

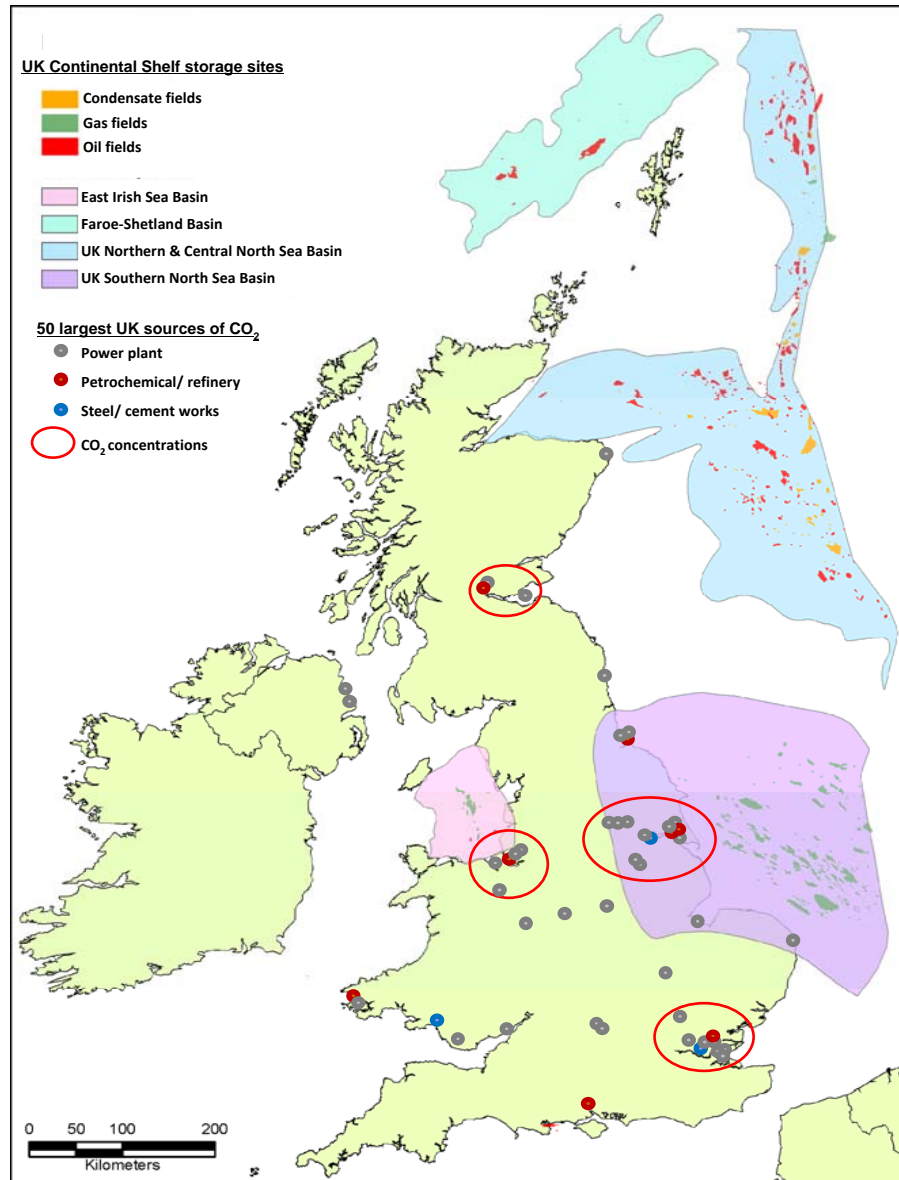
# Developing CCS in the United Kingdom

Dr Ward Goldthorpe

**Roundtable: Regional Roadmap for Implementation of  
Technologies for Carbon Dioxide Capture and Storage in the East of Ukraine**  
23 October 2012, Donetsk



# UK CO<sub>2</sub> Emissions Sources and Storage Sites



# The Crown Estate All offshore activity (UK)



- Offshore Wind Activity**
- Demonstration Wind Farm Site
  - Round 1 Wind Farm Site
  - Round 2 Wind Farm Site
  - Round 1 or 2 Wind Farm Extension Site
  - Round 3 Agreement for Lease
  - ▨ Round 3 Wind Farm Zone
  - Northern Ireland Pre-Search Exclusivity Agreement
  - Scottish Wind Farm Site
- Wave and Tidal Activity**
- Wave Site
  - Tidal Site
- Cable and Pipeline Activity**
- Active Cable
  - Active Pipeline
- Marine Mineral Activity**
- Production Licence
  - Application Area
  - Option Area
  - Bouby Lease
  - Hundale Exploration and Option Agreement
- CCS and Gas Storage Activity**
- Gas Storage Lease or Agreement for Lease
  - Carbon Capture and Storage Site
- Base Map**
- Territorial Waters Limit
  - UK Continental Shelf
  - International Waters

**MaRS**  
Marine Resource System

0 100 200  
km

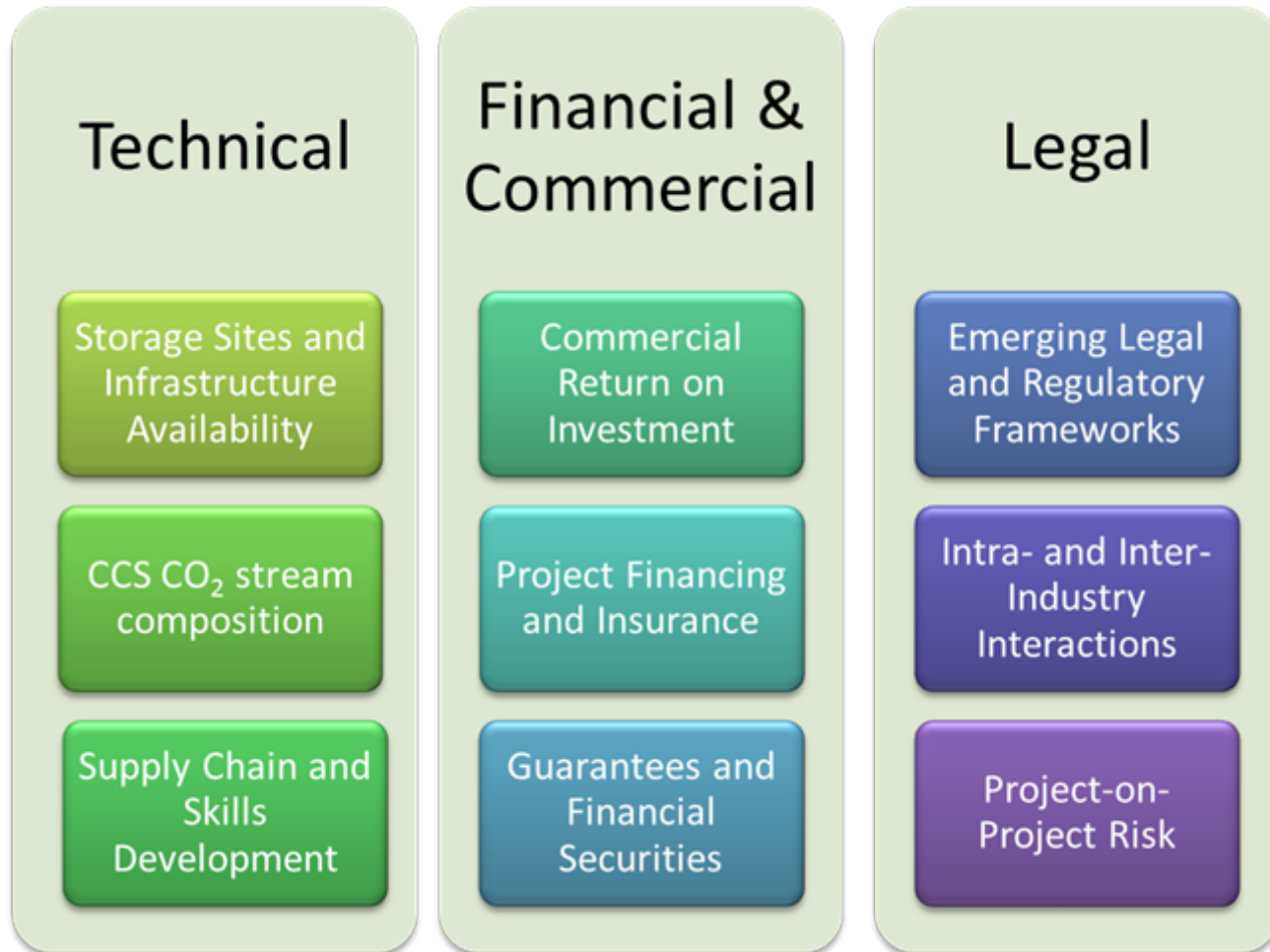
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**THE CROWN ESTATE**

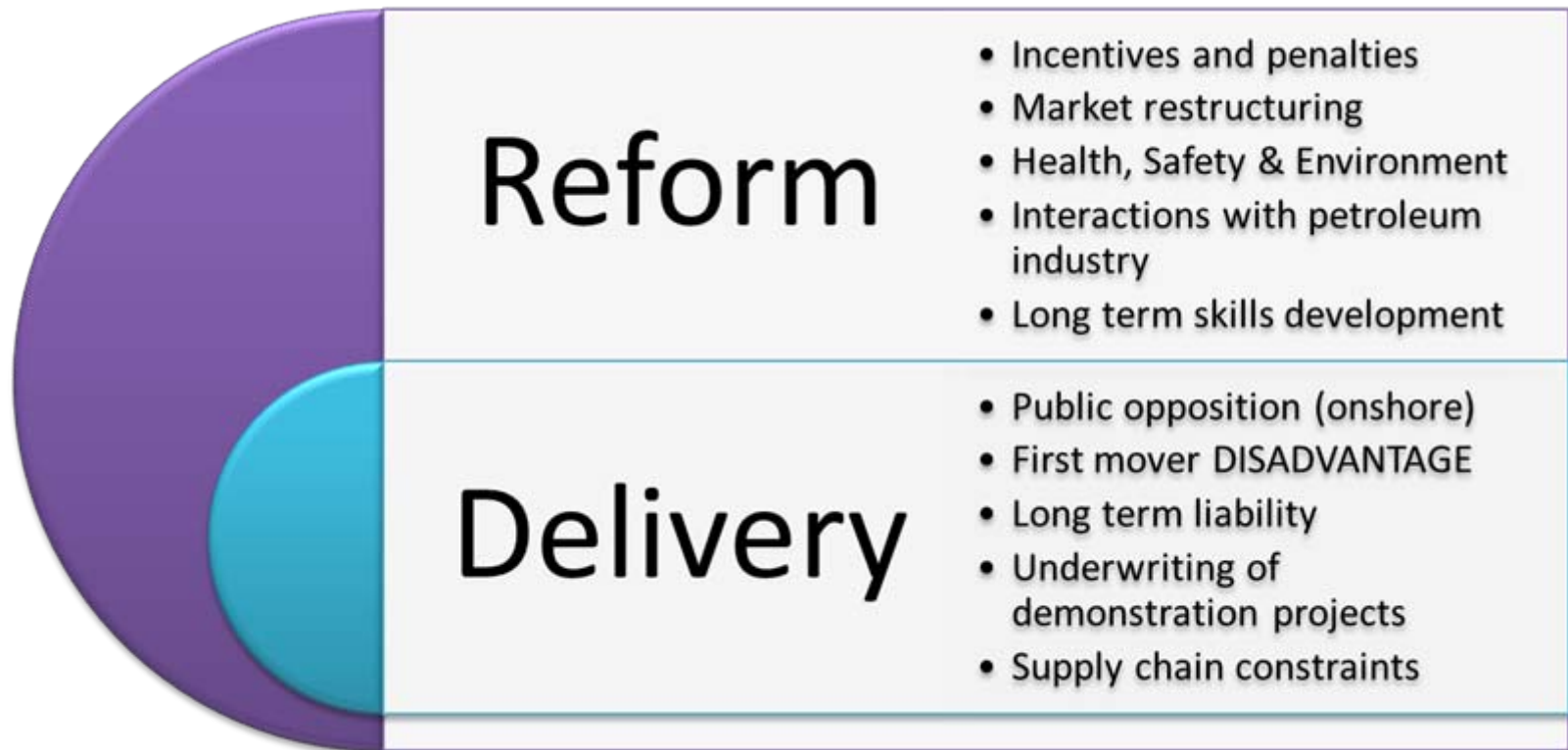
Positions shown relative to WGS 84. © Crown Copyright © Oct 2012. Reproduction in whole or part is not permitted without prior consent of The Crown Estate © Crown Copyright, 2012. All rights reserved. License No. 20001-0010001. Not to be used for navigation. Ordnance Survey Data: <http://www.thecrownestate.co.uk/ordnancesurvey/licence/>. Limits supplied by UKHO. Round 3 agreements for lease reserve exclusive property rights from The Crown Estate and projects are still subject to approval through the statutory consenting process. Please refer to project developer website for the latest status of planning activities. <http://www.thecrownestate.co.uk/energy/offshore-wind-energy/our-portfolio/>. Cable data created from Kingfisher, OceanView and Global Marine Systems data. Pipeline data created from UKBeal, OceanView and Global Marine Systems data.

OffshoreActivity\_UK\_opt.mxd -- 09/10/2012 -- 17:33:56

# Challenges to Deploying Integrated CCS



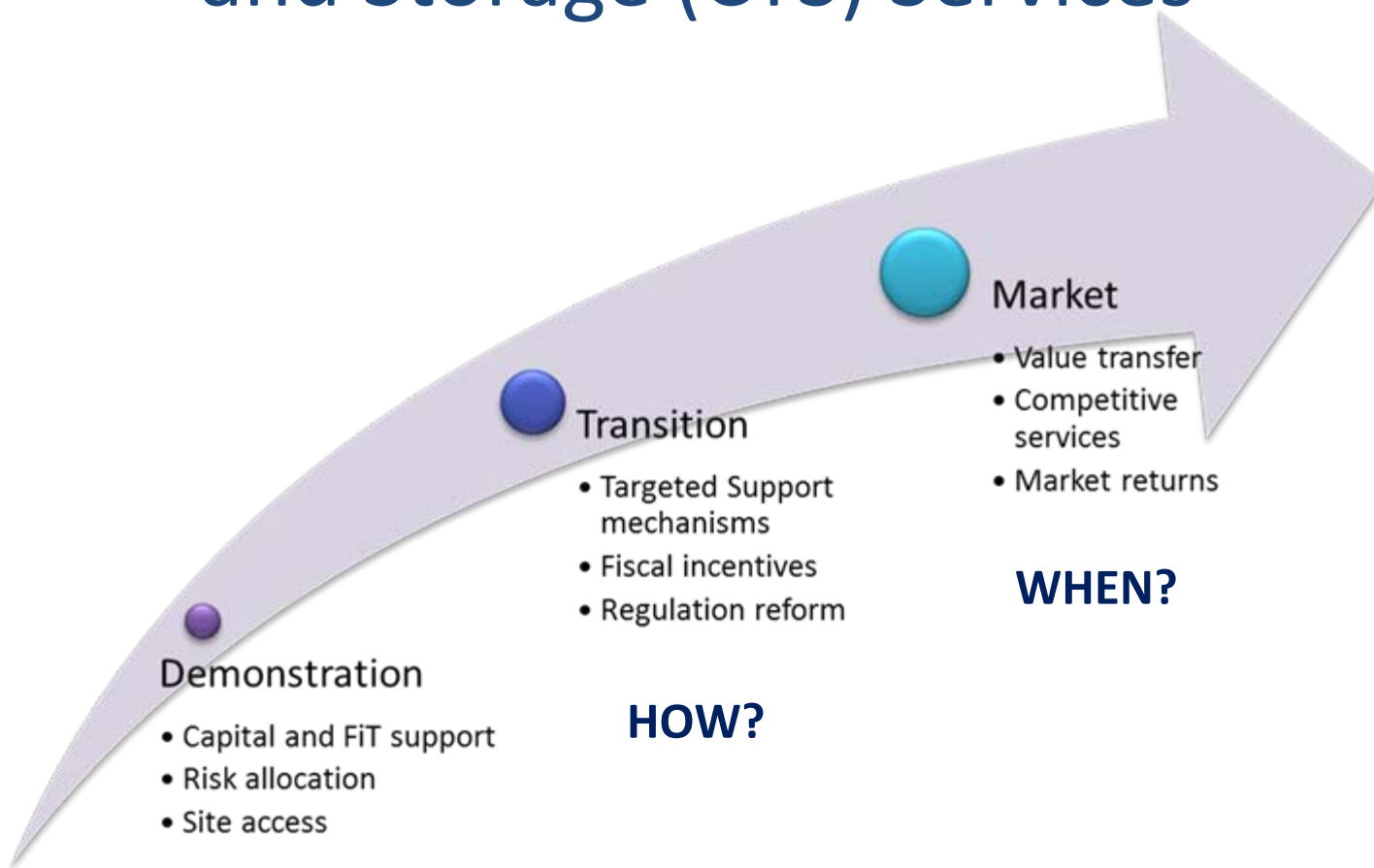
# Removing Uncertainty: An Integrated Framework



# A Model for Managing Implementation Risk

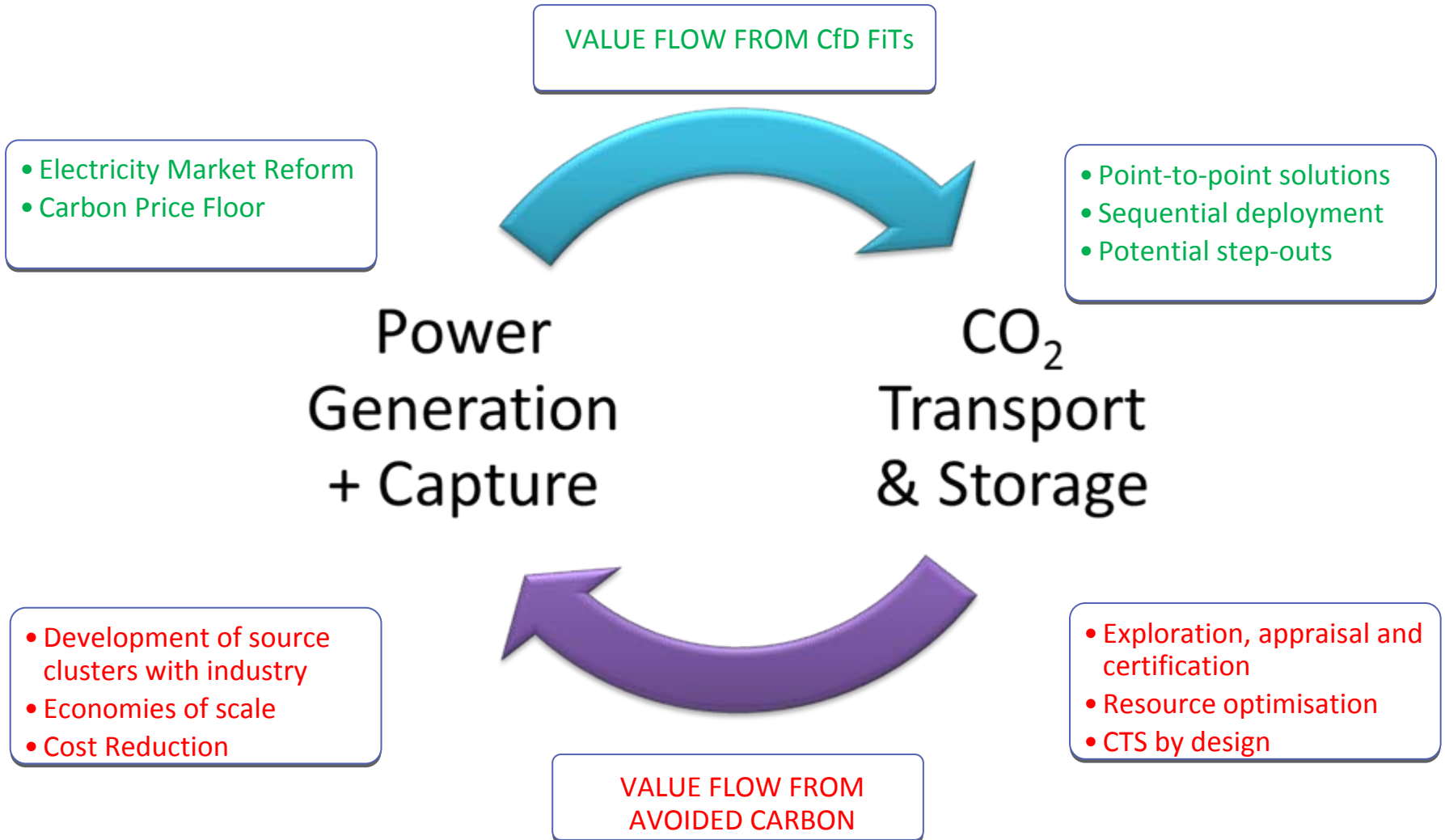


# Developing the Market for CO<sub>2</sub> Transport and Storage (CTS) Services



**DESIGN A “REAL”  
ROADMAP**

# Creating a Positive Feedback





# Strategic RD&D Objectives

## Robust evaluation and selection of storage proposals

Geostatistics and probability density functions for reservoir and aquifer site characterisation

Measurement, monitoring and verification techniques

Corrective measures and remedial action

## Facilitate optimised CO<sub>2</sub> transport and storage infrastructure development

Aquifer injectivity, pressure management, and containment

Pipeline standards and network/cluster design

Offshore CO<sub>2</sub> enhanced oil recovery with storage