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Conclusions of the DECC CO2 Storage Appraisal Project

Den Gammer

CSLF 29th June

Project Context

Autumn 2014 : 2 major CCS projects being progressed

: appraisal progressed for 3 stores

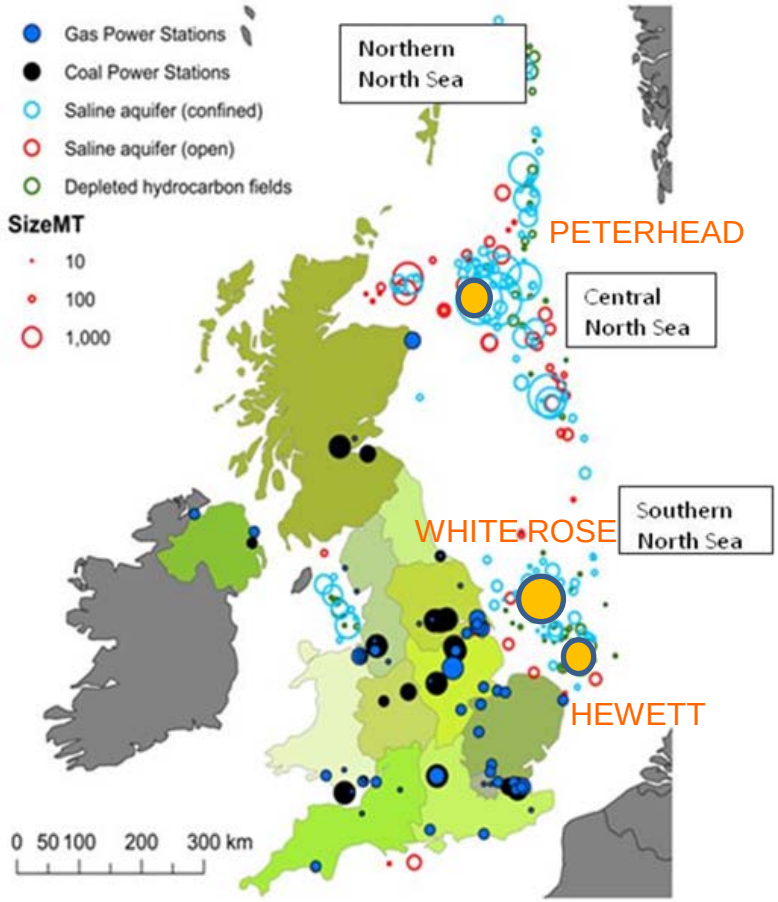
: concerned that emitters don't see CO_2 ready storage. Full chain projects lengthy and complex

: DECC take the initiative and fund more appraisal . ETI will define, commission manage it. £2.2M and 12 months

Dec 2014 : Public call issued . Kick – off Jan

May 2015 : Contract Signature

April 2016 : Complete. Dissemination May 2016

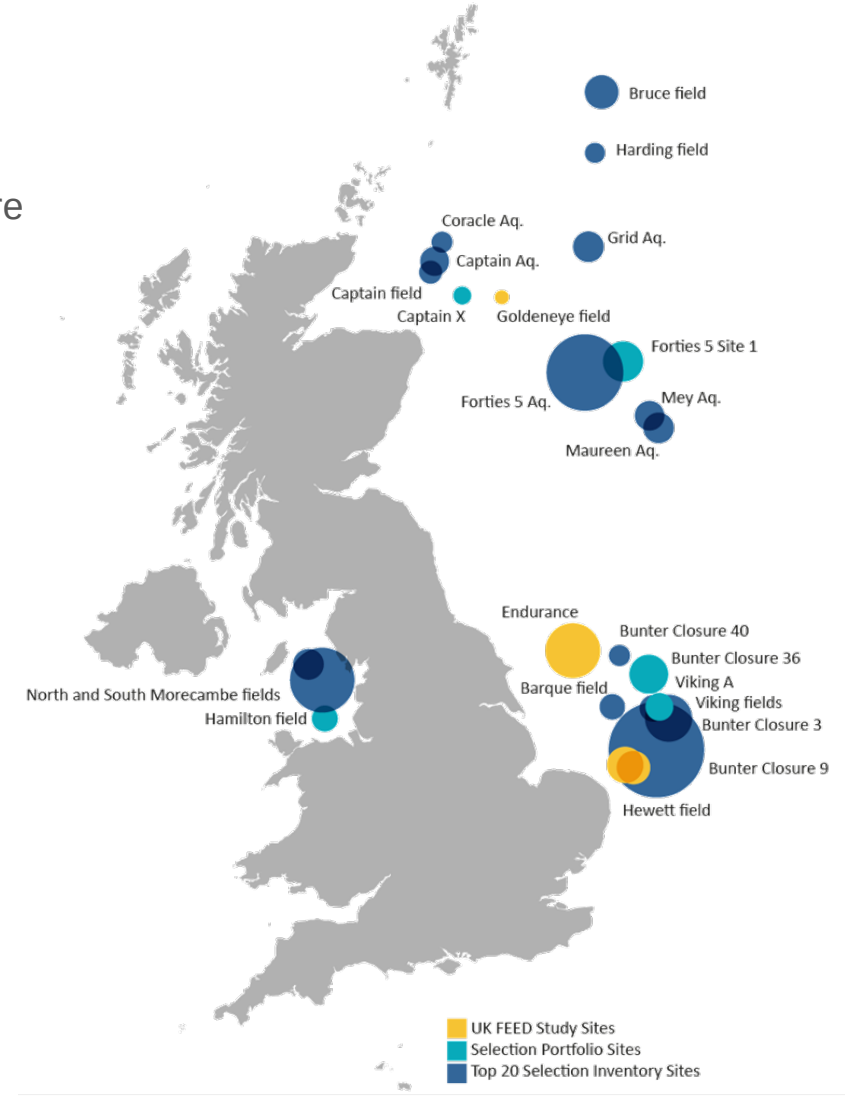


Objectives

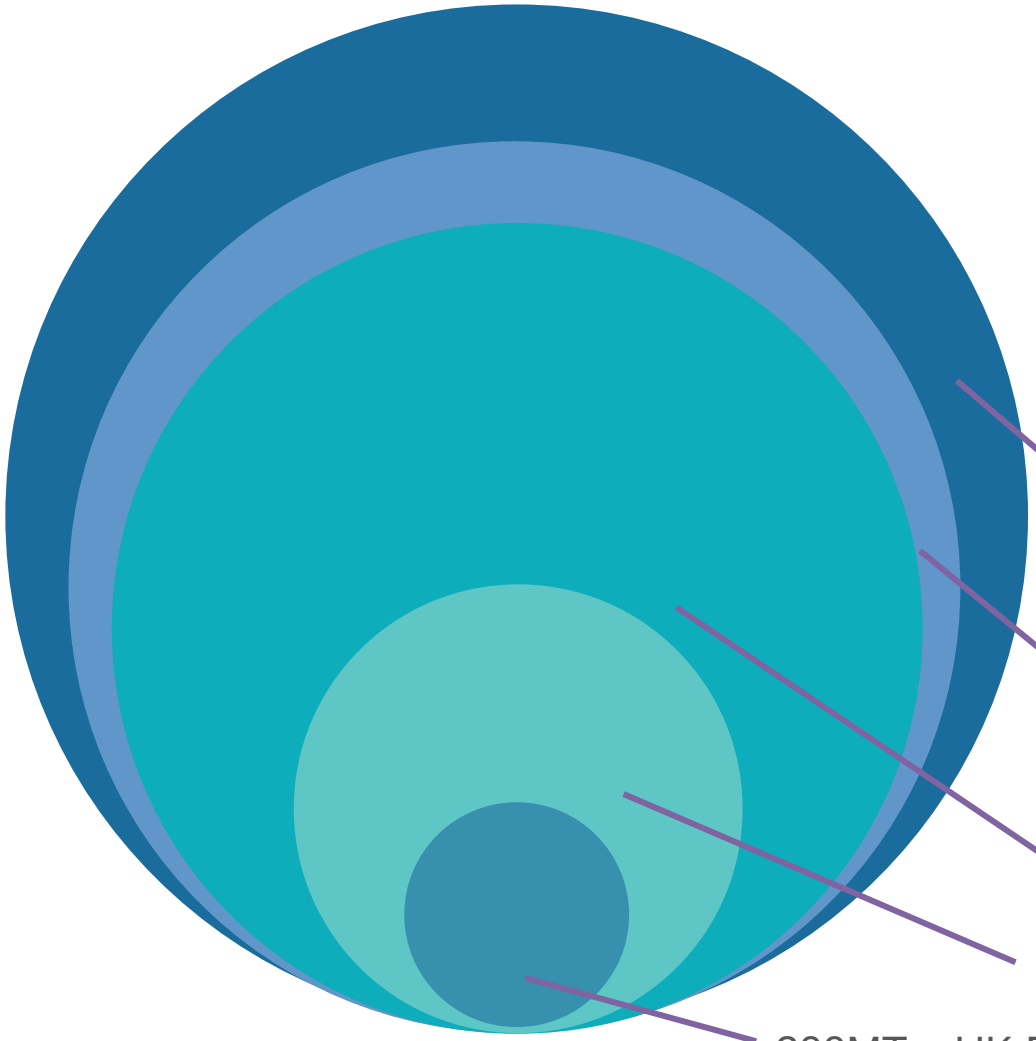
- To prove that there is a secure storage resource beyond what had already been appraised during UK FEED projects
- To alleviate most of the storage and schedule “risk” in projects – to simplify commercial discussions
- To provide encouragement that CCS is on a declining cost curve for CCS towards £100/MWh
- To mature a portfolio of 5 stores with different development timescales and costs, servicing a broad geography and balancing risk through its diversity. DECC provided £2.5M for this project
- To keep UK capable of storing up to 50MT/a by 2030

Varied Portfolio

- 20 stores were selected from the CO_2 Stored database for due diligence work. Then 5 stores were chosen for further appraisal effort
- The portfolio of 5 sites selected is geographically and technically diverse. Differing levels of data are available for each
- Only 2 of the 5 sites require any further appraisal drilling before an investment decision
- Alongside the detailed KT from UK FEED projects these sites characterise one of the most comprehensive and mature CO_2 storage potential propositions available within the public domain



The UKCS is endowed with a rich and diverse national offshore CO_2 storage resource, key components of which can be brought into service readiness without extensive appraisal programmes thanks to decades of petroleum exploration and development activity



78GT – UKCS potential

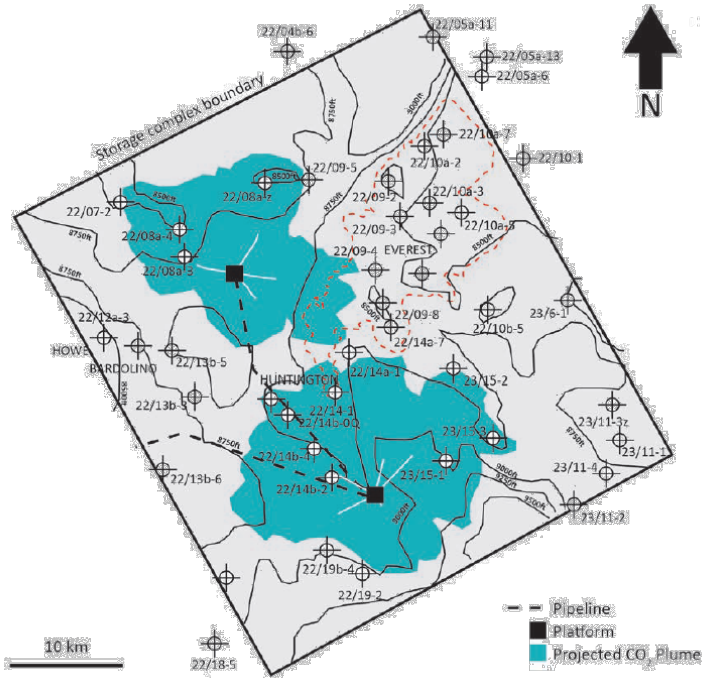
8.6 GT – All qualified sites

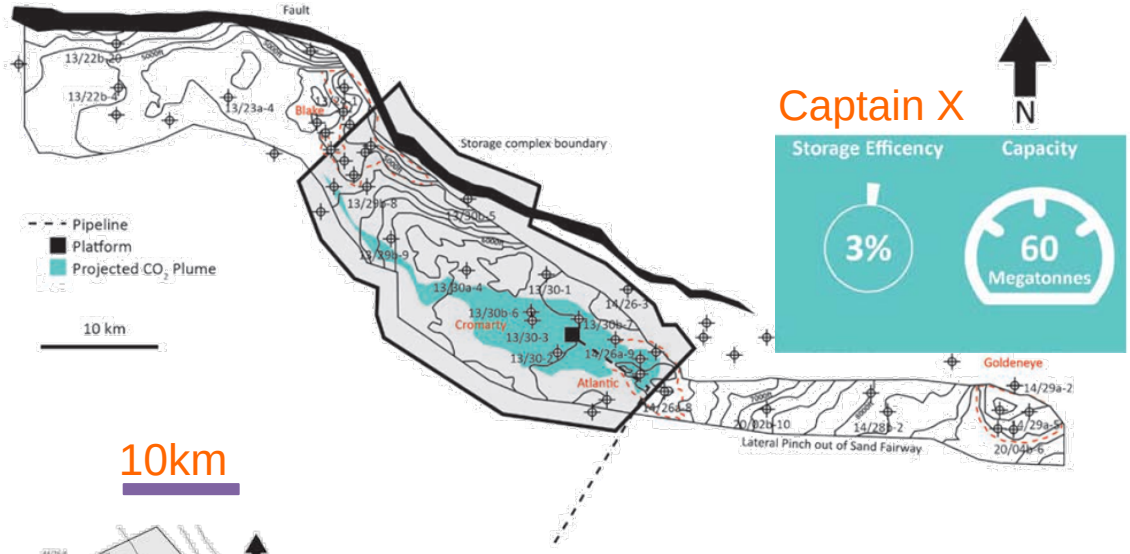
7.1 GT – Top 20 sites

1645MT – including this study

200MT – UK FEED Studies

The portfolio at the same scale

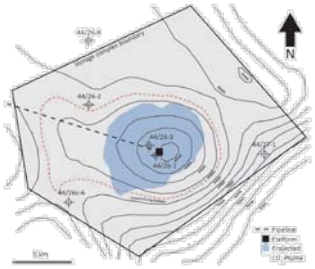


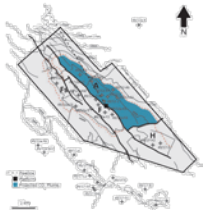


Captain X

Storage Efficency	Capacity
3%	60 Megatonnes

10km





Forties 5 Site 1

Storage Efficency	Capacity
6%	300 Megatonnes

Bunter Closure 36

Storage Efficency	Capacity
19%	280 Megatonnes

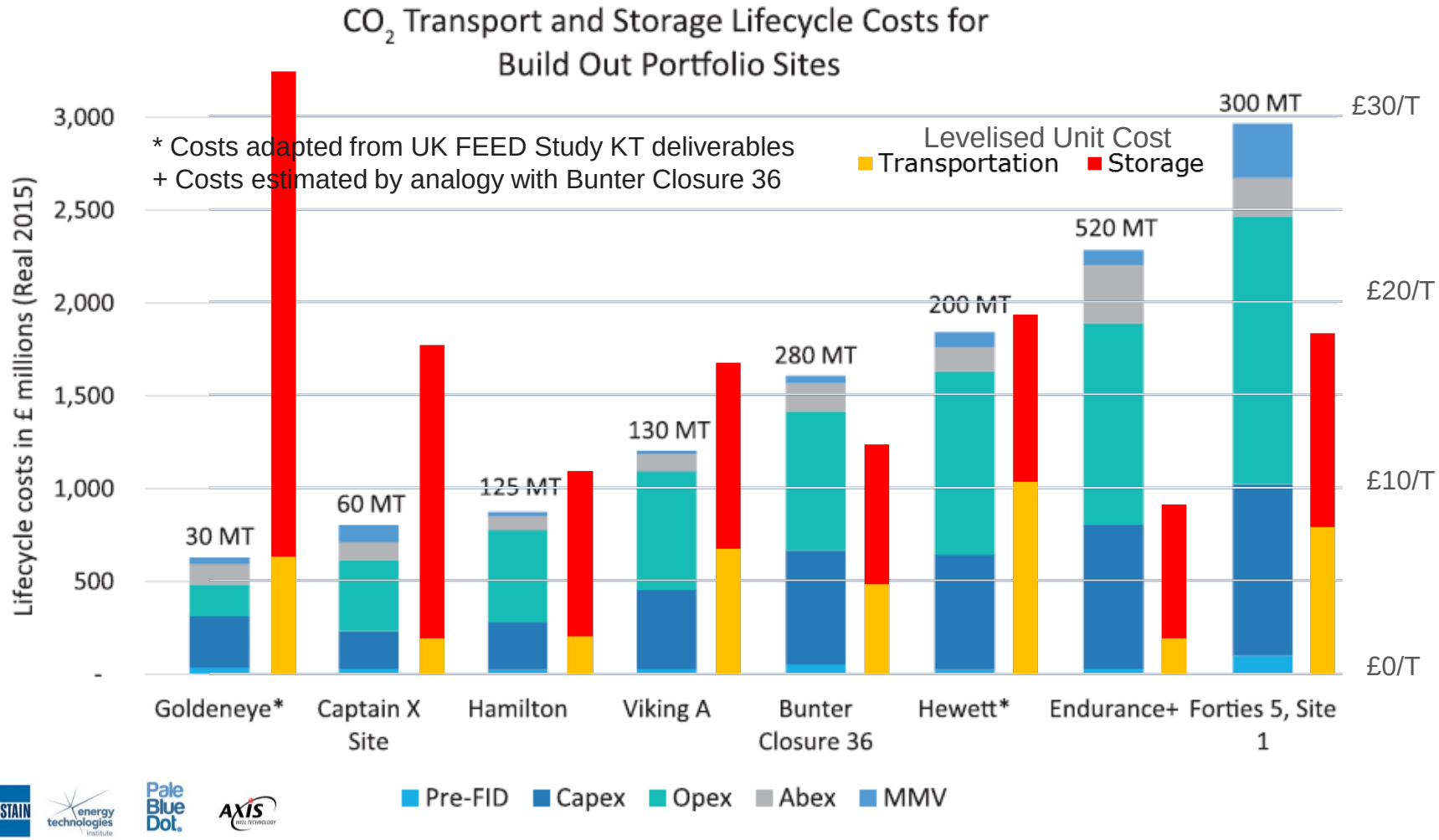
Viking A

Storage Efficency	Capacity
78%	130 Megatonnes

Hamilton

Storage Efficency	Capacity
70%	125 Megatonnes

Lifecycle costs and Unit costs



Conclusions

- Resource Potential
  - The Build-out Portfolio of eight stores can accommodate a CO_2 supply profile of up to 50Mt/y out to 2070
  - A total of 1645Mt is stored in the Build-out scenario by 2070
  - Our O&G legacy is very valuable – skills, information and confidence
- Risk
  - Key remaining risks involve the integrity of abandoned legacy wells.
  - We must ensure that in the future wells are abandoned to preserve the integrity of potential CO_2 storage sites
- Cost of Development
  - The Build-out Portfolio would require an investment of approximately £2.1 billion (Real, 2015 PV_{10}) over the lifetime of the portfolio
  - The unit cost of offshore transportation and storage ranges between £8 – 16/t in Real, 2015 terms
  - The aggregate levelised cost of transportation and storage of the eight stores is £14.4/t

Conclusions

- Contribution to Power Generation Cost
  - Offshore transportation and storage contributes £6.9/MWh to the levelised cost of gas fuelled electricity. Capture costs still dominate CCS
- Focus of cost reduction
  - The operating cost for the injection facility and the wells represents the largest component of cost
  - There appears to be a relationship between the levelised cost of storage and the storage efficiency factor

The entire study is publically available at:

http://www.eti.co.uk/project/strategic-uk-ccs-storage-appraisal/

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