

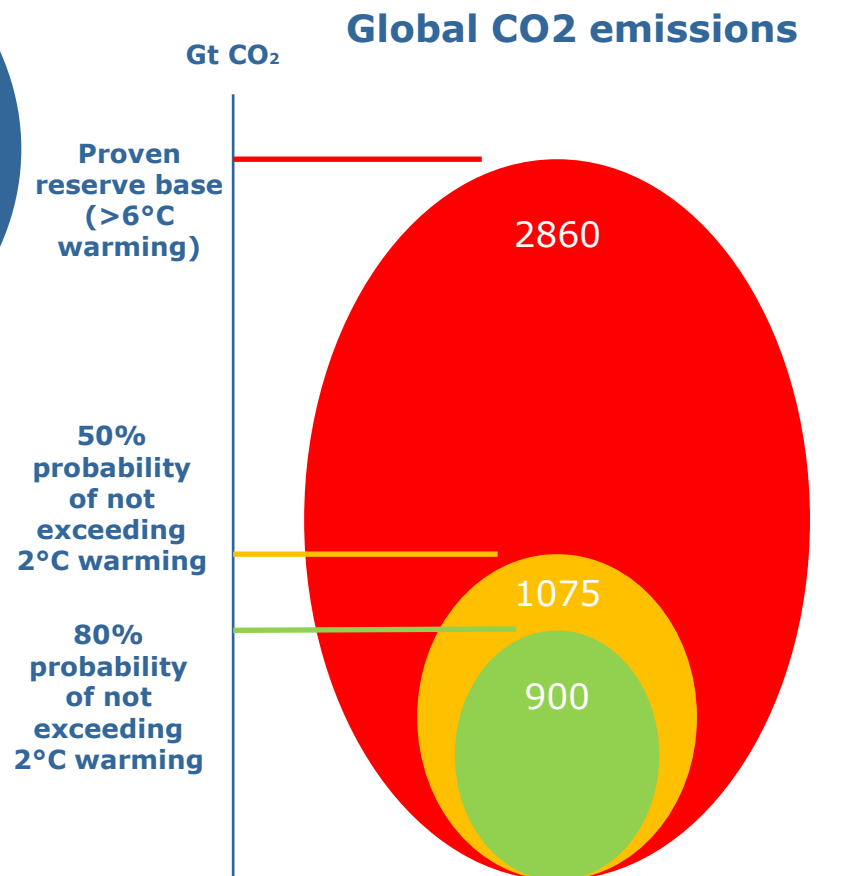
Pale Blue Dot.

Sam Gomersall
CCJ Conference
25th March 2014



THE CLEAN ENERGY
PROJECT

Pale Blue Dot Energy Limited



Business Consultancy

Supporting the Low Carbon Transition

Strategy Development, Change Management, New Markets and Product Development support

Advice to power, oil & gas, decarbonisation, transmission, renewables, efficiency, markets, development and financing companies

Deploying direct experience of solving complex challenges

Supporting all aspects of Mergers & Acquisitions

Low Carbon focus

Seeing things differently

Strong Business Management Background

Source <http://carbontracker.live.kiln.it/Unburnable-Carbon-2-Web-Version.pdf>

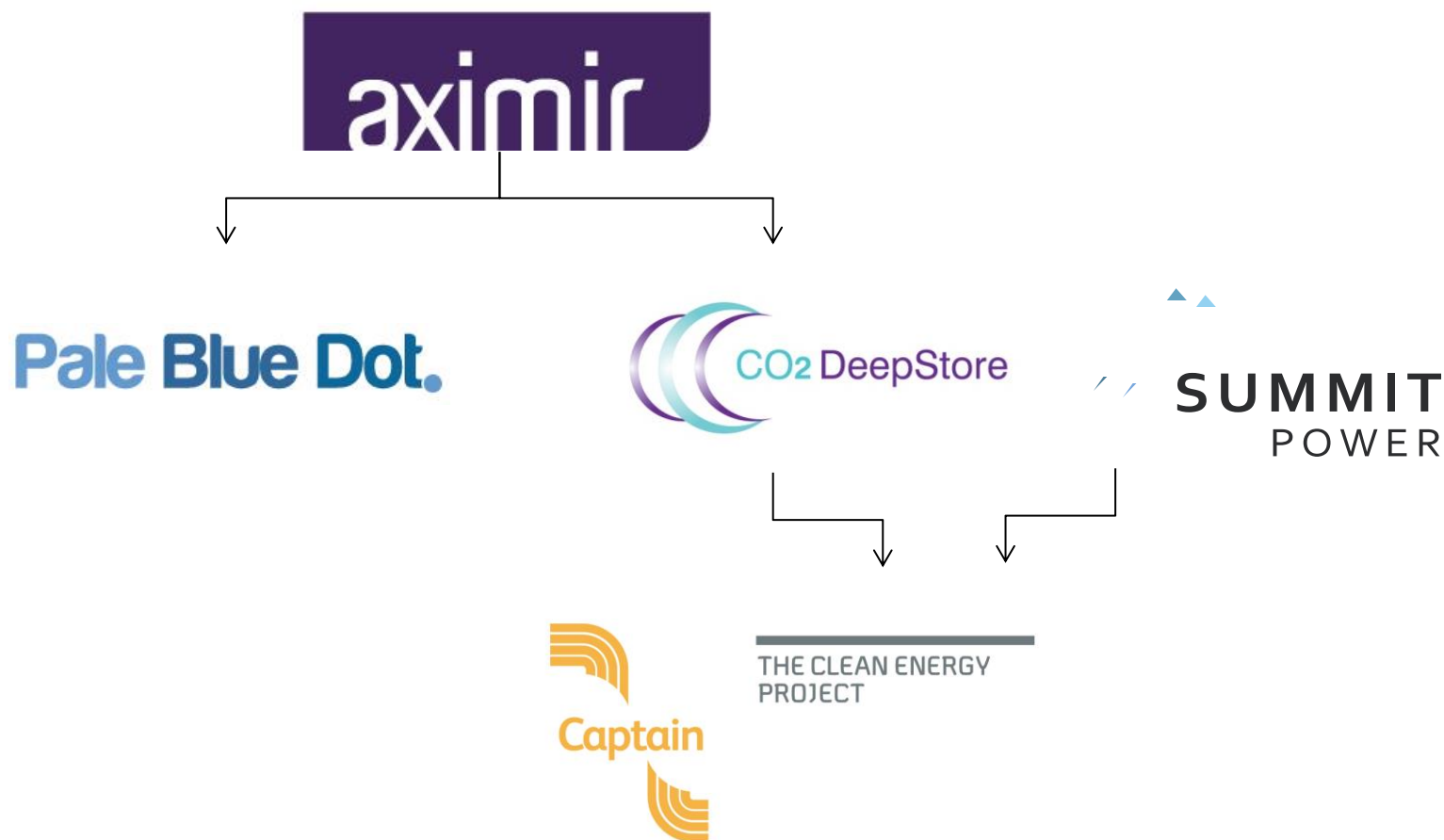
CCEP Partners

- Summit and CO2DeepStore are 50/50 JV partners in Captain Clean Energy Limited
- CO2DeepStore is a Scottish CCS developer formed in 2007. It has been deeply involved in all Scottish CCS projects, including as a 50% offshore storage partner for Longannet, Peterhead and Hunterston
- Summit Power has twenty years' experience of developing power projects. It has over 7,000 MW of large scale clean energy projects built and more than 2,000 MW either being developed or under construction. It's involved in wind, solar and natural gas and it has earned a global reputation for developing CCS



SUMMIT
POWER

Pale Blue Dot and CO2DeepStore



Captain Clean Energy Ltd

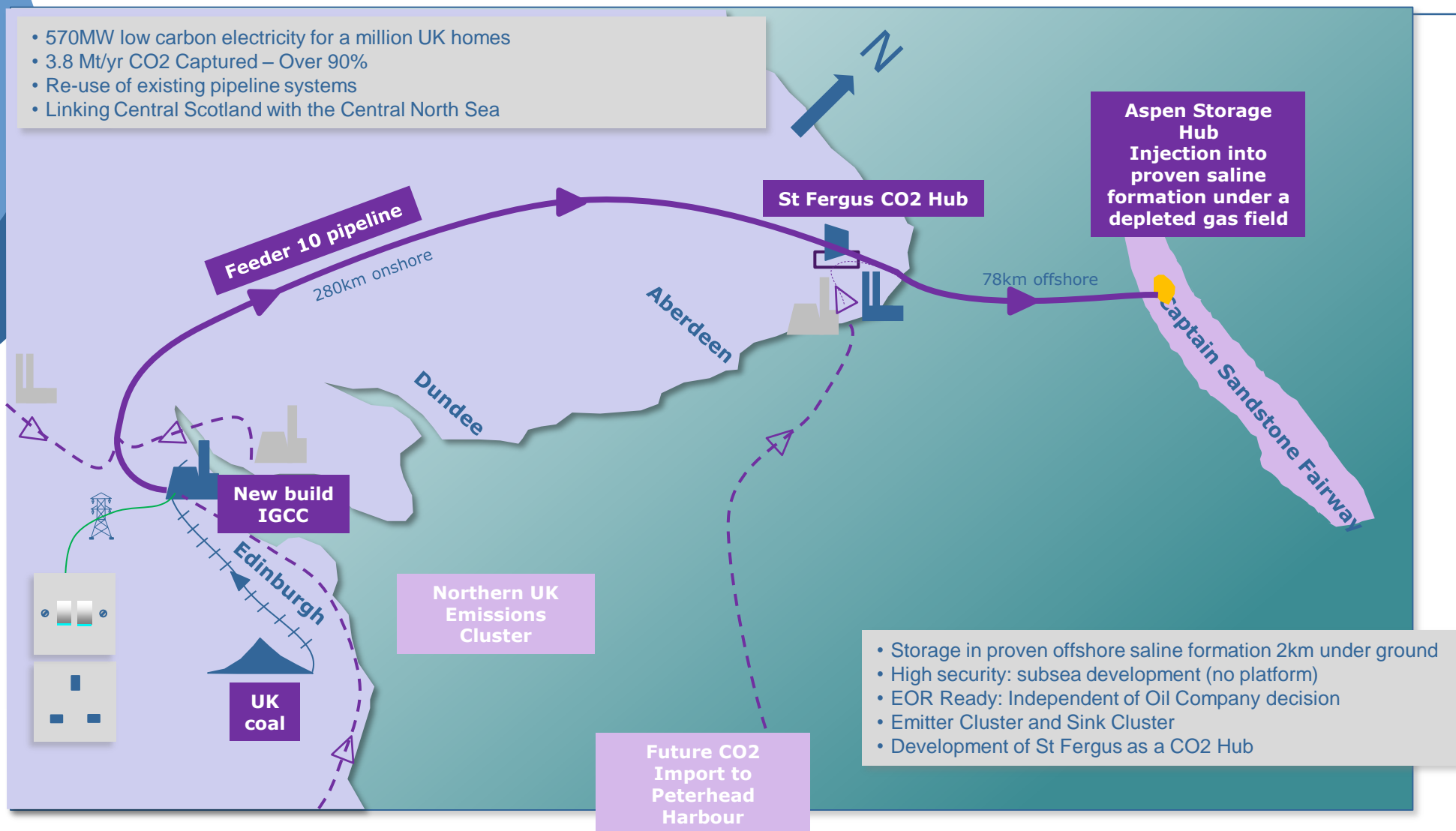
CCEP status

“This Project is not dead”



“It’s working on a CfD”

CCEP Overview



CCEP Process

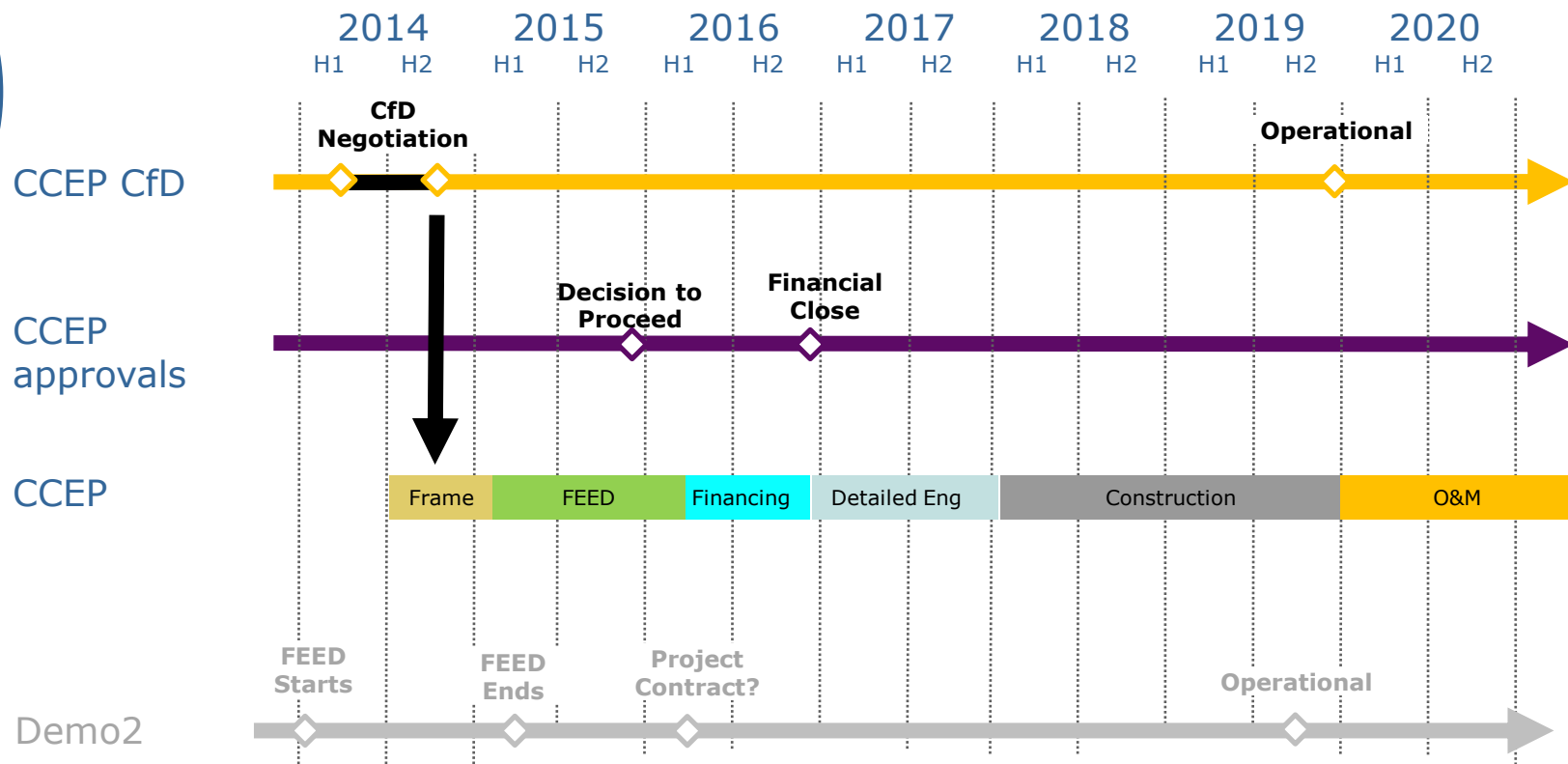
- CCEP has been in discussions with DECC under the FIDe process since March 2013
- Process has involved promoting the potential for CCS projects outside the competition
 - This has had Ministerial support
- Projects funded by CfD alone (no capex subsidy)
- Detailed weekly discussions regarding the nature of a CfD during Q3/4 2013
- Departmental/ministerial review ongoing
 - Awaiting a decision by the Minister (April) to offer a CfD in principle
- CCEP will then negotiate CfD terms (Q2/3)
 - Allowing preparation and delivery of FEED (2015)

CCEP is an attractive project



- Good value
 - CCEP can deliver a project with a strike price competitive with offshore wind
 - Available to deliver power when required (unlike wind)
- Enables EOR
 - It is also a step towards potential EOR, highlighted in the Wood Review as important for the N Sea
- The first commercial project in the UK
 - Project expects to finalise a CfD, then do FEED
 - No capital subsidy
- Investment
 - Chinese investment interest remains strong for EPC, Investment and debt financing
- Plus
 - Re-use of existing pipelines, integrated project, well understood store, aquifer storage potential, applies IGCC technology, cluster potential

CCEP Outline Schedule



CCEP challenges

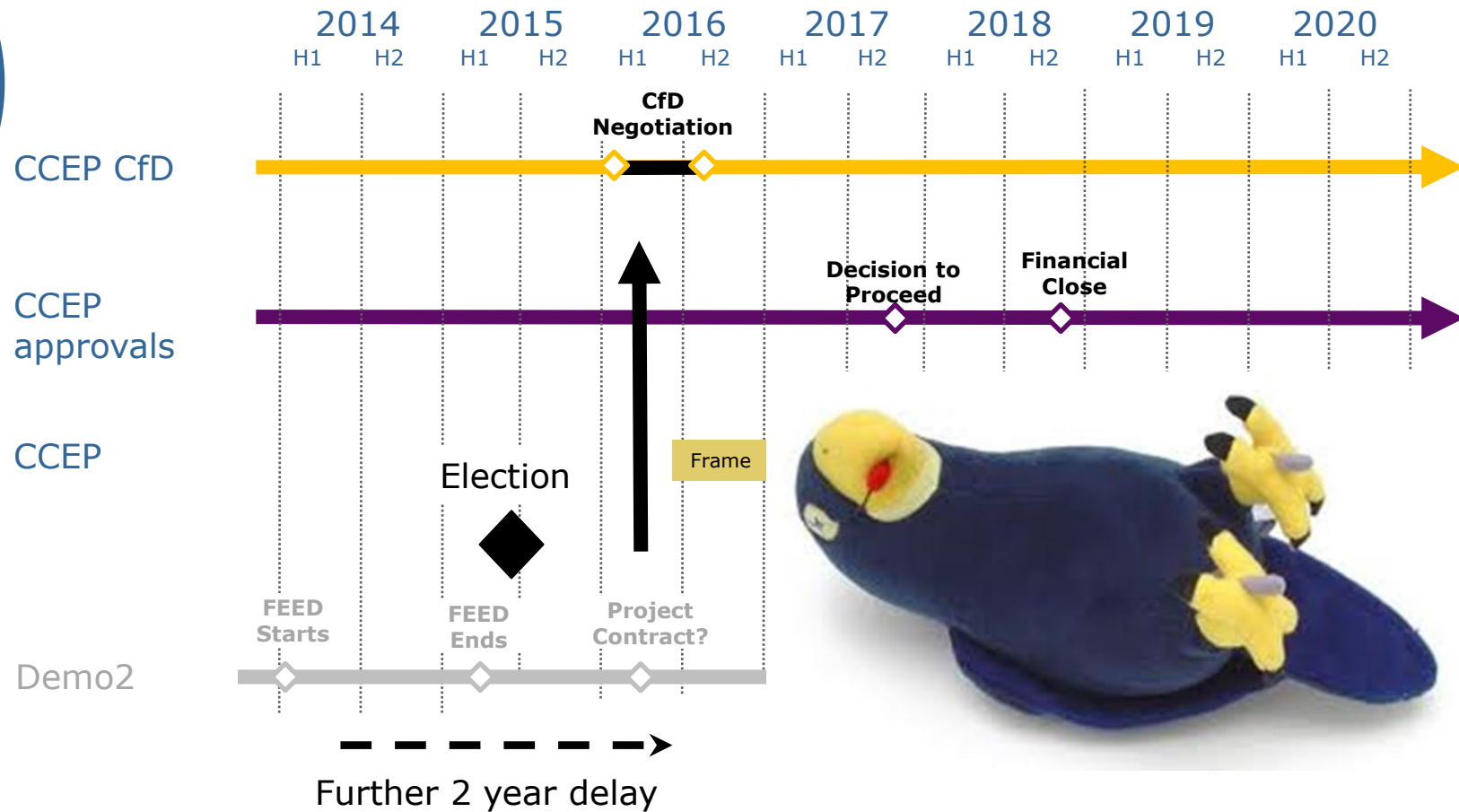
- CCEP is seeking certainty of a CfD prior to FEED
 - Our offer is a specific proposed Strike Price
 - Discussions covering new ground in an emerging EMR
- LCF allocation availability; for CCS; for CCEP
 - Made more difficult after Budget carbon floor price freeze
- No-one can see past Demo2
 - The 'follow on' projects have insufficient visibility & support
 - This is/has been an issue for CCEP since March 20th 2013
 - Supply chain, 3rd party asset owners/licensors all need to see Government commitment so we can get engagement
- The UK general election

Demo2

- Award of FEED for Peterhead and White Rose is to be congratulated
 - It will be ~2 years before we know if the projects will be built
 - FEED, Project Contract, owners approvals, external events,.
- We are seeking action **now** for 'follow on' projects
 - Does not effect Demo2
 - We are ready/keen to proceed
 - Potential for synergies & learning between projects
 - To move down the cost reduction curve
 - In order to achieve DECC's stated objective

"that private companies are able to take investment decisions to build CCS equipped fossil fuel power stations, in the early 2020s, without government capital subsidy, at an agreed CfD Strike Price that is competitive with the strike prices for other low carbon generation technologies"

CCEP Delay



General thoughts

Competition vs collaboration

- CCS project mentality has been driven to make it a competitive space
 - DECC process has been a Competition
 - Maybe that phase is now complete
- Competition is the wrong mindset
 - We have already lost most of the big utilities, several major service companies and investors
- Collaboration is required
 - To make best use of the knowledge, expertise and investment available



Summary

- CCEP is alive
- Progress is dependent on a CfD
- Demo2 progress to FEED is positive
- Government leadership still required
 - To enable 'follow on projects'
 - To achieve CO2 emissions reductions
 - To mitigate the risk of a Demo2 project failure



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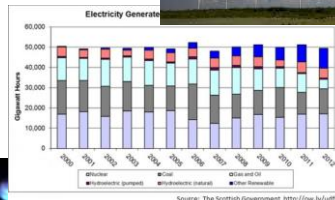
Supporting the Low
Carbon Transition

2050 Low Carbon
Economy

Displace fossil fuels
with renewables

Switch to lower carbon intensity

Existing energy practice





EOR discussion

CO2 EOR

- CO2 transfer price is complex
 - Location: where is the transfer point
 - Physical state (pressure): what is the transfer condition
 - Supply; what are the supply obligations
 - Take: what are the obligations to take CO2
 - Emissions & risk; which party is carrying the EU CCS directive obligations
- Value
 - CO2 does have significant value for EOR
 - EOR economics are complex
- Zero transfer price?
 - Does not mean there is no value
 - Zero could be a transfer price
- Positive transfer price more likely

CO2 EOR



- CCEP is a CO2 storage project
- CCEP creates potential for future use of the CO2 for EOR
- There is significant regional EOR potential
- The challenge has always been CO2 supply
- EOR projects require scale and CCEP provides this with 3.8Mt/yr of CO2

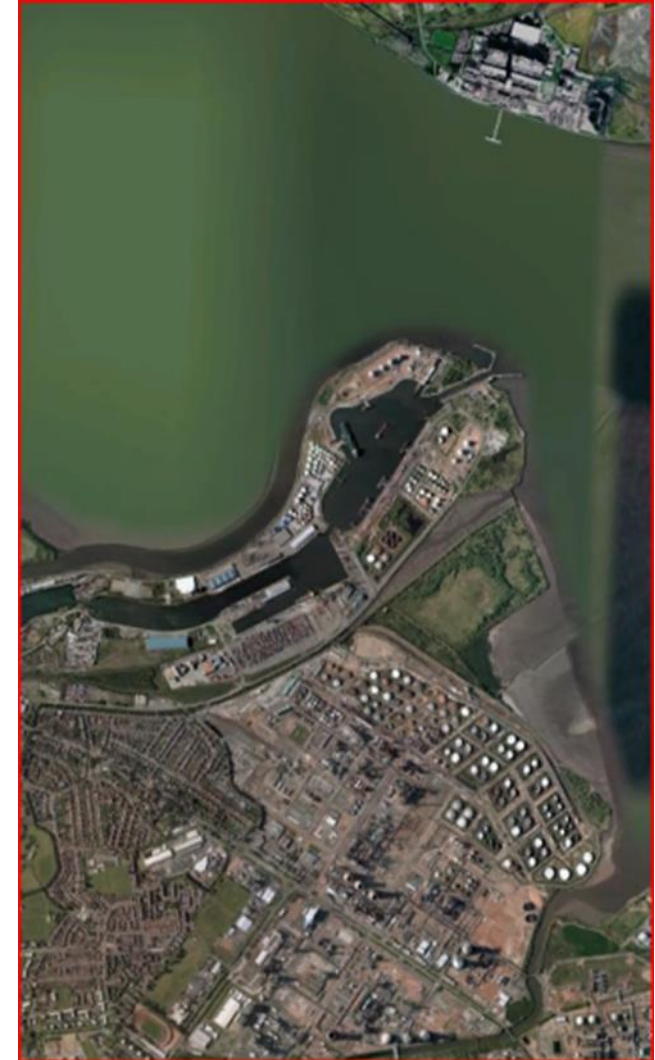


CCEP

Project slides

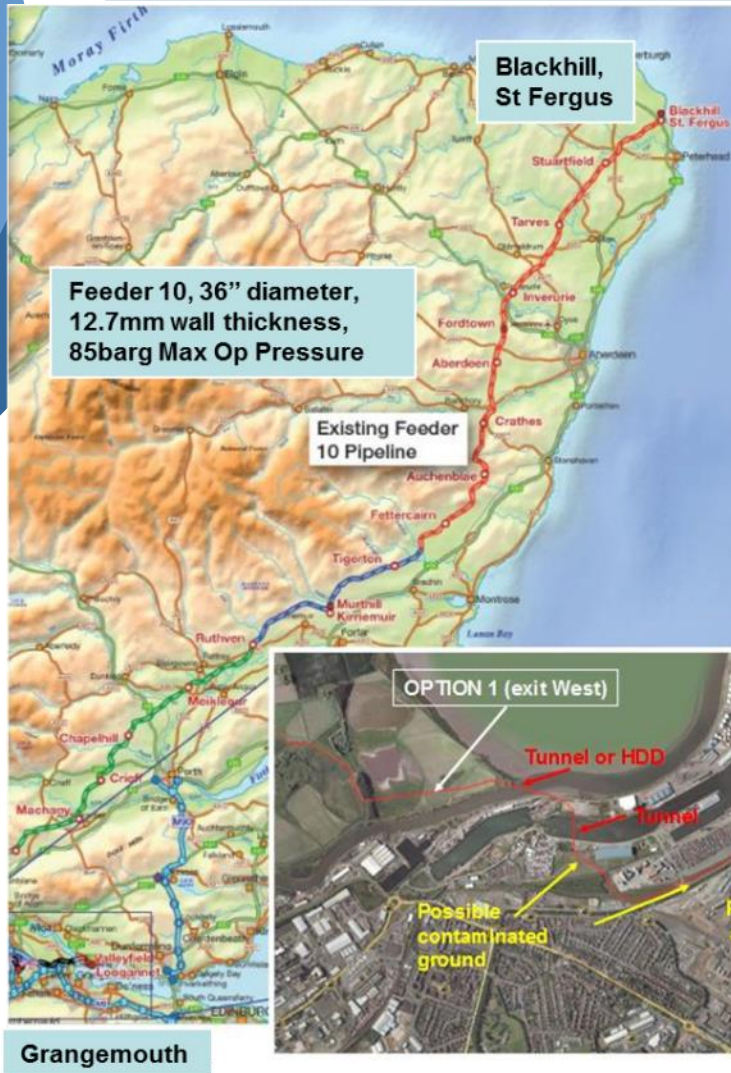
IGCC Grangemouth

- An Integrated Gasification / Combined Cycle (IGCC) power station
- Processes coal very differently – reducing it to basic chemical building blocks
- No coal is burned – only clean “syngas” is produced
- Mercury, sulphur, particulates, CO₂ are all removed before hydrogen is burned
- Easy to capture CO₂ and other waste products
- Highly efficient, tried and tested technology
- It will be one of the cleanest power stations

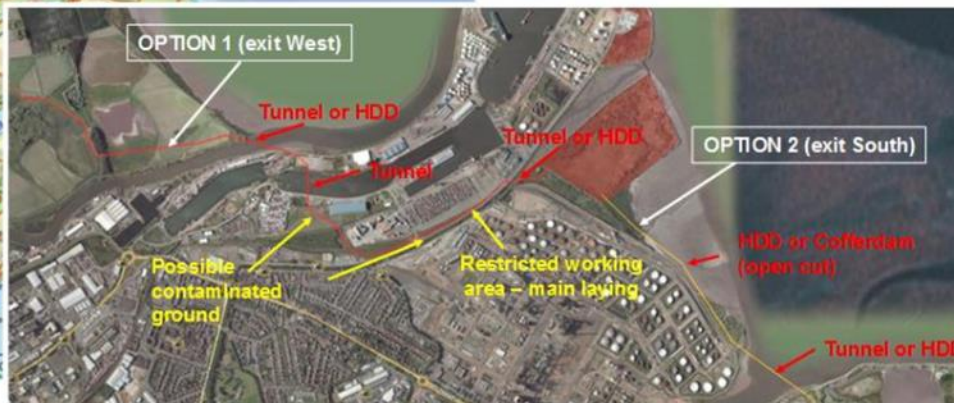


The CCEP Project

CO2 Transport



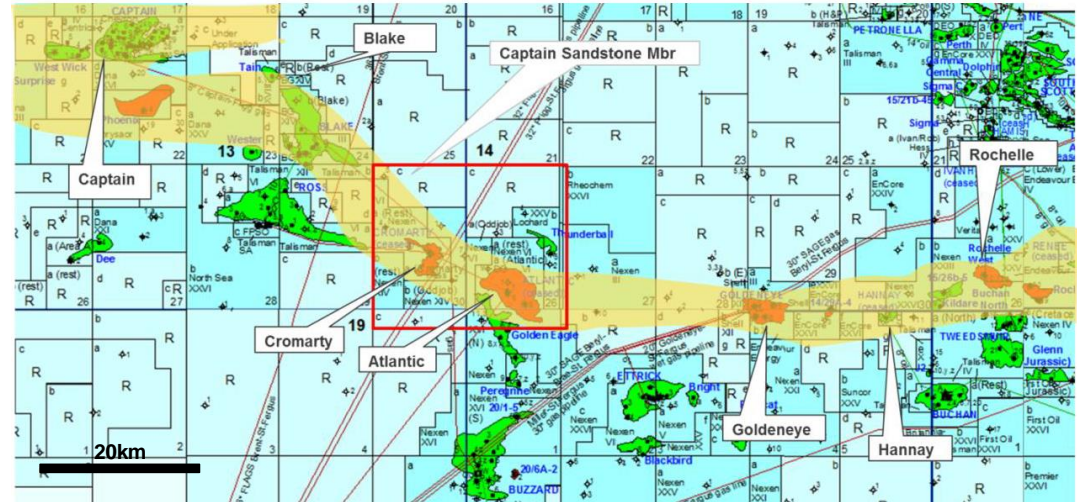
- Onshore transport through existing Feeder 10 Pipeline
- Short piece of new connecting pipeline
- Transports gas phase CO2 from Grangemouth to St Fergus
- Compression at St Fergus
- Offshore transport through existing subsea pipeline in dense phase



The CCEP Project

CO2 Storage

Captain Formation Saline Aquifer Proven Quality and Performance



- The Aspen store is in the Captain saline aquifer
- Regional hydrocarbon development activity provides significant data
- Large aquifer with regional connectivity proven during production to confirm capacity
- Excellent CO2 containment seals and excellent injectivity
- Subsea development with new wells designed to be EOR ready