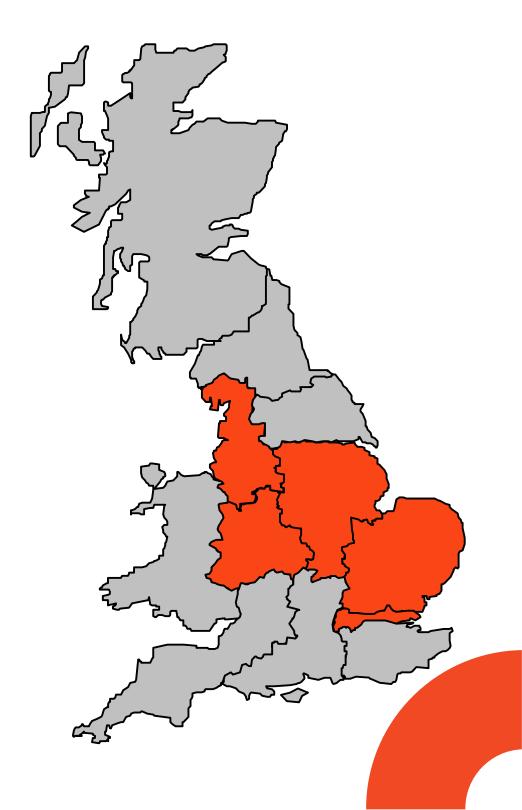


Exit Capacity Planning Guidance 2023 Outcomes Report

Chris Jones October 2023





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Executive Summary

Overview

To meet our license obligations, the NGT 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 49 offtakes.

As per the Exit Capacity Planning Guidance document (ECPG), which forms part of a new licence condition introduced under RIIO2 (**Standard Special Condition A57: Exit Capacity Planning**), Cadent are now obliged to report on the outcome of the annual bookings process.

This year:

- The Cadent Peak Day demand forecast has shown a 7.47% decrease over the previous year
- The average change from year 1 to year 6 of the forecast indicates a 0.99% increase, suggesting a slow recovery from the effects of the high energy costs
- Assured pressures were discussed with National Gas Transmission (NGT) and some changes were agreed
- No major changes have been made to booking patterns from last year
- Capacity bookings are higher than our approved Peak Day forecasts due to User Commitment Cadent obligations, resulting in a surplus in all networks. Cadent continues to be compliant with the obligations as set out in the ECPG



Analysis

Demand Forecast

Context

Cadent endeavours to 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 2023 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 NGT 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 fifth year, 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 slightly below the observed peak demand of the 1st March 2018, down 1.7% for Gas Year (GY) 2023/24. The reason for the decrease since 2022 forecast is predominantly due to the domestic demand reductions as a result of high gas prices. The peak demand forecast increases 1.3% from 2023 to 2027.

East Midlands

Peak forecasts are slightly below the observed peak demand of the 1st March 2018, 2.3% below for GY 2023/24. The reason for the decrease since 2022 forecast is predominantly due to the domestic demand reductions as a result of high gas prices. The peak demand forecast only increases by 0.7% from 2023 to 2027.



North London

Peak forecasts are below the observed peak demand of the 1st March 2018, 4.7% below for GY 2023/24. The reason for the decrease since 2022 forecast is predominantly due to the domestic demand reductions as a result of high gas prices. The peak demand forecast increases by 1% from 2023 to 2027.

North West

Peak forecasts are slightly above the highest recent observed peak demand of the 1st March 2018, 0.1% above for GY 2023/24. The reason for the decrease since 2022 forecast is predominantly due to the domestic demand reductions as a result of high gas prices. The peak demand forecast increases by 1.2% from 2023 to 2027.

West Midlands

Peak forecasts are below the observed peak demand of the 1st March 2018, 5.1% below for GY 2023/24. The reason for the decrease since 2022 forecast is predominantly due to the domestic demand reductions as a result of high gas prices. The peak demand forecast increases 0.8% from 2023 to 2027.

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

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

LDZ	2022/23 Peak Day Forecast (mcm/d)	2023/24 Peak Day Forecast (mcm/d)	Change from 2022/23 Peak day forecast (mcm/d)	% Change from 2022/23 Peak day forecast
EA	31.697	29.438	-2.259	-7.13%
EM	40.307	37.110	-3.197	-7.93%
NL	37.778	34.843	-2.935	-7.77%
NW	46.683	43.166	-3.517	-7.53%
WM	33.953	31.643	-2.310	-6.80%
Total	190.418	176.199	-14.219	-7.47%

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

Yr 1	EA	EM	NL	NW	WM
Pk	29.438	37.110	34.843	43.166	31.643
D13	25.184	31.564	29.939	36.452	26.777
D46	18.526	24.076	21.882	27.444	19.532
D150	12.072	16.472	14.442	19.123	12.823
D300	4.606	6.954	5.484	8.555	4.854



Table 3 – Future years (mcm/d)

	EA	EM	NL	NW	WM
Yr 2	30.849	38.749	36.491	45.099	33.103
Yr 3	30.849	38.718	36.451	45.187	33.081
Yr 4	30.455	38.178	35.965	44.562	32.613
Yr 5	29.815	37.364	35.189	43.679	31.899
Yr 6	29.815	37.364	35.189	43.679	31.899

Table 4 – Forecast by Topology (mcm/d)

	, , , , ,	•					
EA - 2023/24	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	This info	orma	tion r	nas be	en re	edact	ed
	due to its	sens	itivity	ıin li	ne wi	th DE	SNZ
	and the	e CPN	II gen	eral p	orinci	ples o	of
	security	arou	ınd it	s wid	er dis	closu	ire
EM - 2023/24	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
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	This info	orma	tion I	nas be	een r	edact	ed
	due to its	sens	itivit	v in li	ne wi	th DE	SNZ
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Your Gas Network

NL - 2025/24	ropology	i cui i	I Cui L	Tour o	I Cui T	icaro	icui c
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	and th	e CPN	II gen	eral _l	orinci	ples o	of
	security	, arou	ınd it	s wid	er dis	sclosu	ire

NW - 2023/24	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	This inf	orma	tion h	nas be	een re	edact	ed
	due to its	canc	itivity	, in li	ne wi	th DE	SN7
	and the	e CPN	II gen	eral p	orinci	ples o	of
	security	arou	nd it	s wid	er dis	closu	re
WM - 2023/24	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
WM - 2023/24	Topology	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
WM - 2023/24	This inf						
WM - 2023/24	This inf	orma	tion ł	nas be	een re	edact	ed
WM - 2023/24	97	orma	tion ł	nas be	een re	edact	ed
WM - 2023/24	This inf	orma s sens	tion h	nas bo	een ro ne wi	edact th DE	ed SNZ
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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 NGT 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 previous reports, the introduction of SSC A57 means that Cadent now use a combination of annual and daily products to meet our 1 in 20 requirement. Under RIIO2 we use long term products only as these have been deemed more efficient than using daily products.

Increases in demand forecasts over previous years and due to localised demand. This has 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 Gas, (LDEM & Peak Day Forecast), and a file downloaded from the National Gas 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 the coming winter requirement for each LDZ is as follows:

Table 5 – Storage Requirement (mcm/d)

LDZ	Storage Requirement
EA	4.180
EM	5.492
NL	4.355
NW	6.201
WM	4.398

All requirements are met through a combination of linepacking, (storage created within the pipeline by cycling the pressures between the upper and lower limits), NTS Exit (Flex) Capacity or other within network options, such as 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 Gas and National Grid ESO

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 NGT 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 NGT on 3 occasions to discuss what Cadent's bookings were likely to be and whether these were likely to be acceptable to NGT.



Final Outcomes

Bookings

Summary

All requests for Annual Flat capacity were met for all three years. Increases in Flex were met for all three years.

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. There are instances where Enduring levels of capacity are in excess of the Peak forecast. Cadent is currently unable to make the required Reductions due to User Commitment obligations being in place at the offtakes in question.

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.

Table 6 – Sites with reductions to the Enduring booking

LDZ	Site	Comments
EM		
EM	This information	n has been redacted due
NW	to its sensitivity	y in line with DESNZ and
NW	the CPNI gener	al principles of security
NW		s wider disclosure
WM		

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.



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 DESNZ and the CPNI general principles of security around its wider disclosure	ЕМ	This information has been redacted due to its sensitivity in line with DESNZ and the CPNI general principles of security around its wider disclosure
NL	This information has been redacted due to its sensitivity in line with DESNZ and the CPNI general principles of security around its wider disclosure	NW	This information has been redacted due to its sensitivity in line with DESNZ and the CPNI general principles of security around its wider disclosure
WM	This information has been redacted due to its sensitivity in line with DESNZand the CPNI general principles of security around its wider disclosure		

Table 8 – Sites with increases to the Enduring booking for Years 5 & 6 Increases to Enduring levels required to ensure long-term booking levels are in-line with Peak Day forecasts.

LDZ	Site
	This information has been
	redacted due to its sensitivity
	in line with DESNZ 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.

		1:20 pe	ak day	Day	/ 13	Day	/ 46	Day	150	Day	300
EA - Year 1	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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EM - Year 1	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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NL - Year 1	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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		1:20 pe	ak day	Day	y 13	Day	46	Day	150	Day	300
NW - Year 1	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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WM - Year 1	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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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.

	Topology	1:20 pe	ak day	Day	/ 13	Day	/ 46	Day	150	Day	300
EA - Year 2	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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				C	isclo	osure	2				



	Topology	1:20 pe	ak day	Day	y 13	Day	/ 46	Day	150	Day	300
EA - Year 3	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
		mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d
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	Topology This i	1:20 peak day		Day	/ 13	Day 46		Day	150	Day	300
EM - Year 2	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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EM - Year 3	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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		1:20 pe	ak day	Day	/ 13	Day	46	Day	150	Day	300
EM - Year 4	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
		mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d
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NL - Year 3	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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NL - Year 4	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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	genera	al pri	ncip	les (of se	curit	ty ar	oun	d its	wide	er
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		1:20 pe	ak day	Day	y 13	Day	/ 46	Day	150	Day	300
NW - Year 4	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
		mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d	mcm/d
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				C	lisclo	sure	9				



		1:20 pe	ak day	Day	y 13	Day	/ 46	Day	150	Day	300
WM - Year 2	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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		1:20 pe	ak day	Day	y 13	Day	/ 46	Day	150	Day	300
WM - Year 3	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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	genera	al pri	incip	les d	of se	curit	ty ar	oun	d its	wid	er
				C	lisclo	sure	9				



		1:20 pe	ak day	Day	/ 13	Day	46	Day	150	Day	300
WM - Year 4	Topology	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex	Flat	Flex
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	This in	forn	natio	on h	as be	een i	reda	cted	due	e to i	ts
	sens	itivit	y in	line	with	DES	SNZ	and	the (CPNI	
	genera	al pr	incip	les d	of se	curit	ty ar	oun	d its	wid	er
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		1:20 pe	ak day	Day	/ 13	Day	46	Day	150	Day	300
WM - Years 5 + 6	Topology	Flat mcm/d	Flex mcm/d								
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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 tables.

		1:20 pe	ak day	Day	/ 13	Day	y 46	Day	150	Day	300
EA - 2023/24	Topology	SOD	EOD								
		Pressures									
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EM - 2023/24	Topology	SOD	EOD								
		Pressures									
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		1:20 pe	ak day	Day	/ 13	Day	46	Day	150	Day	300
NL - 2023/24	Topology	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD
		Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures	Pressures
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		1:20 pe	ak day	Day	/ 13	Day	46	Day	150	Day	300
NW - 2023/24	Topology	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD
	•									Pressures	
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		1:20 pe	ak day	Day	/ 13	Day	/ 46	Day 150		Day	Day 300	
WM - 2023/24	Topology	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD	SOD	EOD	
										Pressures		
	This inf	orm	atic	n ha	as be	een	reda	acte	d du	e to	its	
	sensit	ivity	ı in l	ine	with	DE:	SNZ	and	the	CPN	11	
	genera	l pri	ncip	les c	of se	curi	ty a	rour	nd it	s wi	der	
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Pressure Requests from NGT Cost of meeting Requests

Requests from NGT 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 info	rmat	ion has	been redacted due to its
	sensitivity	in line	e with D	ESNZ and the CPNI general
	principles	of se	curity a	round 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 NGT, 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, where Pressure requests have not been met, Cadent continue to operate as efficiently as possible given the configuration allowed.

Table 13 – Rejected requests for an increase

LDZ	Offtake	Rejection Reason	Indicative Cost of Acceptance	
	This info	rmat	ion has	been redacted due to its
	sensitivity	in line	e with D	ESNZ and the CPNI general
	principles	of se	curity a	round its wider disclosure

No cost estimates were provided



Conclusion

Forecast -v- Bookings

All Networks have capacity levels in excess of that required to meet Peak Demand Forecasts. As stated previously, due to User Commitment obligations Cadent is unable to make the necessary Reductions to capacity booking levels that would bring them inline with the Peak Day forecasts. As all steps have been taken to meet this obligation, Cadent considers itself to be in compliance with the requirements of **SSpC A57: Exit Capacity Planning** and the ECPG. Further discrepancies between the 2 as seen in WM Yr 2 and Yr 3 are due to inter-LDZ transfers.

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

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

Table 14 – Peak Day Forecast -v- Booking (mcm/d)								
EA	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	29.438	30.849	30.849	30.455	29.815	29.815		
Booking	31.691	31.678	31.718	31.867	31.886	31.886		
EM	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	37.110	38.749	38.718	38.178	37.364	37.364		
Booking	40.898	41.173	41.223	41.084	41.099	41.099		
NL	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	34.843	36.491	36.451	35.965	35.189	35.189		
Booking	37.663	37.663	37.786	37.767	37.777	37.777		
NW	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	43.166	45.099	45.187	44.562	43.679	43.679		
Booking	44.922	45.559	48.913	45.242	45.209	45.209		
WM	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	31.643	33.103	33.081	32.613	31.899	31.899		
Booking	32.870	32.937	32.966	32.738	32.720	32.720		
Cadent	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6		
Forecast	176.199	184.292	184.286	181.774	177.945	177.945		
Booking	188.045	189.010	192.606	188.699	188.690	188.690		



User Commitment

The tables below show surplus bookings made due to existing User Commitment

Table 15 – Surplus booked capacity

	Yea	ar 1						
	FALCON 2024 Plan Peak Flow (mcm/d)	FALCON 2024 Plan Peak Flow (GWh/d)						
EA	2.378	25.830						
EM	2.916	31.864						
NL	3.638	39.635						
NW	1.750	19.203						
WM	2.127	23.208						
Total	12.809	139.740						

Year 2							
Scaled FALCON Flow (mcm/d)	Scaled FALCON Flow (GWh/d)						
0.959	10.415						
1.514	16.538						
2.028	22.097						
0.454	4.982						
0.774	8.446						
5.728	62.478						

Year 3						
Scaled FALCON Flow (mcm/d)	Scaled FALCON Flow (GWh/d)					
0.999	10.863					
1.595	17.439					
2.189	23.850					
3.720	40.819					
0.826	9.007					
9.330	101.978					

Year 4						
Scaled FALCON Flow (mcm/d)	Scaled FALCON Flow (GWh/d)					
1.541	16.758					
2.008	21.955					
2.646	28.820					
0.673	7.389					
1.052	11.475					
7.921	86.397					

Year 5	
Scaled FALCON Flow (mcm/d)	Scaled FALCON Flow (GWh/d)
2.197	23.886
2.857	31.235
3.413	37.180
1.525	16.731
1.727	18.841
11.720	127.872

Year 6	
Scaled FALCON Flow (mcm/d)	Scaled FALCON Flow (GWh/d)
2.197	23.886
2.857	31.235
3.413	37.180
1.525	16.731
1.727	18.841
11.720	127.872



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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