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Storage: update and way ahead?

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Overview

- Brief update on DECC strategic storage appraisal project
- Broader context for storage development

Strategic storage appraisal project

- CO2 storage appraisal activity to support follow-on projects from White Rose and Peterhead
  - Show that there is secure storage resource outside Phase 1, to give confidence today in follow on plans and projects
  - Alleviate storage “risk” and schedule in projects - simplify commercial discussions
  - Provide evidence that CCS is on a declining cost curve for CCS after Phase 1

- DECC is providing up to £2.5M funding for the Project to cover
  - Project costs
  - Data Costs

- All funding must be expended in FY 15/16. Bidding launched December 2014; project contract agreed by 1st May 2015

- Results to be made publically available – e.g. through CO2Stored

CCS value & scale of ambition

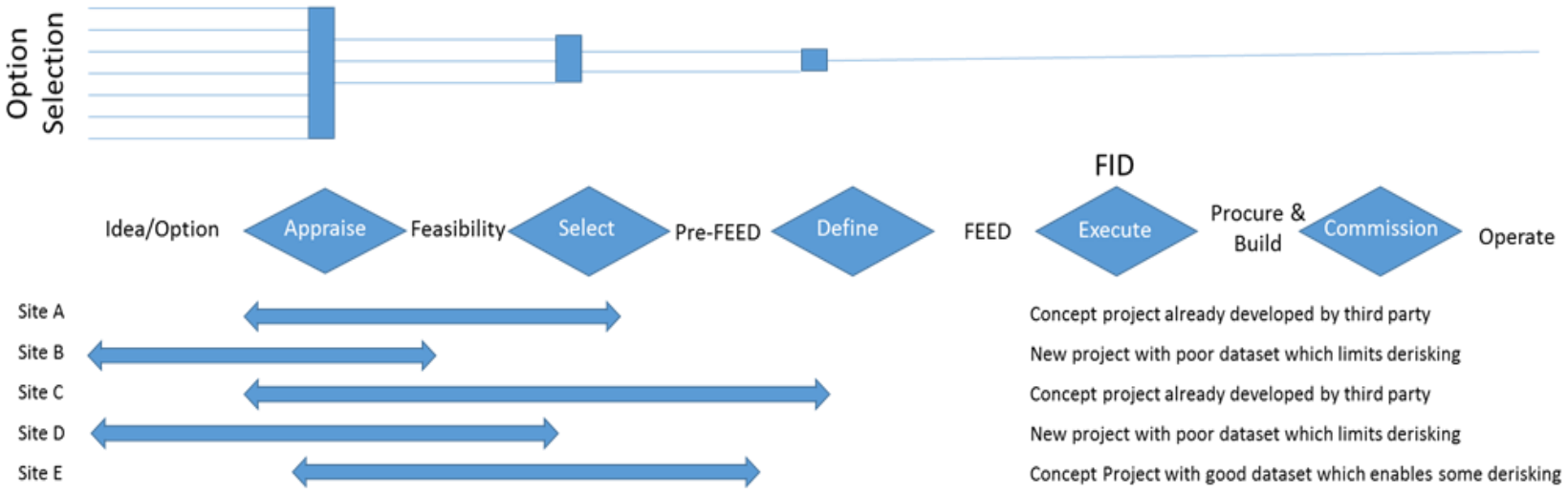
- CCS is the UK's most powerful technology to help it meet its climate change targets at lowest cost
- ETI modelling suggests 10 GWe of power, 50Mt/a CO2 by 2030 is a challenging, realistic target offering lowest system cost of decarbonisation. This figure is not inconsistent with others.
- The Phase 1 project leaves us well short of this target. More appraisal is needed – ~1.5Gtes before 2030 to give 30 years look ahead capacity for new investments.

Project	Store Size p90/p50 MT (CO2Stored)	Phase 1 Injection MT/a	Power GW	Pipeline MT/a
Peterhead	37/40	1	0.38	10
White Rose	200/500	2	0.44 gross	17

Note. 1. The White Rose store has an economic injectivity of around 10MT/a in CO2Stored
2. The DECC Competition work will not de-risk all of the White Rose store capacity

Strategic UK CCS Storage Appraisal Project

- Sustain a storage development trajectory that services 10GWe - 50Mt/a of storage operational in 2030
- Down-select a portfolio of 5 stores for detailed de-risking: build on Phase 1 infrastructure
- Provide options that will support Phase 1 decisions and early Phase 2 options
- Develop commercial scale, low cost and risk options towards full appraisal in the 2020-2026 period (and hence operation by 2030)
- Estimate and schedule and resources needed to get down selected stores fully appraised and then operational
- Make results available to current and potential future stakeholders
- £2.5M funding provided by DECC, commissioned and delivered by the ETI



Sector scenarios - key conclusions

- 10 GW scale CCS sector by 2030 is **feasible and affordable** by a range of different paths, based on co-ordinated cluster / hub development

- Strike prices at or below **£100 / MWh achievable by 2025** with further potential for cost reduction by 2030
  - Efficient use of stores and transport infrastructure developed under the commercialisation programme is key

- Annual support **cost of around £1.1 to £1.3 billion by 2025** (Levy Control Framework)
  - Or circa 20 to 30% of annual low carbon support by 2030

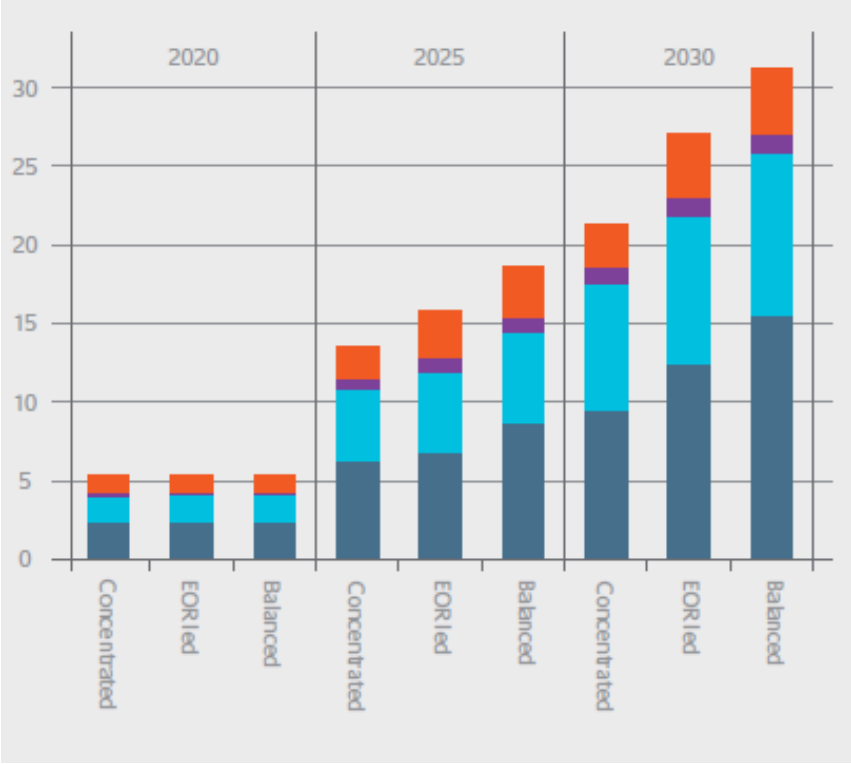
Four key actions

1. Implement both Peterhead and White Rose projects

2. Early investment in storage appraisal

3. Award further CfDs by 2020 to enable early investment decisions by phase 2 projects

4. Send strong signals about policy commitment to stimulate project pipeline



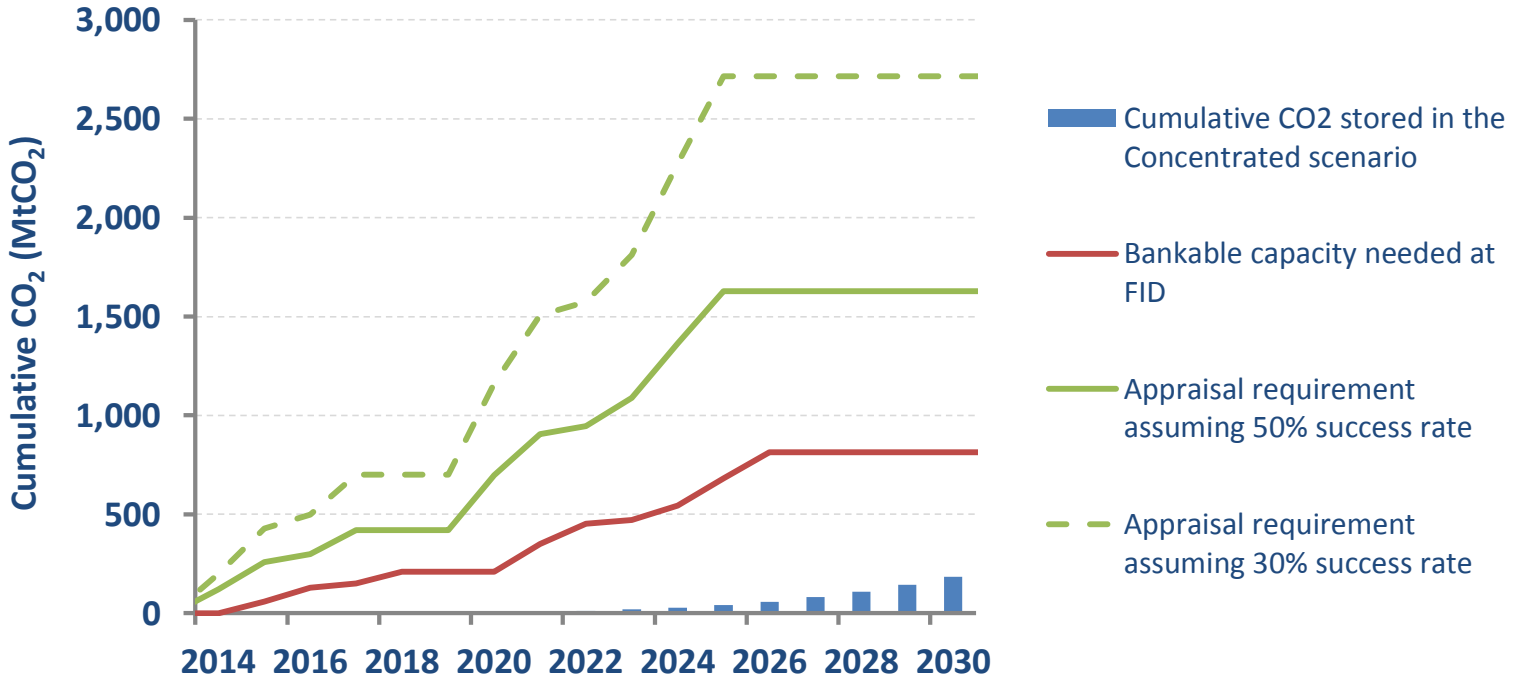
What if CCS sector takes a bit longer..

- Developing a 10 GW scale CCS sector by 2030 is **very challenging** - but delay will increase risk of higher costs in meeting carbon budgets, both before and after 2030

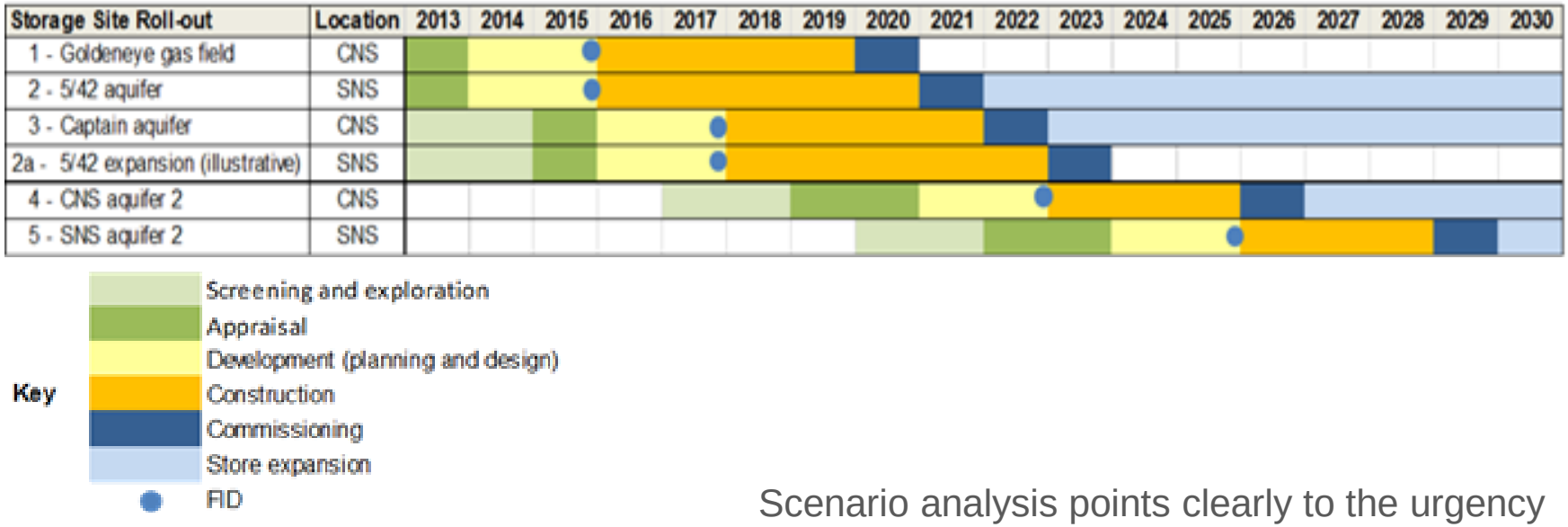
- Slower development of CCS (e.g. 5 year delay) would mean a need to advance other potentially **more costly and risky** ways of cutting emissions

- Avoiding costs and risks of delay, by investing in circa 10 GW of CCS by 2030 **delivers high value to UK**

Storage development: what scenarios tell us



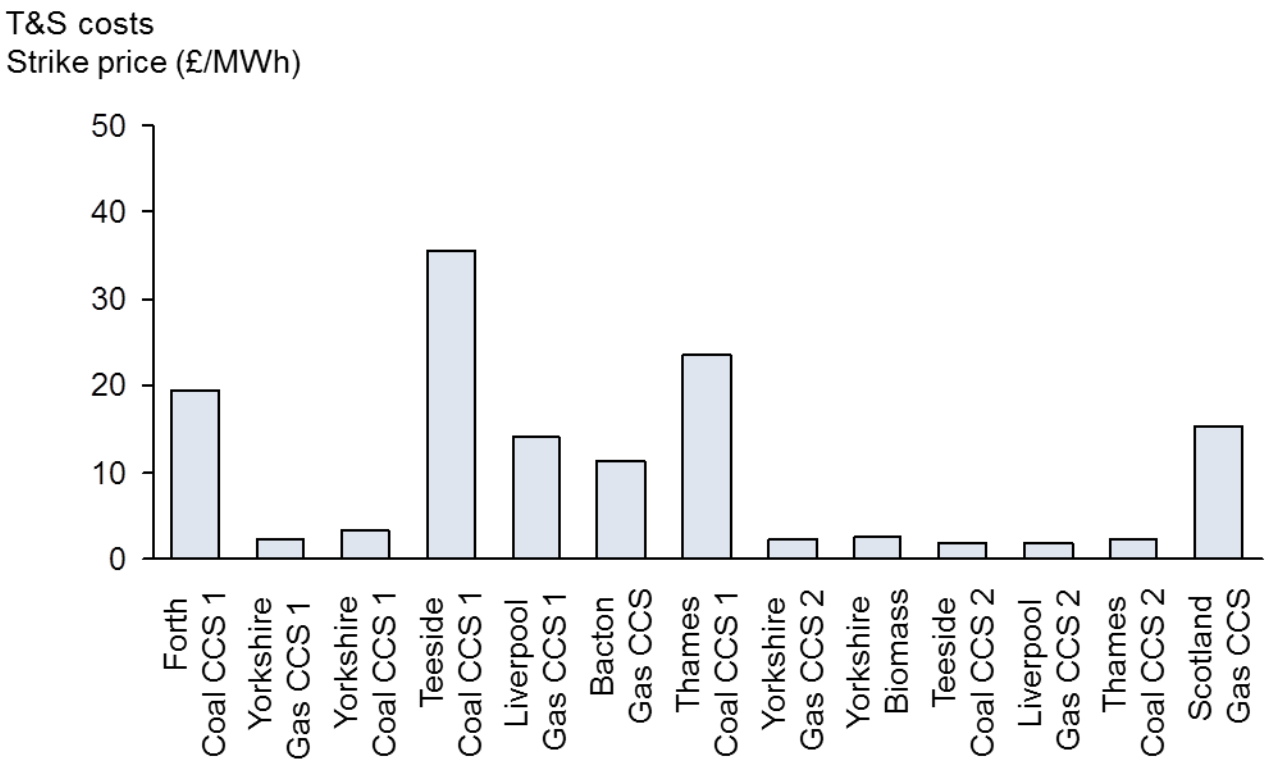
Storage appraisal – a key enabler



Scenario analysis points clearly to the urgency of further early investment in storage appraisal

A key priority for the next government

Other challenges



Some outstanding questions

- Private sector investment in storage appraisal still looks highly risky – is there a credible investment case for private sector, or should the public sector do more?

- Can the market solve co-ordination and shared access – and how does this inter-relate with the reward regime via EMR?

- Is there a need for some form of regulation of charges for transport and storage? Would greater clarity bring down the cost of capital?

To conclude..

- The DECC funded Strategic storage appraisal project is very timely – a useful and important next step – watch this space
- Major rollout of CCS in the 2020s is vital to cut overall decarbonisation costs and is deliverable
- But delivering this needs early action on storage - if the private sector is to finance then it requires rapid efforts to create a clearer investment case

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