

# UK CO<sub>2</sub> Storage Appraisal Project

UKCCSC

University of Edinburgh, 7 July 2010



# Objective and Participants

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*Provide a fully auditable, defensible and realistic estimate of overall UK CO<sub>2</sub> storage capacity in offshore geological formations*

## The Sponsor:

Energy Technologies Institute

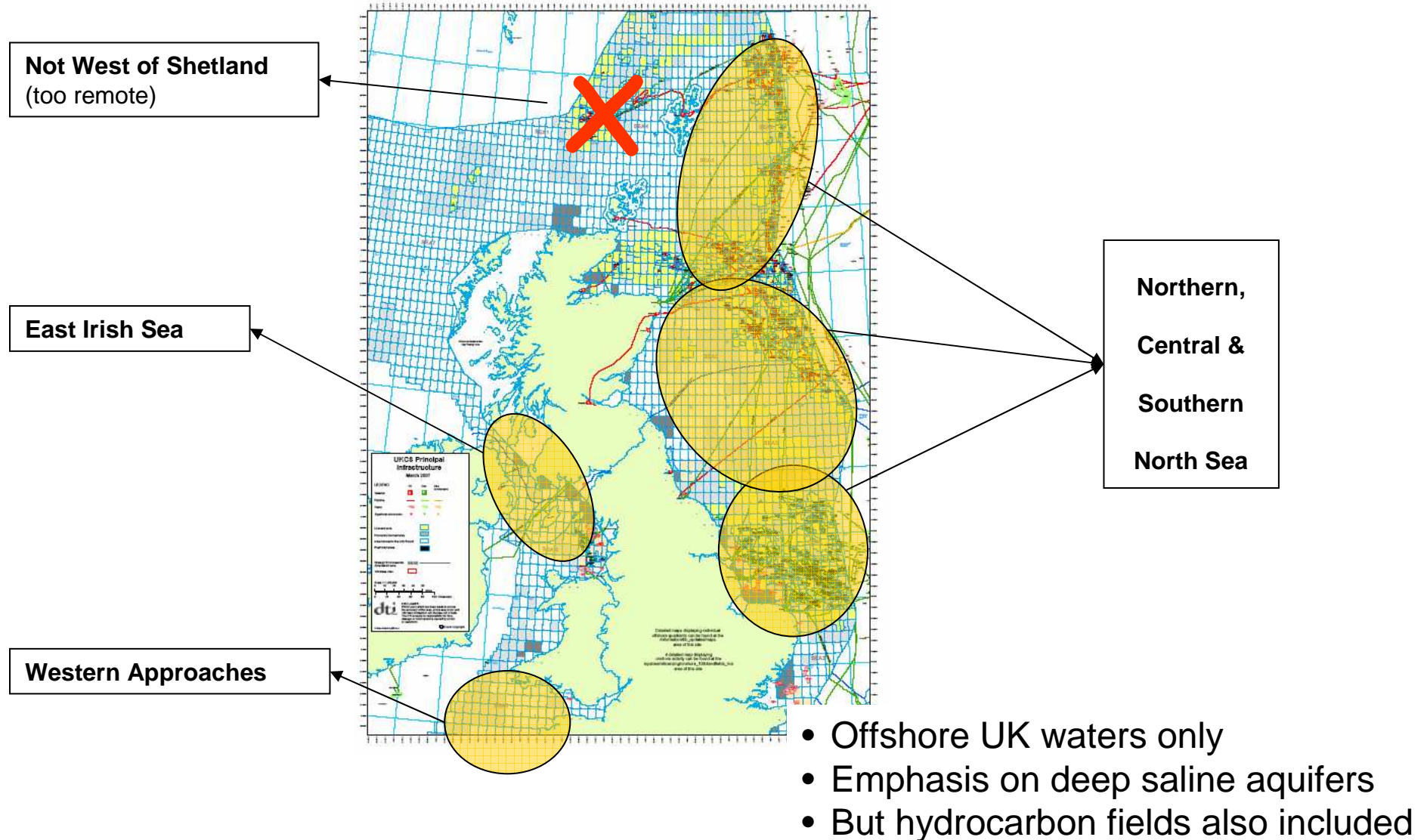


## The Team:

British Geological Survey  
Element Energy Ltd  
Geospatial Research Ltd  
Imperial College, London  
Senergy Alternative Energy Ltd

Durham University  
GeoPressure Technology Ltd  
Heriot Watt University  
RPS Energy Ltd  
University of Edinburgh

# Areas of Study



# Distinctiveness and Goals

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## Open systems:

- In-situ fluids displaced
- Migration of CO2
- Generally fewer wells
- Large storage capacity estimates

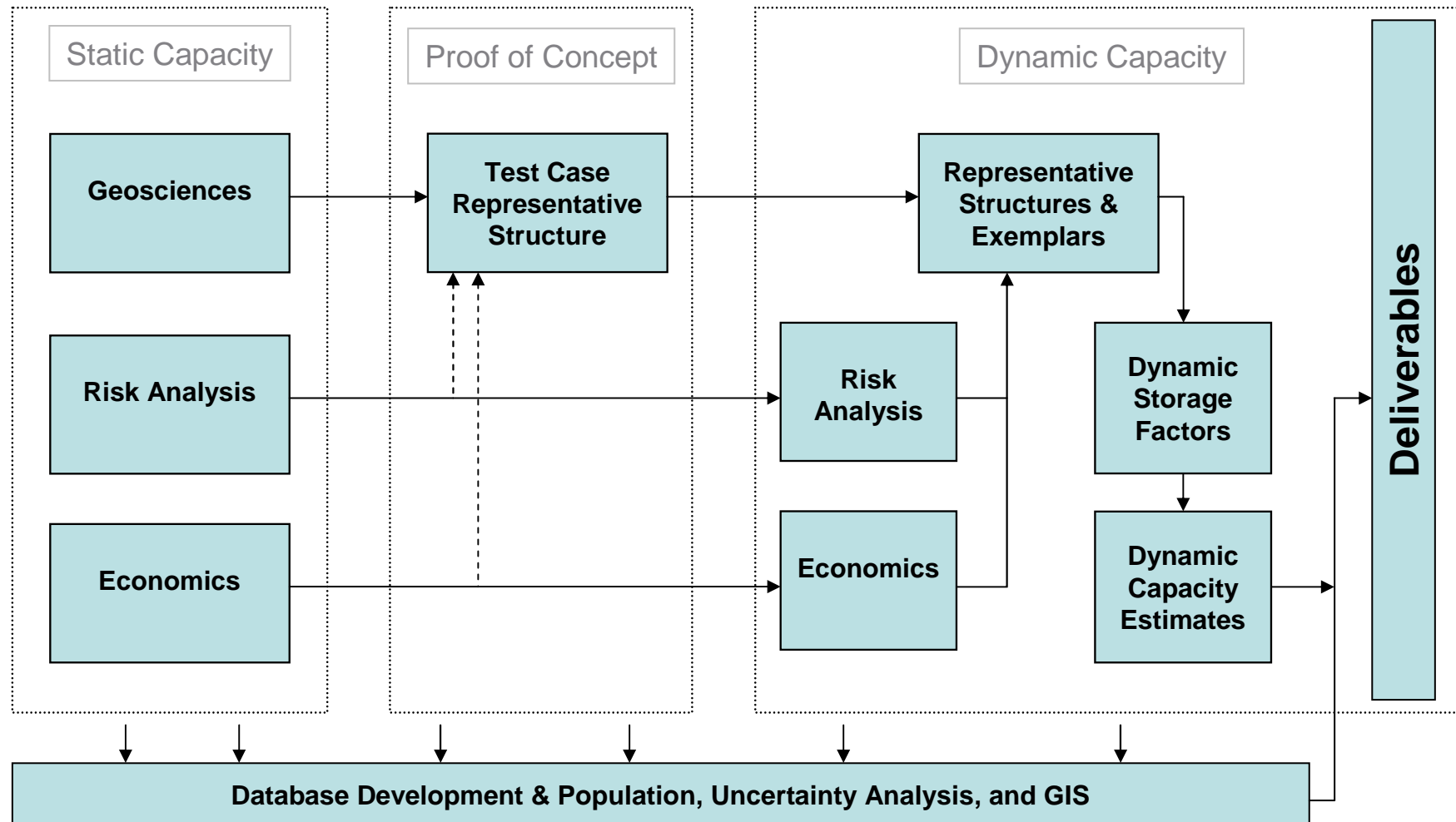
## Closed/ Compartmentalised box:

- Complete containment
- Constrained by pressure build-up
- Large well count (prod + inj)
- Small storage capacity estimates

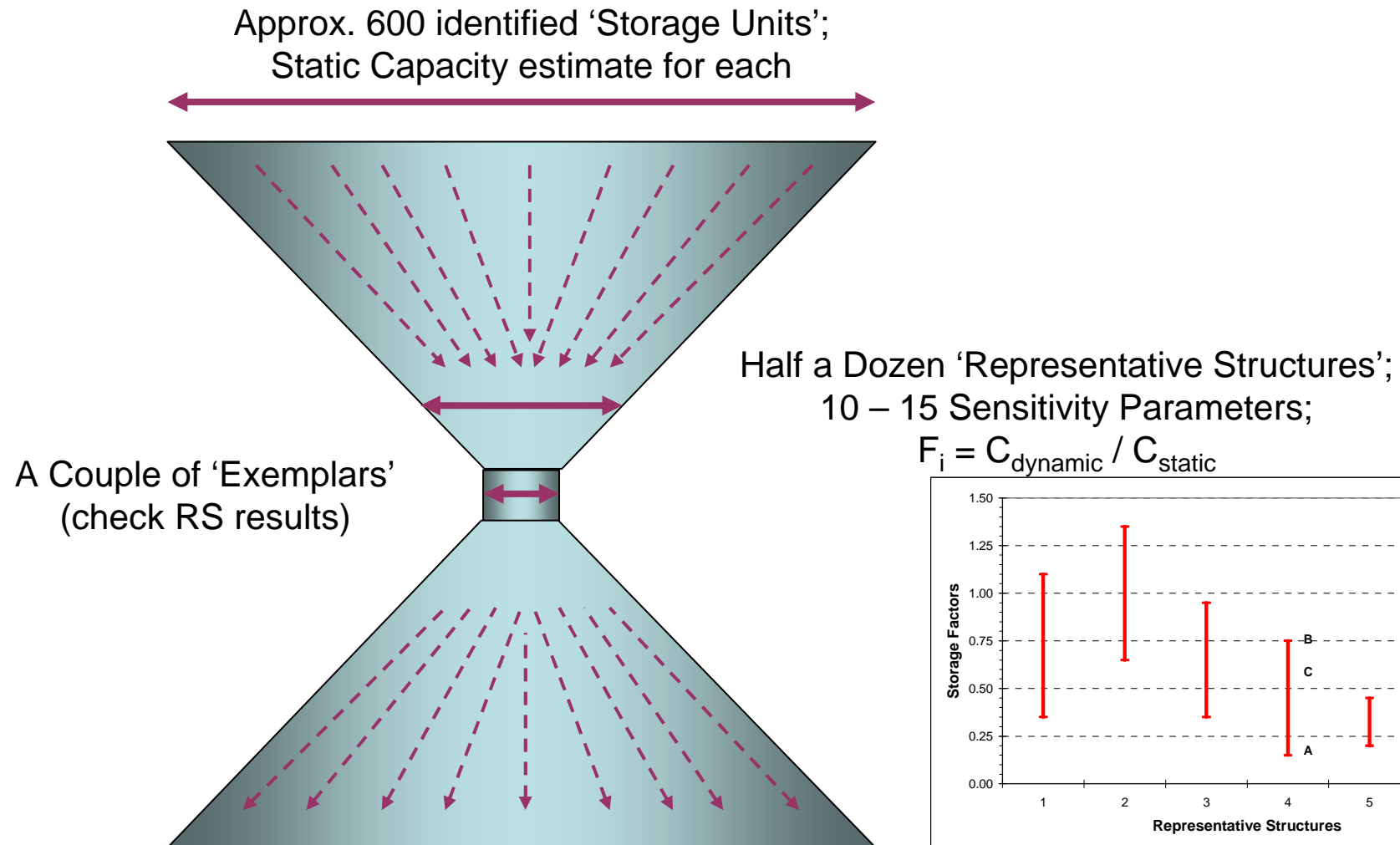
- Auditable, defensible and 'realistic' estimates
- Published methodology
- Operational timescales and Risks considered
- Uncertainty – both magnitude and origin – described
- Maintainable and searchable database/ GIS of current capacity estimates

# How will it be achieved?

## Generic Workflow



# Application of Dynamic Modelling



Goal: ~600 estimates of Dynamic Capacity ( $P_{10}$ ,  $P_{50}$ ,  $P_{90}$ )

# Challenges

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- Require overall UK estimate
  - But unable to study individual sites in detail
- Dynamic behaviour clearly important
  - But site specific? RS approach valid?
- Desire semi-quantitative risk assessment
  - Need to develop methodology that can be usefully applied to prioritise/ discriminate between stores
- Availability of data
  - Access to IHS (Edin-GIS), PGS (Megamerge), GPT and public domain information, but quality/ density of data variable
- Study draws on expertise of 10 different participant organisations
  - Consistent approach required, without stifling creativity or recourse to 'lowest common denominator'

# Further Research

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- Appraisal requirements to ‘prove-up’ untested (saline aquifer) storage sites:
  - Interference tests (connectivity)
  - Injectivity tests (conventional and extended)
  - Alternatives to 4-D seismic (particularly where ability to image storage reservoir is poor)
- Ability to model large storage ‘farms’, including geochemical, geomechanical and thermal effects
  - (multi-million cell models, parallel computing – or ‘conventional’ sector models and upscaling?)
- More to emerge (particularly from Risk Analysis and dynamic modelling work?)