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# The North Sea's CCS Opportunity

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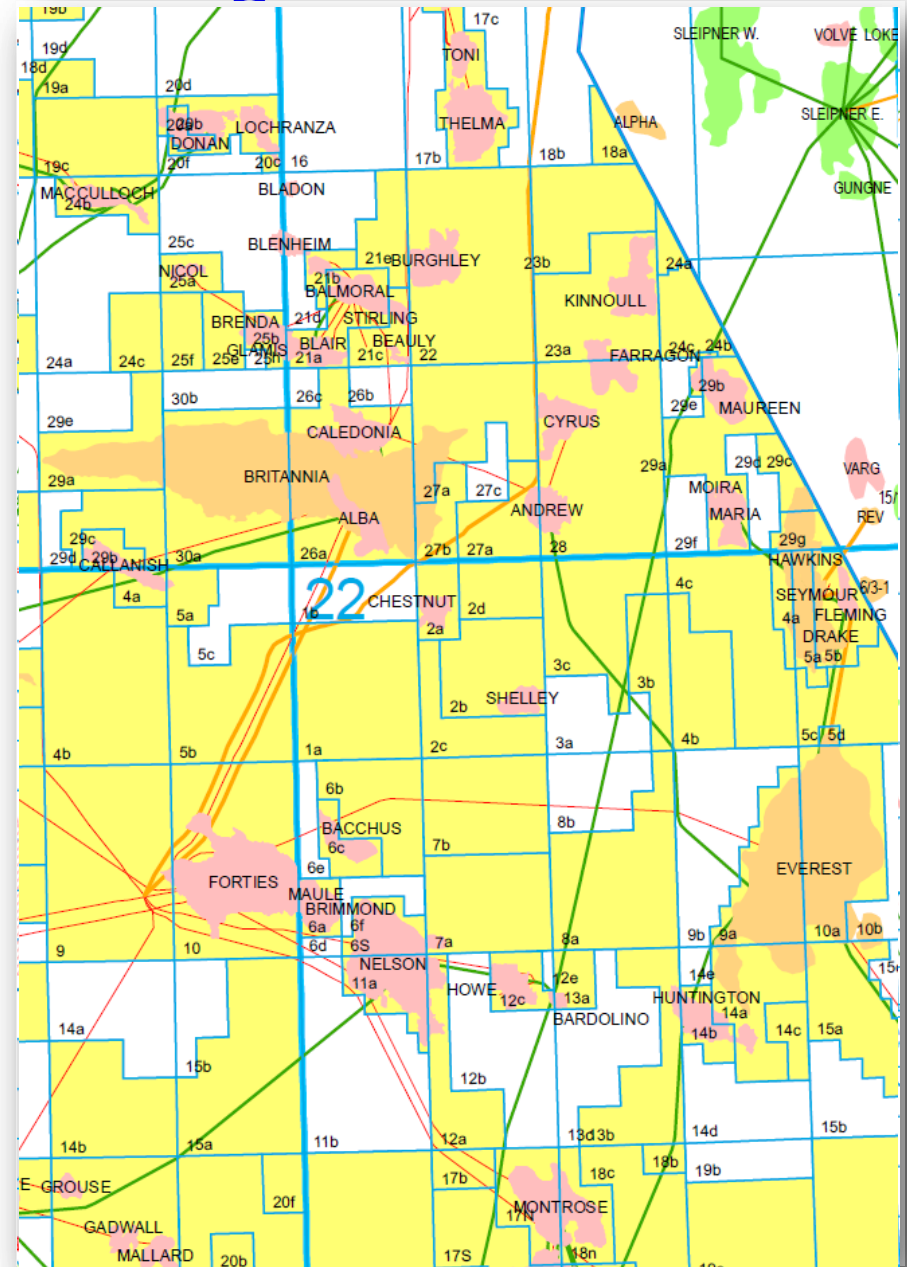
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# Outline

- ▶ Capacity, injectivity & integrity
- ▶ CO<sub>2</sub>-EOR a soft start for CCS

# North Sea Knowledge Base

- ▶ Near complete 3D seismic coverage of licensed areas
- ▶ Extensive 2D coverage of platforms and marginal areas
- ▶ 10416 E, A & D wells to end 2010
  - Static data
- ▶ >350 fields
  - dynamic data – production & injection

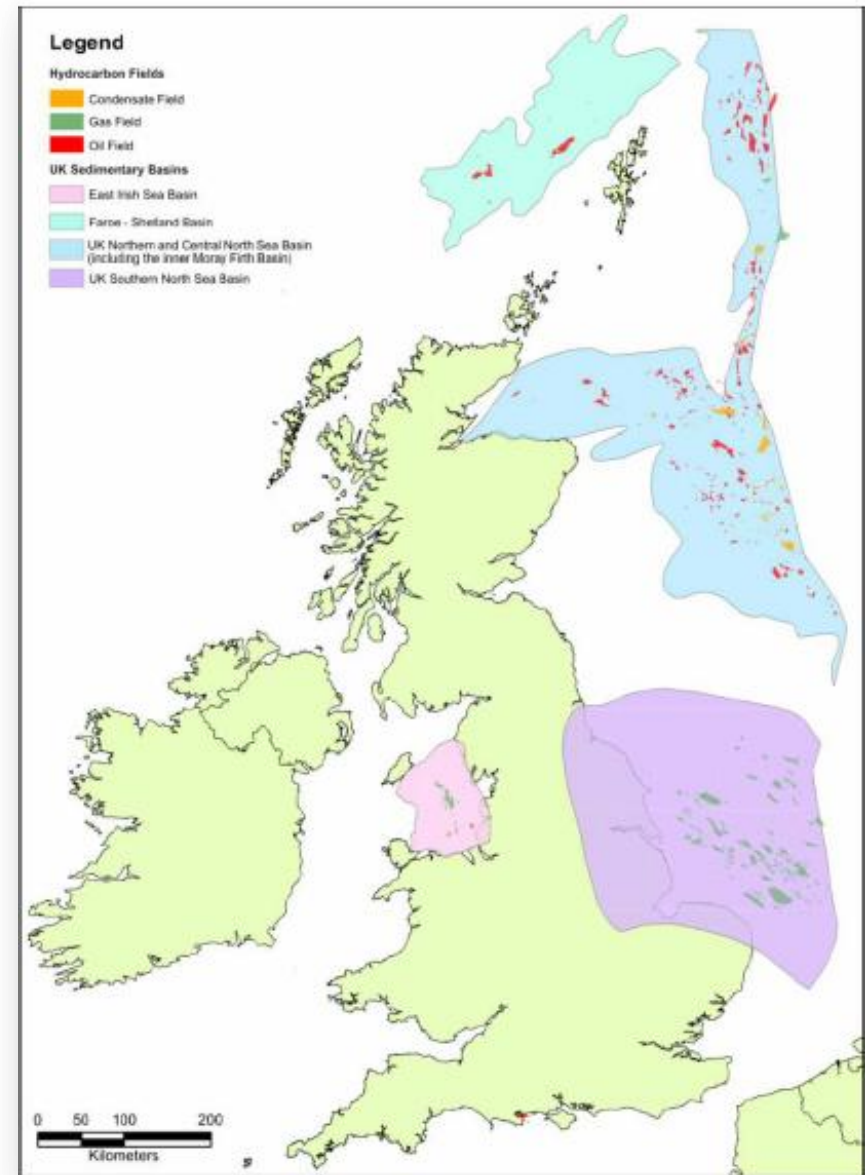


# UK CCS Capacity & Injectivity

- ETI UK Storage Appraisal Project
  - Step change in methodologies to make a realistic assessment of practical CO<sub>2</sub> storage capacity
  - Overall estimate of capacity
  - GIS database of potential storage units, including risks & economics
  - Inform investment decisions for CCS roll out in the UK
  - 10 institutes & companies

Andrew Green Programme Manager CCS, 2010

- Completion in mid 2011
  - 310 saline aquifers
  - 50 water bearing closures
  - 220 petroleum fields

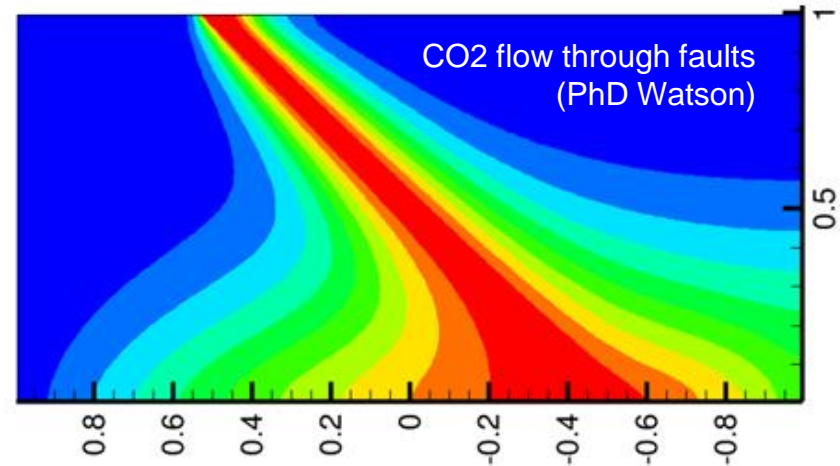


BGS map

# UK CCS Integrity

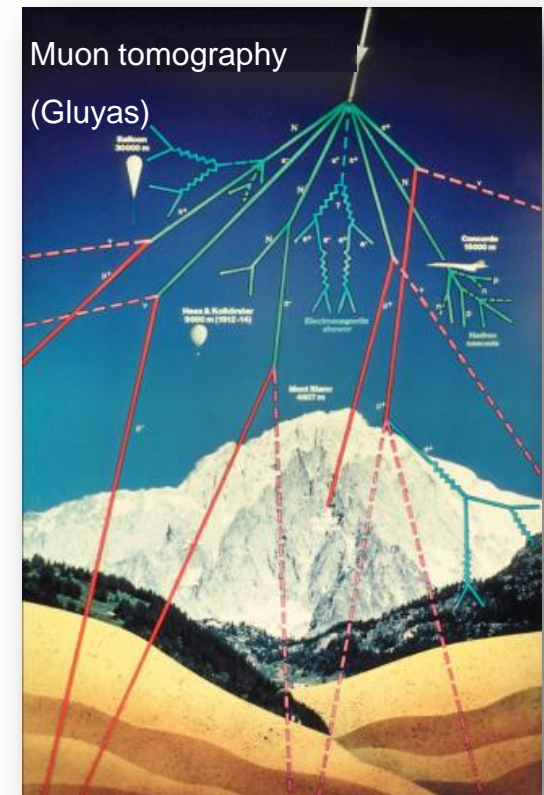
## ► Impact of injection

- Rock mechanics
- Fluid rock interaction



## ► Measuring, monitoring & verification

- Seismic & electromag tools from the oil industry
- Requirement for inexpensive continuous monitoring



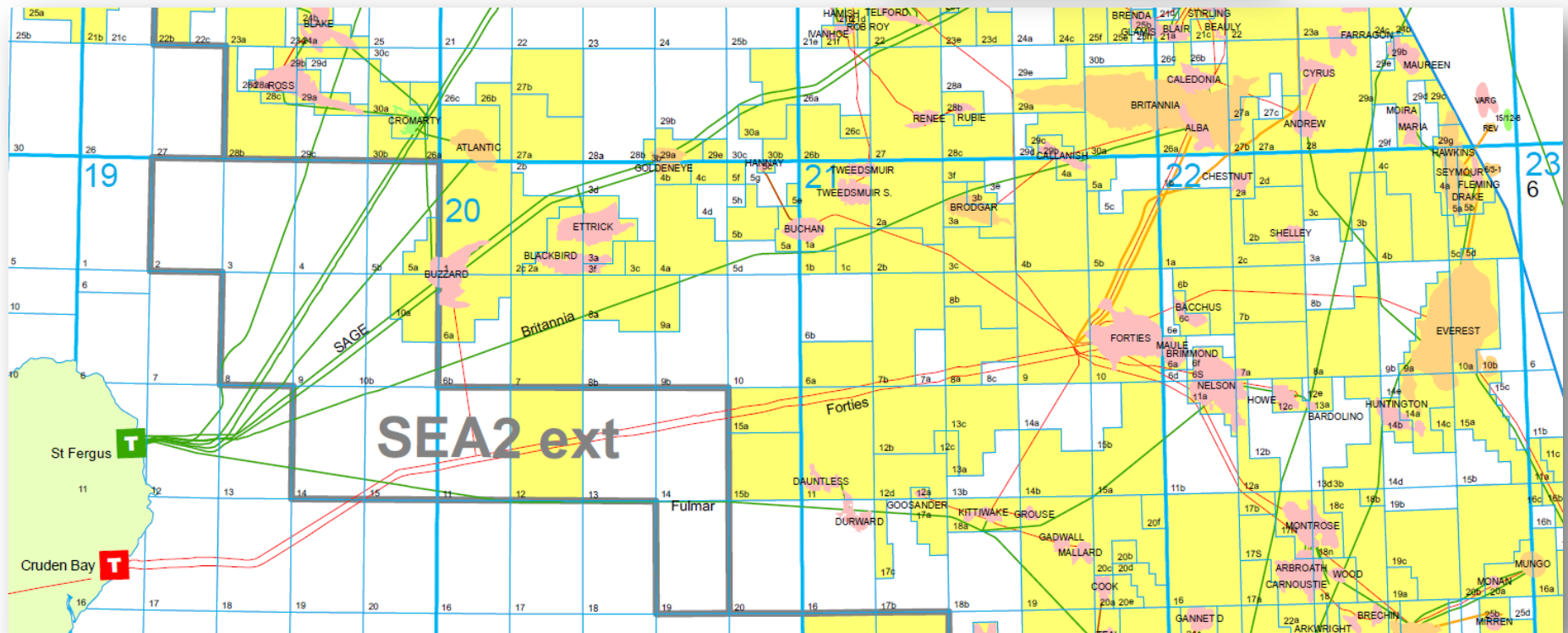


# CO<sub>2</sub> Capture, Transportation & Storage

- An entirely new process?
- or
- Have we done it before?

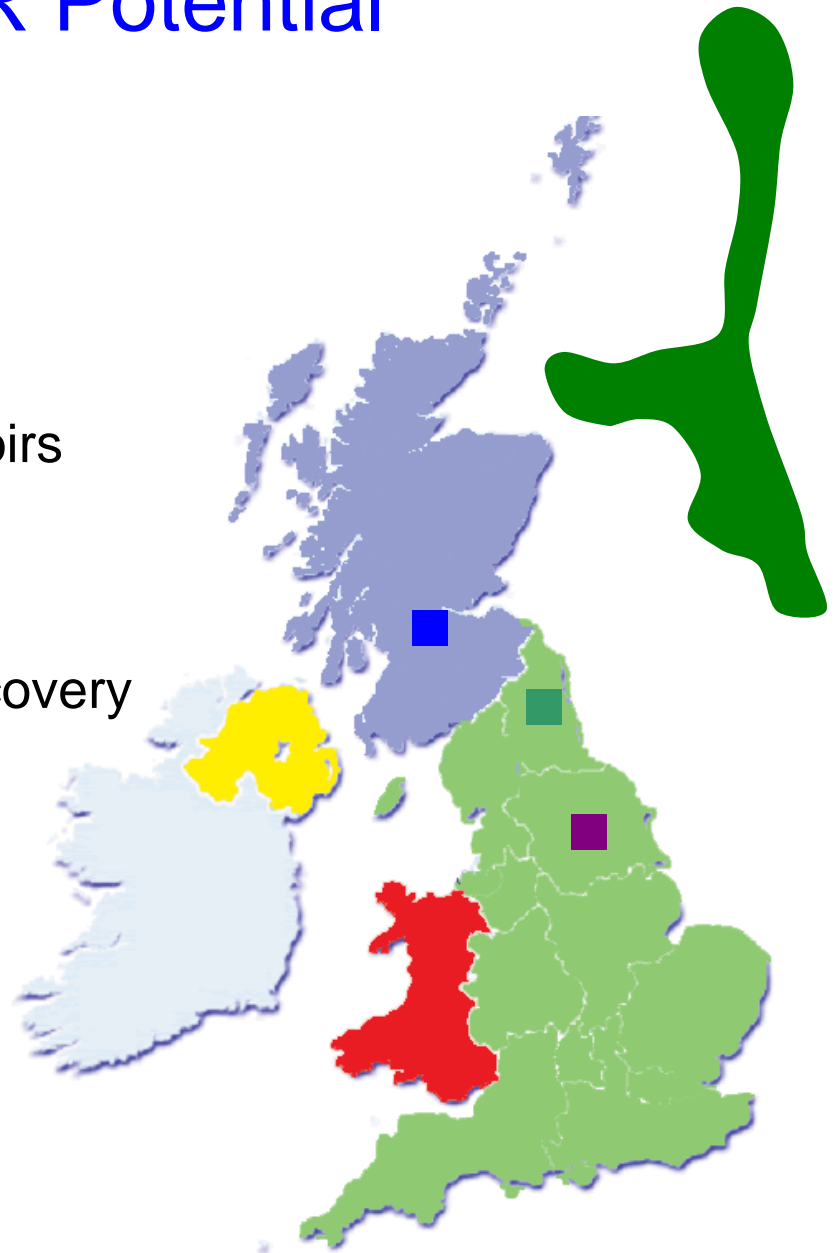


Forties Alpha



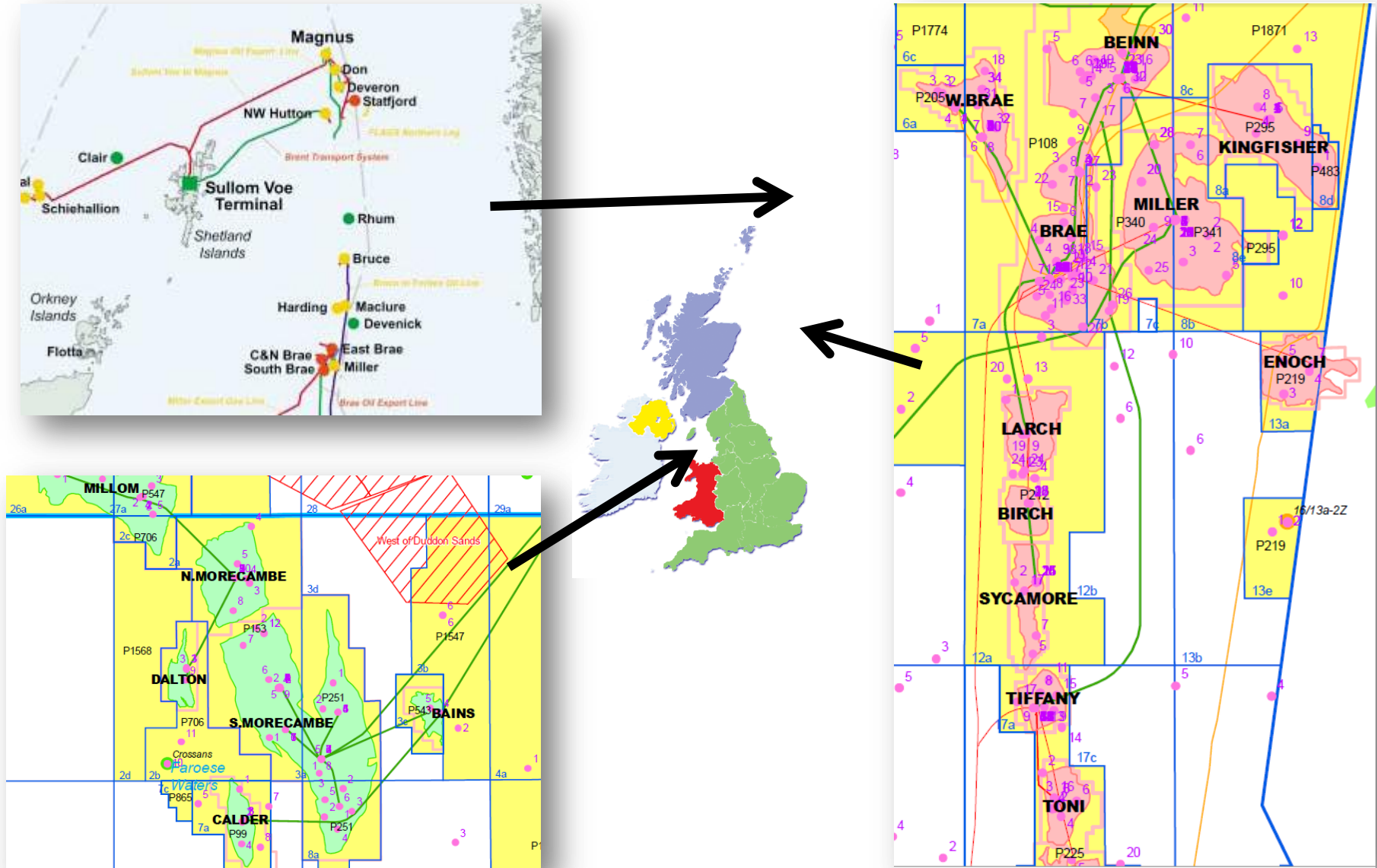
# UK CO<sub>2</sub> – EOR Potential

- ▶ Well proven tool in West Texas
  - 4-12% of STOIIP extra recovery
  - Miscible and immiscible floods
  - Low quality, shallow (cool) reservoirs
  - 1 billion barrels recovered to date
- ▶ Untested in UK
  - Projected prize ~5% additional recovery
  - Largely miscible flood
  - High quality deep reservoirs
  - ~ 3 billion barrels
    - Matched by CO<sub>2</sub> production



# Capture, Transportation, Injection & Facilities Morecambe, Magnus & Miller

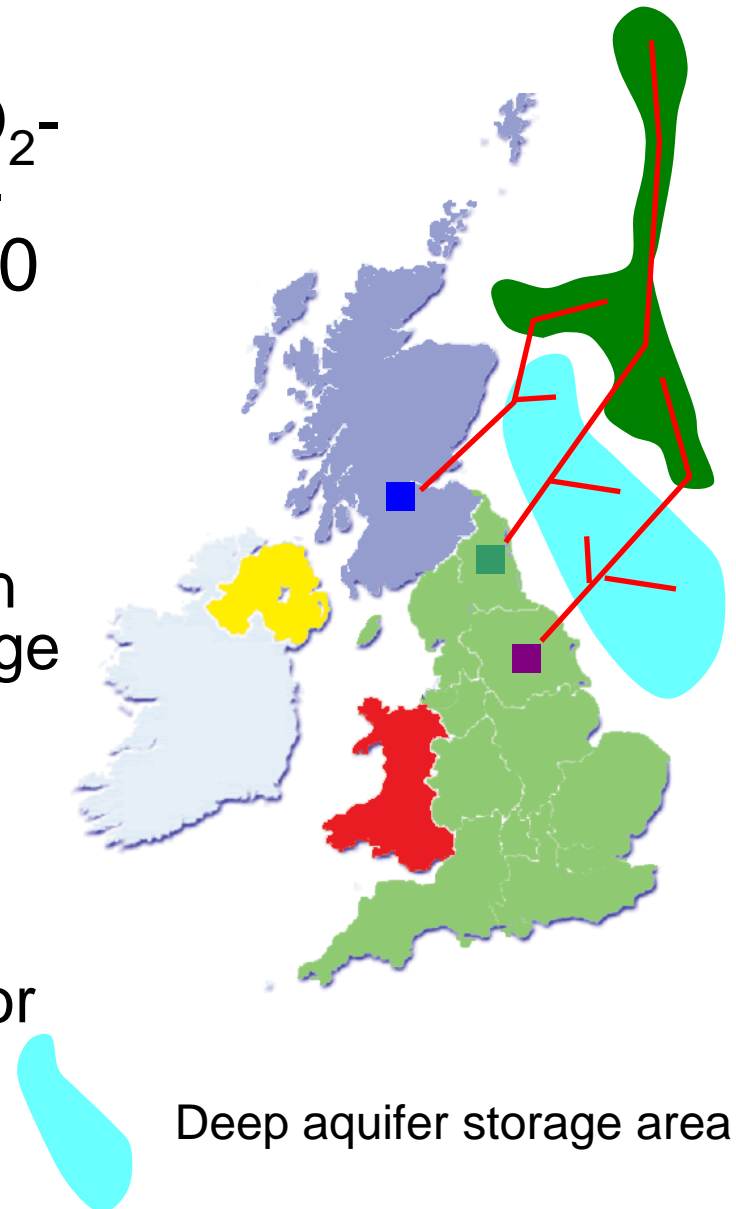
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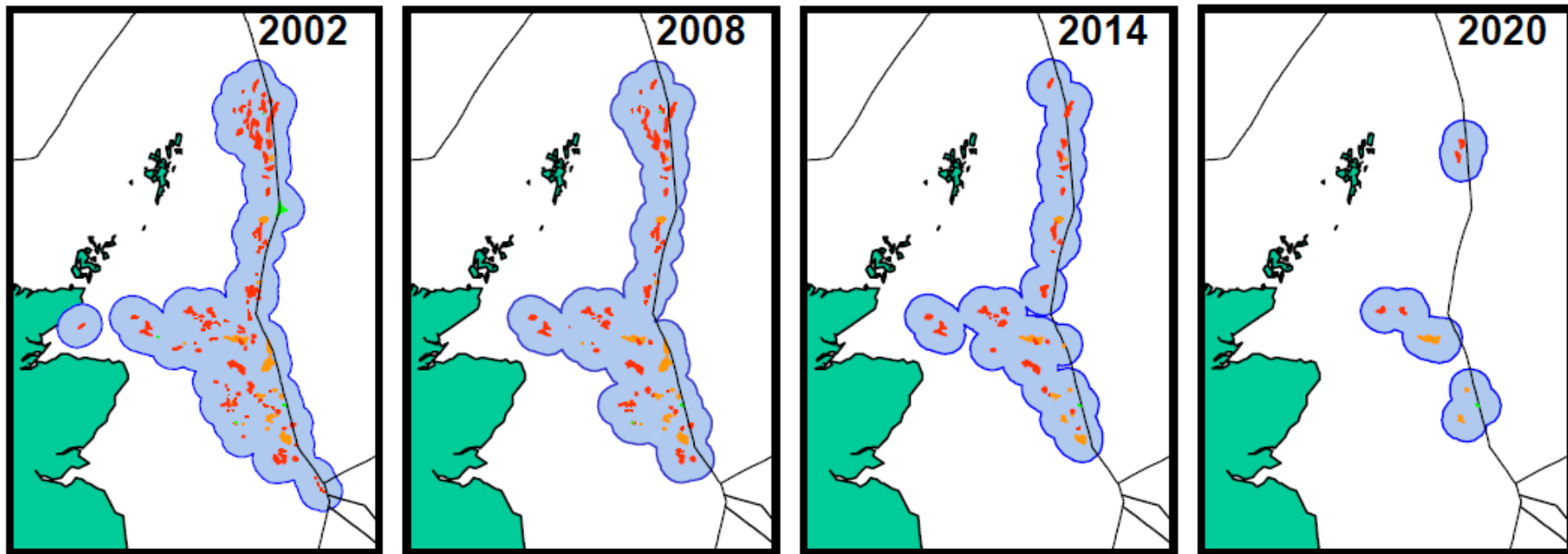
# CO<sub>2</sub>-EOR Heritage

- ▶ The CO<sub>2</sub> production from eastern UK could 'power' CO<sub>2</sub>-EOR in the North Sea for 10-15 years per project, over ~30 year period
- ▶ It could deliver:
  - Improved security of oil supply
  - Infrastructure usable for carbon capture, transportation & storage
  - Increased tax revenues over current projections
  - Understanding of how storage sites behave
  - New & tested methodologies for MMV



Deep aquifer storage area

# Do it now!



UKCS Shrinking Infrastructure

Jayasekera & Goodyear SPE 75171