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 we need 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 loads 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 LDZ's.

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.

This first element is developed by comparing load enquiry information with Base Plan consultation feedback, NGC Seven Year Statement and commercial sources. In addition the impact of new commercial arrangements and Government policies, e.g. the Stricter Consents Policy, are taken into account when deciding which power stations are built or closed.

To be able to 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 one third 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 the Britain throughout the year, i.e. allowing for the seasonal variation of Britain gas prices.

Exports to Ireland are based on the analysis of Northern and Republic of Ireland energy markets, depletion and development of indigenous supplies, Base Plan feedback 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, Base Plan 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 LDZ's or for categories of NDM demand as required under the Network Code) are based on Composite Weather Variables (CWV's) defined and optimised for each LDZ. Details of the modelling approach, definitions of CWV's and current CWV parameters are provided in the Transco document "NDM Profiling and Capacity Estimation Algorithms for 2000/1". Seasonal normal CWV's (one for each day and each LDZ) are produced according to the procedure set out in paragraph H1.5.2 of the Network Code, now 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 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 being 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 2000 BPA indicated a potential tightening of supplies as a result of a reduction in new supply developments/activity on the United Kingdom Continental Shelf (UKCS) and increases in annual demand. Due to development time-scales the BPA concluded that in the short term any supply shortfall would have to be met by an increase in existing supplies or by demand management at times of high demand and high prices.

Feedback from the BPA consultation process was generally supportive of Transco's assessment of supplies, however, there was a difference of opinion on the timing of when the UK would need new field developments or imports and the likely source of additional gas.

In terms of information received through the consultation process, Transco again received detailed supply information from the majority of producers and to a lesser extent from shippers. The collective responses continue to show a potential shortfall of future supplies in-line with other forecasts. Whilst external sources of supply information are limited to relatively few parties, the trends all show a similar outcome. That is in terms of annual supplies to meet demand, the UK has a potential supply shortfall in the next few years. In previous years when a supply surplus existed the need for new developments beyond those fields forecast to meet annual demand was typically between 5 to 10 years ahead compared to the near imminent position.

In reality the reporting of an annual supply shortfall is a little misleading as with the seasonal nature of demand any annual shortfall will be simply met by existing fields producing more gas at lower levels of demand. This in turn however could shorten the anticipated field life and exacerbate the supply position further in future years. Under these conditions with fields producing more at lower levels of demand and no increase in future supply developments, the UK will become more reliant on seasonal supplies at times of higher demand. This could take the form of further storage developments, increased Interconnector flexibility or demand management.

Though oil and gas prices have increased considerably over the past year there is still little or no sign of increased exploration and appraisal activity on the UKCS.

A1.3 NTS and LTS Capacity Planning

Transco's Network Analysis teams develop forecast flow patterns from the supply/demand match, maintaining up to date plans through an annual process taking on board the changes in the gas volume forecasts resulting from changes in the gas market. The process is also updated following any major developments.

Transco uses a computer software package, called FALCON, to analyse the performance of the transportation system. FALCON enables the anticipation of network capacity constraints and helps identify suitable reinforcements needed to ensure the appropriate level of system security is maintained. Copies of the FALCON package have been bought by outside agencies to facilitate an understanding of the NTS network and our 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
- building 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 to cope with everyday demand including peak day for each of the years selected, consistent with the 1 in 20 criteria.

As well as planning to ensure that the pipelines are designed to the correct size to meet peak demand, Transco also has to plan to meet the variations in demand over a 24-hour period. Diurnal storage in the LDZ is used as a cost-efficient and secure way of satisfying these variations. LDZ diurnal storage consists of gas held in LTS linepack, low pressure gasholders, high pressure bullet installations and salt cavities. Where it is economic to do so, diurnal storage may also be provided by the NTS to LDZs with a shortfall of storage availability. Alternatively LTS networks may be operated to transmit storage from one system with a surplus of storage capacity to another which is in storage deficit.

A1.4 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 pipe data held in the Digital Records System and demand data from the Demand Derivation System. This data is analysed by a Graphical Based Network Analysis (GBNA) computer program and validated against a comprehensive set of actual pressure recordings. The GBNA 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 it can be installed 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 are used to produce financial plans, budgets and appraisals in a consistent and easy to understand manner to ensure that maximum value is obtained. For non-mandatory projects the key investment focus in the majority of cases is to undertake only those projects which carry a positive NPV. 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 capital projects is central to Transco's business objectives. Transco's project management strategy involves:

- post project and post investment review
- deciding how the project should be carried out, and by whom
- 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

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 improve future decision making processes.

Transco's project management of major capital projects is designed to ensure that they are delivered on time and to at least the same cost and quality standards as other world class companies. The project management process in particular makes use of professional consultants and specialist contractors.

Transco continues to work with Ofgem and the industry to improve the transparency of its investment process. Some recent examples are:

- long term investment workshops, facilitated by Ofgem. A consultation document has been published by Ofgem, in May 2000, on this subject.
- discussions are ongoing to agree a regulatory output framework and business performance measures with Ofgem. These measures will underpin the capital, replacement and operational expediture requirements for Transco. The framework and the process supporting it, will clarify the treatment of variations between actual and expected expenditure and enable output performance targets to be set linked to allowed revenue and investment

Appendix 2

Gas Volume Forecasts

A2.1 Baseline Demand Case

A2.2 Strong Demand Case

A2.3 Annual Supplies – Data Available to Transco

A2.4 Potential Annual Supply Demand Scenarios for Investment Purposes

A2.5 Potential Peak Supply Demand Scenarios for Investment Purposes

A2.1 Baseline Demand Case

Table A2.1a Annual Demand - Regulatory Form of Control Split (TWh)

Load Band	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0 to 73MWh	390	393	398	402	407	408	410	412	416	416
73 to 732MWh	63	64	65	65	66	67	67	68	69	69
>732MWh	132	137	144	150	153	154	156	158	160	161
Interruptible	106	109	113	115	117	118	118	120	122	123
LDZ Total Business & Domestic	**692**	**703**	**719**	**732**	**743**	**746**	**752**	**757**	**766**	**769**
LDZ Large Loads	45	48	44	46	48	48	48	48	48	48
NTS Power Gen	194	213	229	233	237	243	244	244	247	250
NTS Industrials	32	38	44	45	45	46	46	47	47	47
Exports	150	134	141	147	124	92	82	66	54	45
Total Large User	**420**	**433**	**457**	**470**	**454**	**429**	**420**	**404**	**395**	**389**
Formula Volumes	**1112**	**1136**	**1176**	**1202**	**1197**	**1175**	**1172**	**1162**	**1161**	**1158**
Shrinkage	14	14	15	15	15	15	15	15	15	15
Total Throughput	**1126**	**1150**	**1191**	**1218**	**1212**	**1190**	**1187**	**1177**	**1177**	**1174**

Notes

- Volumes are based on a 35 year weather trend
- Exports include interconnector flows to Ireland and Continental Europe
- NTS Power Generation includes all stations connected to the NTS and "centrally dispatched" by the National Grid Company but excludes the consumption of stations supplied via their own dedicated pipelines and those embedded within Transco's LDZs

Figure A2.1a Annual Demand – Baseline Demand

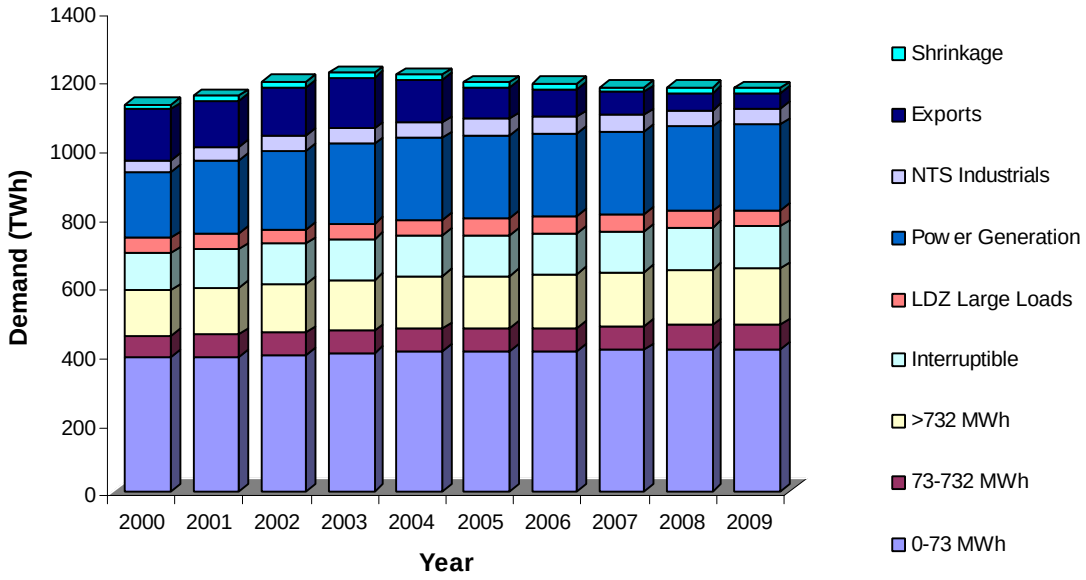


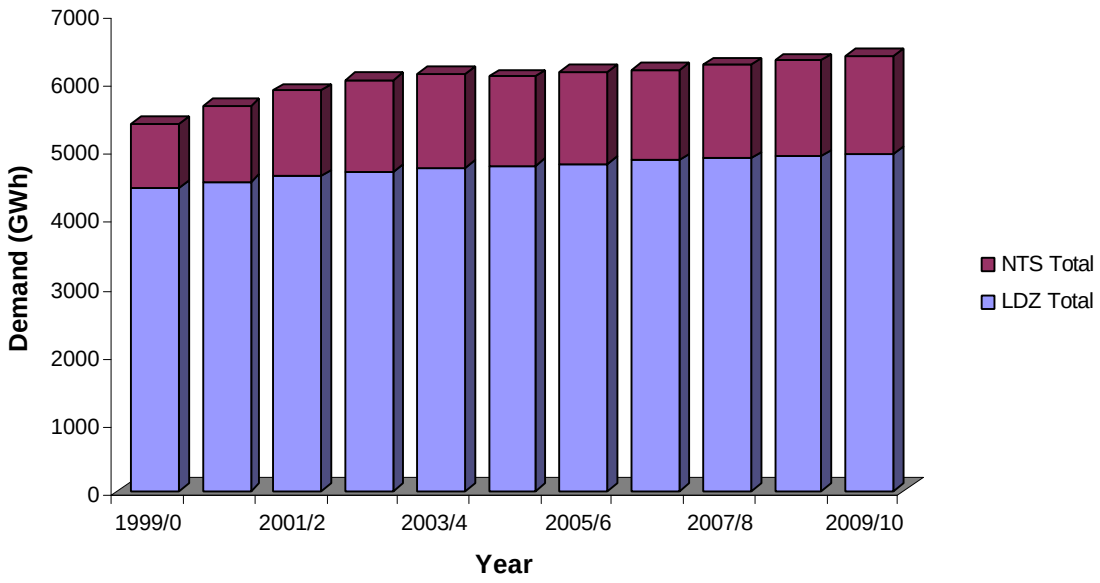
Table A2.1b Forecast 1 in 20 Peak Day Firm Demand by LDZ (GWh per day)

LDZ	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Scotland (SC)	325	331	338	348	353	357	361	364	367	371	374
North (NO)	249	255	258	262	265	267	269	271	273	275	276
North West (NW)	522	528	535	543	550	553	555	558	561	564	567
North East (NE)	267	272	276	280	283	286	288	290	292	294	296
East Midlands (EM)	429	434	449	454	457	461	464	466	469	471	474
West Midlands (WM)	439	446	453	458	461	466	468	472	475	477	481
Wales (WN & WS)	243	249	252	255	258	261	263	265	267	268	270
Eastern (EA)	351	359	366	372	376	380	383	387	390	393	396
North Thames (NT)	489	494	500	504	509	513	515	517	520	522	524
South East (SE)	489	512	517	522	526	529	531	534	537	539	542
South (SO)	361	368	374	384	389	393	399	402	406	409	412
South West (SW)	267	274	279	288	292	296	298	301	303	305	308
LDZ Total	**4430**	**4522**	**4598**	**4669**	**4720**	**4760**	**4793**	**4825**	**4858**	**4889**	**4922**
NTS Total	**942**	**1100**	**1253**	**1338**	**1371**	**1292**	**1325**	**1336**	**1368**	**1401**	**1432**

Notes

- NTS Total Peak Day Demand excludes European Interconnector flows
- Peak Day figures are presented on a supply year basis, that is a year running from October to September

Figure A2.1b Forecast 1 in 20 Peak Day Firm Demand – Baseline Demand



A2.2 Strong Demand Case

Table A2.2a Annual Demand - Regulatory Form of Control Split (TWh)

Load Band	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0 to 73MWh	390	393	399	404	411	413	416	420	425	426
73 to 732MWh	63	64	65	66	67	68	69	70	71	72
>732MWh	132	139	150	159	165	166	169	172	176	178
Interruptible	106	110	118	123	126	128	130	133	136	138
LDZ Total Business & Domestic	**692**	**706**	**732**	**753**	**769**	**775**	**784**	**794**	**808**	**815**
LDZ Large Loads	45	48	44	47	52	58	58	58	58	58
NTS Power Generation	194	215	236	246	253	259	259	259	262	264
NTS Industrials	32	38	44	45	46	48	48	48	48	48
Exports	151	135	143	151	148	137	127	113	100	92
Total Large User	**421**	**435**	**467**	**490**	**499**	**502**	**493**	**478**	**469**	**463**
Formula Volumes	**1113**	**1141**	**1199**	**1242**	**1268**	**1277**	**1277**	**1272**	**1276**	**1277**
Shrinkage	14	14	15	15	16	16	16	16	17	17
Total Throughput	**1127**	**1156**	**1214**	**1258**	**1284**	**1293**	**1293**	**1289**	**1293**	**1294**

Notes

- Volumes are based on a 35 year weather trend
- Exports include interconnector flows to Ireland and Continental Europe
- NTS Power Generation includes all stations connected to the NTS and "centrally dispatched" by the National Grid Company but excludes the consumption of stations supplied via their own dedicated pipelines and those embedded within Transco's LDZs

Figure A2.2a Annual Demand – Strong Demand

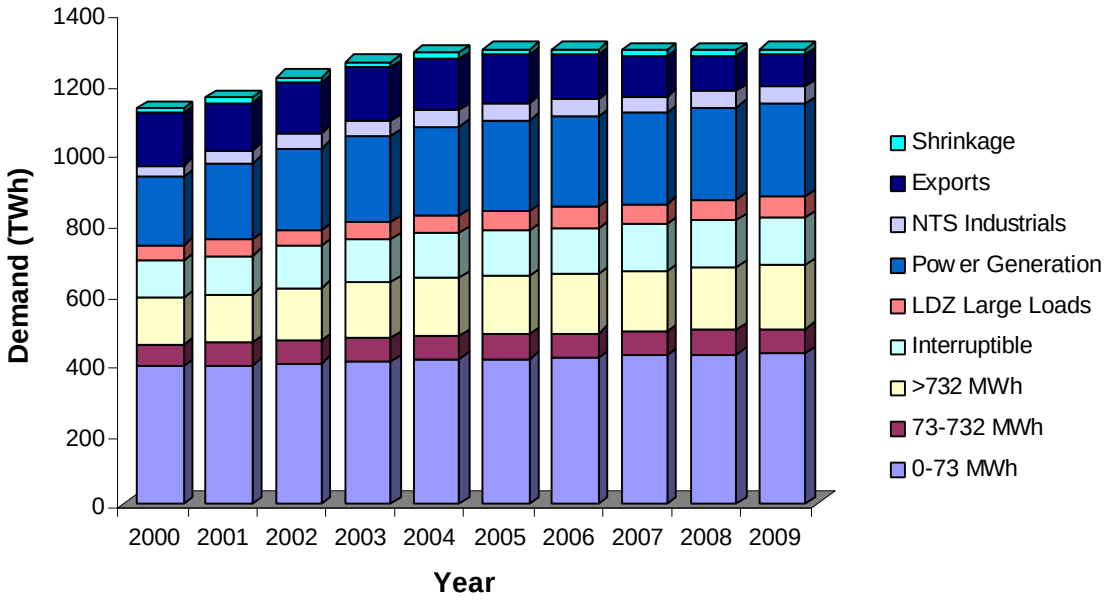


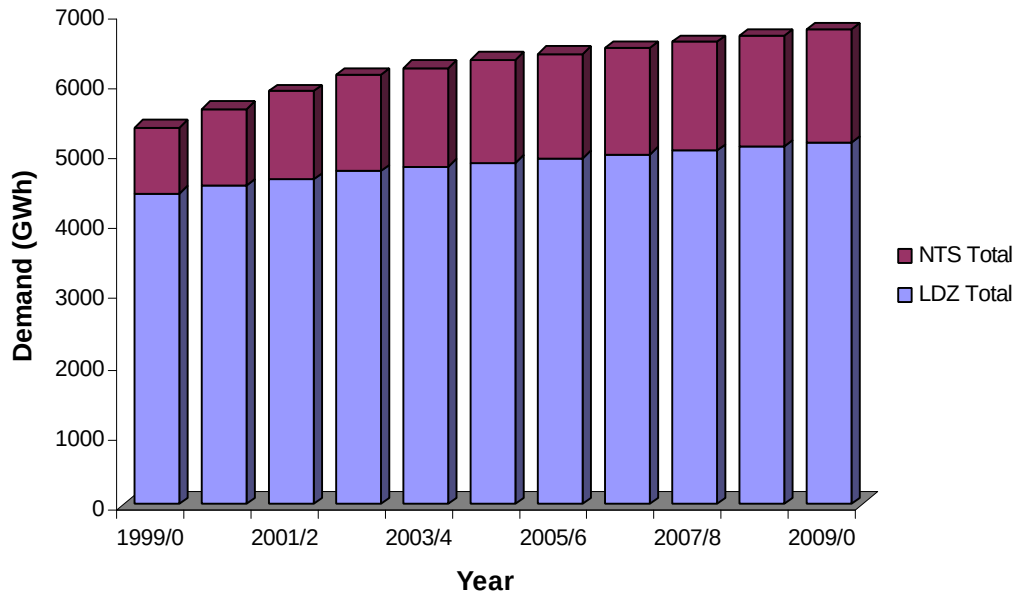
Table A2.2b Forecast 1 in 20 Peak Day Firm Demand by LDZ (GWh per day)

LDZ	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Scotland (SC)	325	331	340	352	360	366	372	377	383	389	394
North (NO)	249	255	259	265	269	273	276	279	283	286	289
North West (NW)	522	529	541	554	567	573	577	582	588	593	598
North East (NE)	267	273	277	282	287	291	294	298	301	304	308
East Midlands (EM)	429	435	455	461	467	473	478	482	487	491	497
West Midlands (WM)	439	447	458	464	470	476	481	486	491	495	501
Wales (WN & WS)	243	254	259	264	269	273	277	280	284	288	291
Eastern (EA)	351	360	367	375	381	387	392	397	402	407	412
North Thames (NT)	489	495	503	509	517	523	527	532	536	539	543
South East (SE)	489	512	518	526	532	537	540	544	548	553	557
South (SO)	361	368	375	387	393	399	408	413	418	423	428
South West (SW)	267	274	281	297	303	308	313	317	321	325	329
LDZ Total	**4431**	**4532**	**4633**	**4737**	**4815**	**4878**	**4934**	**4988**	**5042**	**5093**	**5147**
NTS Total	**942**	**1102**	**1256**	**1373**	**1409**	**1461**	**1493**	**1509**	**1541**	**1574**	**1607**

Notes

- NTS Total Peak Day Demand excludes European Interconnector flows
- Peak Day figures are presented on a supply year basis, that is a year running from October to September

Table A2.2b Forecast 1 in 20 Peak Day Firm Demand – Strong Demand

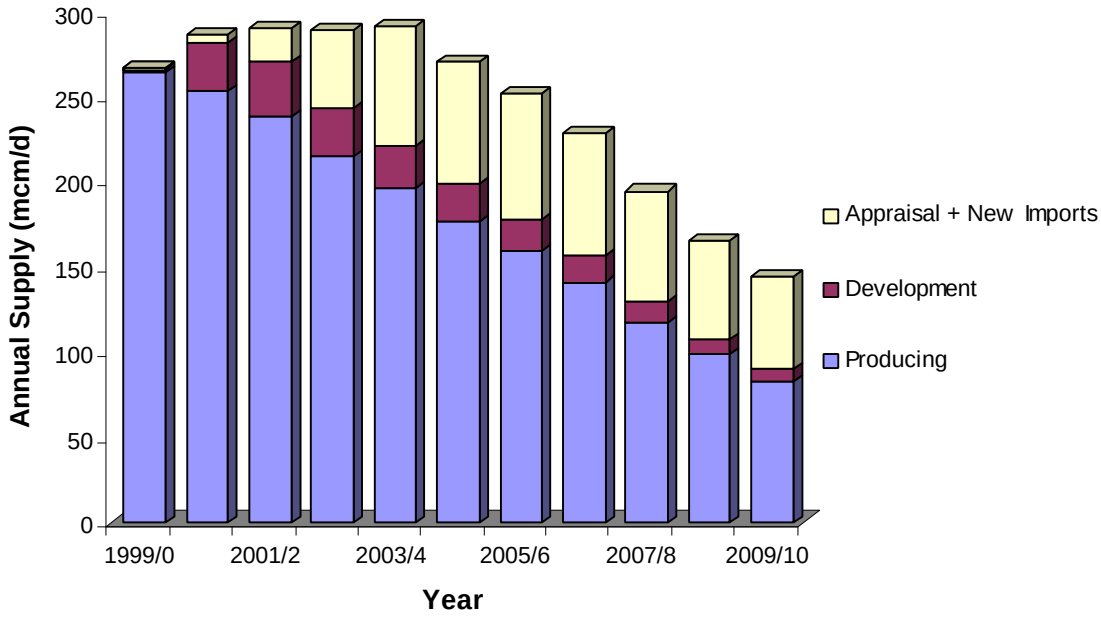


A2.3 Annual Supplies – Data Available to Transco

Table A2.3a Annual Supplies – Information Received by Supply Category (mcm/d)

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Producing	264	254	239	215	197	177	159	141	117	98	83
Development	1.8	27.8	31.9	28.6	23.9	21.7	18.5	16.0	12.4	9.5	7.6
Appraisal + New Imports	1.1	5.7	19.6	45.8	70.9	71.2	74.7	70.9	65.4	58.1	53.7

Figure A2.3a Annual Supplies – Information Received by Supply Category (mcm/d)



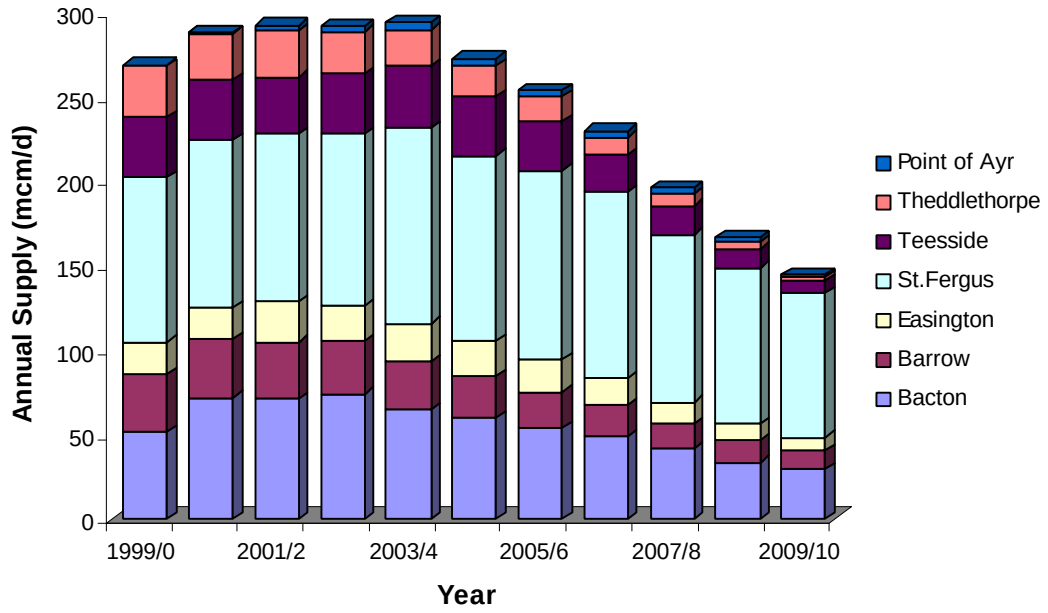
Notes

- Supply volumes include potential by-pass through the European Interconnector at Bacton

Table A2.3b Annual Supplies – Data Available by Supply Terminal (mcm/d)

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Bacton	51.3	71.5	70.8	73.9	65.0	59.8	53.8	48.7	41.2	33.6	29.6
Barrow	34.6	34.7	33.7	31.7	27.8	24.6	21.5	18.4	15.5	12.6	10.9
Easington	18.9	18.5	24.1	20.8	23.0	21.1	18.7	15.7	12.5	10.3	7.7
St.Fergus	97.5	99.2	99.1	101	115	109	113	111	99.3	92.3	85.2
Teesside	35.5	35.8	34.0	36.2	37.0	34.7	28.5	22.3	17.0	11.1	7.3
Theddlethorpe	30.4	27.7	27.2	24.6	21.7	18.4	14.6	10.3	7.1	4.5	2.3
Point of Ayr	1.0	0.9	3.2	3.2	4.6	4.5	4.1	3.7	3.3	2.5	1.8

Figure A2.3b Annual Supplies – Data Available by Supply Terminal (mcm/d)



Notes

- Supply volumes include potential by-pass through the European Interconnector at Bacton

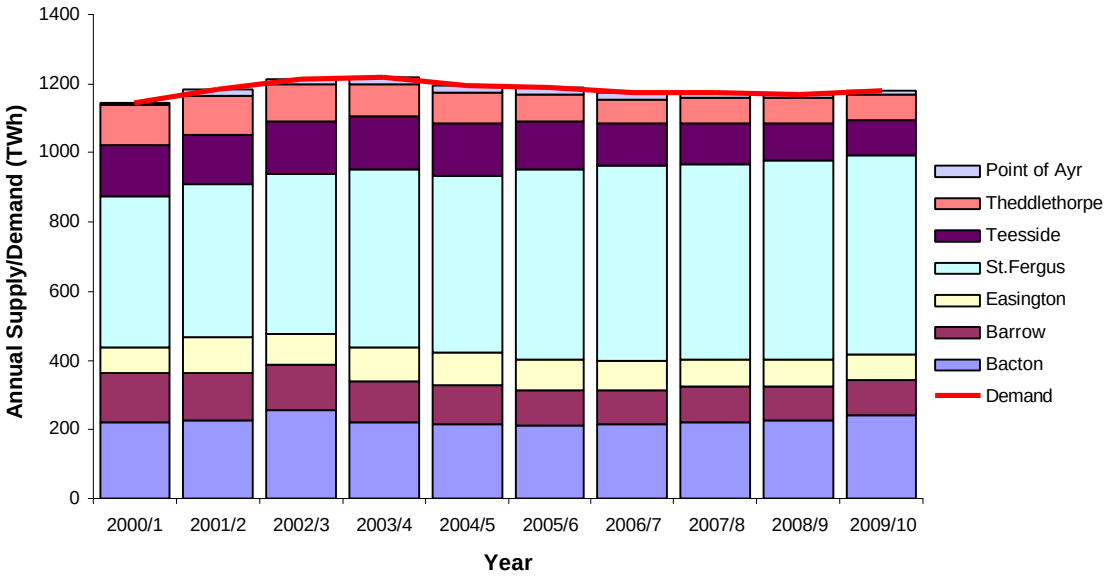
A2.4 Potential Annual Supply Demand Scenarios for Investment Purposes

A2.4.1 Baseline Annual Demand & Interconnector Balance Scenario

Table A2.4a Baseline Demand & Interconnector Balance (TWh)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Baseline Demand	1144	1183	1215	1219	1196	1187	1174	1174	1170	1178
Bacton	223	227	254	223	217	212	215	223	224	240
Barrow	140	139	134	115	109	103	99	102	101	105
Easington	77	102	90	98	94	88	82	78	76	71
St.Fergus	436	440	460	515	512	548	568	566	574	578
Teesside	145	143	155	154	155	138	123	119	109	102
Theddlethorpe	117	115	107	93	87	78	70	71	73	72
Onshore	1	1	1	1	0	0	0	0	0	0
Point of Ayr	5	15	16	21	21	19	18	16	13	10

Figure A2.4.a Baseline Demand & Interconnector Balance (TWh)



Note

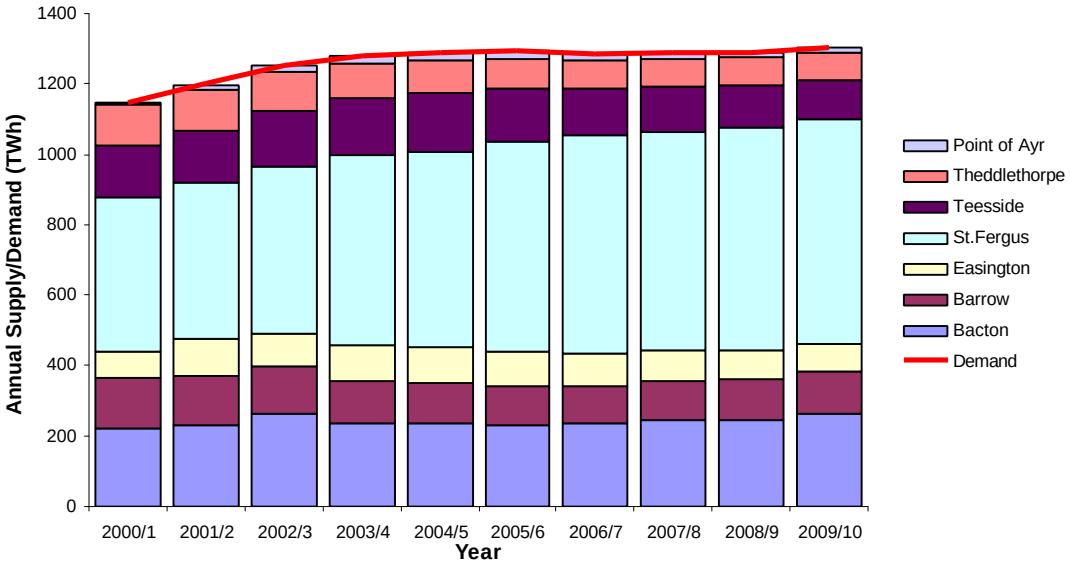
- Supply volumes exclude potential by-pass through the European Interconnector

A2.4.2 Strong Annual Demand & Interconnector Balance Scenario

Table A2.4b Strong Demand & Interconnector Balance (TWh)

	00/10	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Strong Demand	1147	1200	1251	1282	1291	1292	1284	1289	1289	1301
Bacton	224	230	261	235	234	231	235	245	247	265
Barrow	140	141	138	121	118	112	109	112	111	116
Easington	77	104	92	103	101	96	89	85	84	78
St.Fergus	437	446	473	542	552	596	621	621	633	638
Teesside	146	145	159	162	167	150	134	130	120	112
Theddlethorpe	117	117	110	97	94	85	76	78	80	80
Onshore	1	1	1	1	0	0	0	0	0	0
Point of Ayr	5	16	17	23	23	21	19	17	14	11

Figure A2.4b Strong Demand & Interconnector Balance (TWh)



Note

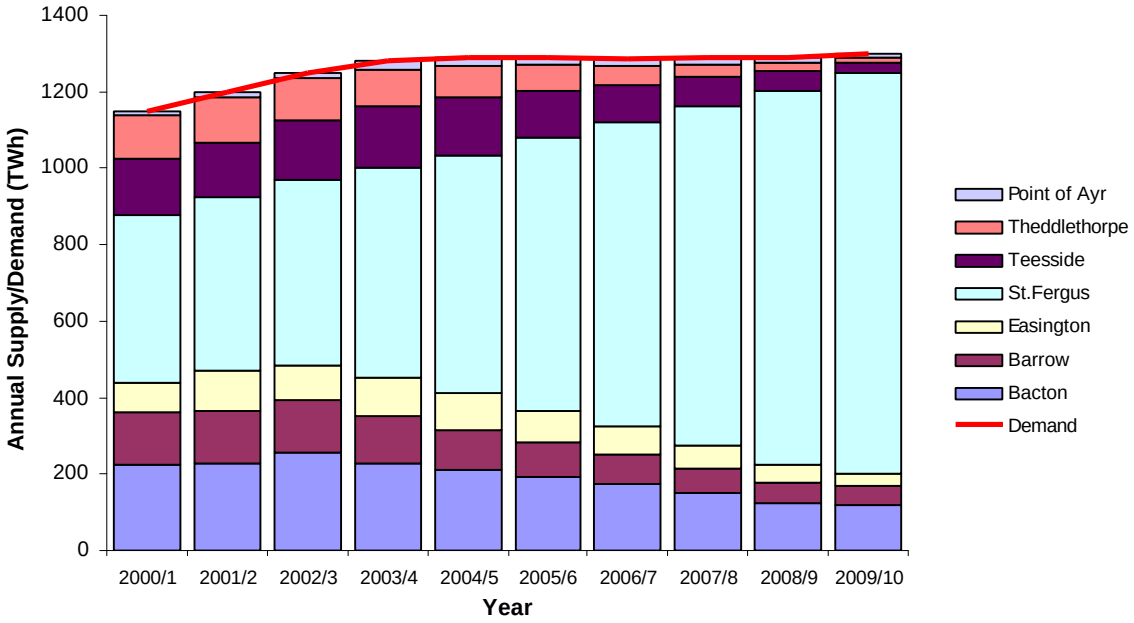
- Supply volumes exclude potential by-pass through the European Interconnector

A2.4.3 Strong Annual Demand & St.Fergus Expansion Scenario

Table A2.4c Strong Demand & St.Fergus Expansion (TWh)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Strong Demand	1147	1200	1251	1282	1291	1292	1284	1289	1289	1301
Bacton	223	228	257	231	210	190	174	150	125	121
Barrow	140	140	136	119	107	93	80	67	53	47
Easington	77	103	91	101	93	83	70	55	45	34
St.Fergus	439	452	483	552	622	713	796	890	980	1047
Teesside	145	144	157	159	152	126	99	75	49	30
Theddlethorpe	117	116	109	96	84	67	48	34	23	12
Onshore	1	1	1	1	0	0	0	0	0	0
Point of Ayr	5	15	16	22	22	20	18	16	13	10

Figure A2.4c Strong Demand & St.Fergus Expansion (TWh)



Note

- Supply volumes exclude potential by-pass through the European Interconnector

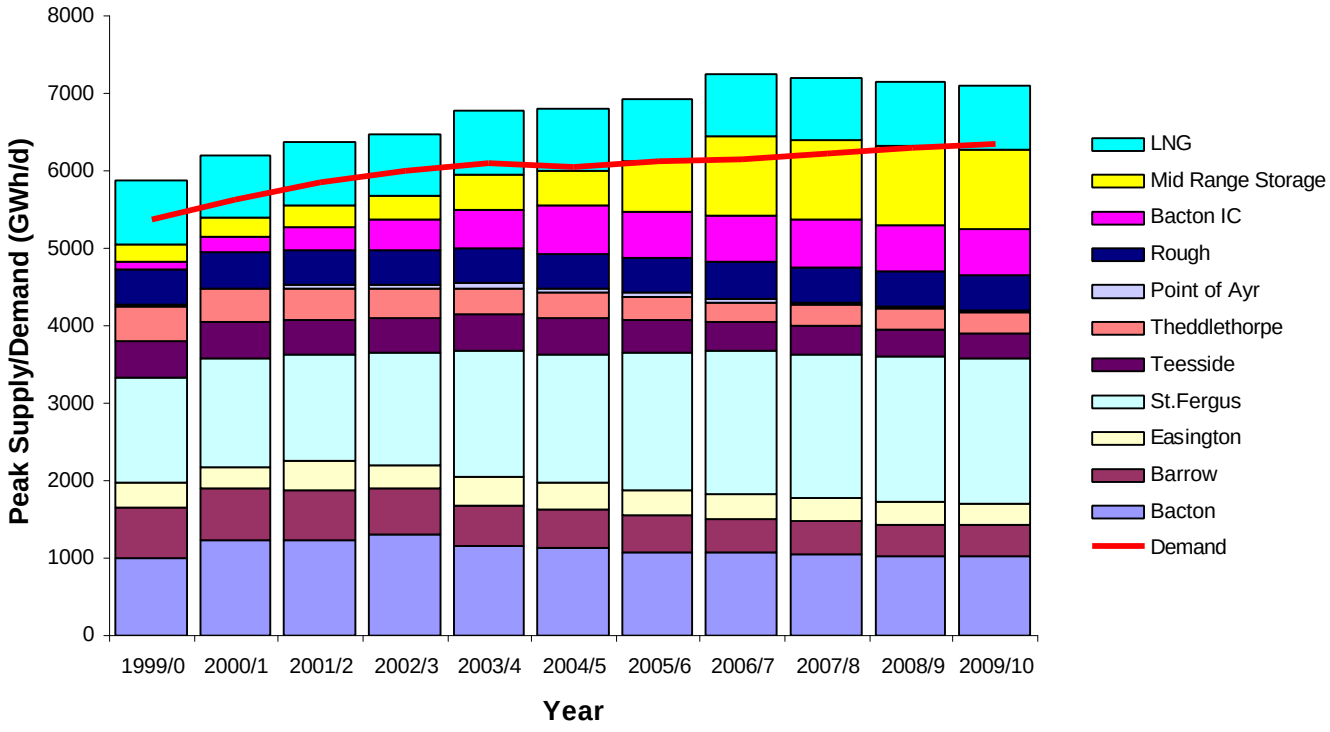
A2.5 Potential Peak Supply Demand Scenarios for Investment Purposes

A2.5.1 Baseline Peak Demand & Interconnector Balance Scenario

Table A2.5a Baseline Demand & Interconnector Balance (GWh per day)

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Baseline Demand	5372	5622	5851	6007	6091	6052	6118	6162	6227	6290	6354
Bacton	1004	1235	1237	1293	1156	1124	1081	1066	1053	1019	1023
Barrow	652	654	634	596	522	492	460	434	428	410	414
Easington	307	297	374	323	370	363	345	319	301	289	263
St.Fergus	1373	1401	1385	1432	1634	1650	1775	1850	1841	1875	1875
Teesside	452	456	434	456	462	472	426	385	379	356	337
Theddlethorpe	463	423	408	373	332	317	288	258	264	268	263
Onshore	3	3	3	2	2	1	1	0	0	0	0
Point of Ayr	20	19	48	48	63	59	52	46	39	29	20
Rough	455	455	455	455	455	455	455	455	455	455	455
Bacton IC	101	202	303	404	505	606	606	606	606	606	606
Mid Range Storage	225	254	283	283	459	459	635	1024	1024	1024	1024
LNG	812	812	812	812	812	812	812	812	812	812	812

Figure A2.5a Baseline Demand & Interconnector Balance (GWh per day)

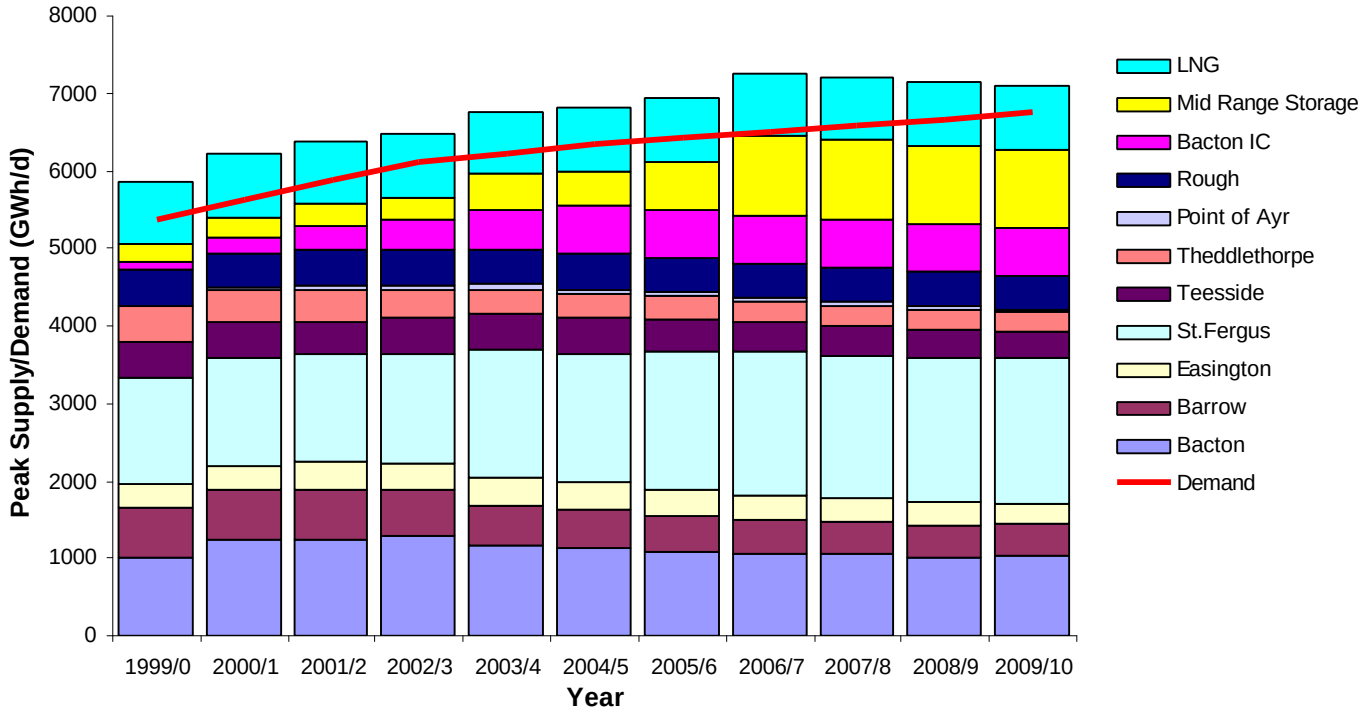


A2.5.2 Strong Peak Demand & Interconnector Balance Scenario

Table A2.5b Strong Demand & Interconnector Balance (GWh per day)

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Strong Demand	5373	5634	5890	6110	6223	6340	6427	6497	6583	6668	6754
Bacton	1004	1235	1237	1293	1156	1124	1081	1066	1053	1019	1023
Barrow	652	654	634	596	522	492	460	434	428	410	414
Easington	307	297	374	323	370	363	345	319	301	289	263
St.Fergus	1373	1401	1385	1432	1634	1650	1775	1850	1841	1875	1875
Teesside	452	456	434	456	462	472	426	385	379	356	337
Theddlethorpe	463	423	408	373	332	317	288	258	264	268	263
Onshore	3	3	3	2	2	1	1	0	0	0	0
Point of Ayr	20	19	48	48	63	59	52	46	39	29	20
Rough	455	455	455	455	455	455	455	455	455	455	455
Bacton IC	101	202	303	404	505	606	606	606	606	606	606
Mid Range Storage	225	254	283	283	459	459	635	1024	1024	1024	1024
LNG	812	812	812	812	812	812	812	812	812	812	812

Figure A2.5b Strong Demand & Interconnector Balance (GWh per day)

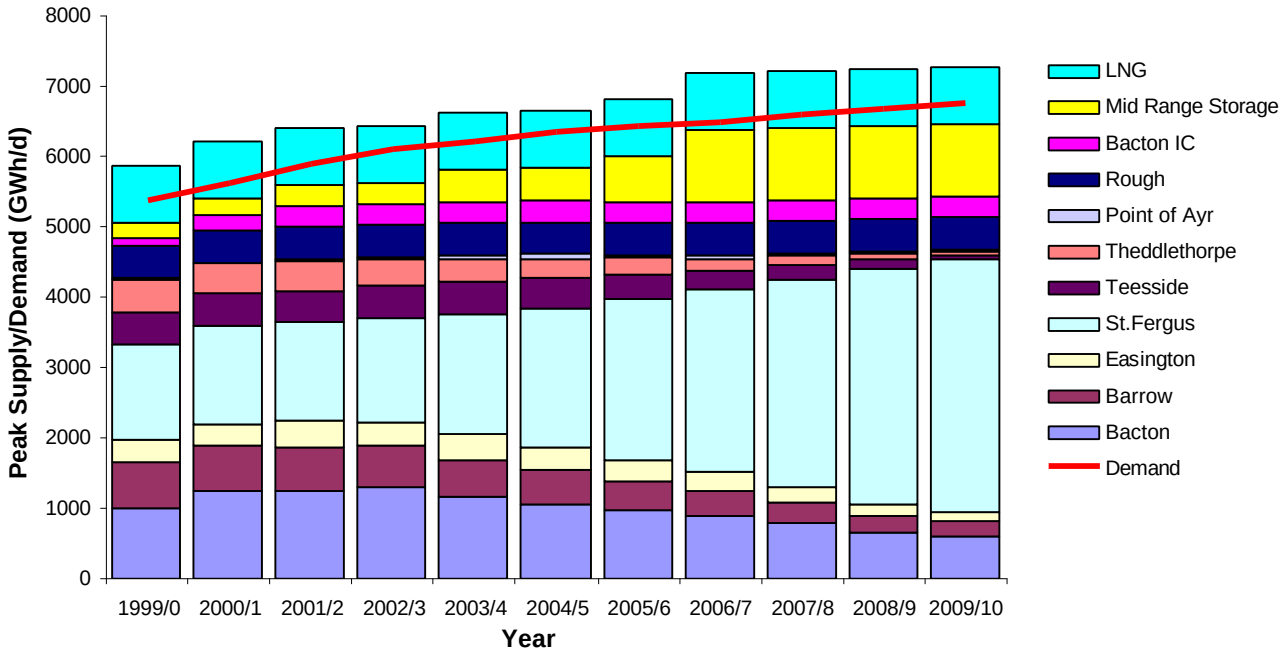


A2.5.3 Strong Peak Demand & St.Fergus Expansion Scenario

Table A2.5c Strong Demand & St.Fergus Expansion (GWh per day)

	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Strong Demand	5373	5634	5890	6110	6223	6340	6427	6497	6583	6668	6754
Bacton	1004	1235	1237	1293	1156	1065	970	891	778	659	599
Barrow	652	654	634	596	522	463	406	348	293	233	206
Easington	307	297	374	323	370	344	310	264	214	175	129
St.Fergus	1373	1411	1414	1488	1697	1955	2278	2595	2970	3338	3594
Teesside	452	456	434	456	462	436	359	279	211	137	80
Theddlethorpe	463	423	408	373	332	287	232	170	124	86	48
Onshore	3	3	3	2	2	1	1	0	0	0	0
Point of Ayr	20	19	48	48	63	59	52	46	39	29	20
Rough	455	455	455	455	455	455	455	455	455	455	455
Bacton IC	101	202	303	303	303	303	303	303	303	303	303
Mid Range Storage	225	254	283	283	459	459	635	1024	1024	1024	1024
LNG	812	812	812	812	812	812	812	812	812	812	812

Figure A2.5c Strong Demand & St.Fergus Expansion (GWh per day)



Appendix 3

Actual Flows 1999

A3.1 Annual Flows

A3.2 Compressor Usage

A3.3 Peak & Minimum Flows

This Appendix describes annual and peak flows during the calendar year 1999. Where relevant, more up to date data from the subsequent winter period has been included. Annual flow is used to calculate the revenue which Transco is allowed to recover in accordance with its price control formula, whilst peak flow is used to determine if capacity expansion is required on the network.

A3.1 Annual Flows

Transco's annual forecasts assume that the weather will be "average". Therefore, when comparing actual demand with forecasts, demand has been adjusted by a factor 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.

To take account of global warming effects, Transco, in the period between 1995 and 1999, has based weather corrected and forecast demands on the equivalent of a 10 year average of weather conditions rather than the full 65 year weather database used historically. This approach was agreed with Ofgem and the MMC during the 1997 price control review and is equivalent to a 2% reduction in LDZ demand compared to that which would be expected if the 65 year weather data set was to be used. No change has been made to Transco's peak forecasts in this period as there is no evidence to suggest that the probability of severe weather occurring has changed.

Tables A3.1a and A3.1b provide a comparison of actual system throughputs in the 1999 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 variances, stranded sites, etc. The reconciliation corrected forecast shows the 1999 Ten Year Statement forecast of 1999 annual demand, with reconciliation, etc. applied for 1998.

Table A3.1a Annual Demand for 1999 (TWh) – LDZ / NTS Split

	Actual Demand	Weather Corrected Demand	Reconciliation Corrected Forecast
LDZ Loads			
0-73 MWh	365	392	391
73-732 MWh	59	63	63
>732 MWh Firm	140	145	149
Interruptible	122	125	124
LDZ Total	**686**	**725**	**727**
NTS Loads	**299**	**300**	**282**
Total Demand	**985**	**1025**	**1009**

Due to reconciliation, the sectorial split of the corrected forecast shown above is different from that presented in the Transco accounts.

Table A3.1b Annual Demand for 1999 (TWh) – Business & Domestic / Large User Split

	Actual Demand	Weather Corrected Demand	Reconciliation Corrected Forecast
0-73 MWh	365	392	391
73-732 MWh	59	63	63
>732 MWh Firm	123	128	134
Interruptible	101	104	103
Business & Domestic Total	**648**	**687**	**690**
Large Loads Total	**337**	**338**	**318**
Total Demand	**985**	**1025**	**1009**

Due to reconciliation, the sectorial split of the corrected forecast shown above is different from that presented in the Transco accounts.

Tables A3.1a and A3.1b highlight the impact that warm weather has had on demand by reducing actual volumes by 39 TWh, 5% of LDZ demand. Growth in the weather corrected 0 – 73 MWh (domestic) and interruptible sectors was in line with expectations, after allowing for reconciliation, whilst lower than expected growth in the >73 MWh sectors was in part due to the slow down of growth in manufacturing industries.

The contribution made by the power generation sector to total demand was under forecast due to greater demand from dual supplied stations and higher load factors.

Overall weather corrected demand was 1025 TWh representing unprecedented growth of 13% on 1998, over twice the rate experienced during the previous year.

A3.2 Compressor Usage

Table A3.2 shows the gas used at each of the compressor stations during 1999. It also shows the usage on the maximum demand day during 1999.

Table A3.2 Compressor Usage for 1999 (mcm)

Compressor	Total 1999	Max. Demand Day 15 Dec 1999
Aberdeen	19.23	0.20
Alrewas	0.34	0.00
Aylesbury	3.09	0.05
Bathgate	37.04	0.20
Bishop Auckland	32.12	0.05
Cambridge	0.29	0.00
Carnforth	49.96	0.19
Chelmsford	4.71	0.10
Churchover	20.39	0.14
Diss	10.06	0.23
Hatton	12.50	0.23
Huntingdon	9.46	0.00
Kings Lynn	2.84	0.07
Kirriemuir	60.18	0.21
Moffat	46.13	0.14
Peterborough	19.85	0.21
Scunthorpe	17.87	0.08
St.Fergus	55.54	0.32
Warrington	29.58	0.15
Wisbech	19.76	0.11
Wooler	18.75	0.07
Wormington	14.20	0.10
Peterstow (electric)	0.0	0.00
Total	**483.92**	**2.85**

A3.3 Peak & Minimum Flows

The maximum demand during 1999 was on 15 December when a record demand was experienced. The minimum demand during 1999 occurred on 6 August 1999. The flows on these days are detailed here.

A3.3.1 System Entry - Maximum Day and Peak Flows

Table A3.3a shows the flows into the system on the maximum demand day of 1999, compared to the previously forecast 1 in 20 peak for 1999/00 and the highest daily flow during the year.

Table A3.3a System Entry - Peak Day Flows on 15 December 1999 (mcm per day)

Terminal	Maximum Day 15 Dec 1999	1 in 20 Peak for 1999/00	Highest Daily For 1999/00
St.Fergus	115.0	122.5	119.6
Barrow	59.4	64.6	63.7
Easington (exc. Rough)	15.5	28.3	23.3
Theddlethorpe	39.8	50.0	43.5
Bacton	103.7	100.5	103.7
Teesside	34.7	39.4	36.8
Burton Point	1.6	-	2.6
Sub Total	**369.7**	**405.3**	**393.4**
Storage Withdrawal	37.5	124	59.3
Total	**407.2**	**529.3**	**452.7**

Notes

- The maximum day for 1999 refers to flows on 15 December 1999. These flows are not necessarily commensurate with current forecasts or with maximum flows at individual terminals
- 1 in 20 Peak refers to the 2000 Base Plan Assumptions, published in November 1999

A3.3.2 System Entry - Minimum Day Flows

Table A3.3b System Entry Flows on the Minimum Demand Day of 1999.

Terminal	Minimum Day 6 August 1999
St.Fergus	76.79
Barrow	0.00
Easington (exc. Rough)	8.26
Theddlethorpe	6.76
Bacton	24.13
Teesside	29.44
Burton Point	0.00
Sub Total	**145.39**
Storage Withdrawal	0.00
Total	**145.39**

A3.3.3 System Exit – Maximum Day & Peak Flows

Table A3.3c shows actual peak flows out of the NTS on the maximum demand day of 1999 compared to the previously forecast 1 in 20 peak flow.

Table A3.3c NTS Exit Peak Flows on 15 December 1999 (mcm/d)

LDZ	Maximum Day 15 Dec 1999	1 in 20 Peak for 1999/00
Scotland	25.71	30.5
North	18.80	23.2
North West	39.82	50.4
North East	20.42	24.0
East Midlands	36.33	41.0
West Midlands	31.34	40.4
Wales	18.99	21.3
East	26.14	33.5
North Thames	35.96	46.3
South East	34.46	45.0
South	23.53	33.6
South West	17.56	24.5
LDZ Total	**329.06**	**413.7**
NTS Loads	82.2	115.8
Total	**411.26**	**529.5**

Notes

- The maximum day for 1999 refers to flows on 15 December 1999, however it was an exceptionally mild winter overall and peak conditions were not experienced. This was the highest overall demand day, but individual systems may have seen higher demands on other days
- 1 in 20 peak demands are from the 2000 Base Plan Assumptions and are firm demands. They have been converted to volume using a CV of 39 MJ/m^3
- NTS Loads include European and Irish Interconnector demands
- The difference between total demand and total supply on the day was due to changes in linepack

A3.3.4 System Exit - Minimum Day Flows

Table A3.3d Actual NTS Exit Flows on the Minimum Demand Day of 1999.

LDZ	Minimum Day 6 Aug 1999
Scotland	6.60
North	4.80
North West	8.51
North East	4.69
East Midlands	8.29
West Midlands	4.73
Wales	6.69
East	4.05
North Thames	7.10
South East	6.73
South	3.90
South West	3.34
LDZ Total	**69.43**
NTS Loads	78.94
Total	**148.37**

Notes

- The minimum day for 1999 refers to flows on 6 August 1999. This was the lowest overall demand day, but individual systems may have seen lower demands on other days
- NTS Loads include European and Irish Interconnector demands
- The difference between total demand and total supply on the day was due to changes in linepack

Appendix 4

Network Code

A4.1 NGTA

A4.2 Planning, Security (including Storage) - (PSS)

A4.3 SPA / Invoicing and Adjustment

A4.1 NGTA

With the introduction of the New Gas Trading Arrangements (NGTA) the winter period of 1999/2000 heralded fundamental changes to both Capacity and Energy regimes.

The NGTA had 2 key areas of enforcement:

- Capacity Regime
- Energy Balancing Regime

The objective of the changes to the Capacity Regime was to provide a better definition of the capacity product. The objective of the changes made to Energy Balancing was to introduce the OCM and create an environment that better facilitates gas trading. The NGTA also introduced incentives on Transco in both the Energy and Capacity arenas.

A4.1.1 Capacity Regime

Following the implementation of Modification Proposals 0314, 0350 and 0380 Transco is to make available quantities of monthly firm capacity via a price auction. The amount of capacity made available is based on seasonal normal demand multiplied by a factor (for the period from October 1999 to March 2000 the factor was 1; for the period from April 2000 to September 2000 the factor is 1.1).

A capacity incentive was introduced by Modifications 0314 and 0382 to encourage Transco to maximise the availability of capacity. Under the incentive Transco is permitted to retain 20% of the revenue received from the auctioning of day-ahead capacity and is exposed to 20% of the associated costs where it fails to meet firm capacity rights. The new capacity regime enabled Transco to sell capacity at the day ahead stage, both on firm and interruptible bases through a daily auction, allowing the available capacity to be increased to reflect daily variations from seasonal normal demand and changes in supply profiles. For the winter period 1999/2000 day ahead sales yielded £5.3 million of revenue, £4.2 million of which was paid to shippers holding monthly system entry capacity with £1.1 million being retained by Transco.

The revenues raised by day ahead auctions of entry capacity for the winter period 1999/2000 are detailed in Figures A4.1a and A4.1b.

Modification 0378 developed a methodology to afford shippers greater choice in the determination of entry capacity profiles. That determination may be achieved if shippers are able to indicate the desired location for each bid quantity during the auction process. This process enables shippers to value capacity at various points on Transco's system sending price signals to encourage Transco to maximise the availability capacity at points of high value.

Figure A4.1a Entry Capacity (Firm Revenue)

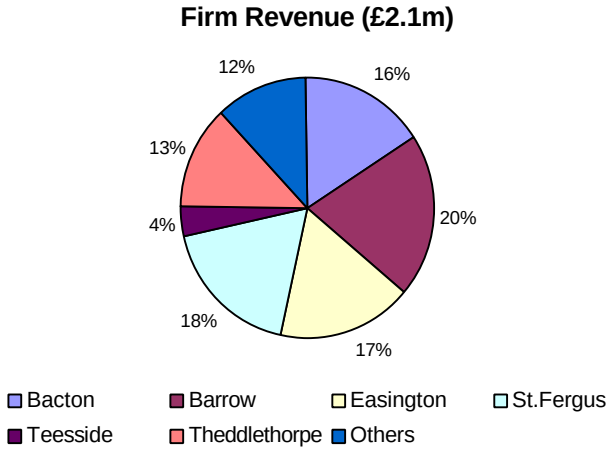
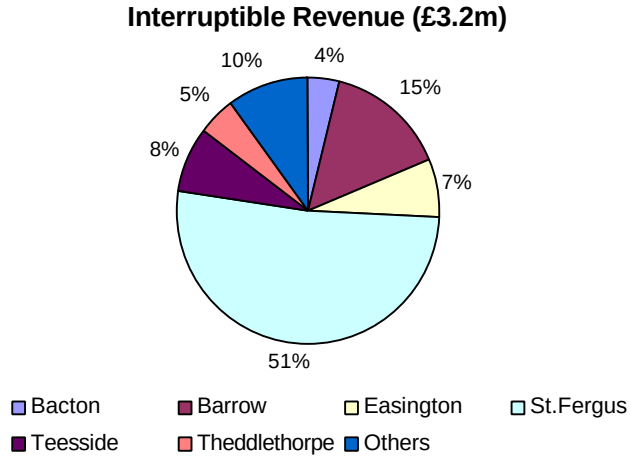


Figure A4.1b Entry Capacity (Interruptible Revenue)



A4.1.2 Energy Balancing Regime

The implementation of Modification Proposal 0313 saw:

- the On the day Commodity Market (OCM) replace the flexibility mechanism. The OCM provides Transco with the majority of gas for its role as residual system balancer and enables anonymous, financially cleared on the day trading between shippers for the first time. The OCM provides shippers with a useful tool in balancing their supplies and demands
- the introduction of an energy incentive regime to encourage Transco to take prices close to the market average
- the removal of matched shipper re-nominations widely believed to be a barrier to within day trading following a trial under Modification Proposal 0305
- a reduction of 25% in shipper balancing tolerances

The operational guidelines were amended to allow Transco the necessary discretion to operate effectively within the incentive regime.

Under the NGTA system cash out prices are set by trades conducted on the OCM. There was a change to the calculation of System Average Price (SAP) to reflect all OCM trades and the calculation of System Marginal Price (Buy) is set at the highest price accepted by Transco or SAP whichever is the higher and the System Marginal Price (Sell) is set at the lowest price accepted by Transco or SAP whichever is the lower. Where no trades have taken place on the OCM on a gas day, a default SAP is set as the average of the previous seven days SAP values.

A4.2 Planning, Security (including Storage) - (PSS)

Fundamental changes have occurred within the storage arena over the last year. The topics driving key changes were:

A4.2.1 Storage Competition

On 1 May 1999 Modification Proposal 0311 amended the Network Code paving the way for storage competition.

Historically there was one storage operator connected to Transco's system, this storage operator was part of the same group of companies as Transco. Now new storage operators provide storage services subject to their own storage terms and are required to enter into a Storage Connection Agreement for each facility connected to Transco's system.

A4.2.2 Review of LNG

November 1999 saw Ofgem publish its 'Review of BG plc's Liquefied Natural Gas Storage Facilities' Proposals Document. On 14 December 1999, LNG storage facilities became part of Transco.

Modification Proposal 0390 was developed as a result of the review to encourage the efficient and economic operation of Transco's system by facilitating efficient utilisation of LNG facilities. This delivered significant changes to LNG services for storage year 2000/01 including:

- pay-as-bid auctions
- revised transportation credits that better reflect the value of the transportation capacity provided through constrained LNG as proposed in PC52

An interruptible space charge for 'uncovered' gas-in-storage carried forward from the previous year was implemented to encourage timely decisions on capacity booking.

A4.2.3 Top-up

A4.2.3.1 Treatment of Constrained Top-up Costs

Another key development within the PSS arena is the treatment of constrained top-up costs. Modification 0297 required Transco to pay for all costs associated with top-up with Transco being able to recover costs only when top-up was actually used. Modification 0391 reversed 0297 with regard to constrained top-up costs only, enabling Transco to recover from the shipping community all constrained top-up costs. The costs for the provision of national top-up, if required, still remains the responsibility of Transco. Modification 0391 only applies to the storage year 2000/01 and will expire 30 April 2001. This topic will be the subject of further consultation.

A4.2.3.2 Alteration to the Top-up Bidding Rules

Historically Transco have been required to make all top-up deliverability available on the OCM. It was identified that if extreme price spikes were experienced it was possible for the top-up offer to become the cheapest. If this was accepted by a party other than Transco the top-up gas would flow breaching the monitor level leaving insufficient gas to ensure 1 in 20 peak day demand and 1 in 50 load duration requirements could be met.

The effect of Modification 0383 was to establish a methodology to restrict the daily top-up market offer to top-up gas which is surplus to the monitor level or 100,000 kWh, which ever is the greater.

A4.2.3.3 Disposal of Operating Margins / Top-up Gas

At the beginning of the storage year, where there was surplus gas in either the top-up or operating margins account and a deficit in the other, Transco was obliged to transfer the surplus at the weighted average cost of gas of the disposing account. This may not be the most economically advantageous method of procuring gas to make up any deficit. Therefore Modification 0393 removed the obligation to make such a transfer but allowed such a transfer where it is beneficial to both the top-up and operating margins account. Modification 0393 also enabled Transco to dispose of surplus gas in either account prior to the commencement of the storage year to take advantage of higher gas prices.

A4.3 SPA / Invoicing and Adjustment

A4.3.1 Adjustments to Invoices

There has been significant progress in the development of a number of adjustment principles and methodologies over the past twelve months. Specific query types benefiting from these developments have been duplicate sites, isolated and withdrawn sites and prime and sub configuration sites.

A4.3.2 Scheduling of Ad-Hoc Invoicing

The implementation of Modification Proposal 0252 supported the streamlined approach to Transco's utilisation of the ad-hoc invoice, and the provision of supporting information to shippers invoiced in this manner.

A4.3.3 Reconciliation by Difference (RbD)

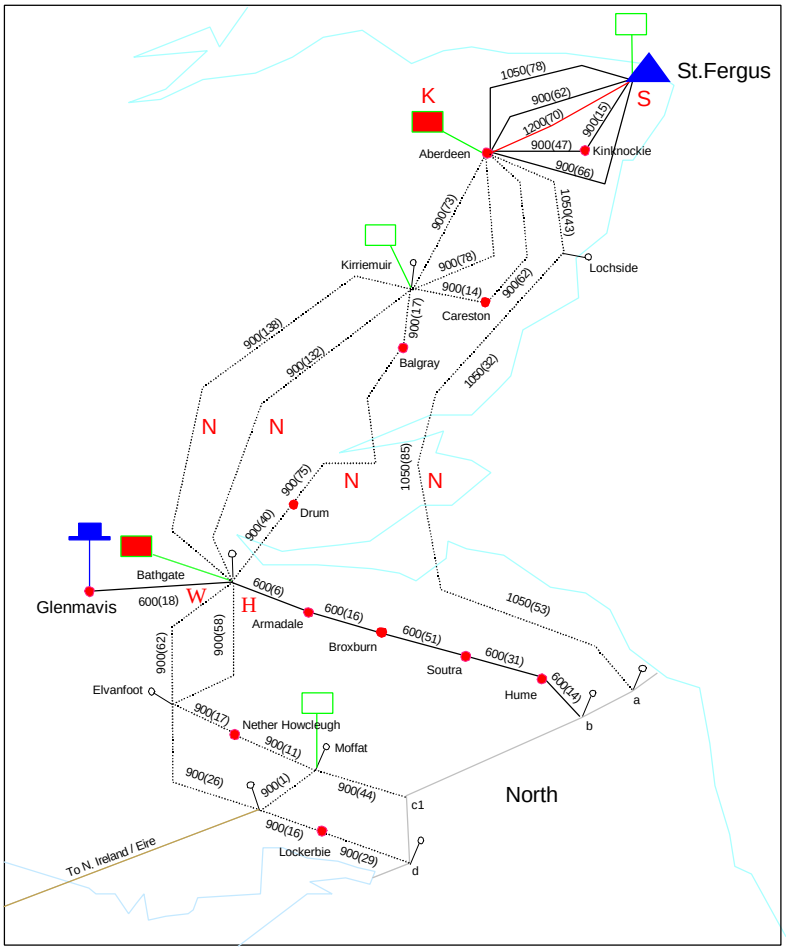
The external audit of RbD sanctioned Transco's compliance with the operation of RbD principles and procedures. Ongoing risk modelling within the Audit Sub Committee (ASC) further demonstrated that the risk profile to small supply point shippers centred on zero.

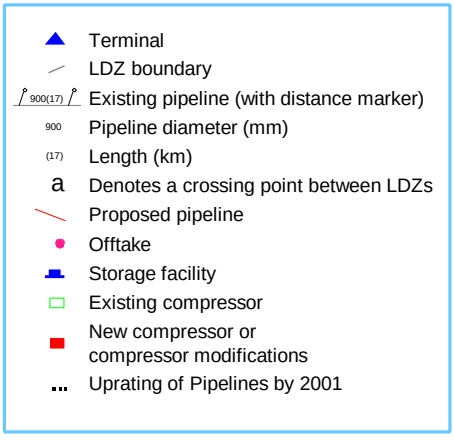
Throughout the year Modification Proposal 0327 was developed, catering exclusively for a series of specific transitional adjustment methodologies which would more accurately reflect the RbD charges from the period February 1998.

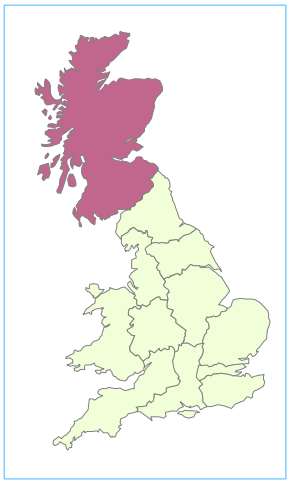
Appendix 5

The Gas Transportation System

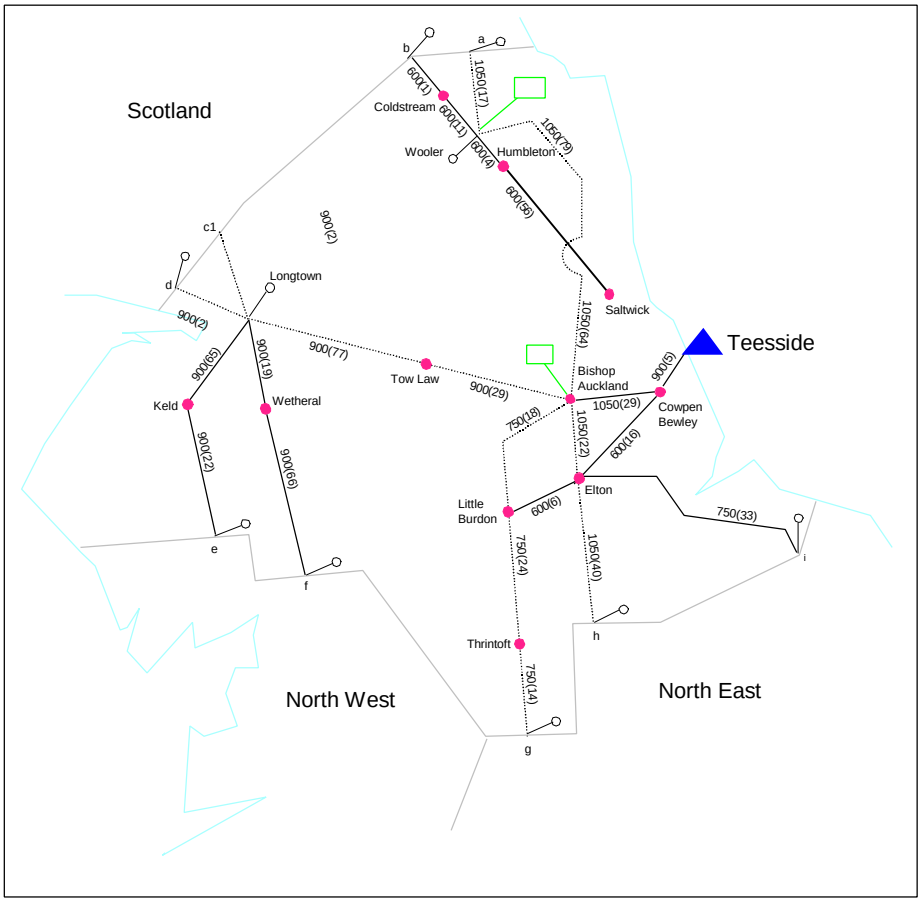
Scotland (SC) – NTS



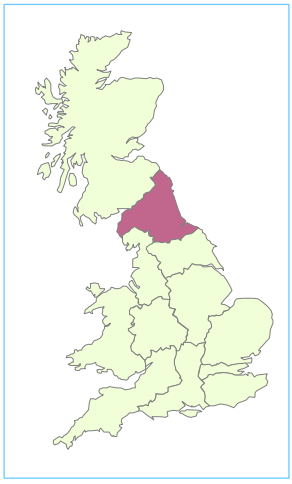




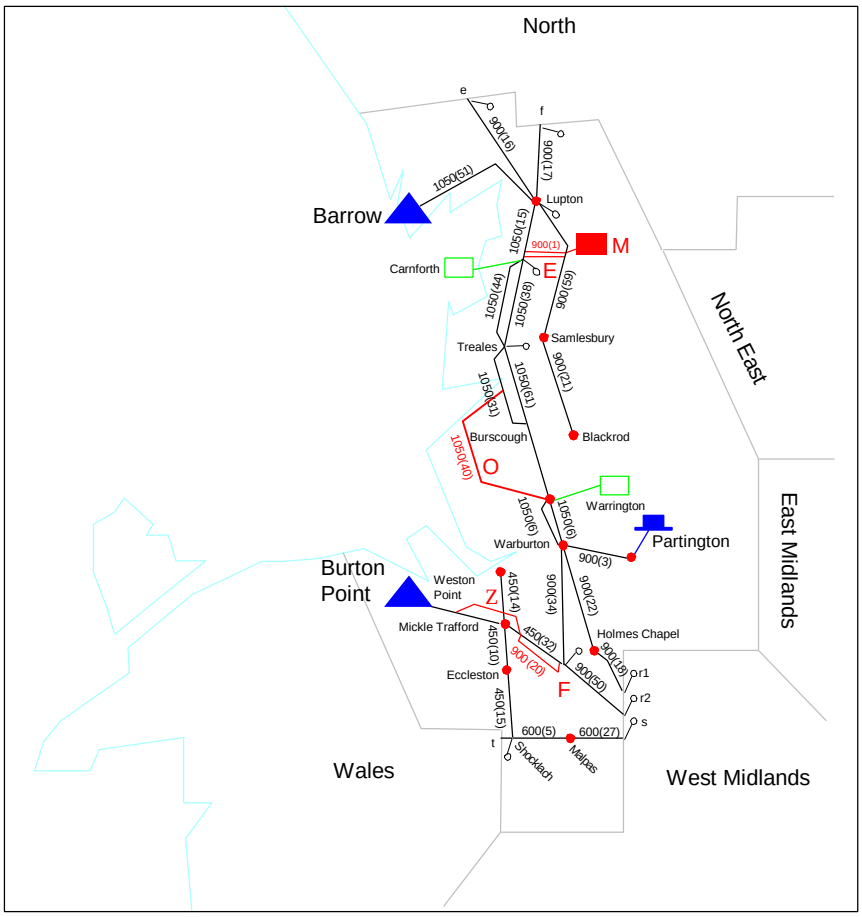
North (NO) – NTS

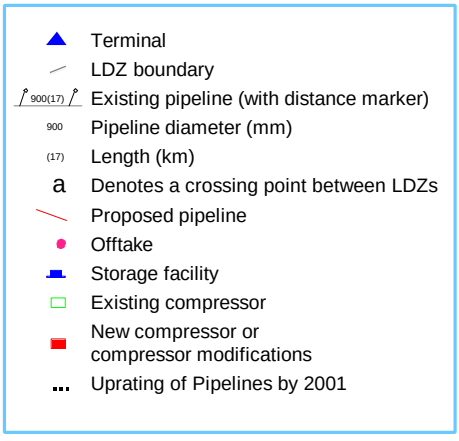


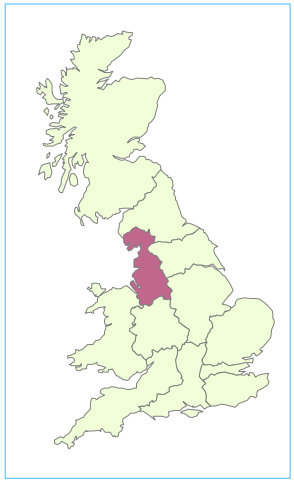
- Terminal
- LDZ boundary
- 900(17) Existing pipeline (with distance marker)
- 900 Pipeline diameter (mm)
- (17) Length (km)
- a Denotes a crossing point between LDZs
- Proposed pipeline
- Offtake
- Storage facility
- Existing compressor
- New compressor or compressor modifications
- Uprating of Pipelines by 2001



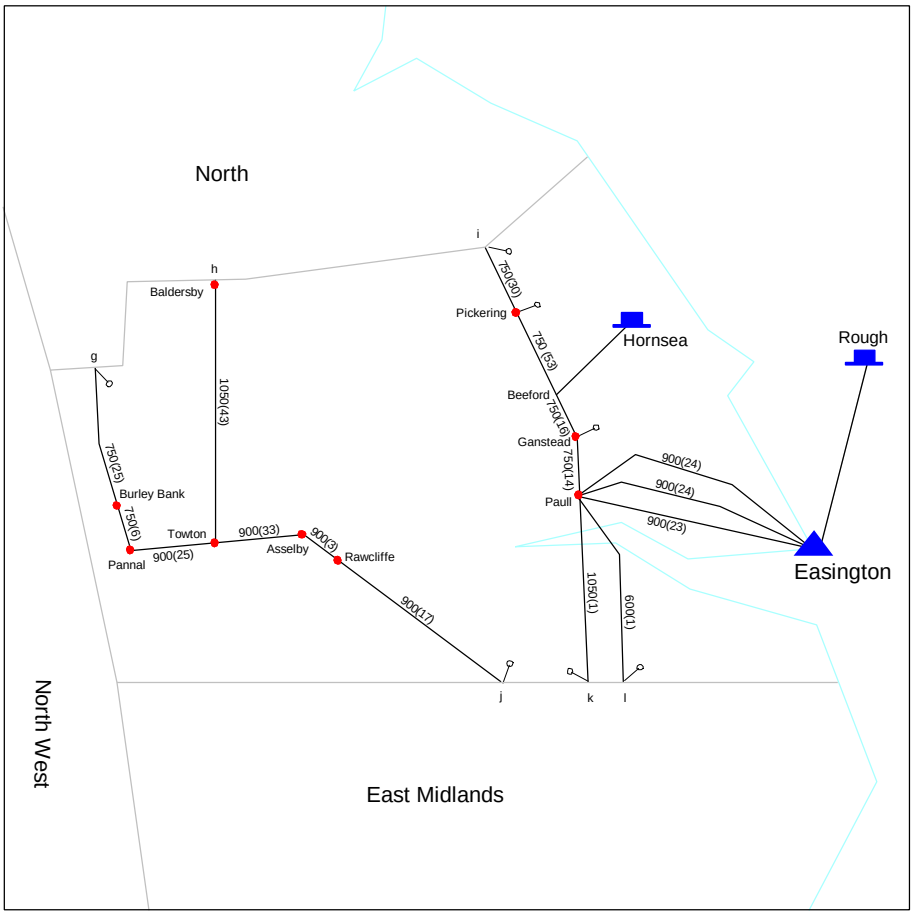
North West (NW) – NTS



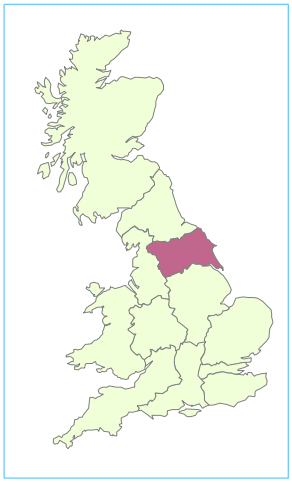




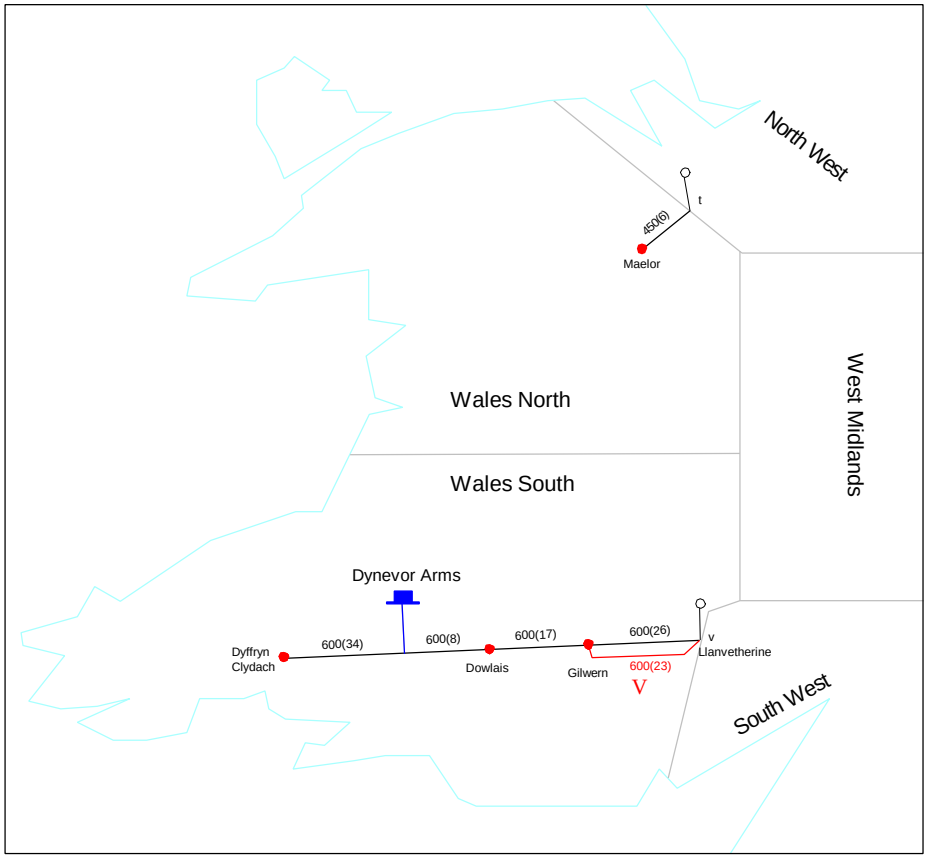
North East (NE) – NTS



- Terminal
- LDZ boundary
- 900(17) Existing pipeline (with distance marker)
- 900 Pipeline diameter (mm)
- (17) Length (km)
- a Denotes a crossing point between LDZs
- Proposed pipeline
- Offtake
- Storage facility
- Existing compressor
- New compressor or compressor modifications
- Uprating of Pipelines by 2001



Wales (WN & WS) – NTS



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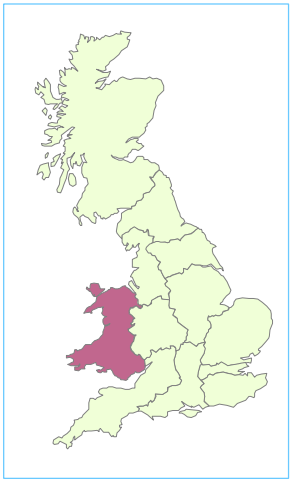
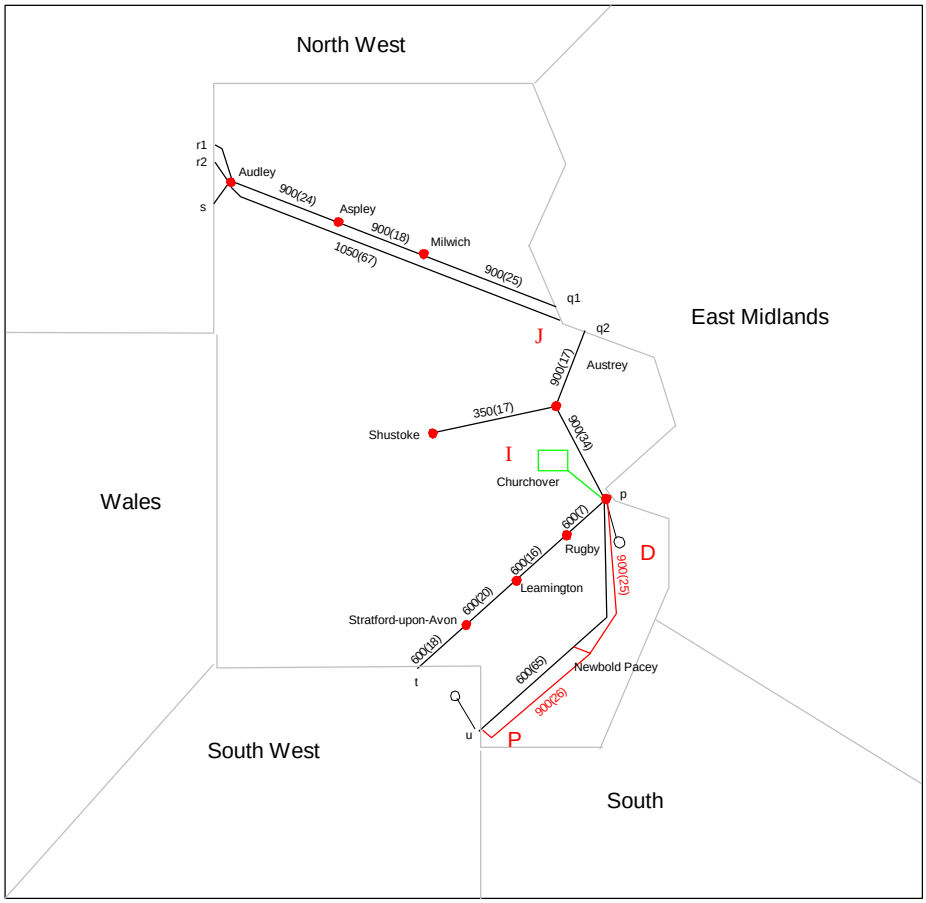


West Midlands (WM) – NTS



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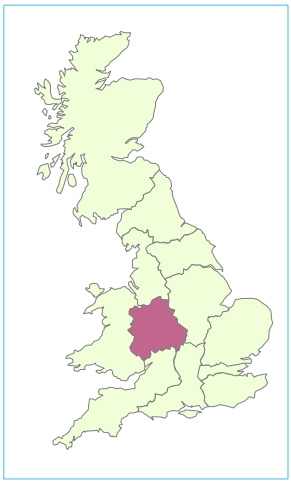

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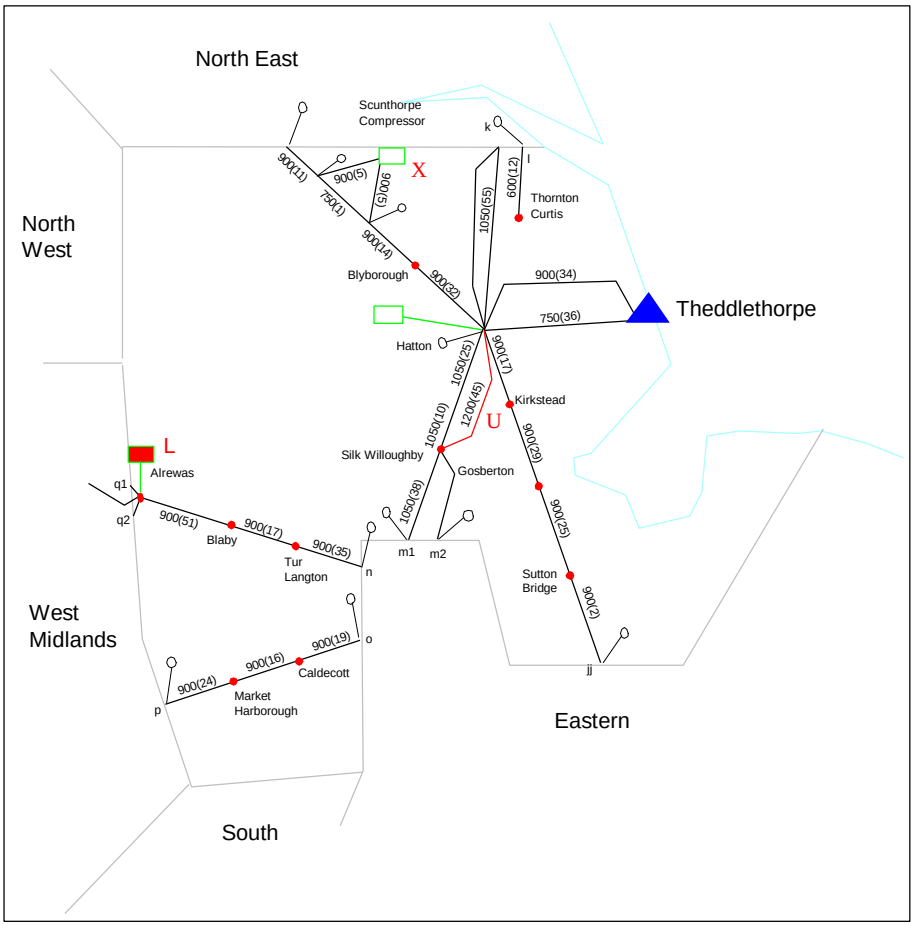
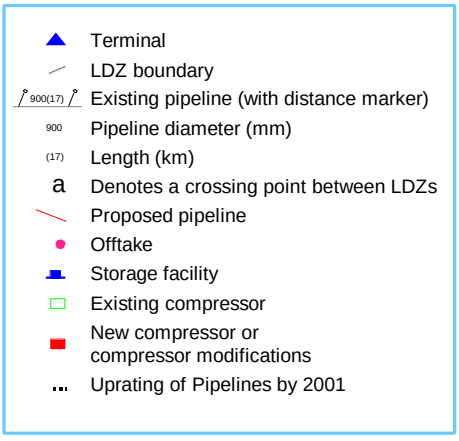
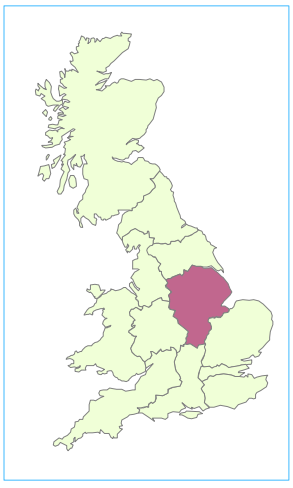
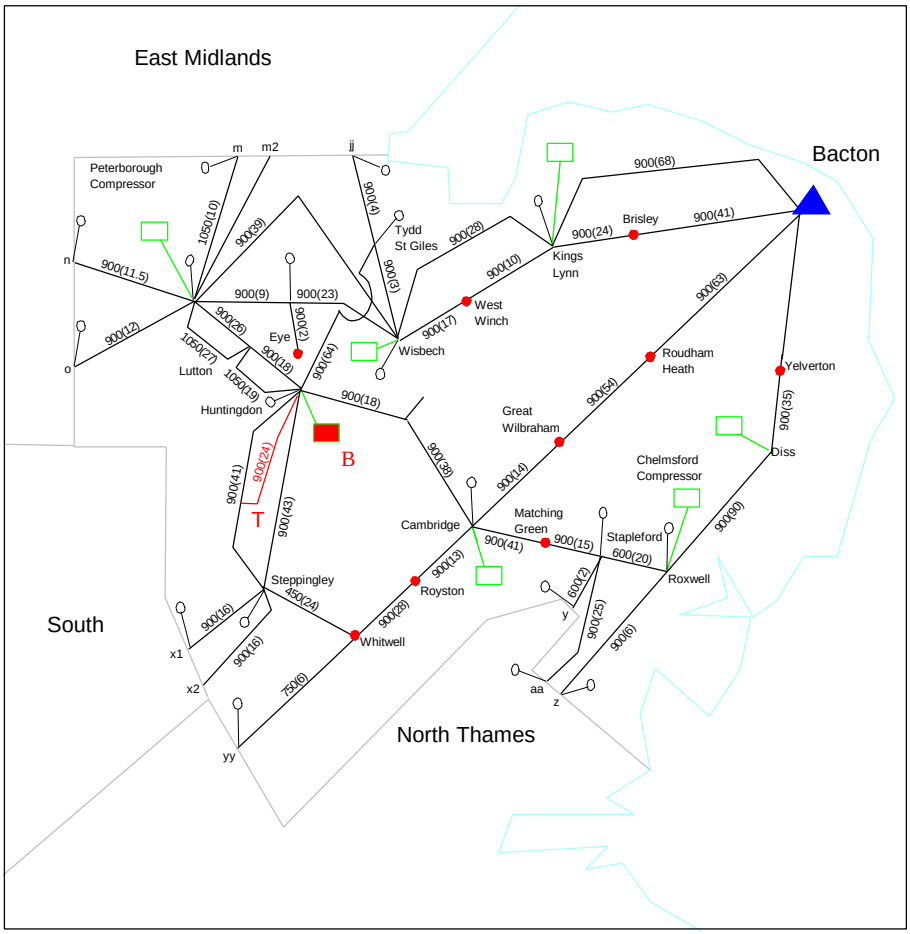
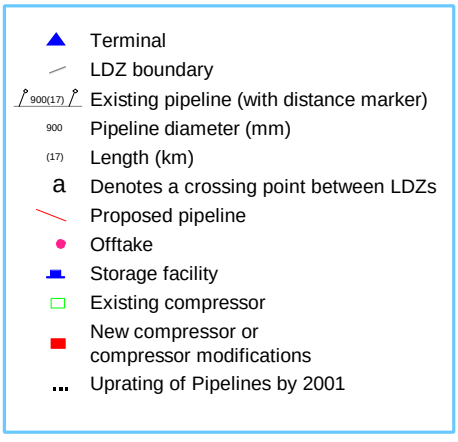


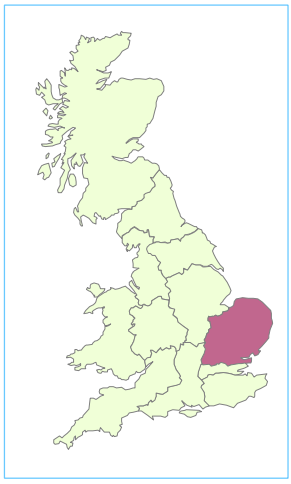




Eastern (EA) – NTS







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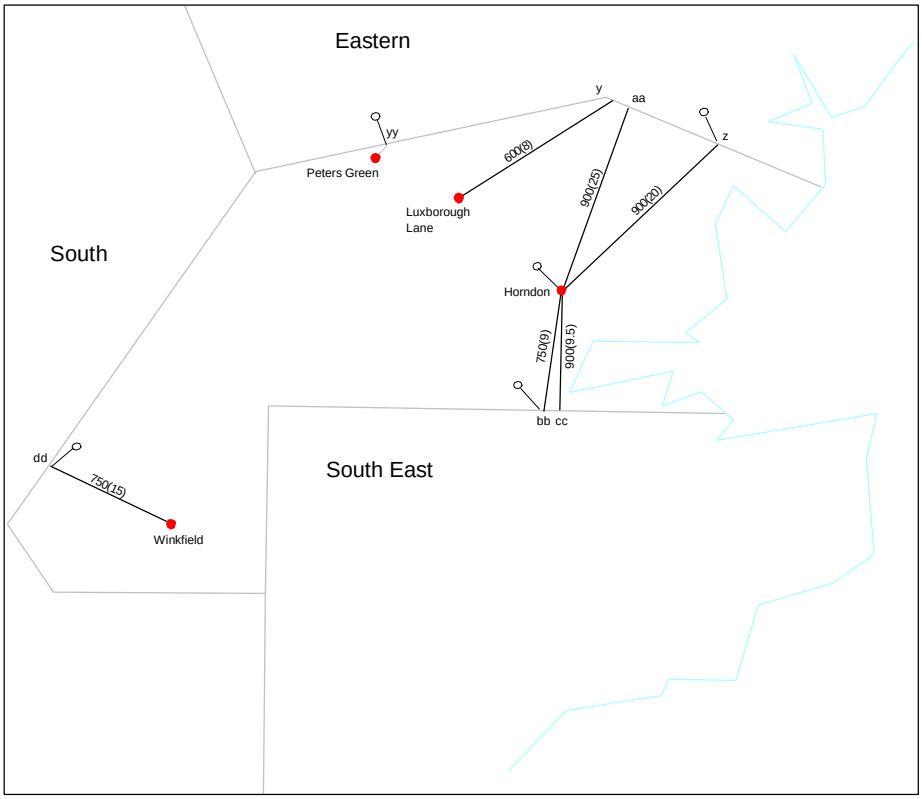

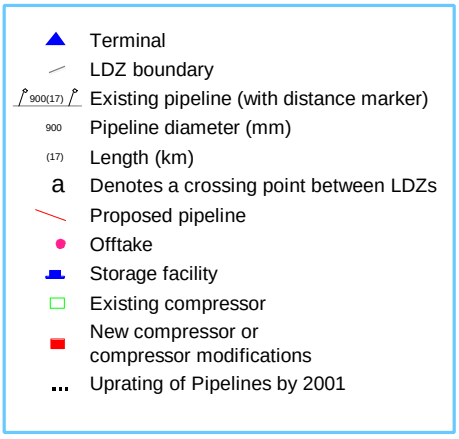

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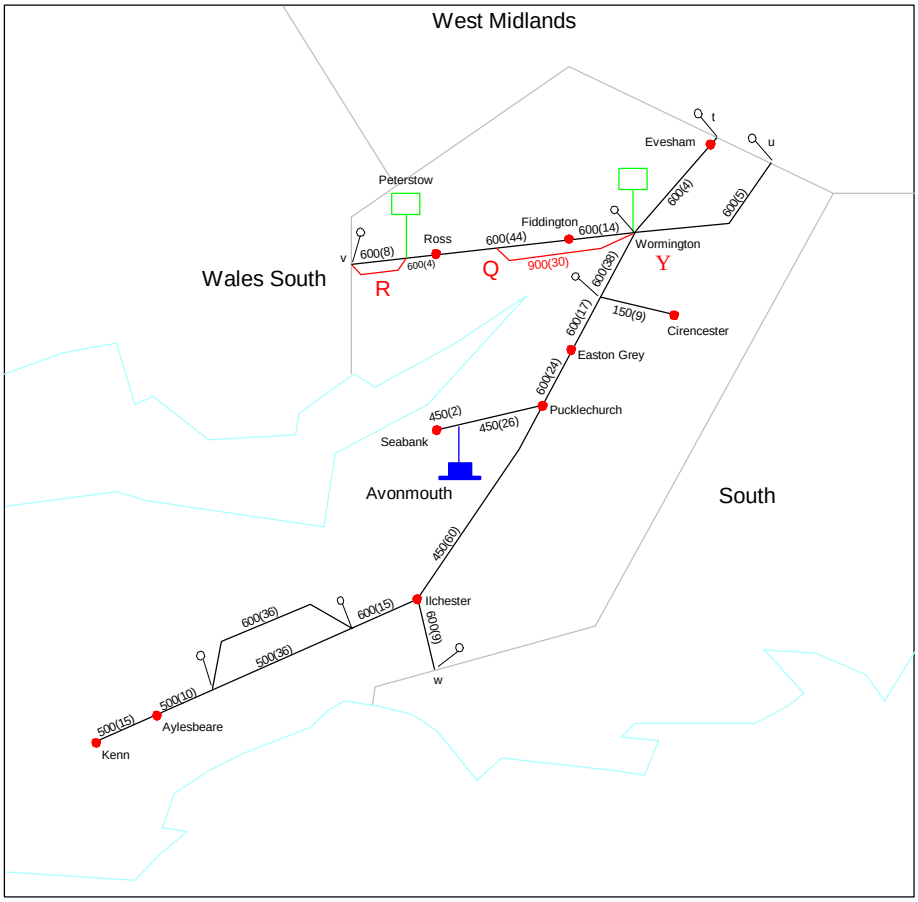
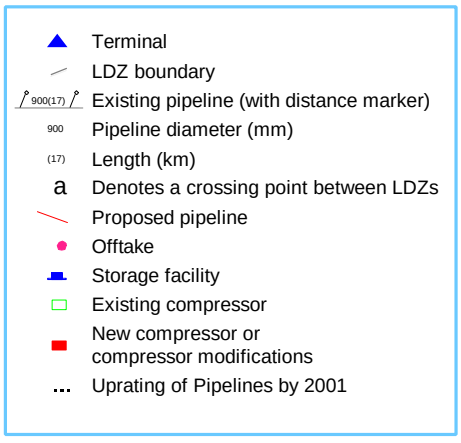
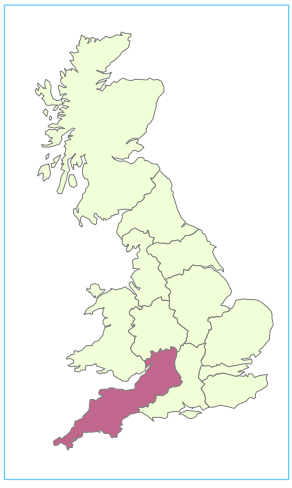
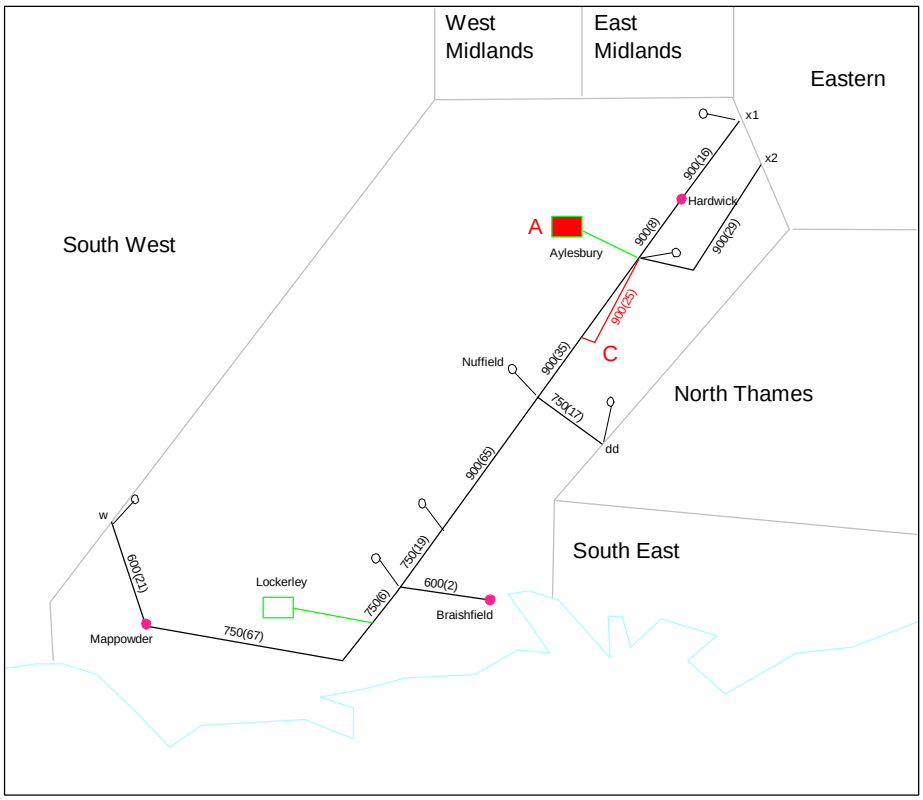






South (SO) – NTS


West Midlands
East Midlands
Eastern
South West
North Thames
South East
x1
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900(19)
Hardwick
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Aylesbury
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C
Nuffield
900(35)
750(17)
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750(19)
Lockerley
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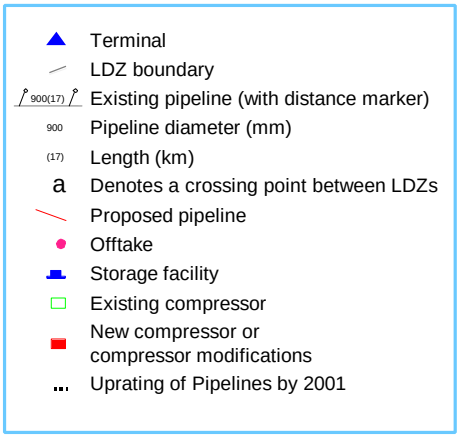
600(2)
Braishfield
Mappowder
750(67)


Terminal
LDZ boundary
900(17) Existing pipeline (with distance marker)
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Proposed pipeline
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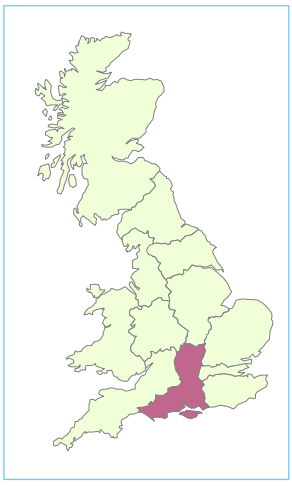
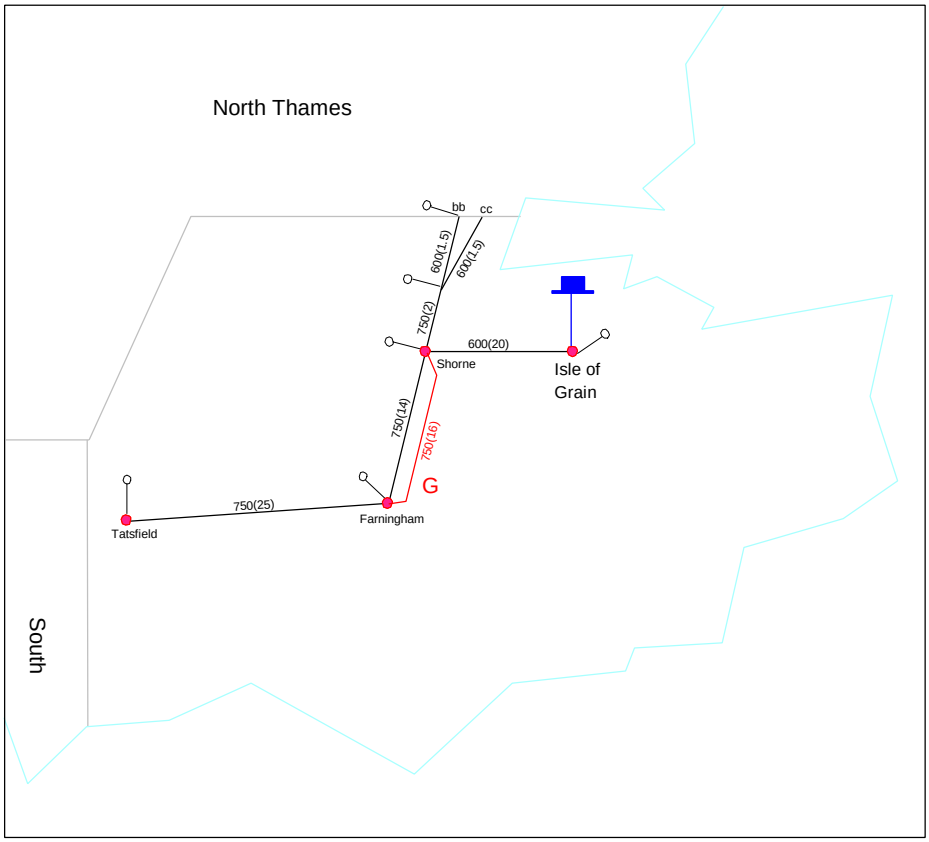
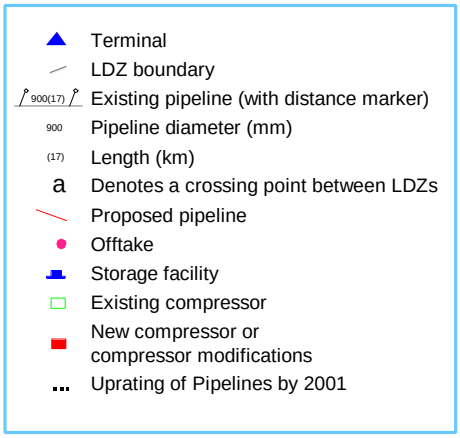
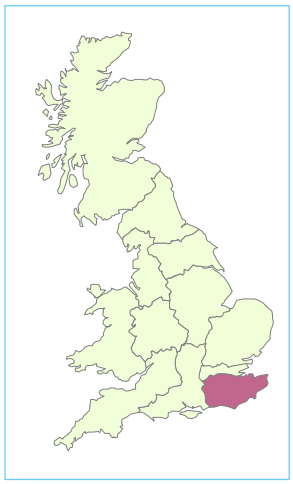
Uprating of Pipelines by 2001



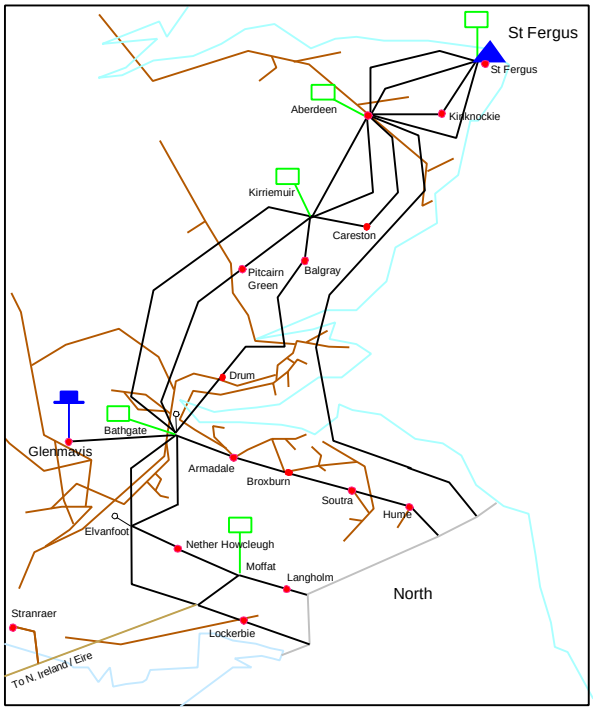
South East (SE) – NTS



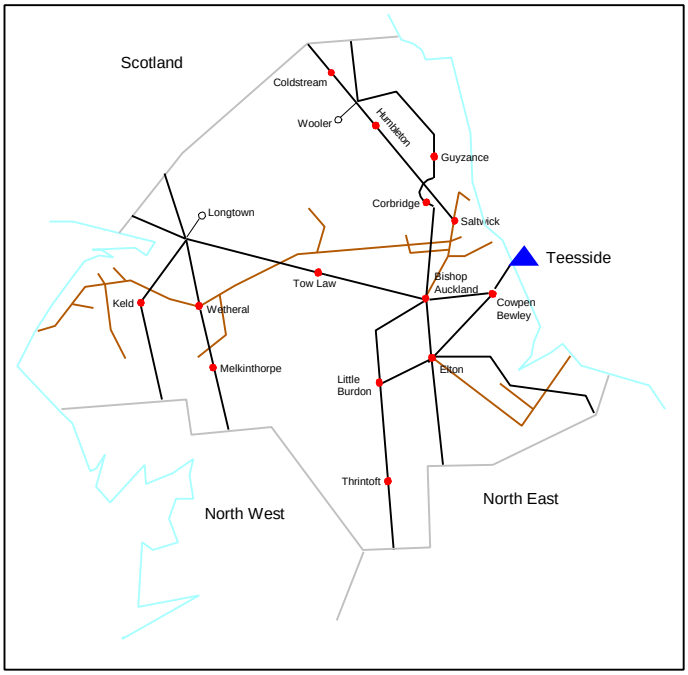




Scotland (SC) – LTS



North (NO) – LTS



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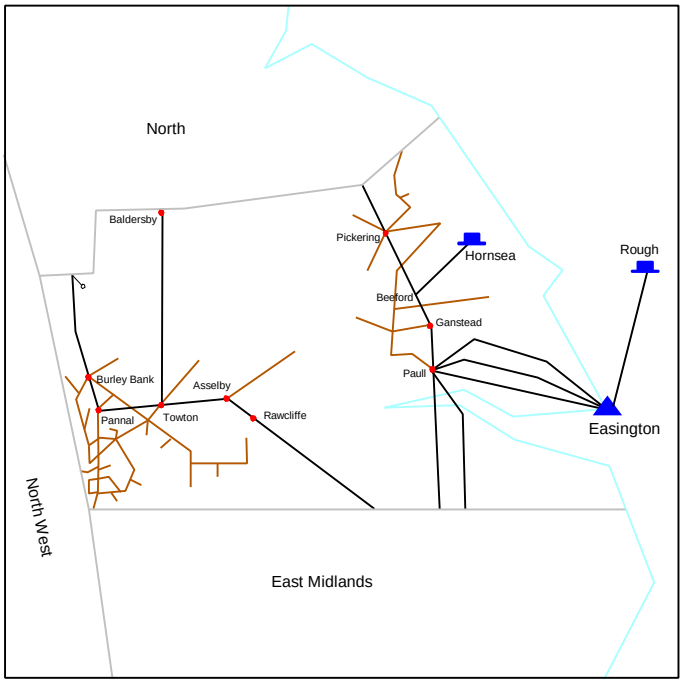
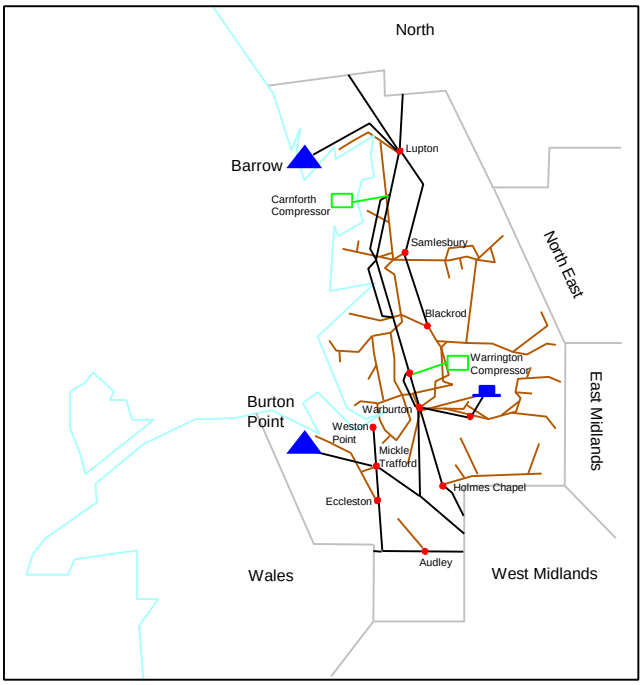
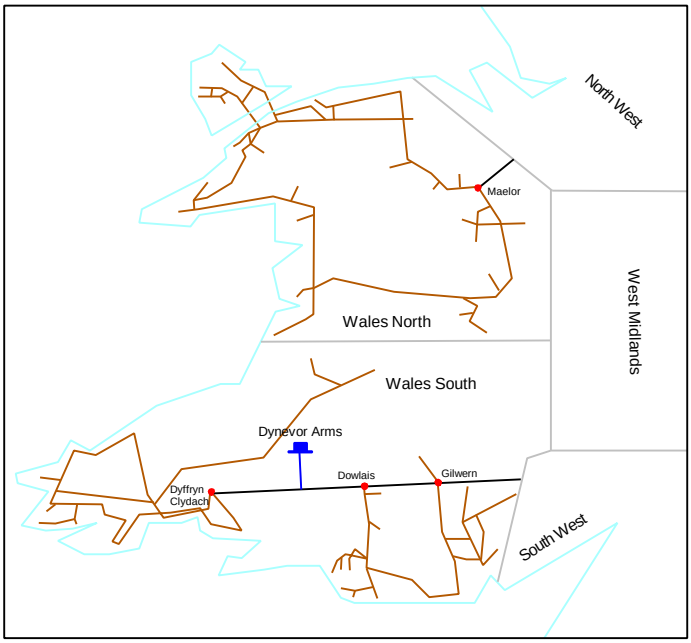


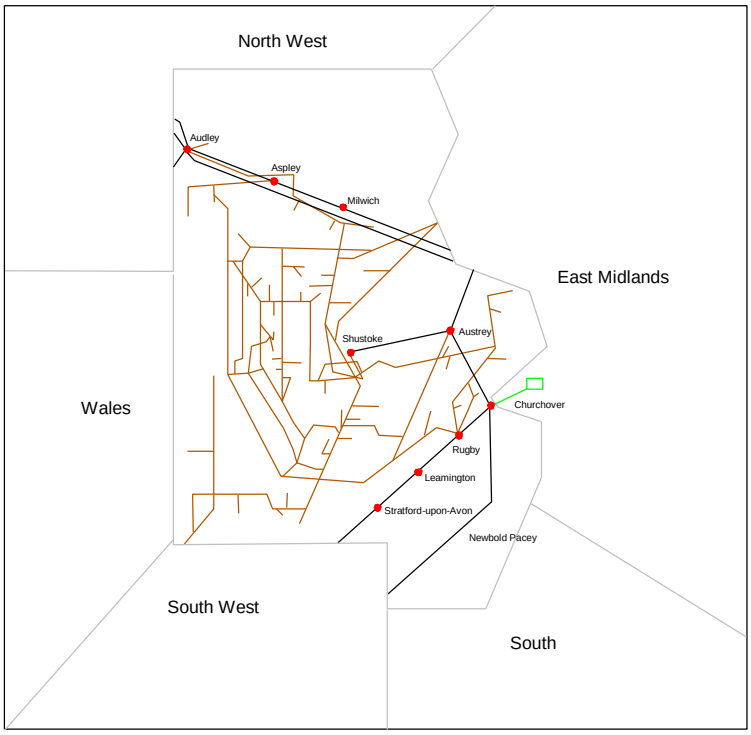
North West (NW) – LTS



Wales (WN & WS) – LTS



West Midlands (WM) – LTS



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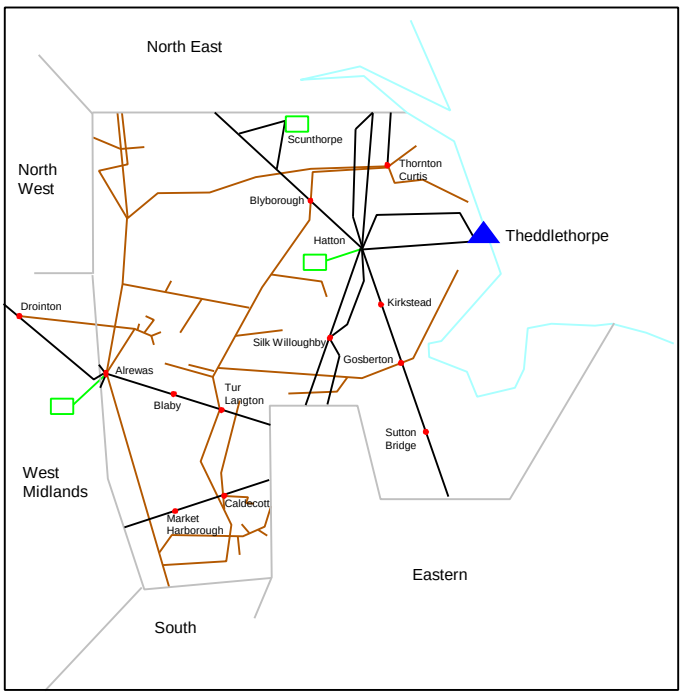
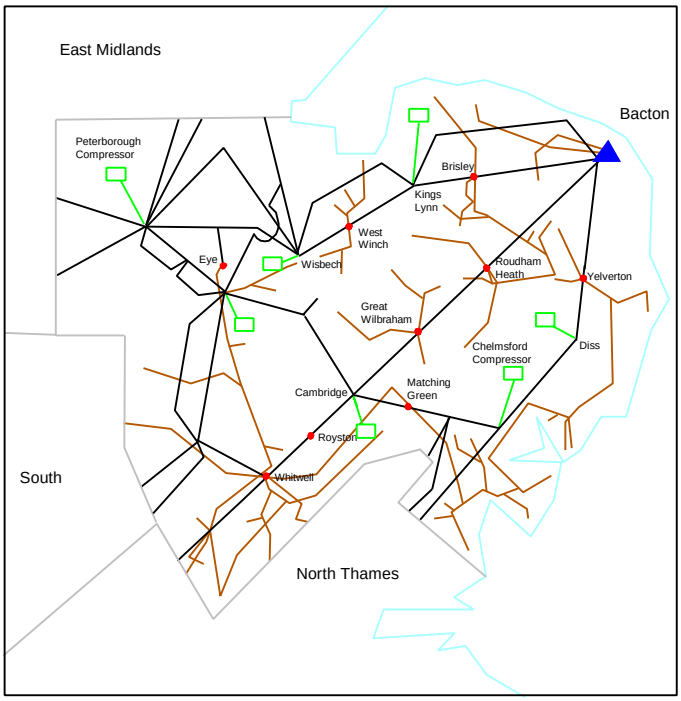
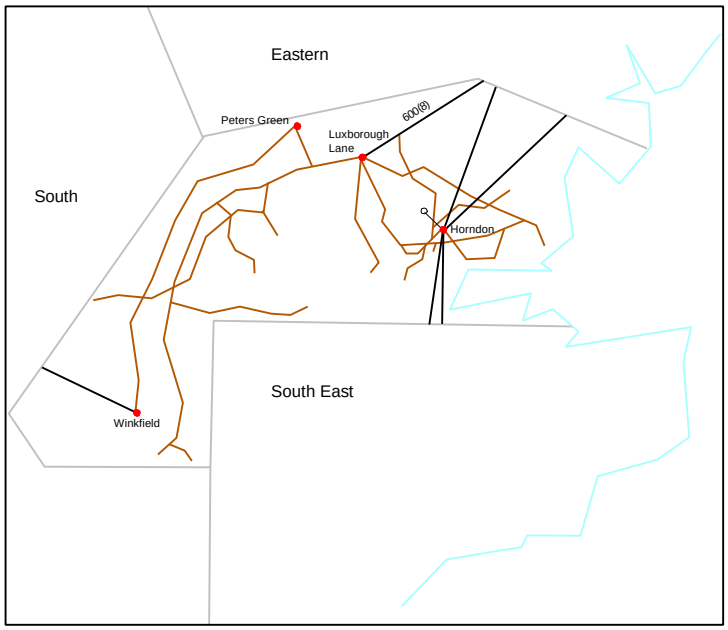


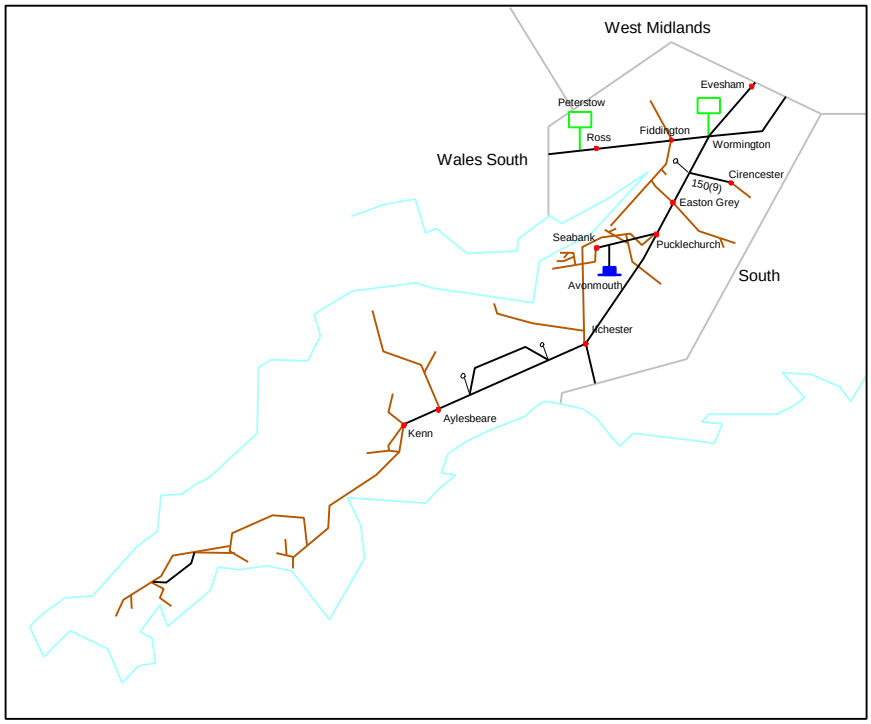
Eastern (EA) – LTS



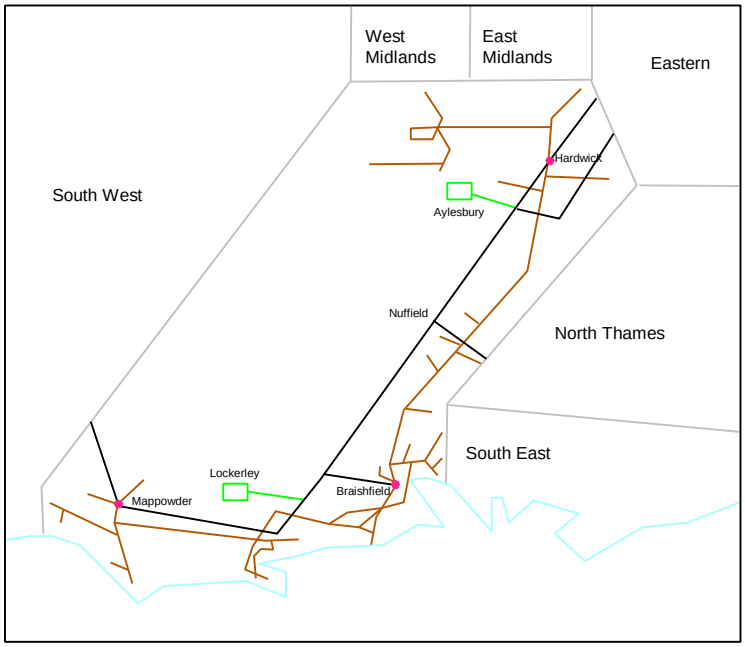
North Thames (NT) – LTS



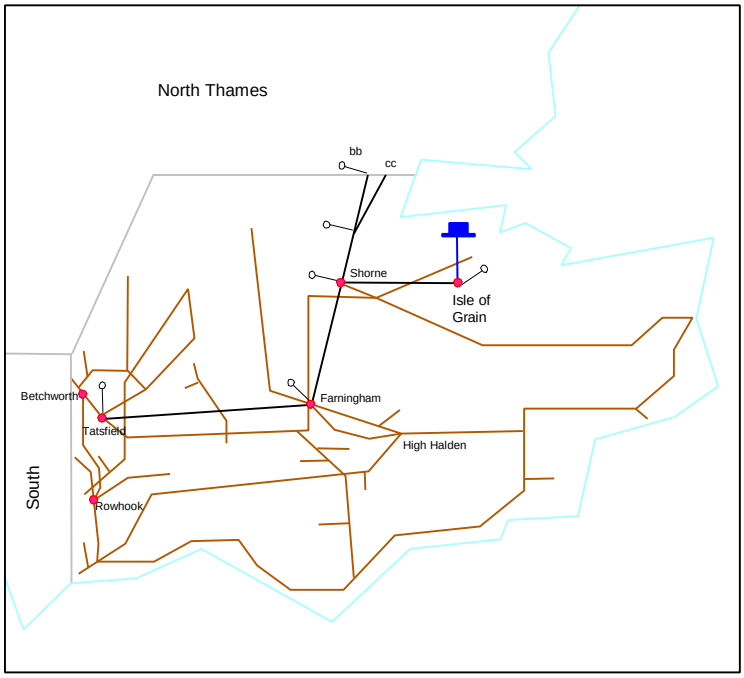
South West (SW) – LTS



South (SO) – LTS



South East (SE) – LTS



Appendix 6

Connection to Transco's System

A6.1 Introduction

A6.2 System Entry Connections

A6.3 System Exit Connections

A6.1 Introduction

This appendix provides an overview of Transco's policy on connections to or from its system.

The UK Gas Industry is in transition between a situation where Transco provided all new connections, to one where customers and developers may choose other parties to build their facilities, and where other Public Gas Transporters (PGTs) can connect their pipeline systems to Transco's system. Any requirement to increase the quantity of gas delivered or offtaken is also treated as a new connection.

Entry Connections are 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 are connections which allow gas to be offtaken from the Transco system and can take the form of individual supply points or Connected System Exit Points (CSEPs). There are several types of connected system including:

- a pipeline system operated by another PGT
- any other non-Transco pipeline transporting gas to premises consuming more than 2,196 MWh per annum

Storage and 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.

Storage Connections are 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 are connections to pipelines connecting Britain to other countries which may both offtake gas from and deliver gas to the Transco system.

Whilst the requirements for the relatively small number of new entry storage and interconnector connections are not expected to change significantly, the competitive market for exit connections is developing rapidly.

Transco's full connection policy is set out in its published Licence Condition 5 Statement. This is available on the Transco web site (www.transco.uk.com), or by writing to the following address:

Asset Policy Manager
BG Transco
31 Homer Road
Solihull
B91 3UE

In addition Transco has published a Connection Charging Statement, which lists it's standard charges.

It should be noted that, many connection services are available on a competitive basis. Whilst Transco continues to offer connection services in line with its Gas Act obligations it is possible to hire another company to install a connection and have it adopted by Transco, have a connection installed by another gas transporter or, in certain circumstances, have a connection installed and retain ownership of it.

A6.2 System Entry Connections

Transco's policy is that the full capital costs of any connection, including project management costs and any costs associated with the existing or new Transco facility, should be borne by the party wishing to connect to Transco's system. These will be assessed on a case by case basis.

The location of the connection point will be agreed between the facility operator and Transco. The costs will include the equipment and construction costs of the physical connection, and any necessary additional metering and quality monitoring if these are required to be provided by Transco. Transco will not receive a return on these assets and in some circumstances may pay additional operating costs.

The equipment will depend on the particular circumstances, but the basic technical requirement is the minimum level of control and monitoring equipment at the point of connection necessary to safeguard the Transco system and to ensure that gas entering the system meets the agreed gas specification. Additionally, the equipment has to provide the necessary information to allow Transco to run an economic and efficient system. Transco needs to ensure that equipment associated with connections to the system is capable of operating under all anticipated conditions and complies with all relevant industry standards.

Transco will consider individually the possible provision of other equipment which may, depending on the circumstances, be installed either by Transco or the delivery/storage facility operator.

Any additional pipeline costs will be subject to negotiation between Transco and the delivery/storage facility operator or the party wishing to connect to the system. If the upstream delivery/storage facility operator funds, constructs and owns the new connecting pipeline, the Transco system entry point will be located at or as close as possible to the point of connection to the system. If Transco is required to complete the connection, Transco will put the contract to competitive tender in the same way that it would for work on other Transco installations or for system modification work.

Whenever a new entry/storage connection or increased entry flow is required, it is important to contact Transco as early as possible to discuss requirements.

For all new delivery and storage facilities, Transco will enter into a Network Entry Agreement or Storage Connection Agreement with the respective operator. These agreements will include the gas quality specification, the physical location of the delivery point and the standards to be used for the measurement of quality and flow of the gas.

The following section provides an indication of the Transco gas entry quality specification.

A6.2.1 Network Entry Quality Specification

In negotiating the Network Entry Agreement and setting the entry quality specification for a new delivery facility and/or System Entry Point, Transco will agree that gas meeting the following specification and complying with the Transco system's statutory requirements will be accepted:

1. Hydrogen Sulphide
   - Not more than 3.3 ppm
2. Total Sulphur
   - Not more than 15 ppm
3. Hydrogen
   - Not more than 0.1 mol %
4. Oxygen
   - Not more than 10 ppm
5. Hydrocarbon Dewpoint
   - Not more than -2°C at any pressure up to 75 bar g
6. Water Content
   - Not more than 50mg/m^3 nor such as would cause a water dewpoint more than -10°C at the delivery pressure provided in 15.
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 mol % subject to
      - Carbon Dioxide: not more than 2.0 mol %
      - Nitrogen: not more than 5.0 mol %
12. Contaminants
    - The gas shall not contain solid or liquid material which 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)which 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 which 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).

A6.3 System Exit Connections

A6.3.1 New Connections or Increased Capacity

Transco's policy in respect of exit connections is to charge for the works at a level sufficient to cover its costs including an appropriate level of overhead. Standard charges are applied to specific categories of load and some connections are eligible for a connection allowance.

There are different technical and operational requirements for exit connections depending on the pressure tier connected into and on the type of connection required. Any enquiries regarding these requirements and other information on how to obtain a connection should be addressed to the appropriate Transco Asset Office.

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. Where a new connection or increased supply might lead to the need for a major capacity expansion project on Transco's system, it is essential that Transco is given between two and three year's notice. In certain circumstances project lead times may even exceed this period.

Anyone can contact Transco for a connection, whether a shipper, operator, developer or end-user, but gas can only be offtaken when the supply point so created has been confirmed by a Network Code shipper.

Transco is working with the gas industry to establish an open market for the provision of connections to the Transco system. Already, Transco has set up an internal organisation, Connections, to carry out connections on Transco's behalf. This development has led to increased competition in this market and, in most instances, customers should be able to obtain competing quotes from other companies. To obtain a quotation from Transco for a new connection or increased load, the customer should contact their local Transco LDZ office.

A6.3.2 NTS Offtake Pressures

The applicable offtake pressure for the NTS is 25 bar. Although system pressure is typically higher., it will be subject to variation over time and location on the network. Transco's policy is to provide, on reasonable request, forecast information and illustrative historical records for specific NTS connection enquiries and notify with 36 months notice to connected parties any significant reduction to the NTS anticipated normal offtake pressure. Transco has a statutory duty to develop and maintain an efficient and economic pipeline system and this is the overall guide on how the system is developed and operated. The latter has a consequential effect of NTS offtake pressures. Generic information on NTS offtake pressures is as follows.

There are many factors which affect NTS offtake pressures at any location at any time and these include; system demand, entry pressures, compressor operation, proximity to pressure sources, pipeline size and maximum operating pressure, and special operations such as maintenance and system development works. Time variation of offtake pressure is within day, from day to day, season to season and year to year. Transco currently plans normal NTS operations with start of day pressures no lower than 33 bar, but this is not guaranteed as it may compromise overall system economy and efficiency. 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.

A6.3.3 Self Lay Pipes or Systems

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 is made. This is in accordance with S.10(6) of the Gas Act. The connection may only be made providing that:

- the pipe is laid to a relevant main
- it meets fitness for purpose requirements
- the appropriate Transco self lay procedure has been followed

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. Transco will take ownership of pipes to premises expected to consume more than 2,196 MWh (75,000 therms) per annum and operating at up to 7 bar providing that it is economic and efficient to do so and the appropriate Transco self lay procedure has been followed.

Transco is currently developing proposals through a series of pilot schemes for taking ownership of self laid pipes operating at a pressure exceeding 7 bar.

If when considering laying a pipe that will either vest in Transco or is intended to come into Transco ownership contact should be made with the local Transco Asset office.

A6.3.4 Reasonable Demands for Capacity

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.

Specific system reinforcement may be required to maintain system pressures for the winter period after connecting a new supply. Transco will normally fund this work subject to the load meeting certain economic criteria. Where the load does not meet these criteria the customer may have the option of making a contribution to the costs in order for the new load to be connected.

Details of how Transco charges for reinforcement and the basis on which contributions may be required can also be found in its Connection Charging Statement.

When making a request for capacity, the shipper should allow sufficient time for the reinforcement to be constructed. As mentioned in section A6.3.1, it is essential that Transco is given between two and three 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. Requests for firm supplies in a shorter time scale may not be reasonable.

Appendix 7

System Entry

A7.1 System Entry Point Maximum Physical Capacity

A7.2 Aggregate Monthly System Entry Capacities

A7.3 Effective Beach Terminal Entry Capacities

The entry capacity associated with terminals on the National Transmission System (NTS) is determined by the installed pipelines and other plant. However, the amount of gas entering the NTS on a particular day cannot greatly exceed demand. Therefore, in general, effective entry capacity reduces as demand reduces and therefore has a seasonal dependence.

The interdependent nature of the NTS is such that the profile of supply and demand affects the maximum amount of gas that can be accepted at a particular terminal. It is, therefore, not a simple matter to quantify entry capacities. For the purpose of this Appendix, entry capacity profiles are shown for individual terminals based on seasonal normal weather conditions, and experienced patterns of supply and demand. Other than during cold weather periods, shippers will have some flexibility in the quantities that they wish to have transported from individual terminals.

The entry capacity profiles shown for individual terminals are indicative only, because they apply only to the specific conditions and assumptions described. Please note that all profiles exclude the impact of maintenance.

A7.1 System Entry Point Maximum Physical Capacity

The terminal capacities quoted relate to the maximum physical capacity and these may exceed expected delivery in 2000/2001. System entry point capacities have been derived by proportioning the maximum physical capacity in 2000/2001.

Table A7.1a System Entry Point Maximum Physical Capacities 2000/2001 (mcm/d)

Terminal	System Entry Point	Capacity
Bacton	Bacton-Phillips	25.8
	Bacton-Amoco	23.7
	Bacton-Shell	41.5
	Bacton-SEAL	14.0
	Bacton-Interconnector	24.0
	Total Bacton	**129.0**
Barrow	**Barrow-HRL**	**67.0**
Easington	Easington-BP West Sole	6.9
	Easington-BP Dimlington	16.5
	Easington-BG Amethyst	5.4
	Easington-BG Rough	43.2
	Total Easington	**72.0**
St.Fergus	St.Fergus-Mobil	48.5
	St.Fergus-Total Oil Marine	47.7
	St.Fergus-Shell	33.9
	Total St.Fergus	**130.0**
Teesside	Teesside-Enron	12.6
	Teesside-Amoco	37.4
	Total Teesside	**50.0**
Theddlethorpe	**Theddlethorpe-Conoco**	**50.0**

The system entry point maximum physical capacities show how the delivery facility flows would be accommodated within the maximum terminal flow. They are indicative only and do not reflect the actual physical capacity of delivery facilities connected to the Transco system, nor will they be used for the purposes of determining input curtailment advice.

The entry capacity profiles shown for individual beach terminals are indicative only, because they apply only to the specific conditions and assumptions described.

A7.2 Aggregate Monthly System Entry Capacities

Graph A7.2a and Table A7.2a illustrate the variation of demand through the year under seasonal normal weather conditions (plus 10%), with expected profiles of beach supplies used to meet demand. Transco has generated these profiles based on experience of supply nominations over the last 3 years. The demand data is derived from the 2000 Base Plan Assumptions and is presented in the form of monthly demands over a year. It is possible that a different amount of capacity may be available at any terminal on any given day, this will depend on the distribution of demand and the level of supplies at other terminals. However this is variable and so only profiles under seasonal normal conditions have been given.

The entry capacity profiles shown for individual beach terminals are indicative only, because they apply only to the specific conditions and assumptions described.

Figure A7.2a Monthly System Entry Capacity 2000/2001

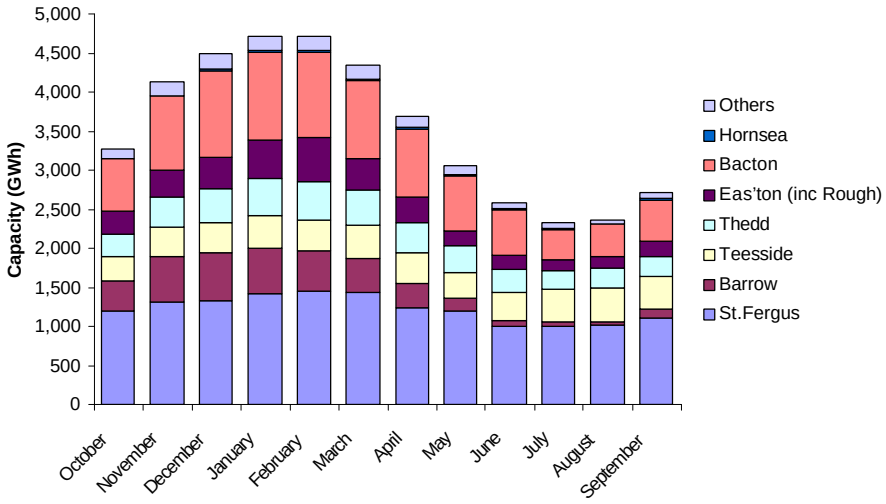


Table A7.2a Monthly System Entry Capacity 2000/2001 (GWh/d)

	St.Fergus	Barrow	Teesside	Thedd	Eas'ton (inc Rough)	Bacton	Hornsea	Others	00/01 SND + 10%
October	1,191	388	308	301	283	671	10	126	3,279
November	1,302	582	382	383	356	936	12	173	4,126
December	1,334	616	384	432	397	1,106	26	188	4,483
January	1,426	570	417	469	499	1,122	18	188	4,709
February	1,459	501	410	479	566	1,088	21	192	4,715
March	1,433	444	414	454	406	1,003	16	172	4,343
April	1,234	314	400	379	323	880	13	144	3,686
May	1,198	160	330	352	170	725	18	95	3,049
June	1,008	57	369	286	190	590	14	76	2,590
July	999	64	403	240	150	387	12	69	2,324
August	1,020	39	425	268	147	410	8	46	2,364
September	1,116	105	418	260	188	534	14	78	2,713

Note

- "Others" includes all onshore fields, LNG sites and other storage facilities
- the figures shown in the Table A7.2a do not include maintenance.

A7.3 Effective Beach Terminal Entry Capacities

The following graphs show the entry capacity associated with the six beach terminals under seasonal normal conditions. The profiles are taken from Table A7.2a

Figure A7.3a St.Fergus Seasonal Normal Monthly System Entry Capacity 2000/2001

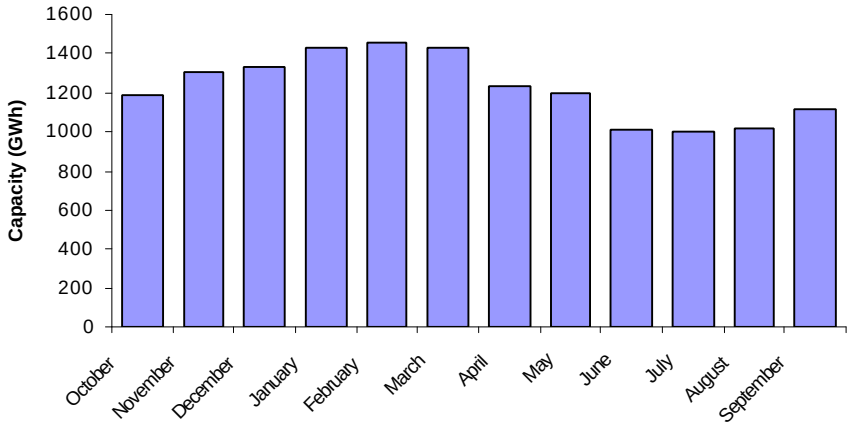


Figure A7.3b Teesside Seasonal Normal Monthly System Entry Capacity 2000/2001

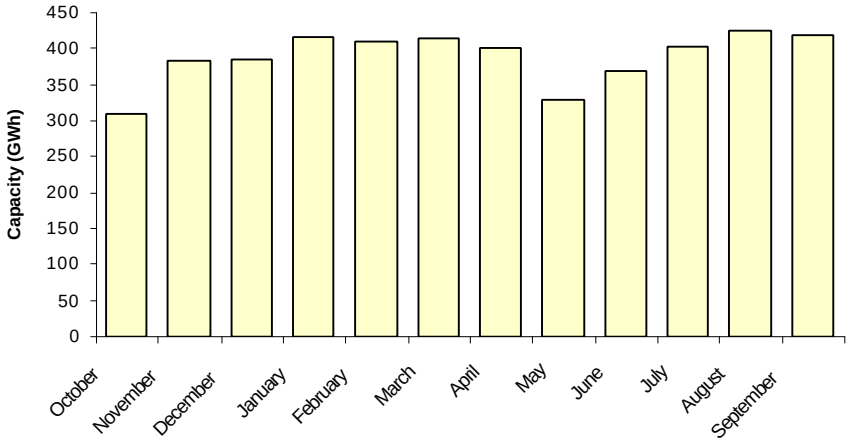


Figure A7.3c Bacton Seasonal Normal Monthly System Entry Capacity 2000/2001

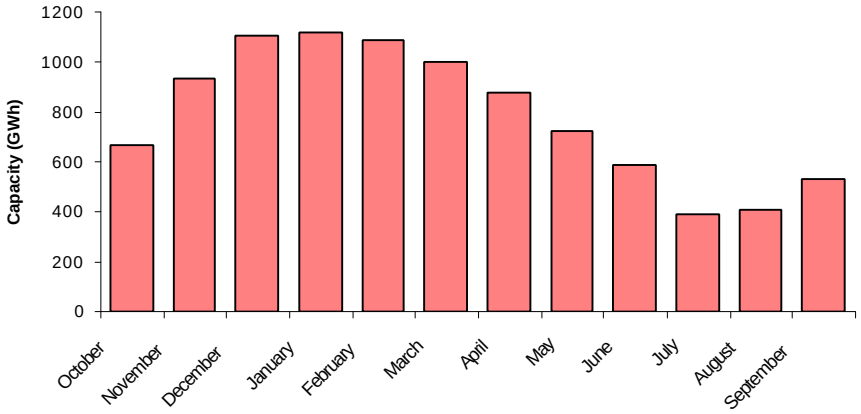


Figure A7.3d Barrow Seasonal Normal Monthly System Entry Capacity 2000/2001

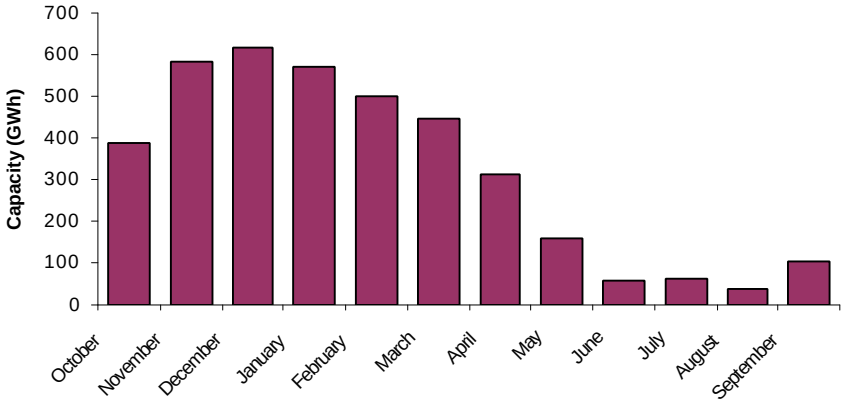


Figure A7.3e Easington (Including Rough) Seasonal Normal Monthly System Entry Capacity 2000/2001

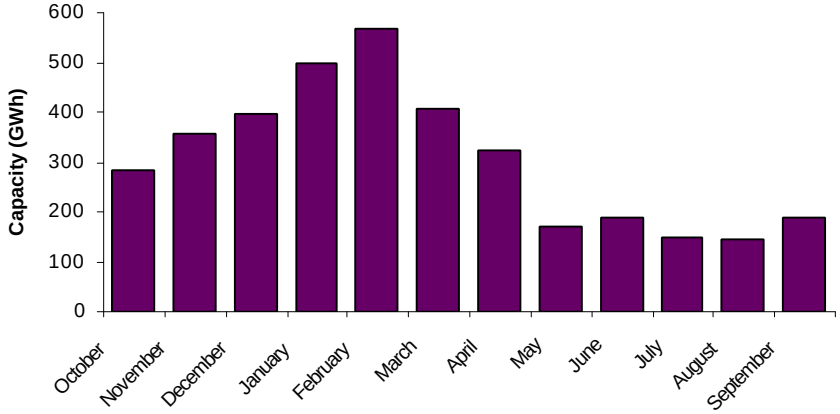


Figure A7.3f Theddlethorpe Seasonal Normal Monthly System Entry Capacity 2000/2001

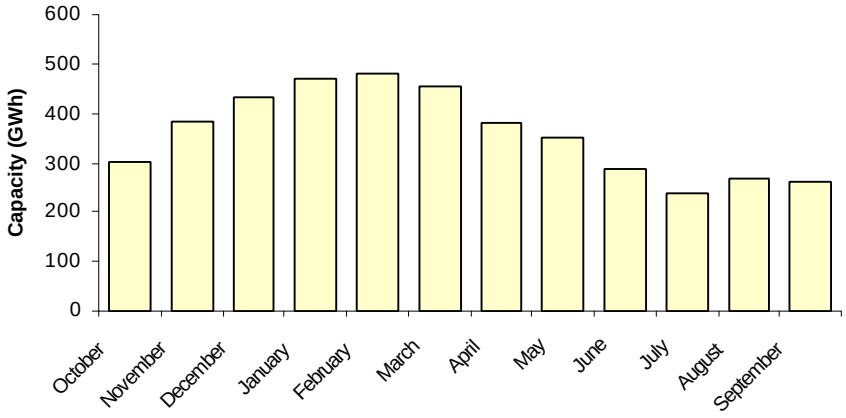


Figure A7.3g Hornsea Seasonal Normal Monthly System Entry Capacity 2000/2001

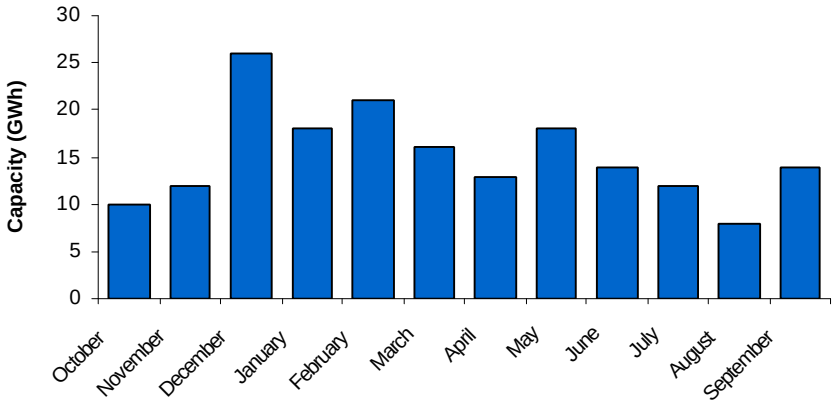
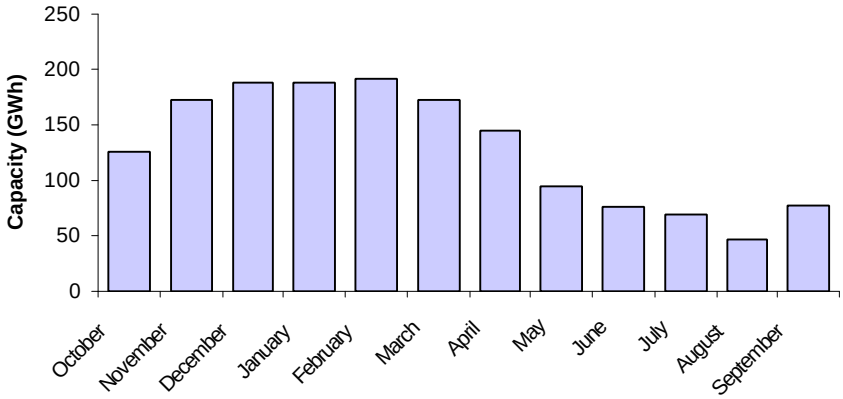


Figure A7.3g "Other" Seasonal Normal Monthly System Entry Capacity 2000/2001



Note

- "Other" includes all onshore fields, LNG sites and other storage facilities

Appendix 8

Glossary

Advanced Reservation of Capacity Agreement (ARCA)

An agreement between BG 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 produced by Transco on an annual basis that describes our supply and demand forecasts for the next ten years

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

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 Public Gas Transporter other than Transco

Cubic Metre (m^3)

The unit of volume, approximately equal to 35.34 cubic feet. One million cubic metres (mcm) equals 10^6 cubic metres, one billion cubic metres (bcm) equals 10^9 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 data logger) 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

Eastern Trough Area Project (ETAP)

A combination of seven distinctive oil and gas fields in the Central North Sea

Electronic Token Meter (ETM)

A prepayment meter which uses "smart card" technology to enable a gas supplier to recover gas charges and any outstanding debt as gas is consumed

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 forecasted supply and demand change over time

Flexibility Mechanism

A way for shippers to bid to buy gas from, or sell gas to, Transco for system balancing purposes

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 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

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

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

Mid Merit

Centrally dispatched powerstation that is within the central range of the electricity pool merit order and consequently is not base load

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 estimated, using an agreed formula, and for supply points consuming more than 73.2 MWh pa, reconciled individually when the meter is read

Odourisation

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

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, such as the flexibility mechanism, 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

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

Public Gas Transporter (PGT)

Transco is licensed by the DDGS to transport gas to consumers, along with other PGT's of which Transco is the largest

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

A company with a Shipper Licence that is able to buy gas from a producer, sell it to a supplier and employ a PGT 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 weighted average price of accepted flexibility mechanism bids on a day

System Marginal Price (SMP)

The highest flexibility mechanism system buy bid accepted on a day (SMP buy), or the lowest accepted system sell bid (SMP sell)

Therm

The 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

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

Unbundled Service

An optional service, offered and priced separately from Transco's core transportation services. For example meter reading