



North Sea
Transition
Authority

Legacy Wells in CO₂ Stores

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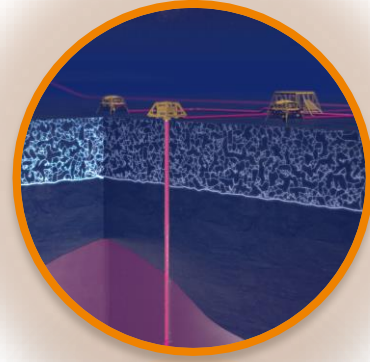
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NSTA – What we do

Three main 'buckets' of NSTA work, with several interdependencies and feedback loops between them, many of which are outside NSTA immediate scope/remit



Capital, skills
Infrastructure reuse

Integration, floating wind
Skills, supply chain

Accelerating the energy transition

Integration
Carbon storage and hydrogen
Co-location and spatial
Digital and data
Cost-effective decommissioning



Energy production & security

Economic recovery of O&G
Storage: Natural gas and H₂



Emissions reduction

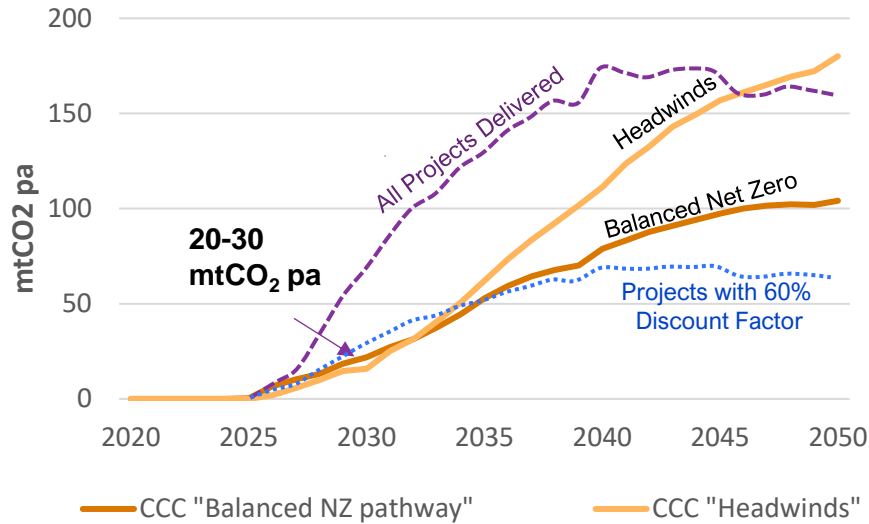
Clean power generation
Flaring and venting
Efficiencies
Technology

Capital

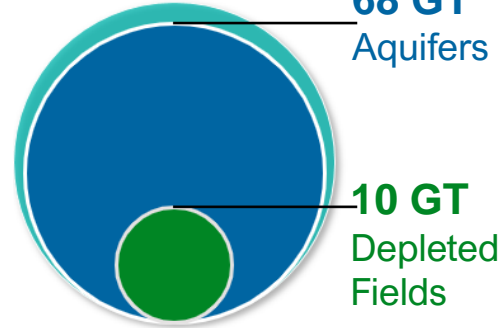
Licence to operate

CCS – Required to reach net zero

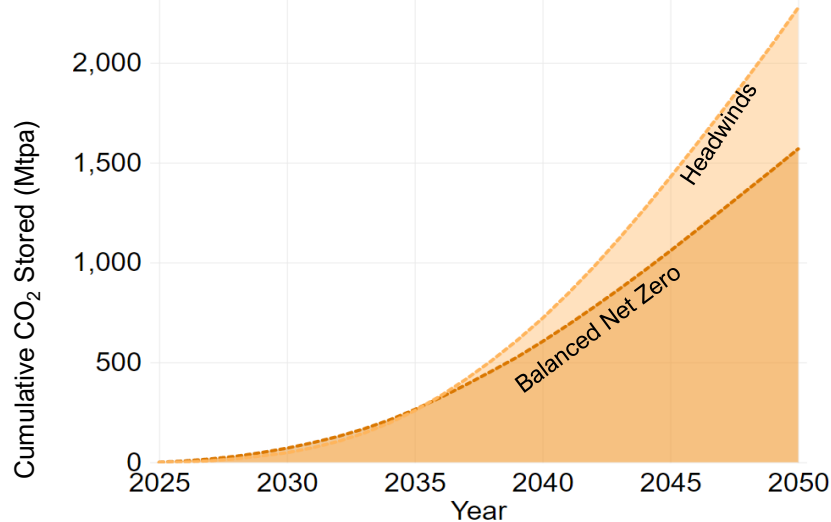
UK CCS Net Zero Requirements – MTCO₂pa



78 GT Total UKCS Theoretical Potential Storage Resource



UK CCS Net Zero Requirements - Total



Cumulative volume



Appraised stores required

Max 172

Min 47

Max 100

Min 28



UK 1st Carbon Storage Round Awards

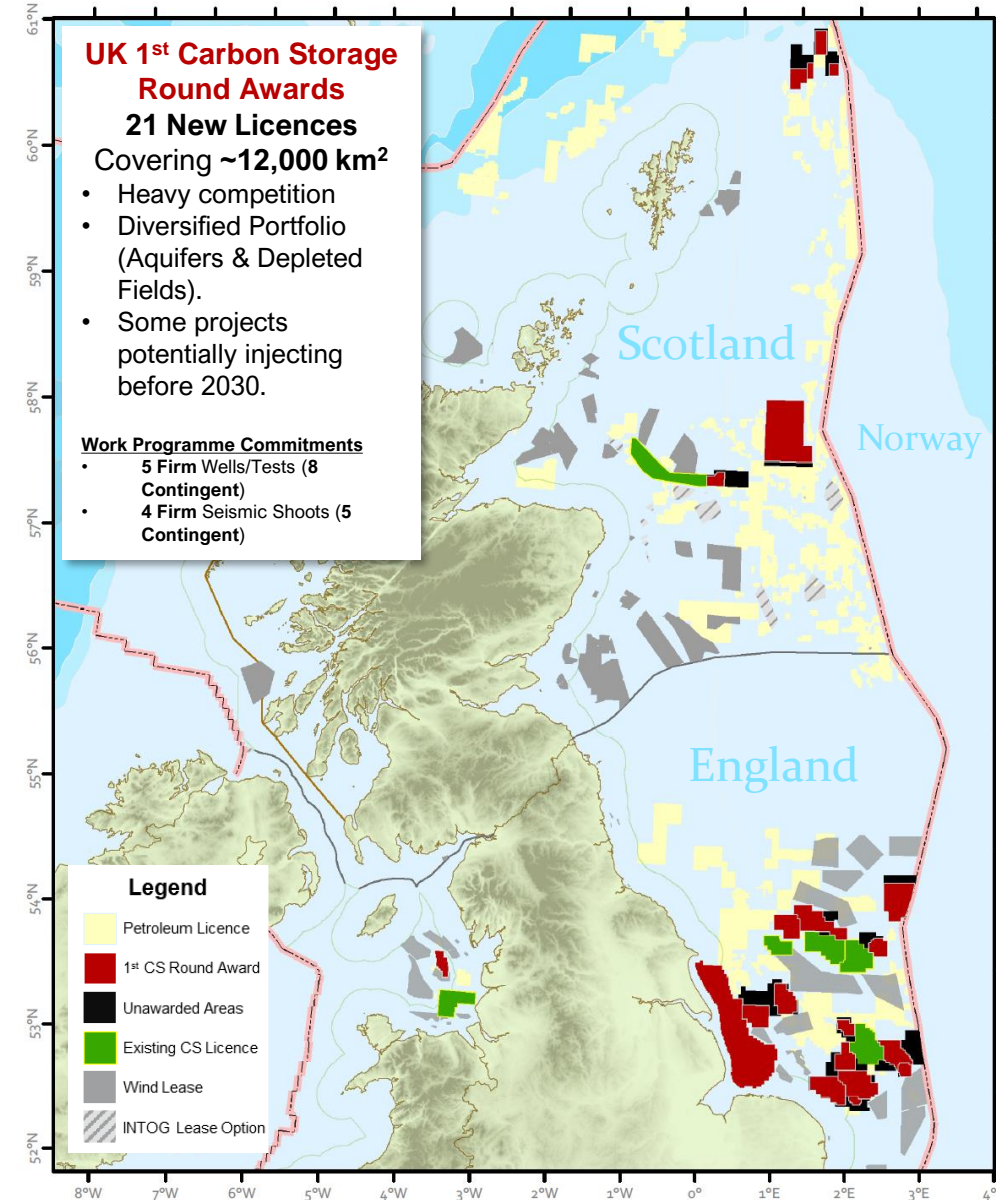
21 New Licences

Covering ~12,000 km²

- Heavy competition
- Diversified Portfolio (Aquifers & Depleted Fields).
- Some projects potentially injecting before 2030.

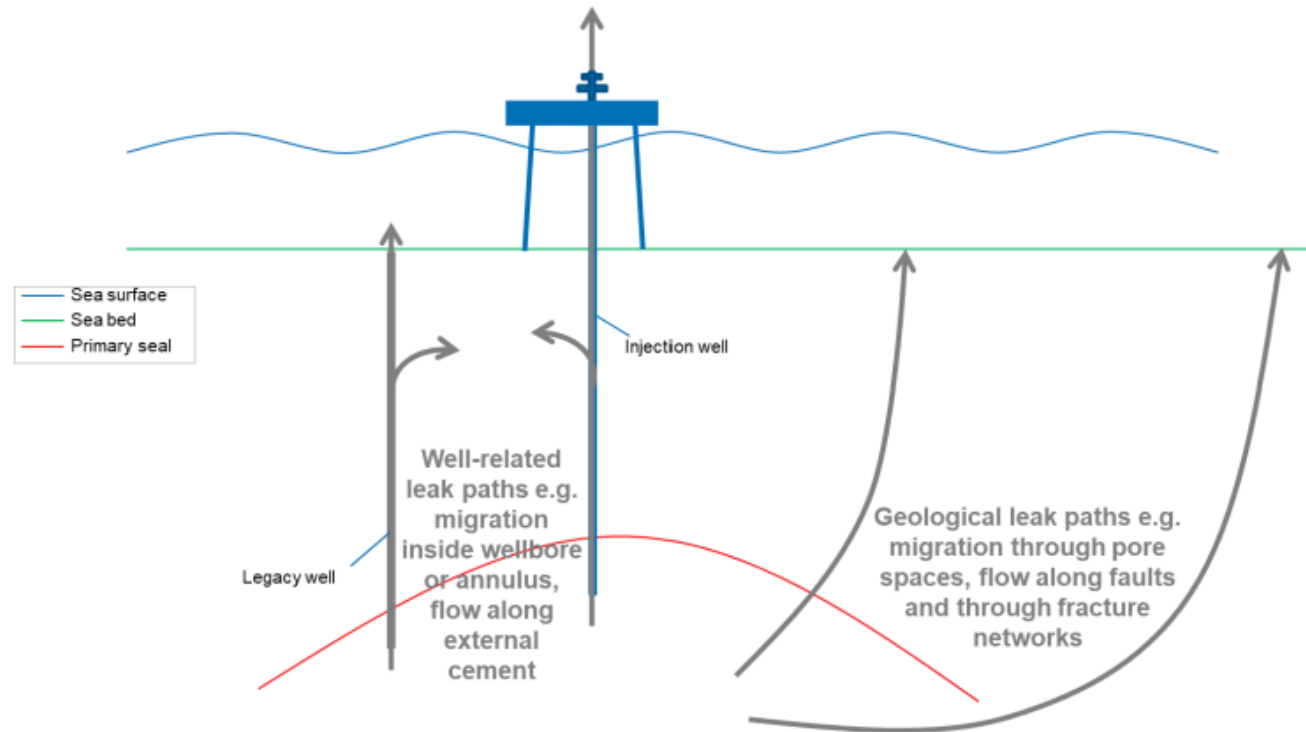
Work Programme Commitments

- 5 Firm Wells/Tests (8 Contingent)
- 4 Firm Seismic Shoots (5 Contingent)



The Role of Legacy Well Assessment in CCS

- There are three main potential sources of CO₂ leakage:
 - Subsurface anomalies,
 - Legacy wells,
 - New infrastructure (i.e. injection wells).



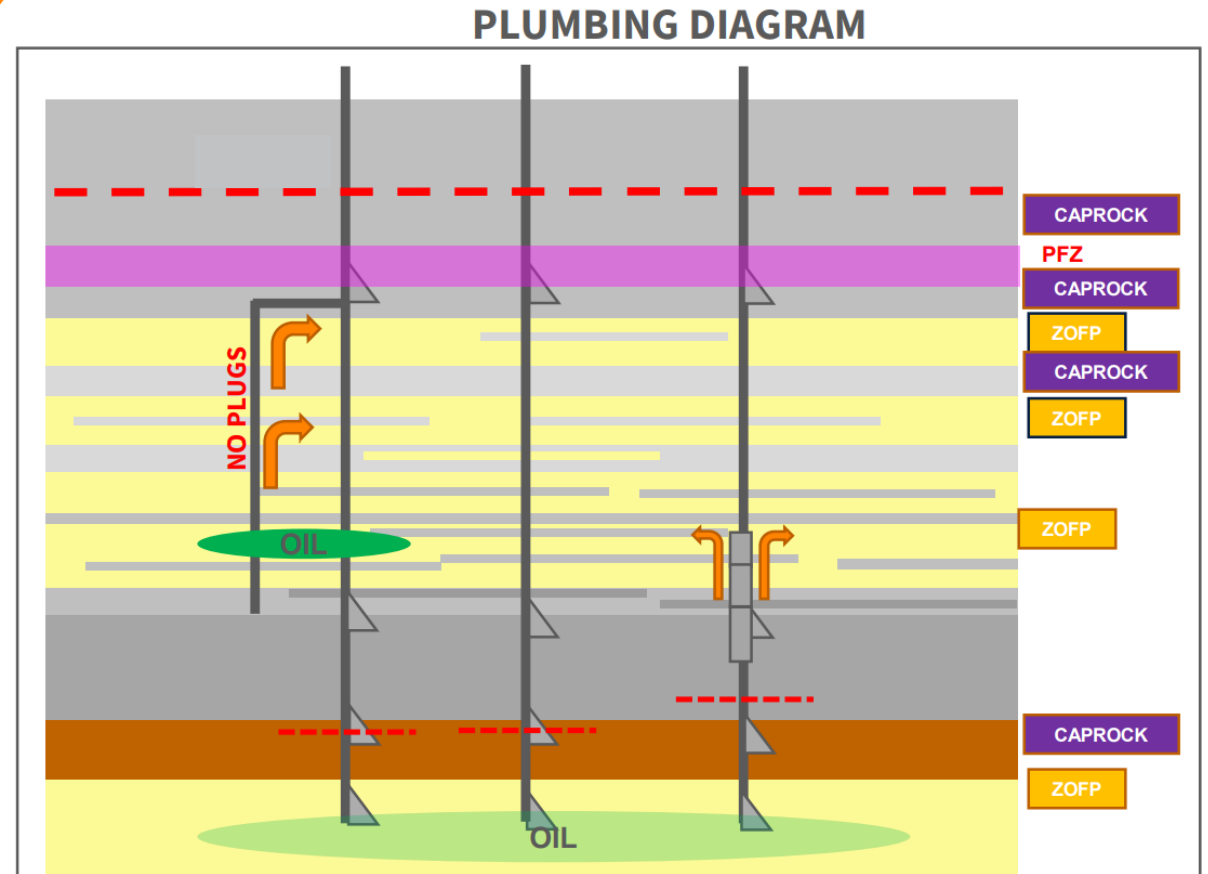
- The test is “no significant risk of leakage”

- Legacy wells are defined as **ALL** existing wells in a CS licence area and those outwith the licence area that could see a pressure increase. CCS wells (e.g. injection and monitoring wells) will eventually become legacy wells.
- >1,400 Legacy wells on current CCS Licences.
- Mixture of decommissioned and operating wells.
- Some legacy wells were drilled in the 1960's.
- Decommissioning practices have changed over the years.
- Wells within the same field can be decommissioned differently.
- **Every well needs to be looked at individually.**
- There is a lack of people competent to carry out the assessments.

NSTA Legacy Wells Assessment Process



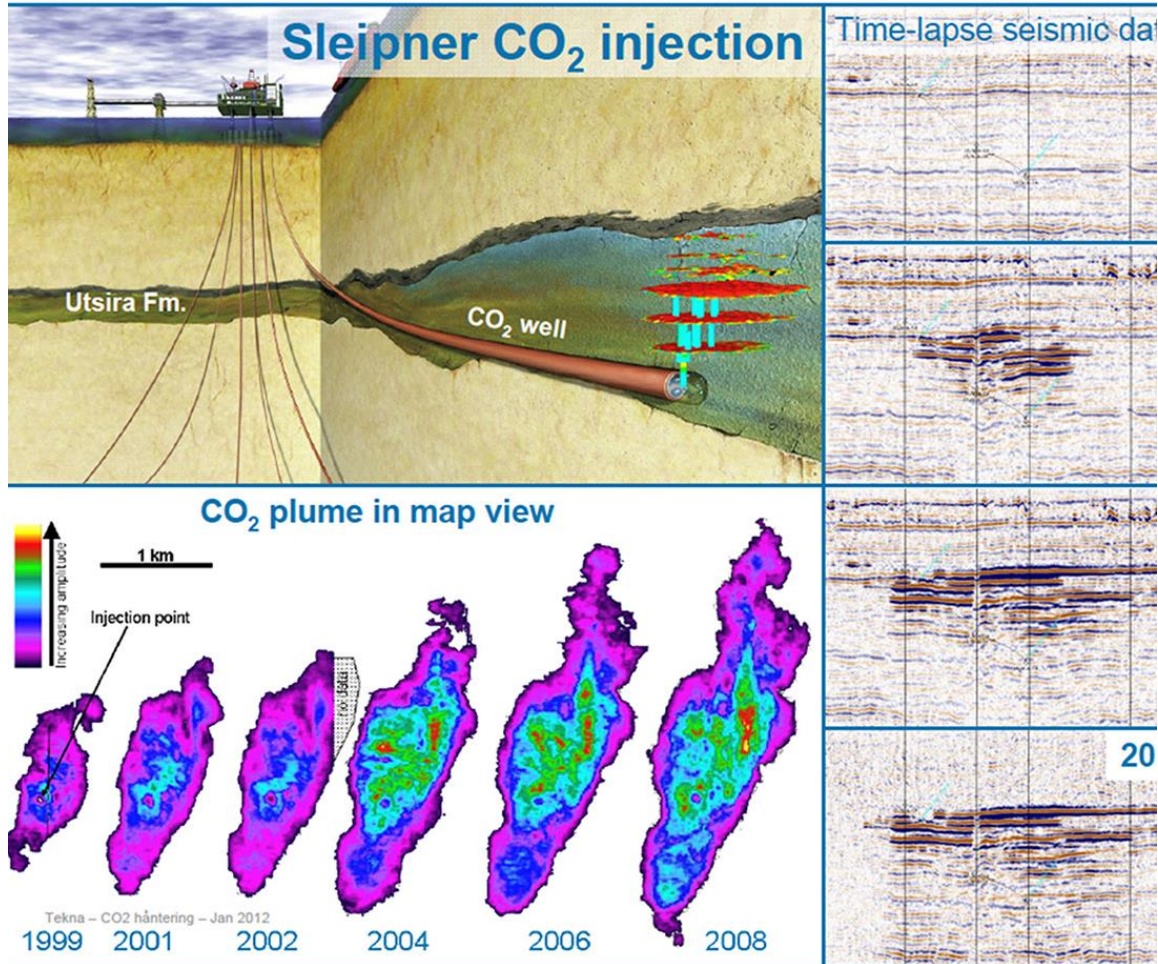
- Ensuring the Licensees have identified all wells that are required to be assessed.
- Supporting Licensees in finding data and missing sidetracks.
- Initial assessment is to the OEUK Guidelines on a well-by-well basis followed by 'snakes and ladders'.
- Engaging in technical discussions with Licensees re wells with technical issues.
- Formal review of ERA, Site Characterisation, Development Plan, CRA, Monitoring Plan, Corrective Measures Plan, Post Closure Plan).



- Majority of the engineering analysis is required where wells do not meet OEUK Guidelines.
- Most time spent gathering data and assessing 'ambers'.
- 'Red' wells may mean part of the store cannot be developed or wells may require remediation.
- Just because the abandonment is not acceptable for CO₂ storage, does not mean they are/were not acceptable for hydrocarbons.

Green	Fully meets OEUK Guidelines for CO ₂ storage
Amber	Barriers in place but do not meet guidelines
Blue (1)	Insufficient information found (so far)
Blue (2)	Wells still to be abandoned
Red	Cannot allow CO ₂ to reach the well

Holistic Review Required



- An initial store will have been identified before legacy wells are considered.
- Subsurface and legacy well assessment, and development constraints are likely to change the actual store and complex.
- The development will have to take into consideration any “red” wells and plan to remediate them or ensure CO₂ cannot reach them.

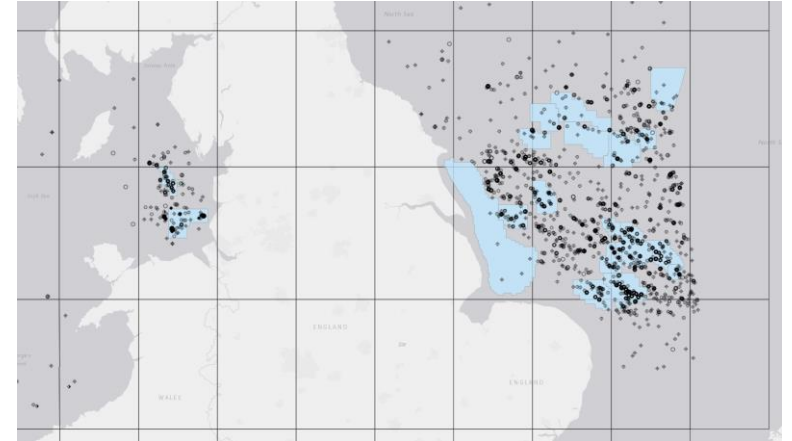
- Some wells may require to be remediated.
- These are required to be remediated before a carbon storage permit is granted.
- New technology is being developed to allow vertical access to fully decommissioned wells.
- Other option is to drill an intersect well.
- If several wells require remediation, this could affect project economics.



Graphic from K&M Technology

Summary

- Legacy wells are one of the biggest risks to potential CS projects.
- >1,400 legacy wells to be assessed; so far...
- Both vertical and lateral leak paths need to be considered.
- Holistic approach required with subsurface and wells working closely together.
- Licensees have identified legacy wells that require remediation.
- Wells will have to be remediated before a storage permit is granted.
- Remediation is costly (even with new technology being developed) and can affect a projects economics.
- Lack of skills and competency could lead to project delays.



Map from NSTA Data