



Strategic UK CCS Storage Appraisal Project UKCCSRC

8th September 2015
Sam Gomersall
sam.gomersall@pale-blu.com
Pale Blue Dot Energy

Strategic UK CCS Storage Appraisal Project

Funded by DECC



Department
of Energy &
Climate Change

Commissioned by ETI



Delivered by;

Pale Blue Dot Energy

Axis Well Technology

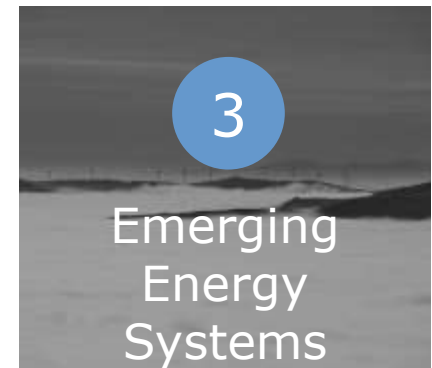
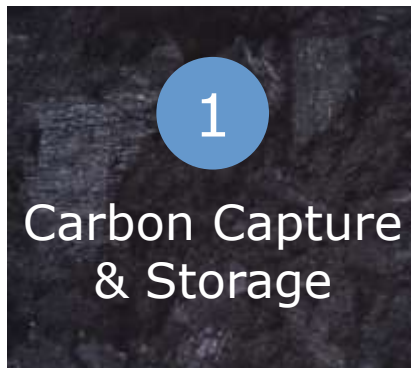
Costain

Strategic UK CCS Storage Appraisal Project

Pale Blue Dot Energy

Management Consultants for the Energy Transition

Delivering advice in three key areas



We help organisations of all sizes to **create opportunities** and **mitigate risks** arising from major changes in the energy markets.

Strategic UK CCS Storage Appraisal Project

Delivery Team

Pale Blue Dot.

Management Consultants specialising in CCS

- Consortium Lead & Project Manager
- CO₂ storage specialists
- Site and portfolio evaluation



Well Technology & Reservoir Development Specialists

- Geological & Geophysical characterisation of sites
- Reservoir & injectivity modelling
- Well design & costing

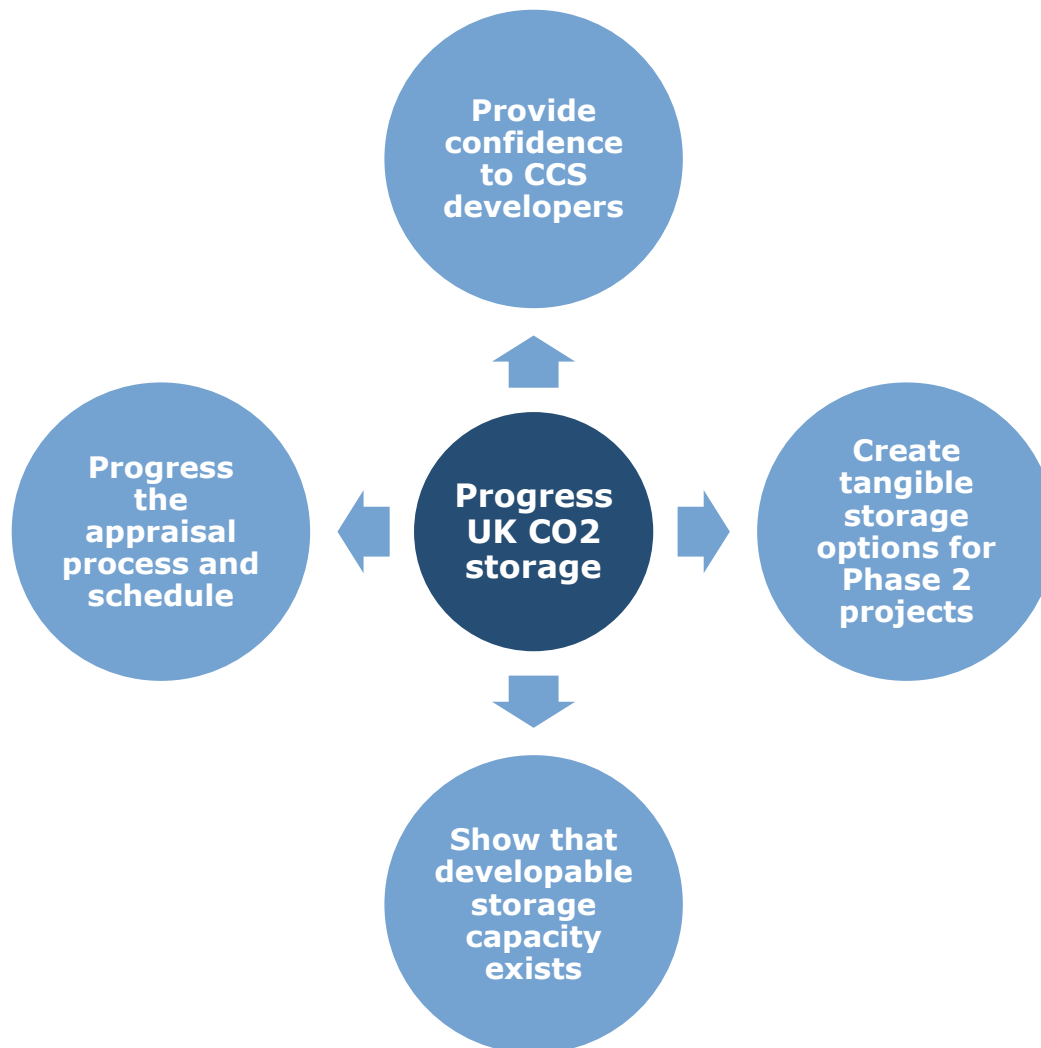


Engineering Solutions Provider

- Offshore developments concepts and facilities requirements
- Offshore pipeline concepts
- Cost and schedule estimates

Strategic UK CCS Storage Appraisal Project

Project Purpose



Strategic UK CCS Storage Appraisal Project

Objectives & Process

Develop practical cost effective storage options that contribute to an extendable storage scheme for 1500MT of storage capacity and 50MT/y of injection capacity by 2030

Screen
Many Sites

Consider a large number of possible stores & screen objectively to identify those with high potential & that form a robust portfolio of 5 sites

Appraise
Portfolio of 5

Assess 5 sites and create output material which makes a significant and tangible difference to future storage developers and complements the DECC CCS Commercialisation Programme

Plan Risk
Reduction

Identify specific risk factors associated with each of the 5 sites and prepare a risk reduction plan for each site

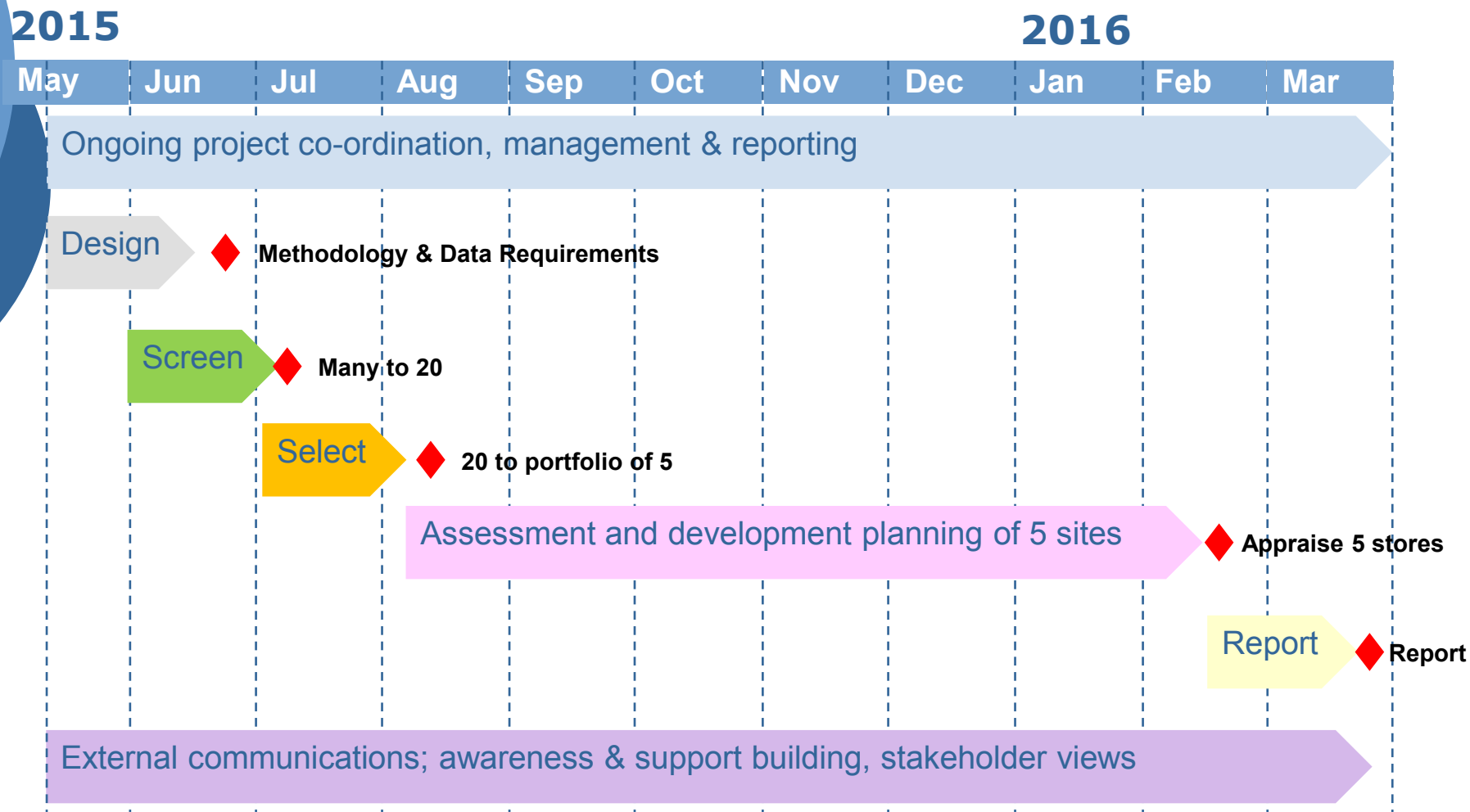
Development
Plans

Estimate and schedule resources needed to fully appraise, develop and operate the 5 sites

Make Output
Public

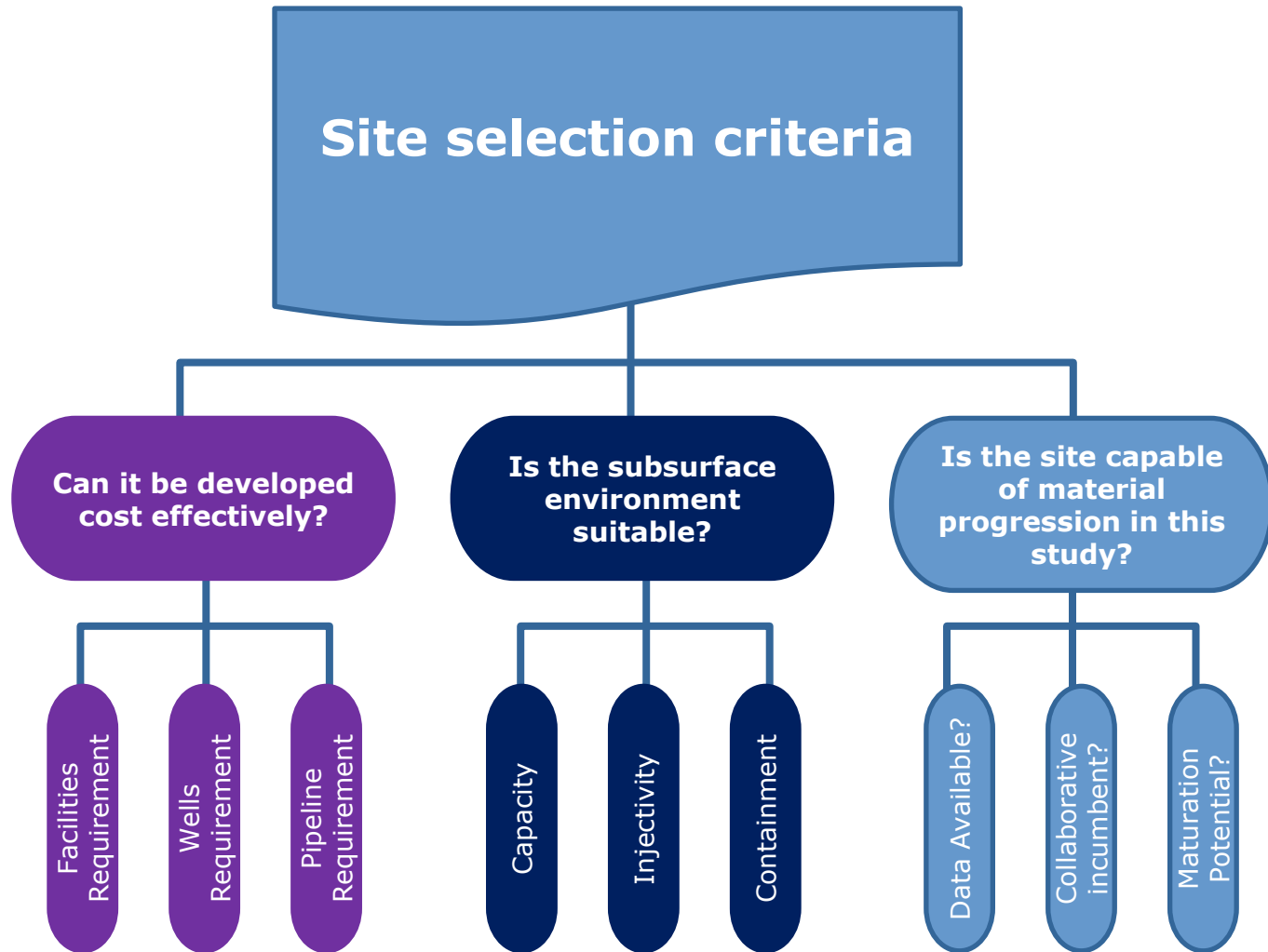
Facilitate future commercial development of UK storage capacity

Strategic UK CCS Storage Appraisal Project Schedule



Strategic UK CCS Storage Appraisal Project

Selection process



Strategic UK CCS Storage Appraisal Project

Store Validation for 20 sites

- Capacity
 - Calculation of capacity using aquifer data generated by the project or actual hydrocarbon production data

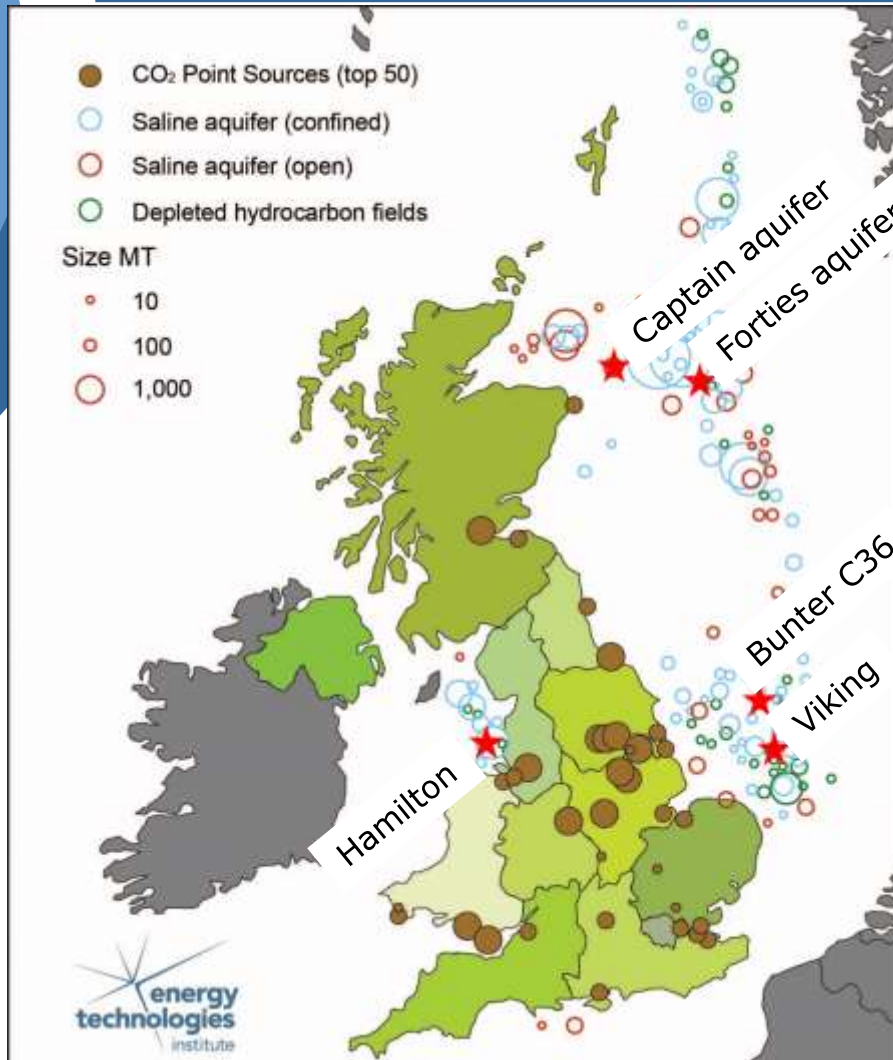
- Injectivity
 - Calculation of injectivity using permeability thickness and Eclipse box model

- Integrity
 - Geological risk assessment using seismic data to look at faulting and caprock resilience from CO2Stored database
 - Wells risk assessment based on number and age of existing wells

- Costing
 - Development scenario and costing done for all 20 sites

Strategic UK CCS Storage Appraisal Project

Selected Portfolio of 5 sites



Selected portfolio

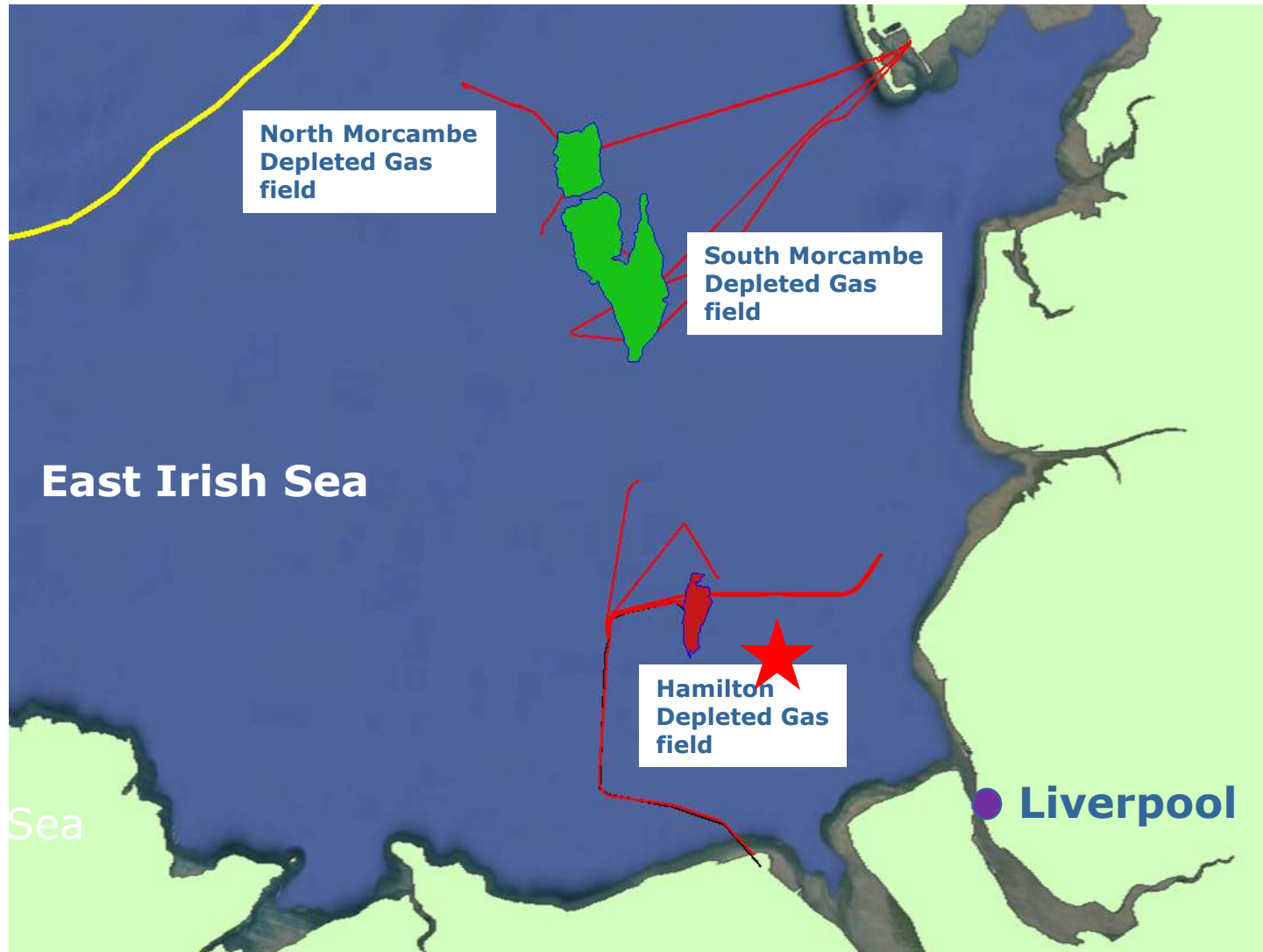
- Regionally distributed
- Significant capacity (1606 Mt)
- Diverse types
- Strong build out from Phase 1 projects
- Good fit with ETI Scenarios
- Enables further build out

There are many other candidate storage sites around the UK with significant storage potential

"The UK has lots of storage"

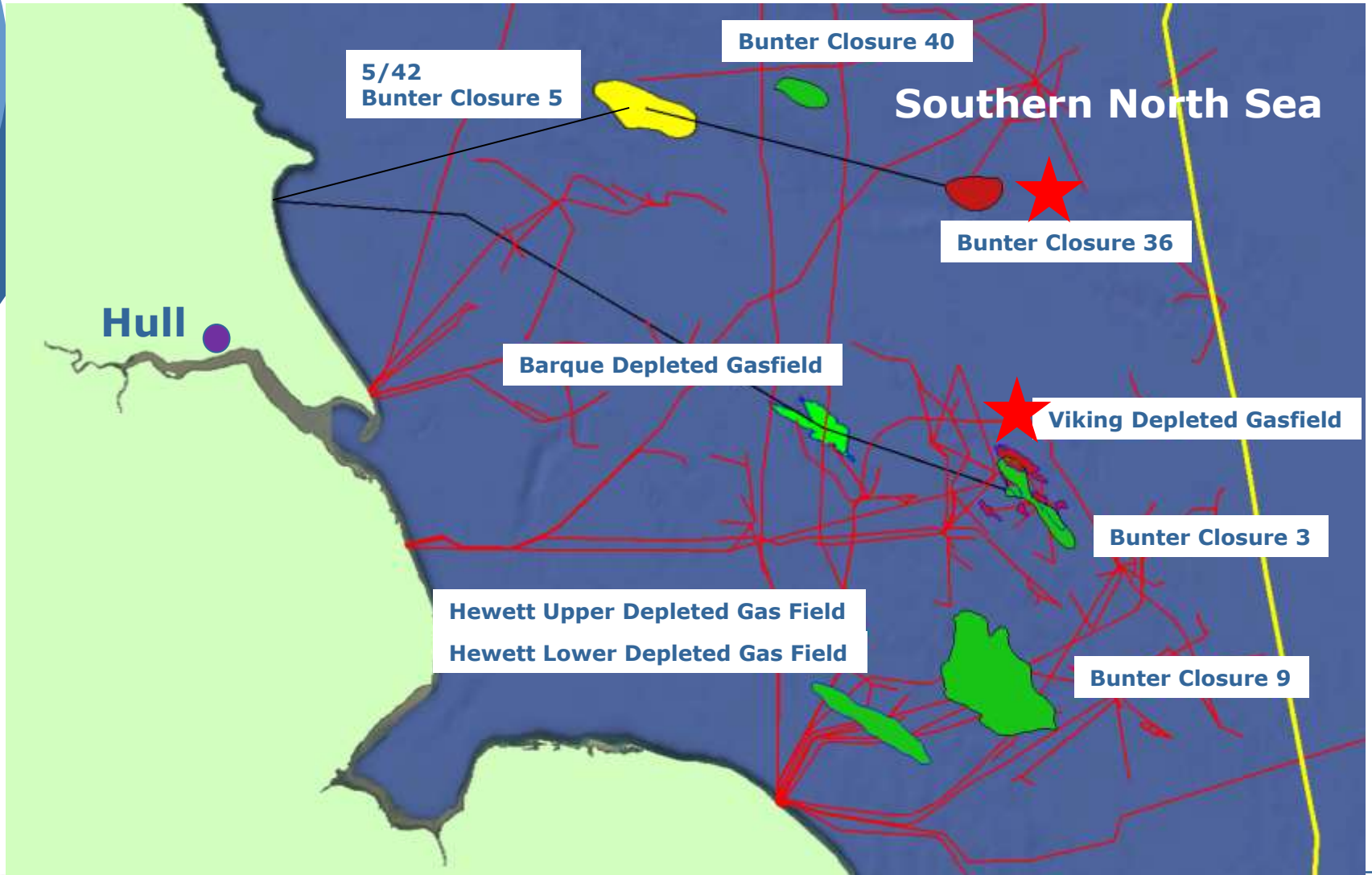
Strategic UK CCS Storage Appraisal Project

3 EIS Sites



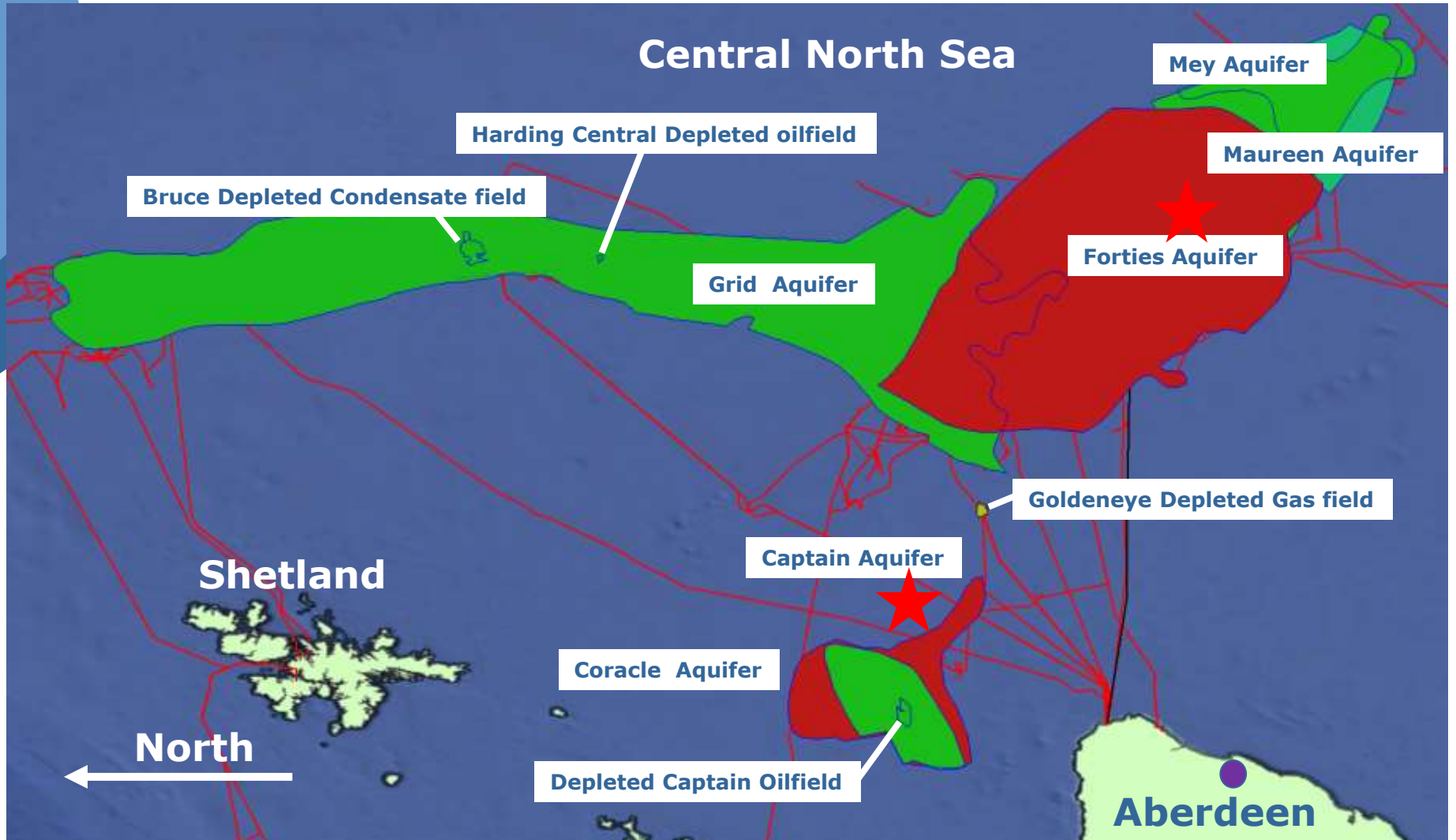
Strategic UK CCS Storage Appraisal Project

8 SNS Sites (plus 5/42 aquifer)



Strategic UK CCS Storage Appraisal Project

9 CNS Sites (plus Goldeneye)



Strategic UK CCS Storage Appraisal Project

Stakeholder Engagement

- Workshops held to coincide with significant project milestones & generate input:
 1. Definition of methodology
 2. Finalisation of 20 candidates in Select Inventory
 3. Recommended portfolio of 5 sites

- Future: Presentation of key findings

Strategic UK CCS Storage Appraisal Project

Remaining work

Appraise Portfolio of 5

Assess 5 sites and create output material which makes a significant and tangible difference to future storage developers and complements the DECC CCS Commercialisation Programme

Plan Risk Reduction

Identify specific risk factors associated with each of the 5 sites and prepare a risk reduction plan for each site

Development Plans

Estimate and schedule resources needed to fully appraise, develop and operate the 5 sites

Make Output Public

Facilitate future commercial development of UK storage capacity

Strategic UK CCS Storage Appraisal Project Summary & Questions

The UK has lots of CO2 storage potential

***Our challenge is ensuring it's appraisal and
development is being progressed***

sam.gomersall@pale-blu.com

07799 740776

Strategic UK CCS Storage Appraisal Project

Portfolio summary

Site	Bunter 36	Viking	Captain	Forties 5	Hamilton
Region	SNS	SNS	CNS	CNS	EIS
Type	Structured aquifer	Depl. gas	Open aquifer	Open aquifer	Depl. gas
Geology	Triassic Bunter Sandstone	Permian Leman Sandstone	Cretaceous Wick Sandstone	Paleocene Forties Sandstone	Triassic Ormskirk Sandstone
Capacity (MT)	252	155	49	1021	129
Injectivity kh (D-M)	57	5	103	22	134
Development	NUI, 75m water, 86km pipeline	NUI, 20m water, 220km pipeline	SS, 95m water, 67km pipeline	SS, 80m water, 186km pipeline	NUI, 25m water, 48km pipeline
Comments	Overlies Schooner	Underlies Bunter 3	"panhandle" only	Specific storage site to be located	