Chapter three

System Capability

NDP – Defining the Need Case

System Flexibility

Customer Capacity – Exit

Customer Capacity – Entry

Impact of Legislative Change

Need Case

Required system capability over the short/medium/long term

System Capability

This section outlines the current system capability of the National Transmission System (NTS). Information is provided for entry and exit capacity, system flexibility, and the impact of the Industrial Emissions Directive (IED). This chapter also explores the Need Case stage of the Network Development Process (NDP), which we use to establish NTS capability requirements.

Key messages

We use our Network Development Process to assess system capability requirements.

- The difference between long-term entry capacity bookings and our capacity release obligations and our Future Energy Scenarios (FES) means that long-term auctions no longer provide a definitive signal of a shipper's intention to flow. Flow on the National Transmission System (NTS) can show great variation from one day to the next due to the extent and diversity of supplies
- Our system flexibility work is making good progress. We are now seeing the first results of an ongoing development project with Baringa that will dramatically improve how we model our customers' future requirements. Although it's still early days, we are continually improving how we build the 'GasFlexTool' into our analysis methods
- The first round of Electricity Market Reform (EMR) auctions has mainly resulted in capacity contracts for existing power stations with some new build. Although the initial developer activity before EMR has not resulted in any new NTS projects, we are still discussing future connections which may lead to future NTS projects
- The impact of legislative change – particularly the Industrial Emissions Directive (IED) – continues to challenge how we develop our network and improve our investment approach
- We continue to provide information about lead times and capacity across different geographical areas and we aim to make our Gas Ten Year Statement (GTYS) and our other publications more relevant to your needs
- Overall distribution network (DN) flat capacity requests are falling but the flex requests, particularly in the South West region, are increasing
- A meeting was held in October with all DNs to discuss the Exit Allocation process. This meeting helped us to gain a better understanding of our customers' changing requirements.

Introduction

3.1 Introduction

System capability and the development of the National Transmission System (NTS) is managed through the Network Development Process (NDP) which we introduced in Chapter 1. Following on, Chapter 2 explored some of the triggers for this process including: customer requirements, changing market conditions as described in our Future Energy Scenarios (FES), changes in legislation such as the IED and asset health requirements.

This chapter describes what happens once we receive a 'trigger' and we enter the Need Case stage of the NDP. This is where we analyse the NTS's capability requirements.

Included within this chapter are:
- system flexibility requirements and how we are developing our understanding of this
- customer entry and exit capacity processes
- capability requirements triggered by the IED.

Understanding our system capability allows us to determine where rules, tools or asset solutions need to be found to meet our customer requirements. Chapter 4 will discuss where, as System Operator, we can better use rules and tools to make more efficient use of the system and Chapter 5 will discuss how the asset solutions are developed.

NDP – Defining the Need Case

3.2
NDP – Defining the Need Case

Defining the 'Need Case' is the process through which we understand the implications of a change. We assess the level of risk to the NTS which allows us to determine the most credible method of addressing that risk. We articulate the cause of the problem or driver (the 'trigger') and consider any potential secondary drivers. This allows us to ensure we consider all opportunities and deliver the most efficient option.

An example of this could be a site with immediate asset health investment requirements. When assessing the health investment we would also consider rationalising the site to remove redundant equipment and incorporate the network future requirements. We ask ourselves the following questions: What do we repair? What do we replace? What do we enhance? This allows us to make the most efficient longer term investments and reduce the chance of stranded assets i.e. assets that are no longer required.

National Grid undertakes the role of System Operator (SO) for the NTS in Great Britain. Gas SO incentives are designed to deliver financial benefits to the industry and consumers by reducing the cost and minimising the risks of balancing the system.

Under RIIO, we are incentivised to think about Total Expenditure (TOTEX) as well as Capital Expenditure (CAPEX) and we need to demonstrate good value for money. We therefore focus on the need of the SO when considering asset and non-asset solutions. Our NDP allows us to articulate the change in risk of different options and present the SO need, both now and in the future.

We initially look at the 'Do Nothing' option. This is the minimum action we could take. This may mean no investment or the minimum investment on a like-for-like basis to ensure safety and licence requirements are met. We then assess other high-level options; these could be rules, tools or assets, against a 'Whole Life Prioritisation Scorecard' as shown in Appendix 7. This ranks the options against multiple categories such as time to deliver, ability to meet the need, and support from the industry. We filter the options to provide a cost envelope under which the development of detailed options can be assessed.

System Flexibility

3.3
Existing Approach to System Flexibility Planning

In Chapter 2, section 2.2.8 we defined what we mean by System Flexibility. We need to ensure, as the System Operator, we have the flexibility to respond to variations on our system. We use the Future Energy Scenarios (FES) to inform the variety of configurations we might require. We consider profiling and rates of change to identify the plant and equipment we might need at our compressor stations and other key multi junctions, and the operational tools we might need to manage the transition between events. Through our Industrial Emissions Directive (IED) stakeholder engagement activities, we have given the example of replacing larger non-IED compliant units with multiple smaller IED-compliant units (rather than a single unit) as an example of how we might maintain or even increase System Flexibility.

We discussed the three components of System Flexibility in Chapter 2, these are:
- within-day linepack variation as a result of varying within-day supply and demand profiles and imbalances
- geographic supply and demand distribution including locational flow requirements away from peak
- adaptability/configurability to meet changing geographic supplies and demands within-day.

We currently plan for within-day flexibility by explicitly modelling the profiling of demand. Distribution Network (DN) flex bookings (see Chapter 2) and Uniform Network Code (UNC) section H submissions (for off-peak demand levels) give us a good indication of likely DN offtake profiling and we are improving how we model gas power generation offtake profiling through the flexibility project work we are doing.

Supply changes as a market response to both demand changes and supply losses. We reflect these variations in our planning process models with assumptions on market behaviour and supply reliability factors.

We plan for supply variations by the reservation of operational linepack via the application of a design margin and via the procurement of operating margins services. More discussion on these can be found in the Transmission Planning Code[1].

We plan for geographic distribution of supply and demand using the FES. We develop sensitivities around the FES, such as minimum supply levels at times of high demand.

[1] http://www2.nationalgrid.com/UK/Industry-information/Developing-our-network/Gas-Transportation-Transmission-Planning-Code/

System Flexibility

3.3.1 System imbalance

Linepack is the volume of gas stored within the NTS. If demand exceeds supply, levels of linepack throughout the network will decrease along with system pressures. The opposite is true when supply exceeds demand.

Throughout a gas day, supply and demand are rarely in balance, so linepack levels fluctuate. In our role as residual balancer of the UK gas market, we need to ensure an end-of-day market balance by ensuring total supply equals, or is close to, total demand. This should ensure that system pressures and linepack are restored, ready for the start of the next gas day. We use a metric called Projected Closing Linepack (PCLP) as an indicator of end-of-day market balance.

PCLP is calculated from the physical flow notifications provided by our customers. It is the key data item that we use to determine whether we are required to take an action in the market to improve the end-of-day balance position.

We have seen an increasing trend in underlying market imbalance at the start of the gas day and the time taken for the network to be in balance by the end of the day.

Figure 3.1
Average projected closing linepack

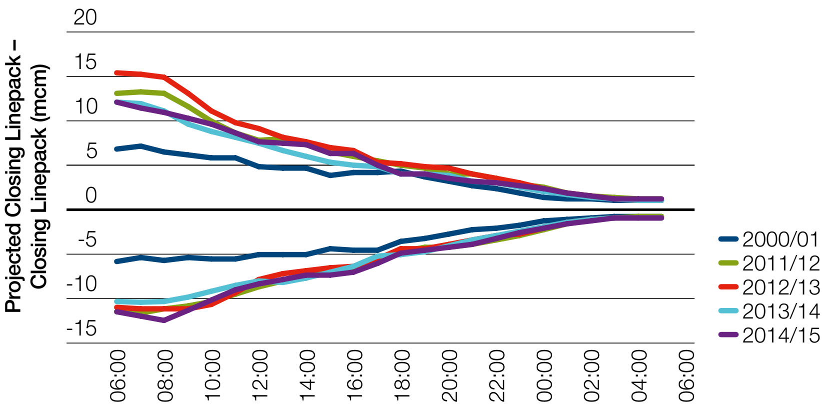


Figure 3.1 shows that average PCLP at the start of the gas day in 2014/15 was out of balance by more than twice as much when compared to 2000/01. In 2014/15 we have had a more challenging year and have been out of balance more than in 2013/14.

This reflects how our more commercially responsive customers are changing the way that they want to use our network. This includes a notable trend towards later daily balance reconciliations, along with start-of-day flow notifications that are less reflective of actual outturn flows.

3.3.2 Linepack and system pressures

To ensure that NTS pressures remain within obligated operational and safety tolerances, we manage levels of linepack on a national and zonal level.

The limits within which we can allow linepack – and therefore pressure – to change within a day are determined by the operating envelope, which determines how we manage the network (namely the maximum operating pressures of our assets and the minimum contractual pressures that we have agreed with our customers).

The levels by which linepack will change within-day in a zone of the NTS are driven by the difference between the levels and profiles of local supply and demand, plus the capability of the NTS to transport gas from zone to zone, as required.

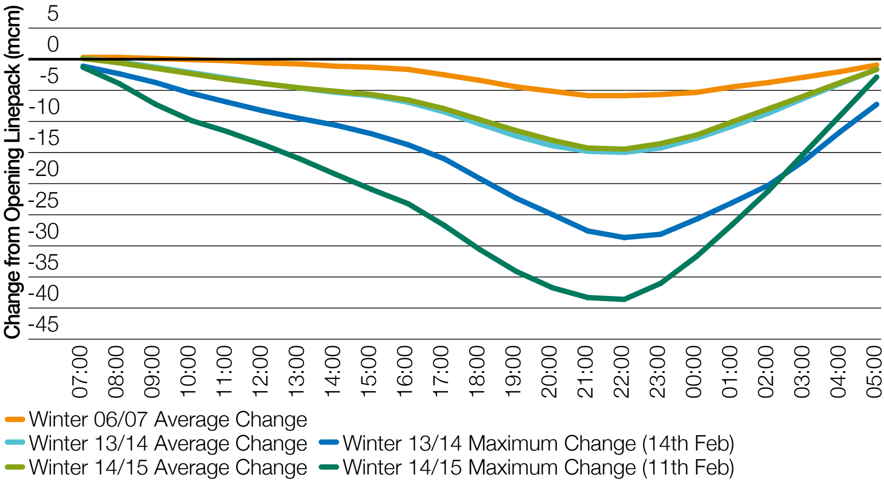
When gas is transported over long distances its pressure can drop significantly, which may mean that we are unable to meet the agreed minimum contractual pressures.

As a result, the evolution of supply patterns and within-day demand variation described in section 2.3 can significantly affect our ability to manage linepack in a controlled way, to allow for the imbalance between supply and demand, while also allowing us to meet our contracted pressures.

Over the last few years we have seen a significant increase in the average change in national linepack across a gas day (see Figure 3.2).

System Flexibility

Figure 3.2
Average and maximum change in linepack across a gas day



As well as an increase in the average change in linepack across a gas day we have seen an increased frequency of large changes.

Figure 3.3
Within-day maximum to minimum range of NTS linepack

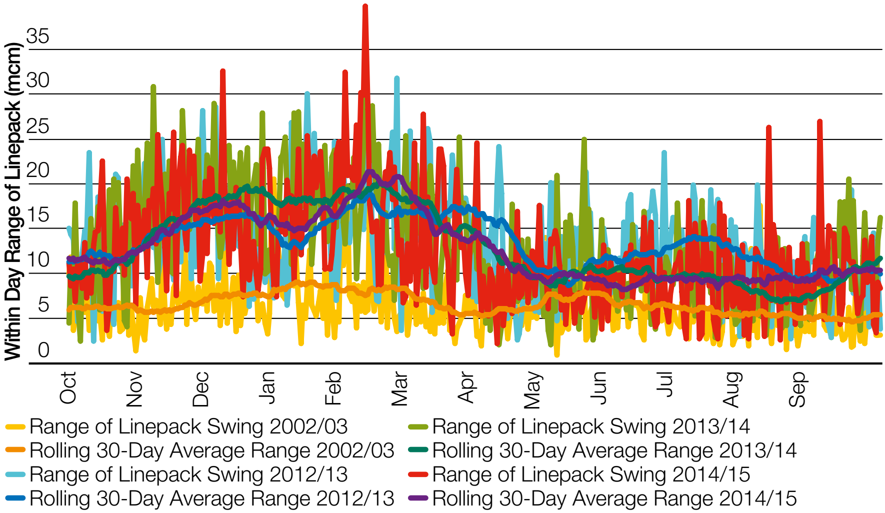


Figure 3.3 compares the within-day linepack changes seen in 2002/03 to those seen in 2014/15. It illustrates that current linepack changes at certain times of the year are up to three times the level seen a decade ago. This trend of increased linepack volatility is leading to greater operational challenges, particularly in terms of managing NTS pressures and ensuring that they remain within safety and contractual tolerances.

The future is uncertain, with a large range of potential future supply and demand patterns on the NTS. Although most will not lead to operational risks and issues, many have the potential to do so – and a small change to an anticipated supply and demand pattern on a given day can have a significant impact on the NTS and how we operate.

To ensure we can continue to assess and meet our customers' changing requirements we decided to review and improve the existing method of planning for System Flexibility.

System Flexibility

3.4
New approach to System Flexibility planning

To ensure we can continue to assess and meet our customers' changing requirements we decided to review and improve the existing method of planning for System Flexibility.

In our current NTS planning approach we use a design margin to account for variations in operational gas flows from the assumptions made in the design analysis. The design margin consists of two elements:
- flow margin
- pressure cover.

A 2% flow margin is applied to pipe flows to account for temporary flow/pressure differences on the NTS from unforseen events such as compressor station trips, forecasting errors and supply alerts. Pressure cover sets a minimum pressure at specific extremities of the NTS. Both elements of the design margin are applied to our network models to account for uncertainties that arise when undertaking network analysis ahead of the gas flow day.

The design margin was not intended for within-day supply and demand variations as large as we now see on the system. This was highlighted by our highest linepack swing, of 38.6 mscmd, which occurred on 11 February 2015. On this day, supply variation contributed 17 mscmd to the total swing. However, the design margin reserves only 3 mscmd (plus or minus). Therefore, it is really important that we have the ability to explicitly model a wider range of varying supply and demand profiles. We are developing how we model combined cycle gas turbine (CCGT) running regimes to improve our accuracy in modelling market behaviour.

We are working with Baringa Partners LLP, an external energy consultancy, to improve our modelling of System Flexibility. The 'GasFlexTool' tool has been developed to model both the UK Electricity and Gas markets.

Our customers' changing use of the system is leading to greater linepack swings which will in turn lead to greater pressure variation. This could affect the pressure requirements of other customers. Our GasFlexTool is being developed to ensure that we can plan for an appropriate level of linepack swing to reflect future system use. This development will move us towards explicitly modelling supply variability to reflect supply loss, demand change and market supply response which we have never been able to do before.

The GasFlexTool produces hourly within-day gas supply and demand flows which are used to simulate gas flows on the NTS. It simulates a large number of supply and demand scenarios based on the FES, historical within-day behaviour and real weather data. We can then filter flow patterns which are more likely to cause a constraint on the NTS. These filtered or 'flagged' scenarios are then used to drive analysis simulations of the NTS to assess if the system is capable of operating under such scenarios. The tool is based on a stochastic approach, as opposed to the deterministic approach[2] currently used, and hence also gives an indication of the likelihood of such scenarios occurring.

For the top flagged days (i.e. those representing the biggest challenge), the tool re-simulates the scenario, along with additional examples showing supply surplus/deficit and outage at specified supply sources. This allows us to also explicitly model temporary supply shortfall or surplus, which (along with normal DN and power profiling) drives linepack depletion or overstocking. This can lead to

[2] The current approach is to start from a base case then gradually vary demand and supply until a constraint is reached. With the GasFlexTool we can run a large number of randomly varying demand and supply patterns and we can filter only those that cause a constraint on the system. This gives us an indication of likelihood of that constraint occurring.

modelled breaches of minimum pressure limits or maximum pipeline operating pressure i.e. constraints. This approach attempts to closely reflect actual system user behaviour on the day and hence improve the planning process.

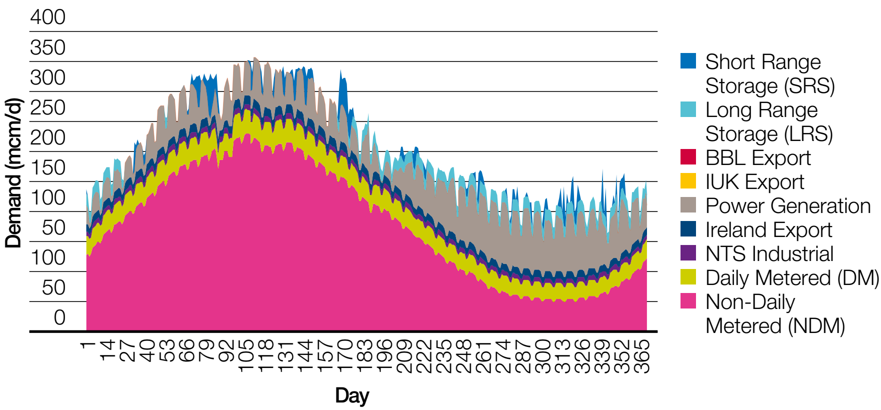
Examples of 'flags' could be scenarios with forecast high linepack swing across the NTS, or forecast high demand in a particular region of the NTS with minimal local forecast supply (e.g. high South West demand coupled with low flows at Milford Haven Liquefied Natural Gas (LNG) terminal).

We have provided two examples, both looking ahead to year 2021. They demonstrate how the impact of supply variation may be modelled using the GasFlexTool.

Example 1

Days with more extreme supply or demand positions can lead to larger within-day swings. Here is an example from our GasFlexTool from Gone Green in 2020. Overall the scenario is balanced on a daily basis as shown in Figures 3.4a–c.

Figure 3.4a
GasFlexTool demand mix for 365 days for 2020 Gone Green scenario



System Flexibility

Figure 3.4b
GasFlexTool supply mix for 365 days for 2020 Gone Green scenario

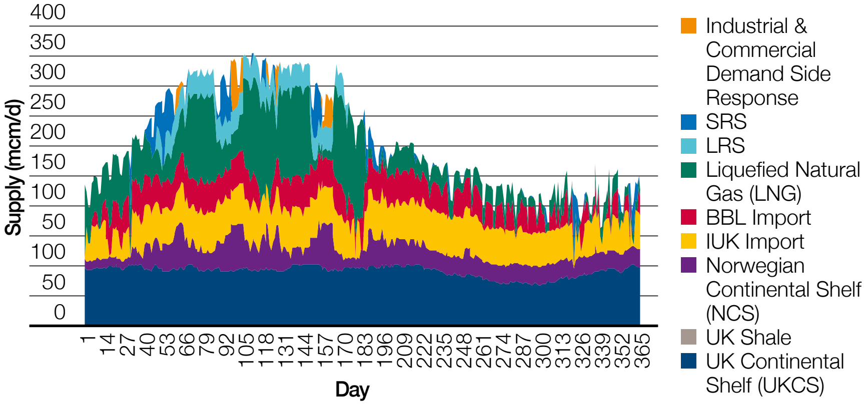
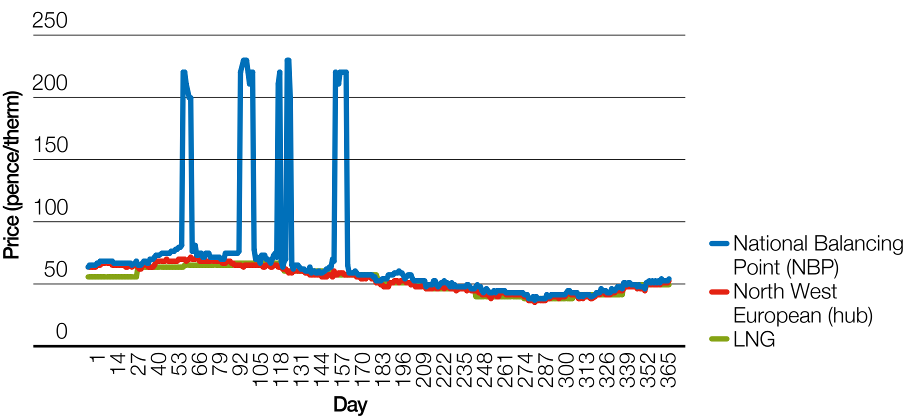
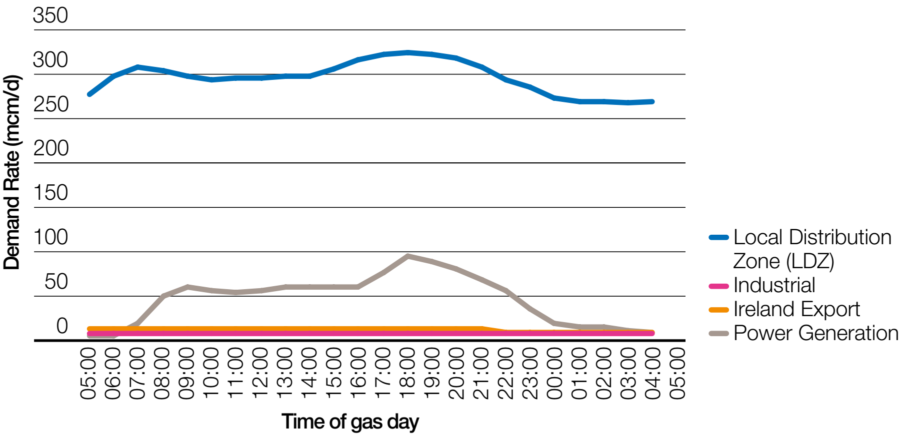


Figure 3.4c
GasFlexTool respective price profiles for 365 days for 2020 Gone Green scenario



Figures 3.5a–c show the individual high demand day. Early in the gas day, an undersupply of 20mcmd is predicted due to the high demands, which is met by system linepack. This causes pressures at some offtakes to fall towards their lower limits. Later in the day, the market tries to balance its position. A supply response to this shortfall occurs at 13 (17:00) and 16 hours (22:00). This results in 23 mcmd of linepack swing. This can lead to reduced pressure at offtakes in Flex constrained areas, such as the South West. In this example we would take system balancing actions (such as locational actions, on-the-day Commodity Market (OCM), National Balancing Point (NBP) title or over-the-counter (OTC) NBP transactions) if we thought the pressure levels resulting from this linepack drop would become unacceptable i.e. if the obligated pressures were likely to be breached.

Figure 3.5a
GasFlexTool output within-day rate of gas demand split by type



System Flexibility

Figure 3.5b
GasFlexTool output within-day rate of gas supply split by source

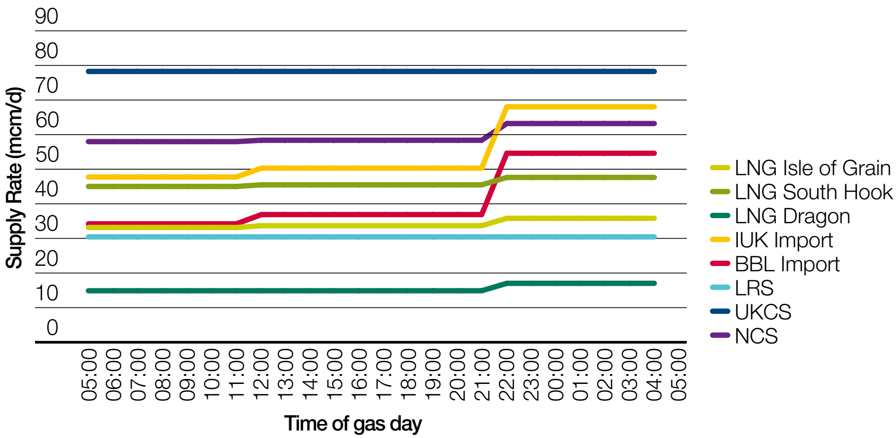
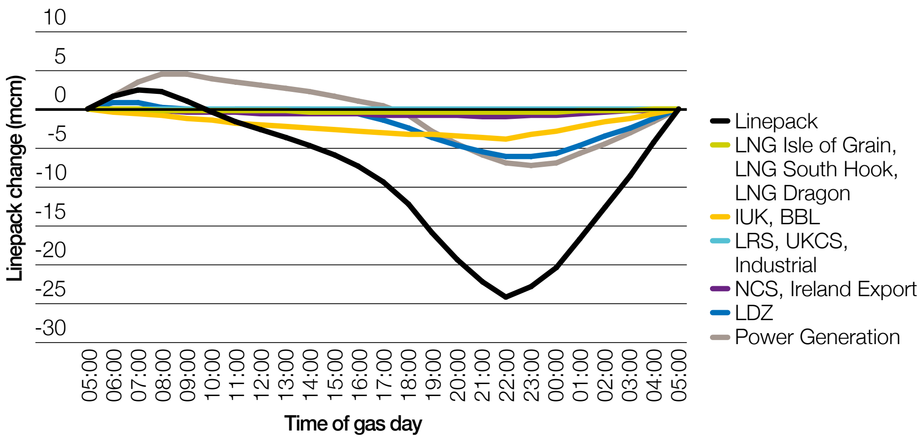


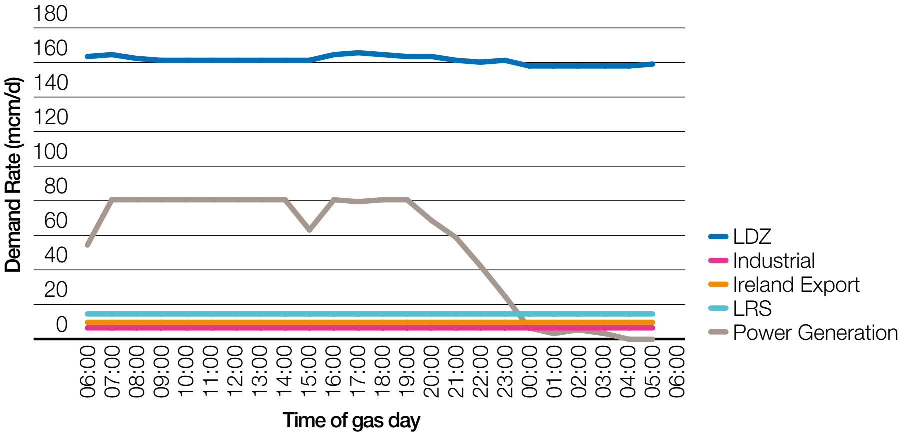
Figure 3.5c
GasFlexTool output within-day linepack swing



Example 2
Another future cause of high linepack swing is the ramp up and down of CCGT generation within-day in response to intermittent generation, such as wind generation.

Figures 3.6a–c show an example output from the GasFlexTool. The wind generation behaviour is based on actual historical wind data (1967). Although the linepack swing at national level as depicted in this chart (Figure 3.6c) may not appear adverse, due to the location of the power stations relative to the supply points, it could lead to large depletions in local pipe stocks. This in turn could lead to fast decay in local lower pressure limits. Such rapid decay could make it difficult or even impossible for an operational change, e.g. turning on a compressor, to take effect, and an obligated pressure level would be breached as a result.

Figure 3.6a
GasFlexTool output within-day rate of gas demand split by type



Chapter three

System Flexibility

Figure 3.6b
GasFlexTool output within-day rate of gas supply split by source

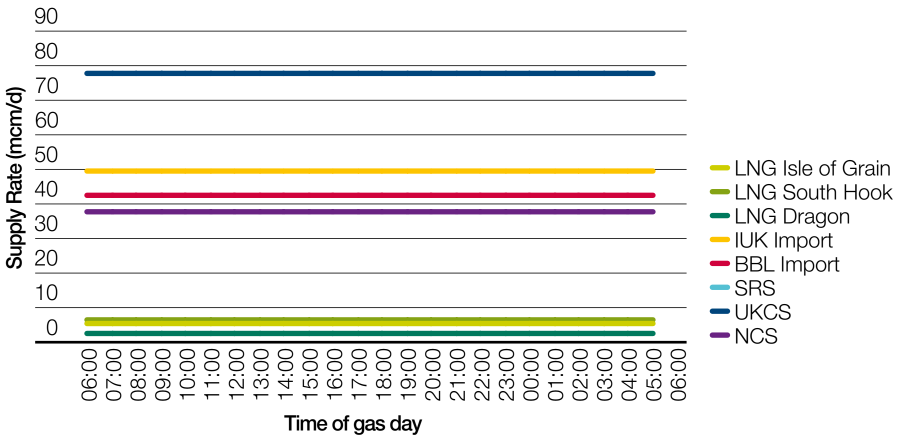
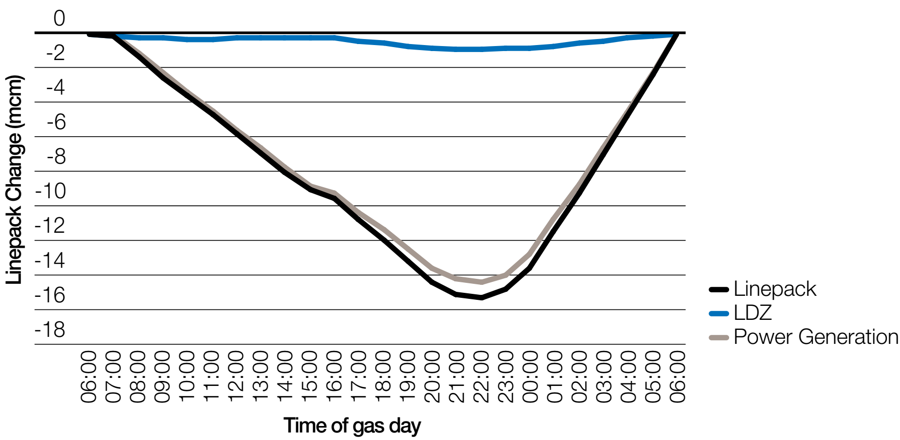


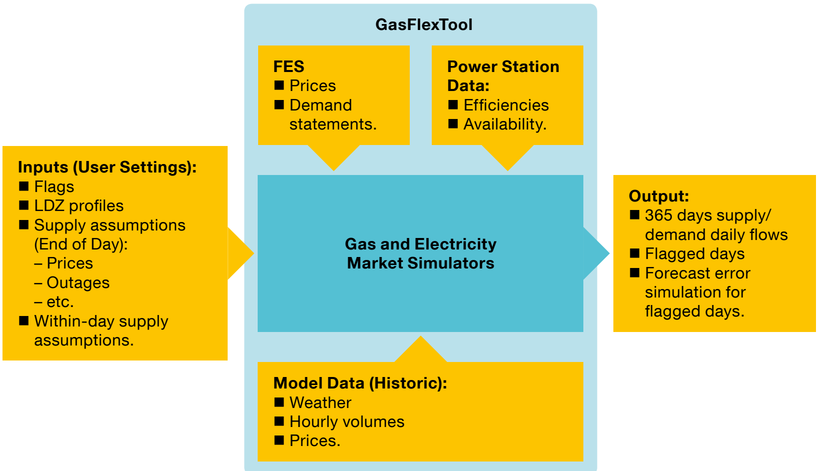
Figure 3.6c
GasFlexTool output within-day linepack swing



Situations like the one shown in example 2 could be dealt with if the gas control room is given suitable notice of the anticipated operation of the relevant CCGT. This allows operational action, i.e. appropriate network configuration change to be made in advance, to create suitable linepack levels in the respective zones. Without suitable notification it would be difficult to manage situations like these. Therefore an enhancement to the network could be required to reduce or eliminate this need. Alternatively, operational solutions such as commercial contracts or code/market amendments could be used.

Figure 3.7 below illustrates components of the GasFlexTool.

Figure 3.7
Components of the GasFlexTool



System Flexibility

3.4.1 System Flexibility Scenarios

Using our GasFlexTool we have identified some future scenarios where the network may not have sufficient capability to meet the requirements of users. We are currently working to understand the full impact so that we can develop the right solutions to ensure we maintain a reliable and adaptable system for our customers to use. These scenarios are based on trends being observed on the system, which are used to stretch the FES.

Table 3.1 shows some of the scenarios we are developing further. The GasFlexTool will start to give an indication of the likelihood of their occurrence, while network analysis will assess the impact on the system.

With regard to the development and operation of the NTS, taking changing user behaviour into account in our planning processes may trigger requirements for additional operational tools or reinforcement projects. This may also lead to changes to how we plan NTS compression and flow control.

Table 3.1
GasFlexTool Scenarios

Scenario	Description
CCGT Profiling	Within-day changes in gas power generation, driven by a number of factors affecting electricity balancing. This scenario impacts at national level as well as regional.
Supply Profiling	The impact of flow rate changes at terminals across the NTS due to factors including: ■ Response to forecast errors ■ Back-loading and front-loading ■ Outages and losses.
Storage Profiling	Impact of rapid flow rate variation, within-day, at storage facilities. This could be driven by: ■ Price arbitrage ■ Response to forecast errors ■ Response to outages elsewhere on the NTS.
Irish Interconnector Profiling	Impact of flow rate variation at Moffat on the north of the NTS, especially when there are low supplies through St Fergus.
High Linepack Swing Day	Days when there is a high linepack swing across the NTS. This could arise from a combination of the above scenarios.
High Regional Flexing	Specific cases where linepack loss in a region is severe. This could be due to a high demand change or forecast error in that region when the supply response is not local.

Example System Flexibility Scenario – CCGT Profiling

Using the GasFlexTool, we have simulated a possible NTS linepack swing range from the current annual peak level out to gas year 2029/30 based on the FES (see Figure 3.8).

Figure 3.8

Total NTS linepack swing range, driven by a very high wind (based on historical data) and cold weather assumption

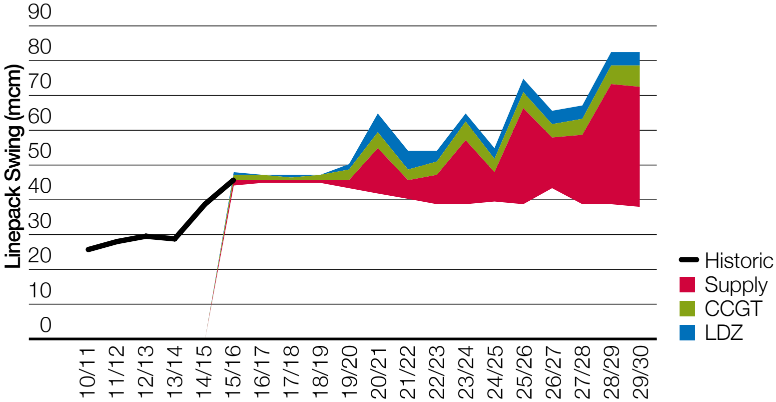


Figure 3.8 shows that the maximum NTS linepack swing has the potential to approach more than double the current level by the end of the next decade. The outputs from the tool are based on the assumption of high CCGT flexible operation and high supply within-day variation. The supply variation assumption is based on recent behaviour of specific supply points on the highest linepack swing day ever observed on the NTS.

The high CCGT flexing is assumed to be driven by wind intermittency. Hence, high wind historical data has been used, together with cold weather conditions. Figure 3.9 shows the CCGT contribution to the maximum NTS swing using these assumptions for each FES.

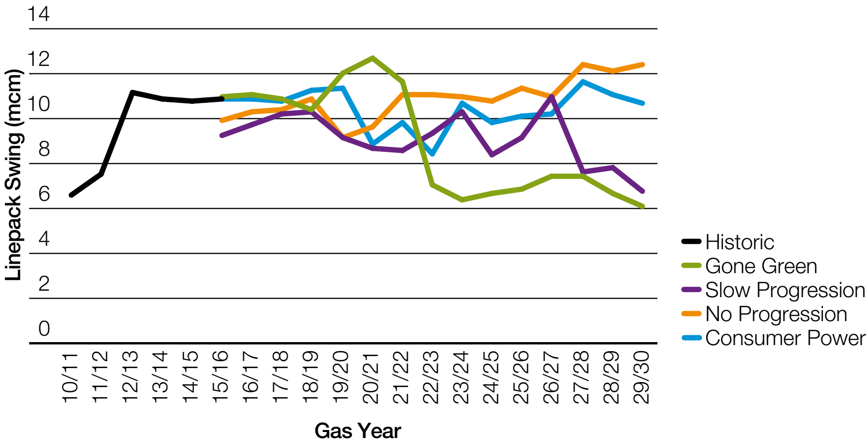
By improving our modelling so that it factors in future customer behaviour we can develop and adopt operating strategies that can manage pressure variability effectively and make use of notice period limits. We welcome your feedback on the data produced and the parameters we have used to model the scenarios.

Feedback can be provided through our Talking Networks site[3] or our GTYS mailbox: **Box. SystemOperator.GTYS@nationalgrid.com**

[3] http://www.talkingnetworkstx.com/System-Flexibility.aspx

System Flexibility

Figure 3.9
CCGT contribution total NTS linepack swing for each FES scenario, driven by a very high wind (based on historical data) and cold weather assumption



3.4.2 Incorporating stakeholder engagement outcomes

We held a System Flexibility stakeholder engagement event on 14 May 2015. At the event we defined the components of system flexibility, as described in Chapter 2, and focused on within-day linepack flexibility. We asked for views on how we should plan for the four main components of within-day flexibility, namely: DN profiling, direct connect profiling (mainly power generation), supply losses, and supply profiling due to delayed market response to demand change ('forecast error').

At this event, stakeholders did not think that there was an immediate concern as their flexibility needs were being met. However, they agreed with our requirement to look into the future and assess how the flexibility requirements may change. They were supportive of our quest to further investigative and quantify the system flexibility.

The feedback we received also highlighted the need for more planning information sharing between National Grid and system users, e.g. Distribution Network Operators (DNOs) and Offshore operators. It is hoped that through this, more detailed information such as flexibility usage, the probability of supply losses, and market-driven supply lag will be gathered. This should enhance current assumptions within the GasFlexTool.

The feedback also highlighted the need for more data sharing on power generation between National Grid Gas and National Grid Electricity to feed into long-term planning. This would enhance the modelling of CCGT operation, due to the coupled Gas and Electricity markets model approach used in the GasFlexTool. Assumed electricity market parameters and behaviour have not been shared between National Grid Electricity and National Grid Gas due to our business separation Licence obligations. We have started to look at the information that could be shared to benefit our within-day system flexibility planning approach, and how we might overcome our Licence restrictions.

There was also feedback on what attendees did not want. There were concerns expressed about placing limits and restrictions on users in terms of how they use their capacity. The feedback was that we should not introduce any arrangements that might undermine the wholesale markets or undermine daily balancing. We should not introduce new mandatory obligations on users. We rarely reject access to flexibility via offtake profile notices and users would like to see this continue. Restricting access to flexibility would have a negative impact on DNOs' ability to meet their customers' requirements and would have a negative impact on gas power generators' ability to participate in the balancing mechanism.

It should be noted that in the prevailing approach to planning for System Flexibility, due to variation of supplies within-day, is including a 2% flow margin. Recent NTS trends have shown that this figure may underestimate the magnitude of supply flow rate variation within-day. Stakeholders suggested that the design margin may no longer be fit for purpose and should be reviewed.

3.4.3 System Flexibility next steps

Over the next 12 months we will continue to develop and test the GasFlexTool to allow us to better quantify and understand future System Flexibility requirements. We will be using our Talking Networks site to keep the industry updated on our progress.

If we use the GasFlexTool as our standard way of assessing System Flexibility, we will include it within the Transmission Planning Code (TPC). The TPC describes the methodology used to determine the physical capability of the system, inform parties, wishing to connect to and use the NTS, of the key factors affecting the planning and development of the system. We consulted with the industry on the TPC in 2014 and 2015 to include RIIO and Planning and Advanced Reservation of Capacity Agreement (PARCA) related changes. We will consult with the industry to gain agreement on the proposed System Flexibility changes to our system planning process. This is also likely to involve revising the design margin, which includes the flow margin.

FES

Much of our data is consulted through the Future Energy Scenarios

The next version of the TPC will reflect these developments, and views will be sought from stakeholders through the consultation.

We are developing an approach based on future whole system planning rather than customer specific limits and products. This will involve setting parameters within the planning process such as the volume and duration of supply losses and the extent of demand variation with an associated supply response lag time. We would appreciate feedback on our planning approach and the approach to parameter setting.

As we mentioned in Chapter 2, section 2.2.9, we would welcome feedback on whether a Gas System Operability Framework (GSOF) would help in terms of setting and consulting on parameters within our planning process.

We plan to carry out further stakeholder engagement activities on our System Flexibility work, GSOF proposal, potential changes to the Transmission Planning Code and the upcoming Gas Standards initiative over the next 12 months.

Customer Capacity – Exit

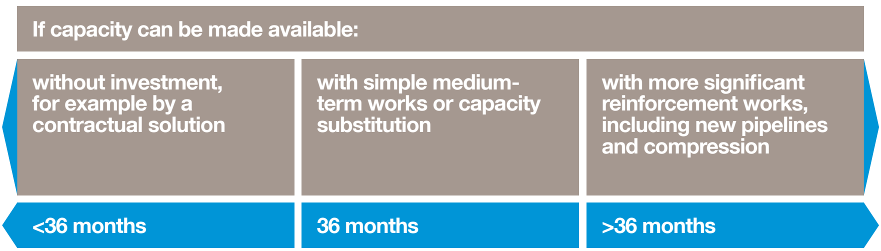
3.5 Customer capacity – exit

Understanding our customers' gas demand (exit capacity) requirements across the NTS allows us to plan and operate our system efficiently and effectively. When we receive an exit capacity request we analyse our current system to assess what impact an increase in demand has on the current system capability. This allows us to identify and plan for any geographical constraints which may arise from increasing customer exit capacity demand in a particular area of the NTS. Where constraints to current system capability are encountered we use the NDP to identify options to meet our customers' needs in the most cost effective and efficient way.

The following section provides shippers, Distribution Network Operators (DNOs) and developers with information about the lead time for providing NTS entry and exit capacity. If unsold NTS exit (flat) capacity is available at an existing exit point then it can be accessed through the July application process for the following winter.

The obligated capacity level, less any already sold, is the amount of capacity that we make available through the application and auction processes. We can increase capacity above the obligated levels when system capability allows, through substitution and via funded reinforcement works.

Figure 3.10
Capacity leadtimes



If we identify reinforcement works or increased operational risk, we investigate substituting unsold capacity. Capacity substitution involves moving our obligation to make capacity available from one system point to another. This is intended to avoid the unnecessary construction of new assets. (Further information on substitution is available in the TPC[4] and via the methodology statements[5].

If substitution is not possible, we will consider whether a Need Case has been triggered and hence reinforcement works and contractual solutions will be investigated. Works on our existing sites, such as modification of compressors and above-ground installations (AGIs) may not require planning permission, so may have shorter lead times. Significant new pipelines require a Development Consent Order (DCO), as a consequence of The Planning Act (2008). This can result in capacity lead

[4] http://www2.nationalgrid.com/UK/Industry-information/Developing-our-network/Gas-Transportation-Transmission-Planning-Code/
[5] http://www2.nationalgrid.com/uk/industry-information/gas-capacity-methodologies/

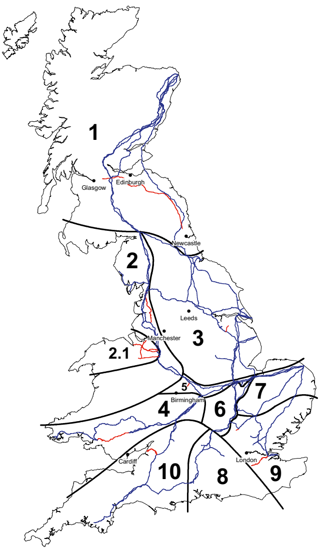
times of 72 to 96 months. Construction of new compressor stations may also require DCOs if a new high-voltage electricity connection is needed and, subject to local planning requirements, may require similar timescales to pipeline projects.

3.5.1 NTS exit capacity map

Figure 3.11 – NTS exit capacity map divides the NTS into zones based on key compressor stations, and multi-junctions. Within these zones, any new connection and/or capacity request is likely to either be met through substitution within the zone or by a similar reinforcement project. It is likely that substitution within a zone will be close to a 1 to 1 basis. These zones are purely for information and were created for the Gas Ten Year Statement (GTYS). All our substitution analysis is carried out to the substitution methodology statement rules and, while it is very likely that capacity will be substituted from within a zone, it is not guaranteed.

We have provided a commentary explaining the potential capacity lead times and likelihood of substitution in each zone, including areas of sensitivity. This information is an indication and actual capacity lead times and availability will depend on the quantity of capacity requested from all customers within a zone and interacting zones. This information recognises the impact EMR may have on interest in NTS connections and capacity.

Figure 3.11
NTS exit capacity map



Legend
- Gas Pipeline
- Gas Pipeline – Sensitive Area
- Exit Capacity Area

Customer Capacity – Exit

3.5.2 Available (unsold) NTS exit (flat) capacity

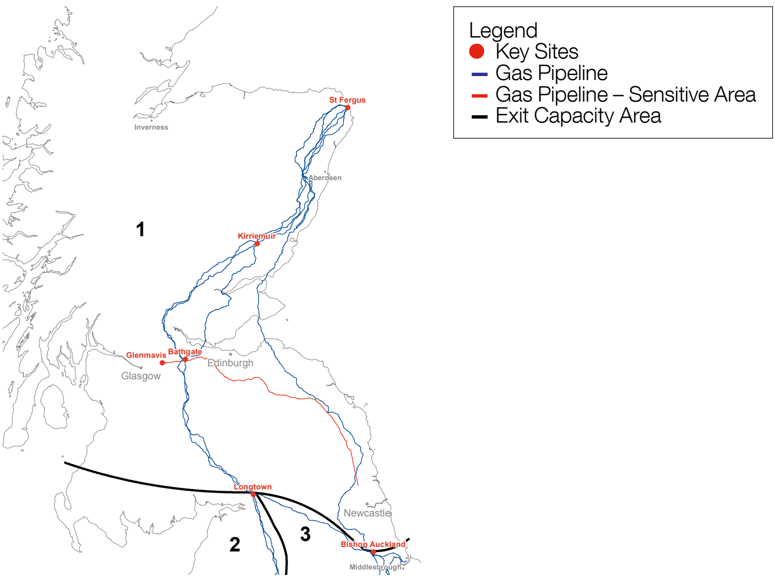
Table 3.2 includes the quantities of unsold NTS exit (flat) capacity in each zone that could be used to make capacity available at other sites through exit capacity substitution. The table also shows how unsold capacity has changed since the publication of the 2014 Gas Ten Year Statement (GTYS).

Table 3.2
Quantities of unsold NTS exit (flat) capacity

Region Number	**Region**	**Obligated**	**Unsold**		
		(GWh/d)	(GWh/d)	% of unsold capacity	% change from 2014 GTYS
1	Scotland & the North	718	108	15%	+7%
2	North West & West Midlands (North)	1,110	347	31%	+3%
2.1	North Wales & Cheshire	315	199	63%	-2%
3	North East, Yorkshire & Lincolnshire	1,570	579	37%	+8%
4	South Wales & West Midlands (South)	569	48	8%	0%
5	Central & East Midlands	281	113	40%	0%
6	Peterborough to Aylesbury	126	29	23%	0%
7	Norfolk	368	121	33%	+4%
8	Southern	526	208	40%	0%
9	London, Suffolk & the South East	1,504	408	27%	+5%
10	South West	461	69	15%	0%

Region 1 – Scotland and the North

Figure 3.12
Region 1 – Scotland and the North



NTS Location:
North of Long Town and Bishop Auckland

NTS/DN exit zones:
SC1, 2, 3, 4, NO1, 2

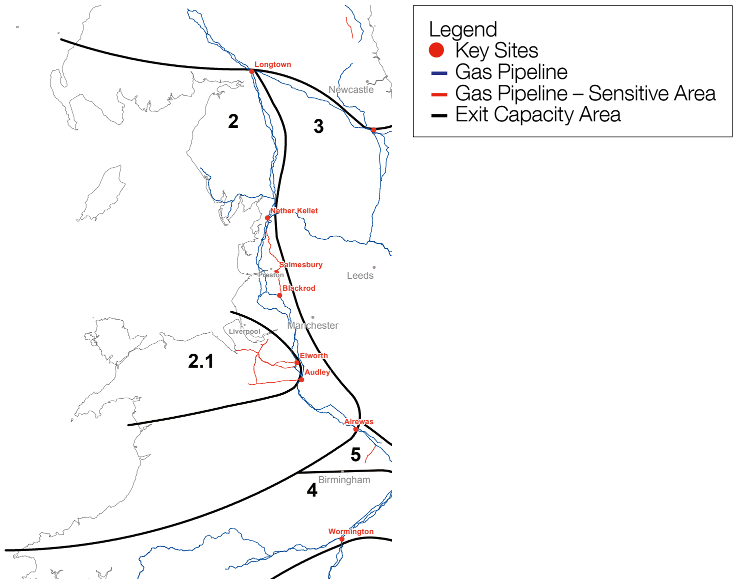
This region is sensitive to St Fergus flows.

High St Fergus flows mean exit capacity will be available. As St Fergus flows reduce, exit capacity will be constrained. There is only a small quantity of substitutable capacity in the area, but compressor flow modifications, including reverse flow capability, can be delivered to provide significant quantities of capacity without requiring Planning Act timescales. Capacity may be more limited in the sensitivity area (feeder 10 Glenmavis to Saltwick) due to smaller diameter pipelines.

Customer Capacity – Exit

Region 2 – North West and West Midlands (North)

Figure 3.13
Region 2 – North West and West Midlands (North)



NTS Location:
South of Longtown, north of Alrewas and east of Elworth

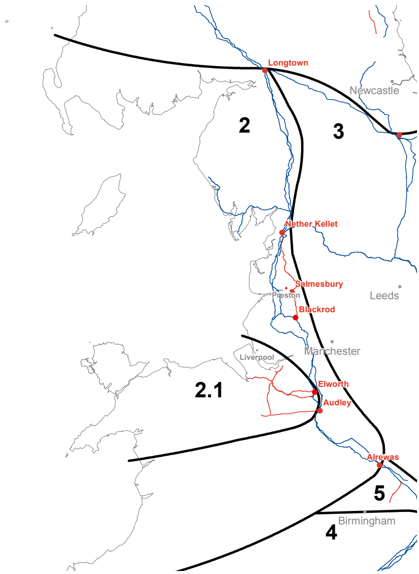
NTS/DN exit zones:
NW1, WM1

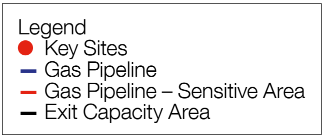
The region is highly sensitive to national supply patterns and use of storage; this area was historically supplied with gas from the north but increasingly receives gas from the south and from the east across the Pennines.

The amount of unsold capacity in the region indicates that capacity could be made available by exit capacity substitution. A capacity request in zone 2 is likely to be met through substitution from zone 2, including zone 2.1, and then from the downstream zones, in this case zone 5. Capacity is likely to be available on the main feeder sections between Carnforth and Alrewas. Potential non-Planning Act reinforcements could release capacity, but then significant pipeline reinforcement would be required, particularly in the sensitive region around Samlesbury and Blackrod (North Lancashire and Greater Manchester).

Region 2.1 – North Wales and Cheshire

Figure 3.14
Region 2.1 – North Wales and Cheshire





NTS Location:
West of Elworth and Audley (feeder 4)

NTS/DN exit zones:
NW2, WA1

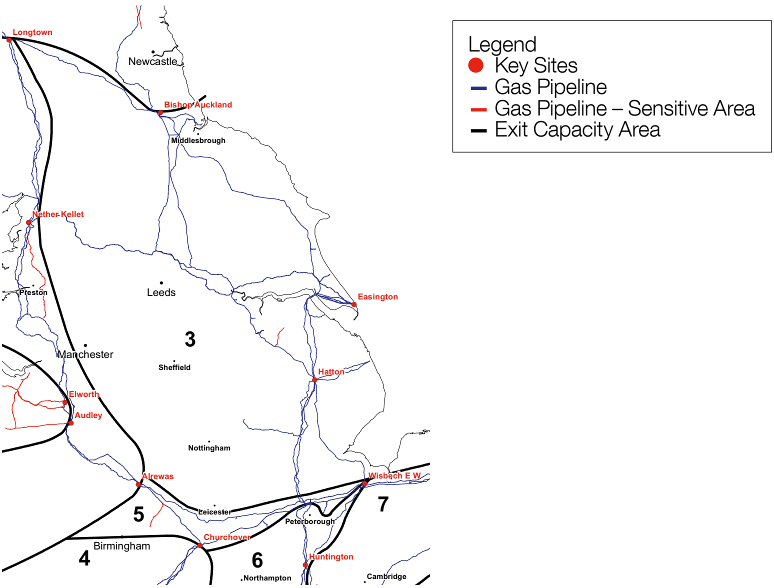
This is an extremity of the system with limited local supplies (Burton Point) but has a significant number of storage facilities.

The quantity of unsold capacity within the region indicates a good probability that capacity could be made available via exit capacity substitution, but this is from direct connect offtakes where the capacity could be booked. Potential non-Planning Act reinforcements could release small amounts of additional capacity, but significant pipeline reinforcement would be required, resulting in long (Planning Act) timescales.

Customer Capacity – Exit

Region 3 – North East, Yorkshire and Lincolnshire

Figure 3.15
Region 3 – North East, Yorkshire and Lincolnshire



NTS Location:
South of Bishop Auckland, north of Peterborough and Wisbech and east of Nether Kellet

NTS/DN exit zones:
NE1, 2, 3, EM1, 2

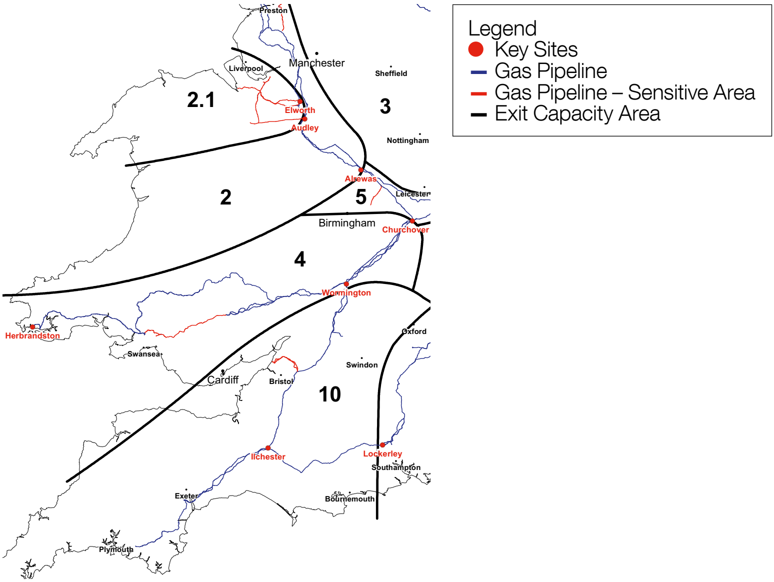
There are a number of power stations in this region and this may impact on future ramp rate agreements (the rate at which flows can increase at an offtake, as set out in the Network Exit Agreement – NExA).

The amount of unsold capacity in the region indicates that capacity could be made available through exit capacity substitution. Further capacity should be available without needing reinforcement, assuming stable north-east supplies; however, this may be limited on smaller diameter spurs, including Brigg (shown as a sensitive pipe).

Non-Planning Act reinforcements, including compressor modifications, could be carried out to make additional capacity available.

Region 4 – South Wales and West Midlands South

Figure 3.16
Region 4 – South Wales and West Midlands South



NTS Location:
West of Churchover

NTS/DN exit zones:
WM3, SW1, WA2

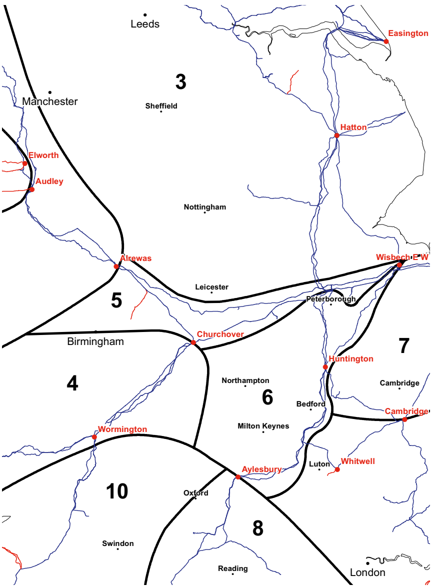
Exit capacity availability is highly sensitive to Milford Haven flows. Low Milford Haven flows result in reduced South Wales pressures, which limit capacity. High Milford Haven flows result in reduced pressures in the West Midlands which may limit capacity.

The quantity of unsold capacity within the region indicates a limited quantity of capacity could be substituted. Potential non-Planning Act reinforcements could release small quantities of capacity, but significant pipeline reinforcement would be required, since the area south of Cilfrew is a sensitive area (shown in red) due to the different pressure ratings.

Customer Capacity – Exit

Region 5 – Central and East Midlands

Figure 3.17
Region 5 – Central and East Midlands



Legend
- Key Sites
- Gas Pipeline
- Gas Pipeline – Sensitive Area
- Exit Capacity Area

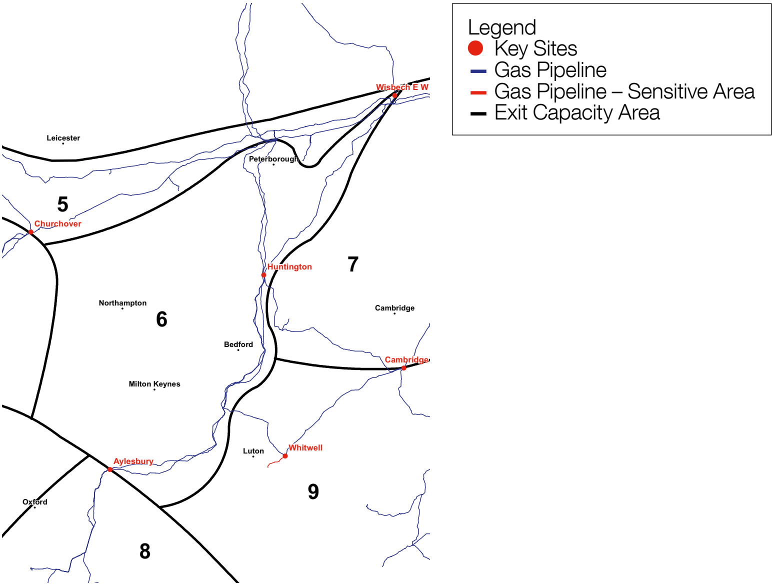
NTS Location:
South of Alrewas, north of Churchover, west of Wisbech

NTS/DN exit zones:
EM3, 4, WM2

The unsold capacity here indicates a limited scope for substitution. Potential non-Planning Act reinforcements could be carried out to release a small amount of capacity, but significant pipeline reinforcement would be required, in particular for the sensitive area Austrey to Shustoke (shown in red).

Region 6 – Peterborough to Aylesbury

Figure 3.18
Region 6 – Peterborough to Aylesbury



NTS Location:
North of Aylesbury, south of Peterborough and Wisbech, west of Huntingdon

NTS/DN exit zones:
EA6, 7

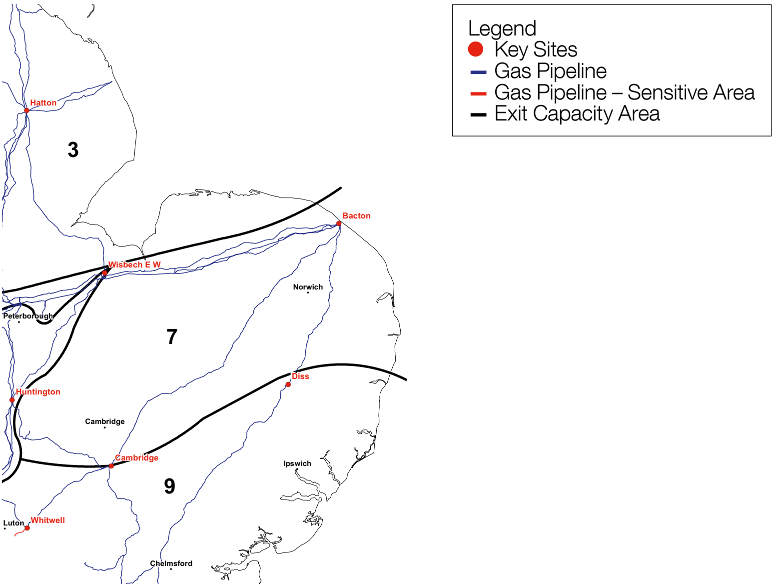
Capacity availability is sensitive to demand increases downstream in region 10, the South West.

The quantity of unsold capacity indicates limited scope for exit capacity substitution from the single offtake in the region, but there may be scope for substitution from the southern region downstream of Aylesbury. Potential non-Planning Act reinforcements could be carried out to release capacity.

Customer Capacity – Exit

Region 7 – Norfolk

Figure 3.19
Region 7 – Norfolk



NTS Location:
North of Diss and Cambridge, east of Wisbech

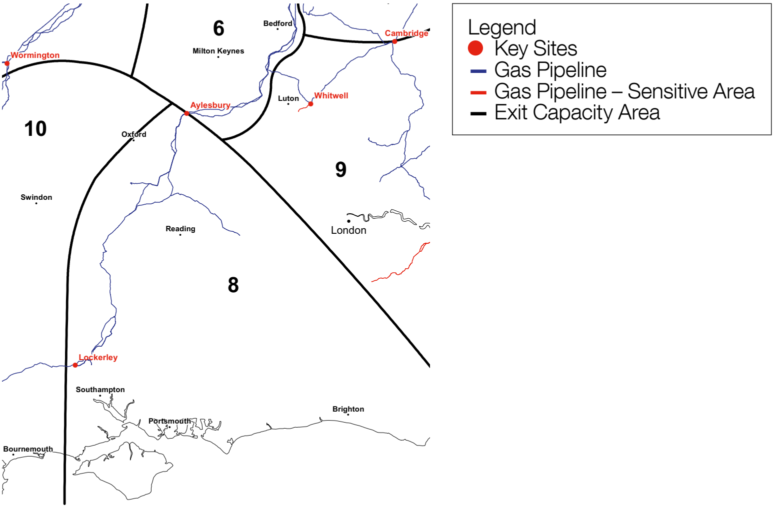
NTS/DN exit zones:
EA1, 2, 3

The region is sensitive to South East demand; if demand increases in the South East, capacity may become more constrained.

Unsold capacity here indicates a good probability that capacity could be substituted. Additional capacity could be made available without reinforcement works, assuming stable Bacton supplies.

Region 8 – Southern

Figure 3.20
Region 8 – Southern



NTS Location:
South of Aylesbury and north of Lockerley

NTS/DN exit zones:
SO1, 2

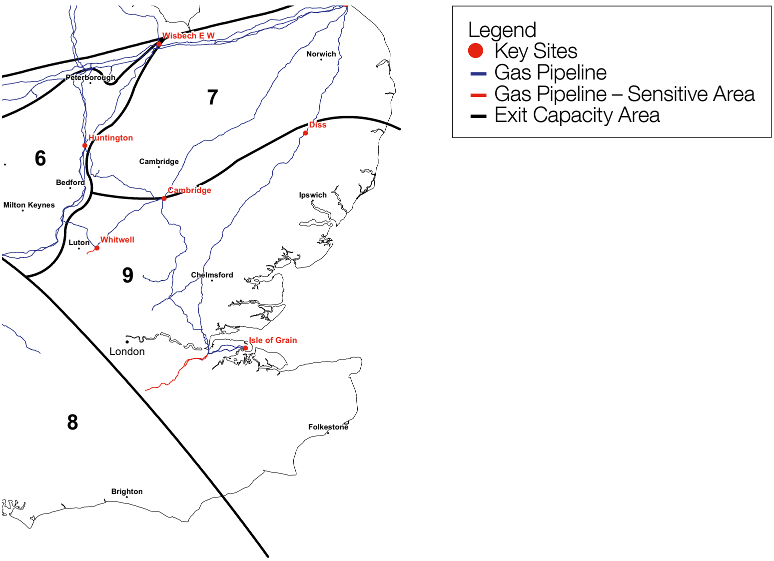
The region is sensitive to demand in the South West; if demand increases, capacity may become more constrained.

The amount of unsold capacity indicates a good chance that capacity could be made available via exit capacity substitution. Potential non-Planning Act reinforcements (compressor station modifications) could release a small amount of capacity.

Customer Capacity – Exit

Region 9 – London, Suffolk and the South East

Figure 3.21
Region 9 – London, Suffolk and the South East



NTS Location:
South Diss, Cambridge, east of Whitwell

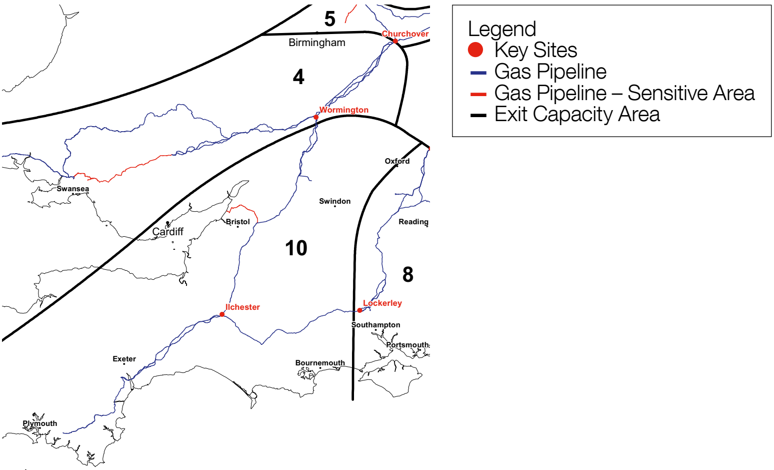
NTS/DN exit zones:
EA4, 5, NT1, 2, 3, SE1, 2

The region is sensitive to Isle of Grain flows, with low flows limiting capacity. Capacity may be more limited in the sensitive areas at the extremities of the system shown in red (Tatsfield, Peters Green). The significant number of power stations in the region may impact on future ramp rate agreements (the rate at which flows can increase at an offtake, as set out in the Network Exit Agreement – NExA).

Unsold capacity indicates a good chance that capacity could be made available via exit capacity substitution, however, exchange rates may vary between locations. Potential non-Planning Act reinforcements could be carried out to release small quantities of additional capacity but significant pipeline reinforcement would be needed.

Region 10 – South West

Figure 3.22
Region 10 – South West



NTS Location:
South of Wormington and Lockerley

NTS/DN exit zones:
SW2, 3

The quantity of unsold capacity in this region indicates limited scope for capacity being made available through exit capacity substitution. Exchange rates may be high due to small diameter pipelines. Potential non-Planning Act reinforcements could release small quantities of additional capacity, but significant pipeline reinforcement would be needed, resulting in long (Planning Act) timescales, particularly in the sensitive area shown in red (west of Pucklechurch on the feeder 14 spur) due to small diameter pipelines. There is some sensitivity to low Milford Haven flows.

Customer Capacity – Exit

3.5.3 Directly Connected exit points

The following Table shows which region the current Directly Connected (DC) offtakes fall within. There are no such offtakes in region 6.

Table 3.3
Direct Connect offtakes by region

Region	Offtake
1	Blackness (BP Grangemouth)
	Cockenzie Power Station
	Glenmavis Max Refill
	Gowkhall (Longannet)
	St. Fergus (Peterhead)
	St. Fergus (Shell Blackstart)
2	Barrow (Bains)
	Barrow (Black Start)
	Barrow (Gateway)
	Carrington (Partington) Power Station
	Caythorpe
	Ferny Knoll (AM Paper)
	Holford
	Partington Max Refill
	Roosecote Power Station (Barrow)
	Sellafield Power Station
	Harwarden (Shotton, aka Shotton Paper)
	Stublach (Cheshire)
	Willington Power Station
	Pickmere (Winnington Power, aka Brunner Mond)
	Wyre Power Station
2.1	Shotwick (Bridgewater Paper)
	Burton Point (Connahs Quay)
	Deeside
	Hole House Max Refill
	Weston Point (Castner Kelner, aka ICI Runcorn)
	Weston Point (Rocksavage)
	Shellstar (aka Kemira, not Kemira CHP)

Region	Offtake
3	Garton Max Refill (Aldbrough)
	Bishop Auckland (test facility)
	Teesside (BASF, aka BASF Teesside)
	Hatfield Moor Max Refill
	Teesside Hydrogen
	Saltend BPHP (BP Saltend HP)
	Blyborough (Brigg)
	Brine Field (Teesside) Power Station
	Blyborough (Cottam)
	Enron Billingham
	Goole (Guardian Glass)
	Hatfield Power Station
	Hornsea Max Refill
	Billingham ICI (Terra Billingham)
	Thornton Curtis (Humber Refinery, aka Immingham)
	Eastoft (Keadby Blackstart)
	Eastoft (Keadby)
	Phillips Petroleum, Teesside
	Rough Max Refill
	Rosehill (Saltend Power Station)
	Saltfleetby Storage (Theddlethorpe)
	Spalding 2 (South Holland) Power Station
	Wragg Marsh (Spalding)
	Stallingborough
	Staythorpe
	Sutton Bridge Power Station
	Thornton Curtis (Killingholme)
	West Burton Power Station
	Zeneca (ICI Avecia, aka 'Zenica')

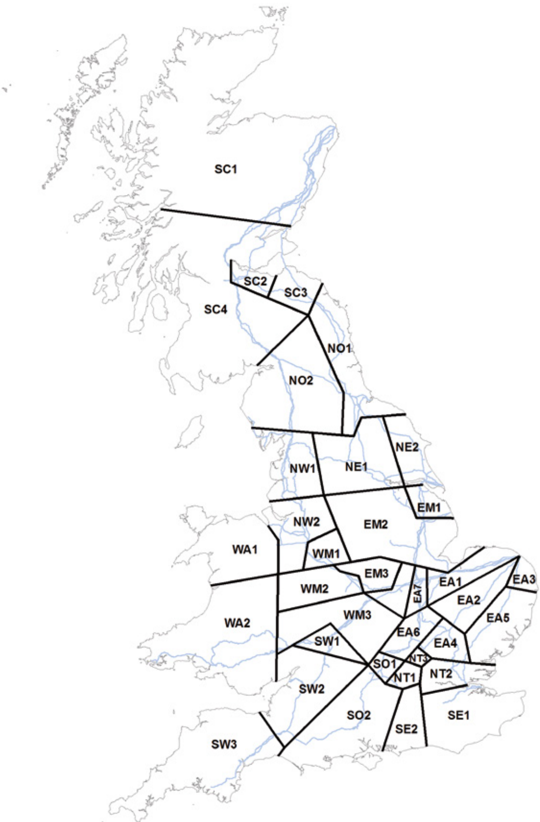
Region	Offtake
4	Tonna (Baglan Bay)
	Dynevor Max Refill
	Pembroke Power Station
	Upper Neeston (Milford Haven Refinery)
5	Caldecott (Corby Power Station)
	Drakelow Power Station
	Peterborough (Peterborough Power Station)
7	Bacton (Baird)
	Deborah Storage (Bacton)
	Saddle Bow (Kings Lynn)
	St. Neots (Little Barford)
8	Didcot
	Barton Stacey Max Refill (Humbly Grove)
9	Barking (Horndon)
	Coryton 2 (Thames Haven) Power Station
	Stanford Le Hope (Coryton)
	Middle Stoke (Damhead Creek, aka Kingsnorth Power Station)
	Epping Green (Enfield Energy, aka Brimsdown)
	Grain Power Station
	Bacton (Great Yarmouth)
	Medway (aka Isle of Grain Power Station, NOT Grain Power)
	Ryehouse
	Tilbury Power Station
10	Avonmouth Max Refill
	Centrax Industrial
	Langage Power Station
	Marchwood Power Station
	Seabank (Seabank Power Station phase II)
	Abson (Seabank Power Station phase I)
	Terra Nitrogen (aka ICI, Terra Severnside)

Chapter three

3.5.4 **NTS/DN exit zones**

Figure 3.23 and Table 3.4 show which distribution network exit zones the current NTS/DN offtakes fall within.

Figure 3.23
NTS exit zones



Customer Capacity – Exit

Table 3.4
NTS/DN exit zones

Exit Zone	Offtake
EA1	Eye
	West Winch
	Brisley
EA2	Bacton Terminal
	Great Wilbraham
	Roudham Heath
EA3	Bacton Terminal
	Yelverton
EA4	Matching Green
	Royston
	Whitwell
EA5	Hardwick
EM1	Thornton Curtis 'A'
	Walesby
EM2	Kirkstead
	Sutton Bridge
	Silk Willoughby
	Gosberton
	Blyborough
EM3	Alrewas Compressor
	Blaby
	Tur Langton
EM4	Market Harborough
	Caldecott
NE1	Towton
	Rawcliffe
	Baldersby
	Pannal
	Asselby
	Burley Bank
NE2	Ganstead
	Hornsea
	Easington
	Pickering
	Paull

Exit Zone	Offtake
NO1	Guyzance
	Cowpen Bewley
	Coldstream
	Corbridge
	Thrintoft
	Saltwick
	Humbleton
	Little Burdon
	Elton
NO2	Wetheral
	Keld
	Tow Law
NT1	Winkfield (NIL)
NT2	Horndon 'A'
NT3	Peters Green
NW1	Blackrod
	Samlesbury
	Lupton
NW2	Mickle Trafford
	Malpas
	Warburton
	Weston Point
	Holmes Chapel
	Eccleston
	Audley
SC1	Careston
	Balgray
	Kinknockie
	Aberdeen
SC2	Broxburn
	Armadale
SC3	Hulme
	Soutra
SC4	Nether Howleugh
	Lockerbie
	Pitcairngreen BV

Exit Zone	Offtake
SC4	Drum
SE1	Tatsfield
	Shorne
	Farningham
	Isle of Grain (LNG
SE2	Winkfield (SE)
SO1	North Stoke (Ipsden)
SO2	Mappowder
	Braishfield 'A'
	Winkfield (SO)
SW1	Fiddington
	Evesham
	Ross
SW2	Littleton Drew
	Avonmouth (LNG)
	Easton Grey
	Cirencester
	Ilchester
	Pucklechurch
SW3	Kenn (South)
	Aylesbeare
WA2	Dyffryn Clydach
	Dynevor Arms Tee
	Gilwern
WM1	Aspley
	Audley
	Milwich
WM2	Shustoke
	Austrey
	Alrewas Compressor
WM3	Ross
	Rugby
	Leamington Spa
	Stratford-Upon-Avon

Customer Capacity – Entry

3.6 Customer capacity – entry

As with exit capacity it is important for us to understand our customers' gas supply (entry capacity) requirements to the NTS to again allow us to plan and operate our system efficiently and effectively. When we receive an entry capacity request we analyse our current system to assess what impact an increase in supply at a particular part of our system has on the current capability. This allows us to identify and plan for any geographical constraints which may arise from an increase in customer entry capacity in a particular area of the NTS. Where constraints to current system capability are encountered we use the NDP to identify options to meet our customers' needs in the most cost effective and efficient way.

This section contains information about capacity availability and the lead time for providing NTS entry capacity as a guide for shippers and developers. Unsold NTS entry capacity available at an existing Aggregate System Entry Point (ASEP) can be accessed via the daily, monthly and annual entry capacity auction processes. If unsold capacity is not available, including at new entry points, the lead times may be longer.

We aim to help you understand the likely lead time associated with new entry points. New entry points can result in significant changes to network flow patterns and we encourage you to approach our customer service team to discuss specific requirements. This information is just an indication; actual capacity availability will depend on the amount of capacity requested from all customers at an ASEP and interacting ASEPs.

3.6.1 Entry planning scenarios

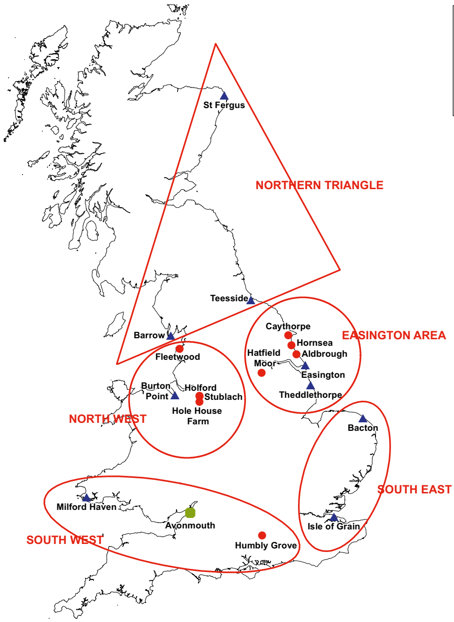
Chapter 2, section 2.2 discussed the uncertainties in the future supply mix that arise from both existing supplies and potential new developments. The available supplies, in aggregate, are greater than peak demand. The supply uncertainty is further increased by the Gas Transporters Licence requirements for us to make obligated capacity available to shippers up to and including the gas flow day. This creates a situation where we are unable to take long-term auctions as the definitive signal from shippers about their intentions to flow gas. We are continuing to develop our processes to better manage the risks that arise from such uncertainties as part of our System Flexibility work.

To help understanding of entry capability, we use the concept of entry zones which contain groups of ASEPs (Figure 3.24). These zones are discussed in further detail in 3.6.2. The entry points in each zone often make use of common sections of infrastructure to transport gas, and therefore have a high degree of interaction. There are also interactions between supplies in different zones which mean that interactions between supplies must also be determined when undertaking entry capability analysis. Examples are the interactions between Milford Haven and Bacton, or Easington and Bacton entry points where shared infrastructure assists capacity provision at both ASEPs by moving gas east–west or west–east across the country.

Chapter three

Customer Capacity – Entry

Figure 3.24
Zonal grouping of interacting supplies



Legend
▲ Terminal
● Constrained LNG
● Storage Sites

Key scenarios we examine through the planning process include:

High west to east flows generated by increased entry flows in the west travelling east across the country to support demands in the east and south east of the UK, including IUK export.

High south to north flows created by reduced entry flows into St Fergus, with a corresponding increase in entry flows in the south, requiring gas to be moved from south to north.

In addition to the traditional geographical scenarios, we may also investigate several **commercially driven sensitivities**. For example, a sensitivity scenario with a reduction in imported gas balanced by high medium-range storage entry flows to meet winter demand.

Historically, we have considered these scenarios on an individual basis using 'steady state' gas flows consistent with an overall 'end of day' energy balance. As customer requirements from the network evolve, it is increasingly necessary for us to consider the ability of the system to switch between different flow scenarios, explicitly considering changing flows on the network.

If this technique indicates that future requirements from the network are outside of current capability, we would investigate a range of possible solutions (regulatory, commercial and physical). This ensures that a broad spectrum of solutions is identified. Where investment in assets is the optimum solution, we would carry out further optioneering through the planning process.

3.6.2 Available (unsold) NTS entry capacity

Table 3.5 indicates the quantities of obligated and unsold NTS entry capacity at each ASEP within each entry zone. This unsold capacity (obligated less any previously sold) is available at each relevant ASEP and could also be used to make capacity available at other ASEPs through entry capacity substitution. Substitution may also be possible across entry zones.

Table 3.5
Quantities of entry capacity by zone

Entry Zone	ASEP	Obligated Capacity GWh/day	Unsold Capacity 2015/2016 GWh/day	2019/2020 GWh/day	2022/2023 GWh/day
Northern Triangle	Barrow	340.01	30.91	37.06	60.27
	Canonbie	0	0	0	0
	Glenmavis	99	99	99	99
	St Fergus	1,670.70	1,180.61	1,547.43	1,635.89
	Teesside	445.09	212.87	354.3	414.52
North West	Burton Point	73.5	45.09	60.36	73.5
	Cheshire	542.7	28.59	28.59	28.59
	Fleetwood	650	650	650	650
	Hole House Farm	296.6	0	13.16	13.16
	Partington	215	215	215	215
Easington Area	Caythorpe	90	0	0	0
	Easington (incl. Rough)	1,407.15	103.12	106.20	138.28
	Garton	420	0	0	0
	Hatfield Moor (onshore)	0.3	0.3	0.3	0.3
	Hornsea	233.1	27.31	27.31	27.31
	Hatfield Moor (storage)	25	3	3	25
	Theddlethorpe	610.7	586.31	601.5	610.7
South West	Avonmouth	179.3	179.3	179.3	179.3
	Barton Stacey	172.6	82.6	82.6	172.6
	Dynevor Arms	49	49	49	49
	Milford Haven	950	0	0	150
	Wytch Farm	3.3	3.3	3.3	3.3
South East	Bacton	1,297.80	608.11	1,020.59	1,181.50
	Bacton UKCS	485.60	0.00	0.00	0.00
	Isle of Grain	699.68	43.6	35.38	35.38

Customer Capacity – Entry

Table 3.5 contains the ASEP names as defined in the NTS Licence. For clarity, the Garton ASEP contains the Aldborough storage facility, the Barton Stacey ASEP contains the Humbly Grove storage facility, and the Cheshire ASEP contains the Hill Top Farm, Holford and Stublach gas storage facilities. More information on storage facilities can be found in Appendix 5 table A5.4.

Appendix 5 figures A5.2 A to H provide further information about the level of booked and obligated entry capacity at each ASEP, excluding those that are purely storage. The figures also provide data points representing historic maximum utilisation and the range of future peak flow scenarios for these ASEPs. While all un-booked capacity can be considered for entry capacity substitution, future bookings may change and the gap between the scenario peak flow data and the obligated capacity level may be a better indication of the capacity available for substitution. Using this indicator, significant capacity for substitution exists at St Fergus and Theddlethorpe.

Entry Zone – Northern triangle

ASEPs: Barrow, Canonbie, Glenmavis, St Fergus, Teesside (and Moffat)

These northern supplies need to be transported down either the east or west coast of England to reach major demand centres in the midlands and south of the country.

The amount of unsold capacity in this region, combined with the reduced St Fergus forecast flows, indicates a high likelihood that capacity could be made available through entry capacity substitution. Potential non-Planning Act reinforcements, including compressor reverse flow modifications, could release further quantities of additional capacity.

Entry Zone – North West

ASEPs: Burton Point, Cheshire, Fleetwood, Hole House Farm, Partington

These five ASEPs use common infrastructure and the main west coast transportation route to move gas into the rest of the system.

The unsold capacity in this region indicates that some capacity could be made available via entry capacity substitution; however, entry capability will not necessarily match entry capacity and exchange rates may be greater than one to one. Potential non–Planning Act reinforcements, including compressor reverse flow modifications, could release additional capacity but significant pipeline reinforcement would then be required, resulting in long (Planning Act) timescales.

Entry Zone – Easington area

ASEPs: Caythorpe, Easington (incl. Rough), Garton, Hatfield Moor (onshore), Hornsea, Hatfield Moor (storage), Theddlethorpe
All these ASEPs use common routes out of the Yorkshire area.

The quantity of unsold capacity in this region indicates a limited scope for additional capacity to be made available via entry capacity substitution. Potential non-Planning Act reinforcements, including compressor reverse flow modifications, could release some additional capacity but significant pipeline reinforcement would be needed, resulting in long (Planning Act) timescales.

Entry Zone – South West

ASEPs: Avonmouth, Barton Stacey, Dynevor Arms, Milford Haven, Wytch Farm

This zone enables sensitivity analysis around potential LNG supplies from Milford Haven.

The quantity of unsold capacity in this zone is principally at the Avonmouth and Dynevor Arms ASEPs associated with the LNG storage facilities. Due to the short duration of deliverability of these facilities, it is unlikely that the capacity could be made available for entry capacity substitution other than for equivalent facilities. Significant pipeline reinforcement and additional compression would be required to provide incremental capacity resulting in long (Planning Act) timescales.

Entry Zone – South East

ASEPs: Bacton UKCS, Bacton IP, Isle of Grain

The ASEPs use common infrastructure away from the Bacton area.

While there is a high degree of interaction between the Bacton (UKCS & IP) and Isle of Grain ASEPs, the quantity of unsold capacity in this zone cannot be interpreted as an indication of suitability for entry capacity substitution. This is due to constraints on the network in terms of the ability to transport gas south to north. Potential non Planning Act reinforcements, including compressor reverse flow modifications, could release some additional capacity, but significant pipeline reinforcement would then be required resulting in long (Planning Act) timescales.

Impact of Legislative Change

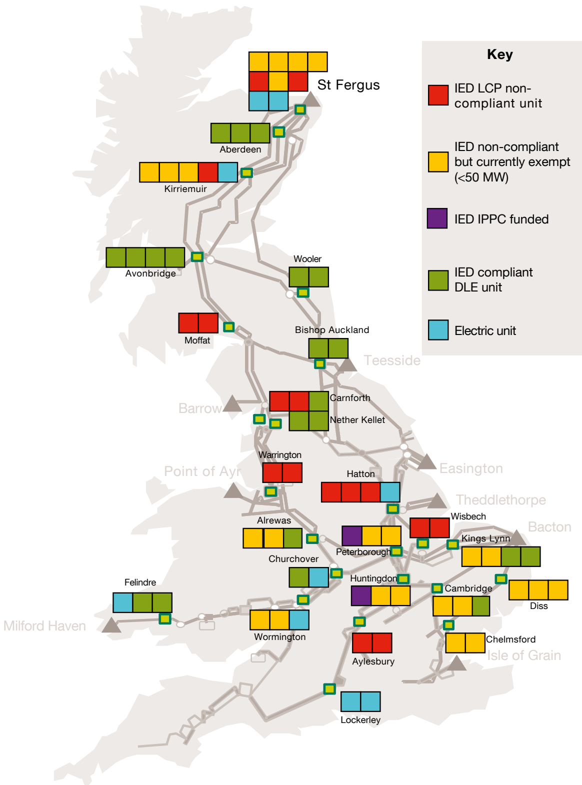
3.7
Impact of legislative change

Industrial Emissions Directive

As we outlined in Chapter 2.3, two elements of IED, the Integrated Pollution Prevention and Control Directive (IPPC) and the Large Combustion Plant Directive (LCP) directive, heavily impact our current compressor fleet (Figure 3.25).

The following sections detail the impact of the legislation before Chapter 5 covers what we are doing to address these legislative changes to ensure our compressor fleet is compliant by 2023.

Figure 3.25
Impact of IED on our current compressor fleet[6]



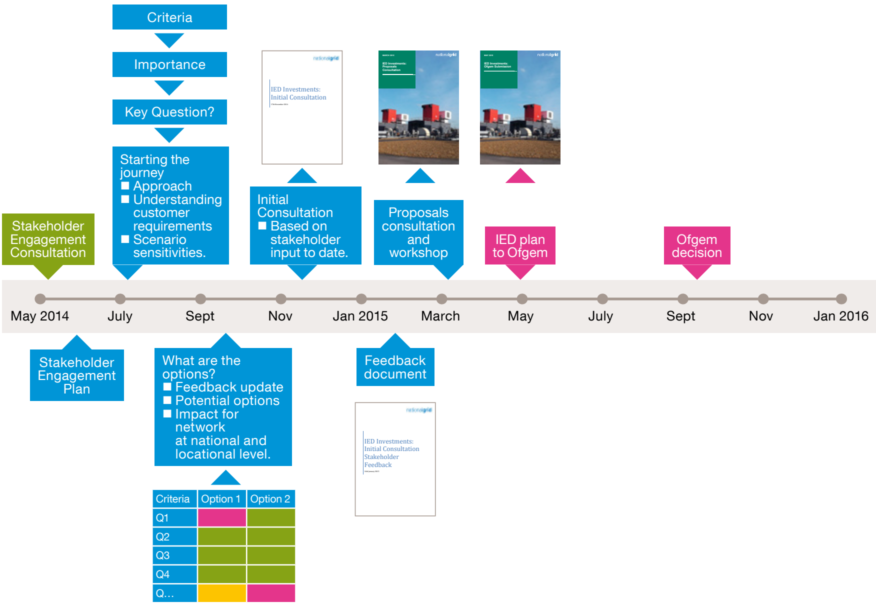
3.7.1 IED stakeholder engagement

We held several stakeholder consultation events in 2014–15 to get industry input on what options we should consider to meet the IED requirements. During these events our stakeholders helped us to develop the Gas Network Development scorecard to identify key network capability criteria. We published two documents following these events: IED Investments: Initial Consultation[7] and IED Investments: Proposals Consultation[8].

Figure 3.26 outlines the stakeholder consultation process we followed for IED along with the key outputs developed following your feedback.

During the consultation process the general stakeholder consensus was for us to, where possible, use the derogations available to enable us to keep our options open with the uncertainty around the upcoming legislation.

Figure 3.26
IED timeline



[6] After seeking further clarification, one of the units at St Fergus was re-classified and so is not subject to LCP. Therefore, in this document you will see reference to 16 units rather than 17.

[7] http://consense.opendebate.co.uk/files/nationalgrid/transmission/IED_Investments_-_Initial_Consultation_17Nov2014.pdf

[8] http://consense.opendebate.co.uk/files/nationalgrid/transmission/IED_Investments_Proposals_Consultation_.pdf

Impact of Legislative Change

3.7.2 Medium Combustion Plant (MCP) Directive

The MCP directive, which is currently in draft, will apply emission limits to all units below 50 MW thermal input. As this directive has not been implemented we are not sure exactly what impact this will have on our compressor fleet. Based on the draft MCP directive, it could potentially impact 26 of our gas-driven units.

Over the next year we anticipate more analysis to be undertaken on our compressor fleet to assess what impact this legislation will have. We will then be approaching the industry again to get input on how we should approach complying with this new legislation.

3.7.3 Best Available Technique References (BREF)

As defined in Chapter 2, section 2.3 BREF has been adopted under IPPC and IED. The BREF for combustion plant is currently in draft form and is due to be finalised in 2016. We will be taking BREF into account when determining the Best Available Technique (BAT) for all options considered on IED non-compliant units going forward. We do not anticipate any significant changes to the BAT process we currently follow when assessing our compressor options.