

# IEA Brazil Gas Workshop Oct 2019

## Session 2: Balancing regime and hub price development

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## Evolving and driving electricity and gas networks across the UK and USA

### UK

### US

Electricity

Gas

Transmission networks

National Transmission System

7,200 km of overhead line

7,660 km of high-pressure pipeline

Electricity

Gas

Transmission and distribution facilities

Distribution networks

3.5m customers

3.7m customers

We have a unique position at the heart of Britain's energy system, connecting people to the energy they use, safely. We keep the lights on and the gas flowing, so people can go about their daily lives – in their homes, their communities and workplaces, right across the nation.

# Gas Transmission in Great Britain

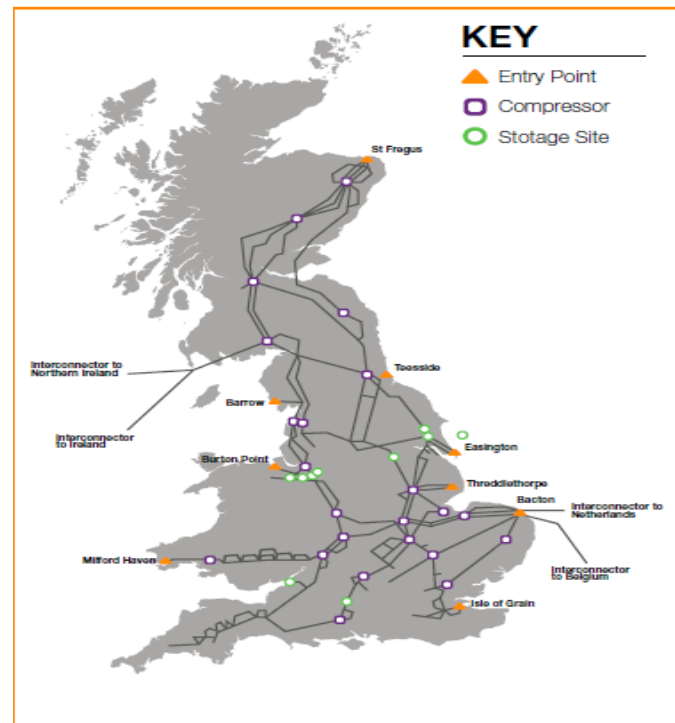
7,660km	Of gas pipelines through the GB National Transmission System (70-94 bar)
7	Beach Reception Terminals
3	LNG Importation Terminals
10	Storage Sites
23	Compressor Stations
200+	Exit Points
12	Distribution Networks

\*Gas continues to be the dominant fuel when considering energy demand from consumers on a whole energy system basis, although a proportion of gas demand is for the generation of electricity

\*This winter we expect...

- total gas demand over the winter period to be 3.9 times higher than electricity demand
- 23.5 per cent of gas demand to be for electricity generation

3

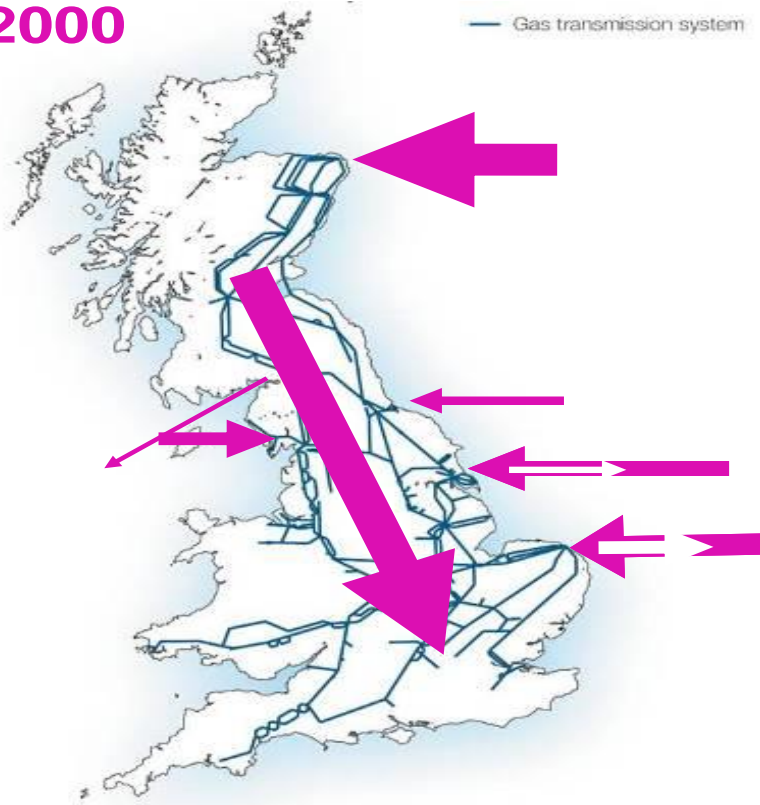


A map of the Gas National Transmission System (NTS)

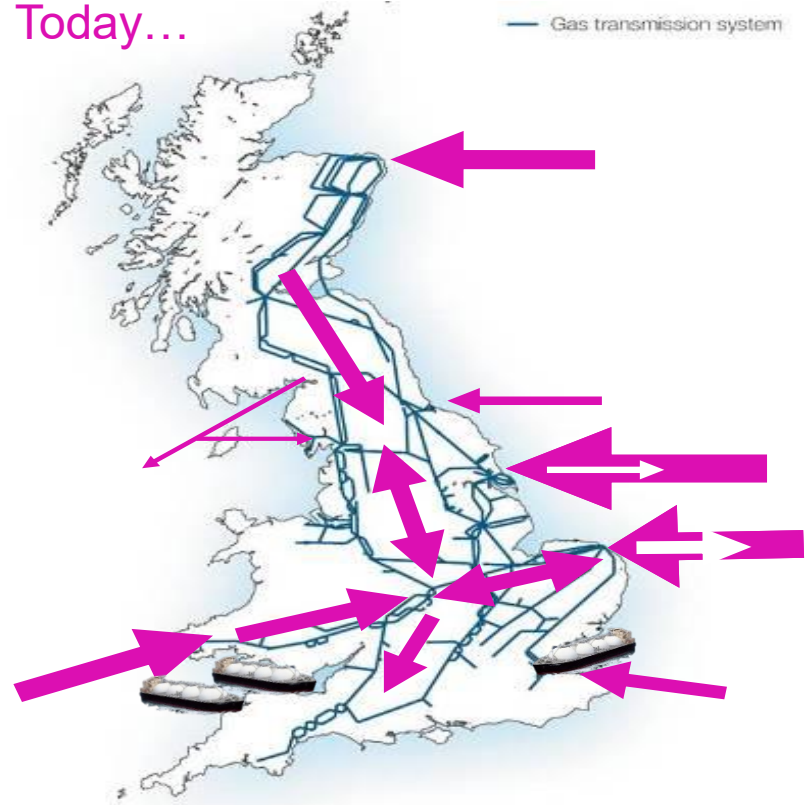
Highest Demand Day: 465mcm (~4600GWh)  
 Lowest Demand Day: 117mcm (~1165GWh)  
 Annual Throughput: 85bcm (~830TWh)

# Changing Network Flows

2000

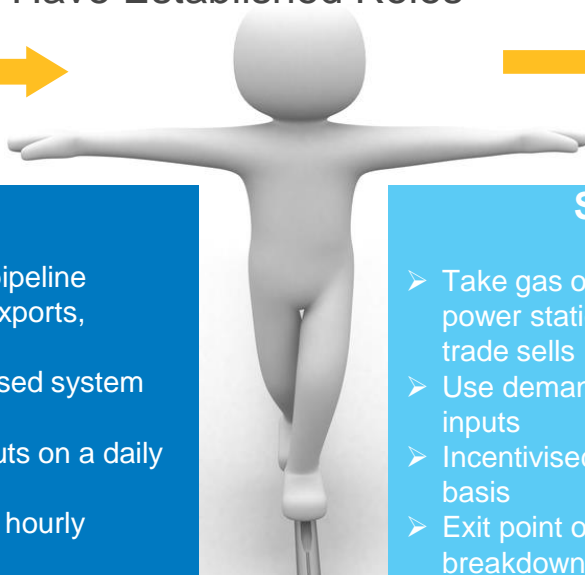


Today...



# Ensuring the Balance

Both Shippers and National Grid Have Established Roles



## Shipper's Role in Supply

- Bring gas onto the system via UK field gas, pipeline imports, LNG (sea tanker) imports, storage exports, market trade buys
- Use supply nominations to notify us of proposed system inputs
- Incentivised to balance their inputs and outputs on a daily basis
- Entry point operators also provide us with an hourly breakdown of system inputs

## Shipper's Role in Demand

- Take gas off the system via distribution zones, industrials, power stations, pipe exports, storage imports, market trade sells
- Use demand nominations to notify us of proposed system inputs
- Incentivised to balance their inputs and outputs on a daily basis
- Exit point operators also provide us with an hourly breakdown of system outputs

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## National Grid SO Role

- Ultimate responsibility to ensure safe operation of the grid on a daily basis (5am to 5am)
- Monitor supply/demand & transport gas for shippers whilst managing the system line pack
  - Provide real time information to assist shippers with their balancing
  - Enter the market to buy and sell gas if shippers do not balance effectively

# Ensuring the Balance

Incentives & Penalties are key

## DURING THE DAY

- Real time balancing information supports shipper's commercial decision making
- National Grid enters the market to balance if shippers do not balance effectively
- A penal system of imbalance pricing provides a flexible incentive for shippers to balance
- The default System Buy Price is 1.11p/therm higher and the system sell price is 1.11p/therm lower than the system average prices
- During the gas day, National Grid may trade to move these prices further away from the system average price, increasing the penalty on out of balance shippers

Inputs & Buy Trades – Outputs &  
Sell Trades  
= a shippers imbalance



## AFTER THE DAY

- Shippers daily balance is calculated (gas brought on to the system minus gas taken off the system)
- The difference between these indicates a shippers imbalance
- Shippers who are “long” sell gas to NG at the System Sell Price
- Shippers who are “short” buy gas from NG at the System Buy Price
- NG is neutral to any charges or credits which is “smeared back” based on system usage

## SYSTEM OPERATOR INCENTIVES

The Balancing Incentive

- Driving economic and efficient balancing actions

The Line pack Incentive

- Ensuring closing the day as close to opening balance as possible



# Available tools

Operational tools (internal)

- Reconfigure Network, Optimise Compressor Fleet, Manage Outages

Operational tools (external)

- None

Commercial tools

- National Energy Actions (Volume or Price), Physical / Locational Energy Actions, Margins Notice

Network Integrity

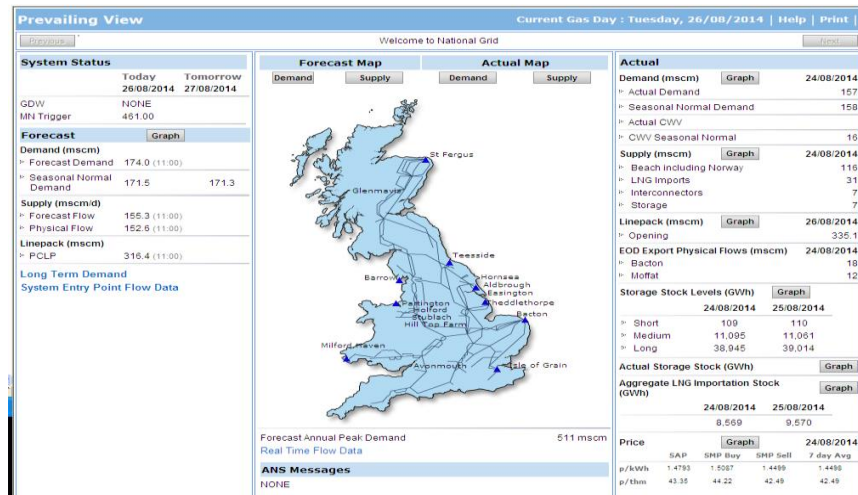
- Gas Balancing Notification, Operating Margins, Gas Deficit Emergency

A liquid and wholesale NBP helps facilitate the functioning of the GB gas market

# Factors considered in balancing decisions

- Physical and Commercial Balance / Time of Day
- Actual Line Pack Levels
- Instantaneous Line pack levels
- Recent balancing trends
- Opening Line pack & Target Closing Line pack
- Market Opportunities
- Operational Risk/uncertainties
- Forward view to minimise risk e.g. preparing for periods of higher demand or known physical issues such as outages.

# Information provision is key





# Today's regime took time develop...

The balancing regime in place today in GB is the result of significant evolution over a 15-20 year timeline

- Improvement in tools, processes & forecasting
- Growth of market participation and mutual confidence
- Maturity of the NBP as a gas trading hub

