

Gas System
Operator

GFOP within-day behaviour study

Gas demand stakeholder
insight summary

nationalgrid

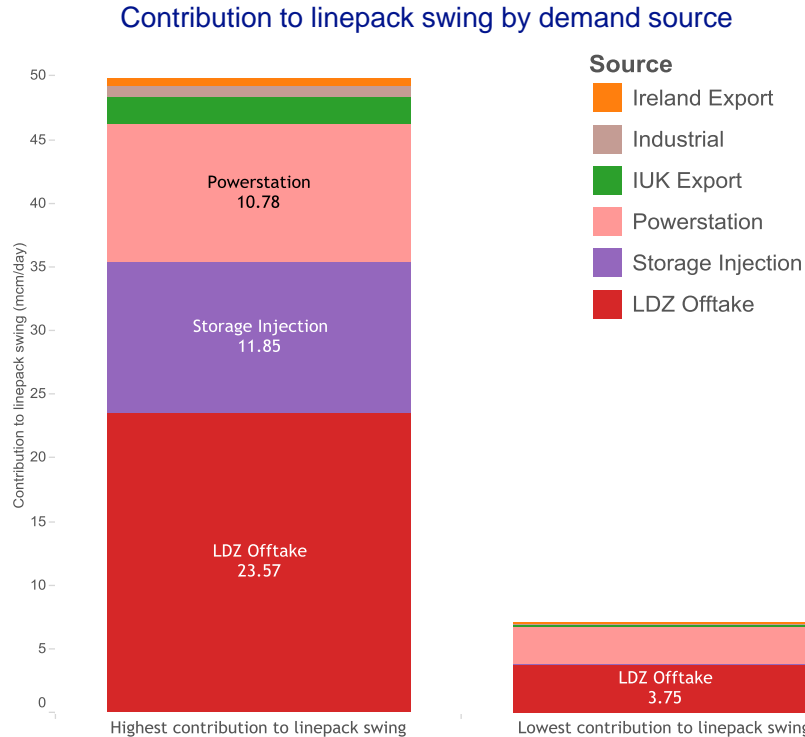


How gas is taken off the network is influenced by many factors. Therefore, a demand source's potential contribution to linepack swing can vary significantly.

How the contributions from each source align determines the level of demand driven linepack swing we see within-day.

We have been engaging with stakeholders to better understand the factors that influence how gas is taken off the network.

This document summarises the insights we gathered for each demand source.



Data: highest 14 linepack swing days in 2017/18, where linepack swing ranged from 21mcm/day to 41mcm/day

National Grid Contribution to swing calculation:

For demand – if demand is greater than the flat 1/24th average demand rate, it is having a negative contribution to linepack (causing it to decline)

For supply – if supply is less than the flat average supply rate, it is having a negative contribution to linepack (causing it to decline)

Local Distribution Network

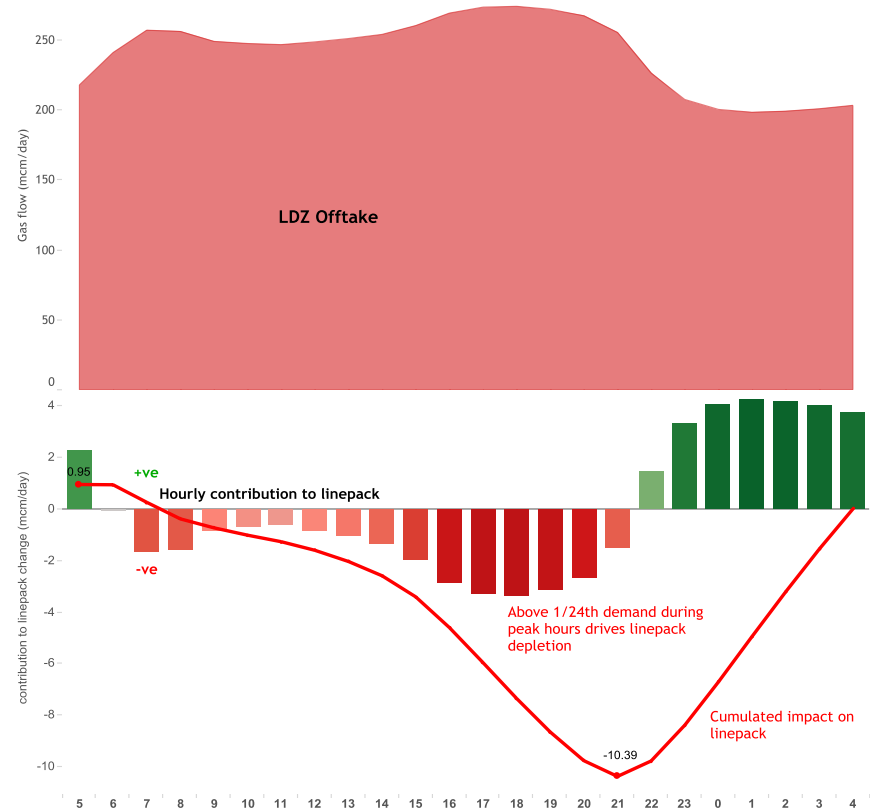
Factors that influence how gas is taken off the network

- Local gas consumption demand. This is strongly linked to weather.
- Distribution zone's linepack facility (this facility has significantly reduced over the past two decades).

Potential drivers for change in within-day flow behaviour:

- Increase in gas-fired power stations connecting at a local network level
- Biogas, BioSNG, shale supplies connecting at a local network level.

Average behaviour for 14 highest linepack swing days in 2017/18



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Gas-fired power stations

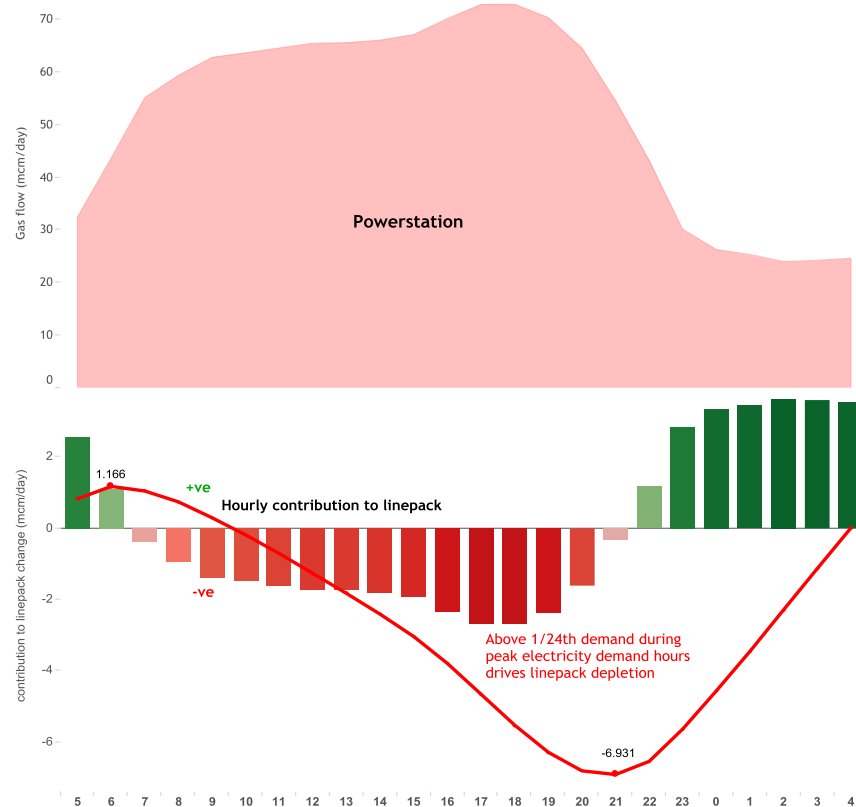
Factors that influence how gas is taken off the network

- Gas price vs power price. Whether operation is economical is influenced by a number of factors (demand levels, renewable generation levels etc.).
- Electricity System Operator balancing actions
- Trips coupled with a delay in response
- Gas/coal forward spread
- Anomalies in wind which lead to power generation forecast errors. These are usually mitigated by gas-fired power stations.

Potential drivers for change in within-day flow behaviour:

- As renewables increase, prices will become more volatile. This:
 - reduces the economics behind baseload gas-fired power stations.
 - may increase commercially driven peaking plant operation
- Developments of batteries and interconnectors could impact when gas-fired power stations are utilised
- Current fleet of gas-fired power stations are aging. This impacts efficiencies and thus economics of utilisation.

Behaviour for 14 highest linepack swing days in 2017/18



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Ireland interconnector exports

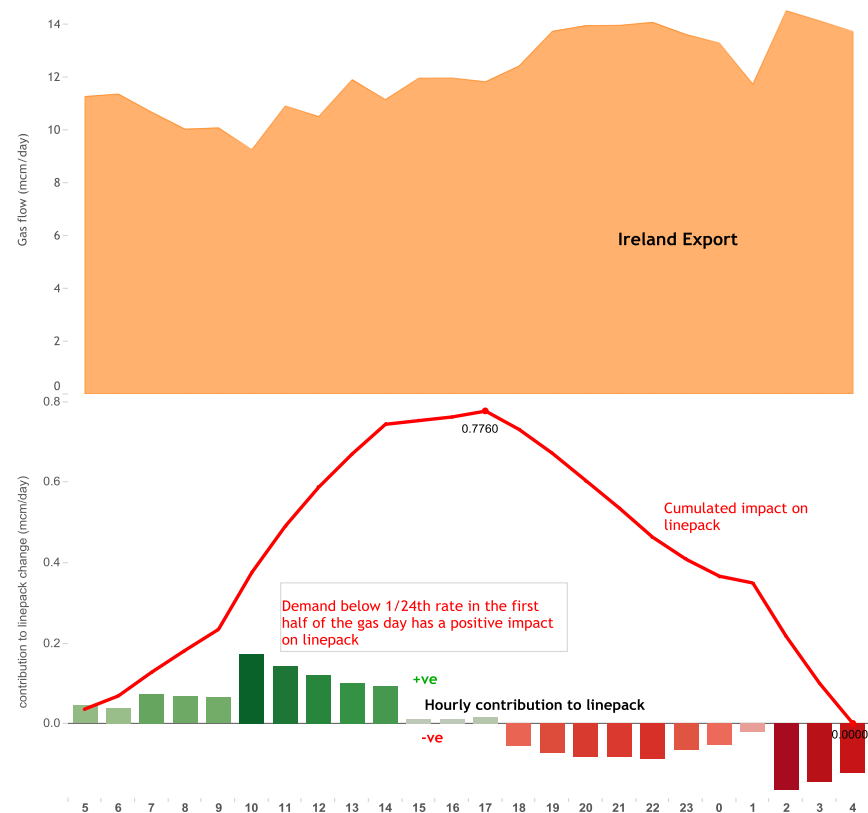
Factors that influence how gas is taken off the network

- Corrib gas flows and certainty around demand levels. This becomes clearer as the day progresses.

Potential drivers for change in within-day flow behaviour:

- Changes to Ireland's market regime and supply/demand mix

Behaviour for 14 highest linepack swing days in 2017/18



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Industrials

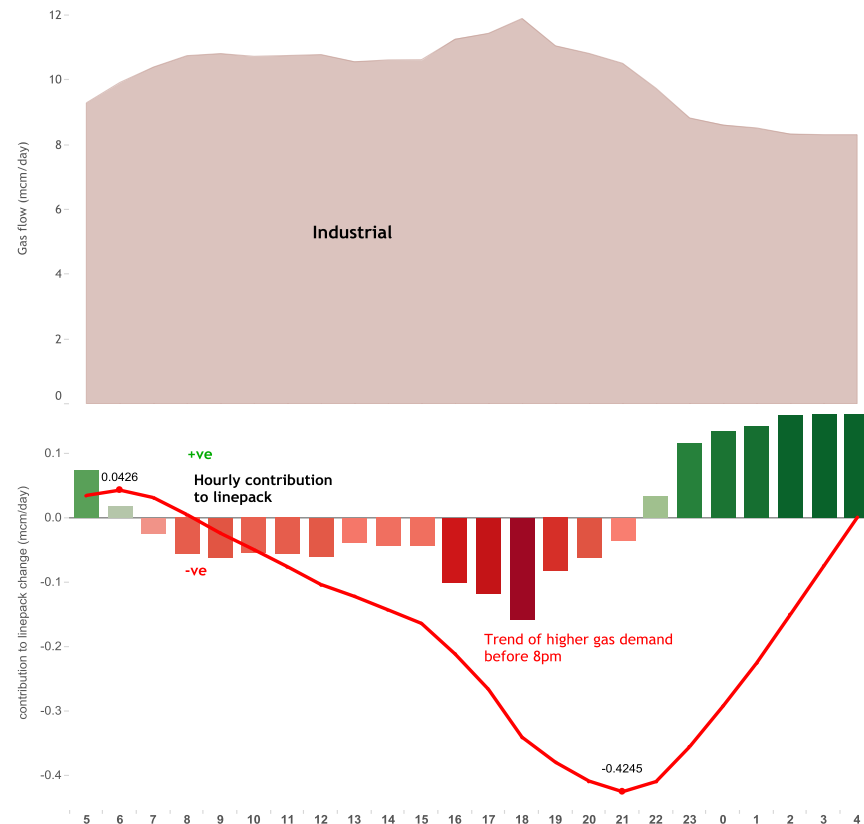
Factors that influence how gas is taken off the network

- Driven by feedstock and/or heating needs

Potential drivers for change in within-day flow behaviour:

- As electricity and gas prices potentially become more volatile, industrials may look to optimise fuel usage to minimise costs.

Behaviour for 14 highest linepack swing days in 2017/18



National Grid Contribution to swing calculation:

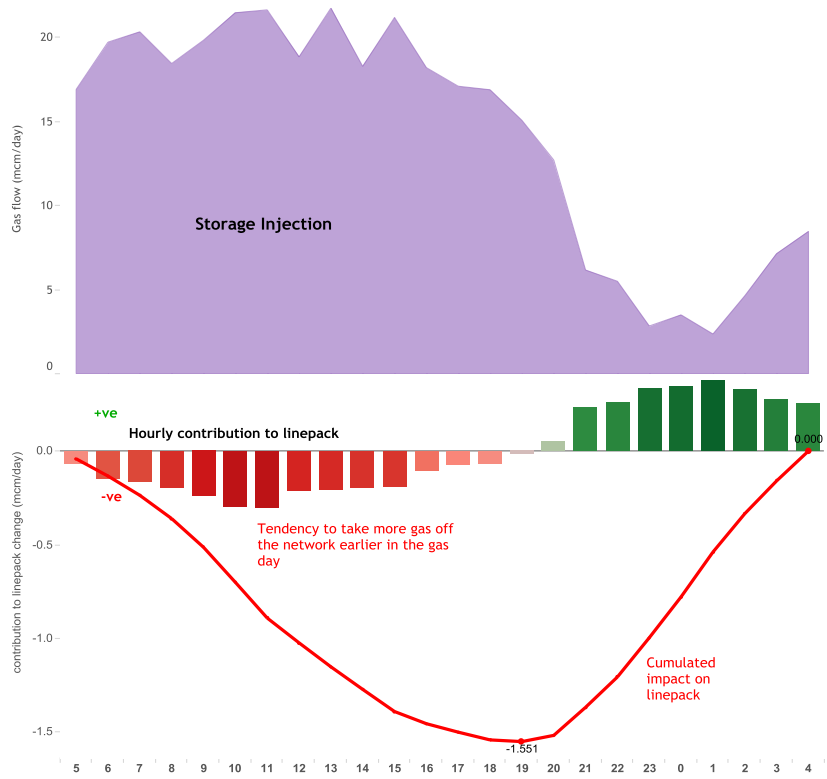
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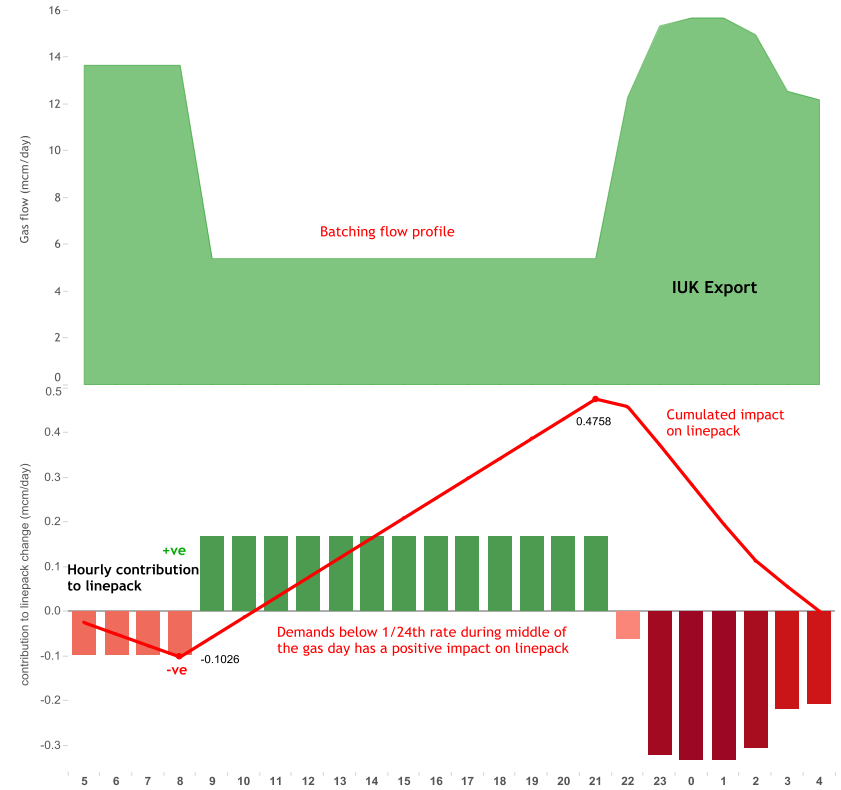
IUK exports and storage injection

(similar drivers to supply operation – please see supply summary for details)

Behaviour for 14 highest linepack swing days in 2017/18



Behaviour for 14 highest linepack swing days in 2017/18



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Throughout this study, we want you to continue to collaborate with us. This will help us outline the future within-day needs of the network and determine potential options that meet these needs.

Support our next instalment:

We are now working to predict how within-day flow behaviour could change in the future. This will be strongly influenced by the insights we have gathered so far.

To improve our predictions:

- I. **is there any potential drivers for change in within-day flow behaviour that we have not captured?**
- II. **which factors do you believe will most strongly impact how gas is brought on and off the network in the future?**

Please email your responses to [**box.gfop@nationalgrid.com**](mailto:box.gfop@nationalgrid.com).

Upcoming release dates and instalment outputs

February 14th

Summary of how within-day flows have changed, and factors influencing behaviour

February 28th

Predict how within-day gas flows could change by 2025

March 14th

“What if scenario” impact study of within-day behaviour in 2025

March 28th

Wider study considering the time to react to a flow change

national**grid**