


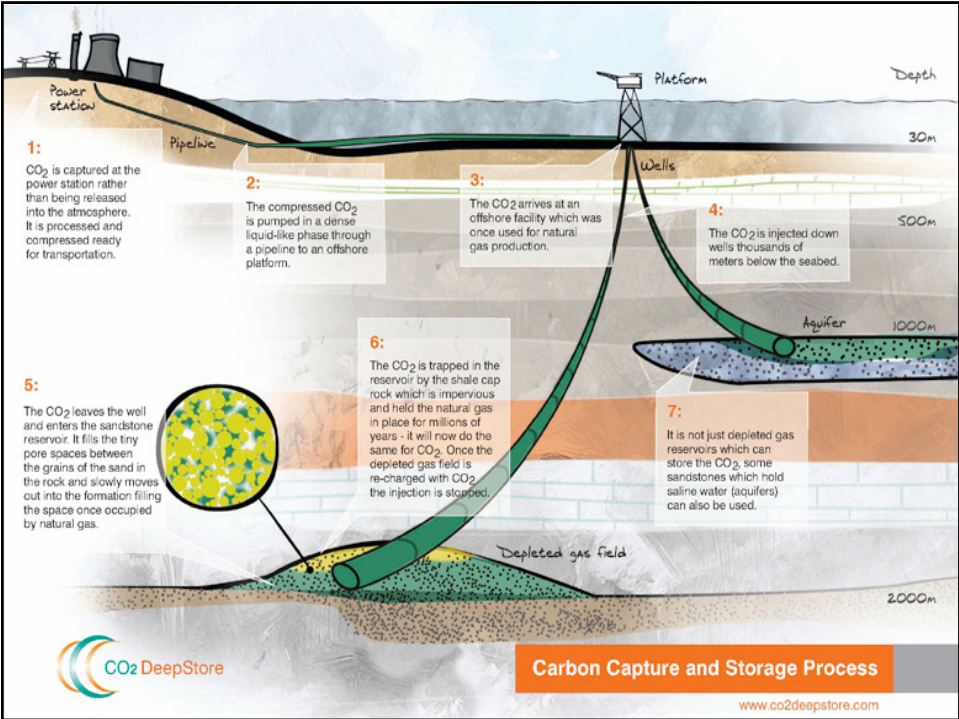
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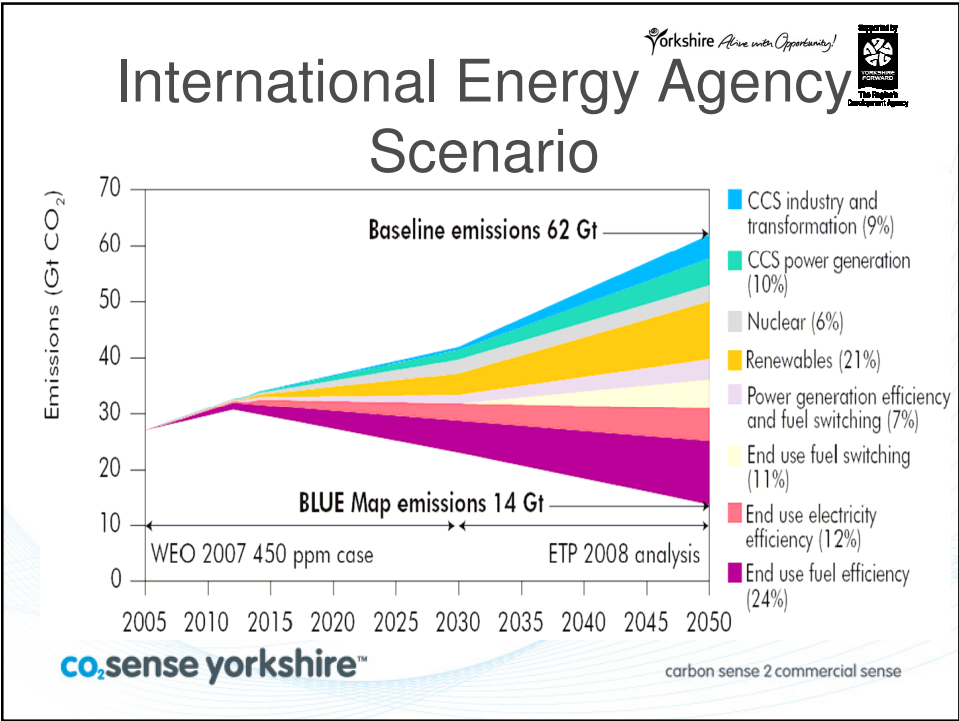


Developing a Carbon Capture and Storage (CCS) Cluster in Yorkshire and Humber

Joanne Pollard
CEO

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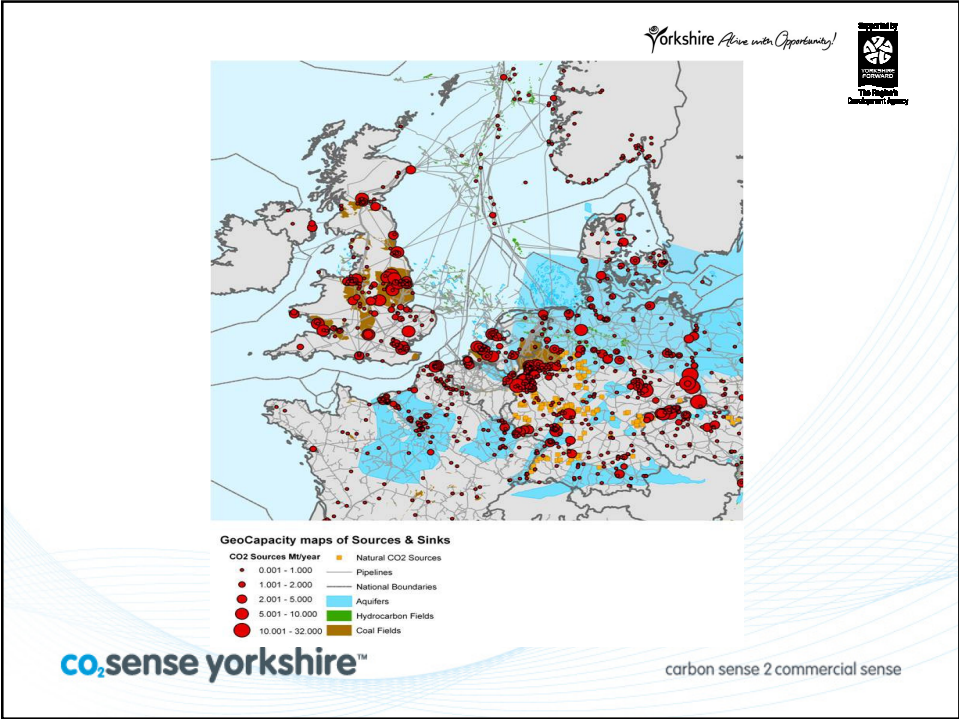
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Why Yorkshire and Humber?

- 60Mt of CO₂ emissions from single point sources
- Range of sectors – not just coal-fired power generation
- Located in a relatively small geographic area
- Adjacent coastline to southern North Sea gas fields
- Considerable industry interest
- Opportunity to gain a world lead for the region

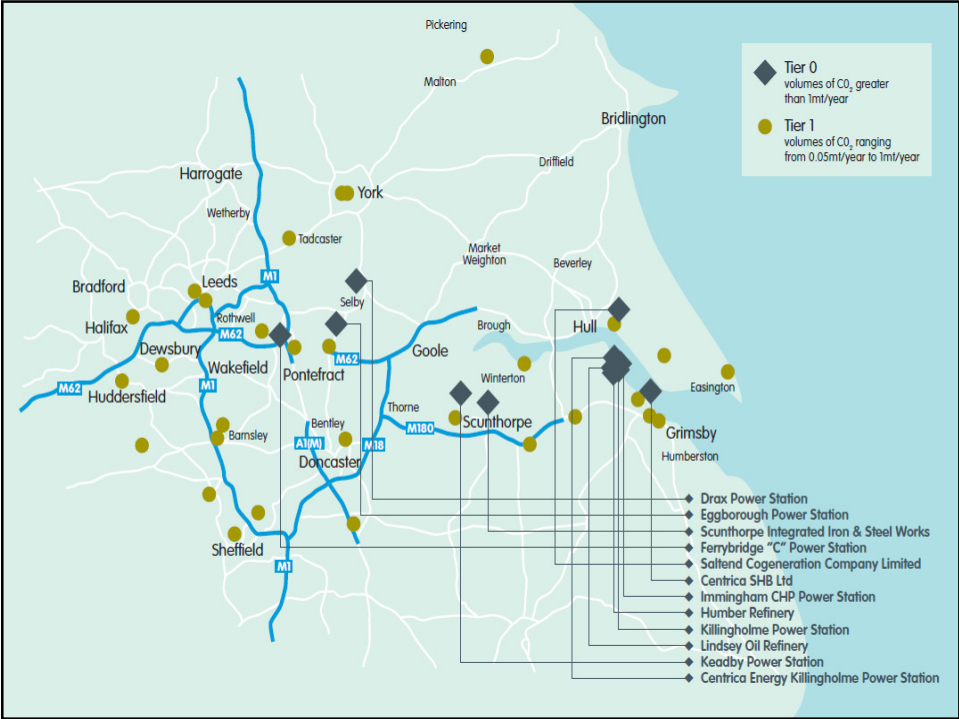
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Why Clusters ?

- Exploit existing industrial infrastructure
 - Fuel/material supply
 - Grid connection
 - Pipeline wayleaves
 - Depleting natural gas fields and saline aquifers
- Mitigate price/volume risk in CO₂ transport
- More cost effective than individual 'source to sink' projects
- But – requires oversizing of pipelines in early years




CO₂Sense/YF Role

- Develop and disseminate the strategic and business case for implementation with partners
- Enable investment from private sector and Government/European Commission
- Facilitate engagement with regional/local stakeholders
- Help position Y&H as a low carbon leader

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Network Opportunity

- Ferrybridge to Theddlethorpe picking up all large emitters
- CO₂ up to 125 bar but below critical temperature
- Tree structure more appropriate
- Phased development from 2011 to 2030
- Opportunity to reuse some existing gas infrastructure
- Target two clusters of gas fields for storage
 - Pickarel/Viking/Indefatigable
 - Hewett/Leman
- CAPEX up to £4bn; 55,000 construction jobs; £30bn GVA
- 8.6Gt CO₂ storage - beyond 2050
- **Regional network more cost effective for each emitter than individual ‘source to sink’ projects**

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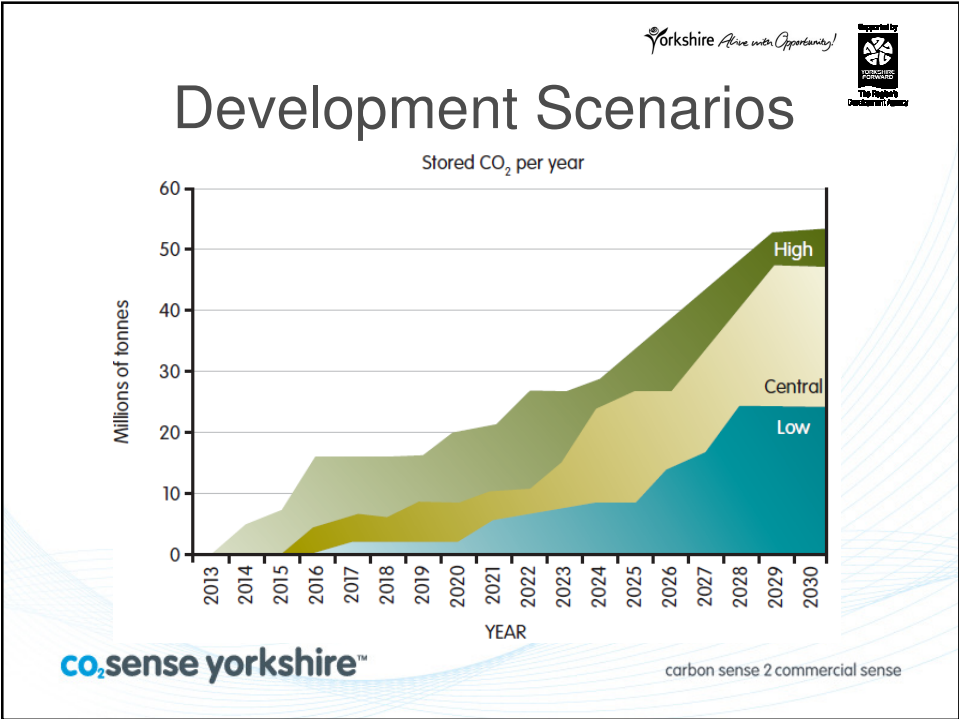
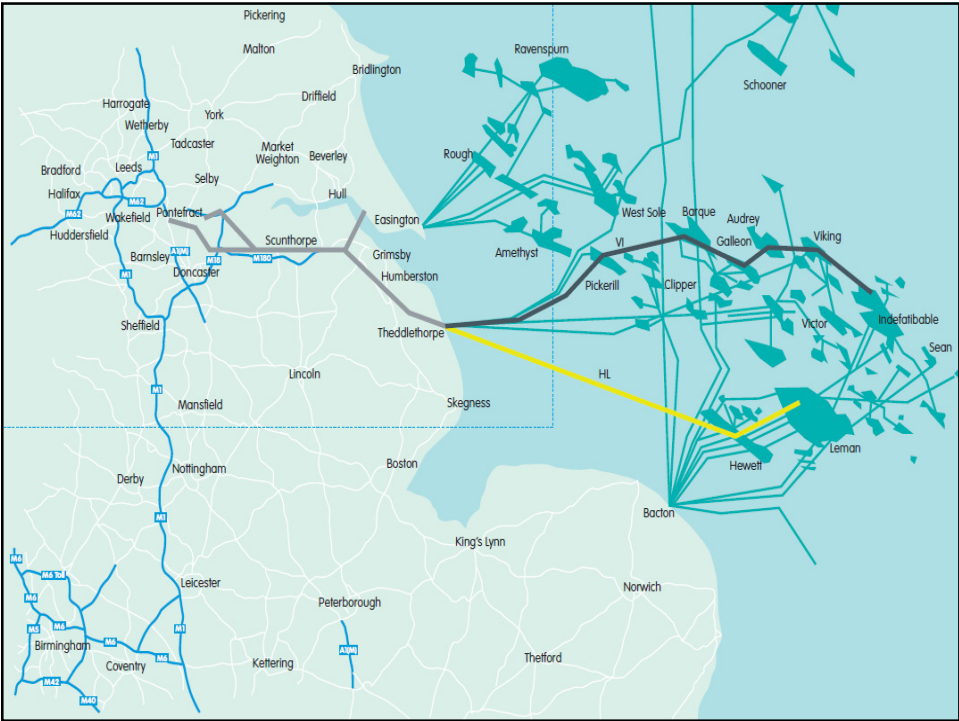


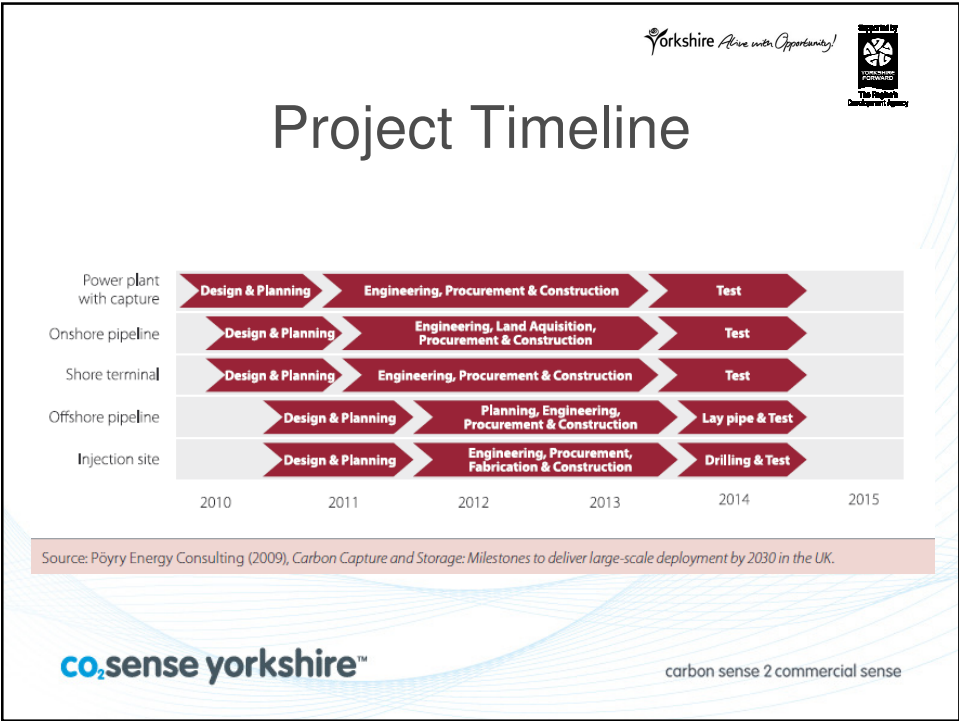


YORKSHIRE FORWARD
A CARBON CAPTURE AND STORAGE NETWORK FOR YORKSHIRE AND HUMBER
An introduction to understanding the transportation of CO₂ from Yorkshire and Humber emitters into offshore storage sites.

<http://www.yorkshire-forward.com/sites/default/files/documents/Yorkshire%20%20Humber%20Carbon%20Capture%20%20Storage%20Network.pdf>

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What Will Drive Development?

Today

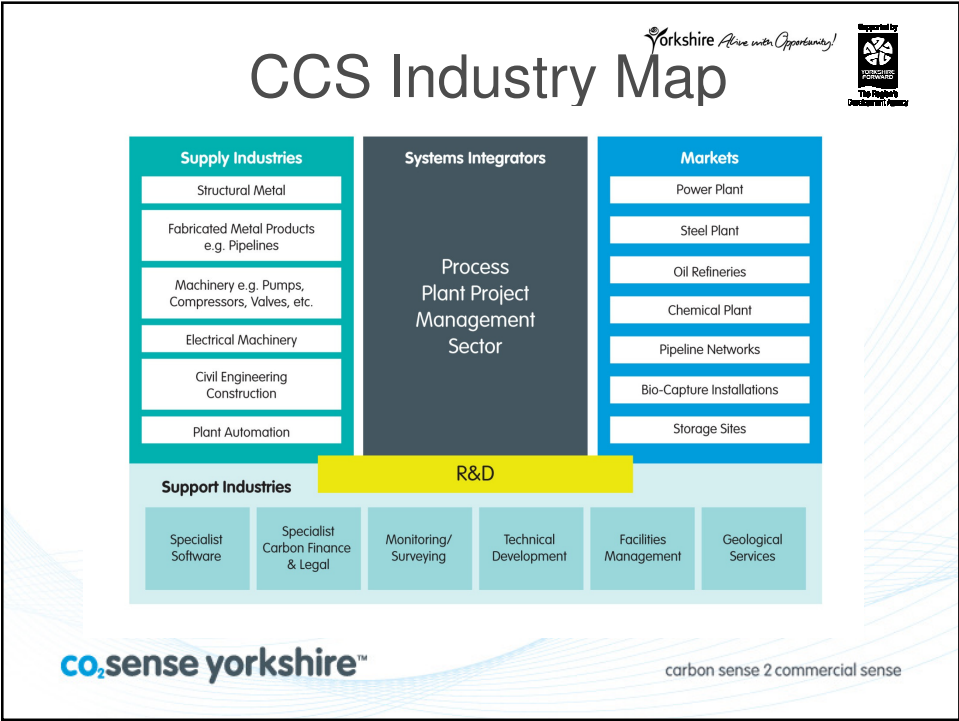
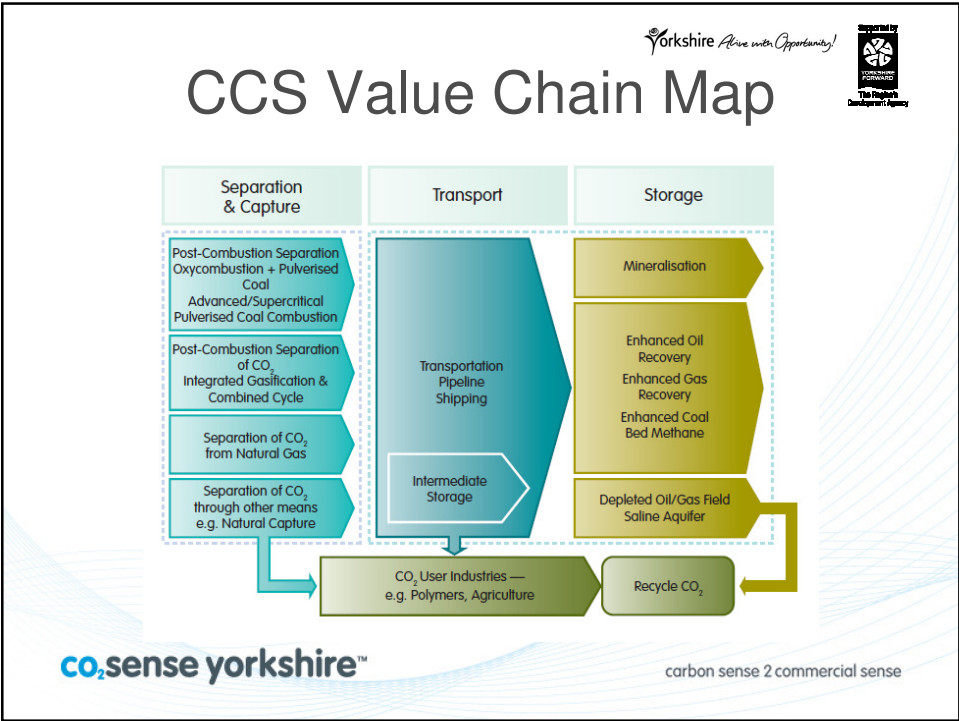
- Incentives
 - EEPR, EU-NER, UK demo programme

Post 2020

- Price of CO₂ in EU-ETS; >€35 per tonne

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Next Steps

- Further develop the business case for network initiation
 - Pre-FEED to support EU funding bids
 - Understand alternatives to debt/equity/grant financing
 - Role of hydrogen and CO₂ import/export?
- Exploit funding opportunities – EEPR/NER/UK incentive
- Awareness raising activity
 - Engage at national and international levels
 - Local Authorities and public understanding
 - Investor attitudes
 - Knowledge sharing with others regions
 - Supply chain opportunities (Tier 2 & 3)

Conclusions

- Region uniquely placed to exploit CCS at scale
- Coincidence of:
 - Cluster of large single point CO₂ sources
 - Proximity to depleting gas fields
- Potential to store up to 60Mt CO₂ per year
- Network approach is more cost effective than individual 'source to sink' projects
- Opportunity to initiate in next five years through partnership
- Meet UK energy, climate change and low carbon industrial goals