Gas
Transmission

Gas Operational Forum

Clermont Hotel & MS Teams
26th January 2023
10.02am

Questions
SLIDO = OPSFORUM

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Introduction & Agenda

Rachel Hinsley
Operational Liaison & Business Delivery Manager

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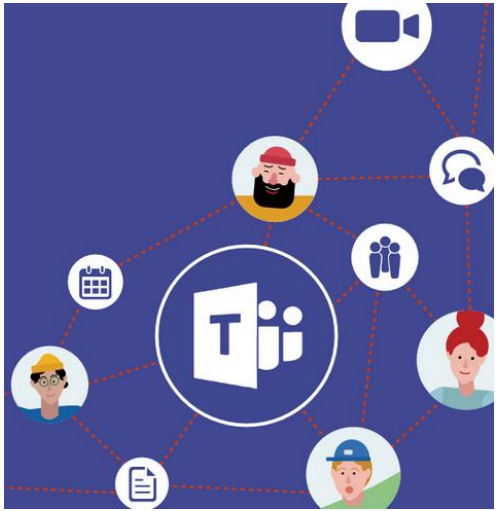
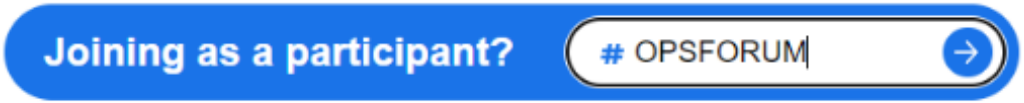
Housekeeping for Forum

For Microsoft Teams participants;

- Attendees will be automatically muted on dial-in and cameras will be unavailable.
- You can ask questions via Slido (#OPSFORUM)
- We have included some time to answer questions following the presentations





Agenda for Today

Welcome and Introduction	Rachel Hinsley - Operational Liaison & Business Delivery Manager	10:02
Winter Outlook Update	Jon Dutton - Engagement and Publications Manager	10:05
Interesting Days	Mathew Currell – Senior Operational Liaison Officer	10:30
Gemini Service Update	Sue Treverton - Access Controls and Application Support Manager (Correla)	10:40
Demand Side Response Update	Matt Newman - Code Change Lead	10:50
NTS Regulatory Update	Matt Newman & Dan Hisgett - Code Change Lead	11:05
MCPD Emission Reopeners	Neil Rowley - Head of Regulatory Performance	11:15
Milford Haven ECR Summer 2023	Bridget Hartley – Head of Operational Delivery	11:30
General Updates	Rachel Hinsley - Operational Liaison & Business Delivery Manager	11:40

Please ask any questions using Slido: #OPSFORUM

Questions will be covered at the end of each agenda section.

December Stat

December saw 110 billion kWh of energy transported through our network. That is enough energy to cook about 14 Billion Turkeys for Christmas Dinner!

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Winter Outlook Update

Jon Dutton
Engagement and Publications Manager

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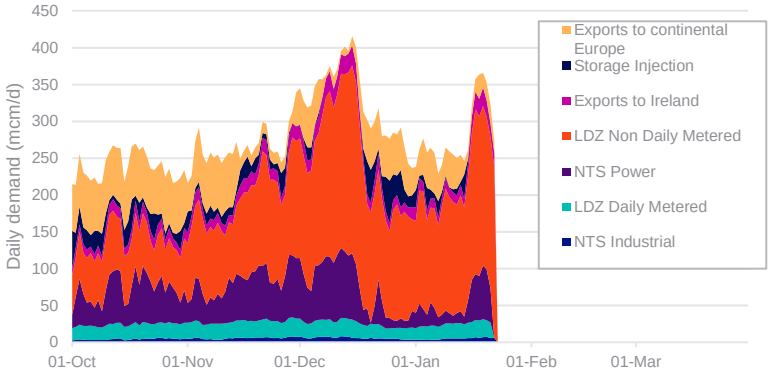
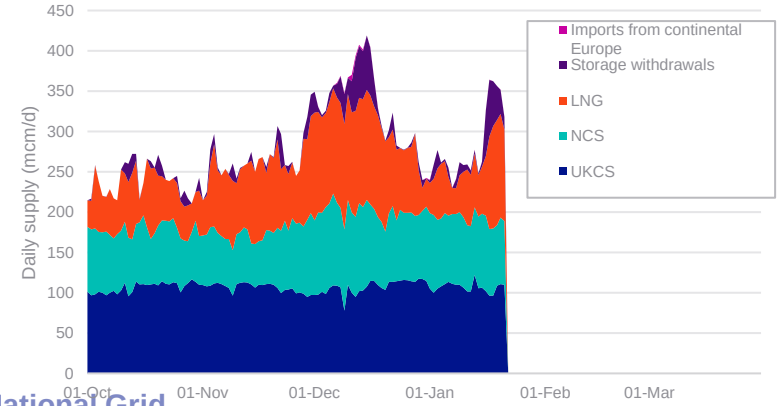
Introduction

- **Our Winter Outlook presented one forecast and three scenarios for gas demand and supply this winter:**

	Demand	Supply
WO Forecast	Seasonal normal demand	• UKCS and Norwegian supplies at similar levels to last winter • High levels of LNG • Storage and interconnectors responding to price signals to provide additional supply at times of high demand
Scenario 1	A typical winter based on actual demands in 2019/20	
Scenario 2	A cold winter based on actual demands in 2010/11	
Scenario 3	A 15 day cold snap based on actual demands in February/March 2018	

Winter so far





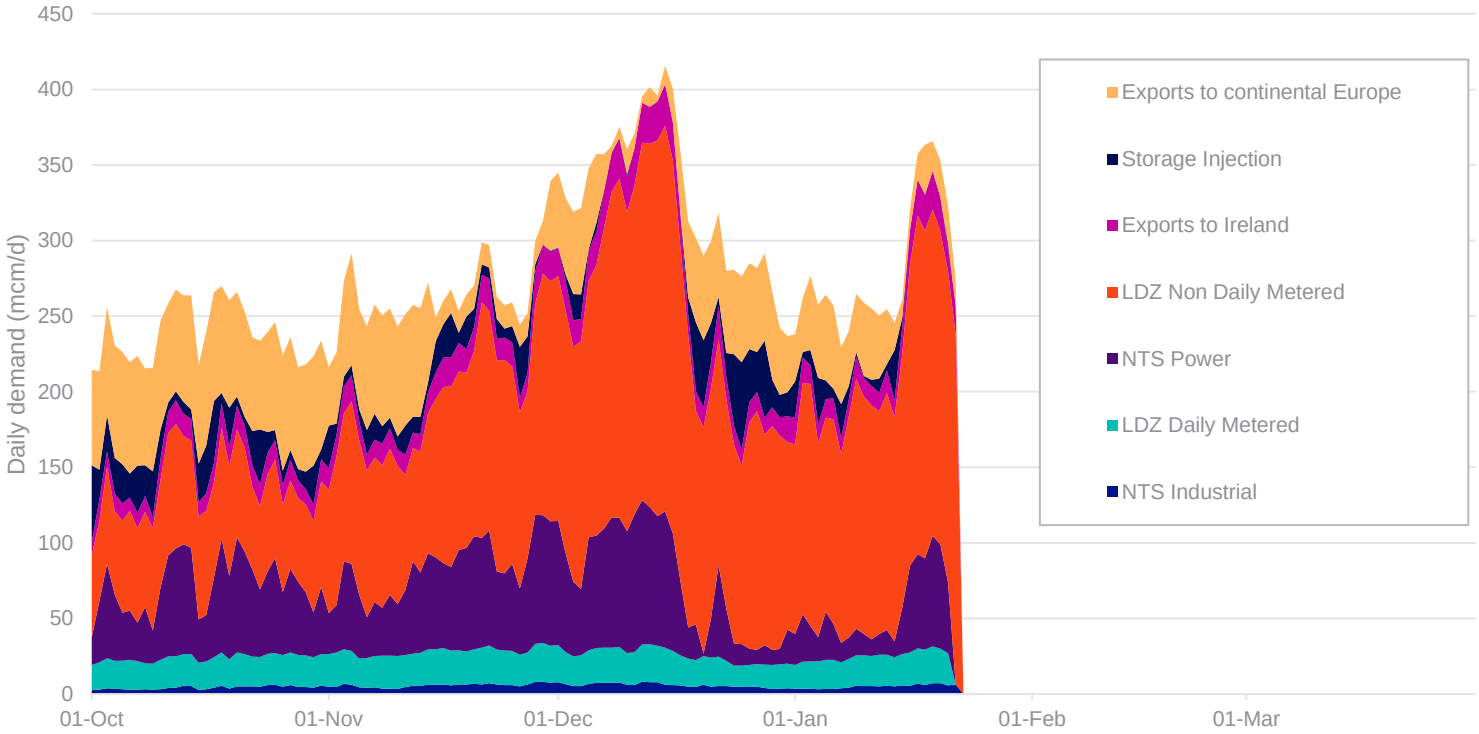
Demand

- GB has experienced periods of both extremely warm and extremely cold weather this winter
- We have seen demand suppression of up to 15% in residential demand, but daily metered demand has not seen the same effect
- We continue to see high levels of exports to Europe when GB has surplus gas
- High winds have reduced the need for gas for power on some days, but have also disrupted LNG deliveries

Supply

- Baseload supplies from UKCS and NCS have been broadly in line with expectations
- Flexible supplies have predominantly come from high volumes of LNG supported by storage
- We have seen some minimal imports from Europe

NTS Demand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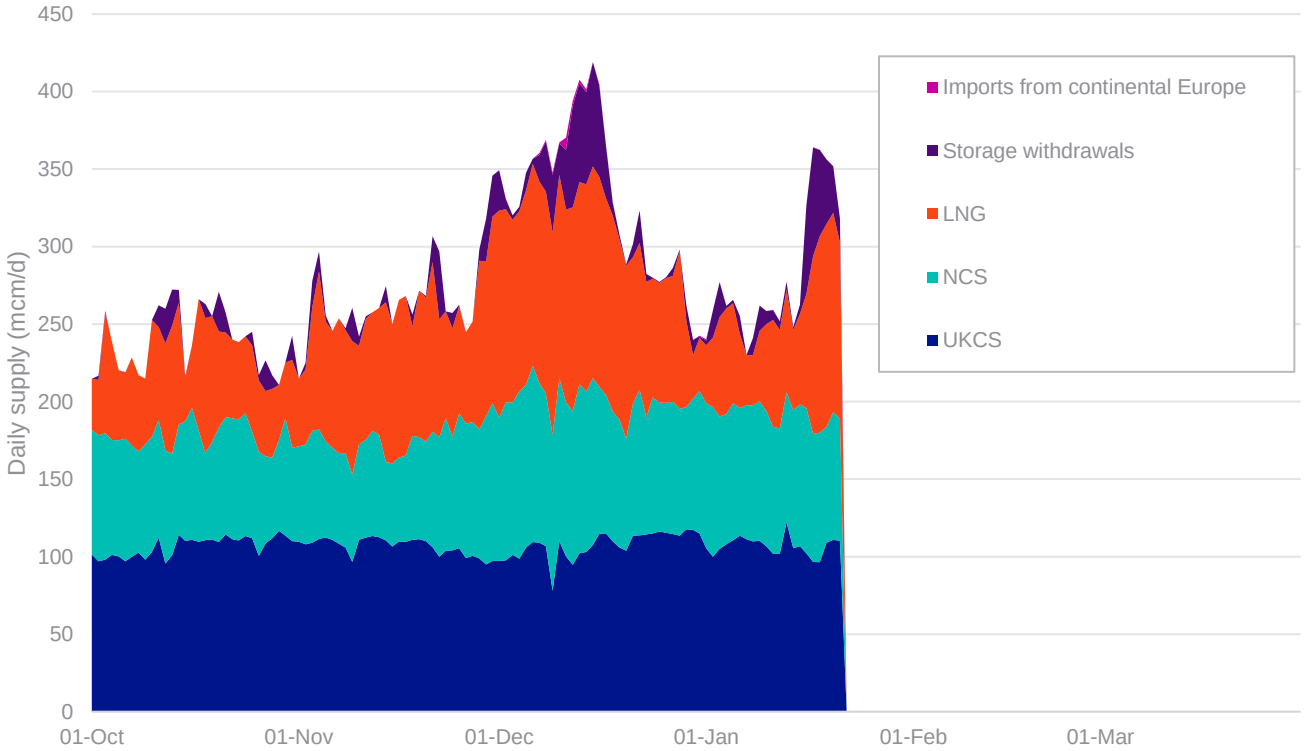
Daily demand (mcm/d)
01-Oct
01-Nov
01-Dec
01-Jan
01-Feb
01-Mar
Exports to continental Europe
Storage Injection
Exports to Ireland
LDZ Non Daily Metered
NTS Power
LDZ Daily Metered
NTS Industrial

NTS Supply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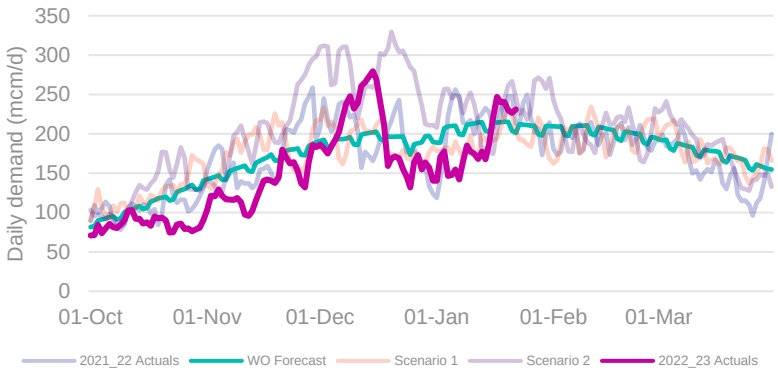
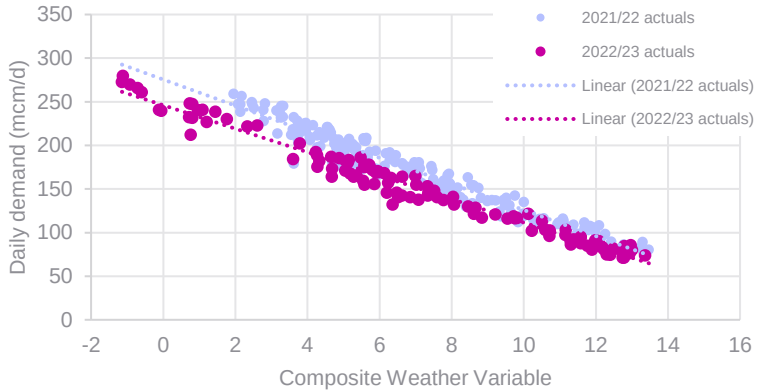
Daily supply (mcm/d)
01-Oct
01-Nov
01-Dec
01-Jan
01-Feb
01-Mar
Imports from continental Europe
Storage withdrawals
LNG
NCS
UKCS

LDZ offtake demand





What did we expect?

- A reduction in demand of 6% due to high prices was built into our forecast.

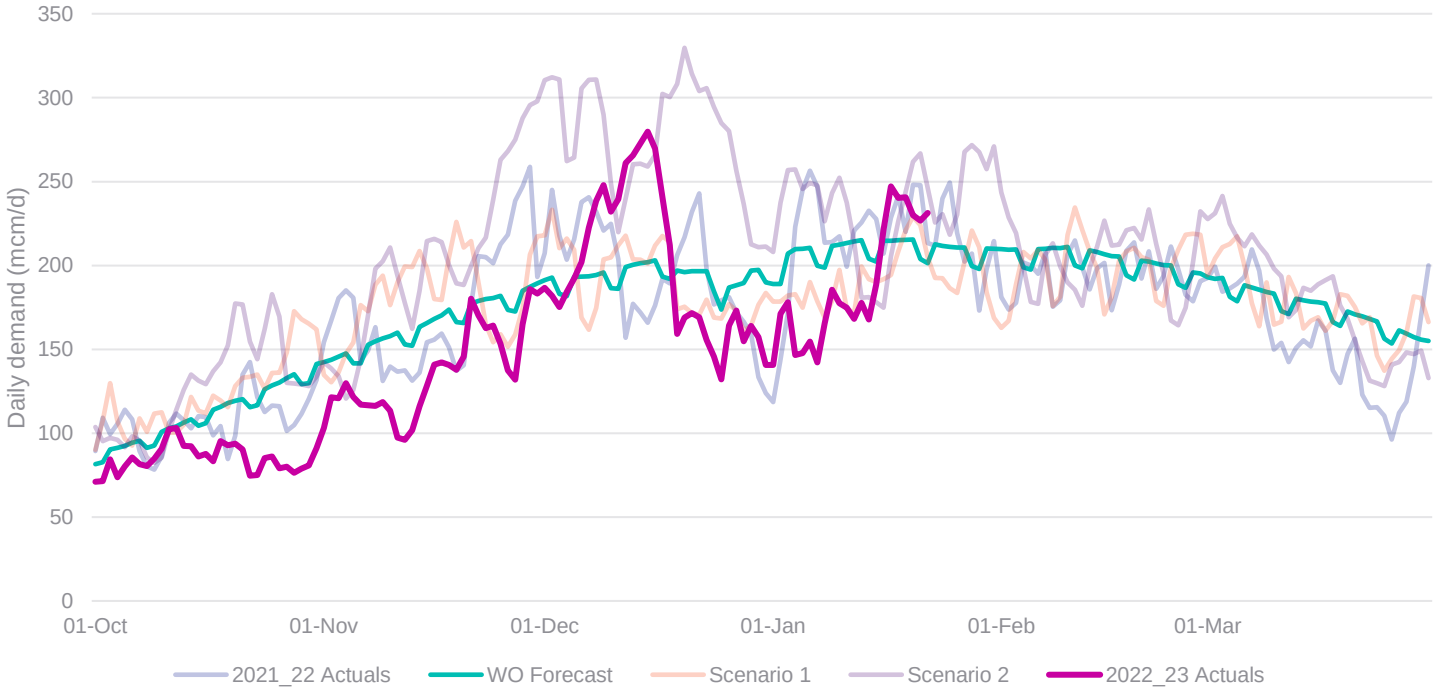
What have we seen so far?

- After adjusting for weather, we are observing a 12% reduction in LDZ demand, which we believe is caused by consumers changing behaviour due to high prices. Demand suppression is still apparent during the recent cold snap.

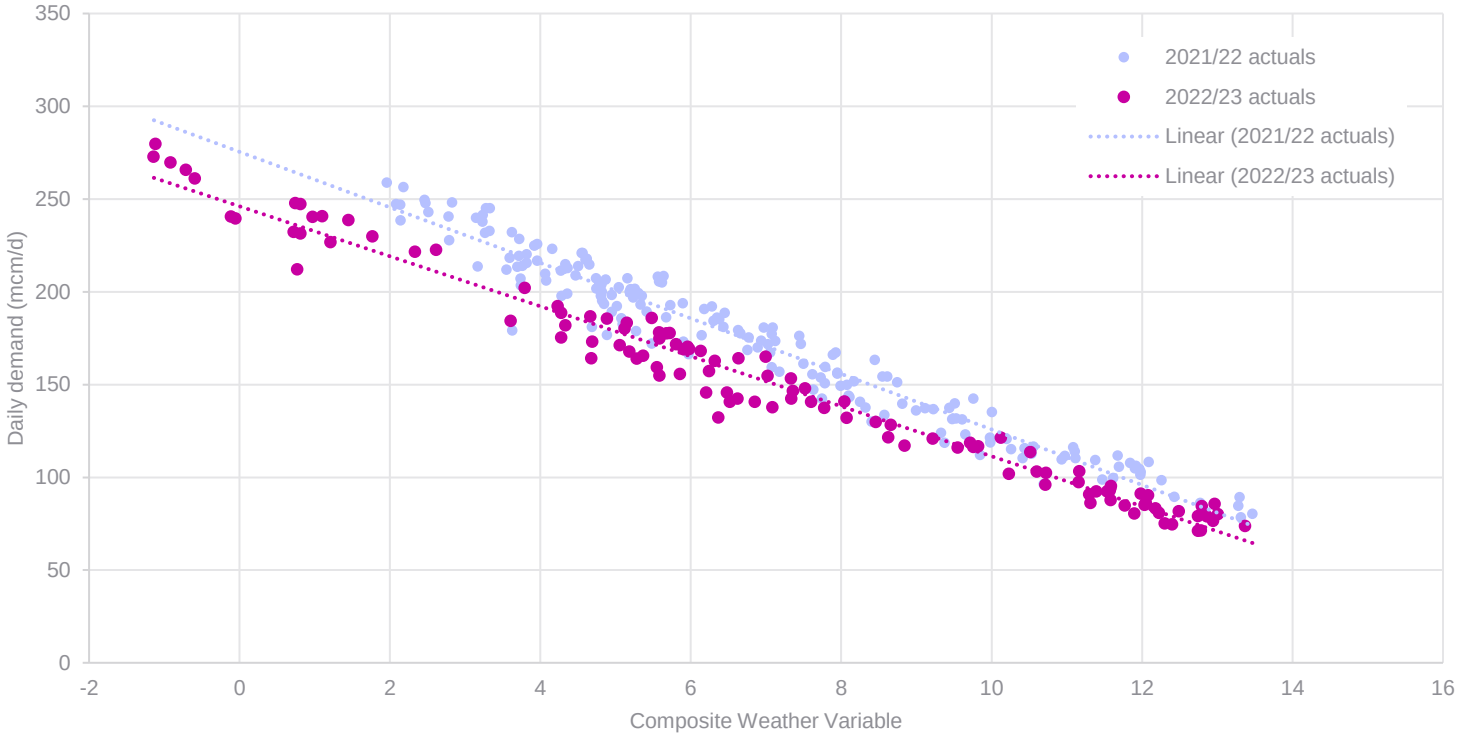
What does this mean for the rest of the winter?

- We expect LDZ demand to remain suppressed for the rest of the winter.

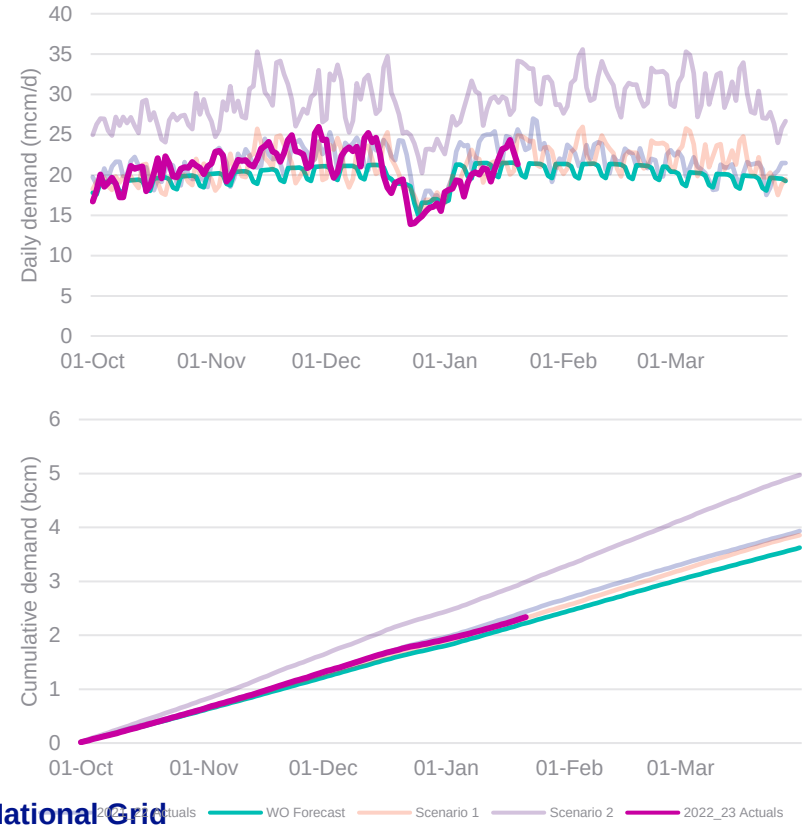
LDZ offtake demand



LDZ offtake demand



LDZ Daily Metered demand



What did we expect?

- A reduction in demand of 6% due to high prices was built into our forecast.

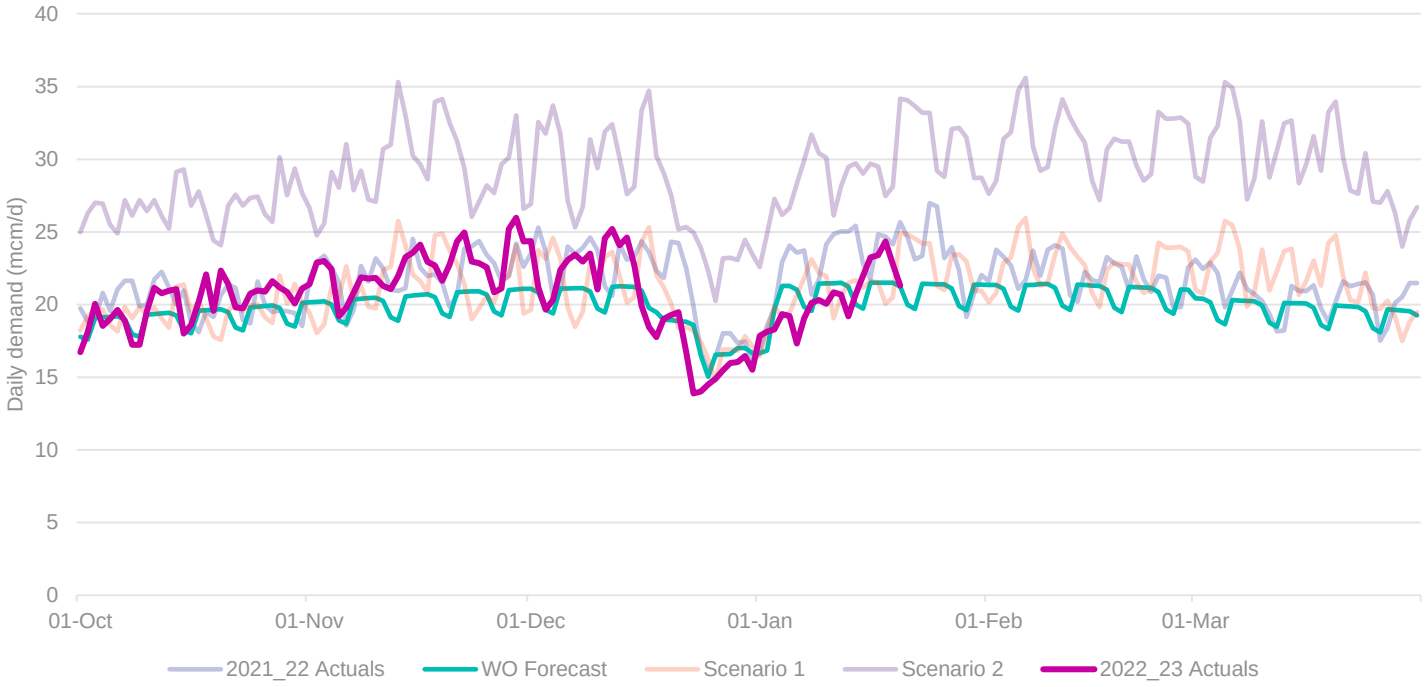
What have we seen so far?

- The expected demand reduction has not materialised. Initial thoughts are that government support schemes have helped to moderate the impact of prices, plus higher demand from embedded generation.

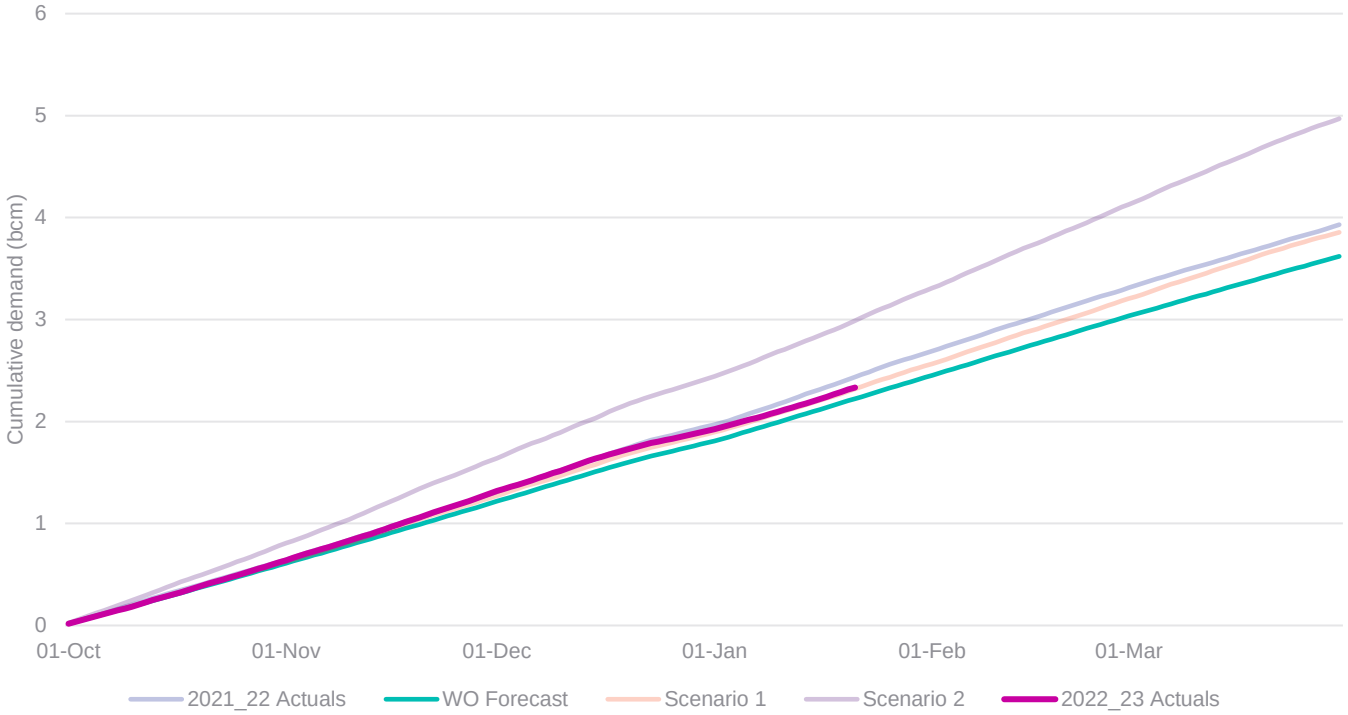
What does this mean for the rest of the winter?

- We expect Daily Metered demand to continue at similar levels to last winter.

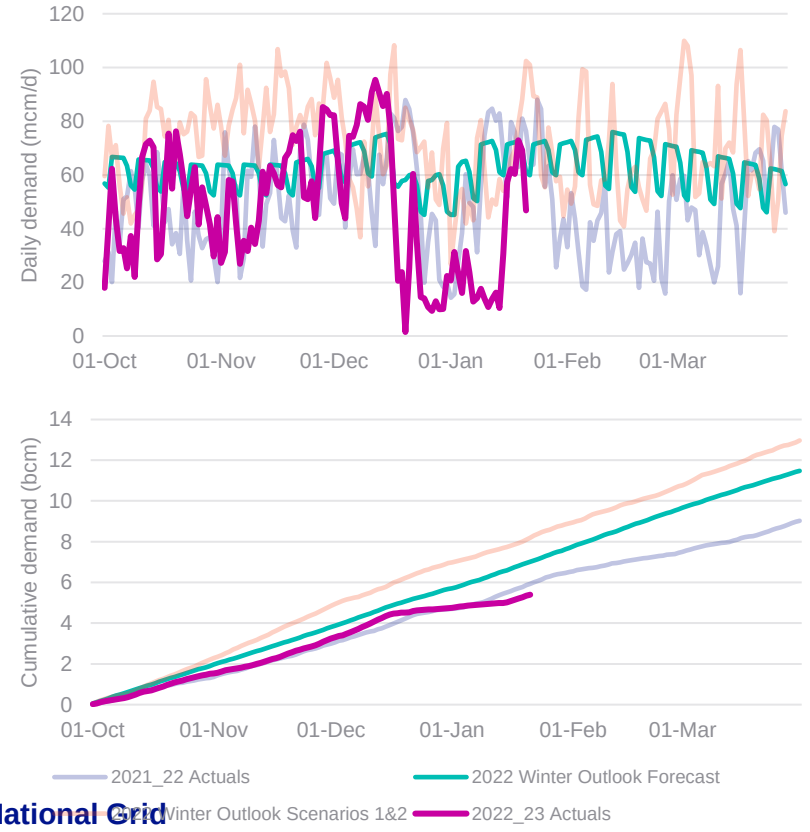
LDZ Daily Metered demand



LDZ Daily Metered demand



NTS Demand for power generation



What did we expect?

- An increase in demand of 15% due to elevated levels of electricity exports

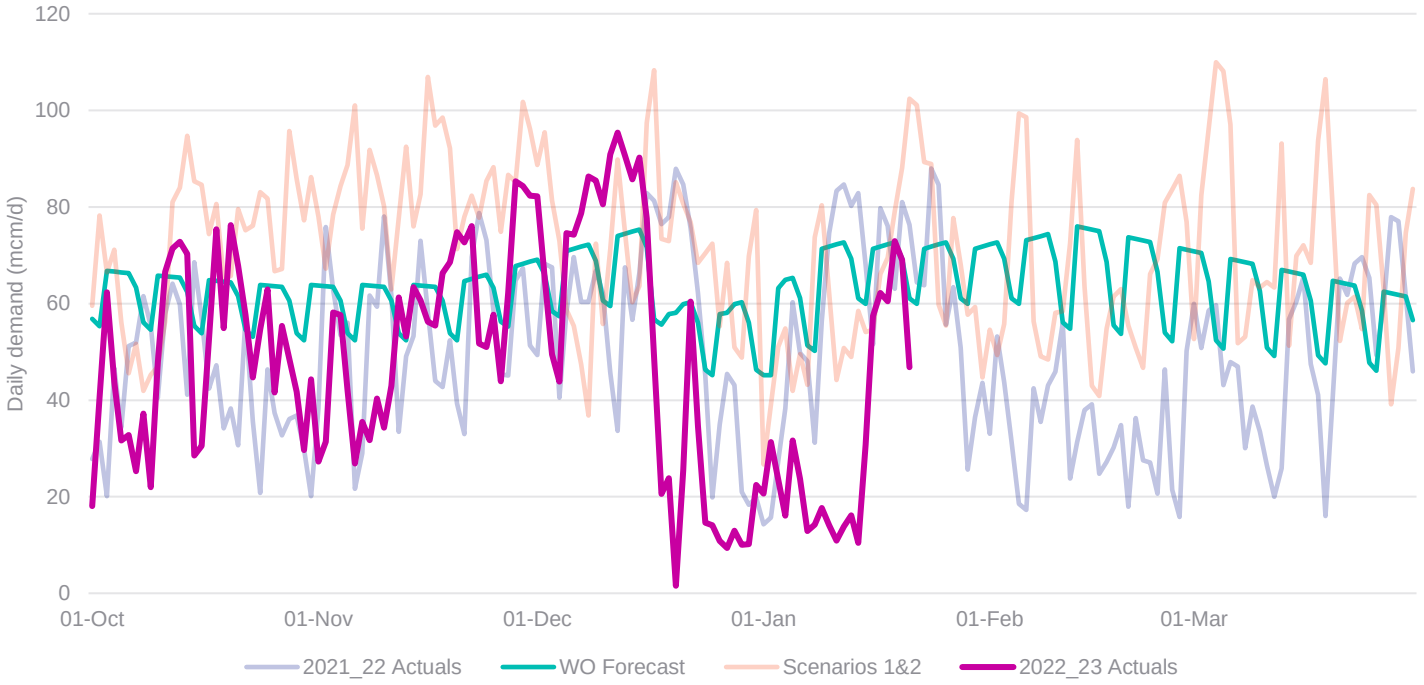
What have we seen so far?

- Demand has been 24% lower than forecast, or a reduction of 12% if no increase had been assumed. High levels of wind generation have reduced demand for gas, although there have also been very high demand days when wind output has been low.

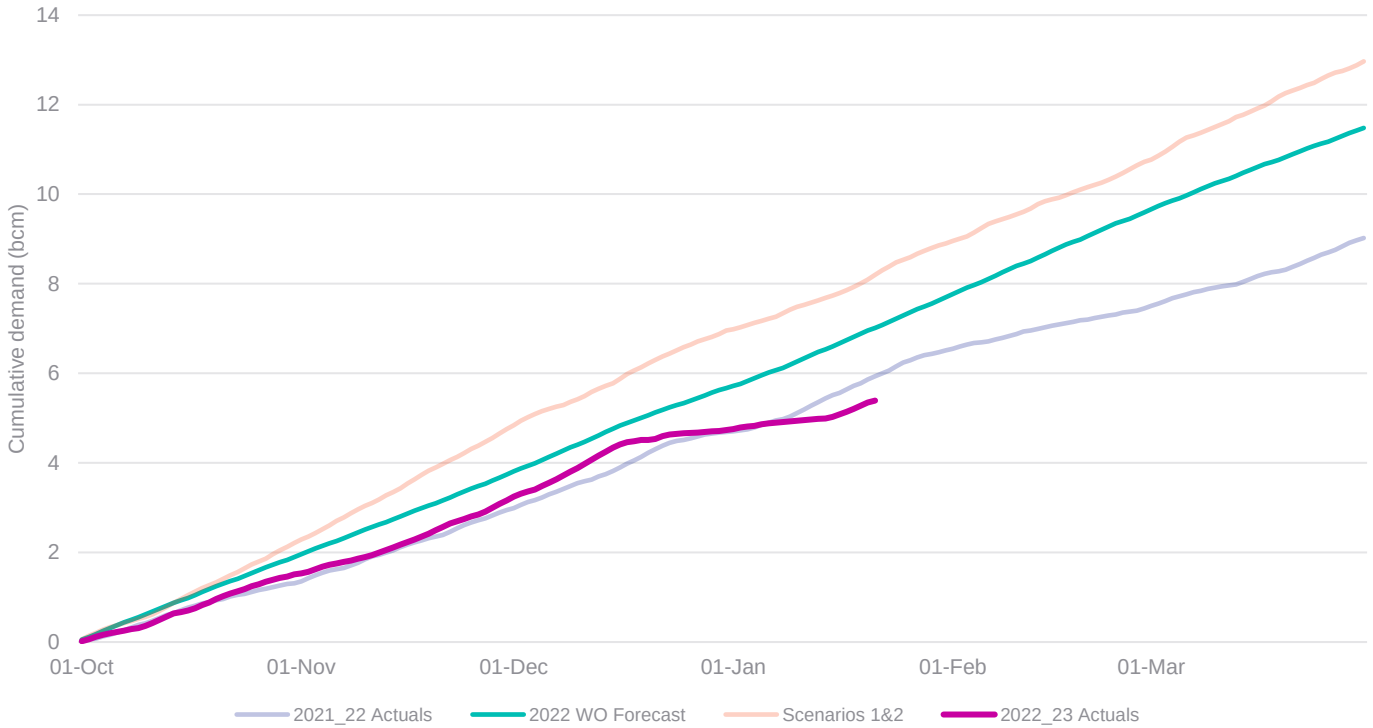
What does this mean for the rest of the winter?

- Further analysis will be undertaken in conjunction with ESO to evaluate the outlook for demand and exports and the possible impact on power generation demand for the remainder of the winter

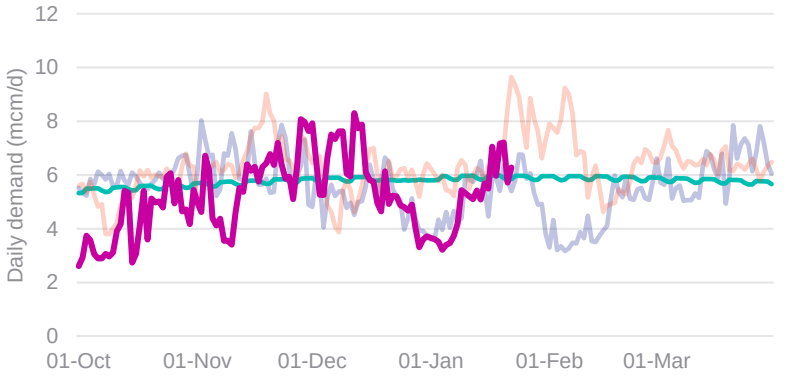
NTS Demand for power generation

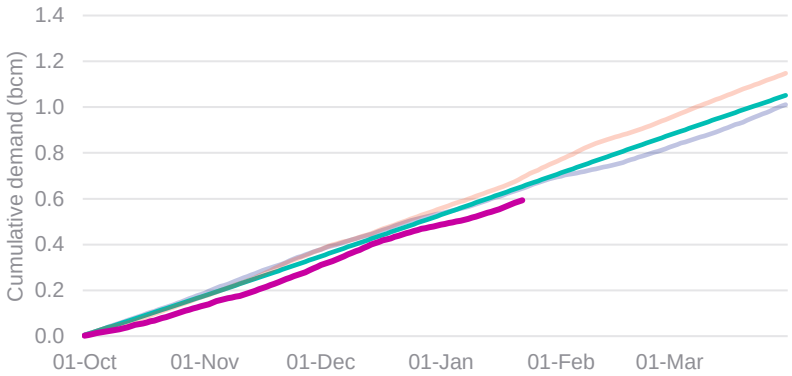


NTS Demand for power generation



NTS Industrial Demand





2021_22 Actuals 2022 WO Forecast Scenario 1 2022_23 Actuals

What did we expect?

- A reduction in demand of 43% due to high prices

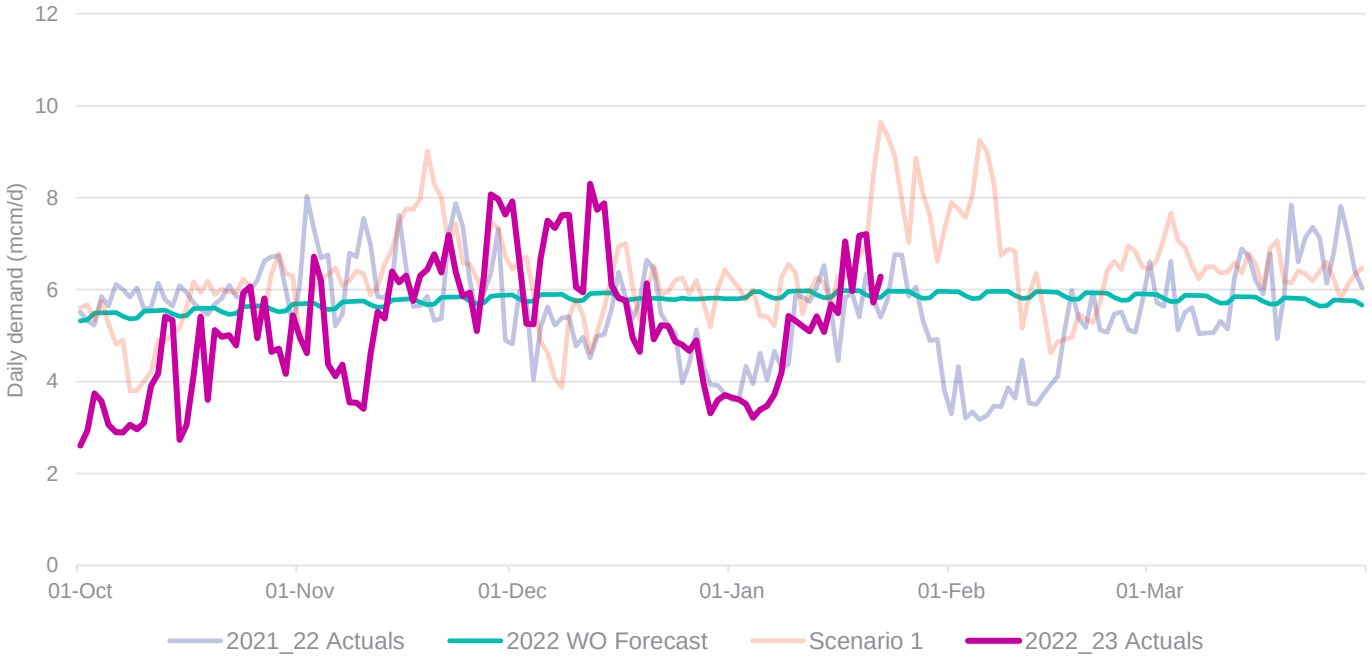
What have we seen so far?

- Demand has been 9% lower than forecast, although quite volatile

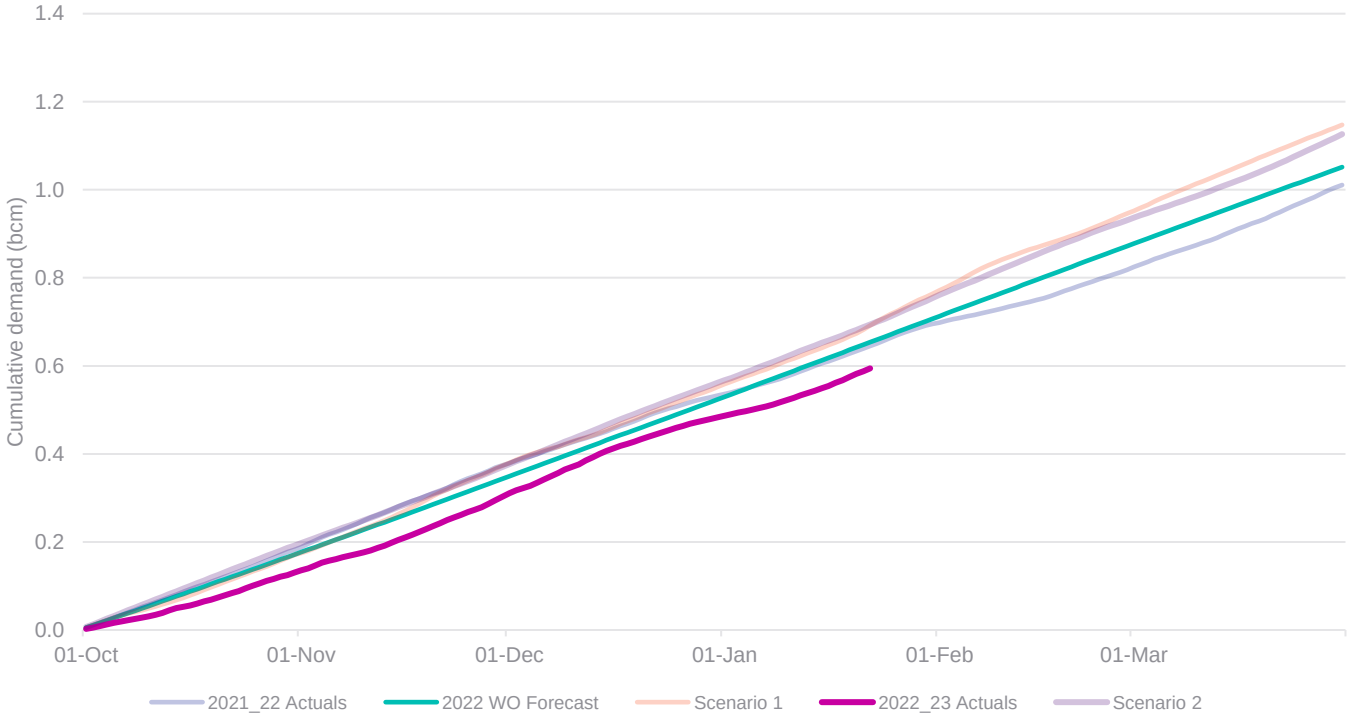
What does this mean for the rest of the winter?

- Further site-level analysis may be undertaken to develop further insight

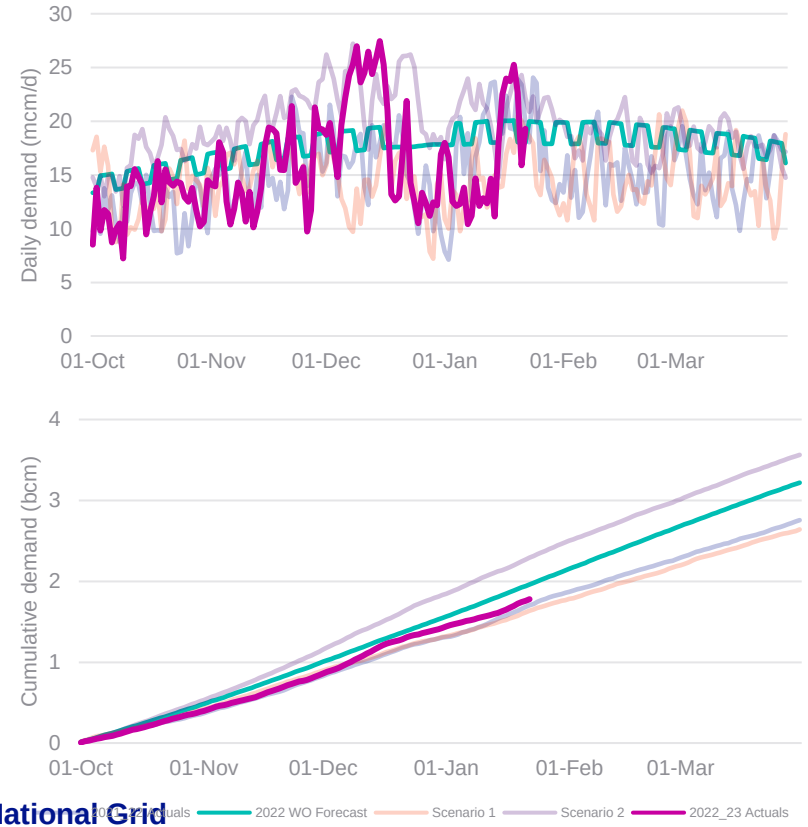
NTS Industrial Demand



NTS Industrial Demand



Exports to Ireland



What did we expect?

- An overall increase due to continued Corrib decline, partially mitigated by demand suppression and fuel switching

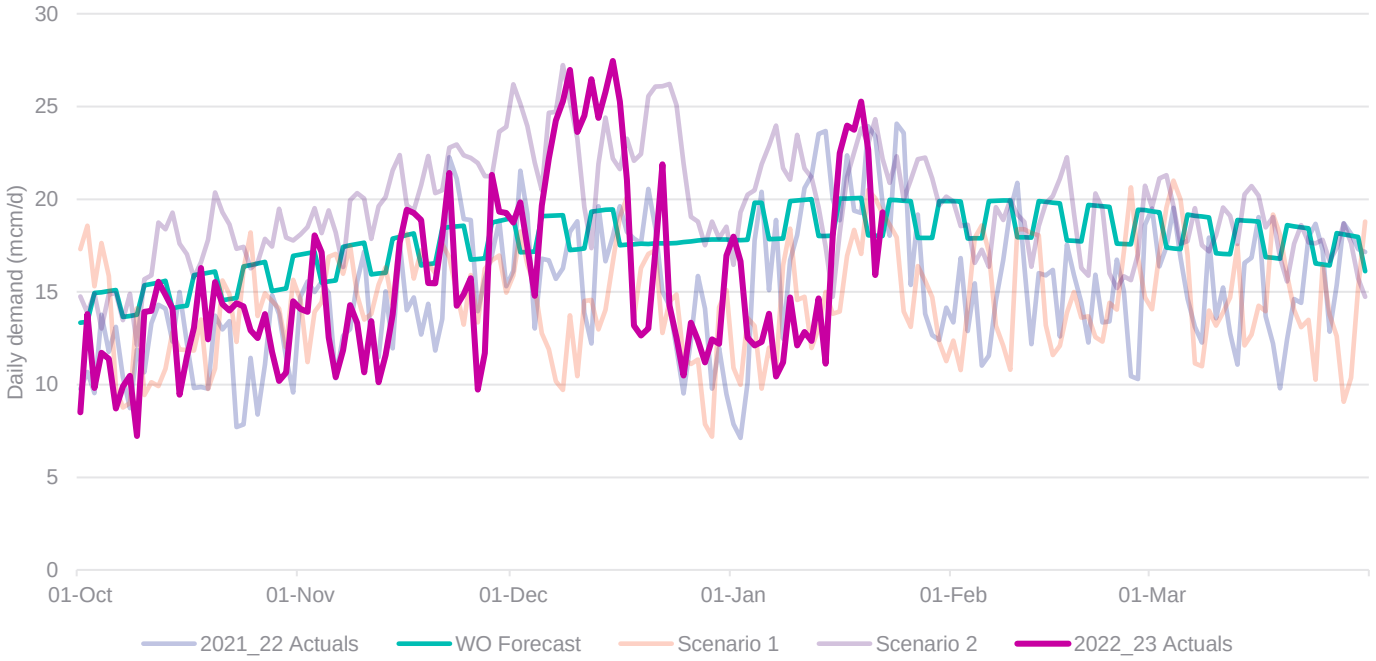
What have we seen so far?

- Demand has been 9% lower than forecast, although it has increased significantly during periods of cold weather

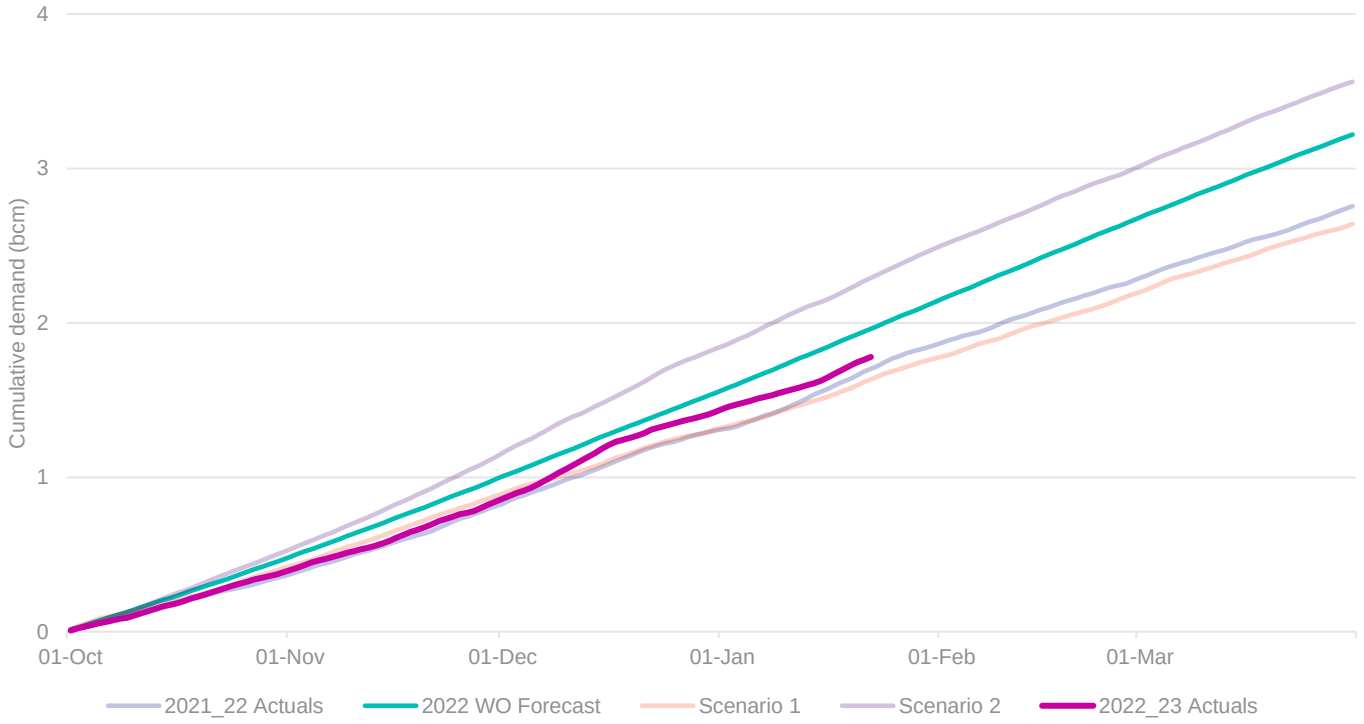
What does this mean for the rest of the winter?

- Further analysis required in collaboration with Gas Networks Ireland

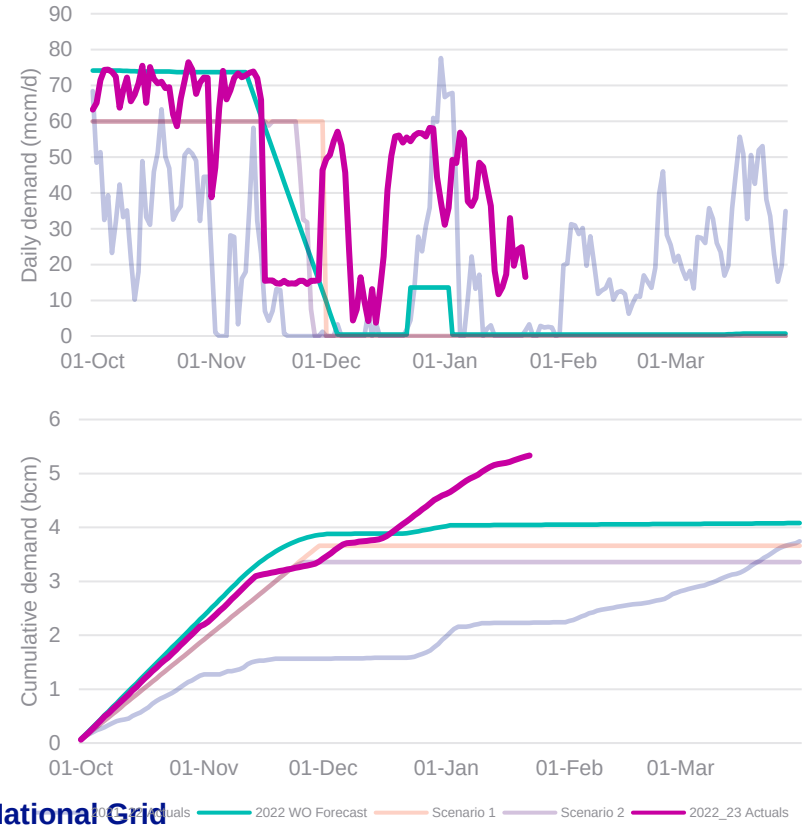
Exports to Ireland



Exports to Ireland



Exports to Continental Europe



What did we expect?

- Exports at full capability during October and November

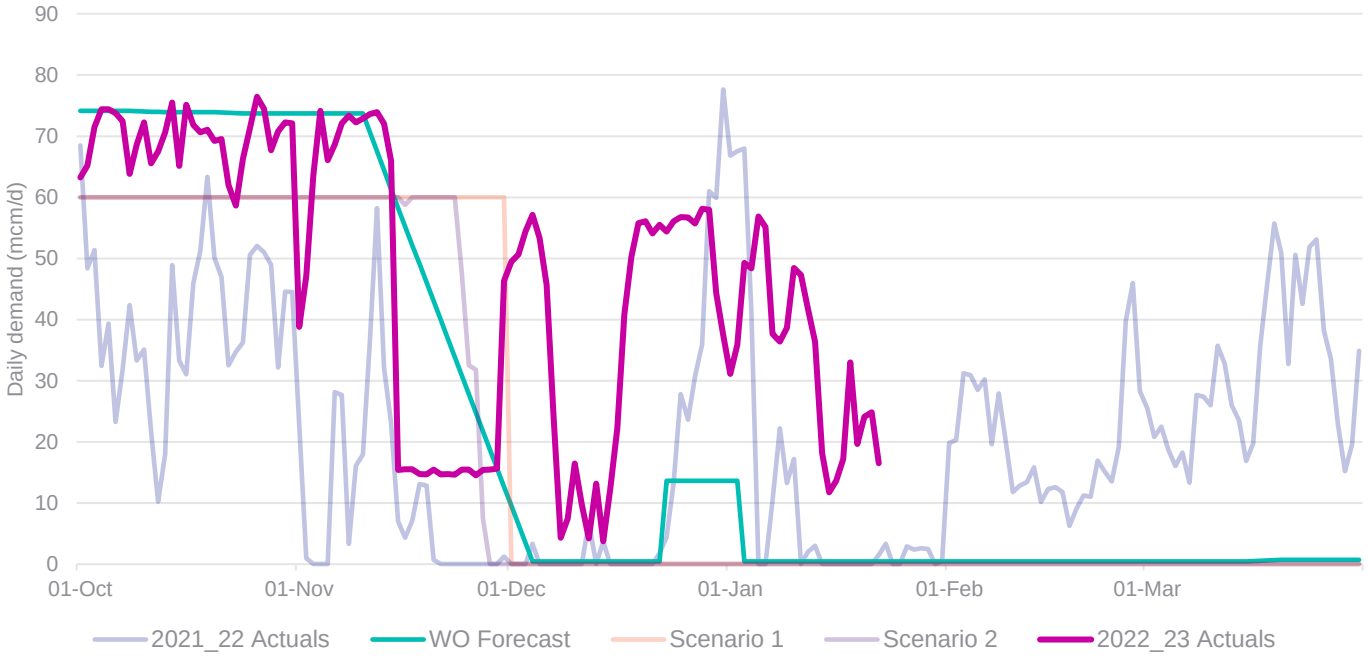
What have we seen so far?

- Exports remained high while demand was low, including after the cold snap. Price differentials have reduced recently leading to lower levels of exports.

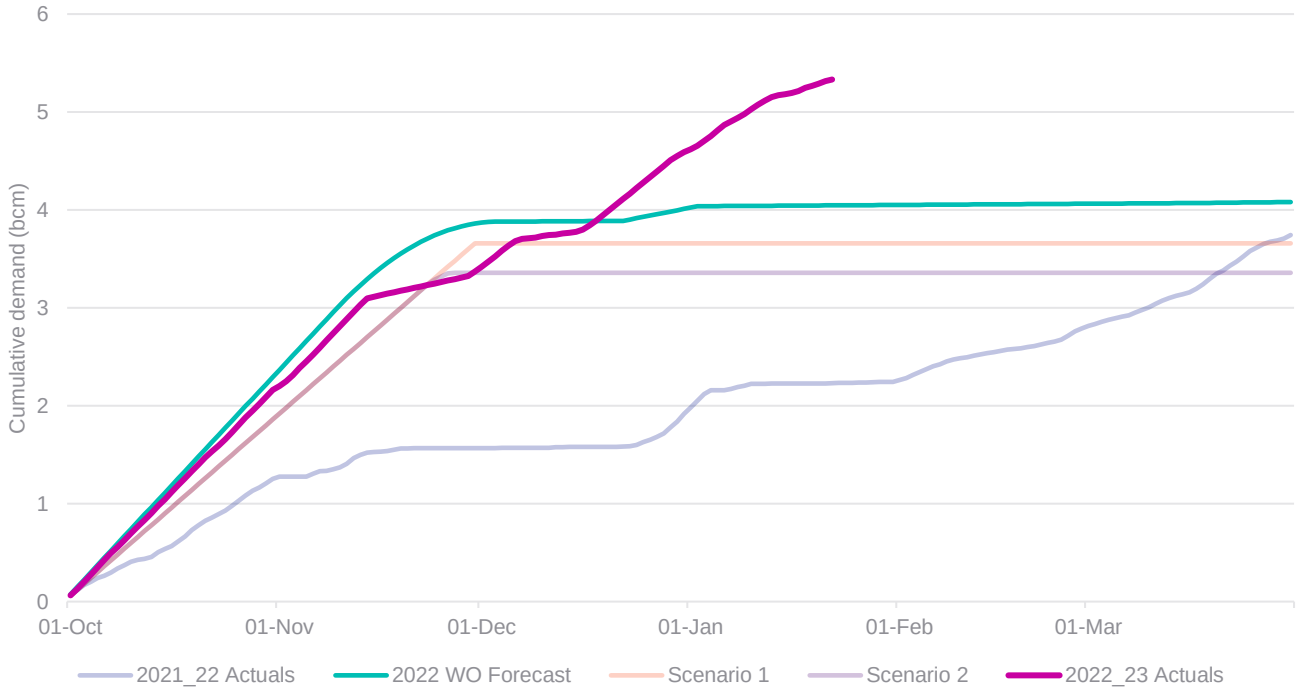
What does this mean for the rest of the winter?

- We expect interconnector flows to continue to be driven by availability and market signals.

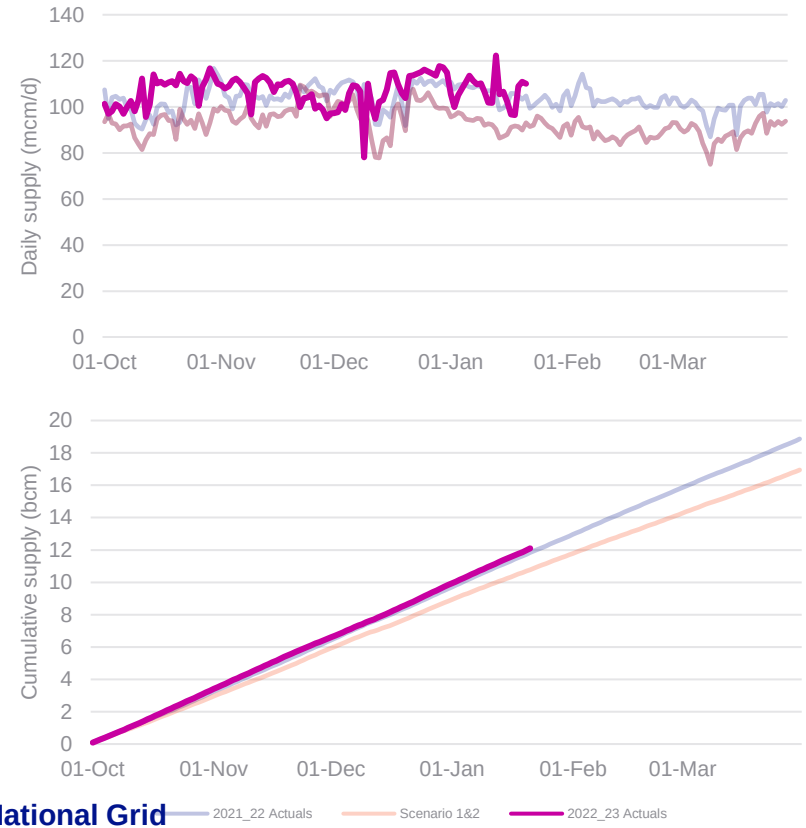
Exports to Continental Europe



Exports to Continental Europe



UKCS supply



What did we expect?

- Steady flows at around 100 mcm/d

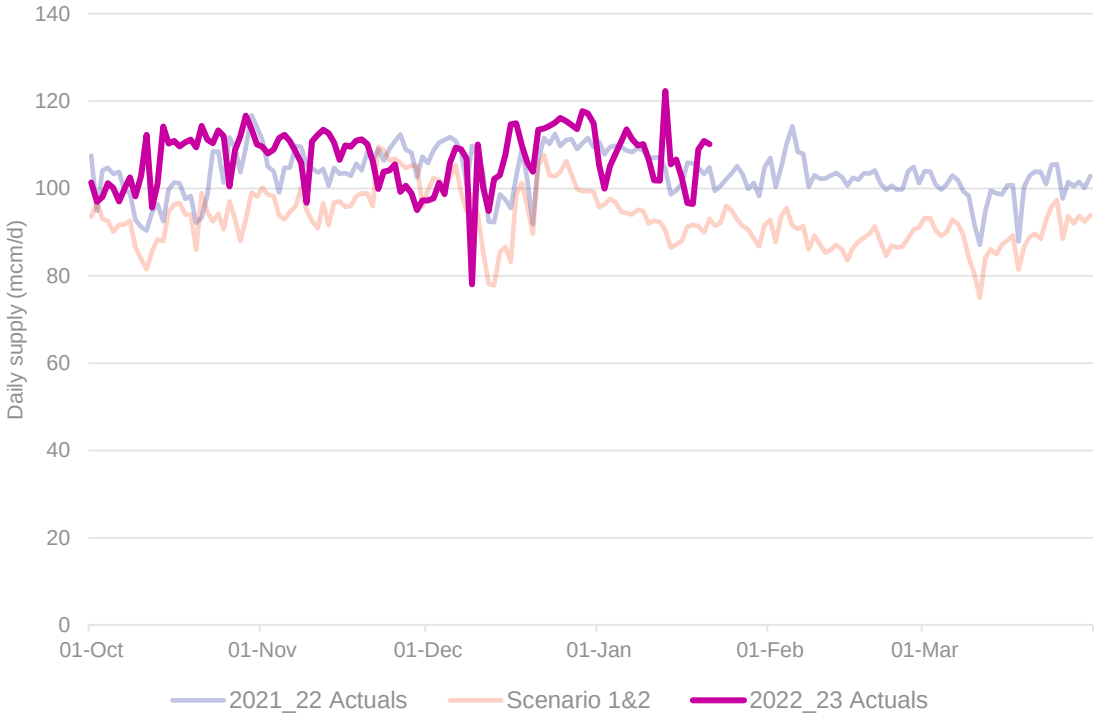
What have we seen so far?

- Average supplies of 107 mcm/d, slightly higher than last year

What does this mean for the rest of the winter?

- UKCS supplies are expected to continue at a similar level for the rest of the winter

UKCS supply


140
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Daily supply (mcm/d)
01-Oct
01-Nov
01-Dec
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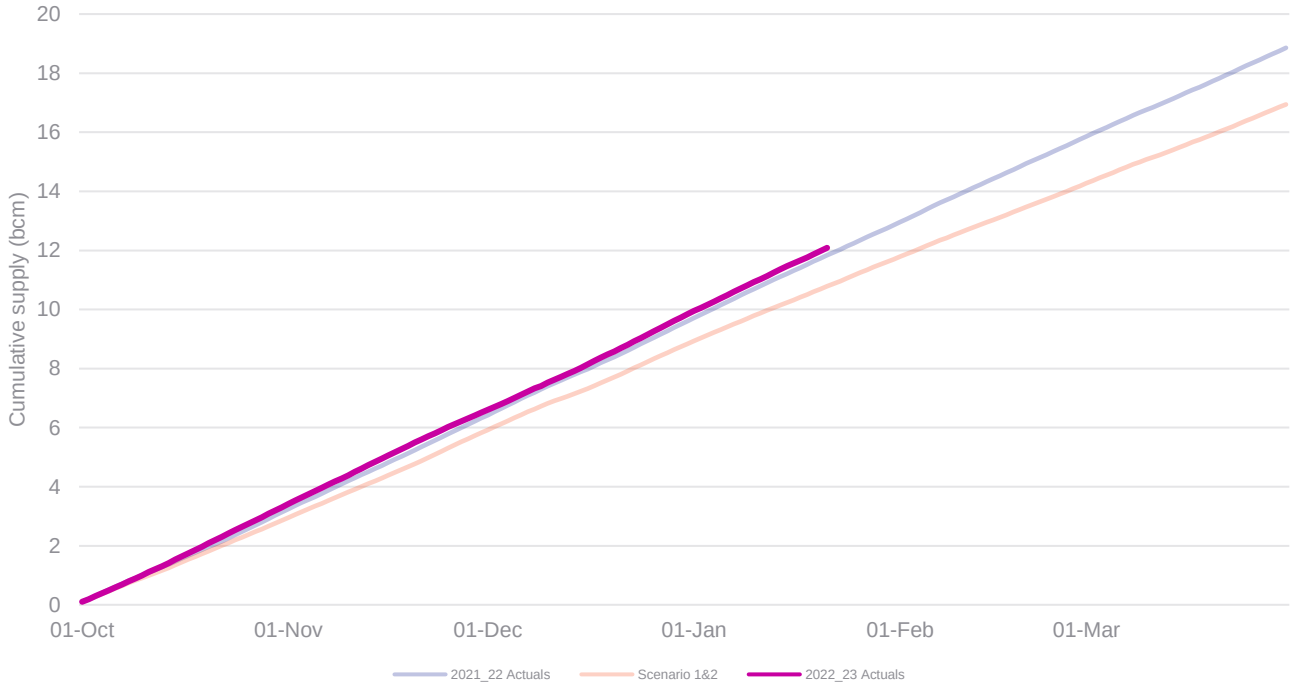
01-Mar
2021_22 Actuals
Scenario 1&2
2022_23 Actuals

UKCS supply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Cumulative supply (bcm)
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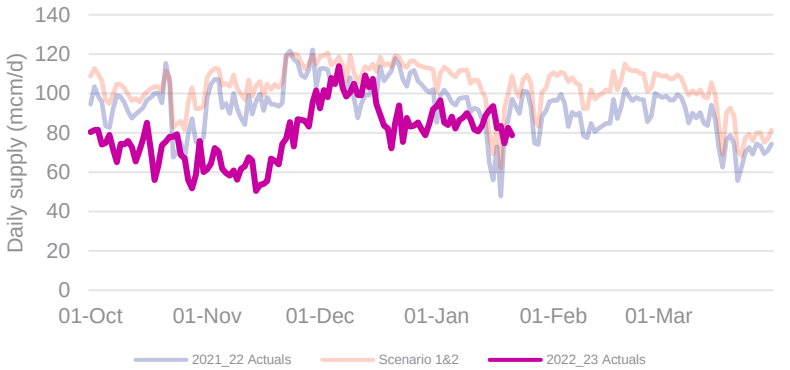
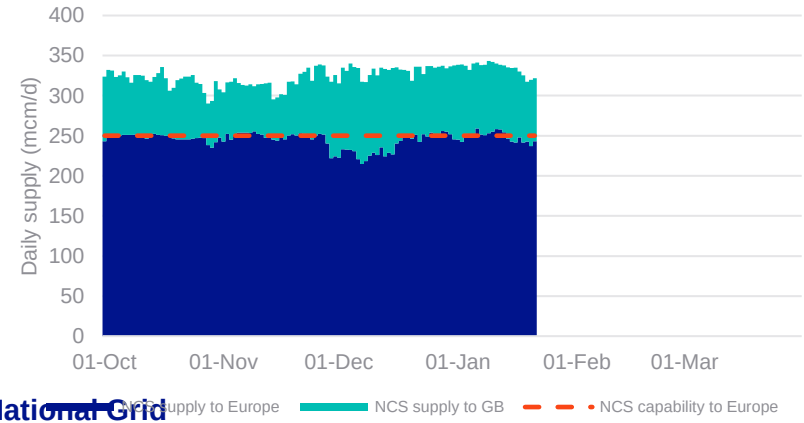
01-Mar
2021_22 Actuals
Scenario 1&2
2022_23 Actuals

NCS supply





What did we expect?

- Steady flows at around 100 mcm/d

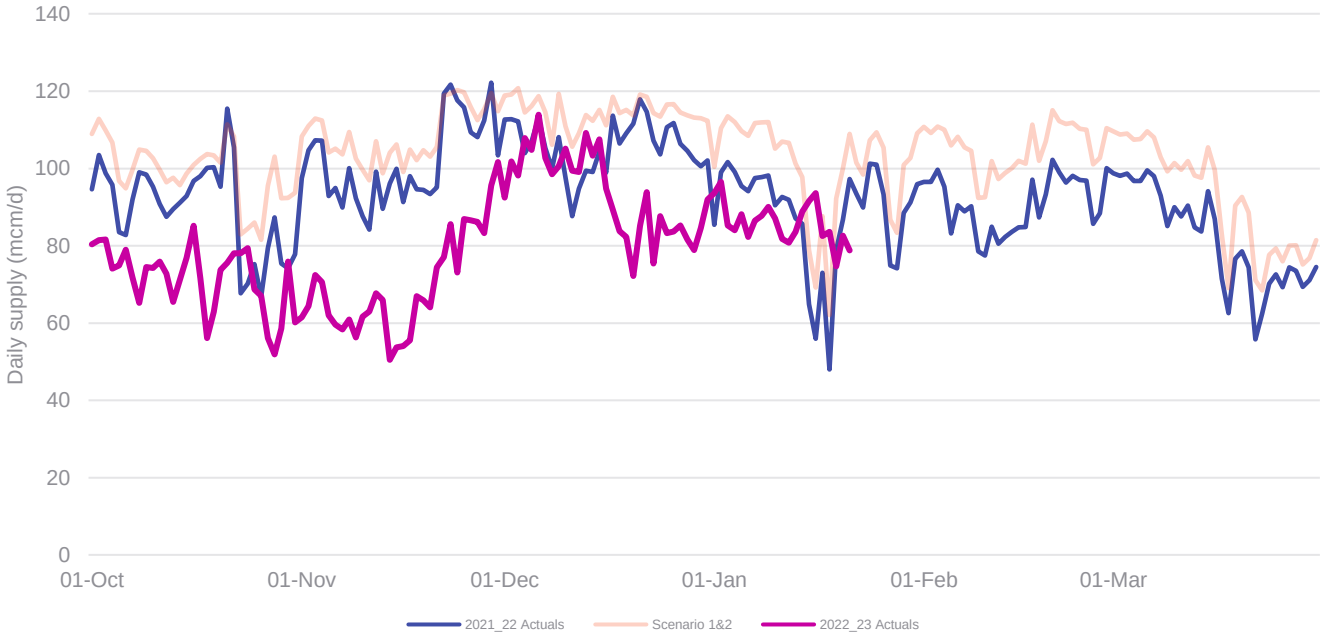
What have we seen so far?

- Norwegian production has been lower than forecast at 325 mcm/d. Shippers have prioritised Europe as expected, leading to lower flows to GB at 80 mcm/d. Some apparent switching from Europe to GB in response to market signals during the cold snap.

What does this mean for the rest of the winter?

- NCS will continue to prioritise flows to Europe, but there is potential for Norwegian gas to respond to GB price signals

NCS supply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Daily supply (mcm/d)
01-Oct
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01-Dec
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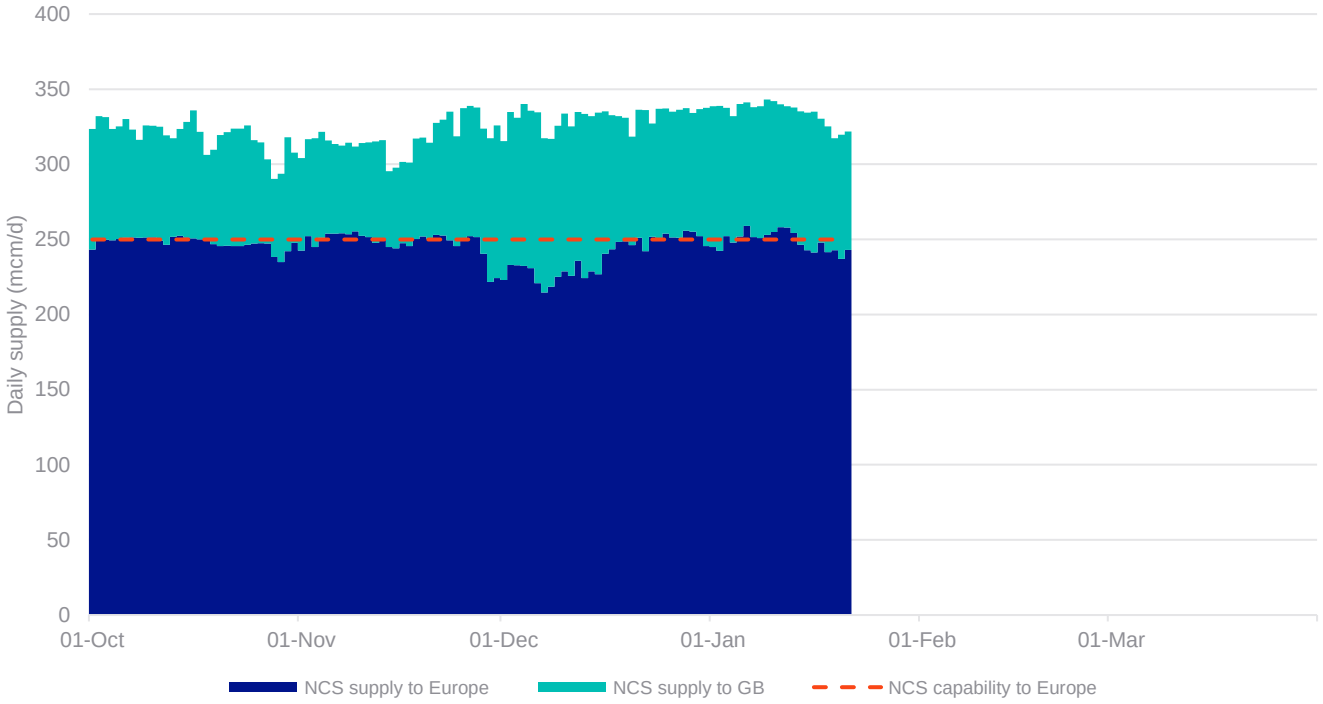
01-Feb
01-Mar
2021_22 Actuals
Scenario 1&2
2022_23 Actuals

NCS supply


400
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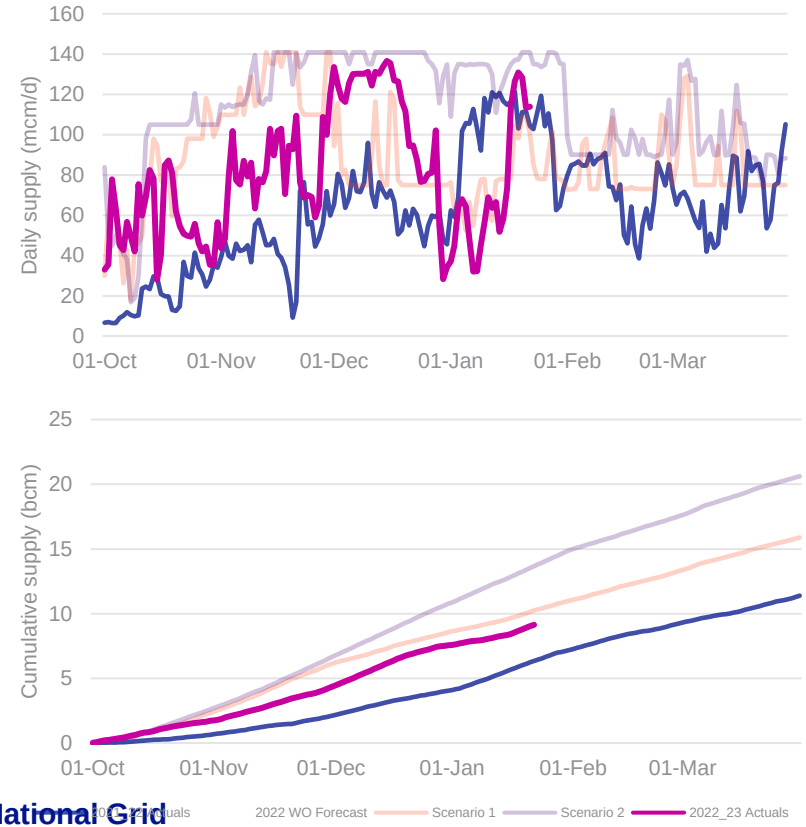
Daily supply (mcm/d)
01-Oct
01-Nov
01-Dec
01-Jan
01-Feb
01-Mar
NCS supply to Europe
NCS supply to GB
NCS capability to Europe

LNG supply



What did we expect?

- We expected LNG to be the main source of flexible supply, in preference to Europe, Norway or storage.

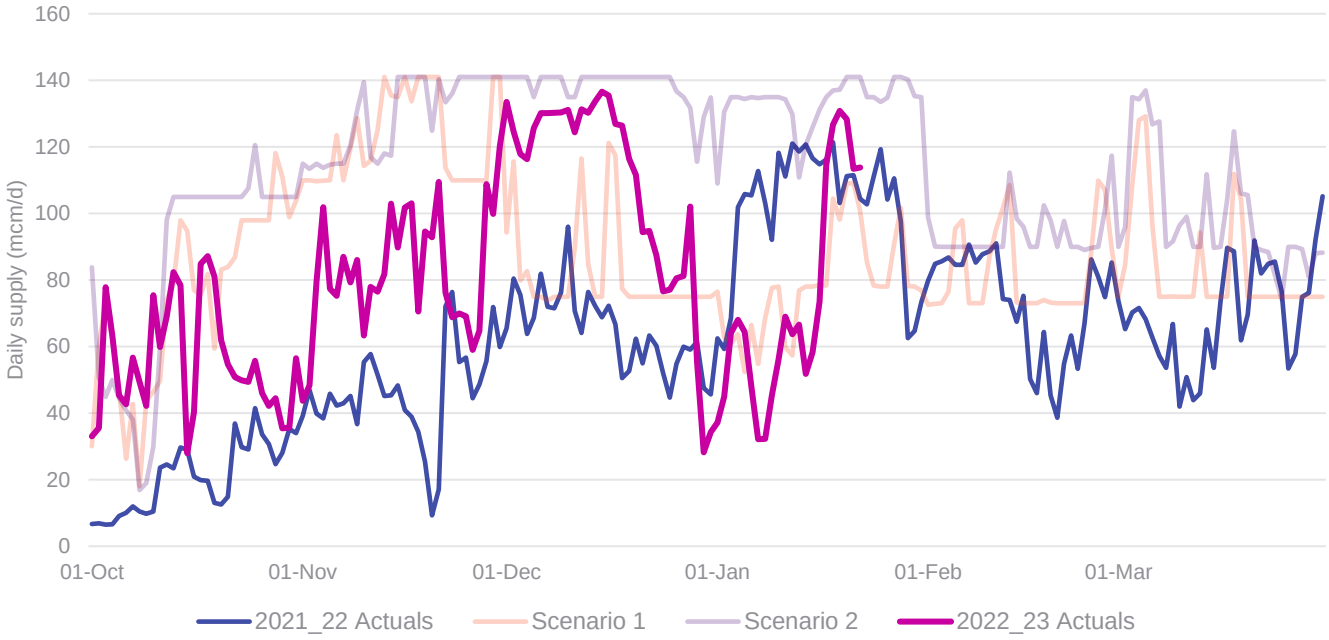
What have we seen so far?

- Average supplies of 80 mcm/d, 44% higher than the same period last year, have supported high levels of exports. Daily supplies have come close to peak capability. Recent bad weather has restricted the ability of cargoes to offload at Milford Haven.

What does this mean for the rest of the winter?

- High levels of LNG supply are expected to continue, supporting exports to continental European at times of low demand.

LNG supply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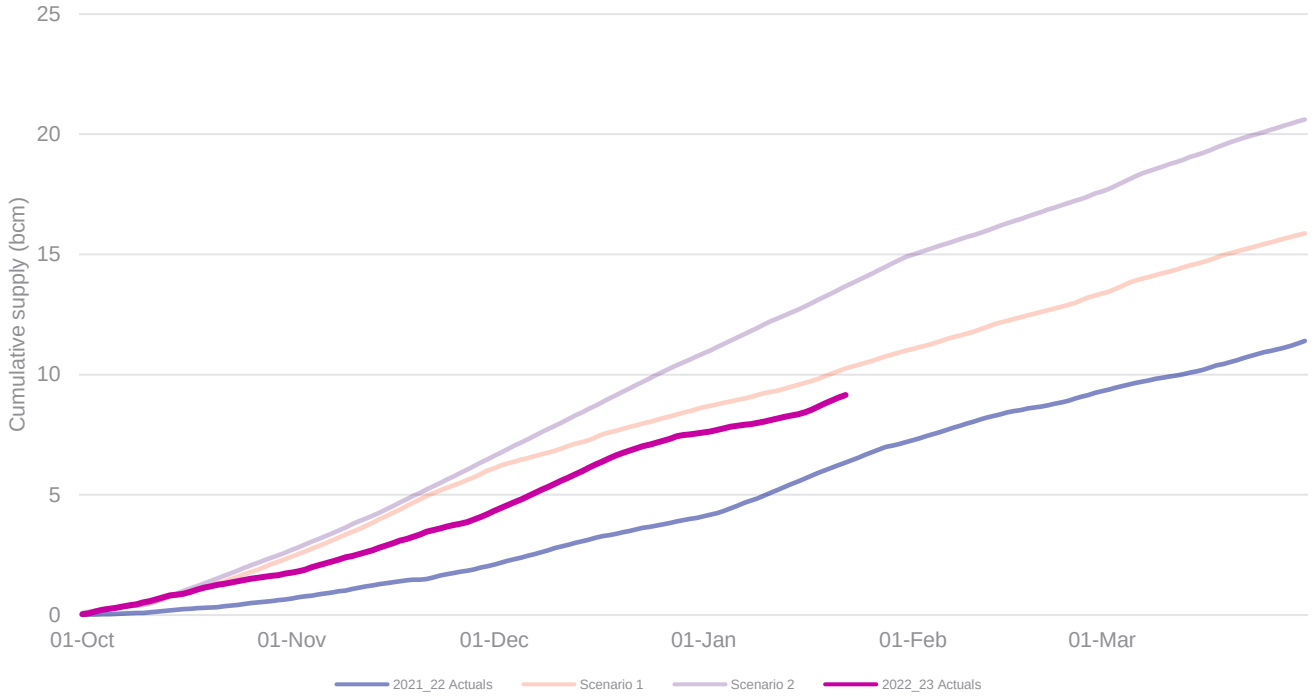
Daily supply (mcm/d)
01-Oct
01-Nov
01-Dec
01-Jan
01-Feb
01-Mar
2021_22 Actuals
Scenario 1
Scenario 2
2022_23 Actuals

LNG supply


25
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Cumulative supply (bcm)
01-Oct
01-Nov
01-Dec
01-Jan
01-Feb
01-Mar
2021_22 Actuals
Scenario 1
Scenario 2
2022_23 Actuals

Gas
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Interesting Days

Mathew Currell
Senior Operational Liaison Officer

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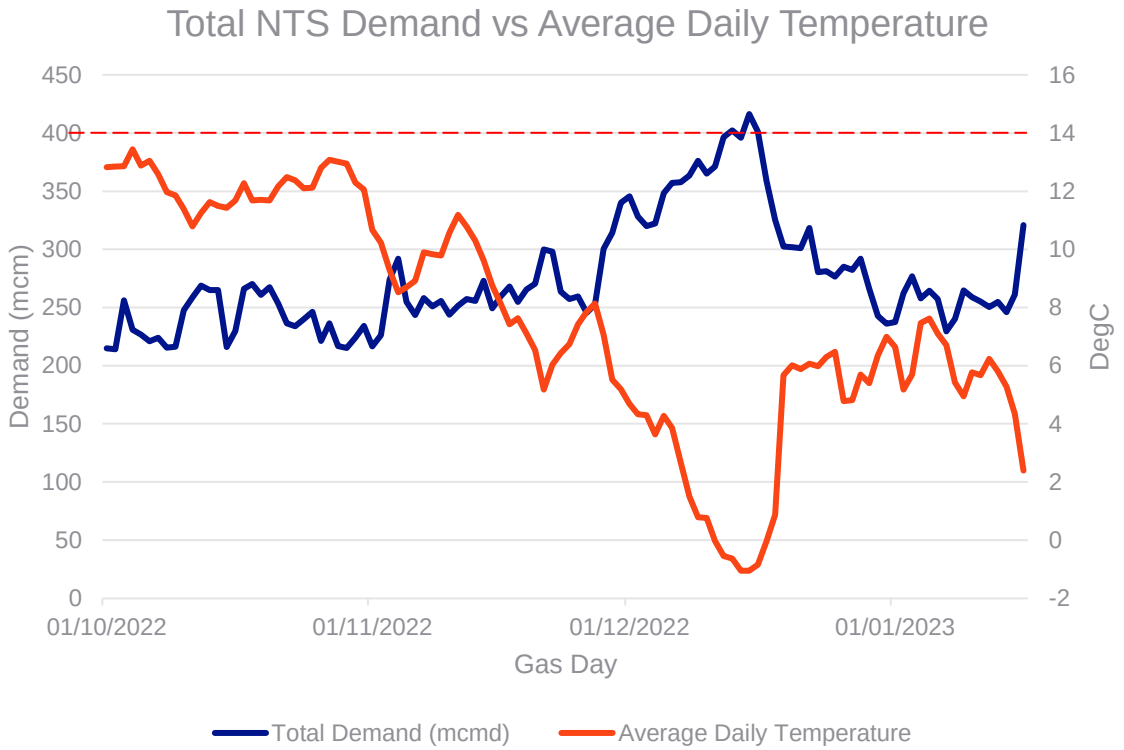
High Demand Days

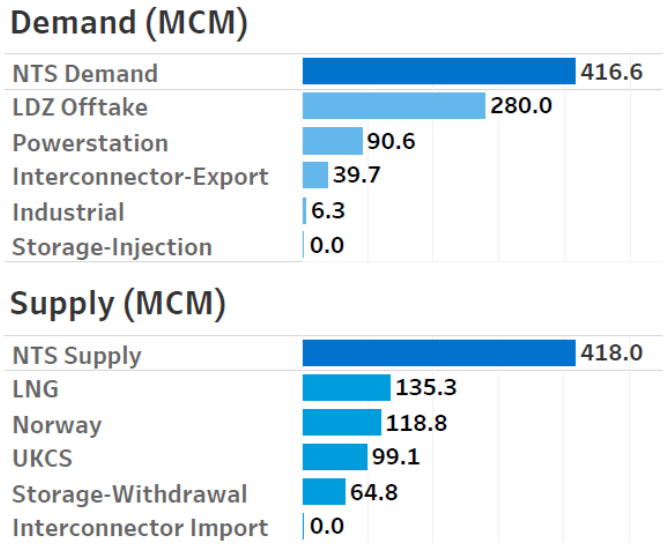
- December saw a sustained cold spell from the ‘Troll of Trondheim’, causing the coldest night of the year at -15.7degC in Aberdeenshire
- December saw three days reach a 400+mcm demand day on the NTS
- One of these days reached a 416mcmd demand (Gas Day 15.12.22)
- This is the highest demand seen since ‘Beast from the East’ in 2018



Walk Through of Gas Day 15.12.22

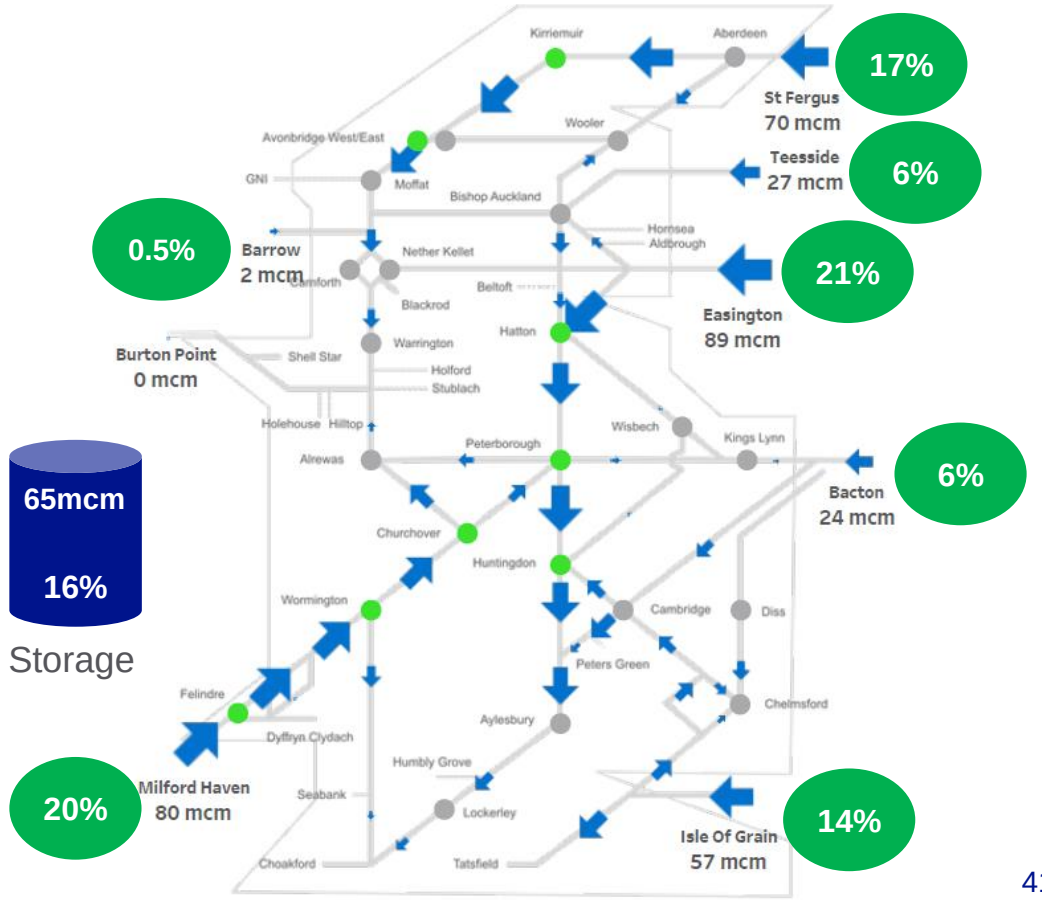
- The gas day started relatively balanced between forecast supply and demand
- There was higher demand than typical days, but high supplies from LNG and Norwegian supplies helped to meet this
- The effects of the lower ambient temperatures from the ‘Troll of Trondheim’ caused LDZ demand to increase by approximately 11mcmd as the morning progressed
- The extra demand caused the OCM market to trade up in price, encouraging storage withdrawal to come online and meet the additional demand
- National Grid didn’t need to trade this day as the market balanced itself out

NTS Demand 416.6 mcm



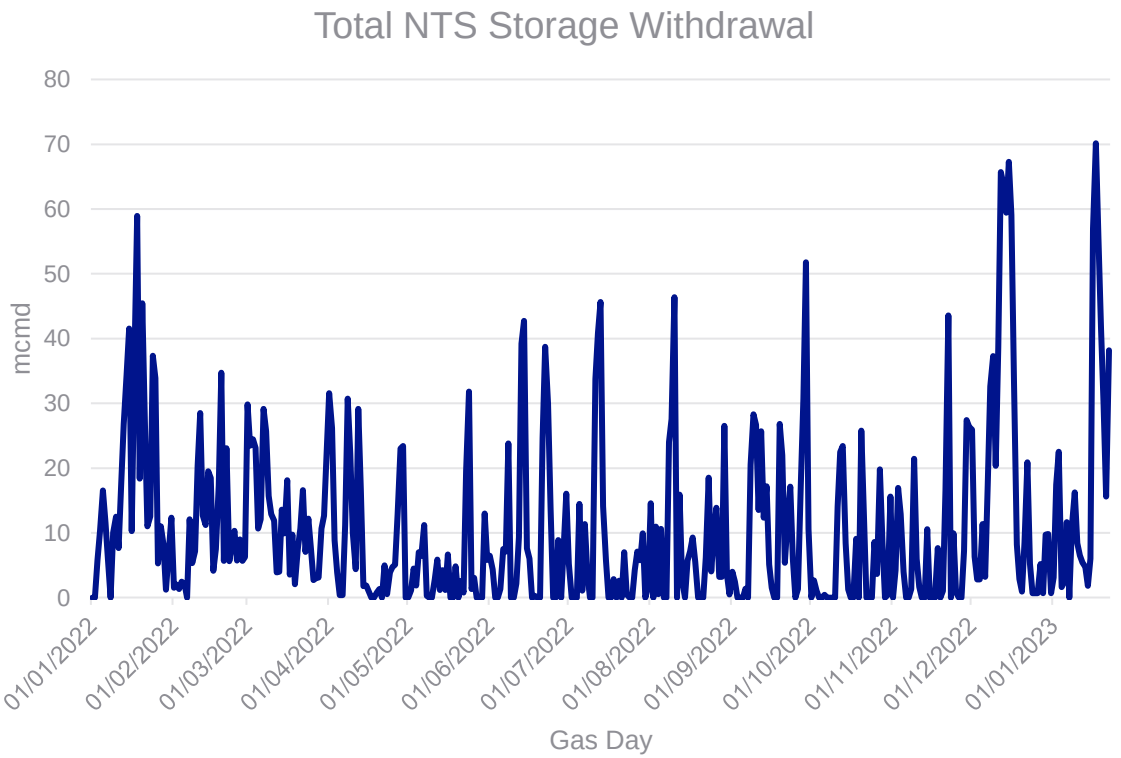
Summary of Gas Day 15.12.22

- The system saw the highest daily demand in over 3 years
- Due to the diverse and evenly distributed supplies into the UK, the gas came on to, and off the grid as planned
- Our network all functioned reliably
- Reinforces our capability and confidence in our system



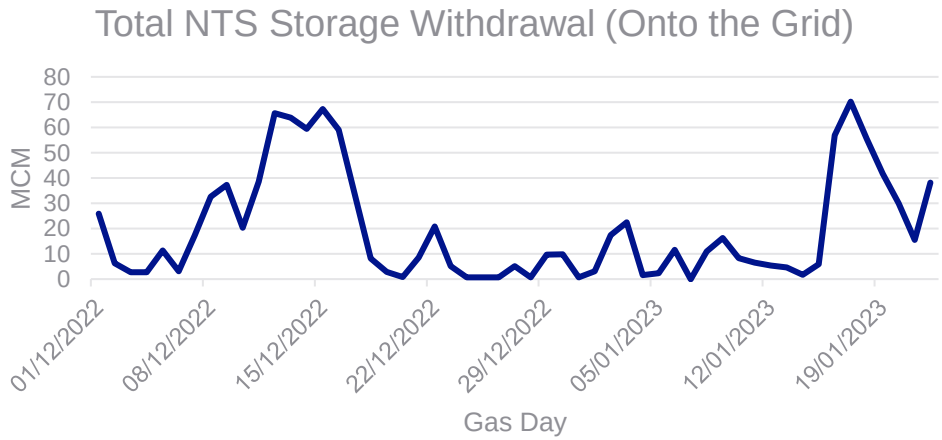
Storage Withdrawal

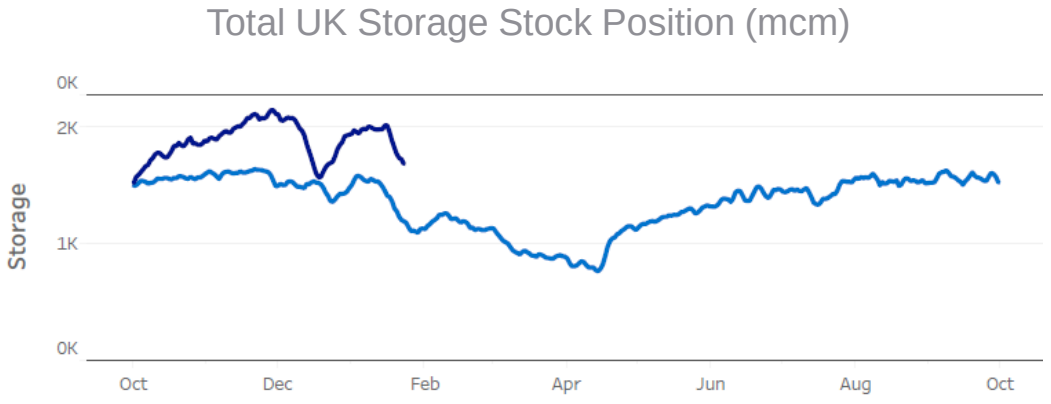
- Throughout the last year we've seen a high variability in storage profiles, especially in withdrawal mode (giving gas to the NTS)
- Storage profiles are very market driven
- The main reason is due to storage sites ability to quickly react to market conditions and address imbalances when the price is favourable



Storage Withdrawal - Peaks

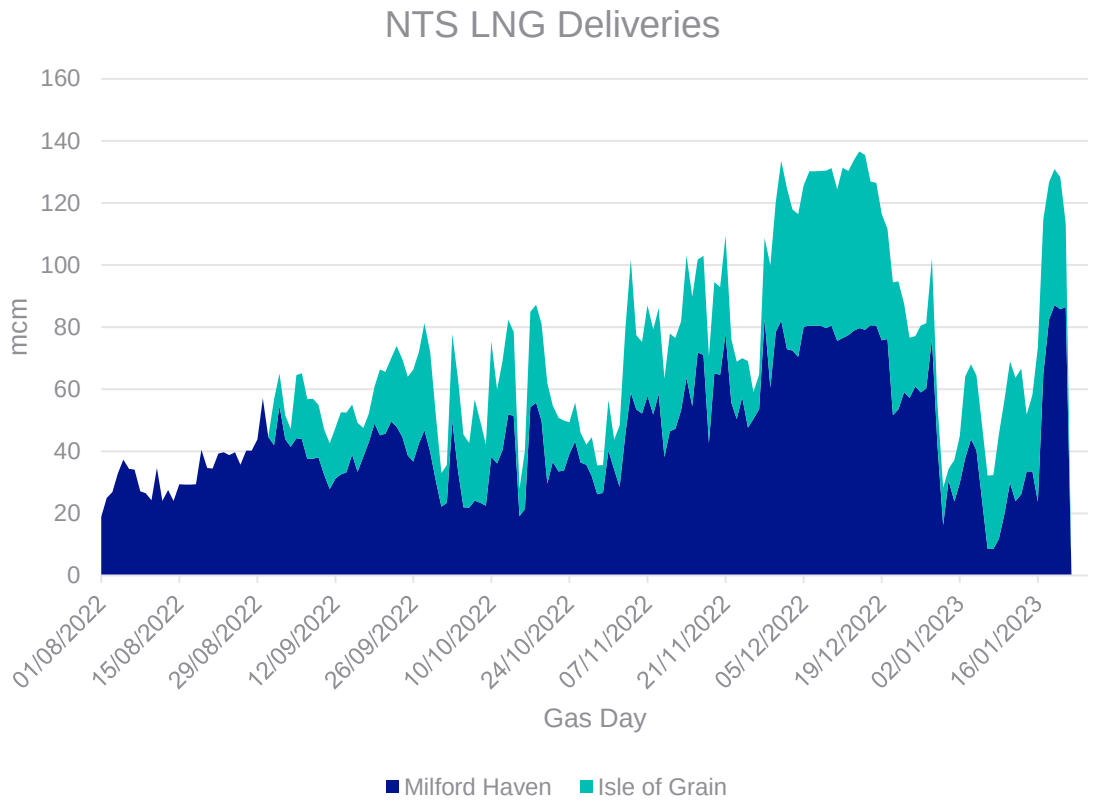
- We've seen two periods of high storage withdrawal this winter, in December and January
- On gas day 17.01.23, we saw a cumulative total of 70.2mcm of gas enter the NTS from storage withdrawal
- Highest volume in the last 18 months
- The effects of these peaks can also be seen on the UK storage stock position graph





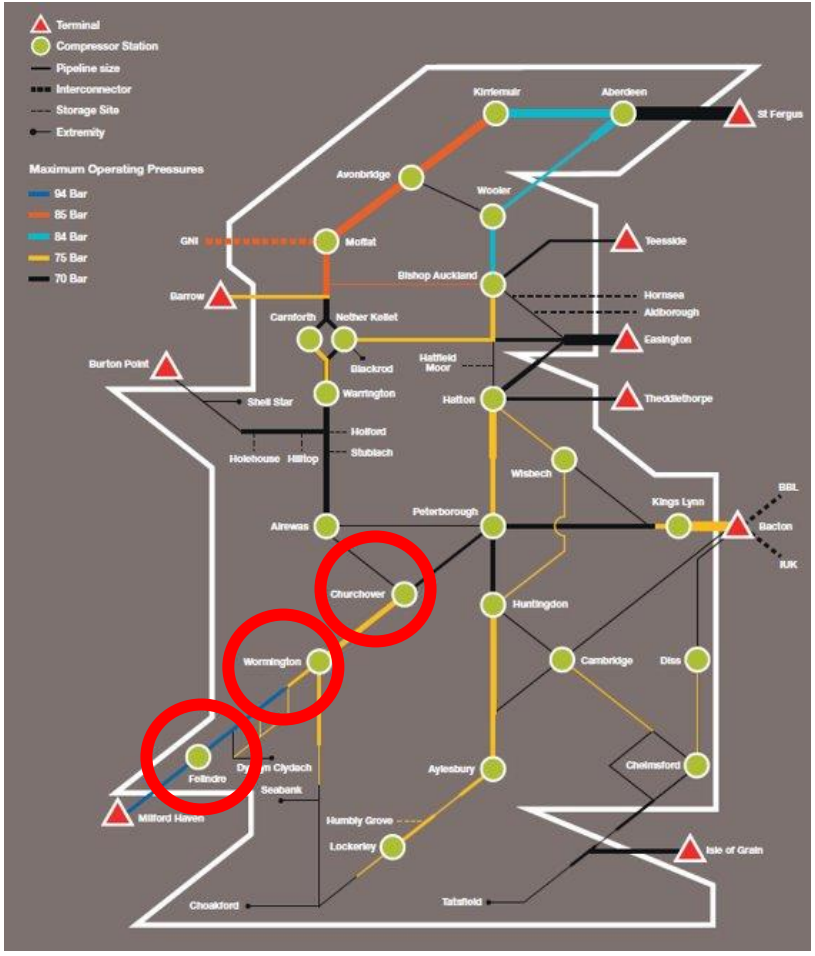
LNG Deliveries

- December saw consistently high LNG imports into the UK from both LNG terminals
- LNG dropped off at the beginning of January before returning to high levels
- Sustained high Milford Haven inputs can cause operational challenges with the distribution of gas into the system, if there are network restrictions or low demands

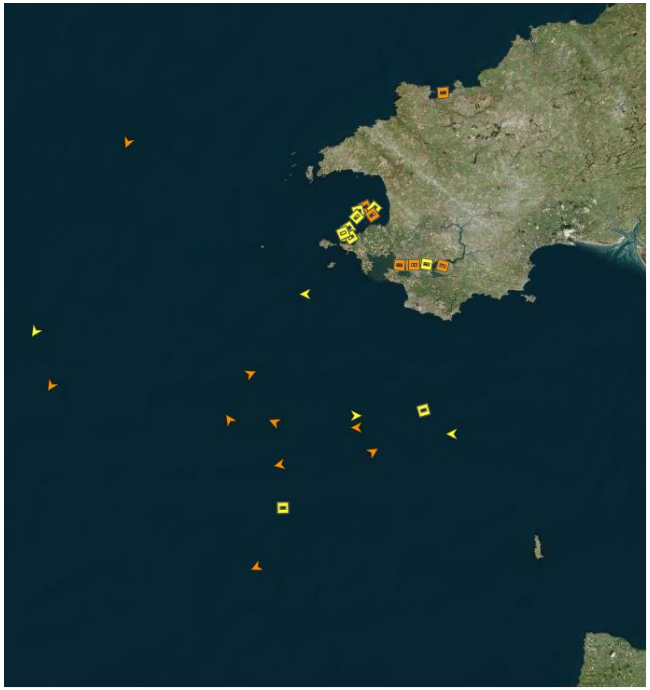


Milford Haven Transmission Overview

- To accommodate high Milford Haven flows, we rely on a chain of compressors located strategically throughout Wales and England to pull gas away from the terminal and push it towards the middle of the grid where the gas can be distributed.
- The compressors we run are as follows:
  - Felindre
  - Wormington
  - Churchover

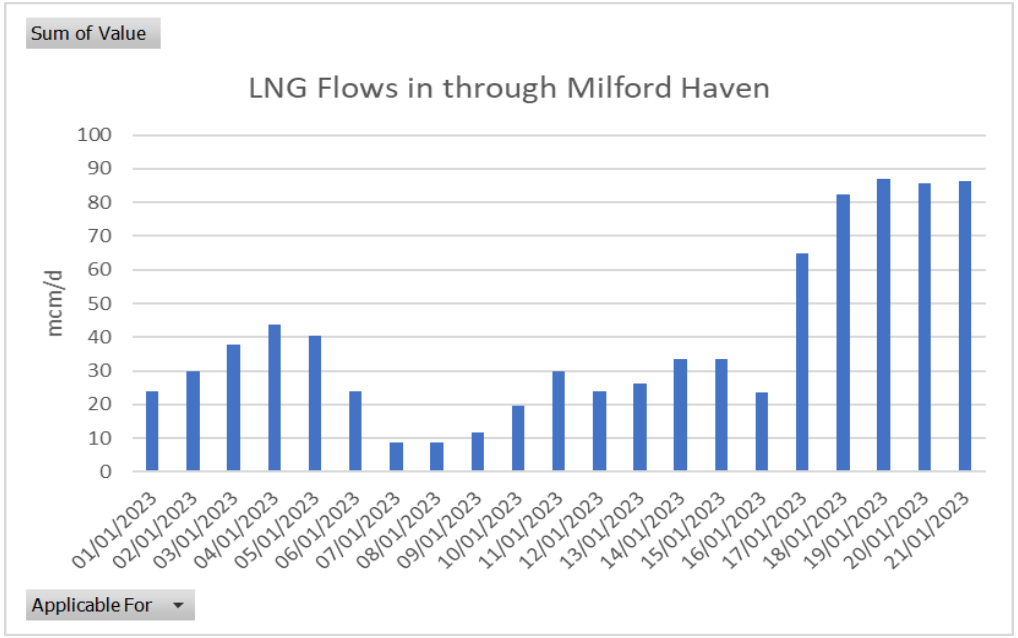


Milford Haven Update



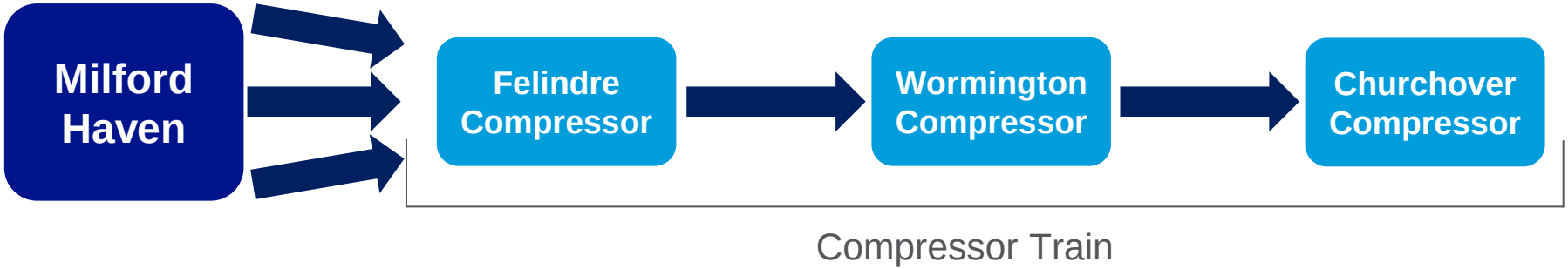
12th January LNG cargoes in orange arrows

High winds at Milford Haven prevented LNG cargoes from docking for two weeks and supressed LNG imports during the middle of the month.



Milford Haven Constraint

- Eventually the winds died down and ships could dock at Milford Haven
- NTS compression was turned on to accommodate the increase in flows
- Late on in Gas day 17th January, a compressor tripped off
- This then caused a knock-on effect with the other compression, resulting in some other units having to go offline
- This chain of events reduced our ability to maximise transmission away from Milford Haven terminal due to the sustained high flows coming in and the lower demand in that area of the network.



Milford Haven Constraint

- On Gas Day 18th January, analysis showed a constraint was forecast so actions were required.
- Some compression was re-established, but due to the high flows and subsequently pressures, it was not possible to re-establish all units.
- Locational actions were taken to reduce Milford Haven flows or increase demand. This resulted in a decrease of ~4mcm of supply.
- The small reduction in supply was all that was required to bring all the machinery back online.

Gas Ops Forum
January 2023

correla
ON BEHALF OF xoserve

Major Incidents - November

Date	Created Time	Resolved Time	Issue Description	Why did this happen	Resolution
01/11/2022	07:55	08:35	The Gemini Exit application was not accessible to internal and external users	There was a rare memory hardware failure which impacted the availability of Gemini via nodes 3 and 4.	Services were automatically restarted and the impacted nodes 3 and 4 were removed from the load balancer. The hardware was replaced and the nodes were reintroduced and the service was restarted. This was followed by quality assurance checks to ensure no additional impact experienced.
17/11/2022	16:34	18:35	Customers reported they were unable to access Gemini Service via their Citrix access	Access encryption certificates were auto-renewed by Microsoft (in line with their policy) ahead of expiry dates. This change was not reflected in the underlying Siteminder Authentication Service.	Service was restored by isolating the affected access node and updating the required certificate. A manual check and automated alert has been put in place to provide advanced (90 days) notice of any renewal – this is in line with other certificate notifications.
29/11/2022	11:20	12:15	Customers reported they were unable to access the Gemini Service via their Citrix access	Root cause was found to be an edge case issue with a Citrix patch that had been applied to 3 of the 4	A full rolling restart of the services across all Citrix servers restoring service while working on root cause. To restore stability, it was determined that rolling back the patch
29/11/2022	18:26	20:15			
30/11/2022	00:20	01:05			
21/12/2022	11:11	16:45	The Gemini Exit application was not accessible to internal and external users	RCA in progress - no definitive cause yet identified. Multiple potential causes identified.	The Exit database automatically but unsuccessfully transferred to the HA node. On recovery the Entry database then also became unresponsive. A service restart and a subsequent hard reboot were both unsuccessful. As a result the DR process was invoked and services were brought back online.

Major Incidents - December

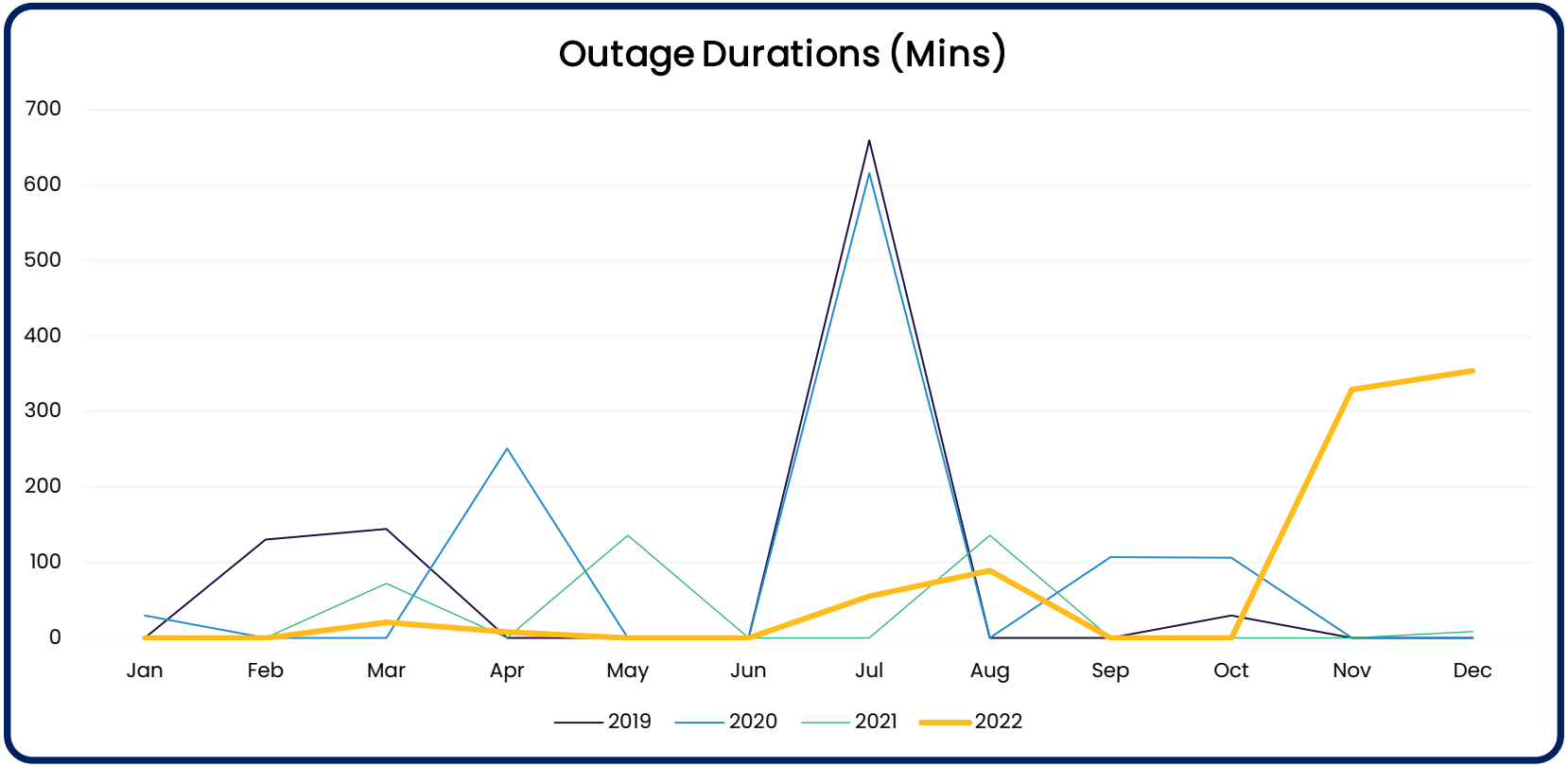
Details	
Date:	21/12/2022
Issue:	The Gemini Exit and Entry services became unresponsive.
Outage Duration:	11:11 to 16:40
Root Cause:	Three simultaneous elements contributed to the server becoming unresponsive: Logs showed abnormally high activity levels were observed. It was found that an active Archival operation was being triggered continuously adding to high activity load. Issues were detected with the Antivirus software when the server was running at high activity levels.
Resolution:	To restore the service as soon as possible the Disaster Recovery (DR) plan was engaged, reverting the impacted database to the DR servers. To address the root cause the Antivirus software upgrade was rolled back to the previous version. We have also upgraded the data storage to increase capabilities of archival processes. Following a monitoring period we have now reverted back to the Primary Server service.

Core System % Availability Jan 22 – Dec 22

Month	Availability %
January	100%
February	100%
March	99.95%
April	99.98%
May	100%
June	100%
July	99.87%
August	99.79%
September	100%
October	100%
November	99.20%
December	99.17%

100% | Above 99% | Below 99%

Monthly Service Availability (YoY)



Thank You

Gas
Transmission

Demand Side Response Update

Matthew Newman
Code Change Lead

nationalgrid

Gas DSR: Re-cap

Enables consumers to offer to reduce their gas demand via their shipper/supplier at times of gas system stress,
in return for a payment which they define

Gas DSR could **reduce the likelihood, severity and duration** of a gas deficit emergency

Provides a ‘route to market’ for large consumers to receive **greater financial compensation** by **voluntarily curtailing** demand ahead of an emergency than if they were **involuntarily curtailed** in an emergency.

Aimed at **large industrial and commercial sites** rather than power generation

Shippers may place offers to sell quantities of gas on the OCM DSR locational market which NGG may accept as a pre-emergency action.

Re-cap: Reforms delivered for this winter

DSR Options	Tender process for next three winters
	Shippers offer DSR option quantities, option price and exercise price
	Within day and D-1 options plus D-5 expressions of interest
	Obligation to offer DSR to National Grid when supplies are tight
Extend lead-time	Extend the trigger to include a Margins Notice as well as GBN
Fuel-Switching	Extension of fuel-switching environmental permission

More information at: https://www.gasgovernance.co.uk/0822 https://www.gasgovernance.co.uk/0833 and Fuel switching direction (publishing.service.gov.uk)

DSR Uptake 2022/23

Our first DSR options tender closed on 23 December 2022

We received and accepted two option offers for D-1 DSR (agg volume ~0.2 mcmd)

We received one expression of interest in a D-5 product

- This was not sufficient to warrant progressing an urgent UNC Modification to enable acceptance for this winter

Reflections

Progress has been made but Gas DSR as a pre-emergency tool is still not as effective as it could be

Stakeholder feedback tells us that this low level of participation is not reflective of consumer willingness and ability to provide DSR

Greater volumes could be accessed if product design and procurement and execution mechanisms are further reformed

A Government Direction to support fuel-switching is in place which has limited life and coverage

In 2023, we will further explore the development of a longer lead-time DSR product and other reforms that could remove barriers and broaden participation

Key Challenges

Some sites want certainty of when they'll be called, we seek rapid response

Role of the shipper

How to determine what amount of spend and volume is economic and efficient

Balance between time spent developing the rules and implementation

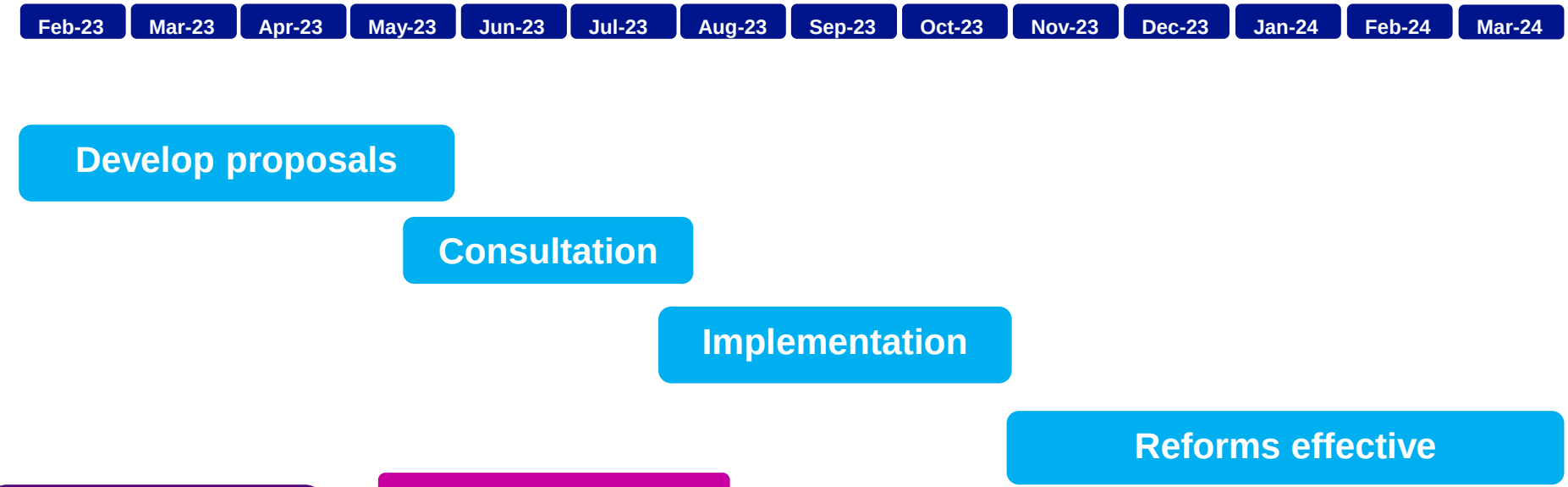
Balance between delivering new reform vs review of existing arrangements

Key Workstreams for 2023

1. Direct NGG-Consumer contracting
2. D-5 / Longer lead-time product
3. Reduction in eligibility thresholds
4. Review of Mod 0822 rules
5. Fuel-switching

We plan to raise a new UNC Request proposal in February to enable industry discussion to commence in March

High Level Timeline



For more information…

Gas DSR

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matthew.newman2@nationalgrid.com

Gas Transmission

NTS Regulatory Update

Matthew Newman & Dan Hisgett
Code Change Leads

nationalgrid

Winter Preparedness

UNC0822 (Urgent) - Reform of Gas Demand Side Response Arrangements.

- Implemented Oct 2022
- Impacting: Large Industrial and Commercial consumers, Shippers, Suppliers and National Grid

UNC0833 (Urgent) - Enabling Demand Side Response (DSR) Market Offers to be made by Non-Trading System Transactions.

- Implemented Dec 2022
- Impacting: Large Industrial and Commercial consumers, Shippers, Suppliers, National Grid and the Market Operator (ICE)

UNC0813 - Revision of Virtual Last Resort User and Contingent Procurement of Supplier Demand Event Triggers.

- Consultation finished on 17/01/23
- Impacting: Suppliers, Shippers, Distribution Network Operators, independent Gas Transporters, Consumers

UNC0814 (Urgent) - Temporary Access to the Enhanced Pressure Service and Increase to the Maximum NTS Exit Point Offtake Rate of the BBL interconnector.

- Awaiting Ofgem decision
- Impacting: BBL, Interconnector Limited, Shippers

Capacity

Milford Haven ECR Summer 2023

- Consultation report and proposal to be submitted to Ofgem by 27th January 2023
- Impacting: Milford Haven Shippers, Milford Haven Terminal operators, Consumers
- Non-Confidential Responses are available here
- Our joint response to the consultation is available here

Milford Haven Summer 2024

- Project webpage is available here
- Indicative project update is available here
- Impacting: Milford Haven Shippers and Terminals

Capacity Methodologies

- Entry / Exit Substitution
- Entry Cap Transfer and Trade

Gas Quality

GS(M)R Review

- Awaiting HSE final impact assessment
- Impacting: Entry Terminals

Gas Quality Data Provisions

- Option development underway
- Workgroup for February

Charging

GNTS Charging Stability

- A recording of the recent webinar is available via this link
- Options to resolve the forecasted issues are being considered and will be brought forward as soon as possible

GCD13: Future Changes in Transmission Charges

- A Gas Charging Discussion (GCD) document will be published on the National Grid website.
- In depth discussions will begin at NTSCMF from February onward.

St Fergus Compression FOSR

- Final Option Selection Report (FOSR) to be submitted to Ofgem by end of January 2023.
- Once proposed works & costs are public we will return to NTSCMF for further discussion on the potential for targeted charges.

Charging

UNC0832: Bacton Exit Large Price Steps

- The Modification has been returned to January's Panel

Auction Close Out Rules

- Current Auction close out rules are being reviewed with the view a potential change to optimise Auction Close Out rules in conjunction with UNC0832.

FCC Consultation

- No material changes in the FCC Methodology are proposed for this year.

General / Other

Company Name Change

- Modification to be raised following completion of sale
- The Modification should be purely housekeeping, amending any reference to National Grid Gas Transmission to reflect the change of company name

UNC0834 - Shared Site Drawings

- To be considered at the January 2023 Panel

UNC0761 – Arrangements for Interconnectors with additional Storage capability

- With Ofgem for decision

Additional Questions?

Name / Email	Projects
Anna.Stankiewicz@nationalgrid.com	**Milford Haven ECR 2023 & 2024**
Ashley.Adams@nationalgrid.com	**UNC0832S:** Introducing additional flexibility to change the NTS large price step for Ascending Clock Auctions at IPs**, Gas Quality Data Provisions, FCC Consultation** and **GNTS Charge Stability**
Colin.Williams@nationalgrid.com	**All things Charging**
Daniel.Hisgett@nationalgrid.com	**GCD13:** Future Changes in Transmission Charging, **St Fergus Compression** and **UNC0823:** Amendment to the Allocation of Entry Capacity and Flow Quantities to Qualifying CNCCD Routes
Kirsty.Appleby@Nationalgrid.com	**National Grid Gas Transmission Name Change** and **Capacity Methodologies**
Martin.Cahill@nationalgrid.com	**Auction Close Out Rules**
Matthew.Newman2@nationalgrid.com	**UNC0814:** Temporary Access to the Enhanced Pressure Service, **UNC0822:** Reform of Gas DSR Arrangements and **UNC0833:** Enabling DSR Market Offers
Philip.Hobbins@nationalgrid.com	**UNC0822:** Reform of Gas DSR Arrangements, **UNC0833:** Enabling DSR Market Offers**, GS(M)R Review** and **Gas Quality Data Provisions**
Phil.Lucas@nationalgrid.com	**UNC0761:** Arrangements for Interconnectors with additional Storage capability, **UNC0813:** Revision of Virtual Last Resort User, **UNC0834:** Shared Site Drawings

Gas Transmission

MCPD Emission Reopeners

Neil Rowley
Regulation Strategy Delivery Manager

nationalgrid

MCPD Emission Reopeners | Key Points

1. **What & Why** the emission reopeners
2. Our **requirements** & **strategy**
3. The current **process** & those to come

MCPD Emission Reopeners | Legislation & Compressors

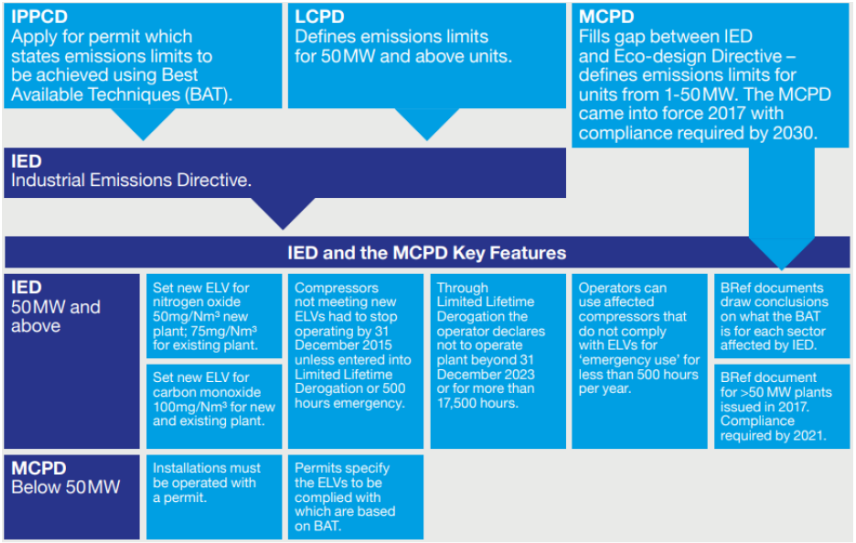
Ensuring compliance with Environmental / Emissions Legislation

Our part in reducing pollutant (NOx, CO2, SO2)

- **Integrated Pollution Prevention (IPPC) | Large Combustion Plant (LCPD) Directives**

Medium Combustion Plant Directive (MCPD) – in force 2017

- Impacts gas turbines (1- 50MW thermal output)
- Must not exceed 150mg/m^3 Nitrogen Oxide by 2030.
- 28 (as of T2 Business Plan) on the National Transmission System which do not meet the legislation
- Broadly, 3 options to consider: Decommission, Derogate or Make Compliant



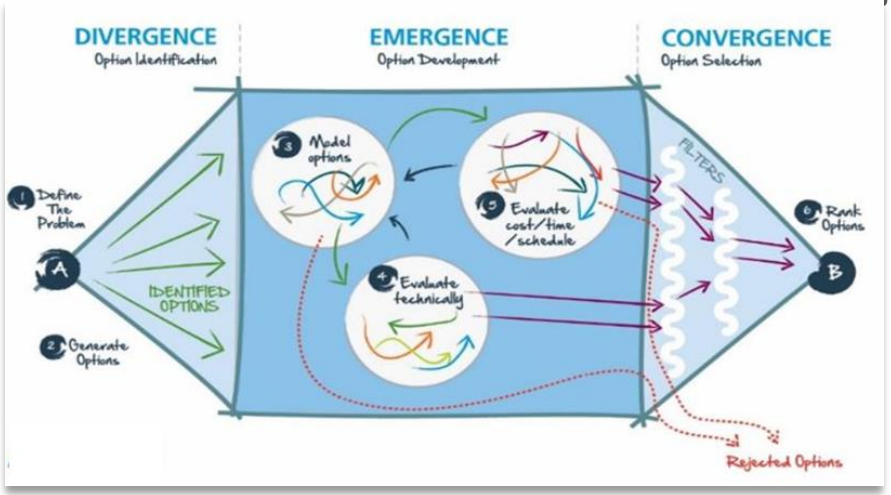
T1/T2 funding in this area inc new unit at Hatton (LCPD) | Huntingdon (x2) & Peterborough (x2) (IPPC). Construction at all three sites is in progress. While 8 compressors will be decommissioned

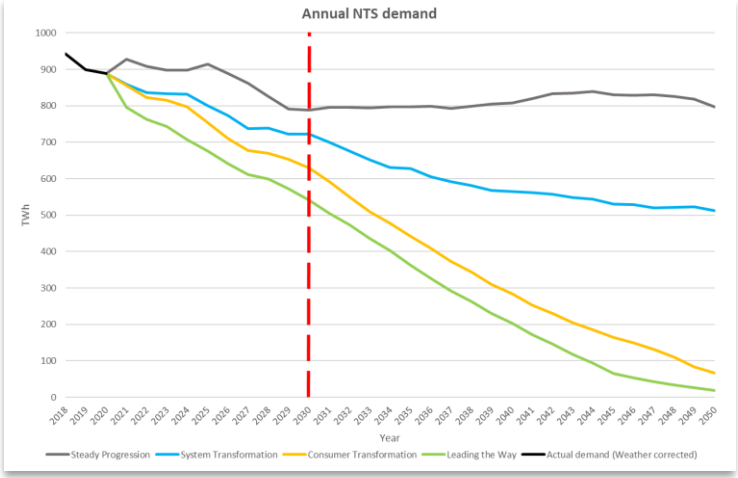
MCPD Emission Reopeners | Challenges & Options

Our challenges to meet:

1. Delivering the **legislation** requirements
2. Solutions in the most **costs efficient** way
3. Delivering by **2030**
4. Ensuring the right **capability & resilience** of the network

- FES but also accounting for the **fundamental change in the gas**

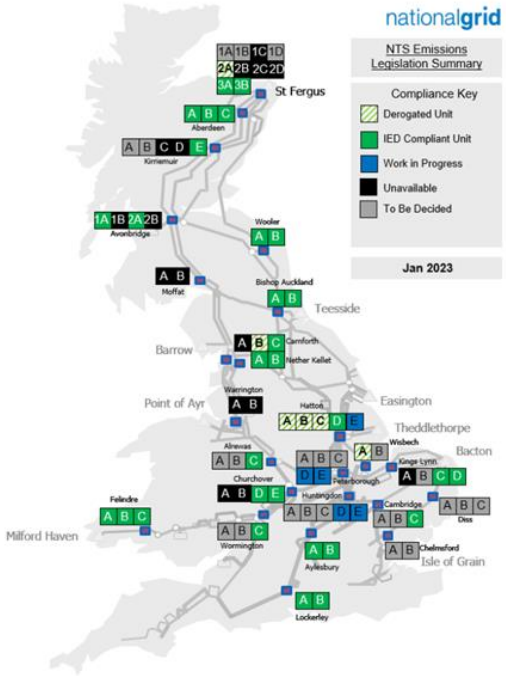


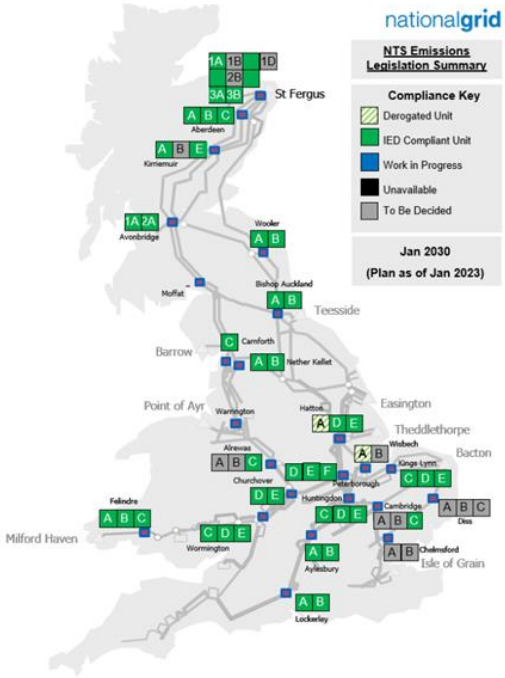


Emission compliance options:

1. **Decommission**
2. **Derogate** – 500hrs per year / rolling average (Delay option)
3. **Abate:** Dry Low Emission (DLE) | Control System Restricted Performance (CSRP)
4. **New** Compliant Unit

MCPD Emission Reopeners | CE-AMP Strategy





1. MCPD will be a catalyst for a reducing but **streamlined fleet** of compressor

2. There are **11 sites** with MCPD units to be managed between now & 2030

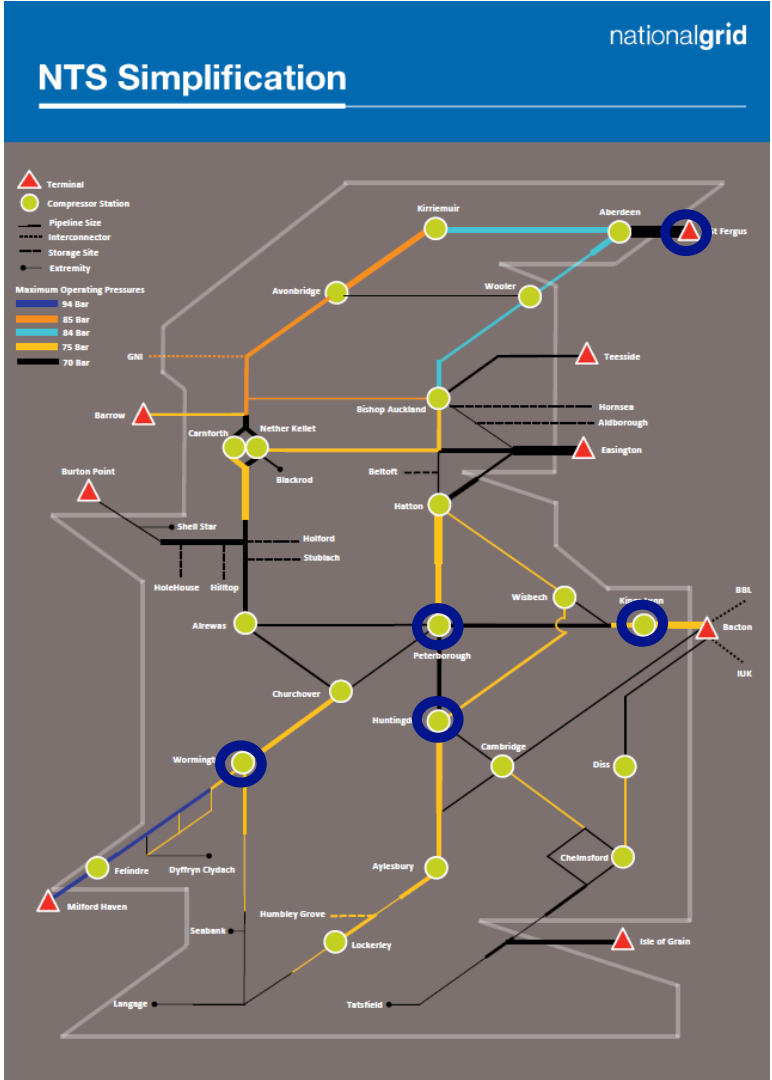
3. We need to **factor in**: meeting peak demand, general SoS, BAT, and the future uncertainties

4. Our approach is **split into 2** phases (T2 & next price control), driven by the sites that are more critical to the network

MCPD Emission Reopeners | Sites

The **first phase** focuses on 5 sites which includes 12 compressor units

1. **The sites.**
    1. St Fergus
    2. Wormington
    3. Peterborough
    4. Huntingdon
    5. Kings Lynn
2. These sites are **key locations** for the supply of gas and the flow across the country
3. The **remaining sites** to be determined in the next phase are:
    - **Kirriemuir | Diss | Cambridge | Chelmsford | Wisbech | Alrewas**



National Grid

MCPD Emission Reopeners | Regulation Process

- **In the T2 Business Plan the 'needs case' to address MCPD non-compliance was accepted but additional steps to robustly identify the right option to take forward – given the uncertainty.**
- **RIIO T2 therefore created a 2 Stage process within the price control**
- **Stage 1 FOSR: We are obligated (through a Price Control Deliverable) to deliver a detailed option selection process that includes final preferred options to Ofgem for approval.**
  - Known as the **Final Option Selection Report** (FOSR).
  - Very **involved process** that includes detailed option selection (long list to short list), feasibility study, detailed Cost Benefit Analysis, and a preliminary Best Available Technique assessment.
  - **Ofgem determine** a minded to position, consult before concluding a position
- **Stage 2 Cost Submission: Following Stage 1, we develop the detailed design and cost case for the final preferred option**
  - **Pre-Front End Engineering Design** (FEED)
  - Tender **long lead** items
  - Confirm the remaining **project costs**
- **Build for 2030**
  - Managing the **construction & network** availability challenges in the process

Future Information

Compressor Emissions Compliance Strategy (CECS) 2019

Compressor Emissions Asset Management Plan (CE-AMP) – MCPD focus

Neil.Rowley@nationalgrid.com

Gas Transmission

Milford Haven Summer Risk

ECR Consultation Amended Proposal

Bridget Hartley
Head of Operational Delivery

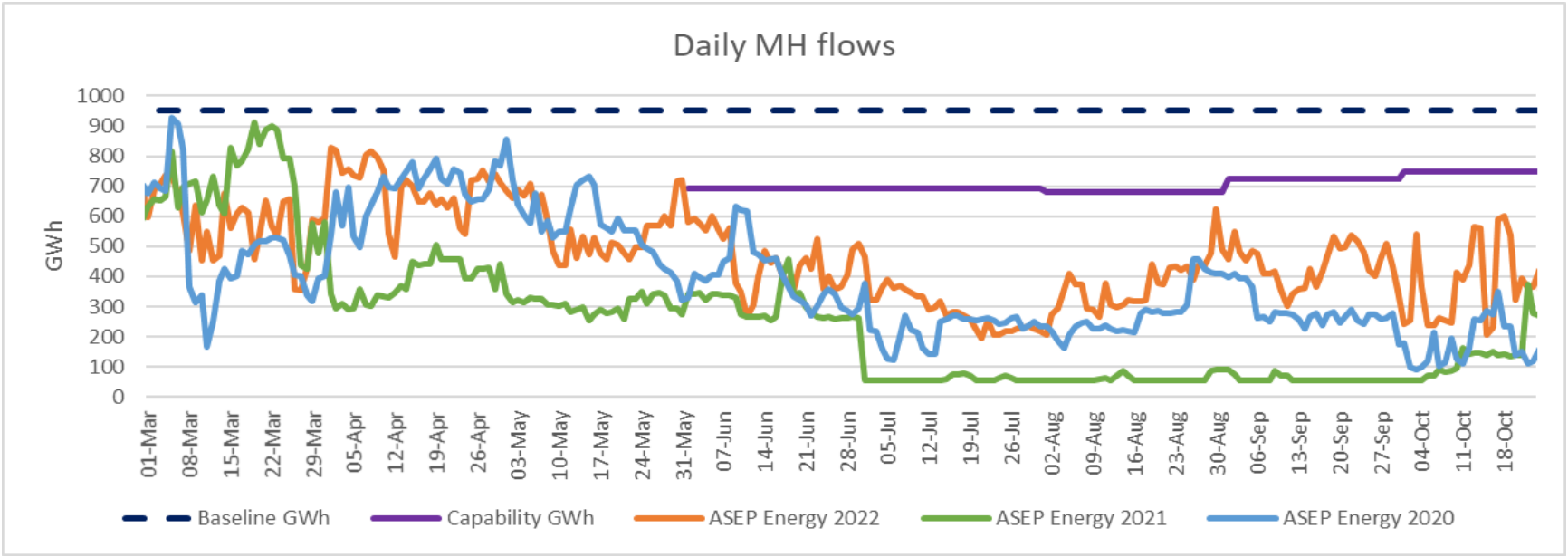
nationalgrid

What happened in summer 2022 at Milford Haven?

The ECR consultation led to reduced capacity made available from 1st Jun – 31st Oct.

Physical capability was not impacted - this remains a product of summer demand levels.

Flows in 2022 were higher than in previous years, though comfortably below capability for majority of Jun – Oct



Why we consulted about summer 2023

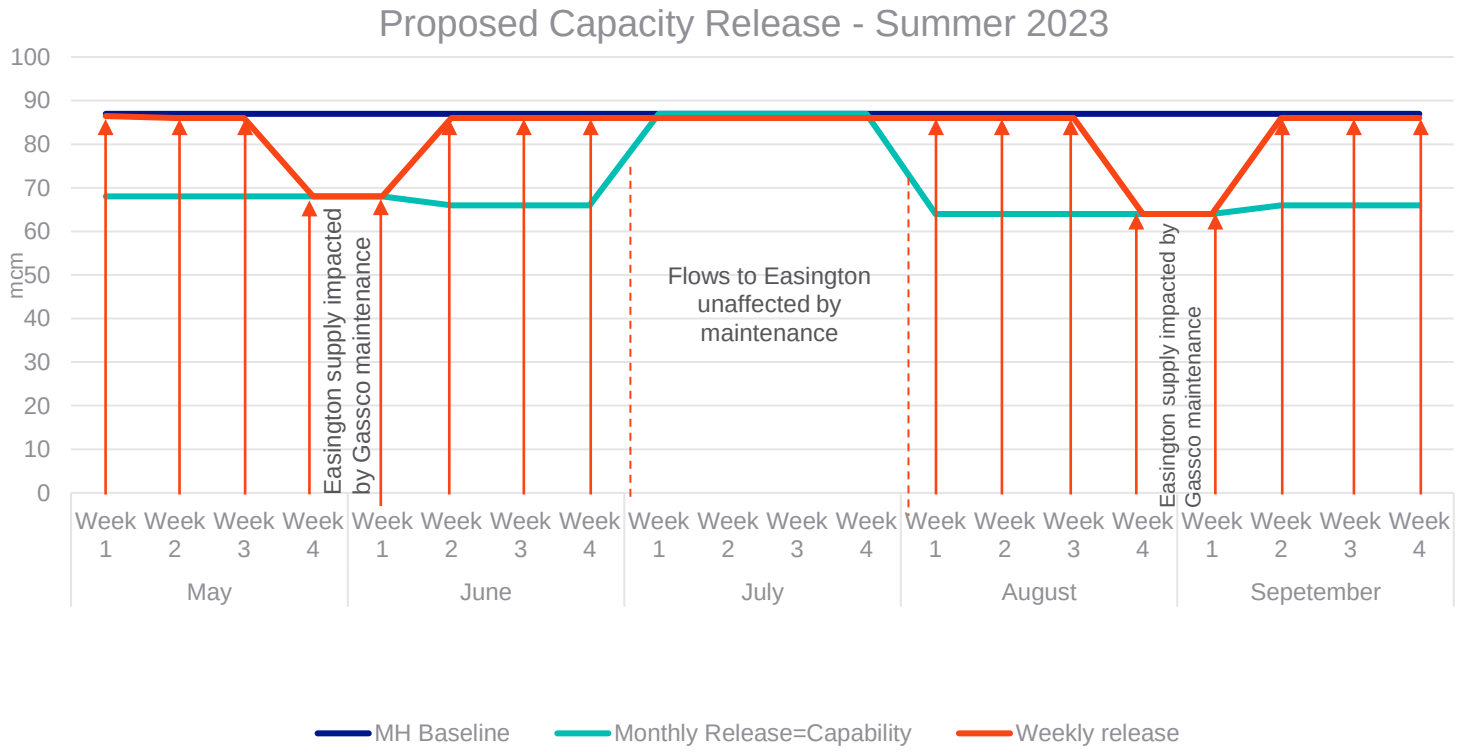
- We are again expecting significant exports to Europe in summer 2023 up to 75mcm/d
- Wider customer / consumer risk and cost to consider, hence Ofgem's involvement
- New information in Nov relating to Norwegian summer supply reductions due to planned maintenance:
  - Maintenance taking place through Summer will impact GB imports link to Gassco pages
    - Vesterled flows (into St Fergus) are planned to reduce to 0 throughout the summer (from May)
    - Nyhamna outage 19th May to 8th June, Easington flows impacted depending on market signals
    - Kollsnes outage 26th Aug to 6th Sept, Easington flows impacted depending on market signals
- There will still be gas being produced but the expectation is that it will flow to Europe due to market signals and not into Easington.
- Our consultation covered ECR's at Milford Haven. The timeframe over which these were proposed to apply is May 23 through to September 23, aligning with Gassco outages.
- We wanted to understand the correct balance between consumer cost realised through constraints (through us not having the network capability to transport very high LNG flows in summer) and consumer cost through higher gas prices from not attracting sufficient LNG into the UK.

	What the consultation responses said
In favour	• Risk correctly identified and successfully mitigated ahead of summer of 2022 • Will remove uncertainty about capacity release, but allow shippers to access capacity up to the system capability level with the sufficient notice period • BAU commercial tools not adequate because of a real possibility that all shippers, who already paid the standard transportation costs, could be exposed to disproportionally high costs
Against	• Terminals were built on the expectation that baseline is available, implementation of the proposal will reduce investor confidence • Reduction of UK attractiveness as LNG cargo destination/ negative impact on Security of Supply • Less cargos delivered / impact on wholesale gas price - warrants further analysis • Ofgem should step in with a complete impact assessment (wholesale price impact, implication on security of supply taking into account new LNG EU terminals, competition distortion among terminals) • Flawed assumptions in cost of constraint analysis • Limited visibility is given re operational risks (and the underlying flow dynamics) • This issue will become an annual exercise/need for long term solution • Regulatory inconsistencies within and across National Grid's licence, the UNC and methodology statements • SHG estimate send out from the Dragon and seek to schedule our deliveries in a way that avoids NTS constraints • Milford Haven put at competitive disadvantage compared to the Isle of Grain

Alternatives suggested

	Details
1.	Align volumes and timelines more closely with Gassco maintenance
2.	Release capacity at a value between that proposed and the baseline to provide headroom to support cargoes being contracted but which is unlikely to lead to a physical constraint
3.	Offer a weekly product with longer lead time (recognising releasing monthly capacity is untenable)
4.	Available LNG storage should influence appropriate locational trades and buyback prices.
5.	Locational sell trade could be executed at Pembroke Power Station if it was not already generating at maximum. Gas could be priced based on the level at which the generator could sell the power produced from it. This selling pressure would probably decrease power prices.
6.	Release the full baseline capacity for May. Should capacity end up being very tight, we envisage that deferrals might be made until June whilst June remains unsold, and will enable NGG to trial releasing full capacity levels.
7.	Offer alternative capacity to Users who execute locational trades or buybacks to give them confidence they will be able to reschedule gas injections that have been subject to those trades (reduce capacity procurement risk for them and hence might reduce the cost of locational trades).
8.	Capacity restrictions apply after a number of constraint days *(not in feedback, but considered by NGG in the past)*

Modified proposal



Monthly auctions sell capacity for every day of the month (i.e. we can't sell monthly with an exclusion of last week of the month/first week of the month).

Weekly capacity offered is reduced by monthly sold quantities.

Gas Transmission

Updates

Rachel Hinsley
Operational Liaison & Business Delivery Manager

nationalgrid

Shaping the future 2022/23

We talked about…

13 webinars across 3 weeks

- Keynote speech
- Facilitating code and commercial changes
- Sustainable construction
- Accessing Energy data
- Operating the network
- Methane emissions
- Driving a positive environmental and community impact
- H2 regulatory framework
- Innovation
- FutureGrid
- Blending
- Future of Heat
- Transitioning to 100%

Thank you for engaging

1237 stakeholders	235 questions	8.95 CSAT
26 stakeholder groups	£1175 raised for Barnardo's	8.65 **SSAT**

"Industry leading webinar series"

"Really thoughtful set of seminars, lots of new information. It's good to see so much transparency in this space."
– UNIPER

All materials are uploaded here

Want us to cover something specific? Get in touch!

Jennifer.Pemberton@nationalgrid.com

Shaping the future 2022/23 - What we heard

Do our priorities continue to deliver your needs?

66% Yes

33% Somewhat

Comments:

If capacity needs to be restricted at key entry points, then there is room for improvement

FY: 21/22

56% Yes
42% Somewhat
3% No

Facilitating code and commercial changes

We asked: What would you like us to focus on in the market Change space?

1. Enable the energy transition
   - Alignment with the electricity market
   - Enabling the hydrogen market
2. Facilitating non-shipper user changes
3. Create stability

H2 regulatory framework

We asked: How would you rank key priority areas?

1. A form of strategic planning is critical
2. **Storage will be a vital component**
3. A large-scale hydrogen network is a crucial requirement to enable the UK to achieve net zero

Accessing energy data

We asked: Are there any minor/quick changes you would like to see on MIPI?

1. Latest Storage stocks table from the Prevailing View
2. Data Item Explorer - add UIG (Unidentified Gas) as a data item by LDZ both Forecast and Actual
3. Is it possible to change the units of data

Blending

We asked: Do you believe blending is needed at a Transmission level?

74% Yes

19% Maybe

7% No

Gas Operating Margins for Winter 2022/2023 - Supplementary Tender Results

Operating Margins is gas which National Gas may use to **manage the system** at times of stress – as a **short term measure** over a day to manage network pressures.

The Operating Margins portfolio is comprised of LNG, Gas in storage and demand reduction contracts.

National Grid keeps the Gas Operating Margins volumes under **constant review**, and as per UNC may enter into OM contracts within the OM Year.

Key Message:

OM is a short term product used to manage system stress events.

Gas Operating Margins for Winter 2022/2023

During summer 2022 a **reassessment** was made of the **Operating Margins requirement** for 2022/2023, following developments in the gas market since February 2022.

The reassessment included analysing different supply flow patterns **to meet winter peak demand day** – an additional 75GWh (minimum Operating Margin gas was initially identified to support the additional scenarios identified)

As a result **National Grid tendered** for the additional Operating Margins, for a service from 01/12/2022 until 30/04/2023.

This tender resulted in a new Aggregate Operating Margins Booking 2022/23 as follows:

	2022/23 Original Volume Booking (GWh)	2022/23 Revised Volume Booking (GWh)	2022/23 Original Max Deliverability (GWh/d)	2022/23 Revised Max Deliverability (GWh/d)
OM Volume Booking	869	989	623	650

For further information including a full report on the Operating Margins tender and a revised Operating Margins statement please see: https://www.nationalgrid.com/gas-transmission/balancing/operating-margins-om

Post Exercise Report

Following on from the Emergency Exercise in September the post exercise report following Exercise ‘Degree’ is now published and available on our website to read.

The report includes information on the scope of the exercise, the key areas of the exercise, for example loading shredding and gas and electricity interactions, and also includes the learning points from the exercise.

Web page is: https://www.nationalgrid.com/gas-transmission/safety-and-emergencies/network-gas-supply-emergencies-ngse

Direct link to report is: https://www.nationalgrid.com/gas-transmission/document/141611/download

To provide any feedback on the report or for additional information please contact: gasops.emergencyplanning@nationalgrid.com

Gas
Transmission

Q&A

nationalgrid

How to contact us

Operational Liaison Team

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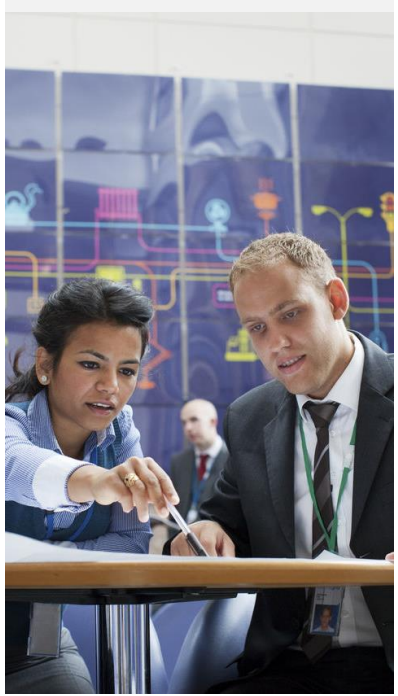
- Operational Liaison Email: Box.OperationalLiaison@nationalgrid.com

For updates and interaction with National Grid Gas please visit;
https://datacommunity.nationalgridgas.com/

For the National Grid Gas Website, please visit;
https://www.nationalgridgas.com/about-us

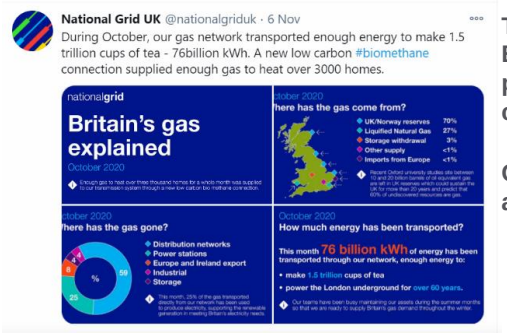


Key resources available to you

Registration is open for all events at:
https://www.nationalgridgas.com/data-and-operations/operational-forum

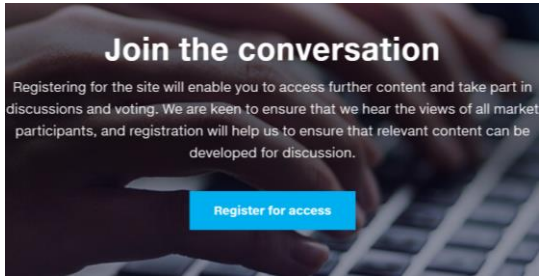
Gas Distribution List

https://subscribers.nationalgrid.co.uk/h/d/4A93B2F6FAF273DE



The monthly Gas Explained information is published on the data community website

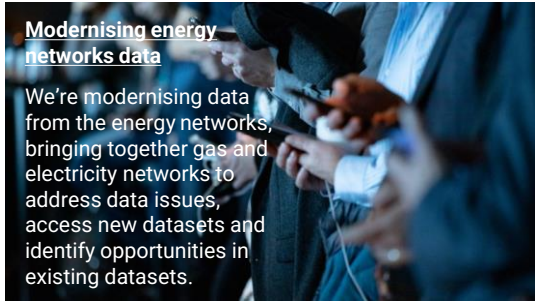
Or follow our personal accounts on LinkedIn



For updates and interaction with National Grid please visit;
https://datacommunity.nationalgridgas.com/

For the National Grid Gas Website, please visit;
https://www.nationalgridgas.com/about-us

Maintenance Planning
https://www.nationalgrid.com/uk/gas-transmission/data-and-operations/maintenance



Energy Data Request Tool:
Microsoft Forms Link

Confirmed Calendar Year 2023 Operational Forums

The forums will be hybrid via Microsoft Teams and at the Clermont Hotel, London

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Clermont & Online	Clermont & Online	Clermont & Online	x	Clermont & Online	Clermont & Online	x	x	Clermont & Online	Clermont & Online	Clermont & Online	x
26/01	23/02	23/03		18/05	22/06			21/09	19/10	23/11	

Registration is open for the February event at:
https://www.eventbrite.co.uk/e/525435721387

The Clermont Hotel
Charing Cross
London
WC2N 5HX