



Industry must prepare for CCUS and Hydrogen now

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Teesside Hydrogen CO2 Capture – At the heart of Teesside for generations



- ✓ Teesside Hydrogen CO2 Capture project is through to the due diligence phase of the BEIS Cluster Sequencing competition
- ✓ Over 200,000 tonnes a year of captured CO2
- ✓ New source of blue decarbonised
- ✓ Distribution through over 80 miles of BOC pipeline
- ✓ 20 years of safe and reliable operation

Congratulations to the other projects in Teesside



The scale of the challenge



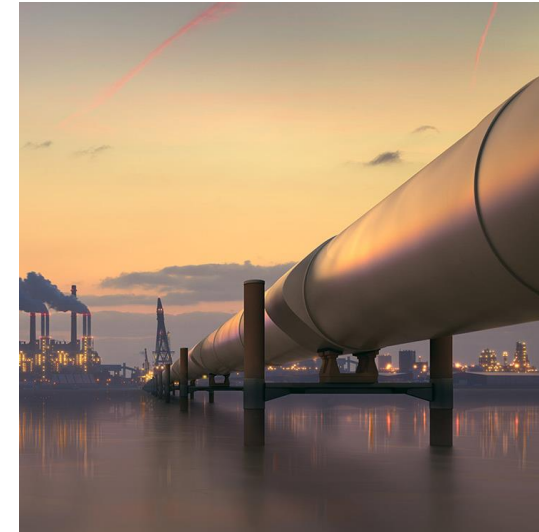
Gas Pipes

736 Twh



**Electricity
Pylons**

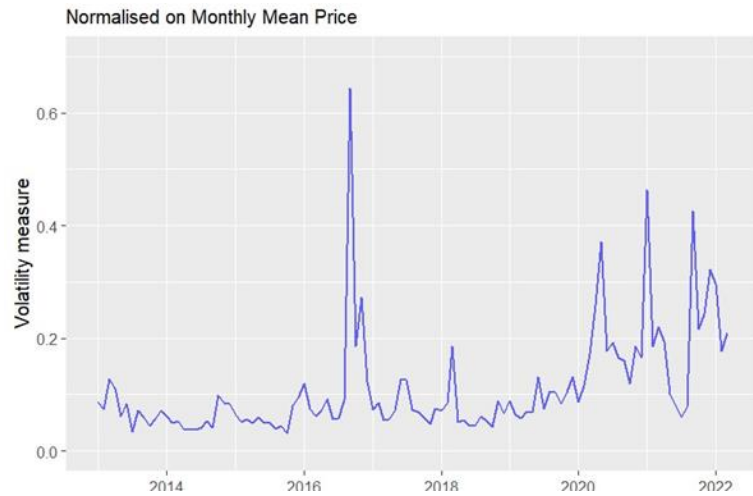
275 Twh



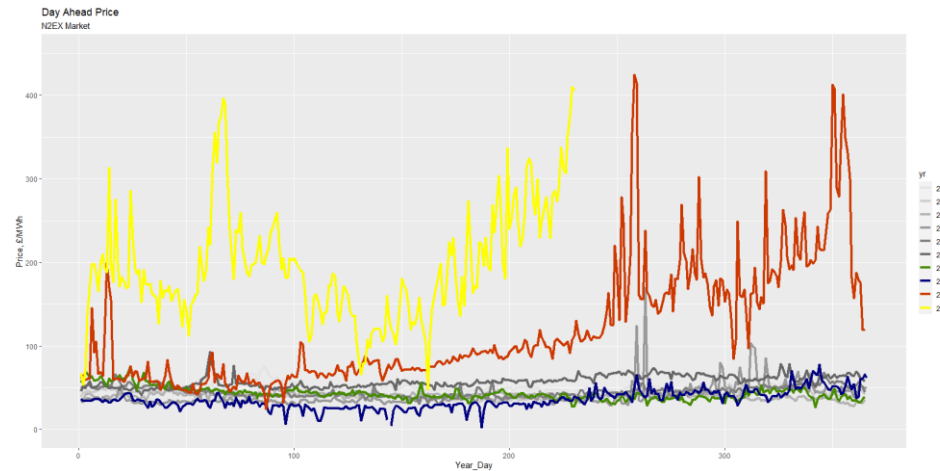
**Petroleum
Pipes**

634 Twh

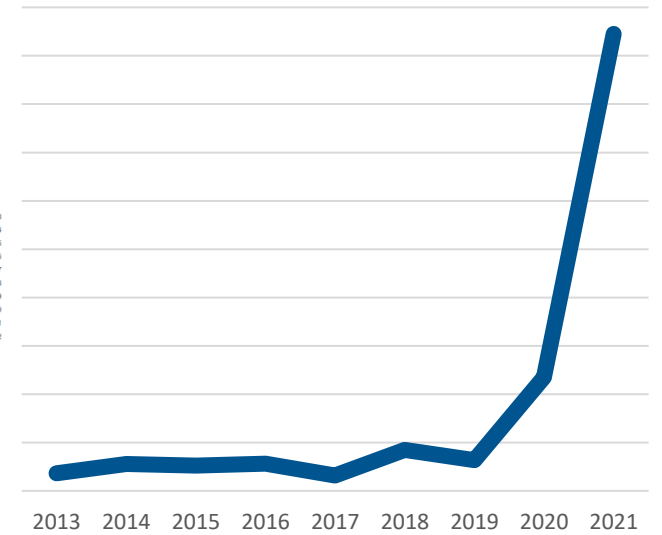
Price volatility



High energy price



Carbon compliance



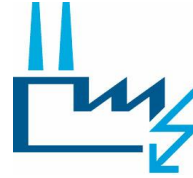
Options in the future for Industry



Fuel Switch



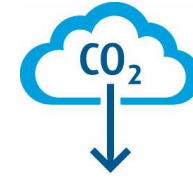
Reheat furnace on hydrogen



Electrification



Induction melting



CCUS



Linde carbon capture plant

Two high temperature processes, two different pathways



- Steel reheat
- Refinery heaters
- Chemical processes



- Glass
- Cement
- Lime

Become an Informed Buyer



The Preparation

Feasibility assessment/CFD Modelling

Design and build High flow skids X 2 – 3500nm³/hr+

Management of logistics, engineering and production/filling capacity for trial – **Up to 100 trailers per trial!**

Install skid and decant rig

Purge, test and commission system



The Deployment



Consumer Products

- Hydrogen as a replacement fuel in a boiler
- Proving mixtures up to 100% hydrogen
- Safe and reliable operation of an industrial hydrogen fired boiler demonstrated

Glass

- World first, successful production of float glass using hydrogen
- 100% Hydrogen firing achieved - Glass unaffected
- Customer – ‘Demonstrate feasibility of Hydrogen Conversion’ – Achieved
- BOC – ‘Demonstrate delivery of large scale H2 trial’ – Achieved
- 8 x 29hcm BOC tube trailers per day
- approx. 100 tube trailers supplied for project

Minerals

- World First Net Zero Fuel mix for clinker production
- Up to 10 trailers per day
- Clinker production unaffected
- Max flow rate of ~3500+SM3/hr achieved (1 x trailer every 25 mins)

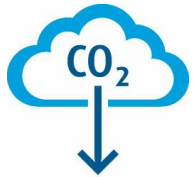
The time to act is now!



The financial drivers to change to a decarbonized operation are here today and will get stronger



Hydrogen is a suitable fuel for the replacement of hydrocarbons in many processes



Process optimization & intensification will mitigate today's costs, ready for CCUS tomorrow



BOC can supply technology, assets and industrial gases to provide a path to decarbonisation



Thank you for your attention
Questions?

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