2025 Exit Capacity Planning Methodology Statement

January 2025

WALES&WEST UTILITIES

Introduction

In December 2020 OFGEM published their RIIO-2 Final Determinations for the transmission and gas distribution price controls. These set out the key elements of the price control from 1 April 2021 to 31 March 2026. This included a new licence obligation for the gas transporter licence holders to comply with an enhanced obligations framework in relation to the exit capacity booking process.

Standard Special Licence Condition ("SSC") A57 (Exit Capacity Planning) of the gas transporter licences requires the licence holder ("licensee") to comply with the Exit Capacity Planning Guidance ("the Guidance").[1]

The Guidance comprises a set of requirements relating to the following areas of capacity booking activity.

- **Methodology:** Gas Distribution Networks (GDNs) must provide information on the structure of their networks known as Network Topology, and both GDNs and National Gas Transmission (NGT) must provide information on their forecasts of demand and the details of the processes in place to calculate these forecasts.
- **Engagement:** The GDNs and NGT must collaboratively work with each other and with other stakeholders to maximise booking efficiency across the gas transportation network.
- **Reporting:** licensees must report annually to the Authority on capacity booking methodology, stakeholder engagement, decision-making and data to demonstrate efficient booking outcomes.

The purpose of this document is to satisfy the requirement comprised within the Exit Capacity Planning Guidance (ECPG) document to publish a methodology statement, setting out the process used to assess the requirements for NTS exit capacity, as set out in paragraphs 3.2-3.6

The document details the end-to-end process for the following process steps:

- Collection and processing of actual demand data
- Customer engagement and data collection
- Population of network analysis and other models
- Load and demand forecasting

Also provided are details on the processes by which these forecasts are developed into National Transmission System (NTS) Exit Capacity bookings, the scenarios developed by the GDN and how our scenarios refer to the National Energy System Operator (NESO) Future Energy Pathways (FEP).

If you have any queries, would like any further information, then please contact our planning team to discuss.[2]

[1] Exit Capacity Planning Guidance | Ofgem

[2] LTSAnalysisRequests_NMU@wwutilities.co.uk

Collection and Processing of Actual Demand Data

Pre-Forecast Data

Each year the Central Data Services Provider (CDSP), Xoserve, provide the Gas Distribution Networks with summary data to support their demand forecasting processes. The data is provided by the 2nd Friday in February. It gives actual consumption and shrinkage during previous calendar year corrected to the Seasonal Normal Composite Weather Variable (CWV) conditions with throughput broken down into the following categories:

- NDM 0 to 73.2MWh per annum
- NDM 73.2 to 732MWh per annum
- NDM >732MWh per annum
- DM
- Shrinkage
- Industrial and non-standard demand data
- Total LDZ

These volumes should take account of adjustments made in respect of individual site and aggregate Non-Daily Metered (NDM) reconciliation, including (if appropriate) the re-phasing of such adjustments into earlier years.

New Loads Connected & Accepted

We receive confirmation from our connections team, of the total number of new loads connected in each Local Distribution Zone (LDZ) in the previous calendar year, and the number of loads in aggregate at the end of the year.

Large Load Data

Included in the Xoserve data are details of any large load consuming/expected to consume >58.6GWh per annum, that:

- Has been connected in the previous calendar year; or
- Is expected to be connected to LDZ networks in the ten-year forecast period
- Information concerning any known or expected changes to any existing loads consuming >58.6GWh per annum

DS8 – Large Load Data Report

A draft of the DS8 Large Load Data is then created. Significant changes highlighted through this report is needed for a) us to add these loads to our models with the appropriate demand levels and b) for NGT to use in their demand forecasting. The DS8 is checked to ensure that the correct data has been used and that any judgement-based decisions are defendable and appropriate to that demand.

The information provided in relation to such demands should include, as appropriate, expected 1-in-20 peak day demand, annual demand, supply type, category/nature of load, date of first gas flow and any associated phasing or build-up of demand over time.

Summary

All required information from the business and Xoserve are sent through to the National Grid Demand Forecasting team for them to assess during the forecasting process. The files sent across will be information from the DS8 review, the LTS Quoted UIP and Non-Standard report from the Connections team and the Pre-Forecast information from Xoserve.

Link to published Xoserve methodology: (gasgovernance.co.uk)

Customer Engagement and Data Collection

Large Load Customer

If a customer's demand is significant enough to have a substantial impact on the network, we engage with them with regards to their demand and usage patterns across the day / year and future strategies e.g. in relation to decarbonisation and the potential to offer interruption services. This engagement can take the form of questionnaires to the user and/or 'face to face', virtual discussion as required.

Connections Enquiry Data

Relevant monthly data on Industrial and Commercial (I&C) enquiries is made available throughout the year to inform our demand forecasting process. An annual report is compiled by the end of January for the previous calendar year using data from core Business Services systems. The report details I&C enquiries for loads > 4166 scm/h (45,132 kWh) or 0.1 mcmd plus those identified by separate load type tags e.g. power generation, compressed natural gas (CNG) fuelling sites and green gas entry.

Internal tracking spreadsheets detail sites with whom we have Advanced Reservation Capacity Agreements (ARCAs) which require financial commitment from the customer due to reinforcement are kept up to date as required. This information can be included separately in the pre forecast information sent to NGT.

Industrial & Other Non-Standard Demands

As a group of GDNs, we have reacted to the changing demands asked of our customers including for new commercial services in relation to flexible generation, unregulated supplies and other sites with non-typical demand profiles. We have adapted/added to processes to meet these needs. We work with the other GDNs to ensure consistent approaches across the industry and carry out stakeholder engagement with our customers where required.

Entry Customers

Although embedded green gas supplies are not considered during the annual plan cycle with regards to reducing our Offtake bookings i.e., they do not offer a guaranteed supply.

We engage regularly with our 21 connected entry sites throughout the year on a site-by-site basis and via industry forums e.g., Entry Customer Forum hosted by the Energy Networks Association (ENA). The assumption of these sites being off at peak may change in the future and so this engagement will become more important in the context of the ECPG as and when that happens.

It is anticipated that hydrogen blending will play a larger part in our forecasting and planning process this year, in line with the Energy Networks Association's Blending Implementation report and recent announcements in support of hydrogen blending from the Department of Energy Security and Net Zero. Stakeholder Engagement and any available data or information will be utilised in this process.

Local Authorities

In the last few years our involvement in Local Area Energy Planning has increased considerably at town, Local Authority, regional and national levels. We have developed several whole system models including Pathfinder Plus:

2050-energy-pathfinder-an-integrated-energy-system-simulator.pdf (wwutilities.co.uk) and more recently Pathfinder Lite. These models are fully transparent and can assist projects in modelling how different combinations of supply, demand and technology types could meet their heat, light, power and transport needs.

Engagement with stakeholders provides us with information on likely pace and direction of change on a regional basis. Use of the Pathfinder models supports our planning processes in providing hourly gas flow data for a given scenario over a sample year (8760 hours) allowing us to identify constraints in entry or exit capacity and storage.

Further information on our work to support the future of energy is available:

The future of energy research (wwutilities.co.uk)

In addition to our future of energy projects, our below 7 bar planning team liaise with local authorities to gain the latest views on growth and probability of growth on the distribution network from domestic and small I&C projects.

Other GDNs

We participate in and occasionally lead a regular GDN planning forum to collaborate on planning activities and industry changes e.g. the introduction of the ECPG, inviting NGT to participate when it is relevant to do so. This forum helps to ensure a consistent approach where practical.

National Gas Transmission, National Energy System Operator & 3rd Parties

Each year, usually in March or April we have our first bilateral meeting with NESO to receive an overview of their draft forecast scenarios. These dates are subject to change as the final version of the demand forecast is received in May.

Meetings are held with NGT at several stages of the process and 3rd parties are invited to observe these discussions as per the new ECPG requirements. The meetings cover:

- Our likely NTS Exit Capacity and pressure requirements.,
- Requests for Assured Pressure changes from either party,
- NGT's capacity baselines and response to booking proposals highlighting any changes to accommodate likely rejections of the requests where needed.

We also engage with NGT and other system users through forums such as Transmission Workgroup which develops changes to commercial arrangements. Through these groups we aim to ensure that arrangements allow efficient access to and use of the Total System for our customers.

National Energy System Operator (NESO)

Engagement with NESO also happens outside the ECPG process regarding the development and outputs of the Future Energy Pathways (FEP) process. Network only discussions happen via regular Forum meetings.

Summary

Regular engagement with our stakeholders as detailed above is essential to inform accurate capacity bookings at our offtakes and efficient planning of our network. In this section of the methodology, we have demonstrated the range of stakeholders that we engage with during this process.

Load and demand forecasting

Annual Demand

We use the NESO forecasts for our expected annual volumes. These are produced in line with the TD76 requirements and consider econometrics:

GasDemandForecastingMethodology2020_v1.pdf

However, over the past few years we recognised that the relationship between peak and annual was changing and made the decision to develop our own forecasting for peak demand independently of annual demand.

WWU Process Background to Peak Forecasting

In 2010, a review of forecasting capability was carried out in WWU because of significant divergence in the scenario data received from NESO from year to year. As part of this project a peak-day model was produced by LPC Delta to forecast future demands for non-daily metered loads. The model considers factors including load growth, weather sensitivity, projected improvements to boiler efficiencies and the latest Composite Weather Variables from the Xoserve process.

Peak-day forecasts for larger sites are derived based on available data as detailed in the engagement section.

Forecast Scenario Development

WWU develop a range of sensitivities to consider the following key factors:

- Growth of key sites such as flexible generation and CNG Fuelling sites
- Impacts of any future homes' standard on growth of domestic connections
- Future industry developments e.g. Hydrogen deployment
- Economic Variables, e.g. cost of energy.

Information on the various sensitivities is shared with our Network Management Committee and the selection of sensitivities to be used in our planning forecast, which is subject to exec sign-off. A summary of our forecast scenarios from the current planning cycle is as follows:

Figure 1: Forecast Scenarios

	Process Step	Recovery	No Recovery
1	Historical Actual Demand	√	√
2	WWU Forecast Unidentified Gas (UIG) Data – Shrinkage plus other, accounted for in the Non-Daily Metered load band	√	√
3	A Review on Industrial Load and changes in their usage	√	√
4	Continued low level Domestic Growth across the period	√	X
5	Short term reduction in NDM due to high energy prices/cost of living crisis	√	√
6	Demand recovery in NDM following the reduction from high energy prices/cost of living crisis	√	X
7	Low level industrial growth e.g., Power Generation, CNG Fuelling	√	X

Population of Network Analysis and Other Models

Software Used

- **Synergi Gas**

We utilise Synergi Gas Unsteady State Model (USM) v 4.9.4 to carry out our transient analysis and LTS modelling which can use the following flow equations: Smooth pipe law; AGA; Chen, Colebrook-White; GERG and Sancham flow. The software is developed and supported by DNV.

- **Capacity Models**

GasCalc v 5.0 is used to calculate our Pressure Reduction Installation (PRI) and Offtake capacities at a component level. PRISM is also available to us to calculate site capacities and identify component constraints. Our PRI Capacity Spreadsheet is used to identify capacity constraints of individual components within our pressure reduction stations by comparing anticipated peak flow with capacities. We utilise a further DNV

tool called HTREC to calculate heating requirements at our sites, heat recovery distances on outlet pipework and heating capacity available from the heating systems installed.

- **Storage Simulation Model (Consus)**

Our Consus model is used to determine the storage required for most sites in our LDZs. Storage requirements for specific sites may be modelled individually where they have unique operating patterns. This is the case for most of our generation sites whose behaviour is increasing dynamic as they respond to electricity market signals.

Annual Model Build

Data from the approved planning forecast is imported into our transient analysis models in Synergi Gas. Models are built annually for peak demand days to meet our 1:20 licence obligation as well as for D13, D46, D150 & D300 (where days are put in the highest demand order for the year from day 1 to 365). This is done by scaling down the peak model to the D13 demand level, the scaling the D13 model to D46, etc.

These models are geographical representations of our LDZs and include:

- relevant network infrastructure parameters including length, diameter, material, roughness, wall-thickness, altitude and
- balancing parameters including supply and demand nodes and behaviours e.g. for electricity generation as detailed above.

Model Validation

Our LTS models are validated in line with the agreed industry standards document:

IGEM/GL/2 Edition 3: Planning of gas transmission and storage systems operating at pressures exceeding 16 bar and company policies and procedures namely:

T/PM/NP/2: Management Procedure for Validation of High-Pressure Distribution Network Analysis

Models

We have 3 LTS models and have determined that a total revalidation of each model every 3 years is a reasonable frequency on the high-pressure network. A partial or full validation will also happen on an ad-hoc basis should any material changes occur, or significant discrepancies are highlighted in between this time frame.

Reinforcement Assessment

Our models are built to determine:

1. How the LTS network can be optimised for storage within pressure parameters to maintain supplies to downstream distribution and directly connected customers, and:
2. Where any pipeline or offtake constraints may exist (physical or commercial).

Where the analysis identifies constraints in capacity the following options for resolution are considered:

1. Network reconfiguration
2. Network reinforcement
3. Commercial services such as interruption
4. Use of additional NTS Capacity (Flat, Flex, Pressure)

If we identify a pressure or storage constraint, then we would first look to optimise and reconfigure the network to either drive more linepack or meet pressures as required at extremities within the existing parameters of the physical network e.g. can we reduce extremity pressures to increase storage or conversely can we increase PRI pressures to meet extremity minimums whilst maintaining our storage position.

Following on from the first step described above, we would also consider the availability of Interruption from our customers as well as additional products from the NTS prior to designing any reinforcement of the

pipelines or equipment. In our view, this method drives network solutions that are least cost and most optimal for our customers.

The outputs from the annual modelling process are saved in the model data Form per LDZ and assurance checks are carried out to ensure that the models have been built and balanced correctly in line with the agreed strategy.

Section H Model Build

As per requirements set out in the Transportation Principal Document of the Uniform Network Code, we also provide capacity and pressure requirements away from peak 1 in 20. This is known as the Section H requirements and sets out our flat, flex and pressure requirements for a range of demand requirements away from peak:

Day 13, Day 46, Day 150 and Day 300 (summer) with Day 0 or 1 being peak 1 in 20.

To achieve this data output, we build a suite of demand models down the demand curve for each year of the forecast period and send this back to NGT by the end of October.

Under the new ECPG regime, NGT will use the demand data provided in Section H returns to inform their substitution methodology and capacity planning process.

Network Planning Policies & Procedures

In addition to the industry standard IGEM/GL/2 Edition 3: Planning of gas transmission and storage systems operating at pressures exceeding 16 bar and our model validation procedure listed above, we adhere to the following internal planning policies and procedures throughout the annual plan cycle:

T/PL/NP/18.1 - Network Planning.
T/PL/NP/4 - Above 7 bar Network Analysis
T/PM/NP15 - Management Procedure for Planning and Network Analysis Requirements
T/PM/NP24 - Management Procedure for Network Planning Policy (T/PL/NP18.1)

Network Considerations

South West

The South West part of our network covers a vast area of mainly domestic demand. There can be significant temperature differences between the Northern and Southern extremities of the network which can result in volatility in the gas usage by temperature sensitive loads during shoulder months.

The LTS is made up of 4 volumetric systems and several pressure-controlled networks. The pressure control networks are difficult to manage as they respond automatically to maintain their set point and they make use of significant NTS Flex due to the absence of system linepack. South West is the only area in the WWU network where the volumetric systems are fed by multiple offtakes, these need to be balanced efficiently to drive out as much storage as possible while keeping the system within its pressure parameters.

There are also several Bullet Storage sites to take into consideration and that interact with these volumetric systems. The South West Network is at an extremity of the NTS and so flexibility from the NTS is limited which means LDZ options to relieve constraints are usually required.

North Wales

We have a single offtake feeding our North Wales LDZ, a network which is split into two systems of large diameter pipelines covering a large geographic area but with relatively low overall demand in comparison to its size. These features result in a network with quite low gas velocities due to the distance that the network covers. There can be significant pressure drops across the

network from Offtake to extremity and time of flight means that it can take a while for any adjustments at the offtake to be seen at the system extremity.

The coastal part of the supply system is unique in that it contains a large HP Volumetric System within larger HP Volumetric system which means that both sections must be managed together to drive out the most storage.

South Wales

In South Wales, all three offtakes are fed by the same NTS feeder. It contains more industrial commercial loads than the other LDZs, including a higher concentration of connected power generation. It is also unique in that some offtakes have both a Volumetric and a Pressure control outlet feeding different parts of the network. Our West Wales feed sees high pressures drops across the network but lower velocities at its extremities.

Some parts of the network under summer conditions can see higher pressures at the extremity then at the offtakes due to altitude difference and the large diameter of the LTS mains.

Commercial Solutions

Where network constraints are identified we consider the use of commercial solutions as a means of reducing demand prior to consideration of physical solutions. In recent years we have held annual interruption auctions for this purpose but have not had any bids. This has reinforced the message that our customers reiterate year after year, that a reliable and constant gas supply is important to them.

Since 2012, we have introduced Network Entry Agreements (NExAs) which allow us to connect customers even if we are unable to secure small additional amounts of storage required by the site at peak demand. These agreements are for loads which are likely to have a significant impact on our network because of their likely operating profiles and / or locations.

In many cases NEXAs will also include terms to ensure flows are managed appropriated at times of high demand often when we may have an issue in providing the storage associated with their full load. Where there is a shortfall in network storage, additional NTS Flex is requested from NGT via annual or ad-hoc processes. Where NTS Flex is not made available additional terms are included in the NEXA to manage operating profiles on days where the network would otherwise be constrained.

These commercial solutions are used where the alternative pipeline or other storage physical solutions presented an inefficient spend for the very small amounts of storage, required per site.

Production of offtake-level capacity and pressure requirements

Principles

The following principles and assumptions are applied when producing offtake level capacity and pressure requirements:

- NTS Offtake capacity must be available to satisfy our 1:20 licence condition.
- NTS Flat Capacity must be guaranteed through purchase of annual or enduring capacity as there are circumstances where NTS may not release capacity through daily auctions, see: ExitCapacityReleasev16.2clean.pdf
- NTS Flat Capacity cannot be offset by embedded biomethane supply as these supplies are not subject to flow obligations.
- NTS Assured Pressure is more valuable than NTS Flex because of the notice periods / restrictions around use of NTS Flex Capacity.

- NTS Assured Pressure and NTS Flex are discretionary products, so a high level of certainty is needed before it is released back to NTS on a permanent basis.
- Requirements signalled through the provision of Section H to NGT provide protection against NTS substitution.
- It is appropriate to use information from modelling as well as actual flow data, operating strategies and information from stakeholders and wider industry to manage uncertainty and to determine final bookings.

Network Co-operation Requirements

We recognise the provisions of the Offtake Arrangements, Section I and the System Flexibility Restriction Notice (SFRN) which provide for cooperation between the GDN and NTS control centres in relation to flow swaps, assured pressure adjustments and the release of additional NTS Flex capacity to support daily operation and maintenance requirements.

Assured Offtake Pressure (AOP) Reduction Requests

Following significant growth in embedded flexible gas generation over the past few years to support deployment of intermittent renewable generation across Great Britain, our storage requirements including from our own Linepack (reliant on AOP) from the NTS and from NTS Flex Capacity have increased significantly.

As detailed in the principles above, the use of LDZ Linepack is a much better option for GDNs than the use of NTS Flex, which is subject to notice periods under the Offtake Arrangements Document, Section I and can be withdrawn through processes defined in the SFRN.

Since NTS Flex and NTS AOP are discretionary products, a high degree of certainty would be required before agreement was made for a permanent reduction of AOP including where NTS Flex Capacity was available instead.

Where NGT request a reduction in AOP, analysis will be undertaken to determine whether this can be agreed based on our forecasts of future requirements.

AOP, Flat and / or Flex Bookings for All Years

Our considerations for flat capacity bookings take account of requirements in later years and the implications of User Commitment should we need to increase bookings.

Recent changes in the NTS substitution methodology to take account of data provided in our Section H data and exclude ECP forecasted capacity from 'Substitutable Capacity', means that for capacities within baseline we will be able to signal requirements through section H without triggering User Commitment whilst securing the capacity as annual flat capacity in the July bookings for October (T-1).

Where capacities are above baseline, we would book enduring capacity to meet requirements for our 1-in-20 demand forecast including future loads for which a financial commitment has been made.

Pressure and flex increases are requested at the point of site enquiry through ad-hoc processes available and as mentioned above.

In many cases a reduction in 1-in-20 demand forecast does not result in a reduced need for storage or assured offtake pressure because the new loads which are connecting have a more dynamic profile than existing loads, e.g. a power station moving from 24-hour operation to 16-hour operation would have a 1/3 reduction in flat capacity but a significant increase in storage required.

Following the implementation of UNC Code Modification 0678 the cost implications of different (T-4) booking patterns have reduced with consistent NTS Flat Capacity prices being applied at all NTS Offtakes.

Scenarios considered as part of the booking process

The key factors that would feed into booking scenarios mean that there are usually few options to consider. To summarise:

- Where User Commitment is in place at Offtakes, we are unable to reduce bookings.
- The absence of a definitive way to recover Flex and / or Pressure reductions means that these are avoided on an enduring basis. AOP is valued over NTS Flex.
- NTS Baseline Capacity and Physical Capacity headroom will constrain bookings in some locations.
- Several of our Offtakes are single feed.
- Injection from Green Gas sites cannot be relied upon to meet our 1-in-20 requirements as their contracts are not for firm flow.

Comparison to FES Scenarios generated by NESO

Demand scenario projections are provided by NESO to GDNs in May each year. These are produced in line with the FEP process for each of the Future Energy Pathways. A five-year central forecast is also supplied. The NESO projections and forecast are subject to review to ensure differences can be explained.

Comparisons are also undertaken with data received in previous years to understand how NESO drivers are changing. In addition, significant attention is paid to the large load projections. These are often different to assumptions within the GDN e.g. for peak generation figures, NESO may apply diversity so that the national generation figure reflects national requirements whereas GDNs will book sufficient capacity for our large loads to operate on a 1:20 in line with their bookings without making assumptions about which loads NESO would call into operation.

Consultation Outcome

As required by the ECPG, we last published our methodology statement on 31st January 2024. The Joint Office invited industry stakeholders to review this methodology on 4th December 2024 and provided a link to the Wales & West Utilities website. The results of the 2024 consultation can be found in our 2025 Methodology Consultation Results Report published on our website.

Appendix A: Planning Process Overview

inc. Exit Capacity Planning Guidance (ECPG) and Annual Plan Cycle - Calendar of Actions

This process is for illustrative purposes only. Exact timelines can vary from one distribution network to another.