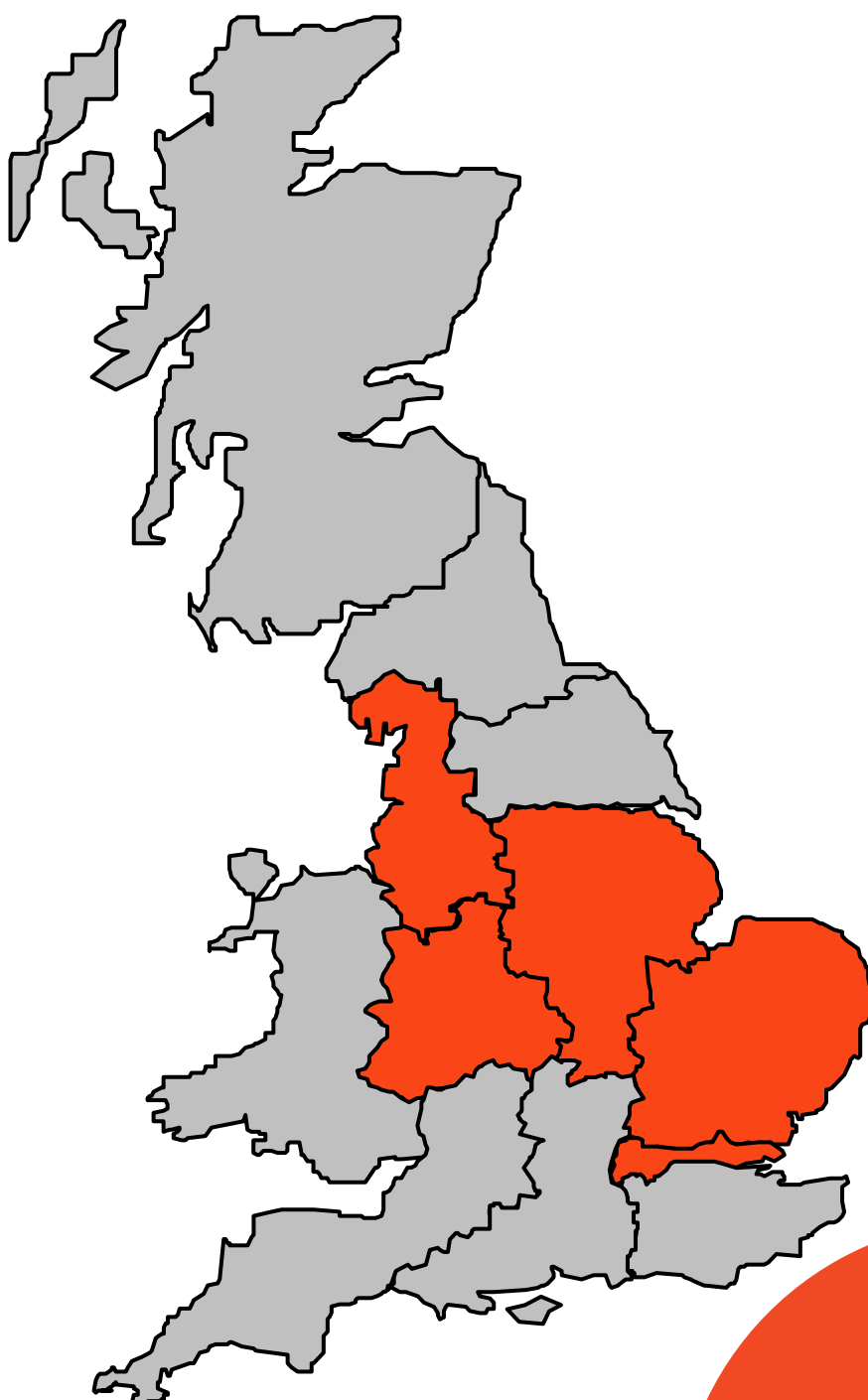


Exit Capacity Planning Guidance 2022 Outcomes Report

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October 2022



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Executive Summary

Overview

To meet our license obligations, the NTS Exit Capacity that we book needs to be sufficient to ensure we are able to meet demand on a peak 1:20 winter day. Every Gas Year (1st October to 30th September), we are required to book exit capacity from the National Transmission System for each of our 50 offtakes.

As per the Exit Capacity Planning Guidance document (ECPG), which forms part of a new licence condition introduced under RII02 (**Standard Special Condition A57: Exit Capacity Planning**), Cadent are now obliged to report on the outcome of the annual bookings process.

This year:

- The average change to Cadent's forecast demand since last year is a 1.12% increase
- The average change from year 1 to year 6 of the forecast is a 1.19% decrease
- Assured pressures were discussed with National Grid Gas (NGG) and some changes were agreed
- No major changes have been made to our booking strategy from last year.
- Bookings are all in line with forecasts
- We have met the obligations as set out in the ECPG

Analysis

Demand Forecast

Context

Cadent will book in line with the approved Peak Day demand forecast, thereby ensuring we remain compliant with the 1:20 licence obligation and not put it at risk.

Cadent have used the 2022 5-year Central Forecast provided by National Grid ESO as we do every year.

Under Cadent's Gas Transporter Licence **Standard Special Condition A11** Cadent has an obligation to demonstrate its ability to meet our 1:20 Peak Day Demand, this approach pursues full compliance with regards to that obligation.

Every year we receive from NG-ESO a forecast based on four different scenarios, as well as a central forecast which is their view of a more accurate representation of where NTS expect demand to be over the next 5 years for Cadent.

The four Future Energy Scenarios are;

- Leading the Way (high levels of societal change and fast decarbonisation)
- Consumer Transformation (high levels of societal change and medium decarbonisation)
- System Transformation (low societal change and medium decarbonisation)
- Falling Short (low societal change and slow decarbonisation)

For the fourth year, along with Future Energy Scenarios, NG-ESO have provided a "Central Forecast" which they believe is an accurate forecast for the level of expected demand in each distribution network. This forecast shows sustained growth consistent with the Falling Short Scenario discussed above. As a result of the recommendations above by NG-ESO, and following formal governance process within Cadent, the Cadent Board approved the use of the Central Forecast.

As a result, the overall trend on each network, as received from NG-ESO, is as follows:

- **East Anglia**
Peak forecasts are above the highest recent observed peak demand of the 1st March 2018, 5.8% above for Gas Year (GY) 2022/23 and 1.99% above last year. The peak demand forecast only drops 1.3% from 2022 to 2026. The reason for the increase in year 1 is predominantly improvements in the calculation of Non-Daily Metered (NDM) demand.
- **East Midlands**
Peak forecasts are well above the highest recent observed peak demand of the 1st March 2018, 6.2% above for GY 2022/23 and 0.73% above last year. The peak demand forecast only drops 1.0% from 2022 to 2026. The reason for the increase in year 1 is predominantly down to the gas-fired peaking power stations connected

to this Local Distribution Zone (LDZ) and improvements in the calculation of NDM demand.

- **North London**

Peak forecasts are above the highest recent observed peak demand of the 1st March 2018, 3.4% above for GY 2022/23 and 0.74% above last year. The peak demand forecast drops 1.4% from 2022 to 2026. The reason for the increase in year 1 is predominantly down to improvements in the calculation of NDM demand.

- **North West**

Peak forecasts are well above the highest recent observed peak demand of the 1st March 2018, 8.2% above for GY 2022/23 and 1.48% above last year. The peak demand forecast only drops 0.9% from 2022 to 2026. The reason for the increase in year 1 is predominantly down to the gas-fired peaking power stations connected to this LDZ and improvements in the calculation of NDM demand.

- **West Midlands**

Peak forecasts are slightly above the highest recent observed peak demand of the 1st March 2018, 1.9% above for GY 2022/23 and 0.71% above last year. The peak demand forecast only drops 1.4% from 2022 to 2026. The reason for the increase in year 1 is predominantly down to improvements in the calculation of NDM demand.

See Tables 1, 2 & 3 for details of the LDZ demand forecast, and Table 4 for the Topography breakdown.

Table 1 – This year -v- last year (mcm/d)

LDZ	2021/22 Peak Day Forecast	2022/23 Peak Day Forecast	Increase from 2020/21 Peak day forecast	% Increase from 2020/21 Peak day forecast
EA	31.079	31.697	0.618	1.99%
EM	40.016	40.307	0.291	0.73%
NL	37.500	37.778	0.278	0.74%
NW	46.004	46.683	0.679	1.48%
WM	33.715	33.953	0.238	0.71%
Total	188.314	190.418	2.104	1.12%

Table 2 – This year down the Demand Curve (mcm/d)

Yr 1	EA	EM	NL	NW	WM
Pk	31.697	40.307	37.778	46.683	33.953
D13	27.330	34.178	32.505	39.353	28.754
D46	20.104	26.145	23.724	29.641	20.975
D150	13.050	17.983	15.559	20.627	13.793
D300	4.793	7.660	5.784	9.188	5.175

Table 3 – Future years (mcm/d)

	EA	EM	NL	NW	WM
Yr 2	31.503	40.203	37.575	46.543	33.821
Yr 3	31.608	40.278	37.691	46.686	33.857
Yr 4	31.500	40.207	37.534	46.632	33.735
Yr 5	31.276	39.912	37.252	46.242	33.477
Yr 6	31.276	39.912	37.252	46.242	33.477

Table 4 – Forecast by Topography

EA - 2022/23	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure

EM - 2022/23	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure

NL - 2022/23	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure						
TOTAL							

NW - 2022/23	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure						
TOTAL							

WM - 2022/23	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure						
TOTAL							

Our approach meets the 1:20 peak day obligation with a combination of Enduring, and Annual capacity products for years 1, 2 & 3, and addresses the risk that daily capacity products may not be available in the event of an NTS constraint being called. In this circumstance, the level of enduring capacity plus our annual capacity bookings would enable us to meet the Peak Day requirement in all of our Networks. For years 4, 5 & 6 Enduring capacity is booked as required.

Cadent takes a holistic approach to both capacity planning and asset investment and one feeds into the other to ensure that we have the most efficient overall operational approach and asset investment strategy for our networks.

We are compliant with **Standard Special Licence Condition (“SSC”) A57 (Exit Capacity Planning)** of the gas transporter licence and **Standard Special Condition A11**, and as outlined above have mitigated the associated risk of insufficient capacity for a peak day. We have also ensured that we have sufficient pressures in our networks at each extremity point.

As per last year’s report, the introduction of SSC A57 means that Cadent now use a combination of annual and daily products to meet our 1 in 20 requirements. Under RIIO2 we use long term products only as these are more efficient and have resulted in an increase in our annual capacity bookings.

Increases in demand forecasts have resulted in a need for some increases in assured pressures to meet the requirement for capacity at certain offtakes.

Storage Requirements

Modelling

CONSUS

Consus is a storage simulation tool that is used to determine the amount of storage required at a given demand level. Two data files are needed for each LDZ from the control room SCADA system. These are Hourly Demands and FE Data (Forecast Error). The remaining data comes from the demand forecast supplied by National Grid, (LDEM & Peak Day Forecast), and a file downloaded from the National Grid Data Item Explorer on their website (historic CWV) or via Xoserve's data files.

The files are loaded into the Consus application supplied by DNV and the tool is run. The report produced by the tool is saved for audit purposes and the results used to determine the storage level required for the coming winter.

For coming winter the requirement for each LDZ is as follows:

Table 5 – Storage Requirement

LDZ	Storage Requirement (mcm/d)
EA	4.549
EM	6.099
NL	4.715
NW	6.489
WM	4.855

All requirements are met through a combination of linepacking, (storage created within the pipeline by cycling the pressures), flex from NGG or other within network options, (storage pipelines or a salt cavity).

Interaction

With Other Networks

Within Cadent

The EM and WM networks have transfer points at 3 locations. The EA and NL networks have transfer points at 7 locations. These are all managed through the bookings process.

Other Distribution Networks (DNs)

Cadent has transfers with SGN at four locations: one with EM and three with NL. At all four, gas is taken from SGN into the Cadent network. Following the application of the accepted demand forecast to the network models, the requirement was communicated to SGN on the standard template used in previous years.

Acknowledgement was received from SGN that the forms had been received and no further communication was received to suggest that there would be any issue with accommodating the requested flows.

National Grid

Cadent had 2 meetings with NG ESO to discuss the demand forecasts; the first to get an overview of what the forecasts were likely to be and the second to confirm that there were no questions / issues with the forecasts received

Subsequently, a meeting was held with NGG to discuss the assured pressures; where any changes were likely to be possible, and the reasons for rejections of requests. Where Pressure requests have not been met, Cadent continue to operate as efficiently as possible given the configuration allowed.

Lastly meetings were held with NGG on 4 occasions to discuss what Cadent's bookings were likely to be and whether these were likely to be acceptable to NGG.

Final Outcomes

Bookings

Summary

All requests for Annual Flat capacity were met for all three years. Some requests for Enduring capacity changes, mainly increases, but some decreases are still outstanding at the time of publication. Increases in Flex were met for all three years, with the exception of Ross offtake in WM where the increase was, as per last year, for year one only.

Although overall the demand increased in all networks for the first year, and this would suggest that increases in capacity were required, changes in demand distribution in some networks meant that decreases were also necessary in the first year. Decreases were also required in later years due to the falling demand.

Requests for increased Start of Day (SOD) and End of Day (EOD) pressures were met in some cases and not others. For offtakes where the request was denied, table 11 shows the associated costs of obtaining the capacity in another way.

Years 1-3

For the first three years of the booking period, the existing Enduring Bookings for flat capacity were supported by annual bookings where needed. Where the booked capacity differs from the forecast demand, this is due to the minimum change possible in Gemini of 100,000kWh. In all cases the booked capacity is slightly higher than the demand forecast.

Due to industry changes affecting the regulatory framework, such as the removal of the capacity incentive and the introduction of the ECPG, some reductions to the Enduring Bookings were also made in year 1. The sites where reductions were made are listed in Table 6 below. Where the offtake name is in italics, the change has not yet been confirmed in Gemini by National Grid Gas (NGG), but should be by December 2022:

Table 6 – Sites with reductions to the Enduring booking

LDZ	Site	Comments
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security	

Years 4-6

For years 4-6 of the booking period, any changes needed were made to the Enduring Bookings. These are shown in the tables 7 and 8 below. Where the offtake name is in italics, the change has not been confirmed in Gemini by NGG at the time of publication:

Table 7 – Sites with increases to the Enduring booking for Year 4

LDZ	Site	LDZ	Site
EA	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure	EM	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure
NL	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure	NW	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure
WM	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure		

Table 8 – Sites with increases to the Enduring booking for Years 5 & 6

LDZ	Site
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure

Table 9 – Year 1 Flat and Flex

The following tables show the booked flat, flex and assured pressures for year 1 for each LDZ. Where the Flat amount is in orange italics, it is yet to be confirmed by NGG in Gemini.

[illegible]

[illegible][illegible]

[illegible][illegible]

Table 10 – Flat and Flex for Years 2-6

Where the Flat amount is in orange italics, it is yet to be confirmed by NGG in Gemini at the time of publication.

[illegible]

This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure

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Table 11 – SOD and EOD Pressures

Network analysis has been carried out under all of the demand levels listed below to determine the minimum pressures required to maintain security of supply across the system. The resultant pressures are contained within each of the the tables.

EA - 2022/23	Topology	1:20 peak day		Day 13		Day 46		Day 150		Day 300	
		SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD
		Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures
		This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure									

EM - 2022/23	Topology	1:20 peak day		Day 13		Day 46		Day 150		Day 300	
		SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure										

NL - 2022/23	Topology	1:20 peak day		Day 13		Day 46		Day 150		Day 300	
		SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure										

NW - 2022/23	Topology	1:20 peak day		Day 13		Day 46		Day 150		Day 300	
		SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure										

WM - 2022/23	Topology	1:20 peak day		Day 13		Day 46		Day 150		Day 300	
		SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures	SOD Pressures	EOD Pressures
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure										

Pressure Requests from NG

Cost of meeting Requests

Requests from NG for a Decrease

The reasons for rejecting the requests for reduced pressures are all linked to the physical capacity of the offtake, and the ability to meet Peak Day obligations and security of supply.

Table 12 below shows the requests that were rejected, and the indicative cost of investment associated with accepting the request.

Table 12 – Rejected requests for a Decrease

LDZ	Offtake	Rejection Reason	Indicative Cost of Acceptance	
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure			

Requests from Cadent for an Increase

The reason for requesting an increase in pressure are all due to offtake capacity.

Table 13 below shows the requests that were rejected by NGG, and the costs for Cadent associated with this rejection. As a general rule the inlet pressures to the Offtake are higher than the SOD and EOD assured pressures and the therefore we manage the risk without the associated projects .

Table 13 – Rejected requests for an increase

LDZ	Offtake	Rejection Reason	Indicative Cost of Acceptance	
	This information has been redacted due to its sensitivity in line with BEIS and the CPNI general principles of security around its wider disclosure			

No cost estimates were provided

Conclusion

Forecast -v- Bookings

Meeting Our Requirements

For all years our bookings are in line with our agreed Peak Day forecast and therefore we have met the requirements of the ECPG. Discrepancies between the 2 are either due to modelling factors, such as linepacking, or rounding, the restriction on the minimum change that is possible to existing bookings or due to inter-LDZ transfers, (only potentially possible for EA, EM, NL and WM) of gas.

The table below shows the Peak Day Forecast and our corresponding capacity bookings;

Table 14 – Peak Day Forecast -v- Booking (mcm/d)

EA	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Forecast	31.697	31.503	31.608	31.500	31.276	31.276
Booking	31.650	31.472	31.580	31.477	31.237	31.237

EM	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Forecast	40.307	40.203	40.278	40.207	39.912	39.912
Booking	41.207	41.113	41.202	41.141	40.844	40.844

NL	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Forecast	37.778	37.575	37.691	37.534	37.252	37.252
Booking	37.778	37.588	37.717	37.702	37.566	37.566

NW	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Forecast	46.683	46.543	46.686	46.632	46.242	46.242
Booking	46.683	46.558	47.073	47.046	46.692	46.692

WM	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Forecast	33.953	33.821	33.857	33.735	33.477	33.477
Booking	33.202	33.081	33.132	33.027	32.928	32.928

In external versions of this publication some of the information has been redacted for the protection of Critical National Infrastructure (CNI). Interested parties seeking to source an unredacted version of this publication can do so after entering into a Non-Disclosure Agreement with Cadent.

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