Offshore Storage: Meeting the Commercialisation Challenge
UK Offshore CO₂ Storage Potential

- P50 78 G tonnes
- High ranked BGS site portfolio of 8.5 G tonnes
- Can service UK and Northern Europe
Example CCS Futures in the UK

**Balanced scenario**
- **2030**:
  - CNS aquifer 2
  - Potential EOR development
  - 9 Mt

**CO₂-EOR scenario**
- **2030**:
  - CNS aquifer 2
  - EOR field 3
  - EOR field 5
  - EOR field 4
  - 36 Mt
  - New parallel onshore pipeline
  - 17 Mt

**Concentrated scenario**
- **2030**:
  - CNS aquifer 2
  - Potential EOR development
  - 11 Mt

Legend:
- Shoreline terminals
- Storage only
- EOR fields
- New offshore pipelines
- New onshore pipelines
- Re-use offshore pipelines
- Re-use onshore pipelines
How can public and private capital be best spent now?
Strategic infrastructure solutions under uncertainty

Create robust system level investment strategies which allow for flexibility in future expansions and minimise future losses.

Create option value (ensure benefits outweigh potential losses) of strategies which help safeguard investors.

Ensure storage site portfolio and investment plans mitigate future uncertainties.

System uncertainties influence investment decision process.
Strategic vs Project Infrastructure Development

Bankable Storage Solutions

Depleted/near depleted fields

In-field and near-field appraisal

Step-out aquifer exploration

Viable Business Structures

Public-private collaboration

Enabling service contracts

Liability and risk sharing

No Regrets Capacity

Future industrial de-carbonisation

Low carbon heat and fuels (e.g. Hydrogen)

Bioenergy and negative emissions

Low carbon heat and fuels (e.g. Hydrogen)
Key CO₂ storage business risks to be managed

- **Technical Viability**: Limited appetite for pre-FID site characterisation
- **Missing Market**: Lack of revenue visibility
- **Leakage Liability**: Exposure to uninsurable levels of potential liability
- **Performance Guarantees**: Exposure to counterparty non-performance and consequential loss

Commercial framework for CO₂ storage must address:

- **Missing market**: Lack of revenue visibility
- **Technical viability**: Limited appetite for pre-FID site characterisation
- **Leakage Liability**: Exposure to uninsurable levels of potential liability
- **Performance Guarantees**: Exposure to counterparty non-performance and consequential loss
Commercial Models for CO₂ Storage

**PRE-FID**

**Grant Funding**
- Grant contribution to appraisal costs
- Certainty of income required in operational phase with minimum availability payment
- Open book policy for costs
- Award through public sector procurement process

**Cost-plus pricing**
- Public sector body commissions characterisation of potential CO₂ stores using service contracts with the private sector
- Rights to use the characterised sites then auctioned to private sector based on defined revenues for CO₂ storage in new industry regulation

**POST-FID**

**DECC Competition Model**
- Grant contribution to construction cost in construction phase
- Power CfD in operational phase
- Open book policy for costs
- Risk allocation matrix

**Public Sector Model**
- Public sector body commissions builds and operations using service contracts with the private sector
- Public sector retains ownership of assets
- Open book policy for costs
- Private sector risk allocation based on relevant commercial precedent for services provided

**PPP Model**
- Public/private partnership splits the ownership of assets and liabilities
- Minimum capacity based payment
- Subsidy top up for usage paid by CO₂ emitter
- Performance incentives or deductions for under-performance

**Private sector RAB Model**
- Capital investment forms the Regulated Asset Base
- Guarantee that regulated company's investment is recovered with appropriate IRR
- Liability cap – Government back stop
- Periodic price setting
Put Actions in a Holistic Framework

**CO₂ Capture Projects**
- Emissions penalties
- Feed-in-Tariff
- Operational income support

**CO₂ Transport & Storage**
- Point-to-point solutions
- Sequential deployment
- Expensive development

**VALUE FLOW FROM AVOIDED CARBON**

**VALUE FLOW FROM ECONOMIC AND SOCIAL BENEFITS**
- Development of emissions hubs including industry
- Strategic infrastructure network
- Economies of scale
- Cost Reduction

- Pre-FID capital funding
- Capacity payments
- Liability backstop
- Resource optimisation
Thank you!