Appendix 1

Process Methodology

A1.1 Demand

A1.2 Supply

A1.3 NTS and LTS Capacity Planning

A1.4 Lower Pressure Tier Planning

A1.5 Investment Procedures and Project Management

A1.1 Demand

The purpose of this section is to give a brief overview of the methodology adopted by Transco when developing its annual and peak demand forecasts. This methodology can be categorised 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 Transco's case these assumptions include economic, fuel prices, environmental and tax policies, etc. A number of these assumptions are based on data from independent organisations. Transco also benchmarks its demand forecasts against a number of recognised external sources, such as the DTI.

To gain a better understanding of how these assumptions are utilised and the modelling approach adopted it is necessary to consider the LDZ and NTS processes separately.

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, e.g. Climate Change Levy, that could affect future growth in demand.

By adopting this approach Transco is able to take account of varying economic conditions and specific large loads within different LDZs.

A1.1.1.2 NTS Modelling

Historically NTS demand (i.e. loads with their own connection to the NTS) was limited to a small number of large industrial sites and chemical works. However, with the advent of gas-fired power generation and interconnectors to Ireland and Continental Europe, a new methodology had to be developed. This methodology can best be described by looking at each sector in turn.

A1.1.1.3 Power Generation

There are two basic elements to forecasting the power generation sector, firstly, the capacity available to generate and secondly, how frequently this capacity is in operation.

The first element is developed by comparing load enquiry information with feedback received from the Transporting Britain's Energy (TBE) consultation process, National Grid's Seven Year Statement and various commercial sources. In addition, the impact of new commercial arrangements and Government policies are taken into account when deciding which power stations will be built or closed.

To provide answer the second element, a model has been developed to forecast the demand for electricity generation by fuel type and individual station over the forecast period based on actual and forecast bid prices and availability.

These power generation forecasts are then split between Transco supplied stations and those stations with their own dedicated pipeline delivering beach gas directly. There are currently 5 such stations, known as "Directs", accounting for approximately 20% of total gas used for generation.

A1.1.1.4 Exports

Forecast flow rates to and from Europe via the Interconnector are based on an assessment of relative gas prices between Europe and Great Britain throughout the year, i.e. allowing for the seasonal variation of British gas prices.

Exports to Ireland are based on the analysis of Northern and Republic of Ireland energy markets, depletion and development of indigenous supplies, feedback from the TBE process and commercial sources.

A1.1.1.5 Industrials

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

A1.1.2 Demand/Weather Modelling

In order to meet both the demand estimation requirements of the Network Code and planning requirements for forecasts of demand in future years, Transco has developed a consistent methodology for demand/weather modelling. Under this methodology, all demand models utilised by Transco (whether for demand in LDZs or for categories of NDM demand as required under the Network Code) are based on Composite Weather Variables (CWVs) defined and optimised for each LDZ. Details of the modelling approach, definitions of CWVs and current CWV parameters are provided in the Transco document "NDM Profiling and Capacity Estimation Algorithms for 2002/3" (which is available to all Network Code signatories). Seasonal normal CWVs (one for each day and each LDZ) are produced in accordance with paragraph H1.5.2 of the Network Code, using a 71 year historical weather database.

All of Transco's demand/weather modelling is based on a 71 year average condition as per Network Code, however, a set of annual demand forecasts is produced based on a warmer weather condition to make allowance for "global warming".

A1.1.3 Peak Day Demand Modelling

Once the annual demand forecasts and daily demand/weather models have been developed, Transco applies a simulation methodology, using historical weather data for each LDZ, to determine the peak day (in accordance with statutory/Licence obligation) and severe winter demand estimates. The peak day demand for the NTS supplied loads, e.g. power stations, are based on the contractual arrangements, where possible, between Transco and its customers. The one exception to this is the treatment of the European Interconnector where it is assumed not to be exporting at times of peak demand due to the high price of British gas.

A1.2 Supply

A1.2.1 Process Introduction

Transco's 2002 forecasts indicate a potential shortfall in future supplies as a result of a reduction in new supply developments / activity on the UKCS and increases in annual demand. Although the short term annual supply position appears well covered (based on information received by Transco) the medium to long term position can only be met by new UKCS developments, further imports and reduced peak demand due to high gas prices.

Feedback from the 2002 Transporting Britain's Energy consultation process was generally supportive of Transco's assessment of supplies. It was agreed there would be a greater need to shift towards import dependency, although there were differences of opinion regarding the likely sources of this gas.

Transco found the level of detailed supply information that it received through the consultation process much reduced from previous years. The main factor behind this was the concern of market participants that Transco may be required to release information provided in confidence.

From the information received through the consultation process, together with information derived from other commercially available sources, Transco constructs a 'match' of supplies to demand for each year of the next ten years. This shows the assumed locations of supply, matched to meet the forecast level of demand at each of the key points on Transco's network.

A1.3 NTS Capacity Planning

Using the supply/demand match as an input, Transco uses a computer software package, FALCON, to analyse the performance of the transportation system. FALCON identifies the location of potential network capacity constraints and helps in the development of suitable reinforcement options that ensure the appropriate level of system security is maintained. Copies of the FALCON package have been purchased by outside agencies to facilitate an understanding of the NTS network and Transco's investment plans.

Having identified potential constraints on the system, Transco evaluates options for adding capacity to the network that represent a safe, economic and efficient solution, whilst maintaining system security. The options available to Transco to increase capacity include:

- Uprating pipeline operating pressures.
- Constructing new pipelines or storage.
- Uprating or modifying existing compressors or installing new compressor stations.
- Building additional regulators and offtakes.

This is an iterative process. The aim is to produce a robust system consistent with all the drivers for investment: 1 in 20 peak day security (in accordance with Licence obligation); flexibility to provide close to peak entry capacity throughout the year, responding to signals for additional entry or exit capacity from industry players, and reducing the level of environmental emissions.

A1.4 Distribution Network/LDZ Capacity Planning

A1.4.2 LTS Capacity Planning

Although the development of Local Transmission Systems is largely demand-led, LTS capacity planning processes are not dissimilar to those utilised for the development of the NTS. Locally based analysts use the demand forecasts to model system flow patterns and produce annual 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.
- Constructing new pipelines or storage.
- 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 day demand, there is a requirement to plan to meet the variation in demand over a 24-hour period. Diurnal storage within each LDZ is used as a cost-efficient and secure way of satisfying these variations and may consist of gas held in linepack, low-pressure gasholders, high-pressure vessels and salt cavities.

A1.4.2 Lower Pressure Tier Planning (below 7 bar)

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. The analysis process is similar to the NTS and LTS, but at a lower pressure level.

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.

A1.5 Investment Procedures and Project Management

Transco has a series of business-wide policies designed to ensure that consistent, well-considered investment decisions are made at all levels. These have been formalised into a single document referred to as the Investment Procedures, which draws together best practice in terms of making investment decisions.

The Transco Investment Procedures 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, the Investment Procedures 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 Transco's business objectives. Transco's project management strategy involves:

- Using Engineering for Value (EfV) principles to decide how the project should be carried out.
- 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.
- Post project and post investment review to ensure compliance and capture lessons learnt.

Current practice within Transco is to monitor projects and ensure the timing of investment decisions is optimised.

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

Tenders are received and evaluated against previously agreed technical, quality, safety, financial and programme criteria. They are compared on a cost basis with the Transco 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. Transco monitors the work on a day-to-day basis and manages the funding of the project by careful cost control. Following completion, Transco carries out a Post Completion Review to provide feedback to management on project performance and to improve future decision making processes.

Transco's 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.

Appendix 2

Gas Demand & Supply Volume Forecasts

A2.1 Demand

A2.2 Annual Supply Data Available to Transco

A2.3 Annual Supply Scenarios

A2.4 Peak Supply Scenarios

A2.1 Demand

TABLE A2.1A – Forecast Annual Demand – Split by LDZ & NTS Load Categories (TWh)

Load Category	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
0 to 73 MWh	409	414	421	424	429	433	439	441	445	449
73 to 732 MWh	61	62	64	65	66	67	68	69	70	71
732 to 5860MWh	52	52	53	54	54	55	55	56	56	57
Total Small User	**522**	**528**	**538**	**543**	**549**	**554**	**562**	**566**	**571**	**577**
Firm 5860MWh - 1465GWh	73	75	79	83	87	89	92	93	95	97
Interruptible <1465GWh	91	96	102	106	109	111	114	116	118	120
Total Large User	**164**	**171**	**181**	**188**	**196**	**200**	**206**	**209**	**213**	**216**
LDZ Very Large User	38	37	38	39	40	44	49	51	51	51
Total LDZ	**725**	**737**	**757**	**770**	**785**	**798**	**817**	**825**	**835**	**845**
NTS Power Generation	219	222	230	242	257	272	282	290	294	297
NTS Industrials	31	32	34	35	38	41	43	45	45	45
Exports via Moffat	57	68	53	53	60	70	78	87	92	95
Exports via IUK	112	51	30	26	25	24	23	22	22	22
Total NTS	**418**	**373**	**347**	**356**	**380**	**407**	**426**	**443**	**453**	**459**
Total Formula Volumes	**1143**	**1110**	**1104**	**1126**	**1165**	**1205**	**1243**	**1268**	**1288**	**1304**
Shrinkage	15	15	16	16	16	17	17	17	17	18
Total Throughput	**1158**	**1125**	**1120**	**1142**	**1181**	**1222**	**1260**	**1285**	**1306**	**1321**

Notes

- Volumes are based on a 35-year weather trend.
- Load categories are presented on a Regulatory Form of Control basis as per formula covering the period April 2002 to March 2007.
- Exports include interconnector flows to Ireland and Continental Europe.
- NTS Power Generation includes all large-scale gas-fired plants connected to the NTS but excludes the consumption of those stations supplied by third party pipelines and those embedded within Transco's LDZs.

FIGURE A2.1A – Forecast Annual Demand

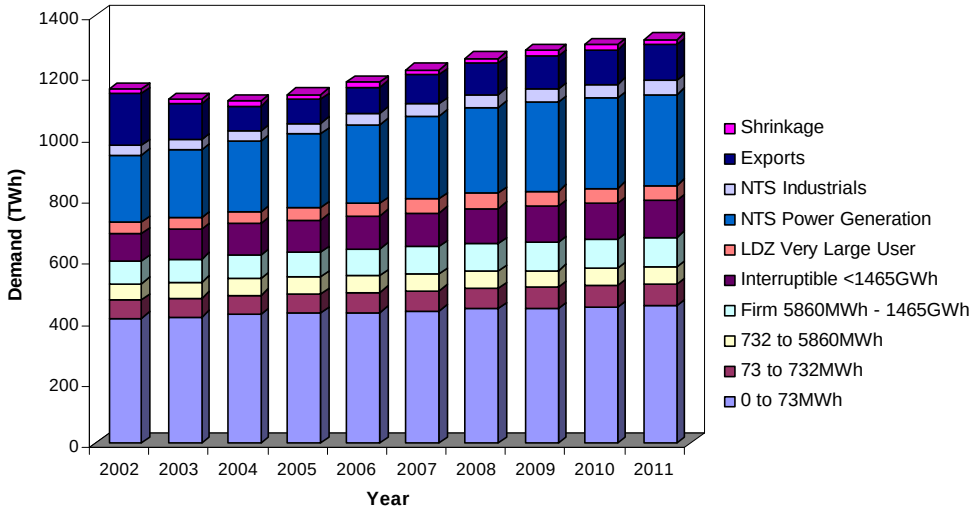


TABLE A2.1B – Forecast LDZ Annual Demands – Split by Supply Type (TWh)

LDZ	Load Category	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SC	Firm	52	53	55	56	57	58	59	60	61	62
	Int	13	14	14	15	15	16	16	17	17	17
	Total	65	67	69	70	72	73	75	76	78	79
NO	Firm	35	36	37	37	38	39	40	40	40	41
	Int	9	7	8	8	8	8	9	9	9	9
	Total	44	43	45	45	47	47	48	48	49	50
NW	Firm	74	75	77	78	79	80	81	81	82	83
	Int	16	17	18	18	18	18	18	19	19	19
	Total	90	92	95	96	97	98	99	100	101	102
NE	Firm	41	41	42	43	43	44	44	44	45	45
	Int	8	9	9	9	10	10	10	10	10	11
	Total	49	50	51	52	53	54	54	55	55	56
EM	Firm	63	64	65	66	67	68	69	70	71	72
	Int	17	17	18	19	21	25	26	26	27	27
	Total	80	81	84	85	88	93	95	96	98	99
WM	Firm	59	60	61	61	62	63	64	65	65	66
	Int	5	6	6	6	6	6	6	6	6	6
	Total	64	65	67	68	68	69	70	71	72	73
WA	Firm	36	37	38	39	40	41	42	42	43	44
	Int	8	8	8	9	9	10	10	10	11	11
	Total	44	45	46	48	49	50	52	53	54	55
EA	Firm	45	46	47	48	48	49	50	50	50	51
	Int	6	6	7	7	7	7	7	7	7	7
	Total	51	52	53	54	55	56	57	57	58	58
NT	Firm	65	66	66	67	68	69	69	70	70	70
	Int	10	8	9	9	10	10	10	10	10	10
	Total	74	74	75	76	77	78	79	79	80	80
SE	Firm	68	70	71	71	71	71	72	72	72	73
	Int	9	9	9	10	10	11	13	14	15	15
	Total	77	79	80	80	81	82	85	86	87	87
SO	Firm	42	43	44	45	46	47	48	48	49	49
	Int	4	6	7	7	8	8	8	8	8	8
	Total	46	49	51	52	54	55	56	56	57	57
SW	Firm	33	34	35	36	36	37	39	40	41	41
	Int	5	6	6	6	7	7	7	7	7	7
	Total	38	40	41	42	43	44	46	47	48	48
LDZ Total	**Firm**	**614**	**624**	**637**	**646**	**657**	**664**	**677**	**682**	**690**	**697**
	Int	**111**	**113**	**120**	**124**	**128**	**134**	**140**	**143**	**145**	**147**
	Total	**725**	**737**	**757**	**770**	**785**	**798**	**817**	**825**	**835**	**845**

Notes

- Volumes are based on a 35 year weather trend.
- LDZ Annual Demands refer to forecast consumption and exclude shrinkage.

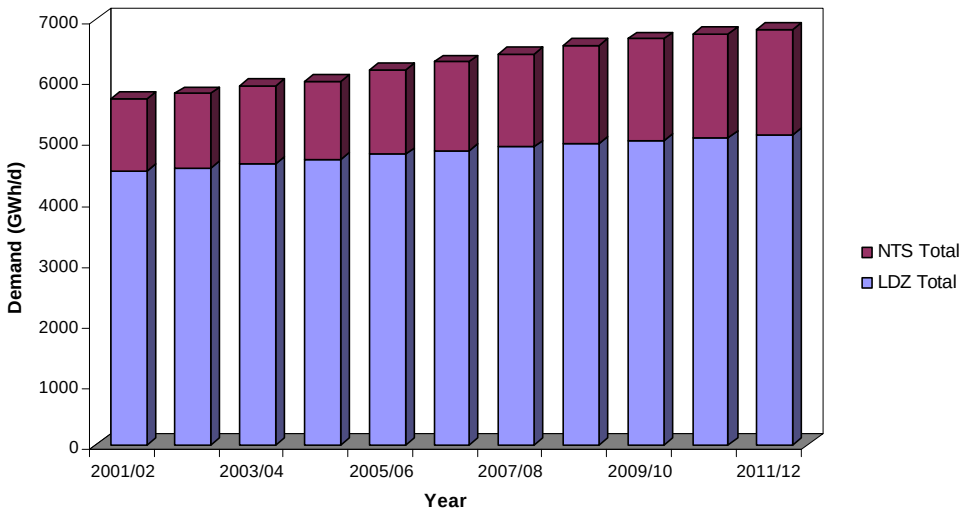
TABLE A2.1C - Forecast 1 in 20 Peak Day Firm Demand by LDZ & NTS (GWh per day)

LDZ	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
SC	340	345	353	361	369	375	381	389	395	402	408
NO	256	260	264	269	276	278	281	284	287	290	293
NW	525	529	541	548	553	558	563	568	573	578	581
NE	275	277	281	286	290	292	295	299	302	306	309
EM	445	451	458	466	473	480	486	493	499	506	511
WM	453	456	461	469	474	479	488	493	498	504	508
WA	235	237	242	247	253	257	262	266	270	275	279
EA	346	350	355	361	367	372	376	380	385	389	393
NT	494	498	502	506	513	518	521	524	528	531	533
SE	502	509	513	517	520	522	525	527	530	532	533
SO	369	373	379	386	403	408	413	418	423	428	432
SW	266	272	277	283	289	293	307	310	314	318	321
LDZ Total	**4504**	**4556**	**4625**	**4698**	**4779**	**4832**	**4898**	**4951**	**5005**	**5058**	**5102**
NTS Total	**1189**	**1221**	**1275**	**1271**	**1385**	**1466**	**1524**	**1624**	**1672**	**1703**	**1720**
Total	**5693**	**5778**	**5901**	**5969**	**6165**	**6298**	**6423**	**6575**	**6677**	**6761**	**6822**

Notes

- Peak day data is presented on a supply year basis, that runs from October to September.
- NTS and LDZ figures include shrinkage.
- NTS Total Peak Day demand excludes European Interconnector flows as it assumed that gas will be flowing into the UK during periods of high demand.

FIGURE A2.1C - Forecast 1 in 20 Peak Day Firm Demand

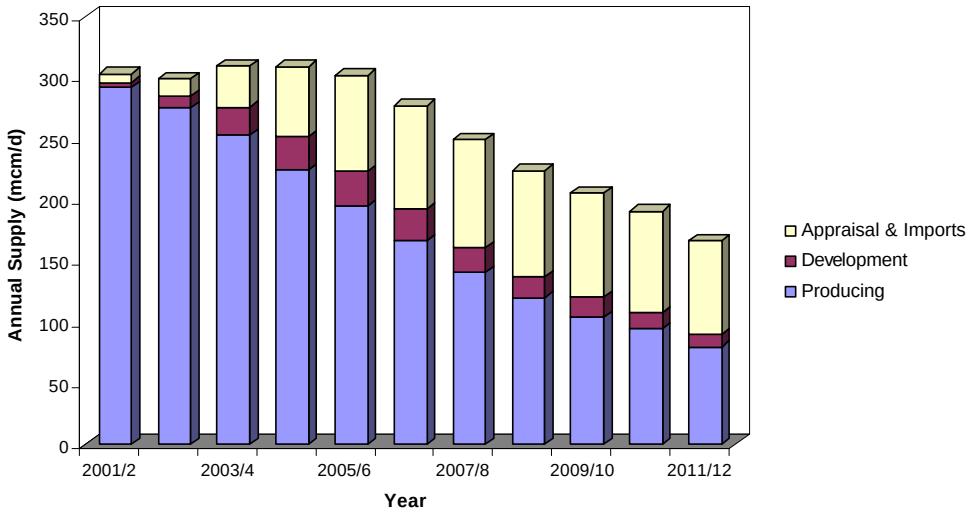


A2.2 Annual Supply Data Available to Transco

TABLE A2.2A - Annual Supplies – Information Received by Supply Category (mcm/d)

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Producing	292	275	253	225	195	167	141	120	104	95	80
Development	4	10	23	27	28	26	20	17	17	13	10
Appraisal & New Imports	7	14	34	57	79	84	88	87	85	83	77

FIGURE A2.2A - Annual Supplies - Information Received by Supply Category (mcm/d)



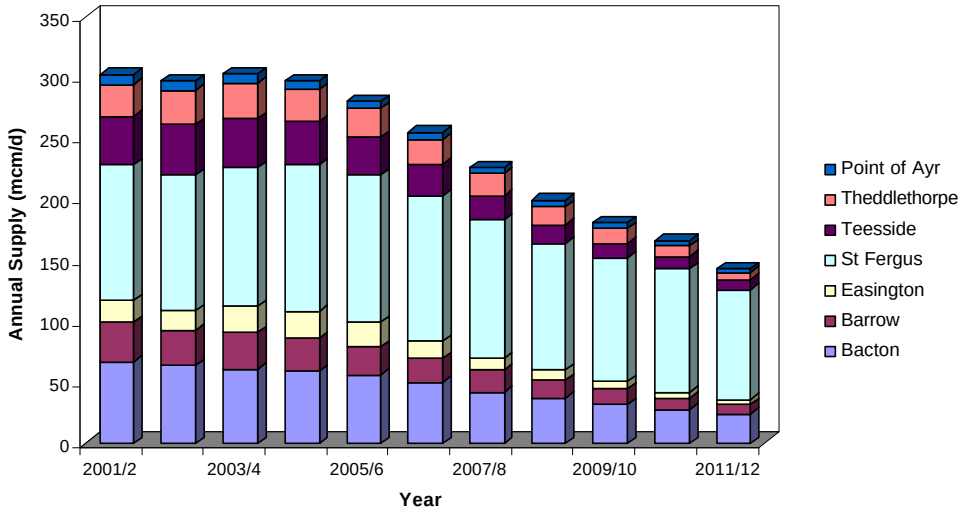
Notes

- Imports include existing Norwegian flows and Interconector imports.

TABLE A2.2B - Annual Supplies – Data Available by Supply Terminal (mcm/d)

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Bacton	67	64	61	59	56	50	42	37	32	28	24
Barrow	32	29	30	27	23	20	18	15	13	9	8
Easington	18	16	21	22	20	14	10	8	6	5	4
St Fergus	111	111	114	120	121	119	113	104	101	101	90
Teesside	40	41	40	36	31	26	20	15	12	10	8
Theddlethorpe	26	28	29	26	23	20	18	15	12	9	6
Point of Ayr	8	8	8	7	6	6	5	5	5	4	3

FIGURE A2.2B - Annual Supplies - Data Available by Supply Terminal (mcm/d)



Notes

- Bacton volumes do not include IC Imports.
- St Fergus volumes include Vesterled.

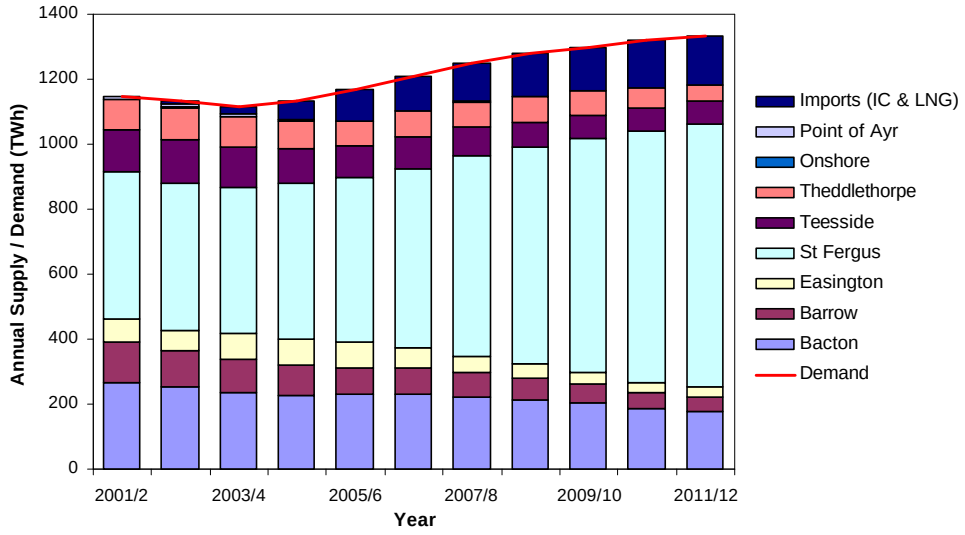
A2.3 Annual Supply Scenarios

A2.3.1 Annual Demand & Northern Supply Scenario

TABLE A2.3A – Forecast Annual Demand & Northern Supply Scenario (TWh)

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Demand	1148	1132	1117	1133	1170	1211	1251	1278	1300	1318	1333
Bacton	267	255	235	229	229	231	222	214	203	188	178
Barrow	124	111	104	92	82	78	73	67	60	49	45
Easington	69	63	79	82	77	62	50	43	37	31	30
St Fergus	453	451	449	478	510	555	620	666	717	772	812
Teesside	129	134	121	106	95	95	86	77	73	70	69
Theddlethorpe	94	99	94	84	75	78	79	79	73	64	51
Onshore	1	1	1	0	0	0	0	0	0	0	0
Point of Ayr	10	9	8	4	3	3	1	1	0	0	0
Imports (IC & LNG)	0	9	25	59	97	108	119	130	137	145	149
Total	**1148**	**1132**	**1117**	**1133**	**1170**	**1211**	**1251**	**1278**	**1300**	**1318**	**1333**

FIGURE A2.3A – Forecast Annual Demand & Northern Supply Scenario (TWh)



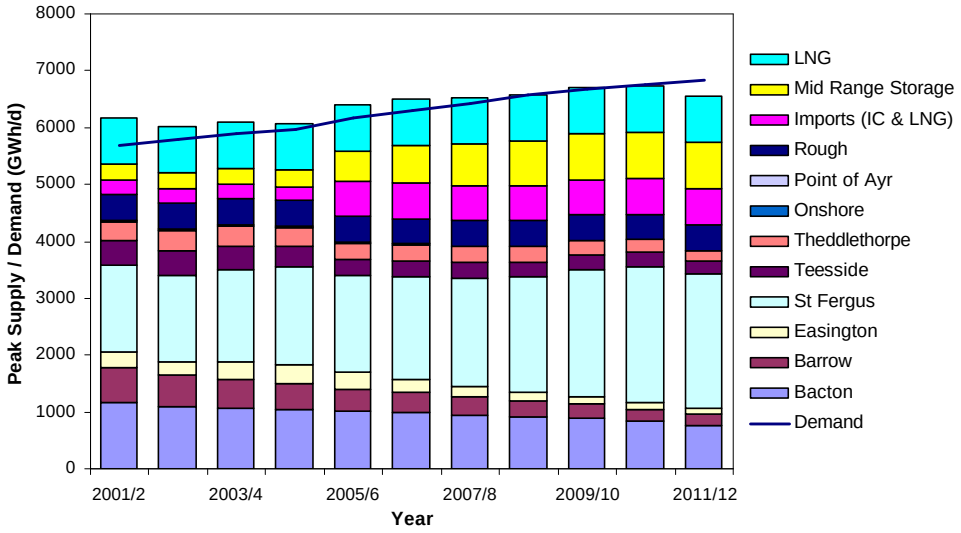
A2.4 Peak Supply Scenarios

A2.4.1 Peak Demand & Northern Supply Scenario

TABLE A2.4A – Forecast Peak Demand & Northern Supply Scenario (GWh per day)

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Demand	5693	5778	5901	5969	6165	6298	6423	6575	6677	6761	6822
Bacton	1176	1103	1058	1046	1005	983	942	910	884	840	774
Barrow	614	547	519	458	394	358	322	292	262	213	184
Easington	265	232	313	323	290	222	178	152	136	117	105
St Fergus	1538	1527	1604	1735	1706	1808	1921	2020	2211	2375	2362
Teesside	409	424	407	356	299	293	269	248	258	252	243
Theddlethorpe	343	361	362	325	278	280	280	281	262	230	178
Onshore	3	2	2	1	1	1	1	1	1	0	0
Point of Ayr	32	30	32	18	10	6	0	0	0	0	0
Rough	455	455	455	455	455	455	455	455	455	455	455
Imports (IC & LNG)	247	247	247	247	617	617	617	617	617	617	617
Mid Range Storage	284	284	284	284	542	662	721	781	810	810	810
LNG	813	813	813	813	813	813	813	813	813	813	813
Total	**6179**	**6025**	**6096**	**6061**	**6410**	**6498**	**6519**	**6570**	**6709**	**6722**	**6541**

FIGURE A2.4A – Forecast Peak Demand & Northern Supply Scenario (GWh per day)

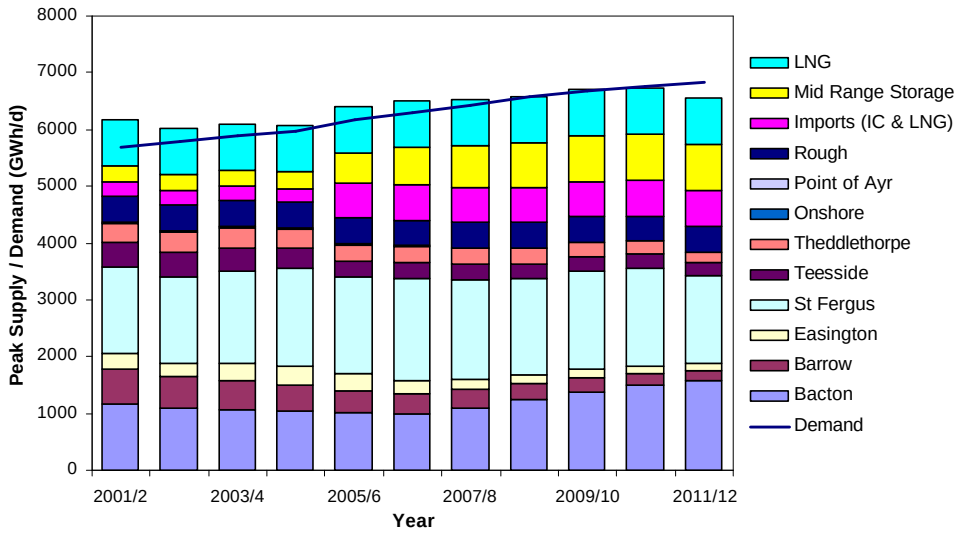


A2.4.2 Peak Demand & Southern Supply Scenario

TABLE A2.4B – Forecast Peak Demand & Southern Supply Scenario (GWh per day)

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12
Demand	5693	5778	5901	5969	6165	6298	6423	6575	6677	6761	6822
Bacton	1176	1103	1058	1046	1005	983	1103	1233	1369	1486	1581
Barrow	614	547	519	458	394	358	322	292	262	213	184
Easington	265	232	313	323	290	222	178	152	136	117	105
St Fergus	1538	1527	1604	1735	1706	1808	1760	1697	1726	1729	1554
Teesside	409	424	407	356	299	293	269	248	258	252	243
Theddlethorpe	343	361	362	325	278	280	280	281	262	230	178
Onshore	3	2	2	1	1	1	1	1	1	0	0
Point of Ayr	32	30	32	18	10	6	0	0	0	0	0
Rough	455	455	455	455	455	455	455	455	455	455	455
Imports (IC & LNG)	247	247	247	247	617	617	617	617	617	617	617
Mid Range Storage	284	284	284	284	542	662	721	781	810	810	810
LNG	813	813	813	813	813	813	813	813	813	813	813
Total	**6179**	**6025**	**6096**	**6061**	**6410**	**6498**	**6519**	**6570**	**6709**	**6722**	**6540**

FIGURE A2.4B – Forecast Peak Demand &Southern Supply Scenario (GWh per day)



Appendix 3

Actual Flows 2001

A3.1 Annual Flows

A3.2 Compressor Usage

A3.3 Peak & Minimum Flows

This Appendix describes annual and peak flows during the calendar year 2001. Where relevant, more up to date data from the subsequent winter period has been included to give gas supply year figures i.e. 1st October 2001 to 30th September 2002.

A3.1 Annual Flows

Transco's 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.

For a number of relatively recent years Great Britain has seen some of the warmest winters on record and consequently, Transco has adjusted the long term average weather condition to allow for "global warming". Hence both the weather corrected actual and forecast demands are shown assuming a weather condition based on a trend of the last 35 years weather.

Tables A3.1A and A3.1B provide a comparison of actual system throughputs in the 2001 calendar year. Actual demands incorporate a reallocation of demand between 0-73 MWh and > 73 MWh firm load bands which include an allowance for reconciliation, loads crossing between thresholds, etc. The forecasts shown are from the 2001 Ten Year Statement forecast for 2001 annual demands corrected for reconciliation in 2000, i.e. the base year from which the forecasts were projected. Hence this enables the demands to be shown on a comparable basis.

Annual demands are presented in two formats, firstly by LDZ and NTS load bands/categories (based on the physical design of the system) and secondly split into Business & Domestic and Large User (as set out in Transco's price control formula that regulated Transco's revenue for the period April 1997 to March 2002).

TABLE A3.1A – Annual Demand for 2001 (TWh) – LDZ / NTS Split

TWh	**Actual Demand**	**Weather Corrected Demand**	**2001 10 YS Forecast Demand**
0-73 MWh	407	405	404
73-732 MWh	61	61	63
>732 MWh Firm	141	141	141
Interruptible	108	110	120
LDZ Total	**717**	**717**	**728**
Industrial	32	32	35
Power Generation	210	212	216
Exports	145	146	158
NTS Loads	**387**	**390**	**409**
Total Consumption	**1104**	**1107**	**1137**
Shrinkage	**16**	**16**	**15**
Total Throughput	**1120**	**1123**	**1152**

TABLE A3.1B – Annual Demand for 2001 (TWh) – Business & Domestic / Large User Split

TWh	**Actual Demand**	**Weather Corrected Demand**	**2001 10 YS Forecast Demand**
0-73 MWh	407	405	404
73-732 MWh	61	61	63
>732 MWh Firm	125	125	123
Interruptible	90	92	99
Business & Domestic Total	**683**	**683**	**689**
LDZ Large User	34	34	39
Industrial	32	32	35
Power Generation	210	212	216
Exports	145	146	158
Large Loads Total	**421**	**424**	**448**
Total Consumption	**1104**	**1107**	**1137**
Shrinkage	**16**	**16**	**15**
Total Throughput	**1120**	**1123**	**1152**

Due to reconciliation, the load band splits of the actual and corrected demands & forecasts shown in Tables A3.1A and A3.1B are different from those presented in Transco's Accounts and the 2001 Ten Year Statement, although the total remains the same.

Tables A3.1A and A3.1B indicate that the weather was closely similar to the "average" weather conditions based on the last 35 years. Growth in the LDZ firm sectors (0 – 73 MWh, 73-732 MWh & >732 MWh) and Power Generation was in line with expectations, whilst lower than expected growth in the LDZ Interruptible, NTS Industrial and Export sectors was due to the slow down in manufacturing, sharp increase in gas prices and less attractive economics for new CHP developments.

Total weather corrected demand grew by only 0.2% during 2001, this compares unfavourably to recent annual increases of 9% and 13% for 2000 and 1999 respectively. The low overall growth can be attributed to a fall in demand at LDZ level - the first such decline since natural gas first came ashore in the late 1960s.

A3.2 Compressor Usage

Table A3.2 shows the gas used at each of the compressor stations during the gas year 2001/2. It also shows the maximum fuel usage day for the same period which occurred on a different day to the maximum demand day.

TABLE A3.2 – Compressor Usage for Gas Year 2001/2 (mcm)

Compressor	**Total 2001/2**	**Max. Compressor Use 03 Jan 2002**
Aberdeen	64.01	0.30
Alrewas	12.45	0.00
Aylesbury	0.72	0.07
Bathgate	52.80	0.18
Bishop Auckland	46.42	0.16
Cambridge	1.09	0.09
Carnforth	54.50	0.19
Chelmsford	2.13	0.06
Churchover	16.88	0.08
Diss	13.02	0.17
Hatton	33.83	0.33
Huntingdon	19.44	0.20
Kings Lynn	1.99	0.09
Kirriemuir	54.08	0.20
Moffat	44.73	0.15
Peterborough	17.77	0.17
Scunthorpe	9.92	0.00
St Fergus	90.50	0.31
Warrington	36.13	0.15
Wisbech	0.80	0.11
Wooler	25.90	0.14
Wormington	3.83	0.11
Peterstow (electric)	N/A	N/A
Total	**602.95**	**3.26**

A3.3 Peak & Minimum Flows

A3.3.1 System Entry – Maximum Day Flows

The maximum demand day for 2001/2 and the maximum historical demand day occurred on 2nd January 2002 when 427 mcm was transported via Transco's system. Total inputs on this day were 433 mcm. The following day was the maximum supply day where fractionally less was transported through Transco's system but inputs were 434 mcm. The minimum demand during gas year 2001/2 occurred on the 17th August 2002 with a demand of 165 mcm.

TABLE A3.3A – System Entry – Maximum Supply Day Flows on 3rd January 2002 (mcm/d)

Terminal	**Maximum Day 3rd Jan 2002**	**1 in 20 Peak**	**Highest Daily for 2001/2**
St Fergus	131.19	128.35	133.06
Barrow	53.97	54.79	55.71
Easington (exc. Rough)	21.90	23.52	22.32
Theddlethorpe	27.24	34.02	30.43
Bacton (incl. IC and SEAL)	106.09	134.76	106.89
Teesside	34.21	35.37	40.55
Burton Point	3.95	2.96	5.25
On Shore	0.25	0.30	0.34
Sub Total	**378.81**	**414.07**	**394.56**
Storage Withdrawal	54.86	125.71	62.63
Total	**433.67**	**539.78**	**457.19**

Notes

- The maximum day for 2001/2 refers to flows on the 3rd January 2002. These flows are not necessarily commensurate with current forecasts or with maximum flows of individual terminals.
- 1 in 20 peak flow refers to the St Fergus Base Scenario in the 2001 Ten Year Statement. Volumes are based on actual flow CVs.
- Bacton terminal flows include imports via the European Interconnector.
- Highest daily flows by terminal are non-concurrent and relate to the 2001/2 winter period.

A3.3.2 System Entry – Minimum Day Flows

TABLE A3.3B – System Entry Flows on the Minimum Demand Day of Gas Year 2001/2 (mcm/d)

Terminal	Minimum Day 17th August 2002
St Fergus	81.17
Barrow	9.32
Easington (exc. Rough)	3.69
Theddlethorpe	16.93
Bacton inc Seal and IC	29.21
Teesside	30.05
Burton Point	0.00
On Shore	0.23
Sub Total	**170.61**
Storage Withdrawal	0.00
Total	**170.61**

A3.3.3 System Exit – Maximum and Peak Day Flows

Table A3.3C shows actual flows out of the NTS on the maximum demand day of gas year 2001/2 compared to the forecast peak flows.

TABLE A3.3C – NTS Exit Flows on 2nd January 2002 (mcm)

LDZ	Maximum Day 2nd January 2002	1 in 20 Peak for 2001/2
Scotland	26.80	31.08
Northern	20.03	23.82
North West	46.23	49.10
North East	23.90	25.31
East Midlands	40.04	41.95
West Midlands	33.08	41.44
Wales North	3.81	4.63
Wales South	15.68	18.00
Eastern	28.13	32.59
North Thames	37.42	46.34
South East	38.88	47.04
Southern	24.90	34.54
South West	19.55	25.24
LDZ Total	358.44	421.08
NTS Loads	68.47	120.80
Total	**426.91**	**541.89**

Notes

- The maximum day for gas year 2001/2 refers to flows on the 2nd January 2002. Winter 2001/2 was another mild winter and 1 in 20 conditions were not experienced. This was the overall highest demand day, but individual networks may have seen higher demands on other days.

- 1 in 20 peak flow refers to the St Fergus Base Scenario in the 2001 Ten Year Statement. Volumes are base on a CV of 39 MJ/m^3.

- NTS Loads include European and Irish interconnection demands.

- The difference between total demand and total supply on the day was due to linepack changes.

A3.3.4 System Exit – Minimum Day Flows

TABLE 3.3D – Actual NTS Exit Flows on the Minimum Demand Day of Gas Year 2001/2 (mcm/d)

LDZ	Minimum Day 17th August 2002
Scotland	7.49
Northern	4.82
North West	7.71
North East	4.81
East Midlands	7.21
West Midlands	4.76
Wales North	1.07
Wales South	4.80
Eastern	3.85
North Thames	6.52
South East	6.89
Southern	3.94
South West	3.33
LDZ Total	67.19
NTS Loads	98.14
Total	**165.33**

Notes

- The minimum day for gas year 2001/2 refers to flows on the 17th August 2002. This was the overall lowest demand day, but individual networks may have seen lower demands on other days.

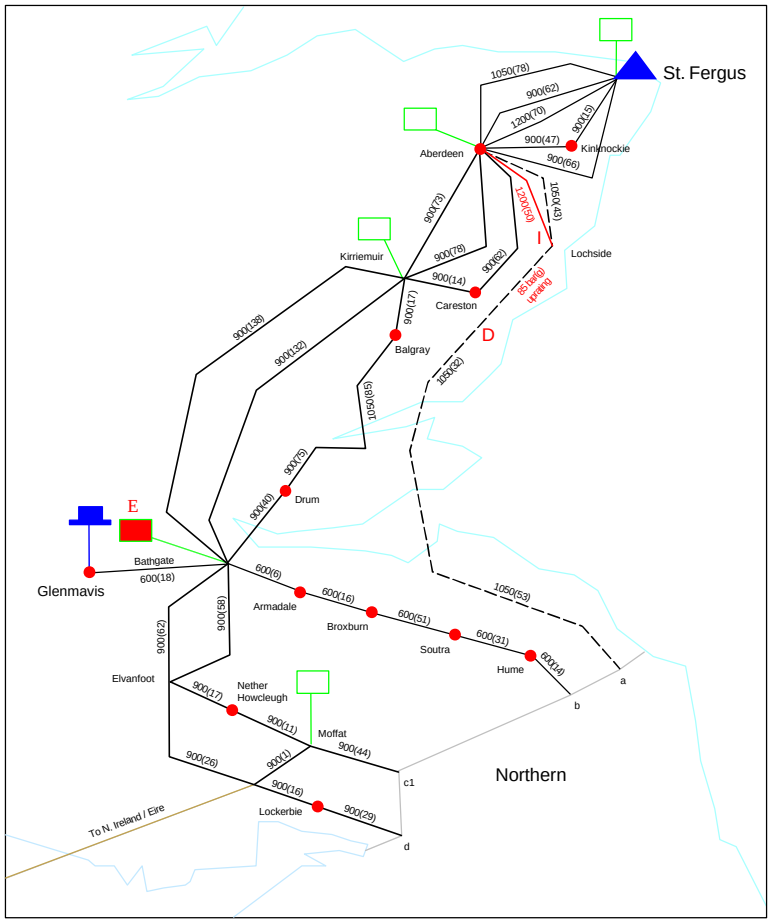
- NTS Loads include European and Irish interconnection demands.

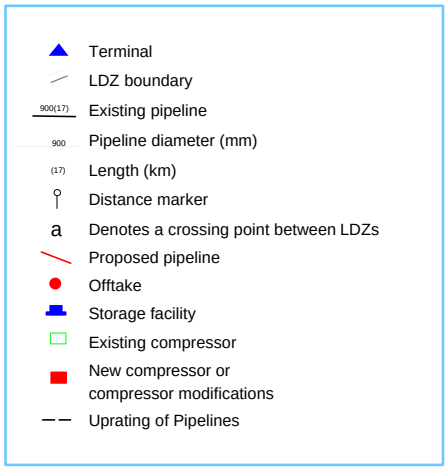
- The difference between total demand and total supply on the day was due to linepack changes.

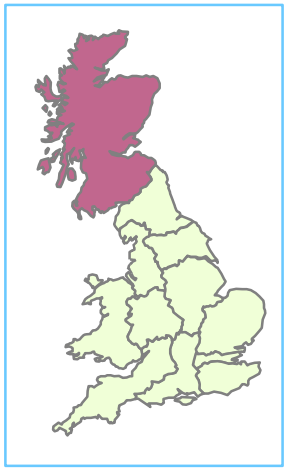
Appendix 4

The Gas Transportation System

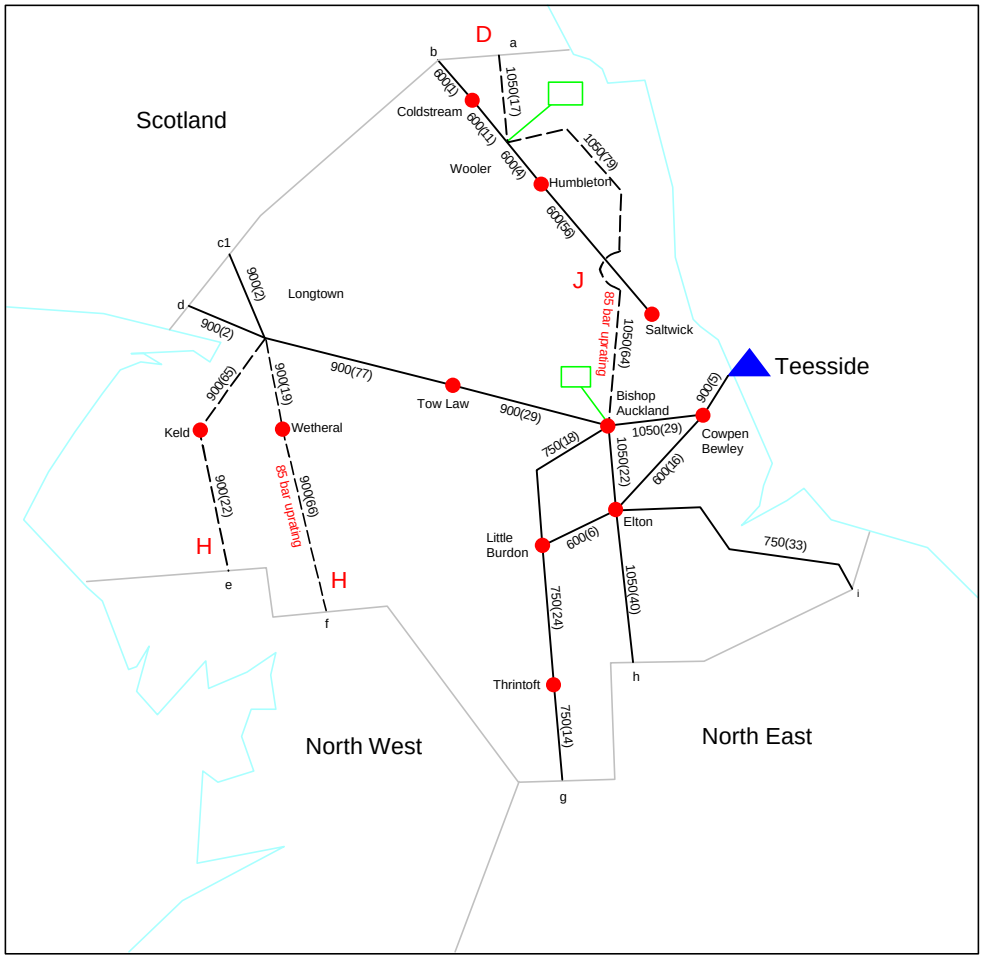
Scotland (SC) – NTS



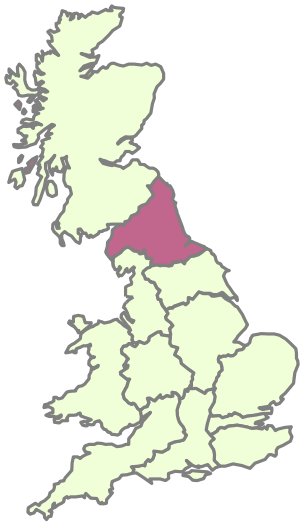




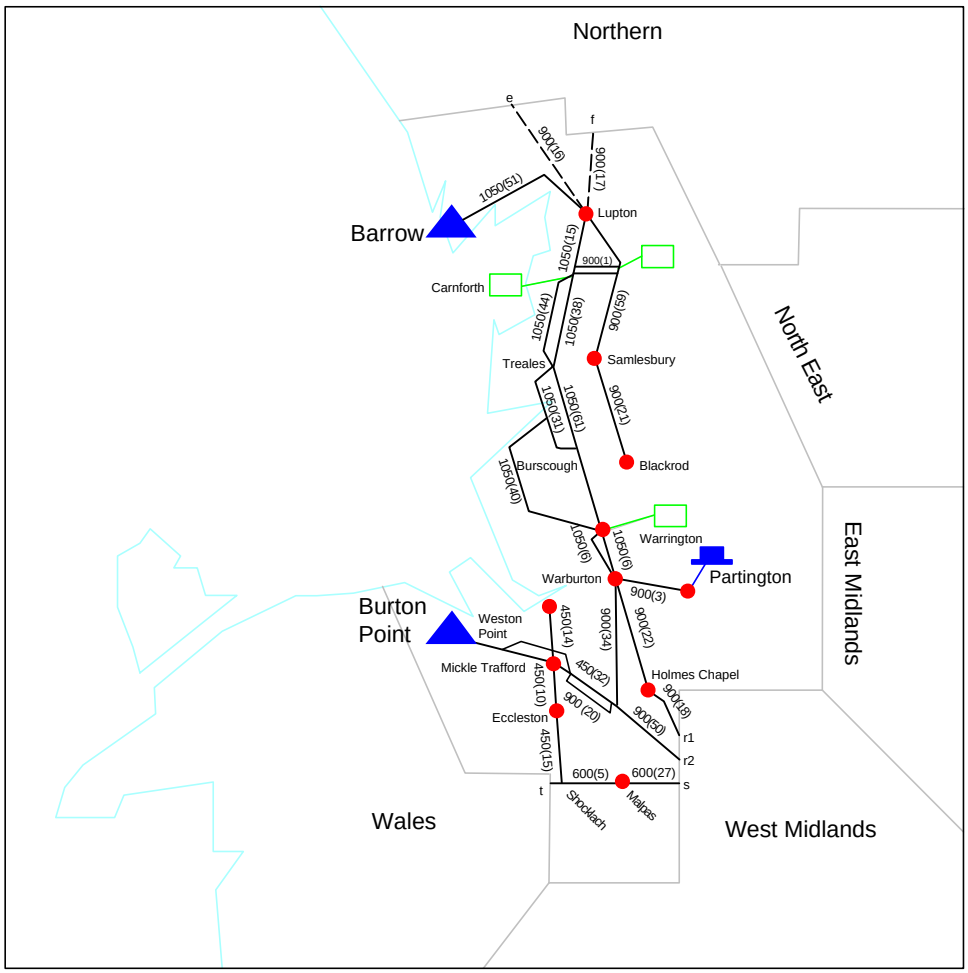
Northern (NO) – NTS



- Terminal
- LDZ boundary
- 900(17) Existing pipeline
- 900 Pipeline diameter (mm)
- (17) Length (km)
- Distance marker
- a Denotes a crossing point between LDZs
- Proposed pipeline
- Offtake
- Storage facility
- Existing compressor
- New compressor or compressor modifications
- Uprating of Pipelines



North West (NW) – NTS



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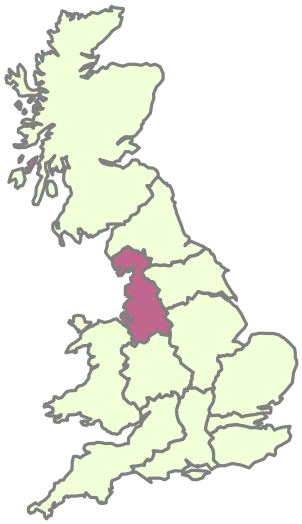
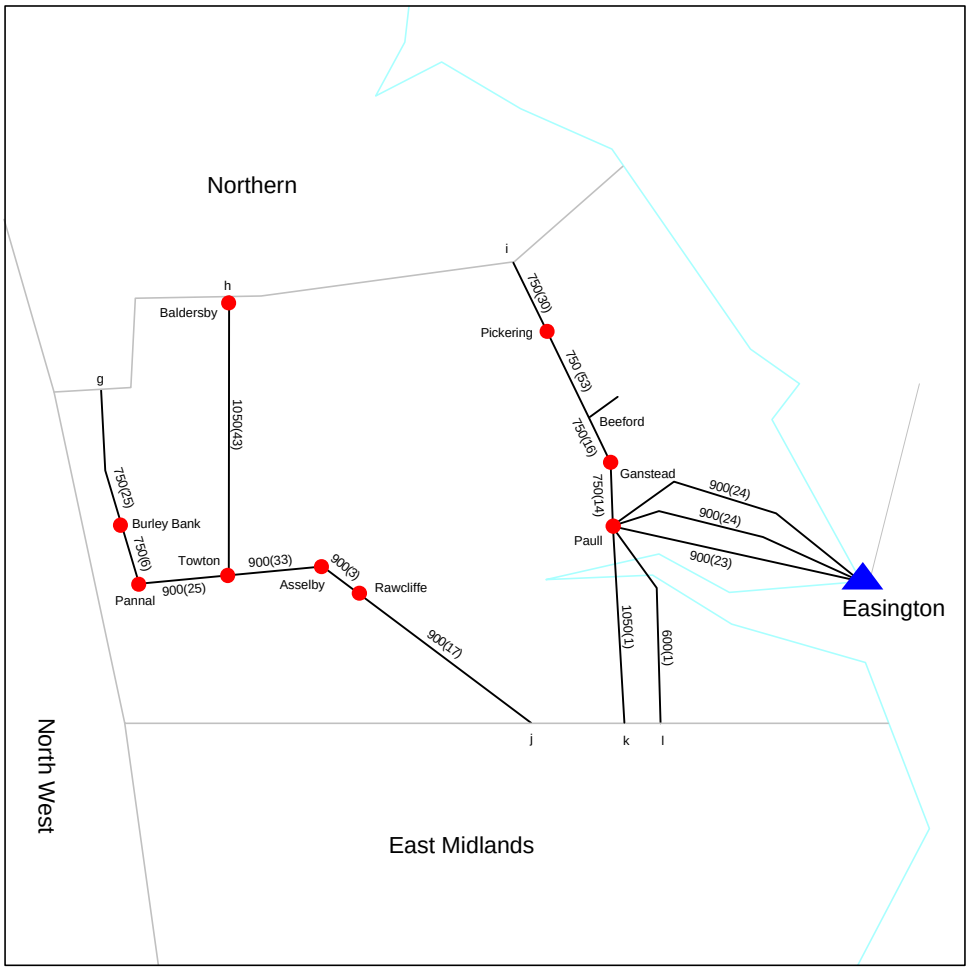
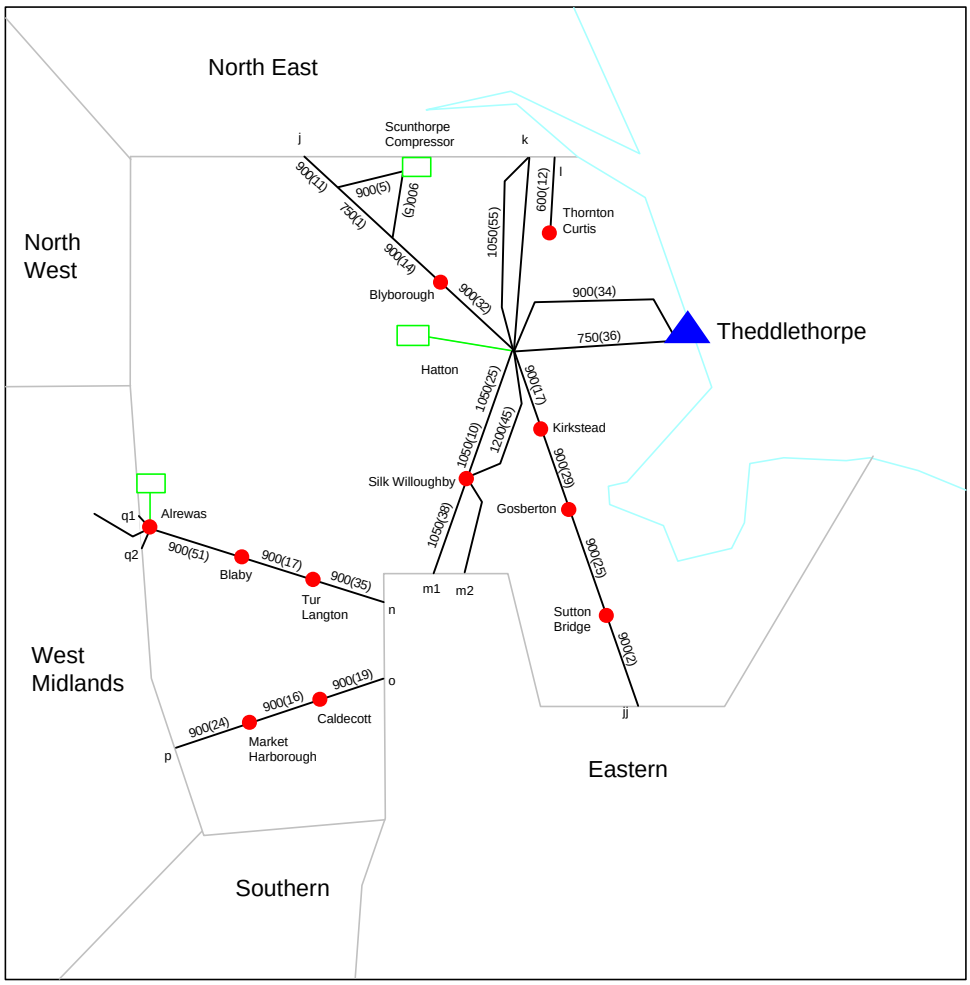
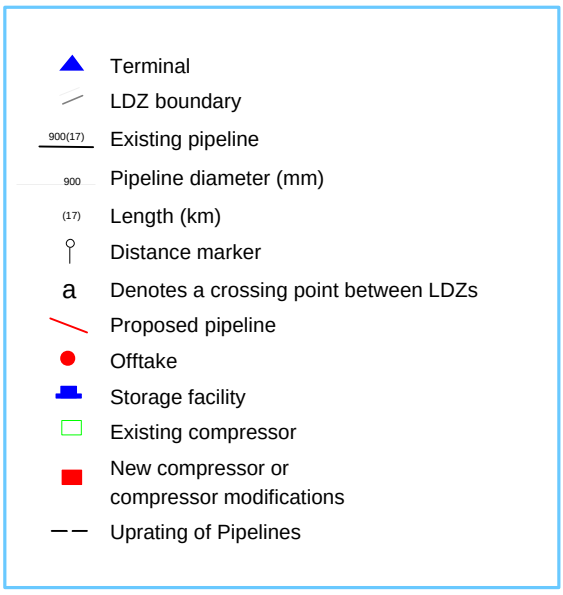


North East (NE) – NTS

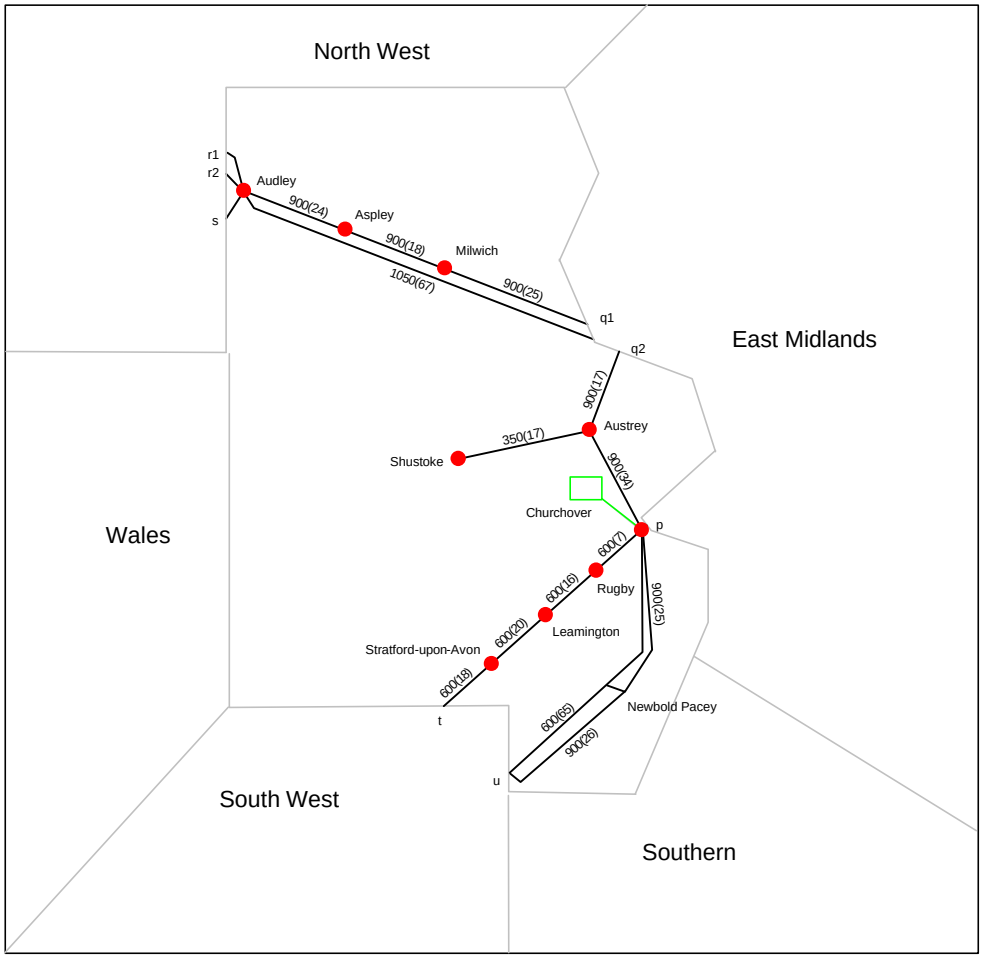


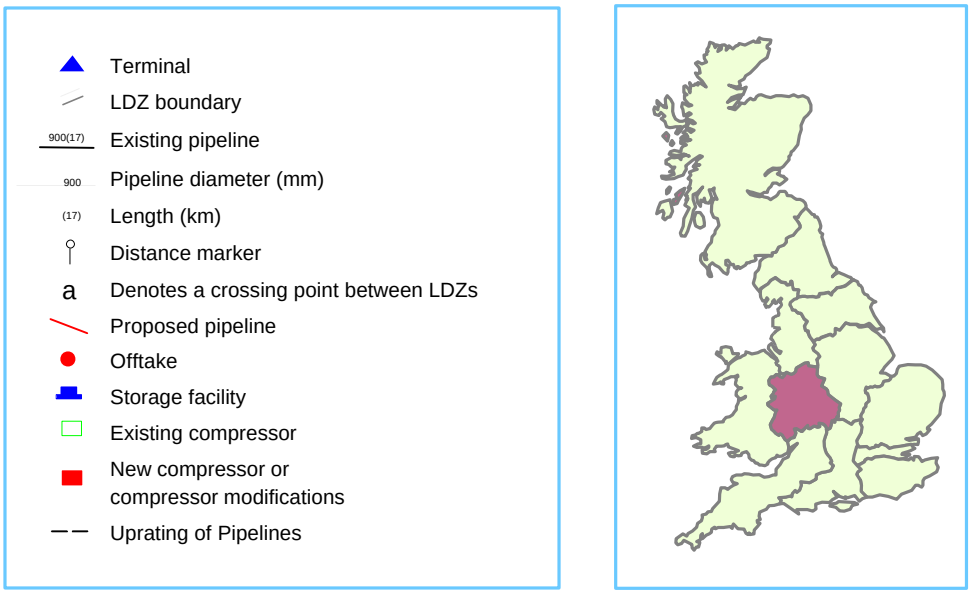
East Midlands (EM) – NTS



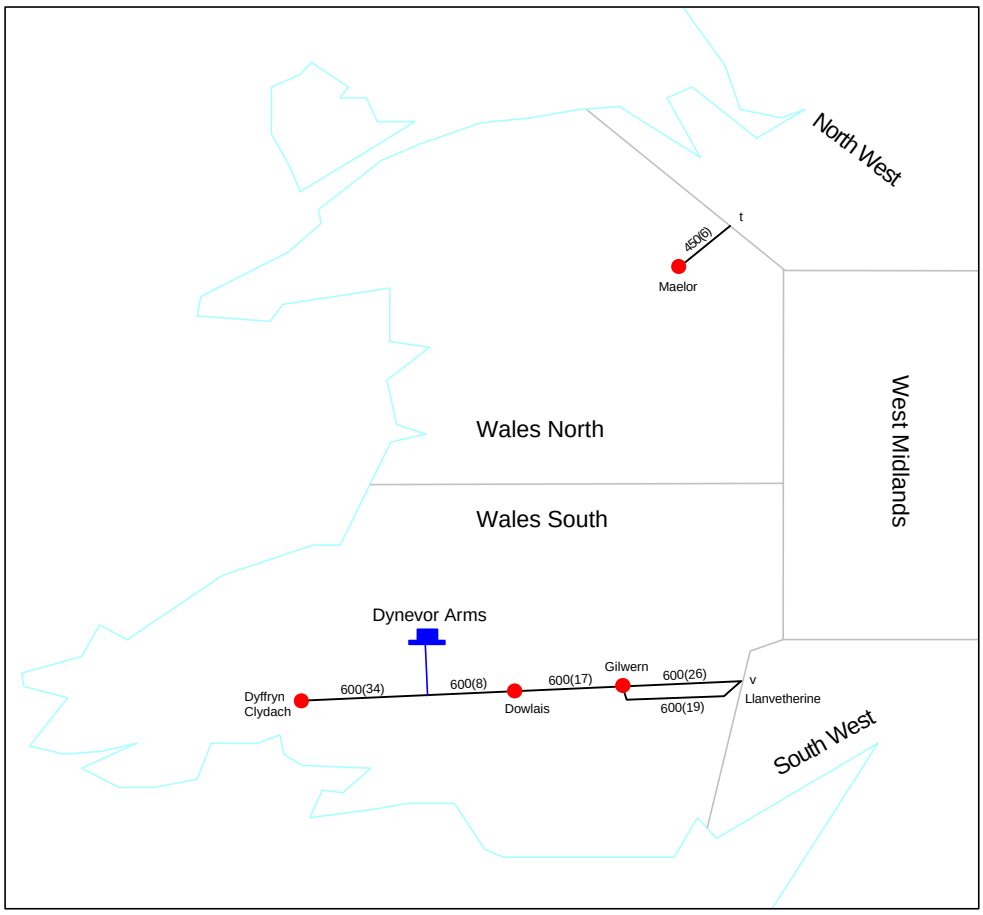


West Midlands (WM) – NTS





Wales (WN & WS) – NTS



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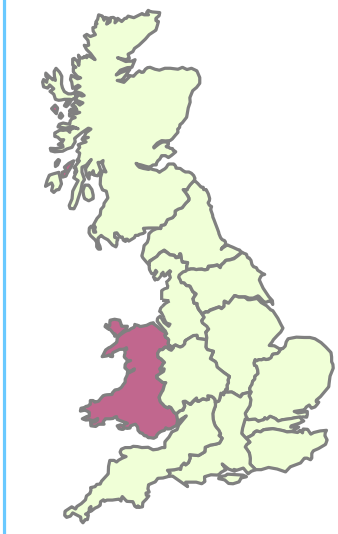
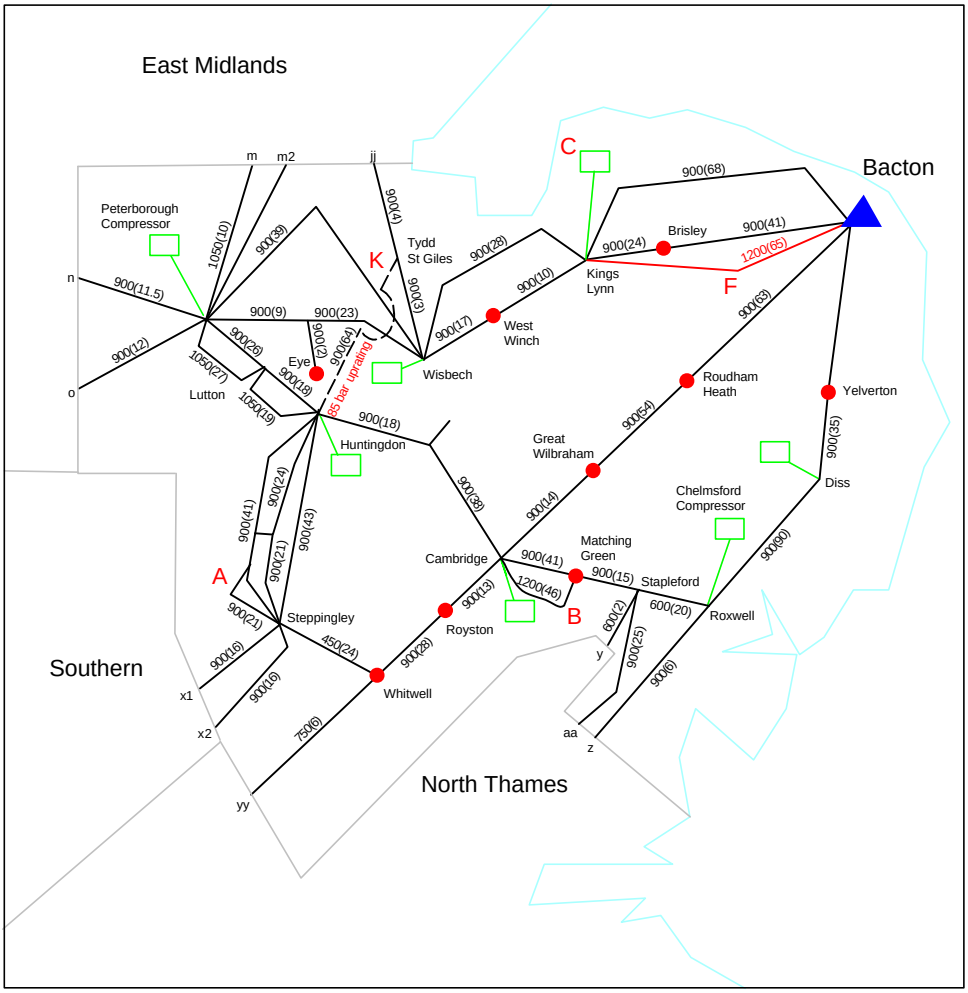


Eastern (EA) – NTS



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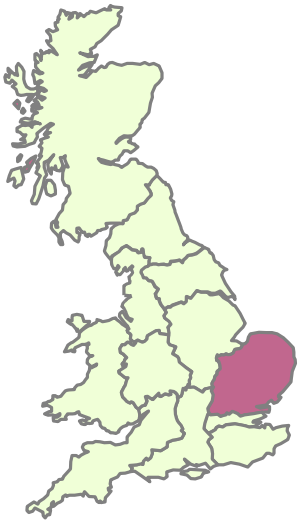
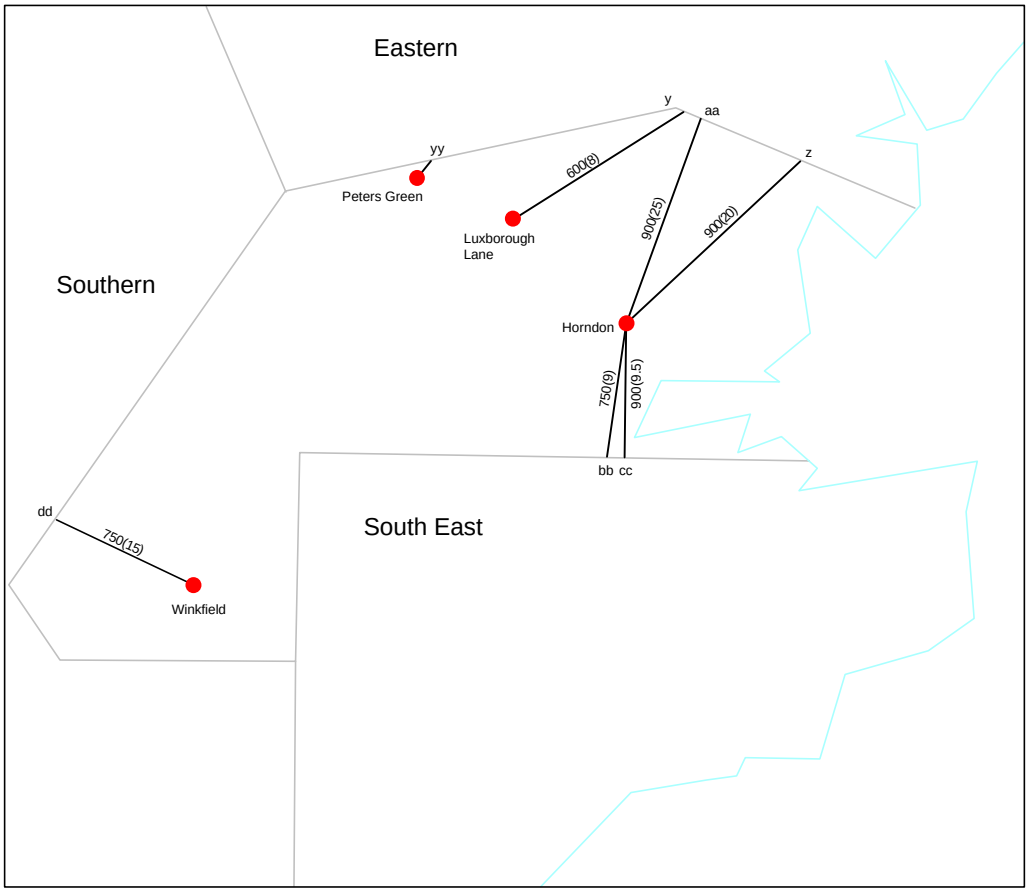
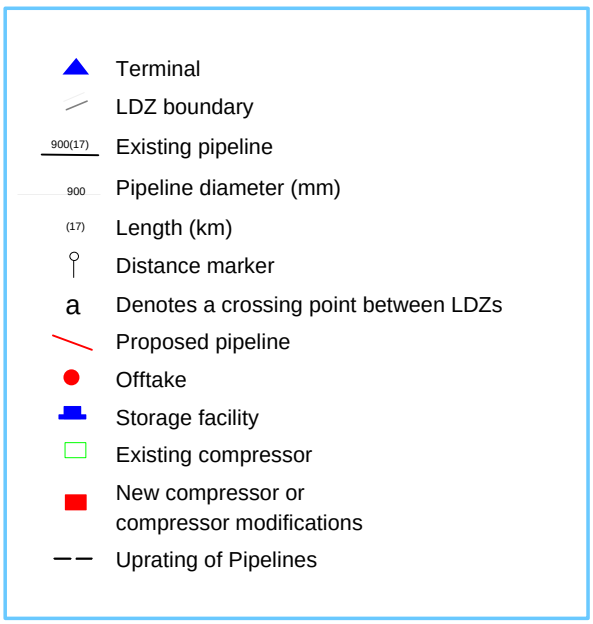
- New compressor or compressor modifications
- Uprating of Pipelines

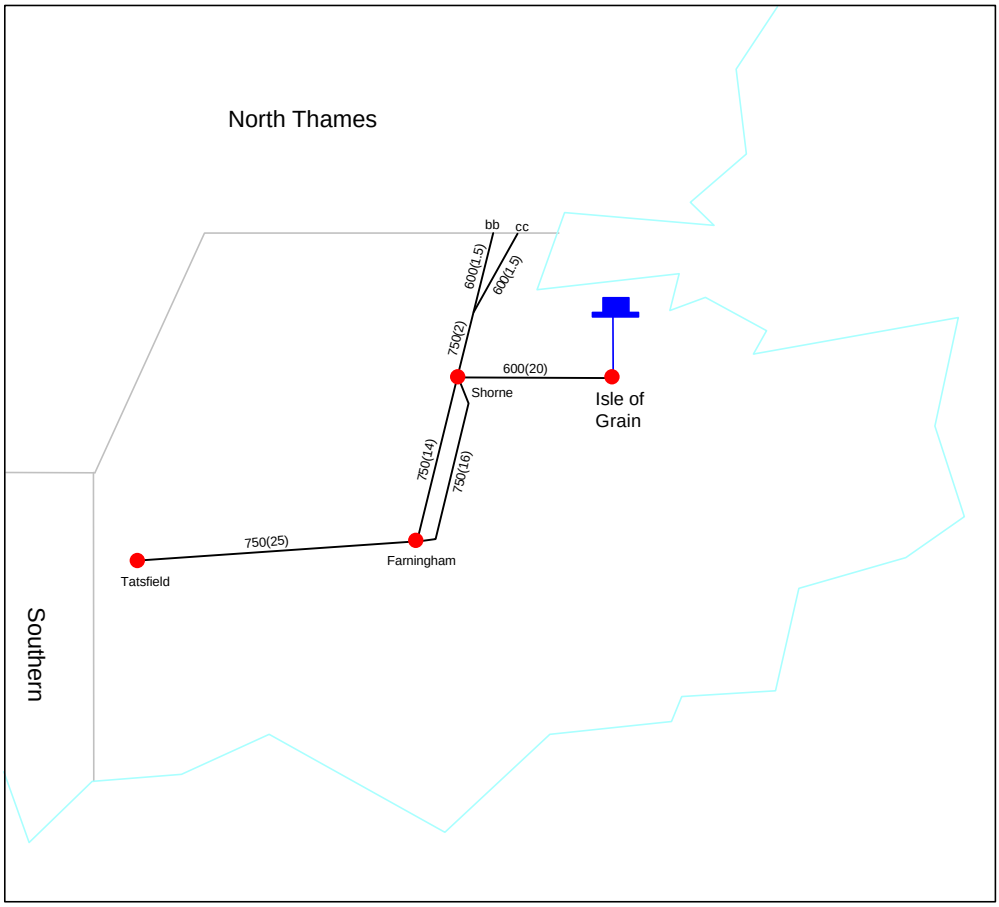


North Thames (NT) – NTS





South East (SE) – NTS



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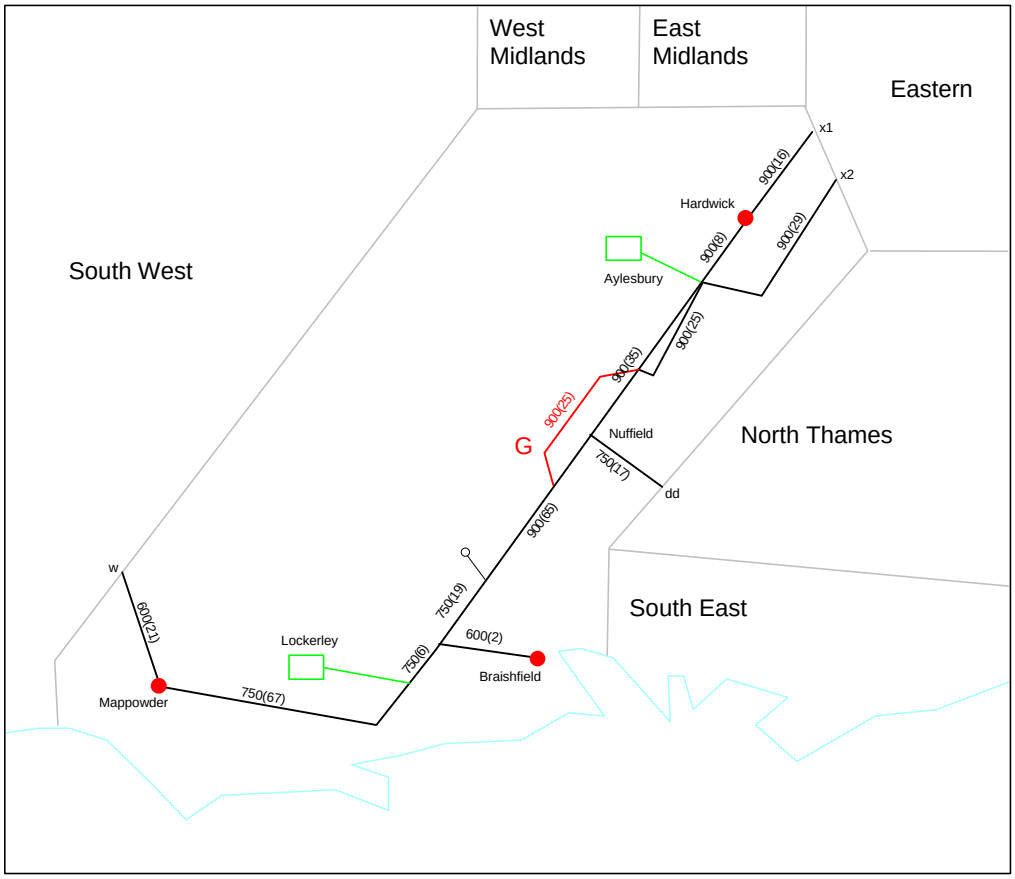
Southern (SO) – NTS



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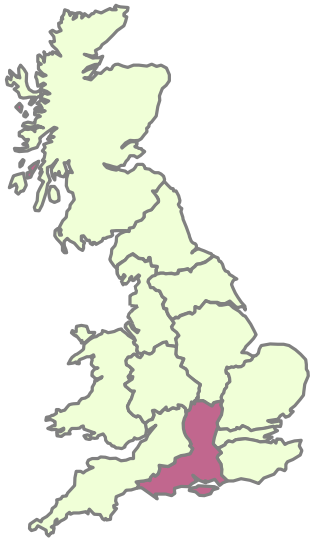
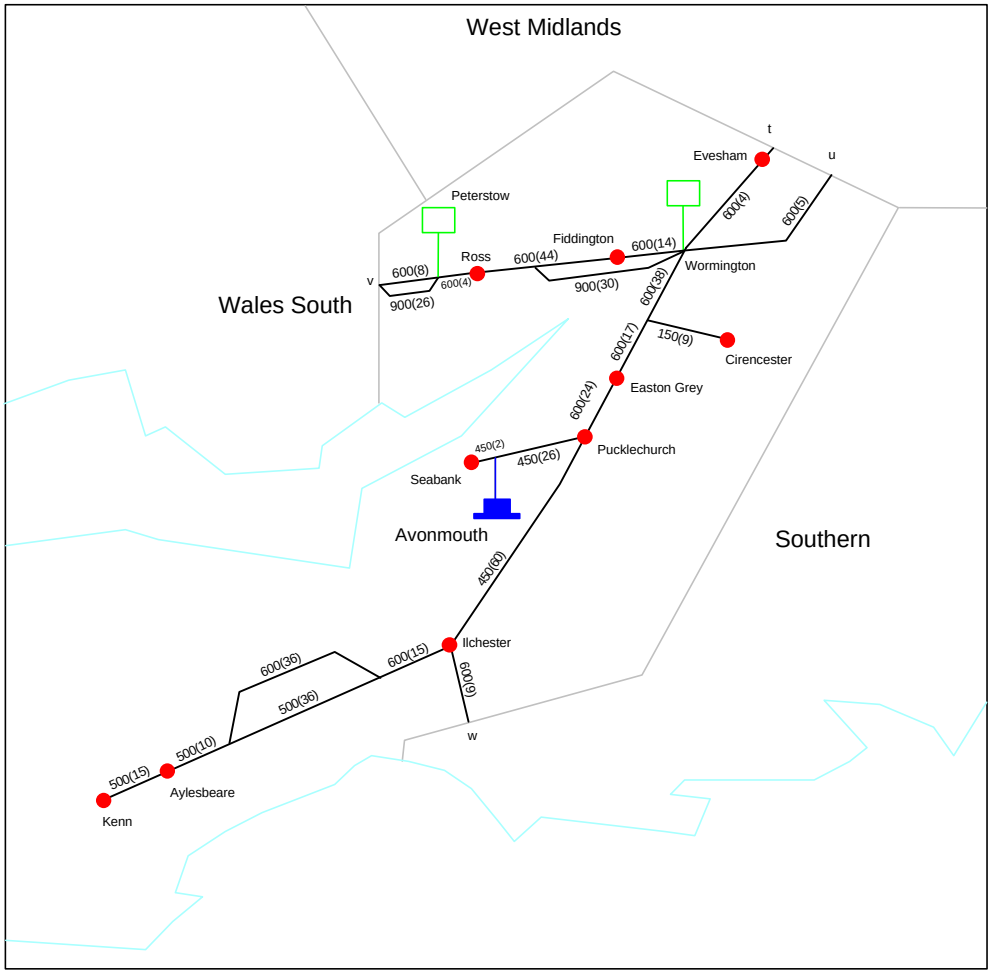


South West (SW) – NTS



- Terminal
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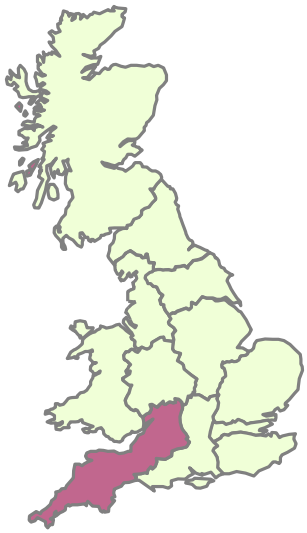
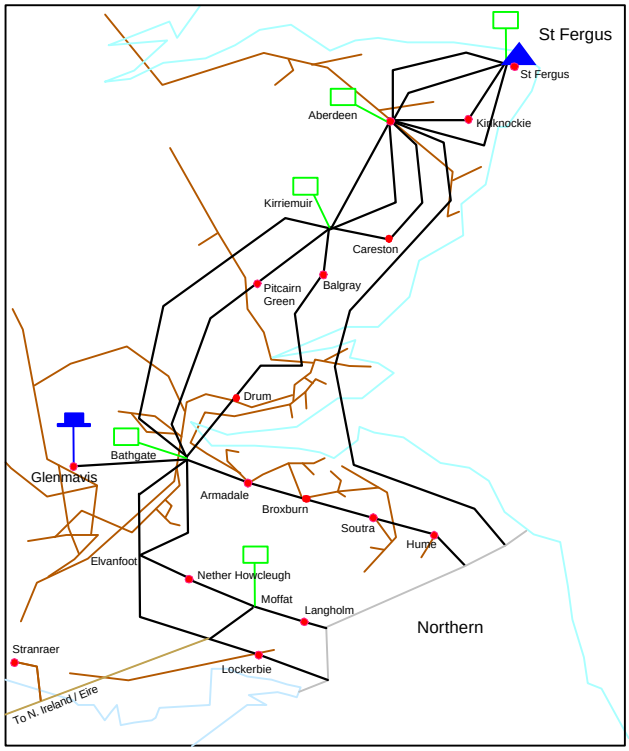
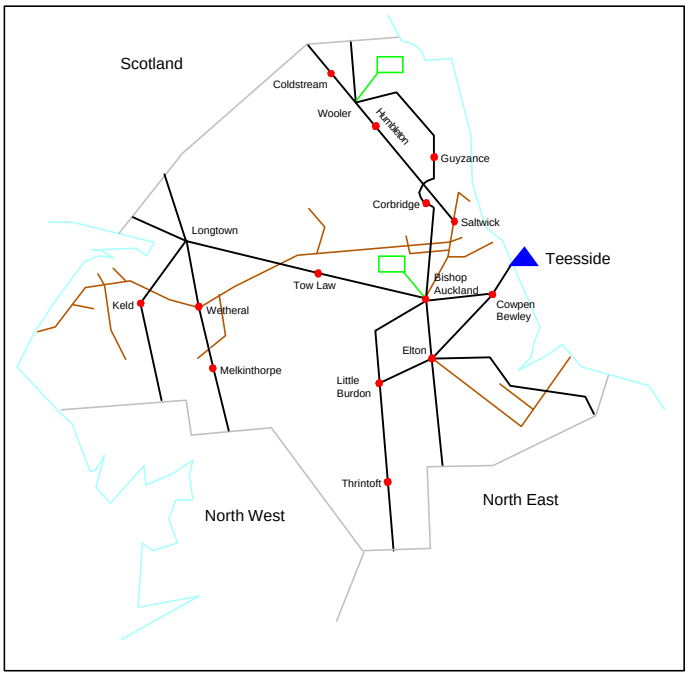


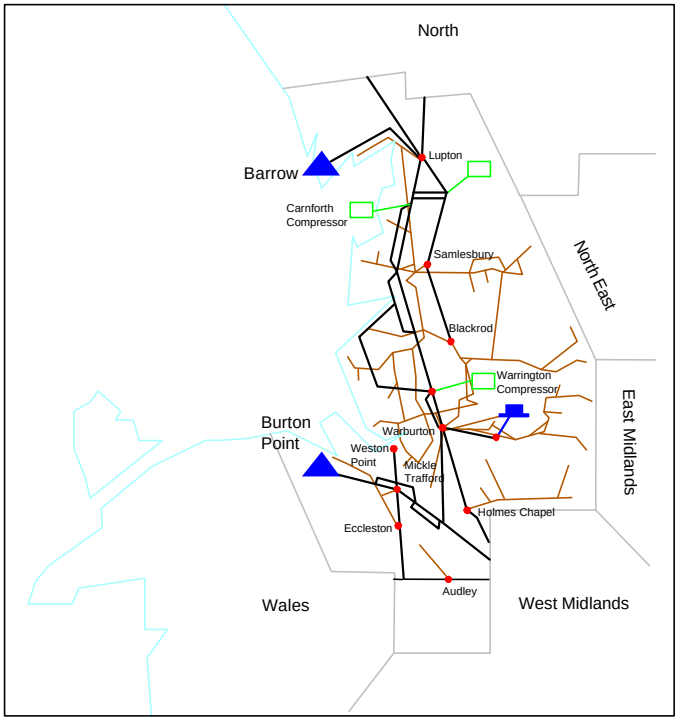
Scotland (SC) – LTS



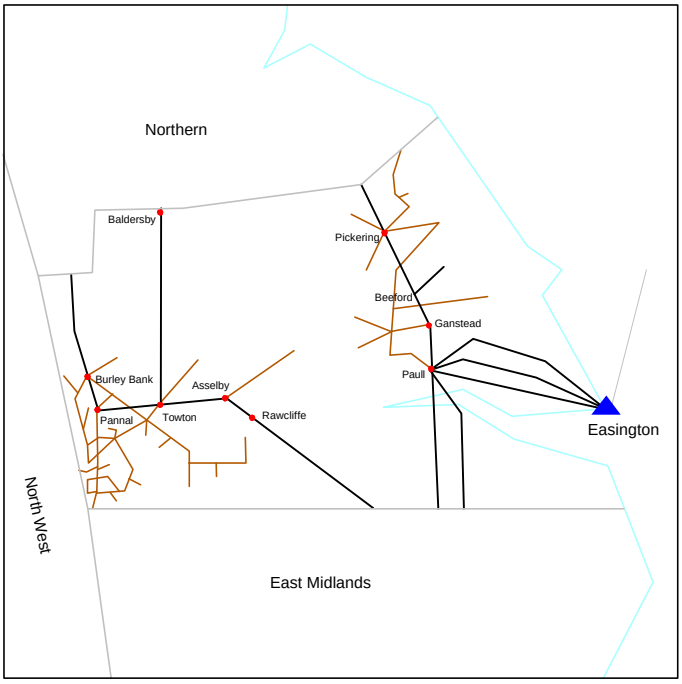
North (NO) – LTS



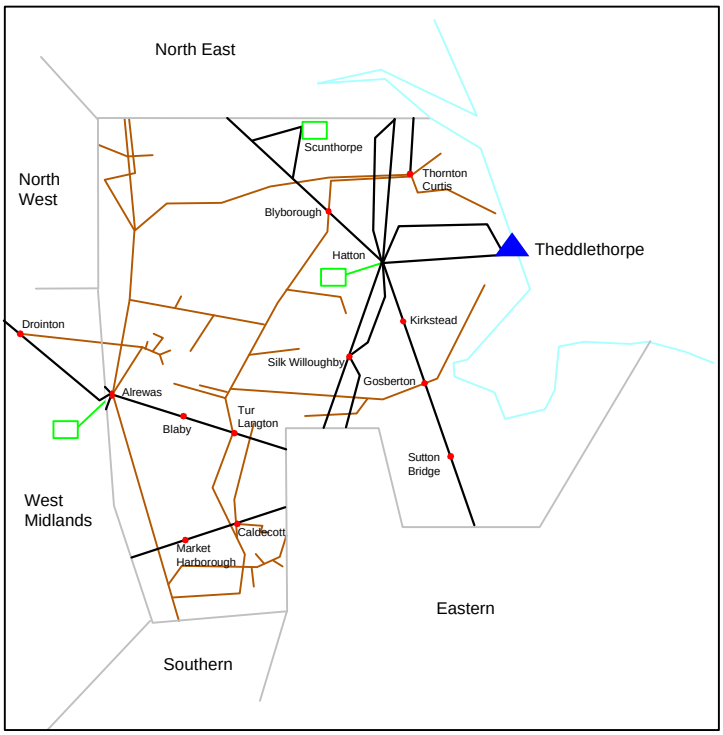
North West (NW) – LTS



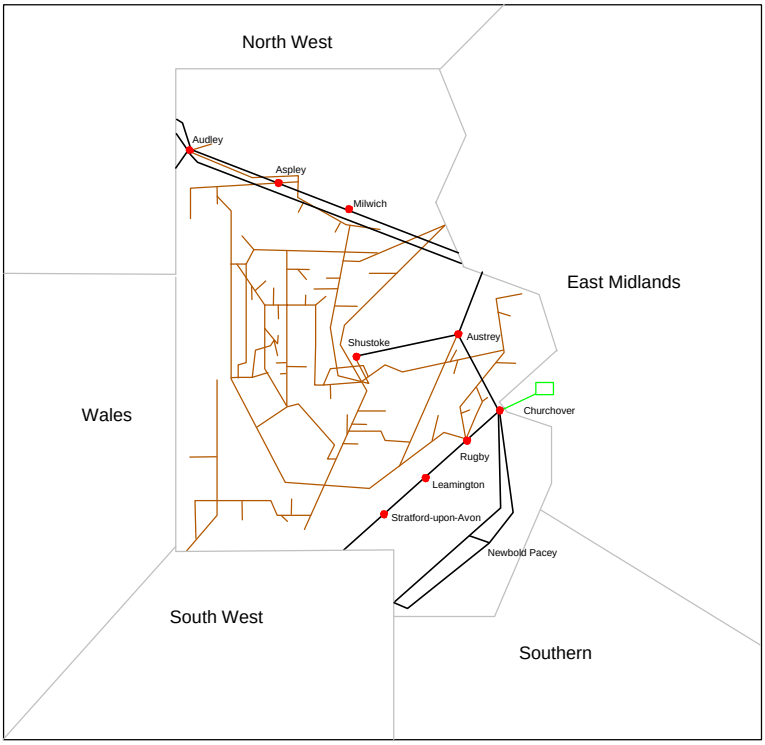
North East (NE) – LTS



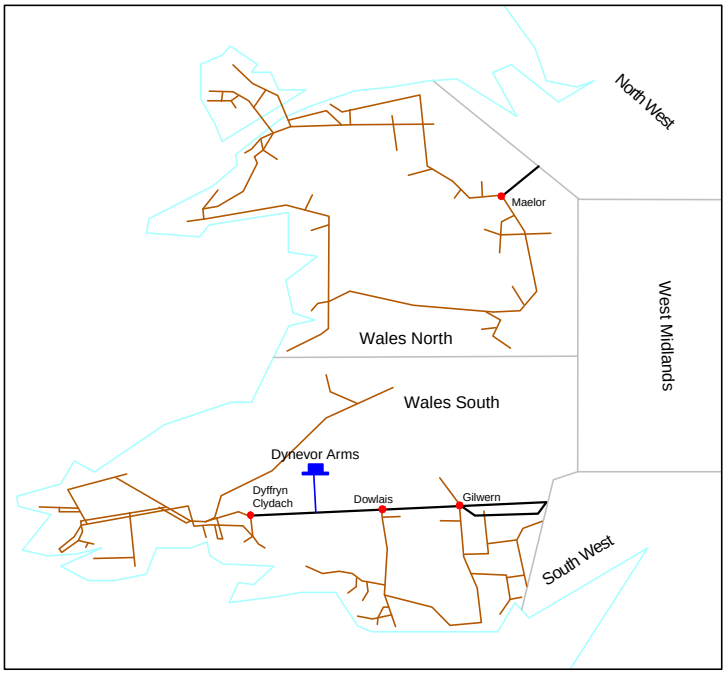
East Midlands (EM) – LTS



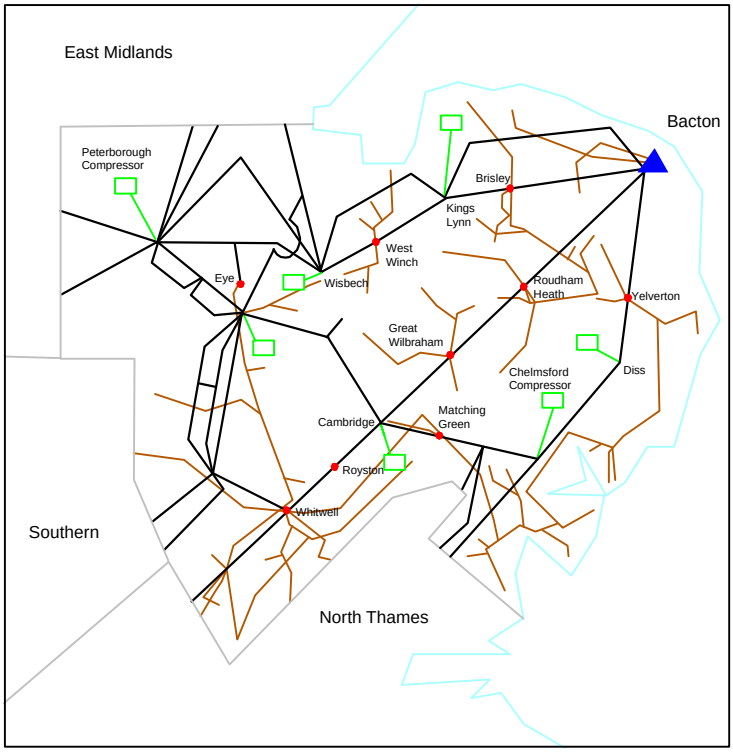
West Midlands (WM) – LTS



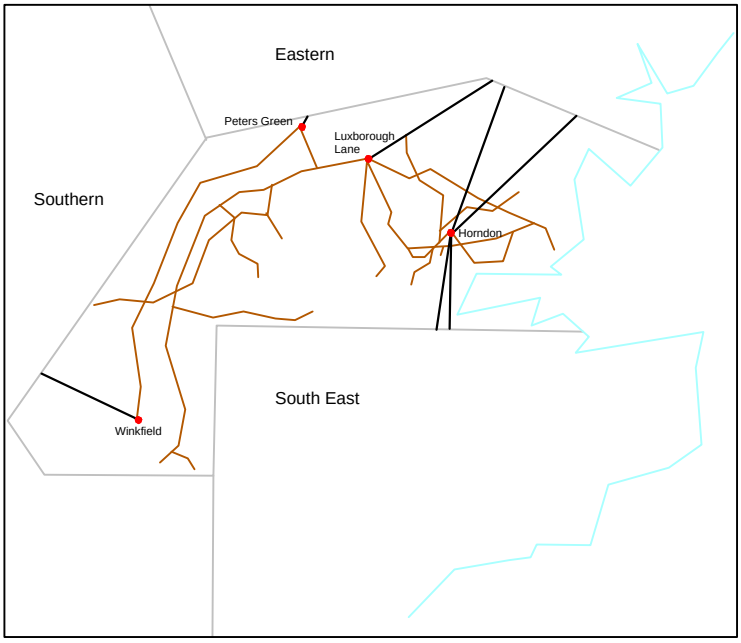
Wales (WN & WS) – LTS



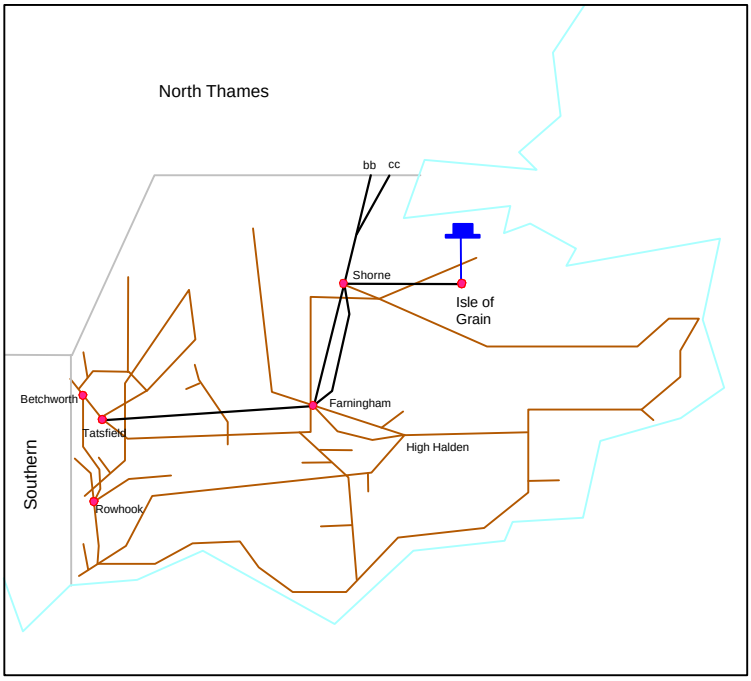
Eastern (EA) – LTS



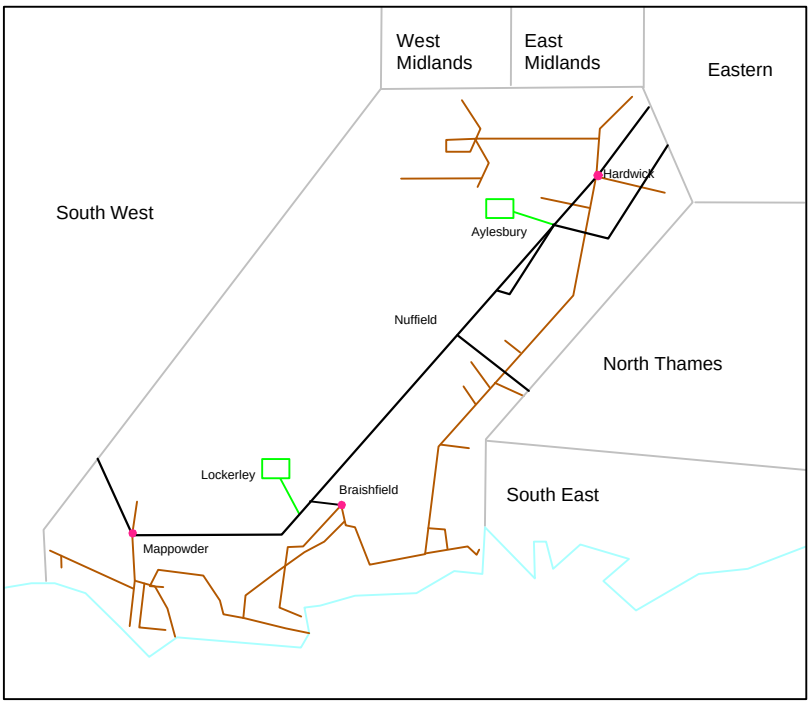
North Thames (NT) – LTS



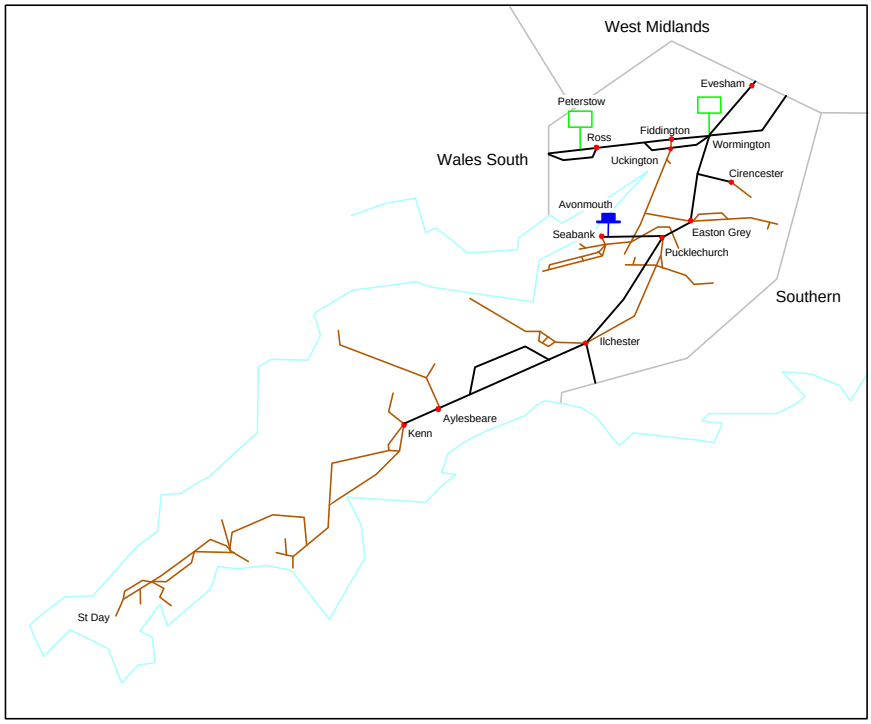
South East (SE) – LTS



Southern (SO) – LTS



South West (SW) – LTS



Appendix 5

Connections to Transco's System

A5.1 Introduction

Within the space of a few years, the British gas industry has evolved from a situation where Transco provided all new connections, to one where many alternative connection services are now available on a competitive basis.

Indeed, whilst Transco continues to offer connection services in line with its Gas Act obligations, customers and developers now 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), or retain ownership of them.

The following are the generic classes of connection:

- Entry Connections: typically connections to delivery facilities processing gas from pipelines associated with offshore or onshore gas producing fields, for the purpose of delivering gas into the Transco system.

- Exit Connections: connections that allow gas to be offtaken from the Transco system. Such connections can take the form of individual Supply Meter Points or Connected System Exit Points (CSEPs). There are several types of connected system including:

    - A pipeline system operated by another gas transporter.

  - Any other non-Transco pipeline transporting gas to premises consuming more than 2,196 MWh per annum.

- Storage Connections: connections to storage facilities for the purpose of temporarily offtaking gas from the Transco system and delivering the same gas back into the system at a later date.

- International Interconnector Connections: connections to pipelines connecting Britain to other countries which may both offtake gas from and deliver gas to the Transco system.

Please note that Storage and International Interconnector Connections 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. Transco's full connection policy is set out in its published Licence Standard Condition 4B Statement, which is supported by a Connection Charging Statement.

Both documents can be downloaded from the Transco web site (www.transco.uk.com), or can be obtained by writing to the following address:

Transco
Network Policy
Lansdowne Gate
65 New Road
Solihull
B91 3DL

A5.2 System Entry and Storage Connections

Transco's policy for new Entry and Storage Connections is set out in the published Licence Standard Condition 4B Statement.

It is important to note that whenever a new Entry/Storage Connection or increased entry flow is required, it is important to contact Transco as early as possible in order to discuss requirements.

For all new delivery and storage facilities, Transco requires a Network Entry Agreement or Storage Connection Agreement, as appropriate, with the respective operator. These agreements should include 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.

A5.2.1 Network Entry Quality Specification

For any new Entry connection to the Transco System, the connecting party should notify Transco as soon as possible as to the likely gas composition. Transco will then discuss whether this is feasible, on a case-by-case basis. In some cases, network analysis may be required and this will be based on the existing system taking into account

Transco's existing statutory and contractual obligations. Therefore, due to continuous changes being made to the system any undertaking made by Transco on gas quality prior to signing a NEA will only be indicative. Transco's ability to accept gas into the system is affected, inter alia, by the gas quality, by the location of the entry point on the system, by the volumes entered and by the quality and volume of gas already being transported on the system. In assessing the acceptability of any proposed gas composition, Transco will take account of:

a) Its ability to continue to meet its statutory obligations with respect to gas quality (including, but not limited to, the Gas Safety (Management) Regulations 1996).

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

c) Its ability to continue to meet its contractual obligations.

For indicative purposes, the specification set out below is usually acceptable for most locations.

1. Hydrogen Sulphide
   - Not more than $5mg/m^3$

2. Total Sulphur
   - Not more than $50mg/m^3$

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 85 bar g

6. Water Dewpoint
   - Not more than -10°C at 85 bar g (or the actual delivery pressure).

7. Wobbe Number (real gross dry)
   - Within 48.14 to 51.41 MJ/m^3 range, and
   - In compliance with ICF & SI limits listed below

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)
    - A value will be set within the band 36.9 to 42.3 MJ/m^3, in compliance with the Wobbe Number, ICF and SI limits described above, subject to a 1 MJ/m^3 variation

11. Inerts
    - Not more than 7.0 % (molar) subject to
        - Carbon Dioxide: not more than 2.0 % (molar)
        - Nitrogen: not more than 5.0 % (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. Delivery Temperature
    - Between 1°C and 38°C

14. 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 bar g which does not possess a distinctive and characteristic odour

15. Pressure
    - The delivery pressure shall be the pressure required to deliver natural gas at the Delivery Point into the Transco Entry Facility at any time taking into account the Transco System back pressure at the Delivery Point as the same shall vary from time to time
    - The entry pressure shall not exceed the Maximum Permitted Operating Pressure (MPOP) of the system into which the gas is delivered.

Note that the Incomplete Combustion Factor (ICF) and Soot Index (SI) have the meanings assigned to them in the Gas Safety (Management) Regulations 1996 Schedule 3 (GS(M)R).

A5.3 System Exit Connections

A5.3.1 New Connections or Increased Capacity

Transco's policy for Exit Connections is set out in the published Licence Standard Condition 4B Statement.

Please note that whenever a new connection or increased supply is required, it is important to contact Transco as early as possible to ensure that the requirements can be met on time. This is particularly important if system reinforcement is required as outlined in 5.3.4. Anyone can contact Transco for a connection, whether a shipper,

operator, developer or end-user, but gas can only be offtaken where the Supply Point so created has been confirmed by a Shipper, in accordance with the Network Code.

Should any party wish to obtain a quotation from Transco for a new connection or increased load, please contact the appropriate Transco office.

A5.3.2 Offtake Pressures

The Applicable Offtake Pressure for the NTS, as referred to in Network Code Section J 2.1 is normally 25 bar. Although system pressure is typically higher, it will be subject to variation over time and location on the network. Transco currently plans normal NTS operations with start of day pressures no lower than 33 barg, 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:

- 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.

Transco's policy is to provide, on reasonable request, forecast information and illustrative historical records for specific NTS connection enquiries.

Notwithstanding the above, Shippers may request a "specified pressure" for any Supply Meter Point, connected to any pressure tier, in accordance with Network Code J 2.2.

A5.3.3 Self Lay Pipes or Systems

In accordance with S.10(6) of the Gas Act, and subject to the principles set out in the published Licence Standard Condition 4B Statement, where a party wishes to lay their own service pipe to premises expected to consume 2,196 MWh (75,000 therms) per annum or less, ownership of the pipe will vest in Transco once the connection to the Transco system has been made. A connection of a self-laid pipe to the Transco system may only be made in accordance with the terms and conditions of the contract between Transco and the customer in respect of the proposed connection.

Where the connection is for a pipe laid to premises expected to consume more than 2,196 MWh (75,000 therms) per annum or the connection is to a pipe in the Transco

system which is not a relevant main, self laid pipes do not automatically vest in Transco. However, subject to the principles set out in the published Licence Standard Condition 4B Statement and the relevant contractual terms and conditions, Transco will normally take ownership of pipes to premises expected to consume more than 2,196 MWh (75,000 therms) per annum and operating up to 7 bar.

Parties considering laying a pipe that will either vest in Transco or is intended to come into Transco ownership should make contact with the appropriate Transco office prior to the planning phase of any project.

A5.3.4 Reasonable Demands for Capacity

Operating under the Gas Act 1986 (as amended 1995), Transco has 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 Transco charges for reinforcement and the basis on which contributions may be required can be found in its published Licence Standard Condition 4B Statement. Please note that dependent on scale, reinforcement projects may have significant planning, resourcing and construction lead times and that as much notice as possible should be given. In particular, Transco will typically require two 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.

Appendix 6

GT Licence Amendments

A6.1 Introduction

A6.2 Entry Capacity Investment

A6.3 Entry Capacity Buy-Back

A6.4 Exit Capacity

A6.5 System Balancing

A6.7 Internal Costs

A6.1 Introduction

On 27 September 2002, Ofgem directed that modifications be made to Transco's Gas Transporter Licence. The revised arrangements introduce a number of new incentives and modify existing incentives. Changes to the Network Code have been introduced to reflect the new arrangements.

Incentives are now placed on Transco for:

- Entry Capacity Investment
- Entry Capacity Buy-Back
- Exit Capacity
- System Balancing
- Residual Gas Balancing
- Internal Costs

A6.2 Entry Capacity Investment

The Entry Capacity Investment incentive has been established to encourage Transco to provide an efficient level of investment in response to customer demand. It is also designed to enable the supply of entry capacity to deviate either side of a central case in response to that level of customer demand.

Transco will periodically make available, via an auction, quantities of capacity, known as baseline capacity, as specified in its GT Licence. From January 2003 a cleared price auction will be introduced that will enable capacity to be bought in blocks of calendar quarters for a period from two years in advance of a gas year up to thirteen years ahead. Demand can be placed for quantities that in aggregate exceed the baseline quantity offered. That process is achieved by shippers placing bids for volumes against a range of prices published by Transco. If sufficient sustained demand above baseline is demonstrated then Transco can apply to the Authority for approval to allocate extra quantities of entry capacity. Transco's decision whether to seek approval will be based on the existence of sufficient demand and that the conditions of its Incremental Entry Capacity Release Methodology are met (for details of IECR methodology please refer to the document "Incremental Entry Capacity Release Statement" contained on the website www.transco.uk.com under Publications). If additional capacity is released then Transco will be allowed additional revenue in accordance with its Entry Capacity Investment incentive.

TABLE A6.2A – Initial NTS SO Baseline Entry Capacity (GWh/day)

Terminal	**2002/3**	**2003/4**	**2004/5**	**2005/6**	**2006/7**
Bacton	1374	1481	1655	1745	1745
Barrow	731	711	711	712	712
Easington	995	887	1027	1062	1062
St Fergus	1520	1549	1628	1648	1677
Teesside	819	741	751	761	761
Theddlethorpe	682	565	791	848	848
Glenmavis	99	99	99	99	99
Partington	215	215	215	215	215
Avonmouth	149	149	149	149	149
Isle of Grain	218	218	218	218	218
Dyenvor Arms	50	50	50	50	50
Hornsea	175	175	175	175	175
Hatfield Moor (storage)	54	54	54	54	54
Hatfiled Moor (onshore)	1	1	1	1	1
Aldborough	0	233	233	233	233
Cheshire	0	0	107	161	214
Hole House Farm	26	26	26	26	26
Wytch Farm	3.2	3.2	3.2	3.2	3.2
Burton Point	55	55	55	55	55

A6.3 Entry Capacity Buy-Back

The buy back incentive provides an inducement to the System Operator to efficiently manage the trade offs between increasing incremental capacity release and the costs of capacity management that arise when gas flows against firm capacity rights exceed system capability.

Broadly a neutrality arrangement is operated which requires that at the end of each day, costs and revenues accruing to each shipper be netted off. The incentive arrangement is based on a central case annual aggregate neutrality cost of £35m. If, primarily by prudent use of capacity management tools Transco is able to hold neutrality costs below the central case then the savings are shared between shippers and Transco (shippers receive 50%). Similarly if aggregate neutrality costs exceed the central case then both Transco and shippers are required to contribute (shippers contribute 65%) to the additional expense.

A6.4 Exit Capacity

The new exit capacity incentive has three components, Interruption, Growth and Constrained Storage. Additional credits to a shipper are now payable if a site in its portfolio is interrupted on more than fifteen occasions in any formula year (April to March). The credit for each day of interruption is equal to $1/15^{th}$ of the annual firm exit capacity charge that the particular site would have paid had it been a firm load. Transco is incentivised to minimise the costs relating to interruption.

Transco is also incentivised to minimise the costs of providing additional system exit capacity beyond the baseline quantity identified in its GT Licence. The calculation is based upon the level of booked exit capacity in each winter period.

The above two components are incentivised in combination so as to encourage efficient trade-off of costs and benefits between the components. Shippers receive 50% of any incentive out-performance but contribute 75% to any under-performance. Transco's upside and downside potential is limited by a cap and collar respectively.

A further element of the exit incentive is intended to encourage Transco to minimise the cost of Constrained LNG services to meet its forecast transportation needs. Only a fixed pre-determined cost allowance for this service is passed on to shippers through the transportation charges.

TABLE A6.4A – NTS Baseline Firm Exit Capacity (GWh/day)

	2002/3	2003/4	2004/5	2005/6	2006/7
Firm exit capacity by LDZs					
Scotland	343	348	355	362	367
Northern	265	271	278	283	287
North West	538	550	557	563	568
North East	279	283	287	290	293
East Midlands	464	470	477	483	488
West Midlands	454	459	464	470	475
Wales North	51	52	54	55	57
Wales South	198	201	204	208	211
Eastern	359	366	372	377	382
North Thames	508	512	516	520	525
South East	516	523	526	529	532
Southern	380	394	402	409	414
South West	279	284	290	295	299
Total firm exit capacity for LDZ loads	4633	4713	4782	4844	4897
Firm exit capacity for NTS loads	1488	1529	1592	1653	1691
Total firm baseline NTS exit capacity	6121	6241	6374	6497	6588

TABLE A6.4B – NTS Baseline Interruptible Exit Capacity (GWh/day)

	2002/3	2003/4	2004/5	2005/6	2006/7
Interruptible exit capacity by LDZs					
Scotland	47	54	56	58	60
Northern	33	34	37	38	39
North West	72	75	77	78	78
North East	38	40	41	42	43
East Midlands	75	77	89	93	99
West Midlands	35	36	37	37	37
Wales North	7	7	8	8	9
Wales South	28	29	31	32	32
Eastern	36	36	37	37	37
North Thames	40	45	47	48	49
South East	40	44	44	51	61
Southern	36	37	38	38	40
South West	32	33	34	34	34
Total interruptible exit capacity for LDZ loads	521	548	576	595	619
Interruptible exit capacity for NTS loads	1073	1141	1142	1147	1148
Total Interruptible baseline NTS exit capacity	1594	1689	1718	1742	1767

A6.5 System Balancing

System Balancing comprises two incentives (i) gas costs and (ii) system reserve.

i. The gas cost incentive principally relates to the costs of providing gas and electricity to meet Transco's NTS Shrinkage requirements. The incentive is of a sliding scale nature and Transco obtains incentive revenue for superior performance where the actual costs of NTS Shrinkage are lower than a target level predetermined by Ofgem. The level of incentive reward is proportional to the degree of underspend (shippers receive 75%). Conversely where actual costs for NTS Shrinkage are beyond the target set by Ofgem then Transco's performance is inferior and it faces a proportion of the degree of overspend (shippers contribute 80%). Transco's upside and downside potential is limited by a cap and collar respectively. This form of incentive allows Transco and shippers to jointly benefit from any underspend or to jointly face the costs of any overspend.

   The target for the gas cost incentive is set with respect to a volume of gas for each year of the price control, a gas pricing formula for the gas volumes for each year and a fixed annual amount for procuring fuel for electric compression.

   In effect Transco is incentivised to reduce the volume of NTS Shrinkage and to purchase the necessary quantities of electricity and gas at a better price than that used to set the cost target.

ii. The system reserve incentive is similar to the gas cost incentive in that it is of a sliding scale nature with a performance measure based on the cost of procuring storage capacity for the purposes of satisfying Transco's operating margins requirements. However, Transco is exposed to the full cost of any overspend and retains the full benefit of any underspend; no cap or collar applies. Transco is incentivised to only purchase necessary volumes of storage capacity sufficient to meet its obligations at efficient prices.

A6.6 Residual Gas Balancing

Transco's Residual Gas Balancing Incentive provides an incentive on each day to trade gas at efficient prices and to minimise the swing of linepack volumes within the NTS. The incentive was formerly described in the Network Code and is now described in its GT Licence. Briefly, for the price incentive component, Transco's reward or payment is a function of the difference between the prices of its marginal buys and marginal sell trades, relative to the system average price for that day. In principle Transco is incentivised to keep the difference between its marginal buy and sell prices as close as possible. For the linepack component small differences between Transco's opening linepack position and its closing linepack position relative to a predetermined value results in access to incentive upside whilst differences beyond this predetermined value

results in incentive downside. The sum of the daily price incentive payments and the daily linepack incentive payments are subject to an annual cap and collar.

A6.7 Internal Costs

Transco is encouraged to trade off operating costs across the range of the System Operator's management functions in order to maximise efficiency. One such example might be that obtaining certain staff skills through recruitment increases the manpower costs of the SO but might lead to lower costs being incurred through the other incentives. Where the benefits of such strategies outweigh the costs the shippers share in those benefits. The form of this incentive is of sliding scale in nature without a cap or collar on the level of shared benefit or cost that can be achieved (shippers receive 60% of any out performance, but bear 65% of any overspend).

Appendix 7

Glossary

Advanced Reservation of Capacity Agreement (ARCA)
An agreement between Transco and Shippers relating to future NTS pipeline capacity for large sites in order that Shippers can book NTS Exit Capacity in accordance with Network Code provision to meet gas requirements of large projects at a later date.

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

Bar
The unit of pressure that is approximately equal to atmospheric pressure (0.987 standard atmospheres). One millibar equals 0.001 bar.

Base Plan Assumptions (BPA)
A document that until recently was produced by Transco on an annual basis that describes our supply and demand forecasts for the next ten years. This information is now contained in Transco's Ten Year Statement.

Calorific Value (CV)
The ratio of energy to volume measured in Megajoules 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.

Combined Cycle Gas Turbine (CCGT)
A Combined Cycle Gas Turbine is a unit whereby electricity is generated by a gas powered turbine and also a second turbine. The hot exhaust gases expelled from the first turbine are fed into the heat exchanger to generate steam which powers the second turbine.

Combined Heat and Power (CHP)
The simultaneous generation of electricity and heat for use within buildings or processes, by recovery of the heat produced in the power generation process. As such, CHP represents the highest efficiency means of generating electricity.

Compressor Station
An installation that uses gas turbine driven gas compressors powered jet engines to boost pressures in the pipeline system. Used to increase transmission capacity and move gas through the network. In addition a small number of electricity driven compressors are utilised.

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 a Gas Transporter other than Transco.

Cubic Metre (m3)
The unit of volume, approximately equal to 35.34 cubic feet. One million cubic metres (mcm) equals 106 cubic metres, one billion cubic metres (bcm) equals 109 cubic metres.

Daily Flow Notification (DFN)
A communication between a Delivery Facility Operator (DFO) and Transco, indicating hourly and end of day entry flows from that facility.

Daily Metered Supply Point
A supply point fitted with equipment (e.g. a datalogger) that enables meter readings to be taken on a daily basis. Further classified as SDMC, DMA, DMC or VLDMC according to annual consumption.

Datalogger
An electronic device that automatically records, stores and transmits meter readings (such transmission usually being via PSTN lines).

Delivery Facility Operator (DFO)
Operators of the reception terminals, which process and meter gas deliveries from offshore pipelines before transferring the gas to Transco's system.

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

Diurnal Storage
Gas stored for the purpose of meeting the variations in demand during the day. Gas can be stored in special installations (e.g. gas holders), or by line pack within the pipeline system.

Exit Zone
A geographical area (within an LDZ) that consists of a group of supply points that, on a peak day, receive gas from the same NTS offtake.

FALCON
A computer program which simulates the operation of the transmission system. It is used to optimise future system expansion plans as forecast supply and demand change over time.

Gas Transporter (GT)
Formerly Public Gas Transporter (PGT). Transco is licensed by the Gas and Electricity Markets Authority to transport gas to consumers, along with other GT's, of which Transco is the largest.

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

Interconnector
A pipeline transporting gas to another country. The Irish interconnector transports gas across the Irish Sea to both Eire and Northern Ireland. The European interconnector transports gas to or from Zeebrugge in Belgium.

Interruptible Service
A service that offers lower transportation charges but where, at times of high demand, Transco can interrupt the flow of gas to the supply point.

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

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

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

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 NTS offtakes. Consists of LTS and Distribution System pipelines.

Local Transmission System (LTS)
The pipeline system that takes gas from NTS offtakes and transports it to the Distribution system and direct to some large users.

National Balancing Point (NBP)
A notional point which represents the NTS for balancing purposes.

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

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

Network Code
The document that defines the contractual relationship between Transco and System Users.

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 73.2 MWh 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. Transco provides odorisation at NTS offtakes.

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

On the day Commodity Market (OCM)
This market enables anonymous financially cleared on the day trading between market participants.

Operating Margins
Gas used by Transco to maintain system pressures under 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 by Transco to operate the transportation system. Includes gas used for compressor fuel, heating and venting.

Price Control Review (PCR)
Ofgem's review of Transco's allowed returns for the period April 2007 to March 2012.

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 (currently 71 such historical years of data).

Shearwater Elgin Area Line (SEAL)
The offshore pipeline from the Central North Sea (CNS) to Bacton.

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.

System Average Price (SAP)
The SAP is set by all Transco and shipper trades on the OCM on a day.

System Marginal Price (SMP)
The SMP (Buy and Sell) are set at a fixed differential from SAP unless Transco's actions affect either SMP at a more extreme level. The fixed price differentials are: SMP Buy = SAP+0.0287p/kWh, and SMP Sell = SAP-0.0324p/kWh.

Therm
An imperial unit of energy. Largely replaced by the metric equivalent: the kilowatt hour (kWh). 1 therm equals 29.3071 kWh.

Transco Networks
There are 8 Transco Networks, which are administrative centres that manage the gas distribution networks and comprise one or more LDZs.

Transporting Britain's Energy
Transco'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.

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

Ullage
Ullage is the difference between pipeline capacity and actual / forecast pipeline flow.

Unbundled Service
An optional service, offered and priced separately from Transco's core transportation services.

Appendix 8

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.

From: / To: Multiply	GWh	Mcm	Mths	Ttoe
GWh	1	0.092	0.034	0.086
Mcm	10.833	1	0.370	0.932
MThs	29.307	2.710	1	2.520
Ttoe	11.630	1.073	0.397	1

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

GWh = Gigawatt Hours

Mcm = Million Cubic Metres

MThs = Million Therms

Ttoe = Thousand Tonne of Oil Equivalent

TEN YEAR STATEMENT 2002 - FEEDBACK

We would welcome your feedback, specifically on the Ten Year Statement and more generally on the TBE consultation process, to help us improve the style and content and to make both more interesting and relevant to you, the reader.

Please answer the following questions and return this form to the address provided.
Thanks for your time.

Your Organisation

Company Name	
Type e.g. Shipper, Gas Producer, End User, etc.	

2003 Transporting Britain's Energy Consultation Question

Do you support the consultation process of meetings, feedback summaries and the use of workshops/events to facilitate discussion on various investment options?

General Questions on the 2002 Ten Year Statement

	← Not Very					Very →
1. How relevant was the material?						
2. How interesting was the document?						
3. How easy to understand was the document?						
4. How useful were the headings and titles?						
5. How useful were the diagrams?						
6. How appropriate was the level of detail?						
7. How logical was the layout?						
8. How clear was the language?						

9. Overall, how useful was the document?

10. What did you like best?

11. What did you like least?

12. What specific improvements would you make?

13. Any other comments?

Thanks for your feedback. We might want to contact you to clarify specific points so, if you don't mind us calling you, please print your name and number below.

Name:	Telephone:

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