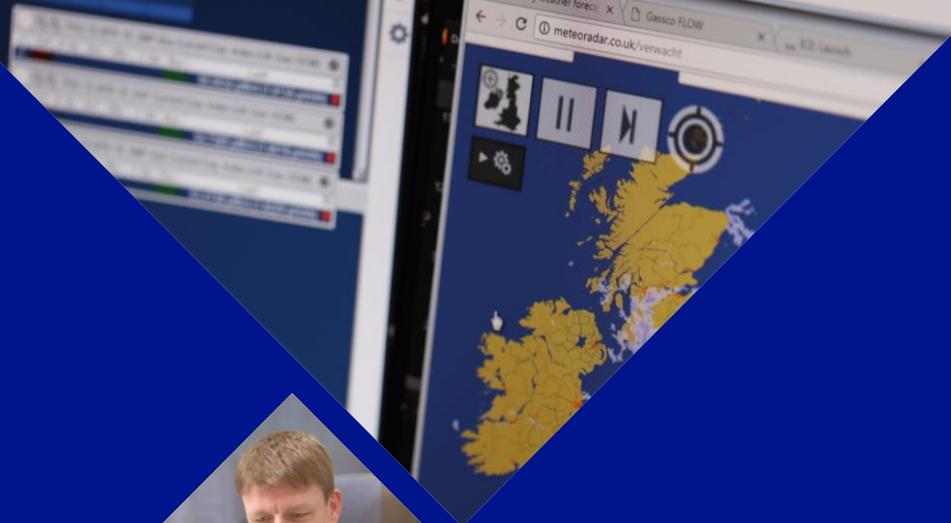


Gas System  
Operator

# Gas Operational Forum

London Radisson Grafton  
7<sup>th</sup> May 2019

nationalgrid



# Health & Safety

## No Fire Alarm testing is planned for today

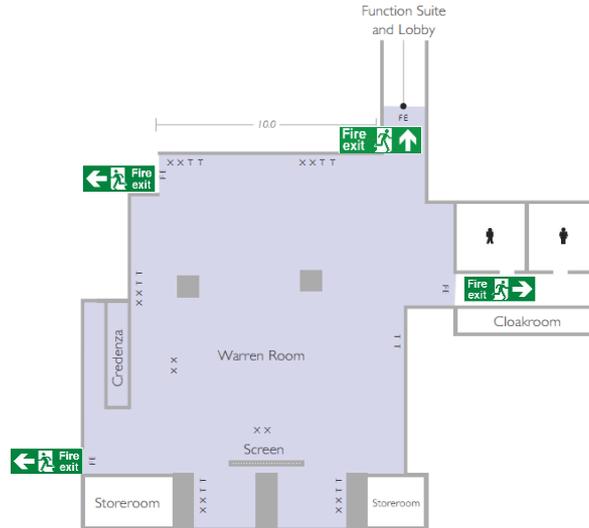
In case of an alarm, -please follow the fire escape signs to the evacuation point

This is at the rear of the Hotel by Fitzroy Square



## Warren Room Fire Exits

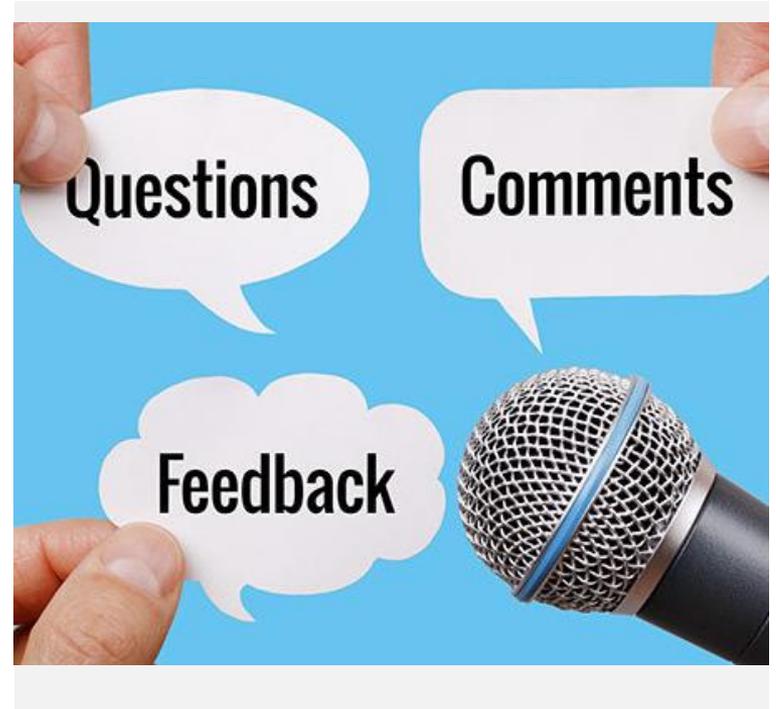
There are 4 fire exits in the Warren Room, as shown by the map below



# Feedback & Questions

## For any questions during the forum you can:

- Ask during the presentations
- Speak to an NG representative during the break
- Utilise the Query Surgery time at the end of the Forum



# Agenda for today

<b>01</b>	Previous Operational Forum Actions and Feedback since Last Forum	09:30
<b>02</b>	Operational Overview	09:40
<b>03</b>	Gas Future Operability Planning – within day study update	09:55
<b>04</b>	Brexit Planning Update - BEIS	10:20
<b>05</b>	GB EU Charging Project	10:55
<b>06</b>	Hydrogen Future	11:10
<b>07</b>	Operational Data enhancements – Instantaneous Demand, GQ, UIG	11:35
<b>08</b>	Summer Outlook	11:50
	<b>Signposting of information</b>	
<b>09</b>	UNC Modifications Top Queries Winter Severity Statistics GEMINI Updates	12:00

## Breaks:

### Morning Break

10:30 – 10:55

### Lunch Break & Query Surgery

12:00 onwards

# National Grid and Xoserve Attendees

national**grid**

---

## Gas Operations

- Karen Thompson
- Jon Davies
- Martin Cahill
- Suki Ferris
- Karen Healy
- Imran Abdulla

---

## Strategy & Regulation

- Gin Uppal
- Elliott Dunn

---

## Business Change

- Sarah Carrington

# Previous Actions

Item	Action	Detail
Gas Quality	Industry to provide feedback about which elements of gas composition data would be most useful.	No feedback received will be covered as part of main agenda.
Forum Question	Include answers to questions at forums in minutes	Available in March minutes, and will continue to be included in the future

Gas System  
Operator

02

# Operational Overview

May 2019

nationalgrid

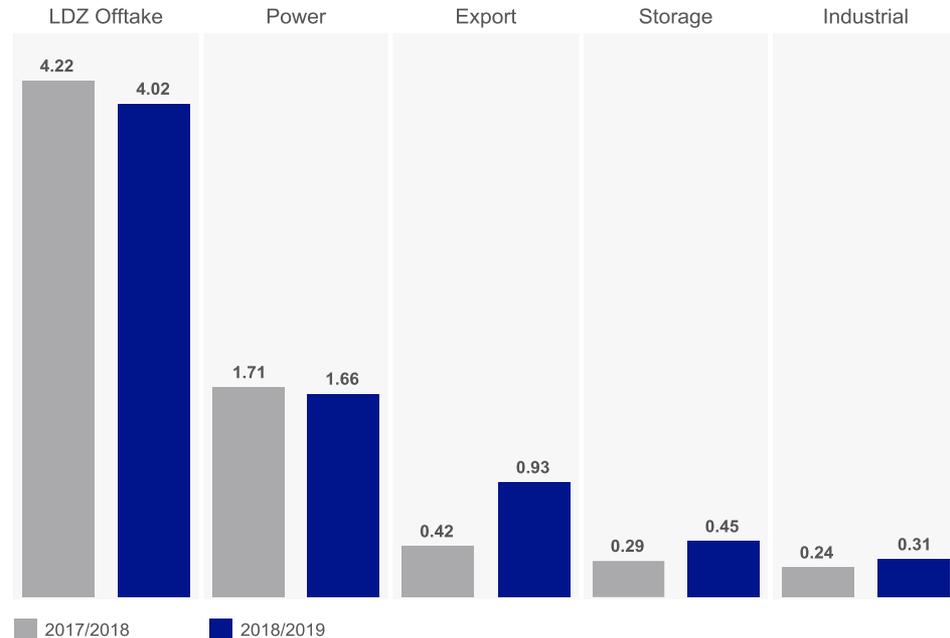


# Demand - Components

The profile of demand seen so far this Summer draws comparison to the same period last year.

The most significant change is in export, where an additional half a billion cubic meters of demand has been made since 1<sup>st</sup> March 2019.

Summer Demand (bcm)  
(1st March to 30th April)

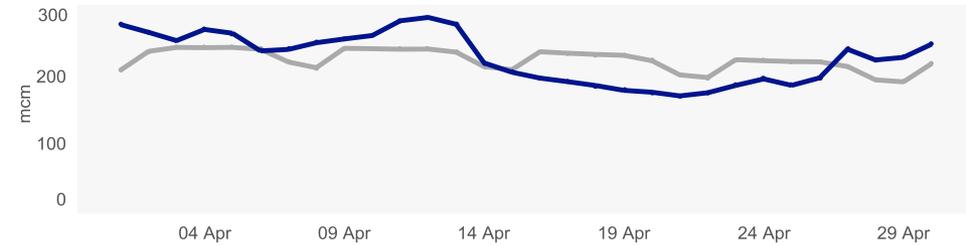


# Demand – Comparison to seasonal norm

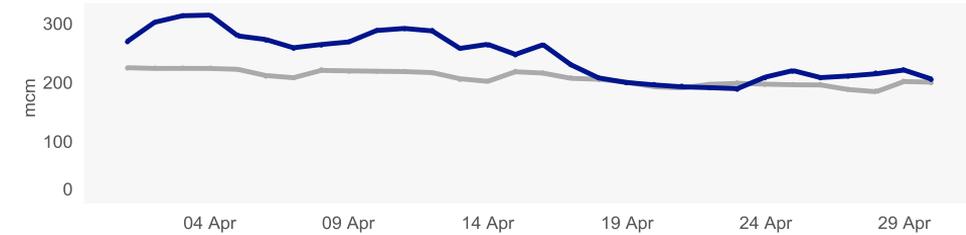
So far this Summer demand has exceeded or been in line with seasonal normal expectations.

Last year saw a similar pattern at the start of the year until abnormally high late April temperatures saw demand fall below normal expectations

**Summer 2017/2018**  
(1st March to 30th April)



**Summer 2018/2019**  
(1st March to 30th April)



■ Demand

■ Seasonal Normal Demand

# CWV

CWV for this Summer started at a much higher level compared to 2018's low temperatures and snow and remained at a steady level during March before increasing towards the end of April

Summer CWV  
(1st March to 30th April)

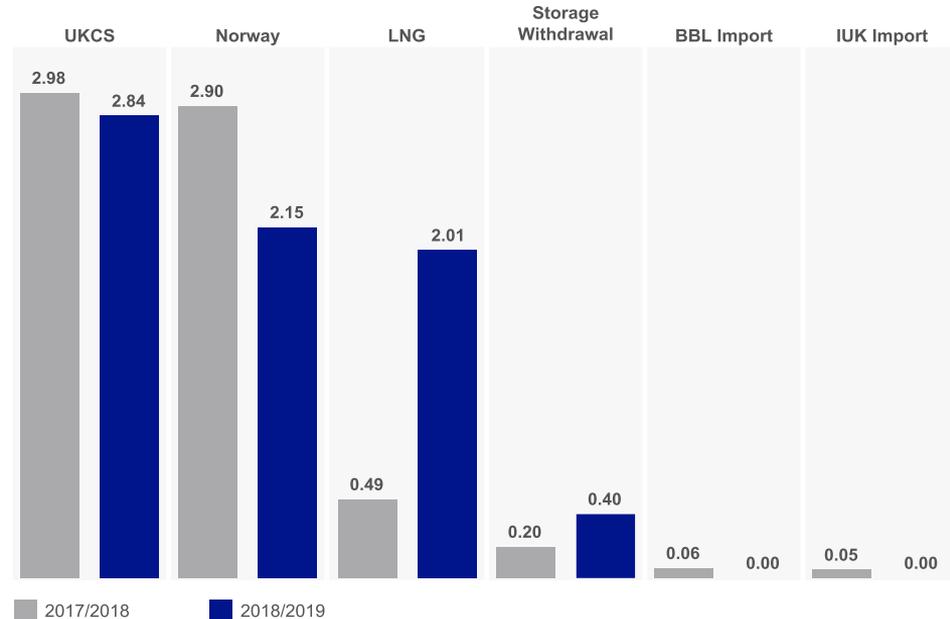


# Supply - Components

Once again we continue to see pronounced increase in supplies from LNG, a pattern common throughout this gas year.

We also, as a result, continue to see a reduction in the proportion of gas being supplied from IUK and Storage.

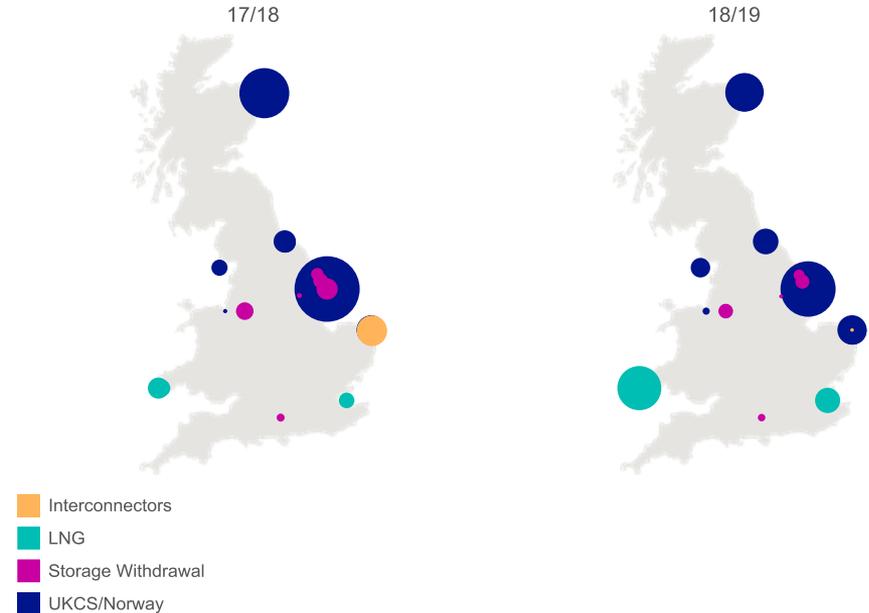
Summer Supply (bcm)  
(1st March to 30th April)



# Supply - Location

The increase in supply from LNG is further illustrated by the locational profile of supply, with a much larger proportion of gas coming from Isle of Grain in the South East and also from South West Wales.

Summer Supply by Location  
(1st March to 30th April)

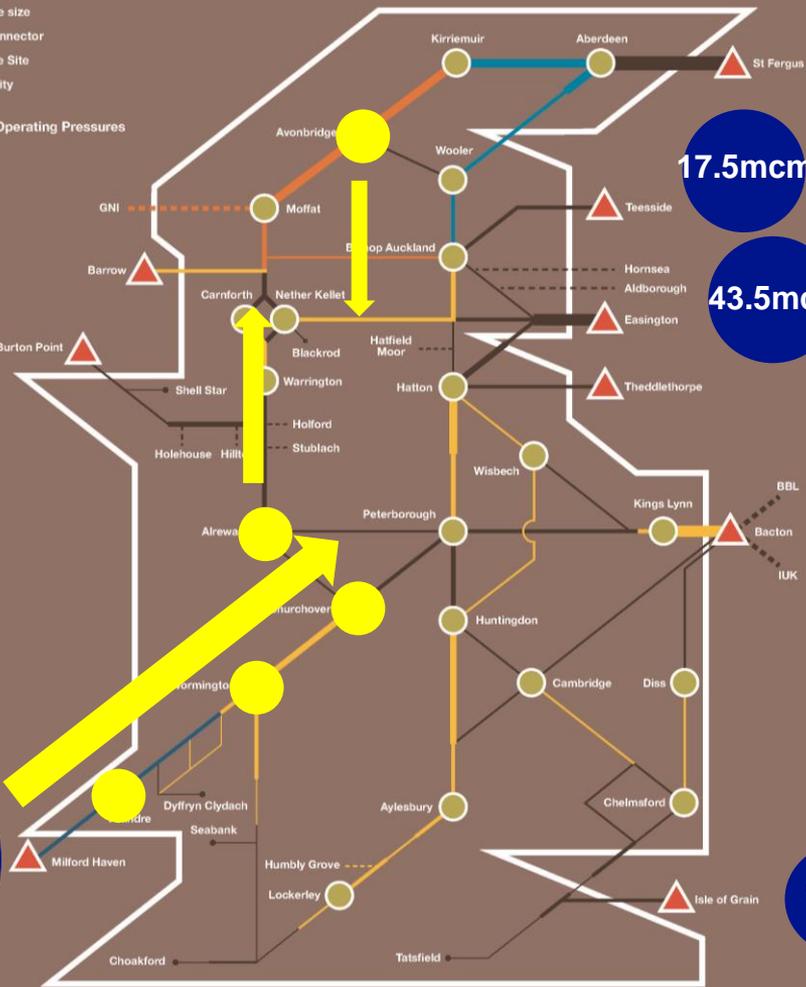


1<sup>st</sup> May 2019

- Terminal
- Compressor Station
- Pipeline size
- Interconnector
- Storage Site
- Extremity

Maximum Operating Pressures

- 94 Bar
- 85 Bar
- 84 Bar
- 75 Bar
- 70 Bar



4.1mcm

1.3mcm

57.7mcm

17.5mcm

43.5mcm

34.9mcm

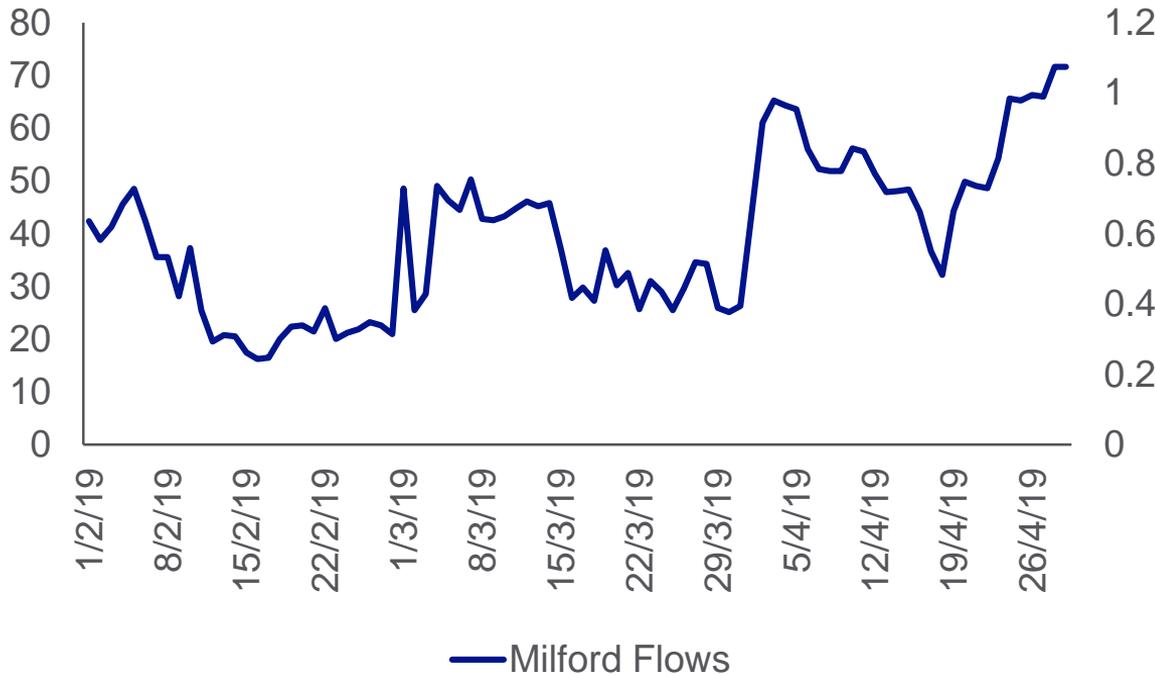
73.4mcm

9.9mcm

Felindre, Wormington and Churchover utilised for SW flows

Avonbridgeto assist North to South flow, no other northern compression required

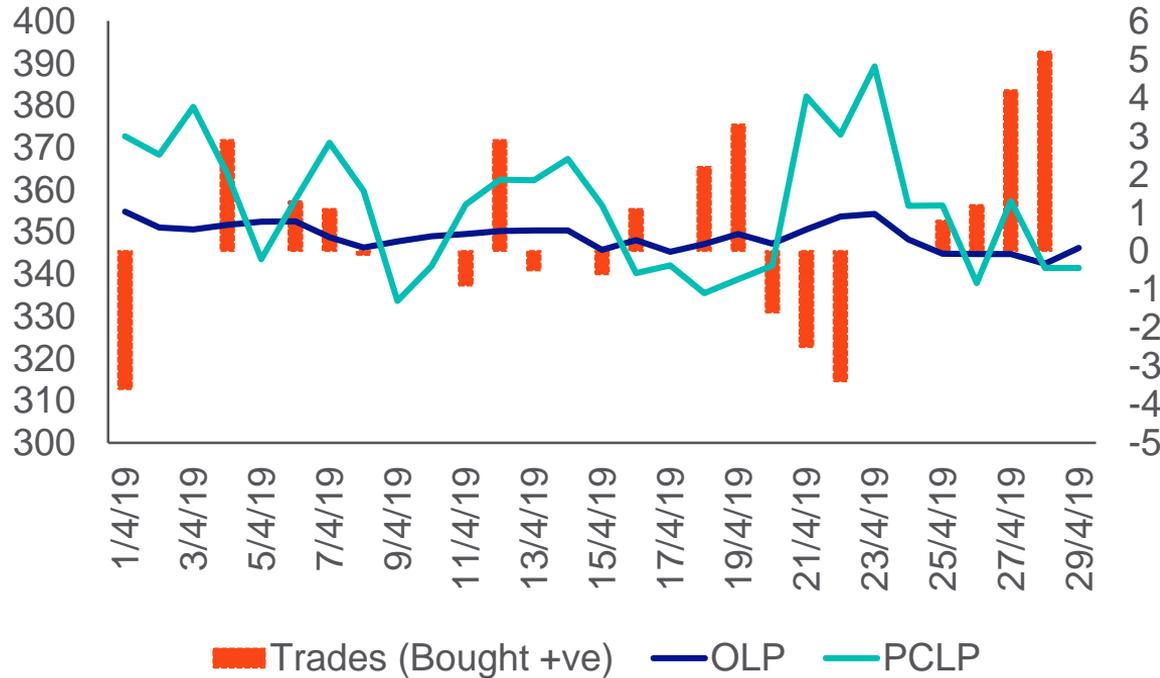
# Milford Haven ASEP LNG Flow in April



- Chart includes combined flows from South Hook and Dragon LNG Terminals
- Flows have increased during April, with the trend expected to continue into May

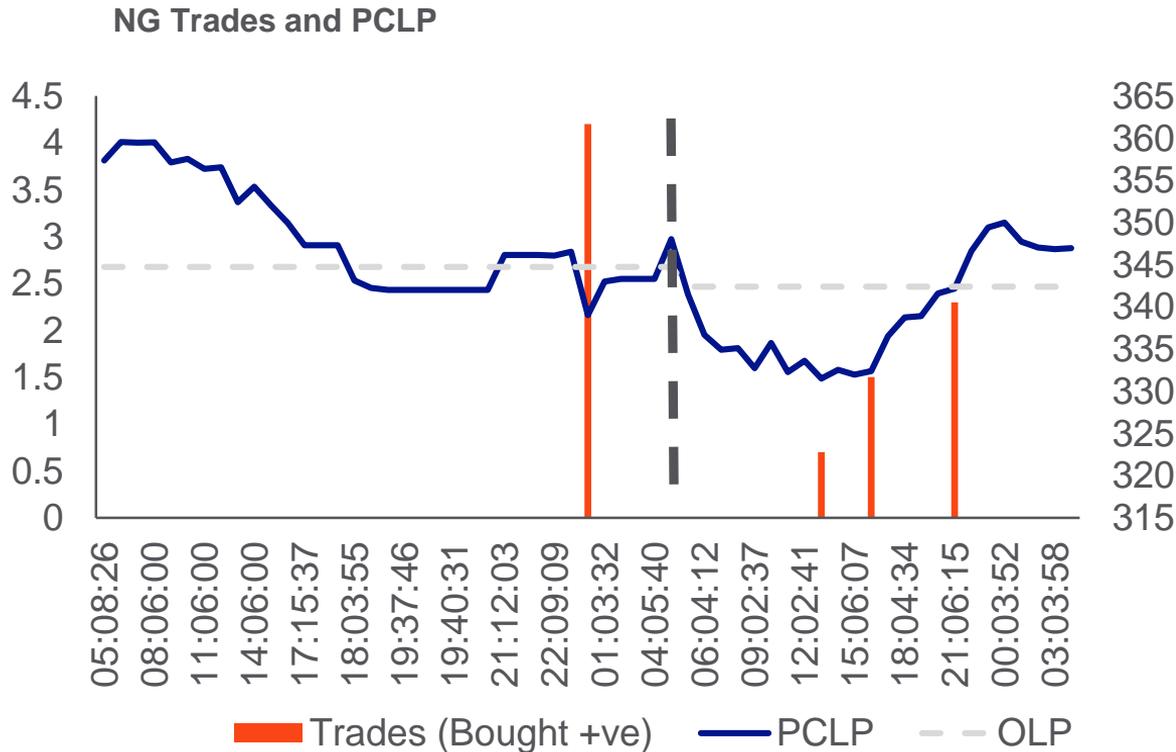
# Trading and Linepack during April

NG Trades, Opening Linepack and PCLP (05:00)



- Consistently started the day heavy throughout April
- Despite this, sells not always required to achieve end of day balance

# Trading during weekend of 27<sup>th</sup> and 28<sup>th</sup> April



- Contingency process invoked for EDSS on Saturday 27<sup>th</sup> meant late buy required in the gas day
- Sunday 28<sup>th</sup> saw a larger supply/demand imbalance than expected, requiring buys throughout the day
- All of this data is now available on NG.com

Gas System  
Operator

03

# Gas Future Operability Planning

Karen Healy and Imran  
Abdulla

nationalgrid



# Agenda for today

How linepack swing has changed

How we manage linepack levels

Real life South East example

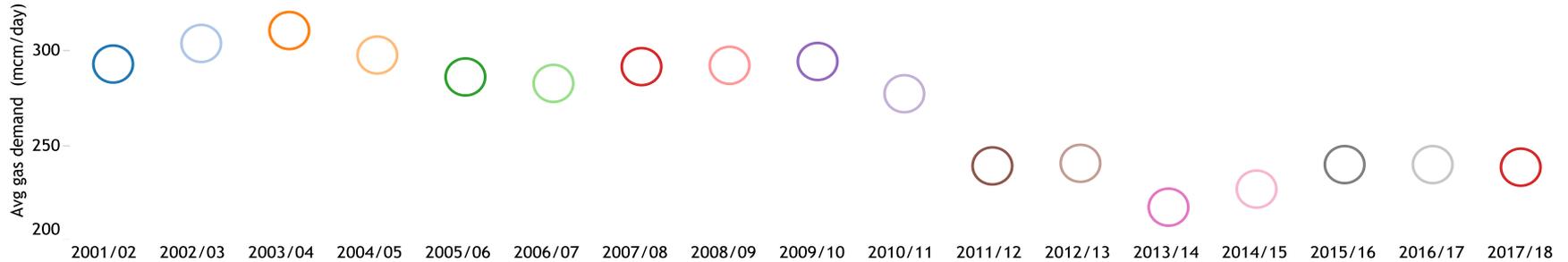
What you have told us

Meeting future customer within-day needs

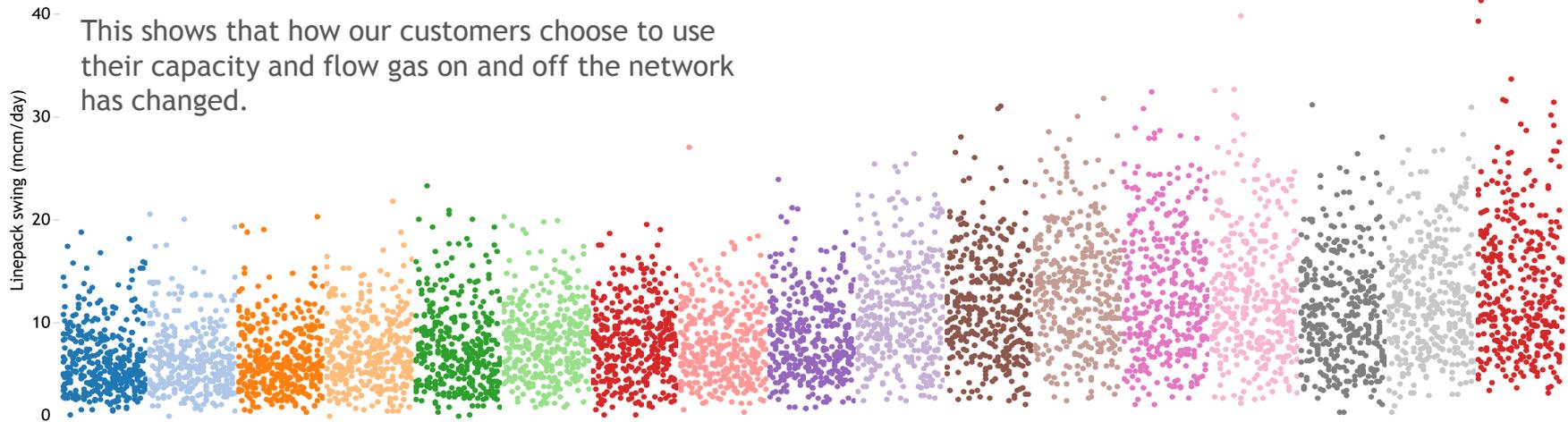
Options for managing linepack

Thank you & Next steps

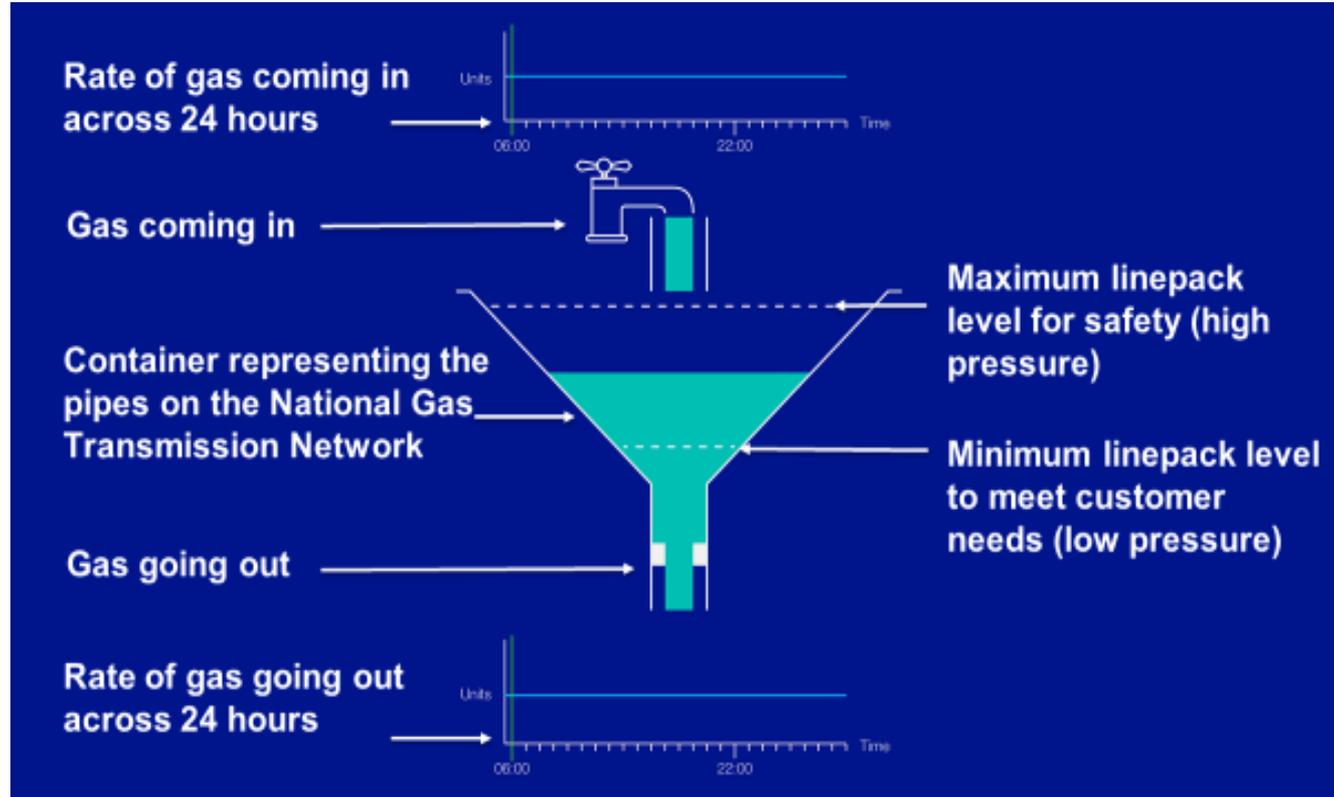
# Linepack swing has increased despite gas demand decreasing.



This shows that how our customers choose to use their capacity and flow gas on and off the network has changed.

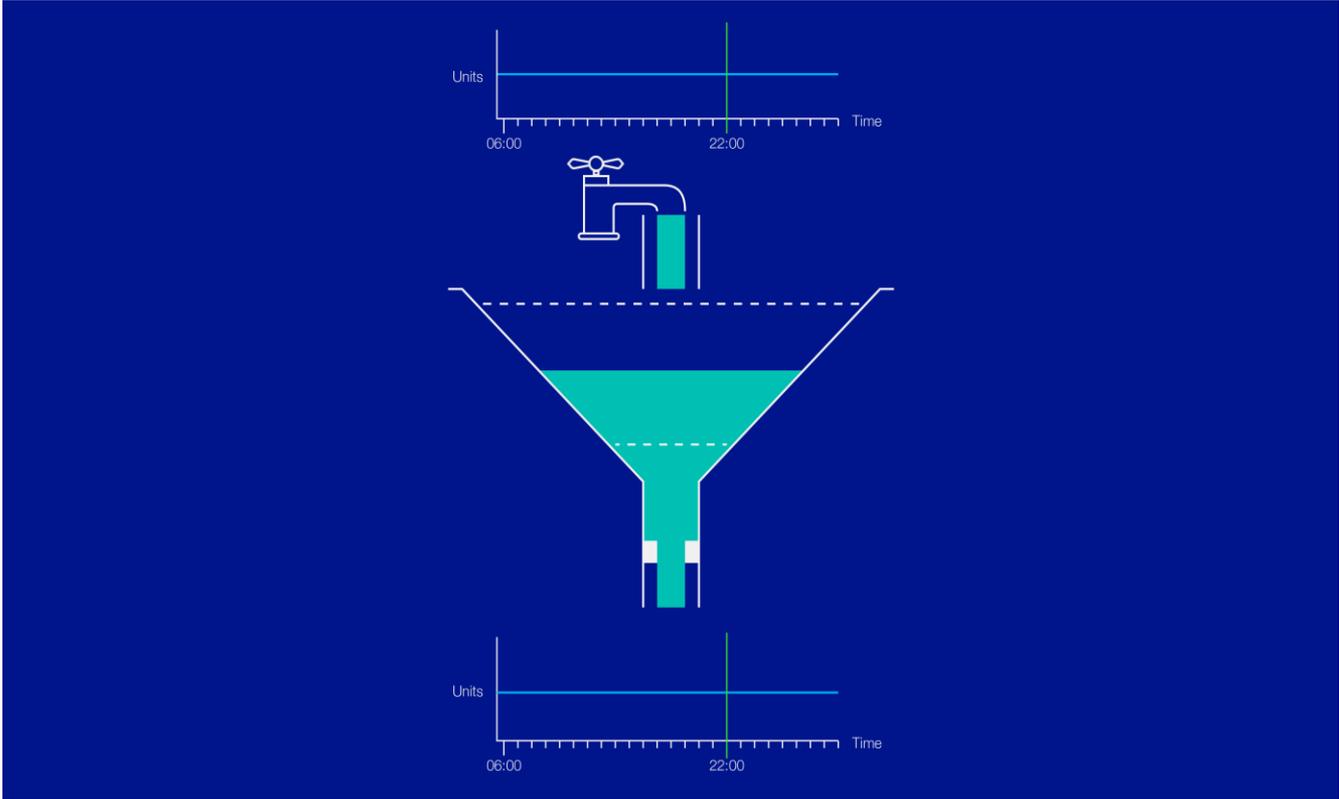


# Introduction into the sink analogy



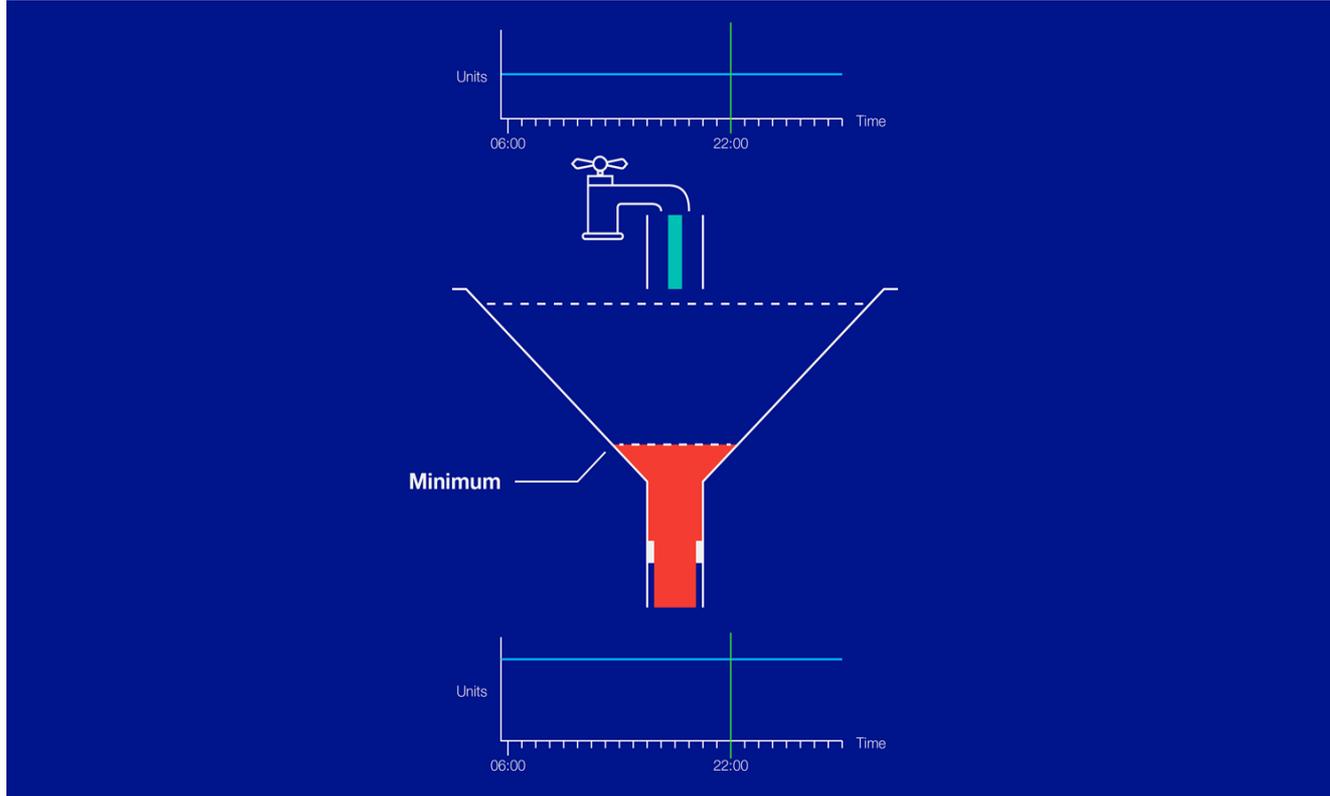
# Supply equals demand

Linepack level remains constant



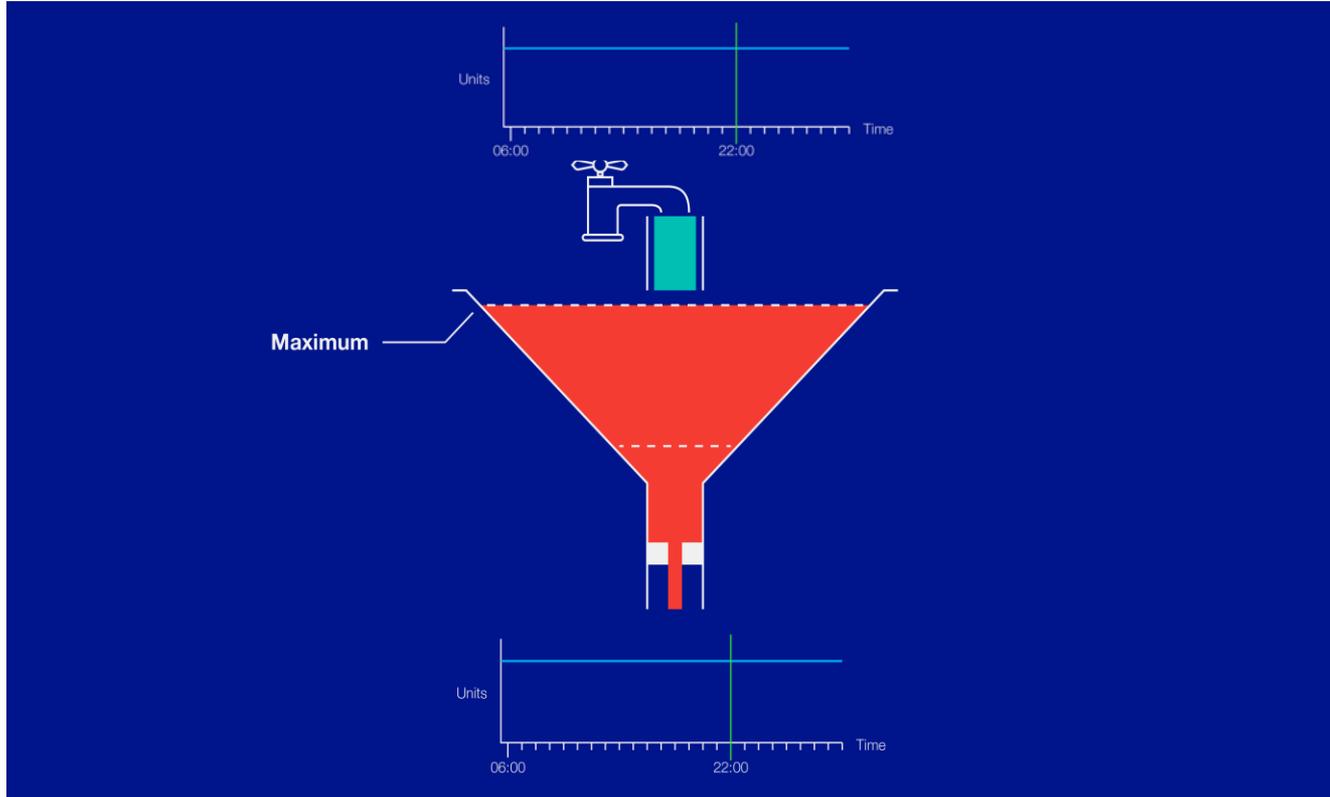
# Demand is greater than supply

Linepack level may reach maximum level → risk to offtake pressures

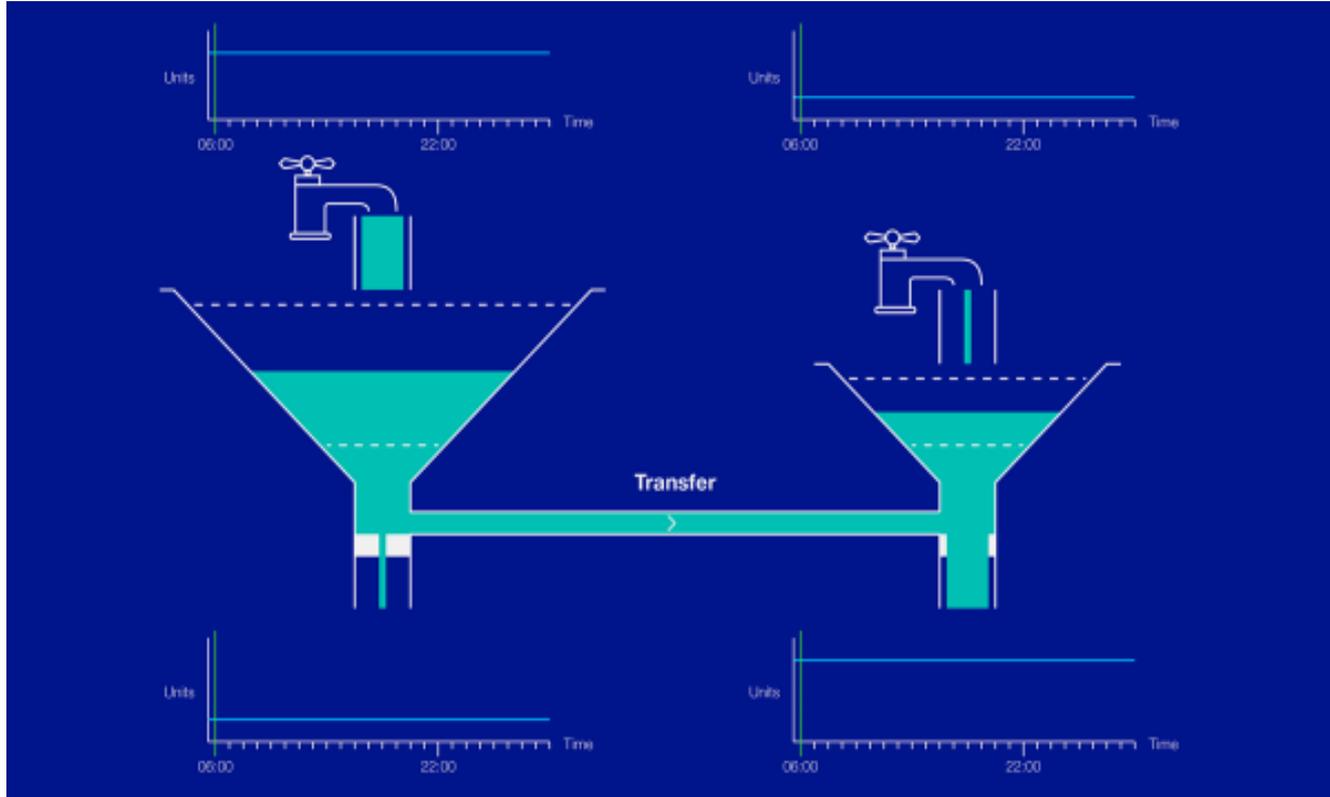


# Supply is greater than demand

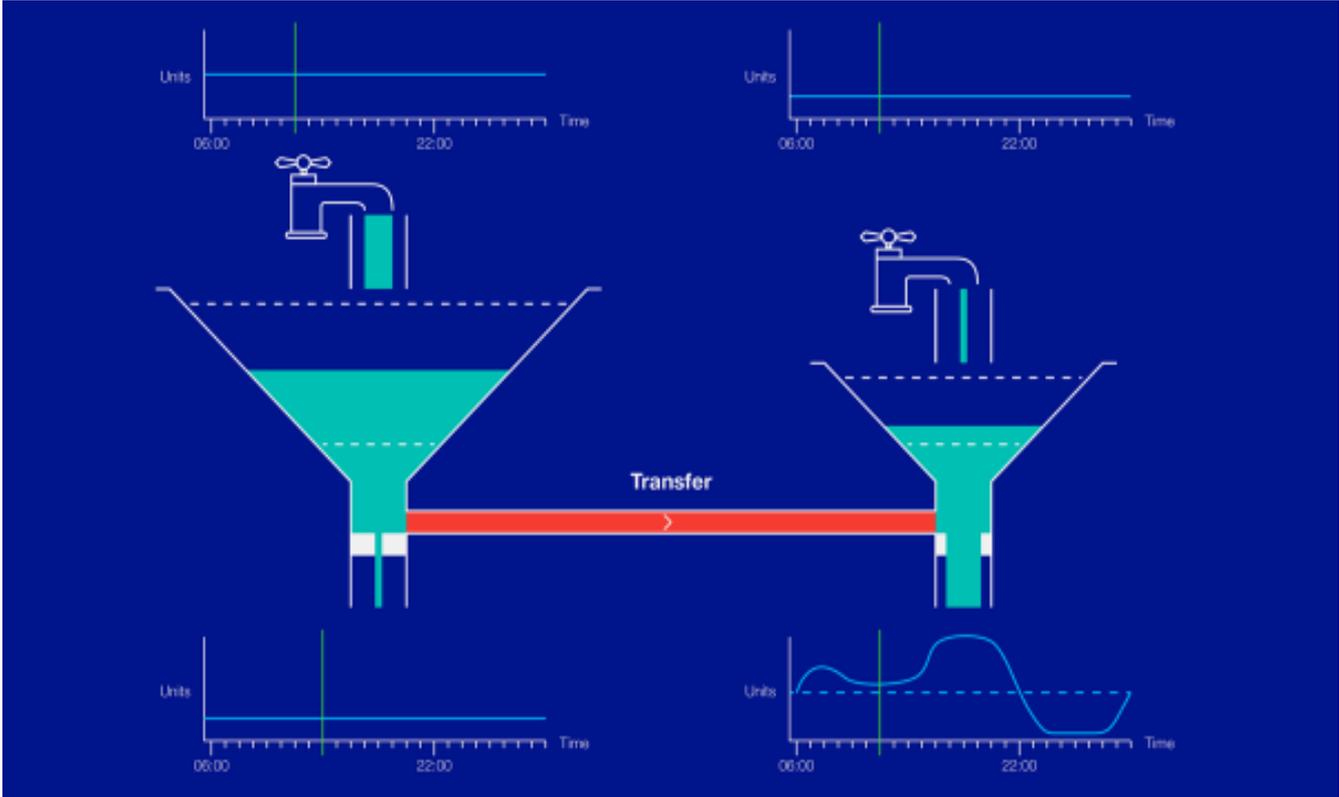
Linepack level may reach maximum level → safety risk



# Our ability to transfer between zones allows us to manage imbalances

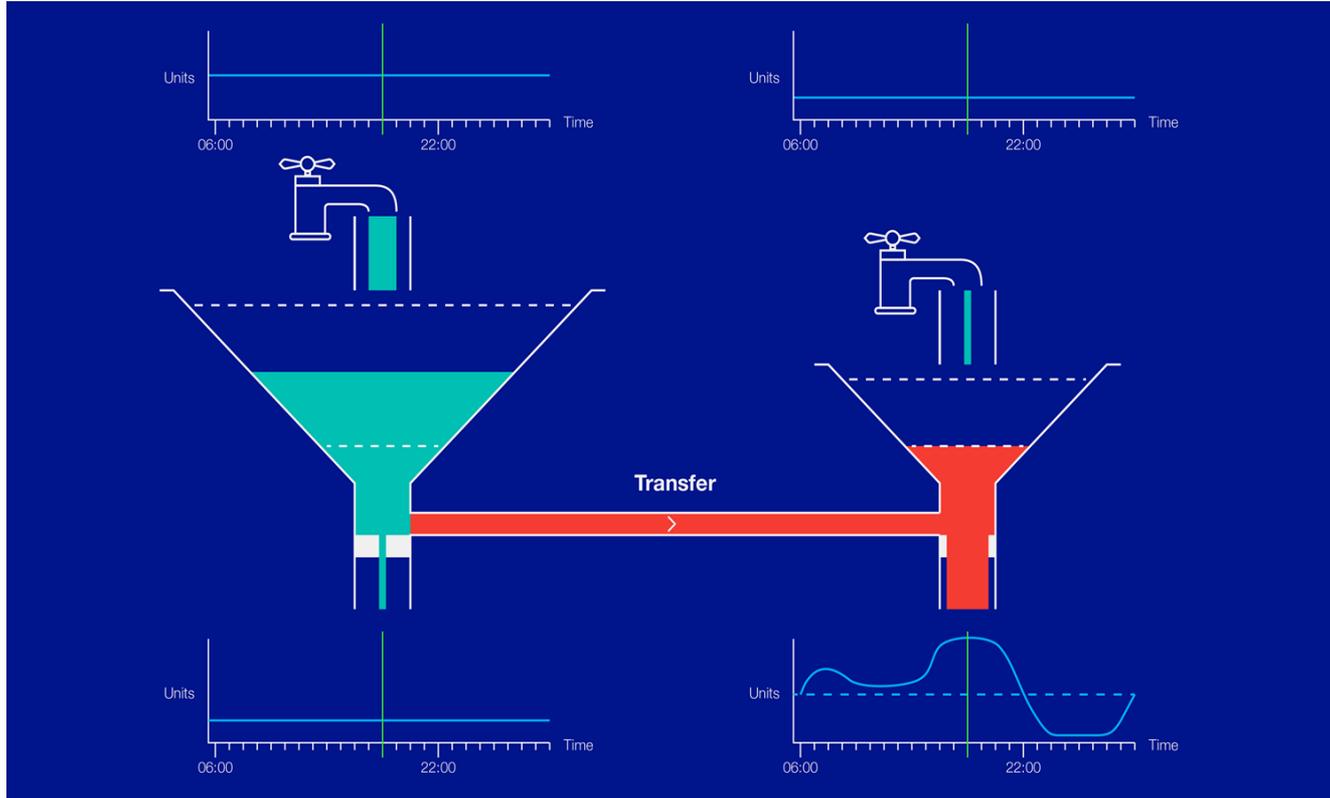


# Transfer capability is insufficient to enable both zones to balance

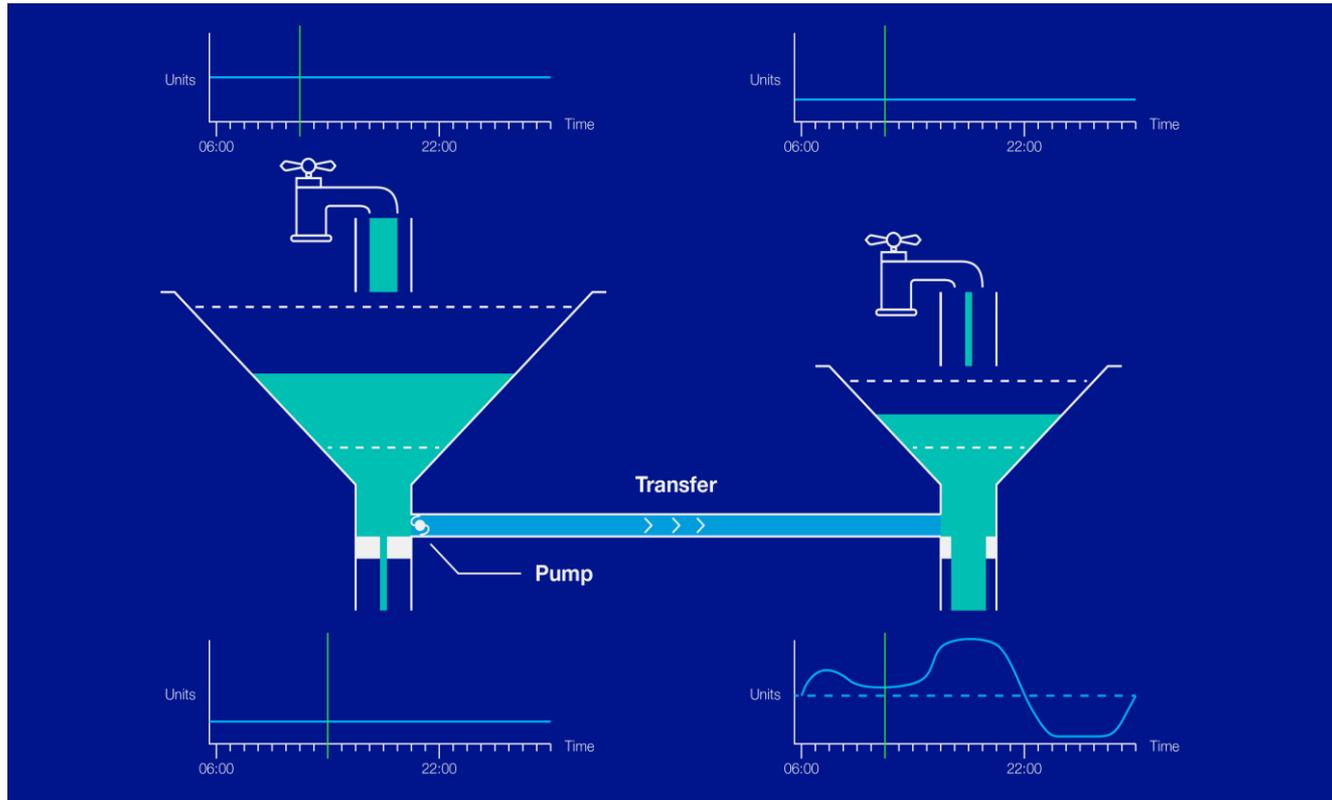


# If we don't take further action.....

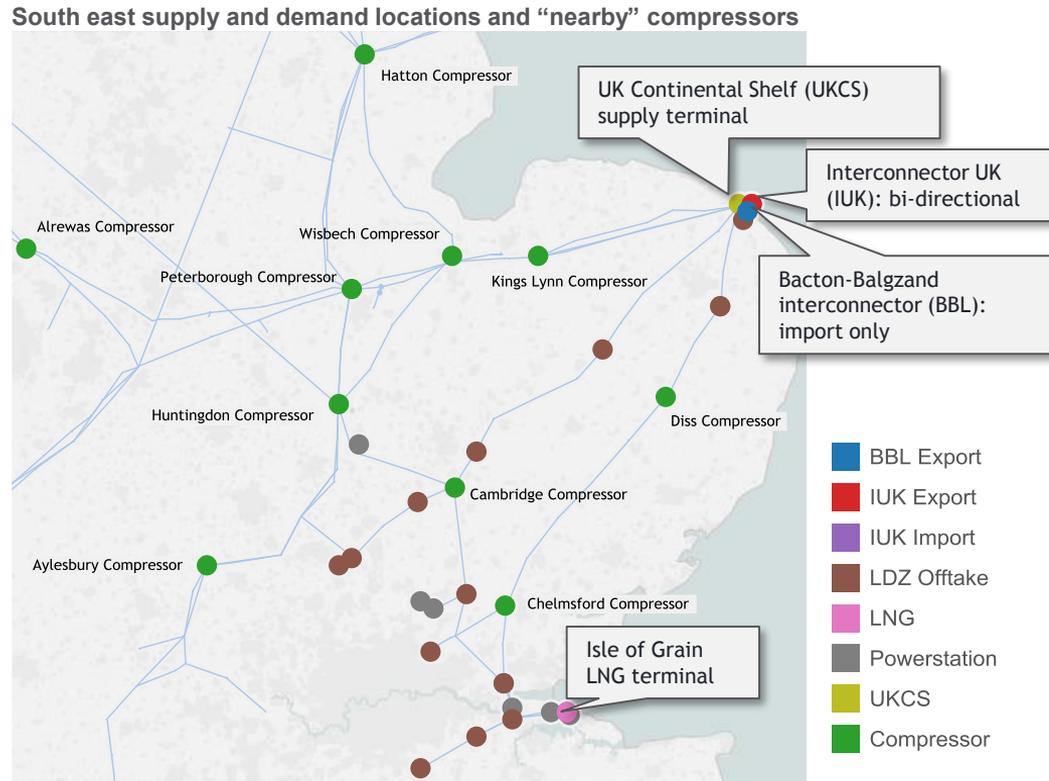
The linepack in the sink / zone on the right could reach the minimum level



# NG use assets (compression) to increase the transfer rate

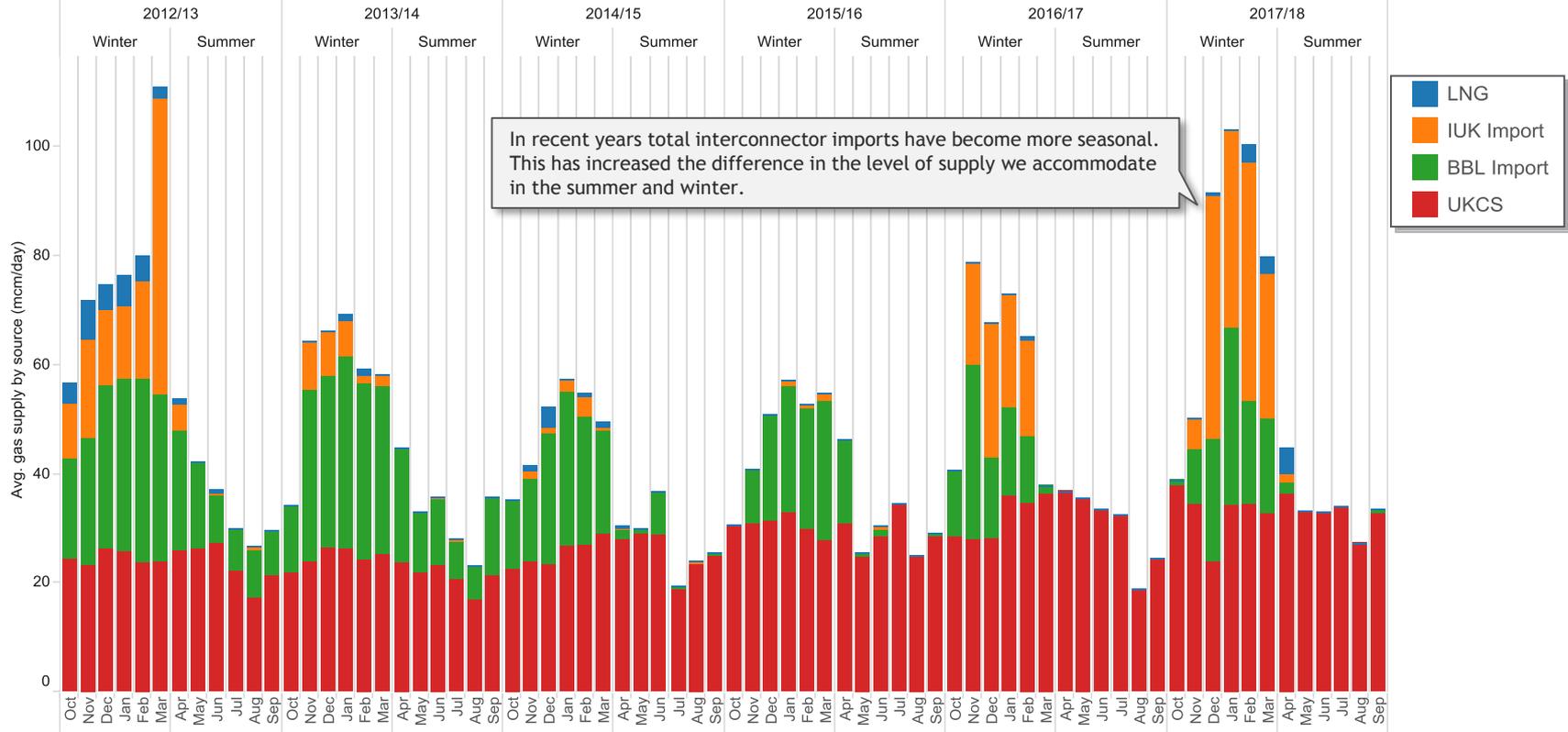


# The south east has an array of gas entry and exit sources



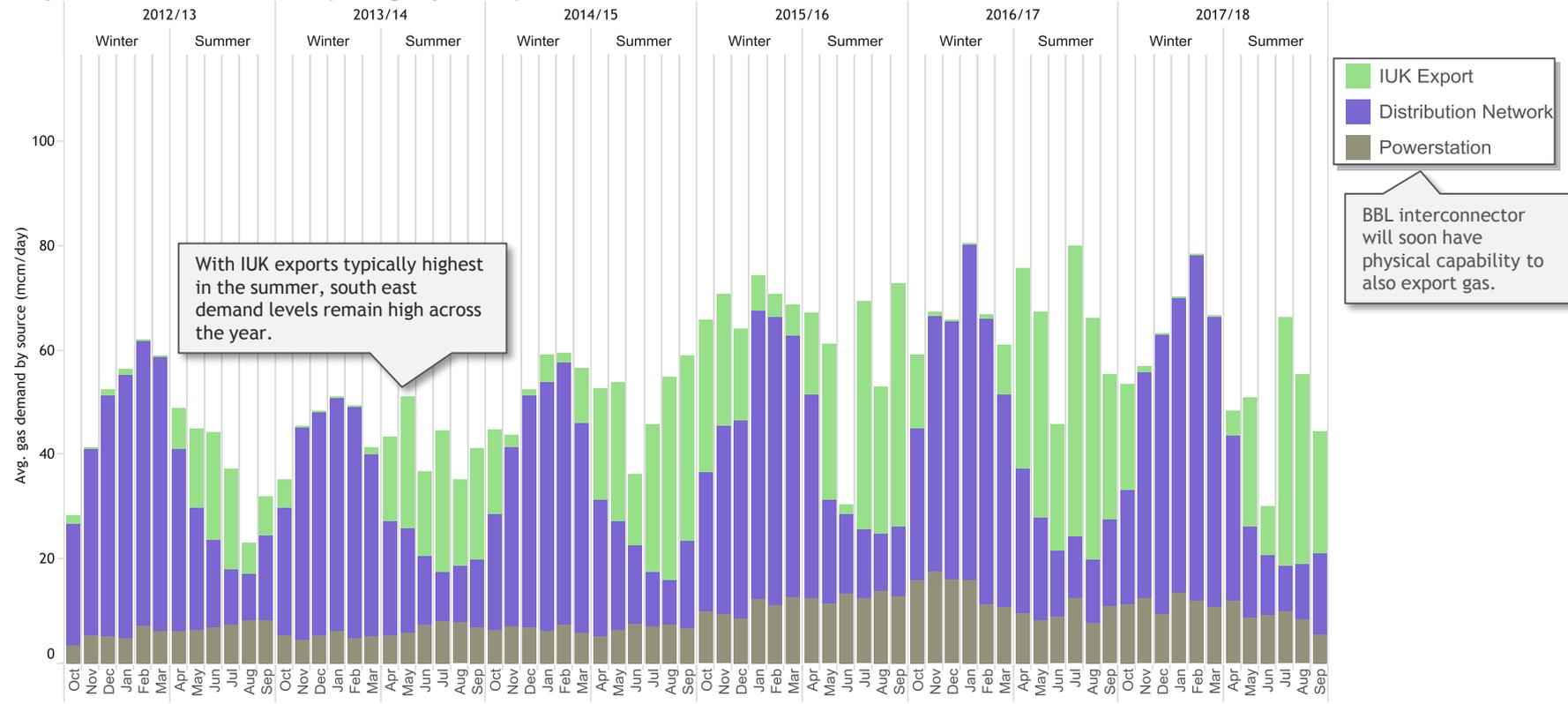
# The array of commercially-driven supplies in the south east leads to a high variability in the amount of gas brought onto the network.

Daily supply in the south east (averaged by month)



# IUK being bi-directional adds another commercially-driven source to the demand mix, along with gas-fired power stations and distribution network offtakes.

Daily demand in the south east (average by month)

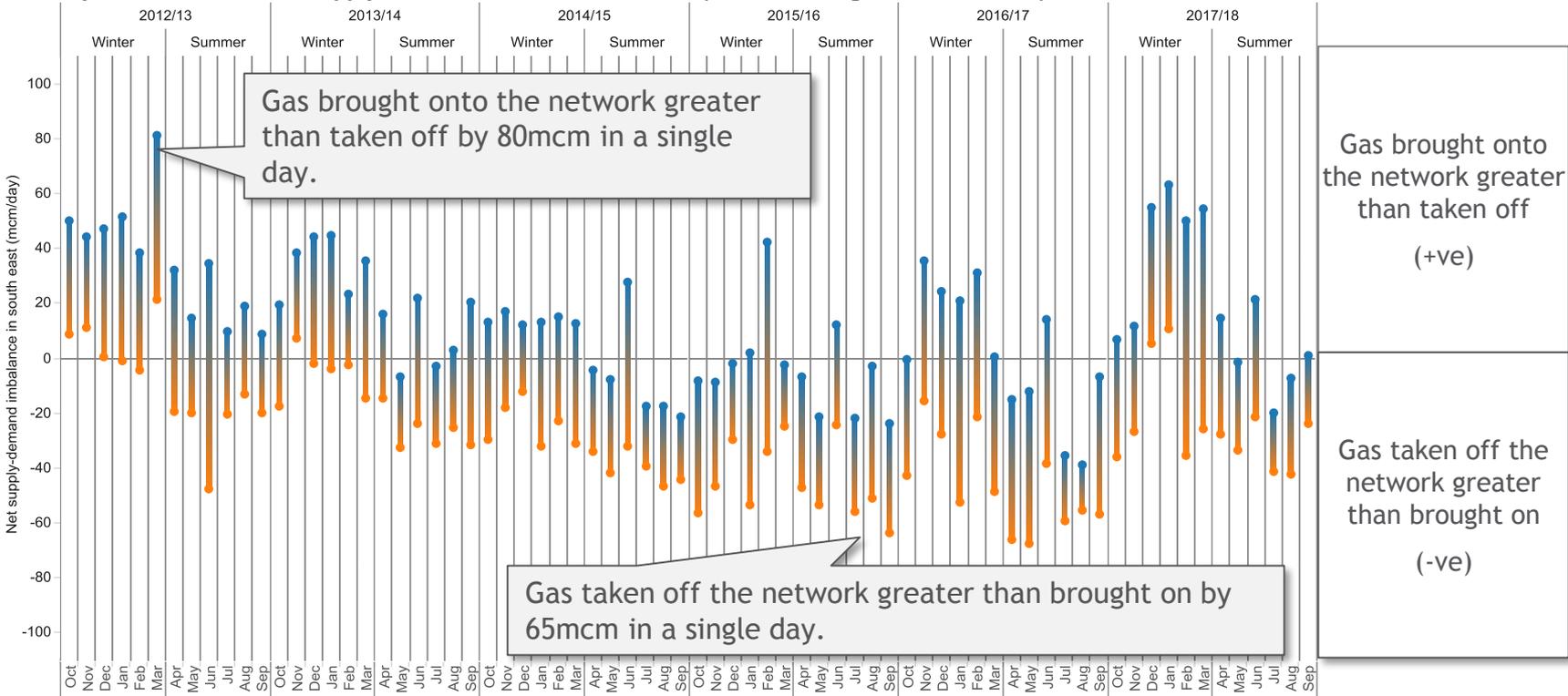


With IUK exports typically highest in the summer, south east demand levels remain high across the year.

BBL interconnector will soon have physical capability to also export gas.

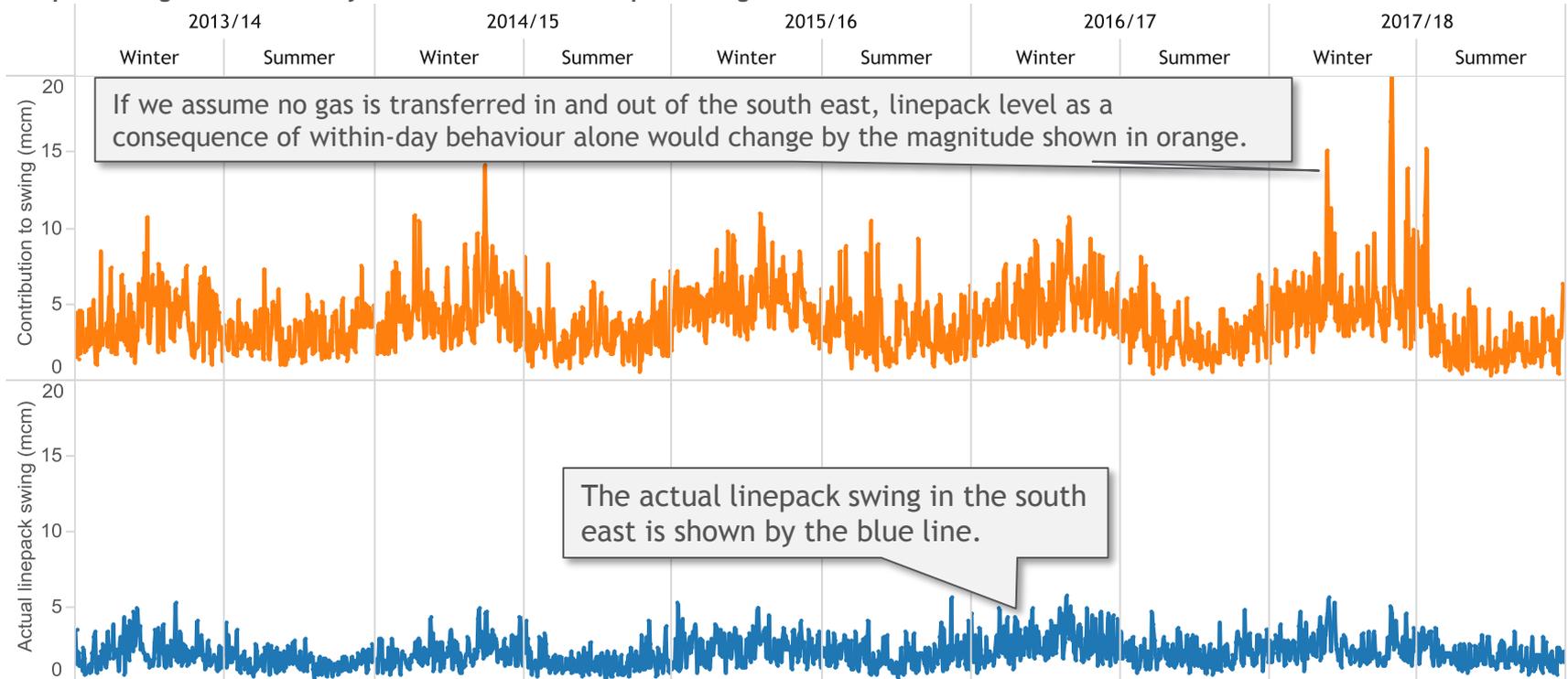
# The south east can be significantly “supply-heavy” or “demand-heavy” during a gas day.

Net daily imbalance between supply and demand in the south east (shown as range over the month)



# Linepack can absorb an imbalance for only a finite period of time. A point is then reached where the balance needs to be addressed.

Linepack swing due to within-day behaviour and actual linepack swing in the south east



# Stakeholders have told us you need within day flexibility so that they...

- **Are able to respond to the market signals (NBP, TTF Electricity prices)**
- **Carry out maintenance during the day and meet your customer nominations later in the gas day**
- **Can carry operations in the most cost efficient manner, e.g.:**
  - Run your compression in the most cost effective way
  - Bring gas on and off the NTS when transmission pressures are at optimum for you
  - Avoid Triad periods

This drives market and operational efficiency which ultimately maximises consumer benefit.

# South East study – key findings

Transferring gas in and out of the south east plays a crucial role in enabling customers to bring gas on and off the network in a manner that suits their commercial and operational needs.

## **Managing imbalances in gas brought on and off in the south east:**

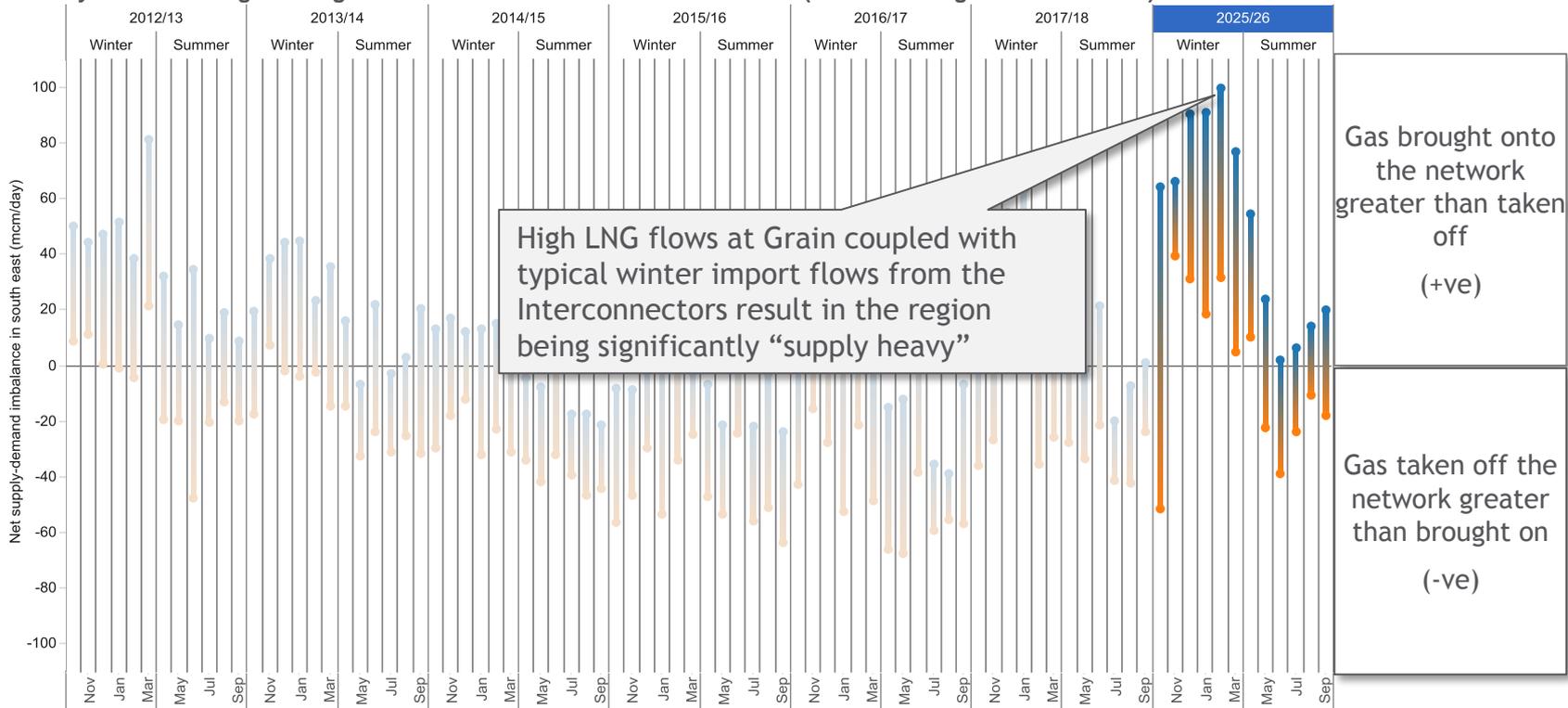
As forecasted by the Future Energy Scenarios, LNG (Grain) and Interconnector flows are anticipated to increase. Therefore, gas entering the network in the south east could grow. The importance in our capability to transfer gas out of the south east to manage linepack levels in the region may therefore increase.

## **Managing within-day behaviour:**

a sudden change in the amount of gas brought on or off at a location can create significant operational challenges in meeting customer needs in the south east, especially if this occurs when national linepack levels are already declining or increasing.

# 2025 FORECAST: With interconnector and LNG operation anticipated to increase, imbalances could become wider.

Net daily imbalance in gas brought on and off the network in the south east (shown as range over the month)



## 2025 FORECAST: Using network analysis software and forecasts, we analysed the operational impacts of varying degrees of within-day flexibility

Increasing within-day optionality in how gas is brought on and off the system in the south east

### Scenario 1:

- Demand sources are taking gas off the network flexibly to meet commercial needs.
- Supplies enter the network at flat 1/24<sup>th</sup> rate.

Compression is turned on to transfer gas

### Scenario 2:

- Both supply and demand sources are profiling within-day

Further compression is needed

### Scenario 3:

- Both supply and demand sources are profiling, with a sudden surge in gas-fired power station demand later in the gas day.

**Operationally challenging to meet customer offtake pressures in the extremities of the south east by transfer capability alone.**

# South East study – key findings

Our physical network's ability to transfer gas in and out of the south east plays a crucial role in enabling customers to bring gas on and off the network in a manner that suits their commercial and operational needs.

## **Managing future imbalances in gas brought on and off in the south east:**

As forecasted by the Future Energy Scenarios, LNG (Grain) and Interconnector flows are anticipated to increase. Therefore, “supply-heavy” imbalances in end of day volumes could increase.

## **Managing within-day behaviour:**

a sudden change in the amount of gas brought on or off at a location can create significant operational challenges in meeting customer needs in the south east, especially if this occurs when national linepack levels are already declining or increasing.

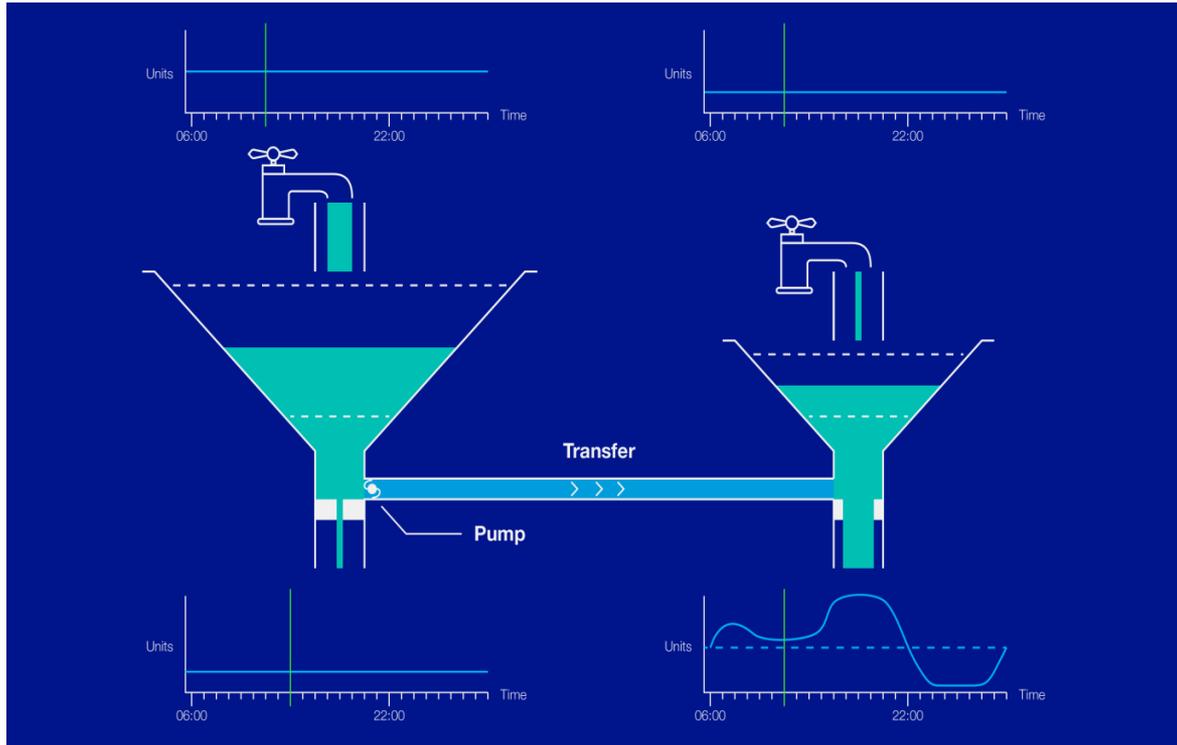
## Next Steps



Engagement during May & June to:

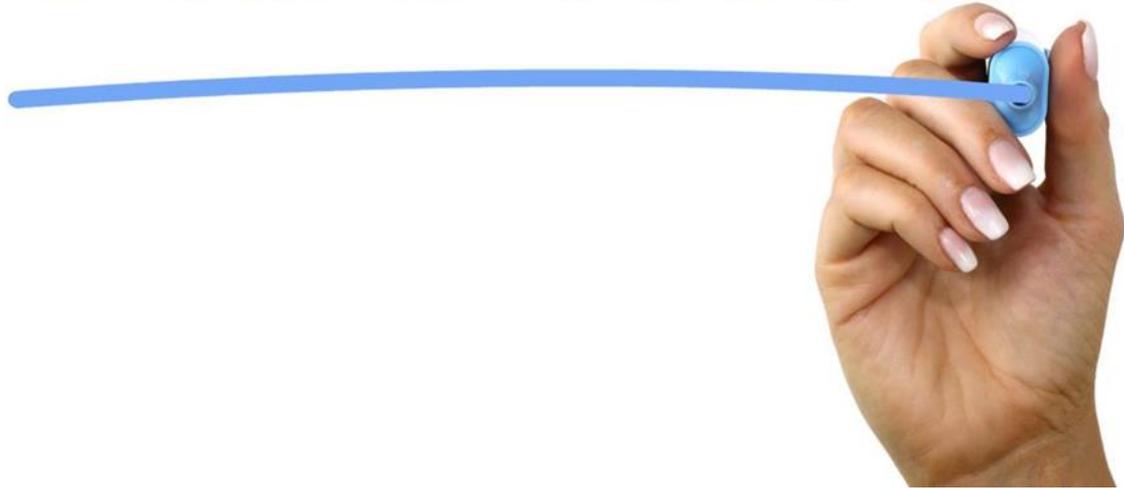
- Share what network capability means for everyone on the network
- Help our stakeholders contextualise this
- Seek input on a range of options for the future of the gas network

# Potential options to continue to deliver customer within-day needs



- Use and consider investments in **assets** to maximise physical capability available
- Use and develop **commercial tools** to manage
- Develop **Market Solutions** for example new products & incentives

# QUESTIONS



Gas System  
Operator

04

# Brexit Preparations Update

Safia Miyanji

nationalgrid



Gas System  
Operator

05

GB EU  
Charging  
Project

Sarah Carrington

nationalgrid



# GBEUC Project Scope – UNC Modifications

- **A new Mod 678** was raised in January 2019, (Amendments to the Gas Transmission Charging Regime)
- **Mod 678 (and Alternatives)** is now in Consultation with the Final Report due to be issued to Ofgem on 29th May 2019
- **Mod 0597:** Rules for the release of incremental capacity at Interconnection Points
- **Mod 0611:** Amendments to the firm capacity payable price at Interconnection Points (most of which has already been implemented)
- **System Change Delivery Date 8<sup>th</sup> September 2019**

The image displays three overlapping screenshots of the Joint Office of Gas Transmitters website, showing details for different UNC Modifications. A large, diagonal watermark reading "IN CONSULTATION" is overlaid on the top screenshot.

**Top Screenshot (UNC 0678):** Shows the title "UNC 0678: Amendments to Gas Transmission Charging Regime". It includes a progress bar with stages 01 (Introduction), 02 (Workshop Report), 03 (Draft Modification Report), and 04 (Final Modification Report). A "Purpose of Modification" section states: "The purpose of this Modification proposal is to amend the Gas Transmission Charging regime holder provided guidance with..."

**Middle Screenshot (UNC 0597):** Shows the title "UNC 0597: Rules for the release of incremental capacity at Interconnection Points". It includes a progress bar with stages 01 (Introduction), 02 (Workshop Report), and 03 (Draft Modification Report). A "Purpose of Modification" section states: "To provide a process for acquiring capacity compliant with the amended EU..."

**Bottom Screenshot (UNC 0611):** Shows the title "UNC 0611: Amendments to the firm capacity payable price at Interconnection Points". It includes a progress bar with stages 01 (Introduction), 02 (Workshop Report), 03 (Draft Modification Report), and 04 (Final Modification Report). A "Purpose of Modification" section states: "This modification seeks to facilitate compliance with the EU tariff code. It seeks to make amendments to the payable price at Interconnection Points (IPJs)." Below this, there is a table of impact assessments:

High Impact:	Shippers and National Grid NTS
Medium Impact:	N/A
Low Impact:	N/A

# GBEUC Project Scope – Live Capacity vs Nominations Report

Live Capacity vs Nomination Report

BA\*: --ALL-- Flow Type\*:  NTS Entry  NTS Exit

Available Selected

Location\*:

- AB
- AL
- AV
- BA
- BI
- BP
- BR

Add ▶

---

Remove ◀

- AB
- AL
- AV
- BA
- BI
- BP
- BR

Add Favourite

Gas Day\*: Within Day Day Ahead

Generate Report Query Clear

Gas Day	BA	Location	Requested Nomination (kWh/d)	Confirmed Nomination (kWh/d)	Net Entitlement (kWh/d)	Utilisation (%)
01-MAY-2019	AGA	IG	-	-	60,000,000	N.A
01-MAY-2019	AGI	EA	-	-	0	N.A
01-MAY-2019	AGI	SF	-	-	0	N.A
01-MAY-2019	BGS	BA	-	-	0	N.A
01-MAY-2019	BGS	BU	-	-	0	N.A
01-MAY-2019	BGS	MH	-	-	51,000,000	N.A
01-MAY-2019	BGS	TE	-	-	0	N.A
01-MAY-2019	BPG	EA	-	-	0	N.A
01-MAY-2019	BPG	IG	-	-	70,000,000	N.A
01-MAY-2019	BUS	BA	-	-	0	N.A
01-MAY-2019	BUS	BI	-	-	528,000	N.A
01-MAY-2019	BUS	BR	-	-	25,900,000	N.A
01-MAY-2019	BUS	BU	-	-	42,500,000	N.A
01-MAY-2019	BUS	CT	-	-	90,000,000	N.A
01-MAY-2019	BUS	EA	-	-	19,633,333	N.A
01-MAY-2019	BUS	IG	-	-	170,000,000	N.A
01-MAY-2019	BUS	SF	-	-	5,722,762	N.A

# Gemini User Trials Approach

- **User Trials (limited scope) being considered**
- **Shippers would be able to view the new Live Capacity versus Nominations Report in the Gemini User Trials environment, ahead of go-live on the 8th September**
- **1 week window mid August 2019**
- **National Grid will issue an invitation to take part**

Any queries please email: [box.gasops.business@nationalgrid.com](mailto:box.gasops.business@nationalgrid.com)

Gas System  
Operator

06

# Preparing for a Hydrogen Future

Suki Ferris

nationalgrid



# Agenda

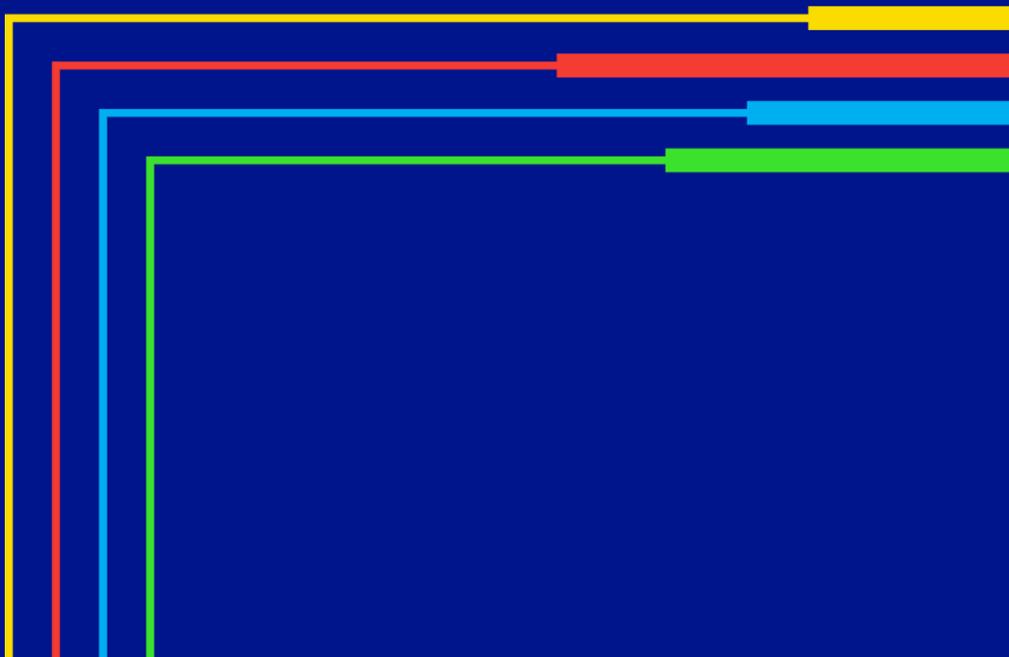
Hydrogen fundamentals

GDN hydrogen projects

NG hydrogen projects

Questions

national**grid**



# The role of gas in the UK

**22m**

gas customers in the UK

**85%**

households are using gas for heat

**995 TWh**

of energy is delivered by the NTS



**39%**

Power Generation

**38%**

Domestic Use

**23%**

Industrial & Commercial

# Hydrogen Fundamentals



Natural Gas  
16.04 g/mol



Hydrogen  
2.02 g/mol

## Molecular Weight

Hydrogen is a much smaller and lighter molecule and therefore is more prone to escaping or leaking than natural gas.

## Diffusivity

Hydrogen disperses much more quickly than methane meaning it is less likely to create an ignitable atmosphere, unless it is confined.

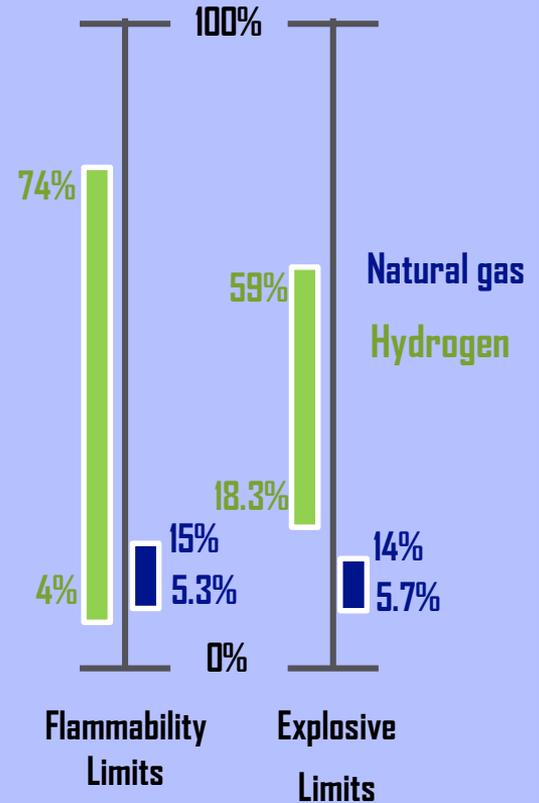


Natural Gas  
0.21 cm<sup>2</sup>/s

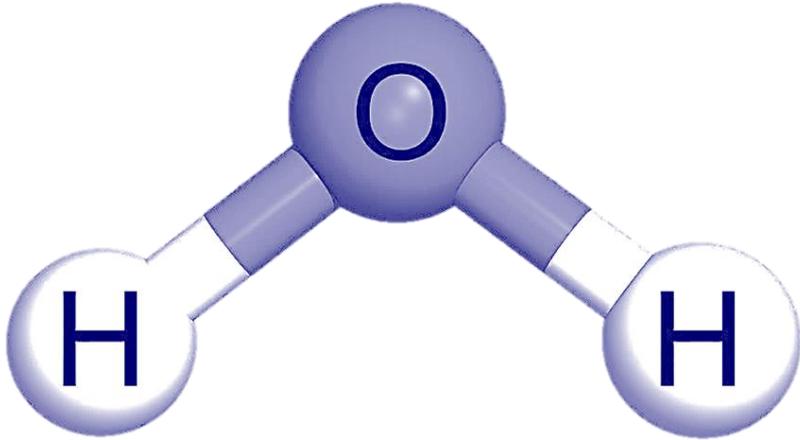


Hydrogen  
0.756 cm<sup>2</sup>/s

## Ignition Limits

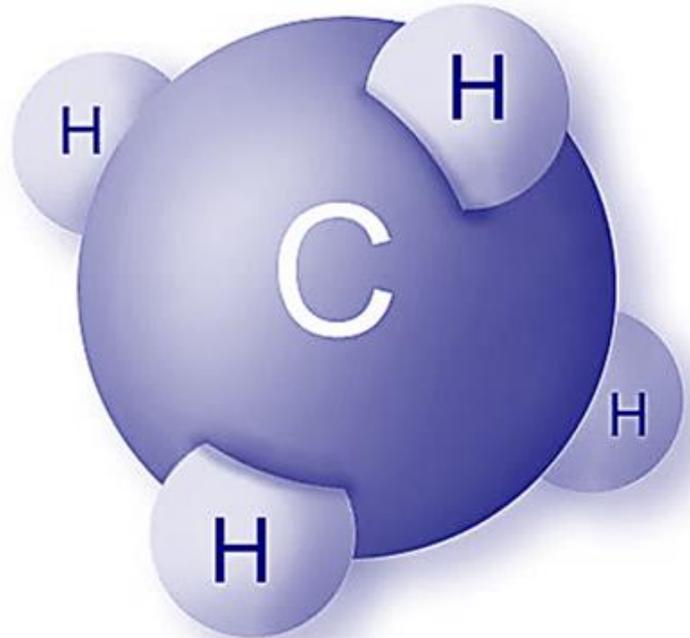


# Hydrogen Sources



**Water electrolysis**

**Natural gas reforming**



# Why hydrogen: Hydrogen in the UK



# Why hydrogen: Hydrogen in the UK



  
New build 100% hydrogen network

# Why hydrogen: Hydrogen in the UK



**SGN**  
Your gas. Our network.

New build 100% hydrogen network



**h<sub>2</sub>i** Northern Gas Networks

Full conversion of Leeds by 2034

# Why hydrogen: Hydrogen in the UK



**HyNet Cadent**  
Your Gas Network

Industrial sector CCS +  
H2 blended in NW DN



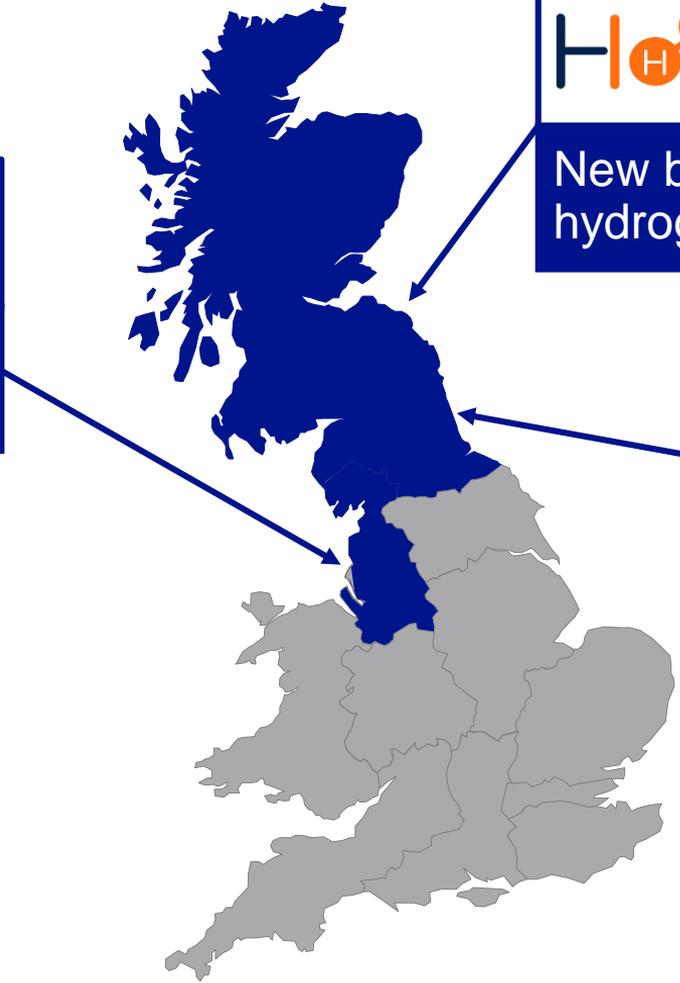
**H<sub>2</sub>**  **SGN**  
Your gas. Our network.

New build 100%  
hydrogen network



**h<sub>2</sub>i** Northern Gas Networks

Full conversion of  
Leeds by 2034



# Why hydrogen: Hydrogen in the UK

**HyNet Cadent**  
Your Gas Network

Industrial sector CCS +  
H2 blended in NW DN

**HyDeploy Cadent**  
Your Gas Network

20% blend on private  
university network

**H<sub>2</sub>**  **SGN**  
Your gas. Our network.

New build 100%  
hydrogen network

**h<sub>2</sub>i**  **Northern  
Gas Networks**

Full conversion of  
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# Why hydrogen: Hydrogen in the UK

**HyNet Cadent**  
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Industrial sector CCS +  
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**H<sub>2</sub>**  **SGN**  
Your gas. Our network.

New build 100%  
hydrogen network

**h<sub>2</sub>1**  **Northern  
Gas Networks**

Full conversion of  
Leeds by 2034

**HyDeploy<sub>2</sub> Cadent**  
Your Gas Network

20% blend on two  
public networks

# Why hydrogen: Hydrogen in the UK

**HyNet Cadent**  
Your Gas Network

Industrial sector CCS +  
H2 blended in NW DN

**HyDeploy Cadent**  
Your Gas Network

20% blend on private  
university network

**Hy4Heat ARUP**

£25M BEIS funded study  
on domestic conversion

National Grid



**H<sub>2</sub>**  **SGN**  
Your gas. Our network.

New build 100%  
hydrogen network

**h<sub>2</sub>1**  **Northern  
Gas Networks**

Full conversion of  
Leeds by 2034

**HyDeploy<sub>2</sub> Cadent**  
Your Gas Network

20% blend on two  
public networks

# Introducing HyNTS



HyNTS encompasses all of our work relating to hydrogen across our business and wider industry. Ongoing programmes include:

## Feasibility of Hydrogen in the NTS

A feasibility study with the aim of determining the capability of the NTS to transport hydrogen. Includes a review of relevant assets, pipeline case study and draft scope for offline trials.

## Aberdeen Vision

A feasibility study for the generation of hydrogen at St Fergus using the NTS (up to 2%) to supply the city of Aberdeen. Includes generation, injection, separation and transport.

## Project Cavendish

A review of the potential of the Isle of Grain region to use existing infrastructure to supply hydrogen to London & the South East including generation, storage, transport and CCS.

## Hydrogen Hub

Established group of technical experts driving our hydrogen ambition across the business and sponsor of the HyNTS programme

# HyNTS Feasibility of Hydrogen in the NTS

A feasibility study with the aim of determining the capability of the NTS to transport hydrogen. Includes a review of relevant assets, pipeline case study and draft scope for offline trials.

<b>Start</b>	Nov 2018	<b>Deliverables</b>	<b>Partners</b>
<b>End</b>	Apr 2019	<ul style="list-style-type: none"><li>• <b>Capability assessment:</b> Review of the physical capabilities of the NTS</li><li>• <b>Standards review:</b> Evaluation of existing hydrogen within the UK and Europe and gap analysis for NTS</li><li>• <b>Live trial optioneering:</b> Evaluation of a range of potential candidates for a Stage 2 offline trial.</li><li>• <b>Draft scope for offline trials:</b> Scope cover a wide range of assets to test assumptions of the capability assessment</li></ul>	 <p><b>HEALTH &amp; SAFETY LABORATORY</b></p>
<b>Fund</b>	NIA Project		
<b>Networks</b>	→ NGGT (Lead)		



# HyNTS Aberdeen Vision

A feasibility study for the generation of hydrogen at St Fergus using the NTS (up to 2%) to supply the city of Aberdeen. Includes generation, injection, separation and transport.

<b>Start</b>	Dec 2018	<b>Deliverables</b> <ul style="list-style-type: none"><li>▪ <b>Hydrogen Production at St Fergus:</b> outline Steam Methane Reform options at St Fergus and feasibility</li><li>▪ <b>2% Hydrogen into the NTS at St Fergus:</b> outline of Hydrogen Injection, evaluation of technical / regulatory / commercial aspects</li><li>▪ <b>2% Hydrogen Distribution &amp; Use:</b> identify impact on distribution network and end users</li><li>▪ <b>Hydrogen Performance Assessment:</b> outline options, identify hydrogen supply pipeline and phased conversion options</li></ul>	<b>Partners</b>   
<b>End</b>	Sep 2019		
<b>Fund</b>	NIA Project		
<b>Networks</b>			
	→ NGGT → SGN (Lead)		



# HyNTS Project Cavendish

A review of the potential of the Isle of Grain region to use existing infrastructure to supply hydrogen to London & the South East including generation, storage, transport and CCS.

<b>Start</b>	Feb 2019	<b>Deliverables</b> <ul style="list-style-type: none"><li>▪ <b>Discovery:</b> review of gas network to meet heating demand, technology for separating hydrogen / methane blend, geological review of Isle of Grain, link with TfL</li><li>▪ <b>Design &amp; Modelling:</b> technical concepts development, CO2 reduction implications, business model, mapping the end state – future vision of hydrogen in South London</li><li>▪ <b>Analysis:</b> refine cost estimates, wider economic benefits, examine commercial / funding options, regulatory arrangements required, road map</li><li>▪ <b>Completion &amp; Next Steps:</b> identify next steps and options</li></ul>	<b>Partners</b>  
<b>End</b>	Feb 2020		
<b>Fund</b>	NIA Project		
<b>Networks</b>			
	→ NGGT (Lead) → Cadent → SGN		



Gas System  
Operator

07

# Operational Data Enhancements

Update May 2019

nationalgrid



# Operational Data Enhancements Project

*Our aim is to have a customer focused, data centric approach, not just meeting our obligated data requirements but enabling transparency of data to promote efficiencies in the wholesale market.*

## **(1) Agile, industry enhancing IT solution, facilitating the changing needs of the industry both now and into the future.**

- Upgrade of the MIPI system, including a new enabling infrastructure and providing for the changing ways in which the industry views and utilises data.

## **(2) To deliver an industry engagement platform to discuss and enable data enhancements**

- All industry players to feed into the change needed for transparency of gas operational data now and into the future so market needs can be anticipated for change.
- To enable a mechanism for NG to provide transparency to the market in an efficient manner on operational & commercial decisions – e.g. ‘Day in brief.
- To test data enhancement concepts and gain insight on whole industry benefits for enhancements to prioritise delivery and investment.

<https://datacommunity.nationalgridgas.com/>

# Operational Data Enhancements Project

## What good looks like for 2019:

- The industry clarifies what data enhancements and transparency is required to promote wholesale market efficiency.
- National Grid understand who is using our data and why (the value attributed to data across the industry).
- National Grid understand how the industry consumes data and adapts our platform and obligations accordingly.
- National Grid understand what data is not valued and initiates steps to remove low value added processes and data.
- Current and new operational data is made available on time and to agreed quality.
- Where availability or quality of data is affected the industry are made aware of this.
- A solution is implemented such that when new data requirements are agreed these can be implemented efficiently (cost and time).
- Industry have shaped the development for data enhancements to create transparency in the wholesale market which could influence efficiencies for market players and in turn end consumers.

# Industry Feedback

**National Grid launched an industry discussion paper in September 2018**

- **Discussion Groups at the Gas Operational Forum**
- **Launched the Collaboration Website, posting new concepts and feedback questions**
- **1-1 Feedback from Industry participants**

**NOTE:** Feedback can be posted on the community website or if you would prefer a 1-1 please contact Karen Thompson.

# Summary of the feedback to date:

- **Data Procurement**
  - Large shippers & industry stakeholders use API's to download the National Grid Gas Data
  - Smaller shippers and occasional browsers use the Data Item Explorer
- **Reports**
  - Limited value articulated and limited use currently.
- **Data Visualisation**
  - Improve Market understanding of the system status and its evolution (currently through Prevailing View)
  - Day in Brief commentary
- **Additional Data Requested**
  - Real time Demand Data
  - Post day hourly residual balancing data provided post day (D+1)
  - Data from external providers systems (UIG, SAP & SMP)
  - Gas Quality data
  - Localised Pressure data
- **Data Consistency**
  - Users value data consistency; Would value a final set of consistent supply and demand data
- **Data Quality**
  - Users value data quality; prefer Grid to use a blank to denote missing/erroneous data
- **Data Dictionary and User Guides**
  - Improvements to the data dictionary and a user guide

# Next Steps - Additional Data – Current NG View:

## Instantaneous Demand and Post Day Trade Data

- Provided trial data on the Grid Website
- Intention is to add this to the existing MIPI platform over the next few months (TBC).

## Gas Quality Data

- Still in the discovery phase to determine what data is actually required and the level of interest.
- Intention is to test the value of this data by launching a 2 week trial on Data Community Site.

## Other Data suggested to date

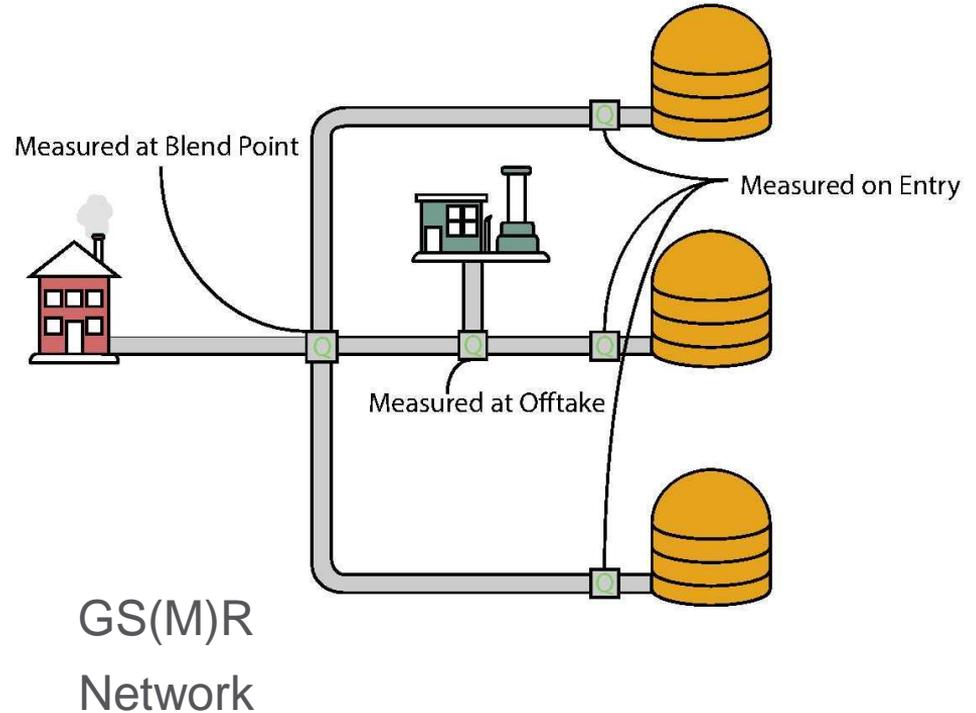
- Localised Pressure Data – Pressure Forecasts provided and uploaded weekly to webpage.
- Third Party Data, UIG and additional price data – would like to understand need and value.
- Lower aggregations of real time demand data – would like to understand need and value.

# Next Steps – Other Developments – Current NG View

- **Data enablement**
  - We will invest in the IT infrastructure supporting the transparency of operational data to facilitate the anticipated growth and value in information provision.
- **Data Procurement**
  - Simplify Data Item Explorer (Used by smaller suppliers and occasional data users)
  - Minimise impact on existing API process.
- **Reports**
  - Reduce the number of Reports pointing users to the underlying data available through other means.
- **Data Visualization**
  - New Data Visualisations: Will test proposals on the data community website.
  - Day in Brief; concept will continue to evolve on the data community website – need suggestions on days of interest.
- **Data Consistency**
  - Feasibility of publishing a final set of consistent post day demand and supply data.
- **Data Dictionary and User Guides**
  - Improvements to the data dictionary and a user guide to support a new data centric approach.

# Gas Quality Data

- This could be provided at the blend point for Bacton, Easington, Milford Haven, St Fergus and Teesside
- Can only provide Gas Quality data which cannot be attributed to a single customer
- Need to understand if Data in this format is valuable
- To be trialled on Collaboration site



# Example of Data Set

Bacton											
Time	CO2	CV	H2ODew	H2S	HCDew	ICF	N2	S2	SG	Soot Ind	WB
22/04/2019 05:00	1.16457	39.0062	-43.0076	0.366674	-12.5475	-0.61616	2.5745	1.52895	0.621987	0.508675	49.459
22/04/2019 06:00	1.15633	39.0017	-42.678	0.366903	-11.4488	-0.61616	2.59876	1.62509	0.621987	0.508675	49.4475
22/04/2019 07:00	1.12474	39.0281	-43.0076	0.337835	-11.4708	-0.61616	2.59373	1.81277	0.62184	0.508675	49.4924
22/04/2019 08:00	1.13436	39.0149	-42.3484	0.345846	-11.3005	-0.61227	2.59098	1.65713	0.621794	0.508675	49.4775
22/04/2019 09:00	1.16503	38.9799	-41.7386	0.33463	-11.2291	-0.63836	2.59098	1.37789	0.62163	0.508675	49.4396
22/04/2019 10:00	1.12154	39.019	-41.0025	0.330053	-11.2511	-0.61593	2.61341	1.86313	0.62184	0.508675	49.4763
22/04/2019 11:00	1.12978	38.9951	-41.2827	0.368048	-11.0973	-0.62738	2.62211	1.54726	0.621721	0.508675	49.4553
22/04/2019 12:00	1.11879	38.9885	-41.1398	0.373999	-11.2181	-0.60838	2.60151	1.81735	0.621245	0.508675	49.4582
22/04/2019 13:00	1.10872	38.9902	-41.5793	0.368276	-11.0314	-0.62348	2.62898	1.80362	0.621309	0.508675	49.459
22/04/2019 14:00	1.11742	38.9947	-42.0298	0.376287	-11.5422	-0.62348	2.62486	1.82193	0.621483	0.508675	49.4701
22/04/2019 15:00	1.14122	39.0301	-41.7276	0.374685	-11.2401	-0.59373	2.56764	1.57473	0.621895	0.512612	49.4965
22/04/2019 16:00	1.11604	39.0553	-41.7276	0.406043	-10.9984	-0.60494	2.53971	1.92721	0.62174	0.508675	49.5262
22/04/2019 17:00	1.08721	38.998	-40.8487	0.38613	-10.0481	-0.63104	2.6157	1.86313	0.621035	0.508675	49.4862

Gas System  
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# Summer Outlook

Report and Key messages

nationalgrid



# Summer Outlook

2019

The *Summer Outlook Report* is an annual publication delivered by National Grid each spring. It presents our view of the gas and electricity systems for the summer ahead (April to September).

The report is designed to inform the energy industry and support their preparations for this summer and beyond.



**nationalgrid**SO

> 1  
Executive  
summary

> 2  
Electricity

> 3  
Gas

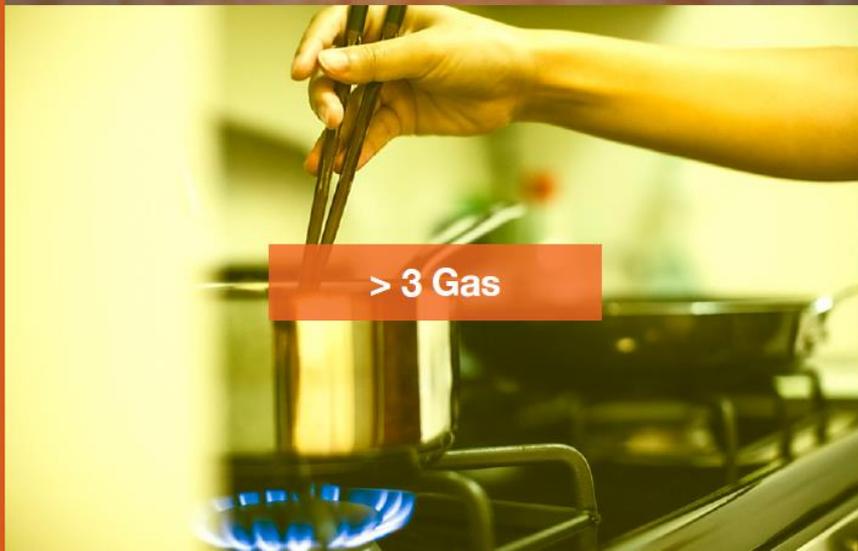
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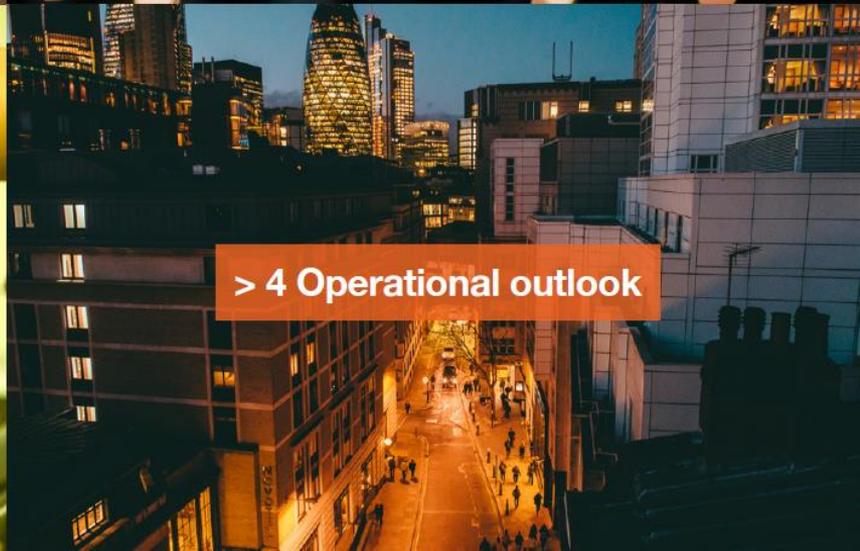
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# Overview

## Executive summary

1

**We are confident that there will be sufficient supply available to meet energy demands for the coming summer.** We anticipate similar gas and electricity demands to summer 2018.

2

**We have the right tools and services available to manage operability** for the coming summer, particularly during periods of low demand, or when access requirements increase for delivery of key maintenance work.

3

**Whole system thinking is becoming increasingly important** as long term trends of decarbonisation and decentralisation drive increased interaction between the gas and electricity transmission systems. In the short term this is primarily due to gas fired electricity generators balancing the intermittent output of renewable electricity generators.

4

**We anticipate no additional operability challenges for this coming summer as a result of the UK's planned exit from the EU.** We have tested our planning assumptions in a broad range of scenarios and via engagement with industry. These scenarios fall within our normal contingency planning.



# To help you find the information you need quickly and easily we have published the *Summer Outlook Report* as an interactive document.



## Home

This will take you to the contents page.



## Arrows

Click on the arrows to move backwards or forwards a page.



## 'Hover over' content

Words highlighted in **purple** will reveal a text box when you hover over them with your cursor.



## 'Hover over' Information

An information icon will reveal further information when you hover over them with your cursor.



How to use  
this interactive  
document



## Enlarge/Reduce

Hover over the magnifying icon to make chart bigger or smaller.

## > 3 Electricity

### 'Roll over' content

Contents can be accessed by rolling over the text or clicking to go to that page

## www.

### Hyperlinks

Hyperlinks are highlighted in **bold** throughout. You can click on them to access further information.



There is a print ready version available if you are having difficulties viewing this interactive pdf on your device.

# Supply and demand

## Executive summary

**We are confident that there will be sufficient supply available to meet energy demands for the coming summer. We anticipate similar gas and electricity demands to summer 2018.**

**Electricity Demand** – weather corrected demand seen on the transmission system at both a peak and minimum level will be similar to last summer, as the recent trend of increasing solar generation has slowed. Generation that is not connected to the transmission network (such as the majority of solar generation) reduces transmission demand as more demand is met locally.

**Electricity Supply** – we will be able to meet demand and our reserve requirement at all times throughout summer 2019 under all interconnector scenarios.

We do not think it is likely that we will need to instruct inflexible generation to reduce output in weeks when demand is low. However should this be necessary we have the tools to do so.

**Gas Demand** – during the summer gas fired electricity generation becomes a more significant component of GB demand, unlike winter when domestic heating dominates. This drives profiles to become more variable in line with renewable generation. We also anticipate greater levels of transit gas than last summer in response to market conditions.

**Gas Supply** – we anticipate increased liquefied natural gas (LNG) deliveries compared to last summer. Whilst this could provide competition for other supply sources, it is likely to result in greater transit flows to the continent.

Key statistics, electricity	
Electricity transmission peak demand	33.7 GW
Electricity transmission minimum demand	17.9 GW
Minimum available generation	39.8 GW

Key statistics, gas	
GB gas demand	25.2 bcm
Total gas demand	36.1 bcm

Above demand forecasts are weather corrected.

# Operational outlook

## Executive summary

We have the right tools and services available to manage operability for the coming summer, particularly during periods of low demand or when access requirements increase for delivery of key maintenance work.



### Key messages – electricity

- Low transmission demand and high volumes of low inertia generation can cause operational issues over the summer.
- We will need to take day-to-day actions to manage system frequency in times of low demand. Usually this will involve working with flexible generation to reduce supply.
- Managing reactive power and voltage levels will continue to be challenging. We have tendered for the provision of (Enhanced) Reactive Power services for summer 2019 and 2019/20.
- Work continues to move smaller generation to new protection settings, which will reduce the need to manage system stability using operational tools.



### Key messages – gas

- Although the need for maintenance remains high, we anticipate no major risks to National Transmission System (NTS) access for the planned summer schedule.
- During summer months, gas fired electricity generation becomes a dominant component of gas demand. Its variability results in a need for close management of system pressures. We are reliant on timely and accurate physical notifications to minimise operability risks.
- We are expecting increased volumes of LNG supply, which affects flows of gas across GB. As LNG supply is less predictable than UK Continental Shelf supply, we must be prepared to operate the network in increasingly complex or new configurations at relatively short notice.

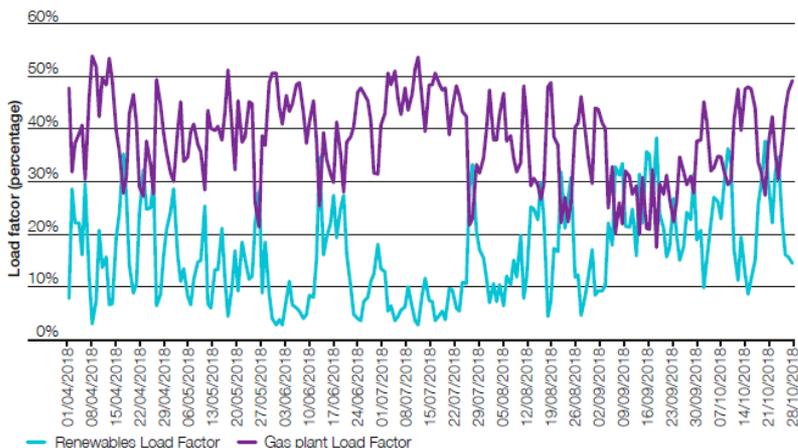
# Whole energy system

## Executive summary

Whole system thinking is becoming increasingly important as long-term trends of decarbonisation and decentralisation drive increased interaction between the gas and electricity transmission systems.

An example of this is how increased renewable generation on the electricity system, coupled with a gradual move away from coal, has a direct impact on the operation of the gas system.

Figure 1  
Load factor of renewable and gas fired electricity generation summer 2018



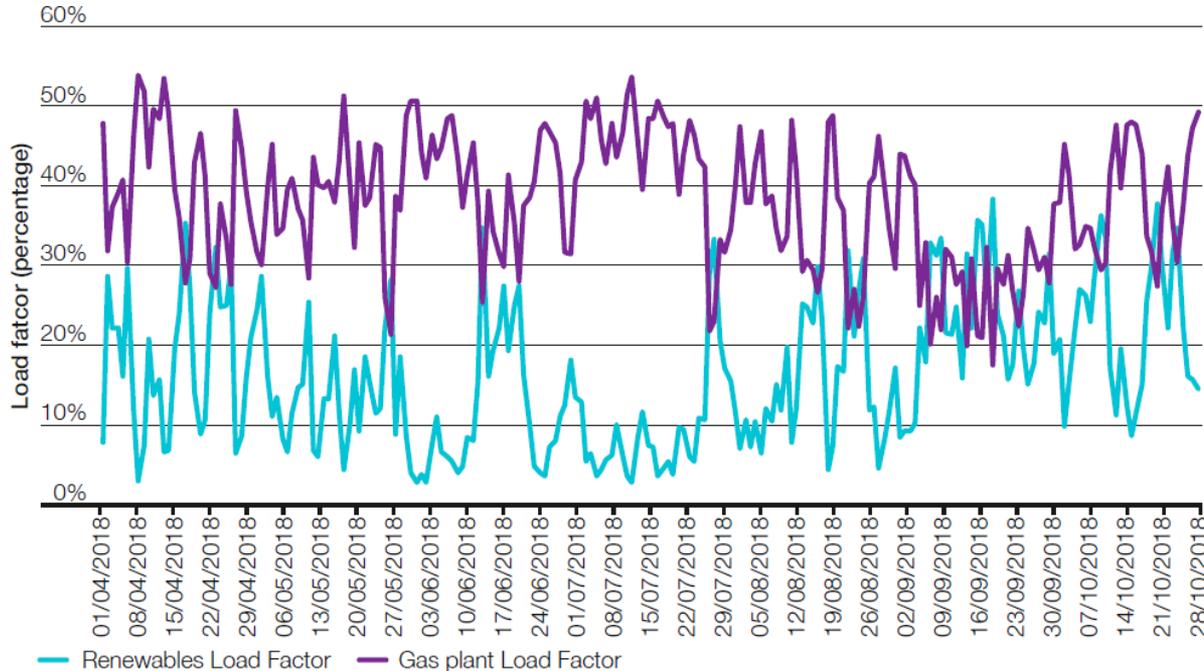
- Output from gas fired generation mirrors the output from renewable generation, increasing when renewable output decreases and vice versa.
- The resulting volatility in output required from gas fired generation also means the gas demand to these sites is more variable.
- In turn this variability has an impact on how we configure and operate the NTS, increasing flexibility requirements within and across days.
- The NTS compressor portfolio is increasingly relied upon to manage this variability in operational pressures.

# Whole energy system

## Executive summary



**Figure 1**  
Load factor of renewable and gas fired electricity generation summer 2018



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- The NTS compressor portfolio is increasingly relied upon to manage this variability in operational pressures.

# EU Exit impact

## Executive summary

**We anticipate no additional operability challenges for this summer as a result of the UK's planned exit from the EU. We have tested our planning assumptions in a broad range of scenarios and via engagement with industry. These scenarios fall within our normal contingency planning.**

Potential impacts concerning interconnector trading are discussed below:

- Currently when electricity is traded over interconnectors with connected markets in the EU a day ahead of real time, this is done using implicit arrangements. This makes trading faster and more efficient. In the case of a no deal exit from the European Union, these arrangements would no longer apply and interconnectors would have to move to fallback arrangements.
- In all scenarios trading will continue, and electricity will flow. It is expected to flow from lower to higher priced markets as is the case at the moment.
- In a no deal scenario, the mechanisms of cross-border gas trade are not expected to fundamentally change. Gas shippers mostly purchase energy and capacity separately, and there would be no change from this in the event of a no deal exit from the EU. The UK's Transmission System Operators (TSO's) expect to have continued access to the Prisma gas capacity trading platform to allocate capacity at interconnection points.

- Should the UK leave the EU with no deal, cross border trading of energy would take place outside of the single market framework, i.e. under World Trade Organisation rules for the majority of countries, where no free trade agreement has been negotiated. Furthermore, as is the case now, flows on both gas and electricity interconnectors may also be impacted by fluctuations in currency exchange rates.



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### Implicit arrangements

mean that the transmission capacity on an interconnector is traded at the same time as the electrical energy purchased through it. Both capacity and energy are reflected in the price of electricity purchased or sold to/from another market. This makes trading more efficient and also means it can take place more quickly.

### In contrast, explicit arrangements

mean that the transmission capacity on an interconnector is auctioned separately to the auction for electrical energy. This is how most capacity was allocated over interconnectors before implicit trading was introduced.

# Continuing the conversation

Join our mailing list to receive email updates on our Future of Energy documents. <http://www.nationalgrid.com/updates>

Email us with your views on the *Summer Outlook Report* at: [marketoutlook@nationalgrid.com](mailto:marketoutlook@nationalgrid.com) and we will get in touch.

**You can write to us at:**  
Future Outlook team  
System Operator  
Faraday House  
Warwick Technology Park  
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09

# Signposting of Information

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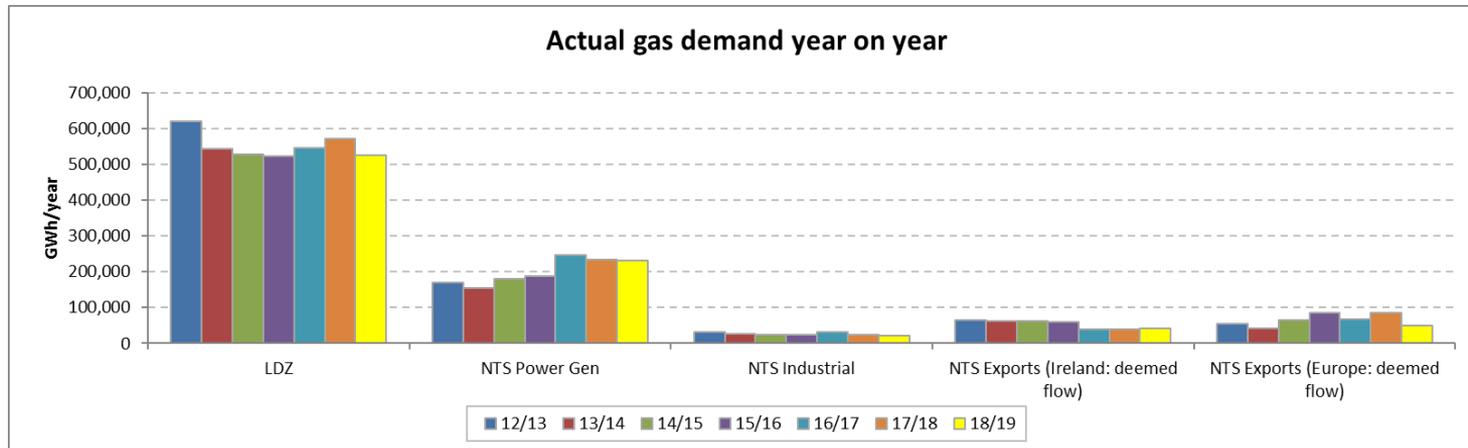
# Winter Severity Statistics

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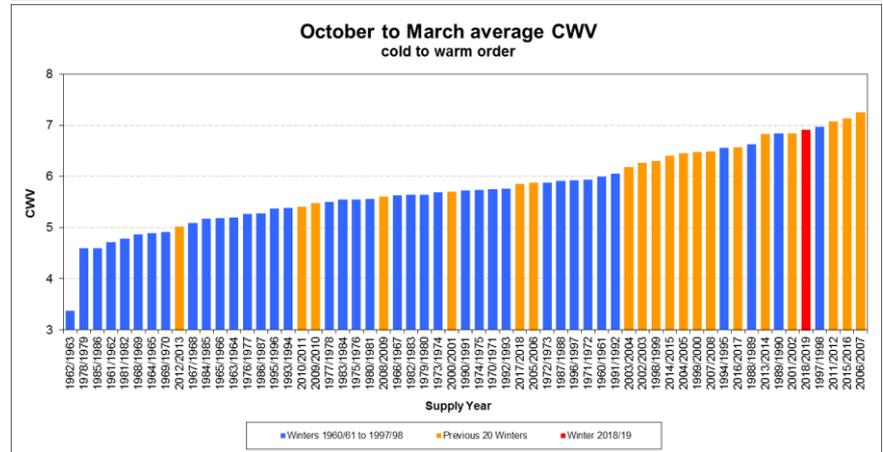
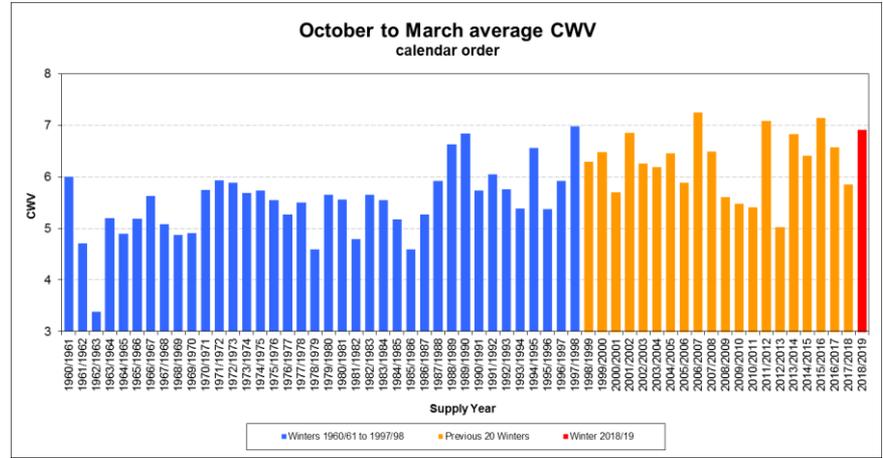
# Winter 2018/19

- Focusing on the weather in winter 2018/19 - as the winter period is the big driver of gas demand - the winter was significantly warmer than seasonal normal.
- Weather sensitive demand (typically demand less than 732 MWh/annum) mirrored the CWV profile for the winter period with demand well below seasonal normal.
- Total demand over the Financial Year 2018/19 was 872 TWh, significantly down from 956 TWh in FY 2017/18, driven by predominantly weather driven reduced LDZ demand and lower exports to continental Europe.



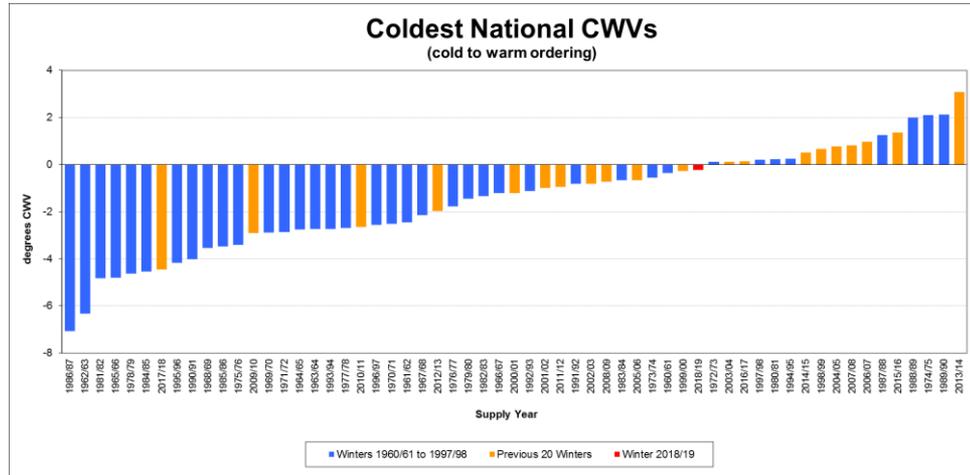
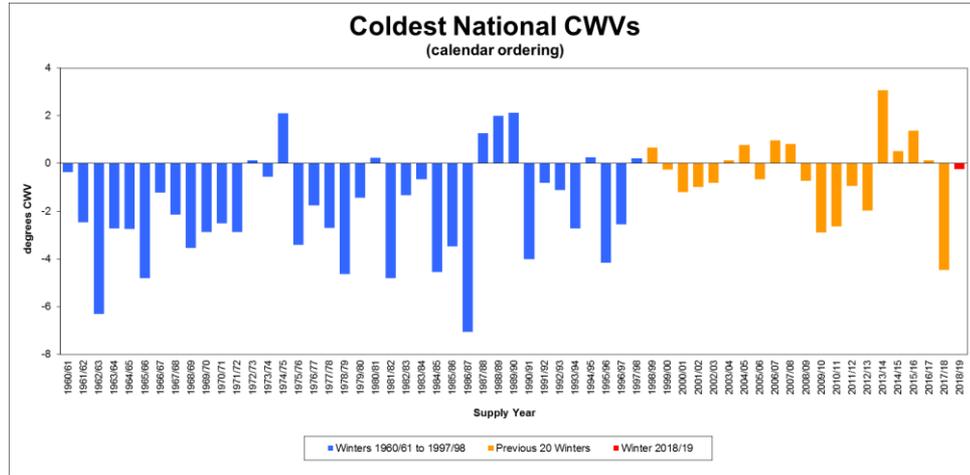
# Winter Weather

- The 2018/19 winter period, as compared against the last 59 years, was defined (on a CWV basis) as 1 in 14 warm at a national level for the full 6 month winter period.
- For the alternative winter period definition December – February, 2018/19 was defined as 1 in 11 warm.
- Overall 2018/19 was the 5th warmest winter in the past 59 years.
- CWV averaged 6.91 across the winter, compared to a climate adjusted seasonal normal CWV of 6.39 and an average CWV for Winter 2017/18 of 5.85.



# Peak Weather

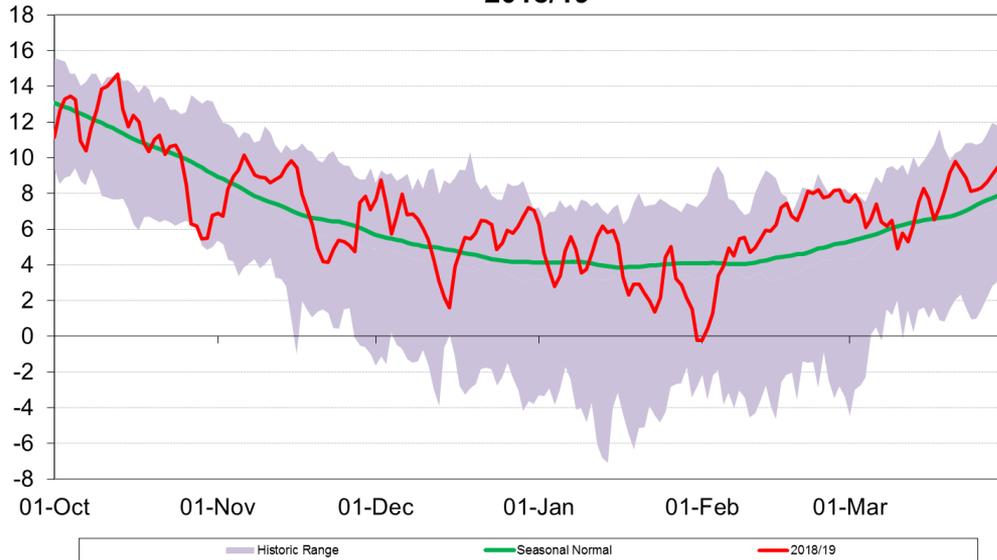
- The coldest day in 2018/19 was the 1<sup>st</sup> February 2019 with a national CWV of -0.23.
- This was the 18<sup>th</sup> warmest peak winter day in the past 59 years.
- This is a contrast to the 2017/18 CWV peak of -4.46 which represented the 7<sup>th</sup> coldest compared to the full history.



# Winter Weather

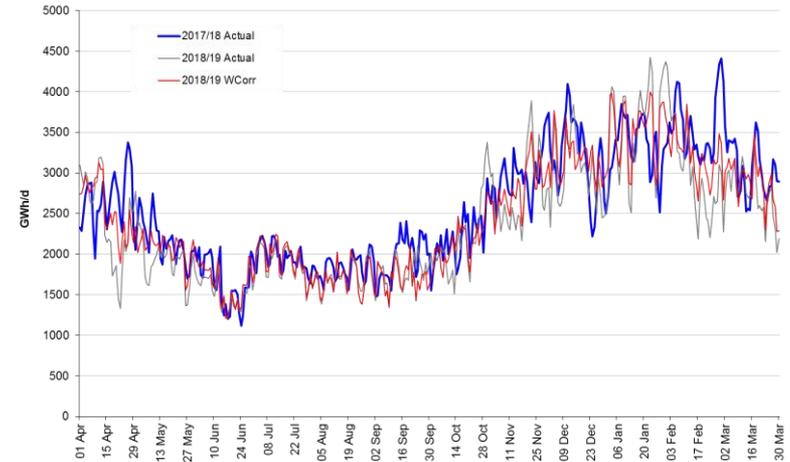
- The weather for winter 2018/19 was slightly above seasonal normal for the first 4 months of the winter, before turning particularly mild towards the very end of the winter. For the period 06/02/19 – 31/03/19 actual CWV exceeded seasonal normal by an average of just over 1.5.

**National Composite Weather  
2018/19**



# Gas Demand Year on Year

- Total gas demand dropped significantly in FY 2018/19 from the previous two years.
- Falls in LDZ demand were predominantly weather driven although there looks to be a small drop even on a weather corrected basis.
- Exports to Europe was the other big drop as increased LNG deliveries to Europe reduced the requirement for UK gas exports to Europe to refill storages.



Financial year demand	13/14	14/15	15/16	16/17	17/18	18/19
LDZ	543,895	527,690	521,324	544,283	571,799 <sup>1</sup>	524,561
NTS Power Gen	153,897	179,813	187,400	245,691	232,557	231,087
NTS Industrial	27,592	22,837	23,246	31,448	24,259	22,218
NTS Exports (Ireland: deemed flow)	61,578	62,702	59,725	39,631	38,953	41,764
NTS Exports (Europe: deemed flow)	40,928	64,509	86,274	67,178	85,228	49,788
NTS shrinkage	4,193	3,473	3,660	3,982	2,968	2,673
Total Demand (GWh)	832,083	861,024	881,629	932,211	955,764	872,090

<sup>1</sup> In last year's winter severity report LDZ demand was reported lower at 547,294 GWh due to the omission of UiG at the time of producing this report. The correction to include UiG within LDZ demand is the reason for the increase in LDZ, and total, gas demand for 17/18.

# Query Surgery and Next Forum

The Next Operational Forum will take place on  
Thursday 13<sup>th</sup> June

Please send any requested topics to:

[Karen.Thompson@nationalgrid.com](mailto:Karen.Thompson@nationalgrid.com)

or

[.Box.OperationalLiaison@nationalgrid.com](mailto:.Box.OperationalLiaison@nationalgrid.com)

Opportunity now for 121 discussion  
with NG attendees

Lunch Available



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