



Carbon Capture & Storage

The Teesside Network

Presented by Dave Robson-SSI UK On behalf of PICCSI





Who are we?



- NEPIC
 - Process Industry Cluster Body for the NE
 - 400 members
- PICCSI
 - NEPIC members with interest in CCS
 - Brings together power and industrial interests
 - Supports and promotes CCS proposals
- SSI UK
 - Formed when SSI purchased the Coke, Iron & Steel making and associated power generation facilities of Tata on Teesside
 - All product currently exported





Where are we?







Why the UK needs industrial CCS



- The only technology available to significantly reduce industrial carbon emissions
- Required to meet the UK's legally binding carbon targets
- Technologically proven at a commercial scale on industrial plants





Why Teesside needs CCS



- **Process industry in Teesside is essential for UK economy worth** ۲ £10bn per year
- North-east only net exporting region in the UK •
- Our international competitors are doing it ٠
- One of the most carbon intensive locations in UK ٠
- No other technology available to substantially reduce industrial emissions
- **Cost effective carbon abatement option** •
- **Excellent geographical location** •
- **Clear industrial support** •

However ... industrial CCS is not currently financeable





Regions Importance to the UK Economy



- In 2011 the UK had a manufacturing trade deficit of £10bn a year, up £2bn from the previous year
- The Process & Chemical industry is the largest manufacturing export sector in the UK. There are very few others.
- In 2011 the chemical industry exported £53bn worth of product, £3bn up
- UK imported £49bn of chemicals up by £4bn an opportunity





Carbon is intrinsic to Teesside Industry



SSI has Europe's 2nd largest blast furnace

- Recently re-started & planning expansion
- >5000 (direct + indirect) jobs depend on it
- Carbon intensive >6 million tonnes CO₂ annually most from a point source



Existing H₂ plants serving Huntsman, SABIC & Ineos emit CO₂

Growhow's Ammonia plant is largest industrial user of natural gas in the UK







- Up to 26 Mt CO2 could be technically captured each year from 37 industrial and power sector emitters (current & future) situated close to each other in Teesside
- This could reduce annual CO2 emissions from the North East by 71%
- Supply 8% of UK's CO2 reduction
- Provide a reliable source of CO2 for EOR



Tees Valley Integrated Complex

TeesValleyUnlimited





Sector attracts Private Sector Investment



Greenergy Green Energy £10million

KP Chemicals Process Industry £20million Mitsubishi Chemical Corp Process Industry £15million

SSI UK Steel Industry >£1000 Million CropEnergy Ag Biofuels Manufacturing £11 million

GrowHow UK Manufacturing £9million

Lotte Chemical UK Ltd Process Industry £62.5 million

Examples of private sector investment across last 24 months

Huntsman Tioxide Process Industry £20 million



Global CCS Investment







Showing 65 of 73 projects.

voice of the industry

rep



Benefits of CCS to industry



- Deployment of CCS in Tees Valley provides a carbon solution for both power, industrial, agricultural and transport needs
- For many industrial sectors CCS is the only way to significantly reduce CO2 emissions and meet climate change targets
- Increasing exposure to EU carbon taxes without CCS in a globally competitive world means potential loss of home based production



Why a Teesside Network?

- A unique combination in the UK of existing industrial emitters (hydrogen, ammonia and bio-ethanol) who already capture CO₂
- Opportunity to include other large industrial emitters, such as the SSI steelworks
- Low capture cost and compact network
- Shipping or Pipeline options readily established
- A full chain network remains an option

Teesside is a highly integrated industrial region & can deliver & benefit from a CO₂ network.





The Tees Valley is an ideal Industrial Network



- The chemical industry is clustered in four discrete UK locations but 58% of the UK's chemical industry exists within Tees Valley
- The industry is being pressured by the EU ETS and UK targets, which could threaten 25,000 jobs in Tees Valley
- Customers are increasingly requiring low carbon polymers & petrochemicals
- The chemical industry is a significant part of the UK economy
- CCS infrastructure will provide a significant reason to locate a chemical/industrial investment in the UK

voice of the industry



The benefits of CCS in Teesside



- Create 4000 high value jobs
- Safeguard £4bn exports every year
- Allow UK companies to compete in the growing market for low carbon chemicals, plastic and steel
- Attract new exporting companies to invest in the UK
- Decarbonise 35% of the UK's fertilisers, produce green hydrogen and low carbon plastic, decarbonise the second largest blast furnace in Europe
- Decarbonise consumer products we all use every day



Deliverability

- Industrial CCS is deliverable using existing technologies.
 - Millions of tonnes of CO₂ are captured globally each year
- Such Capture facilities are routine business for Industrial companies; the technology is proven
- **Comprehensive pipeline networks already exist** across Teesside: A CO₂ network is a deliverable extension
- CCS at Teesside is deliverable on a short timescale,
 - Construction could be commenced within 18 months
 - Operating 3 ½ years later >>> delivering economic growth.





2.5 Million tonnes CO_2 each year since 2000

Dakota Gasification Co,







Future Options



- Low cost availability of CO2 from Ammonia plants and H2 Reformers to seed CCS & EOR Projects around the North Sea Basin
- Land and permitting is in place for a full chain activity at some point
- CCS network could also provide
 - Decarbonised hydrogen to support UK and developing NE ambitions in H2 Fuel Cell vehicles
 - Decarbonised heat for households and industry Teesside has industry and housing in close proximity.
 - Opportunity for decarbonised syngas from UGC or Waste for energy or manufacture



The Tees Valley City Deal



"Global pioneer in industrial CCS"

- £1million from DECC •
- Carryout pre-FEED study for a full chain CCS •
- Propose an investment mechanism for industrial CCS
- Only place in the UK doing something about industrial CCS

