gas used for compressor fuel, heating and venting.

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.

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.

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.

Therm
An imperial unit of energy. Largely replaced by the metric equivalent: the kilowatt hour (kWh). 1 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
The document that defines the contractual relationship between System Users.
The Uniform Network Code has replaced the Network Code and, as well as existing arrangements, cover the arrangements between all gas transporters.