



Finance Roundtable

“Commercial and Financial Structuring of Industrial Scale Projects with CCS, What Will it Take to Turn Ambition into Reality 2”

May 23, 2014,

Société Générale, Paris, La Défense 7, France.

Allan Baker, Global Head of Power, Société Générale
Bernard Frois, Chair, CSLF Financing CCS Task Force



- **Welcome**
- *Allan Baker, Global Head of Power, Société Générale*
- *Bernard Frois, Chair, CSLF Finance Task Force*
- **US DOE ambition in CCS**
- *Jarad Daniels, US DOE, CSLF Secretary*
- **State of the CCS at the World Level**
- *John Scowcroft, Executive Adviser, Global CCS Institute*
- **Regulatory Environment**
- *Juho Lipponen, Head of CCS Unit, International Energy Agency*
- **White Rose: Importance of CCS Commercialisation Program support and Risk Allocation –**
Richard Simon-Lewis, Head of Finance, Capture Power Ltd
- **Peterhead: Role of Post Combustion Capture**
- *Tim Bertels, Head of CCS, Shell*
- **The Texas Clean Energy Project: Innovative financing – pros & cons,**
- *Chris Brookhouse, Vice President, International Development, Summit Power*
- **Kemper County Energy Facility: Kerry W. Bowers, President and CEO, Southern Technologies Company, USA**
- **Round table discussion on key drivers of success, market capacity, key risks and financing requirements**
- **Wrap up discussion: Critical success factors & proposed actions**



GLOBAL
CCS
INSTITUTE

GLOBAL STATUS OF CCS

John Scowcroft, Executive Adviser, GCCSI

CSLF Roundtable. Paris, La Defense, 23 May 2014



Significant global policy and regulatory developments

Canada

- Alberta Government releases final draft of the Regulatory Framework Assessment report

United Kingdom

- UK Energy Act receives Royal Assent and becomes law

Continental Europe

- EC proposes climate targets out to 2030
- European Parliament supports MEP Chris Davies' report on CCS in Europe

United States

- US EPA releases proposals dealing with power plant CO₂ emissions and geologic carbon storage

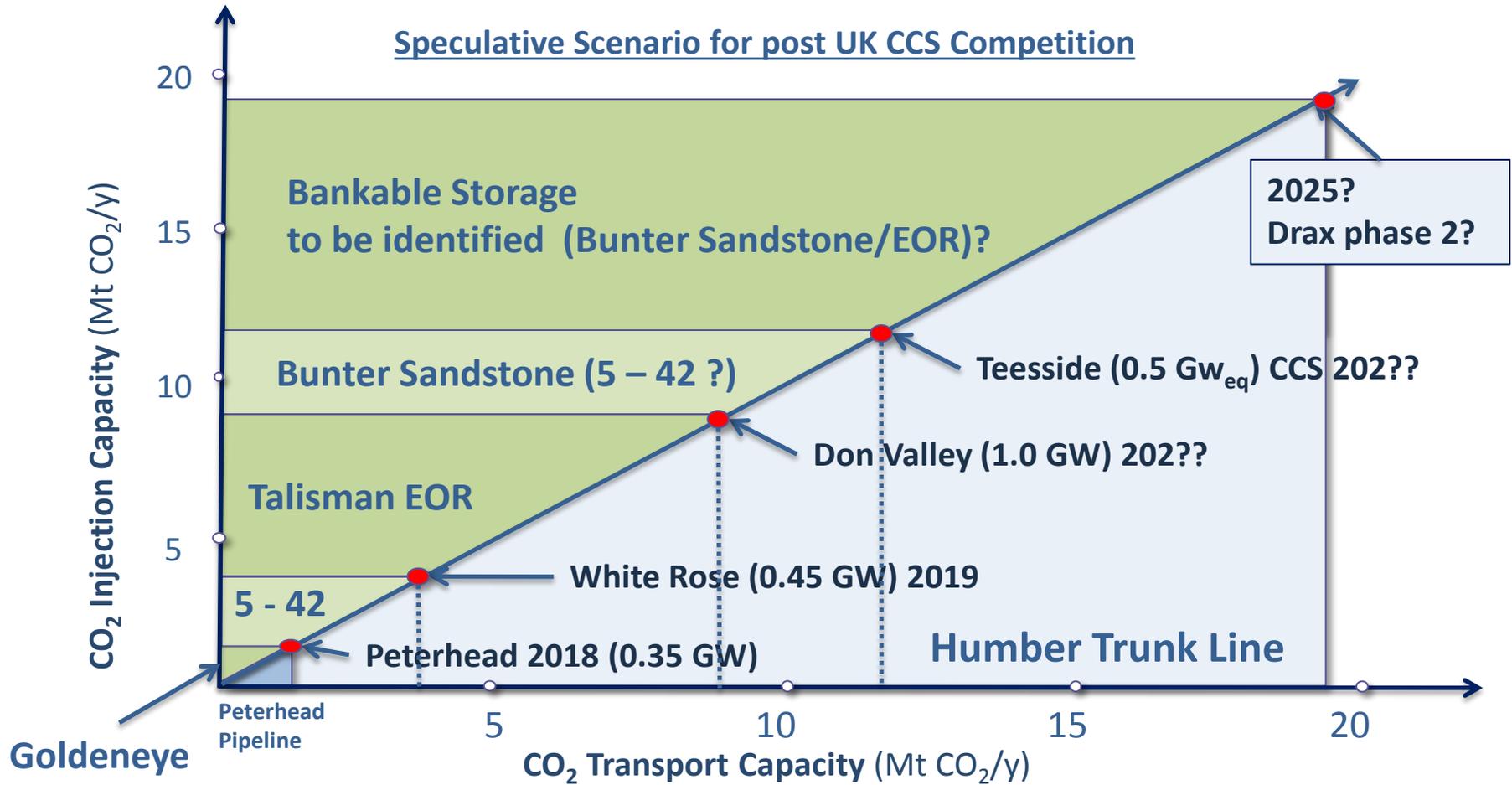
Global

- COP 19 held in Warsaw
- Focus on universal post-2020 climate agreement in Paris, in 2015



CCS Deployment Timeline (to 2025)

20 Mt CO₂ CCS could be realised by 2025 (c.a. 3-4 GW equivalent)



1 GW = ~5 Mt CO₂ coal based CCS and ~2.5 Mt CO₂ gas based

UK's CCS Commercialisation Programme



- UK CCS Programme is key to realising the White Rose CCS:
 - A multi-million pound grant funding a portion of the FEED costs
 - A major Capital Grant funding part of the project capex from the £1 billion budget
 - A market support for clean low-carbon electricity generated in the form of a bespoke Contract for Difference
- NER 300 via European Commission
 - Would provide supporting revenue during operation

The UK CCS Commercialisation programme and NER funding are essential to take CCS from the demonstration stage to full commercialisation

OBTAINING INSIGHTS FROM OUR CCS DEMO PROJECTS



Quest



TCM

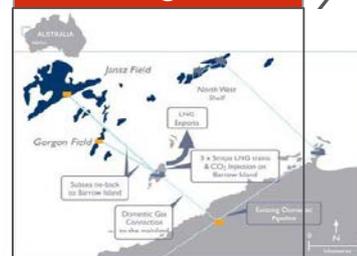


Peterhead



Boundary Dam

Gorgon



- Discontinued projects;
- Barendrecht
 - Draugen
 - Zerogen
 - Longannet

Shell involvement in CCS Projects;

- Industrial scale projects in operation
- Industrial scale projects in construction
- Planned industrial scale project (FEED)
- Involvement through Shell Cansolv Technology

CRITICAL SUCCESS FACTORS TO CCS DEMONSTRATION

1. It is good for Government
2. It is good for me (Industry)
3. It is good for the constituents

Licence to
Operate

4. Enabling legislation exists
5. Clear liability agreement
6. Financial support for demonstration
7. Early adopter benefits
8. Trust & Certainty

Build with
Confidence

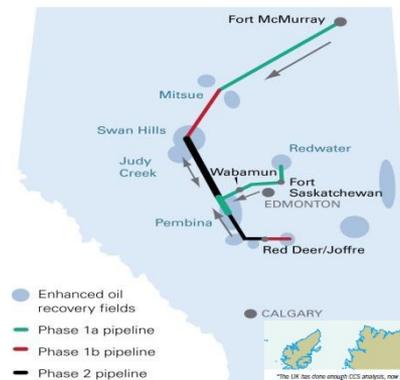
9. Knowledge sharing

Replication

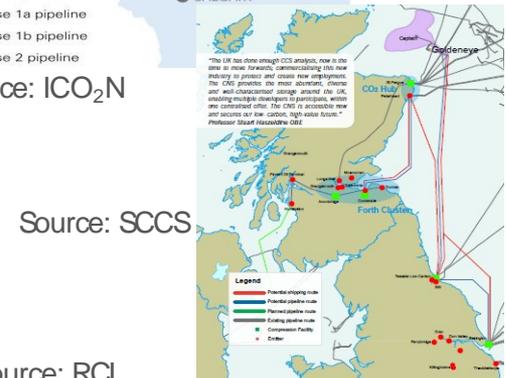
GETTING TO THE NEXT BATCH OF CCS PROJECTS – HUB DEVELOPMENT

Questions to Round Table:

- How do we progress from first round CCS demo projects to the next batch?
- What needs to be demonstrated to get financing risk premiums down?
- How do we enable commercial storage?
- How do we achieve broader collaboration across governments & industry to deliver CCS demonstration?
- How can we obtain public understanding and acceptance for CCS as a solution to fossil fuel decarbonisation?



Source: ICO₂N



Source: SCCS

Source: RCI



Kemper County Project



A major investment of Southern Company



Texas Clean Energy Project

- Coal gasification on “polygen” facility producing urea, electricity, and CO₂ for EOR in Permian Basin
- Will capture 3 million tpy of CO₂
- Fully permitted, without opposition
- \$450 Million award from U.S. DOE
- \$637 Million in investment tax credits from DOE and Treasury Department

Accomplishments:

- Long-term baseload power purchase agreement negotiated for ERCOT region
- No environmental contest for any permits
- Assembled package of US grants and tax credits, Chinese export financing, and large multinational corporate partnerships





Key Summit Learnings

- CCS is happening and will grow significantly
- CCS is commercially proven & available
- CO₂ captured for EOR comes first
- There is value in integration – the value is in the commodity vs the facility
- CCS does not need Gov funding in certain locations
 - But we need policy to encourage the market
- Possible to ‘connect’ the chain from hydrocarbon to oil



Recent Lessons Learned & Applied



- Major reduction in total project cost is essential to financing
- US Construction market has changed unfavorably for this reduction
- Unit prices for output (power, urea, CO₂) are at market
- Thus, we need to:
 - improve plant design and configuration to cut total costs & also boost efficiency
 - incur more cost up front to gain more certainty re: price, performance, and contingencies
 - restructure EPC contracts for construction market issues
 - bring more technology experience (Siemens/China) to the benefit of TCEP
- While ensuring continued support from the DOE

- ... We are revising TCEP to make it financeable, TCEP is back on track.

Banks point of view 1/3

- In the two years since the last round table, we have seen a « Seed change" in the interest of financial institutions in CCS
- Previously they came to the round table to find out what CCS was - this time, they know what it is and came to see where the opportunities are.
- This change has been driven but the flow of "good-news" stories on CCS, particularly the construction and completion of large scale plants around the world like Kemper, Boundary Dam etc.

Banks point of view 2/3

- May not be debt financed yet but the fact that operating plants exist employing a range of technology has started to create the "precedent" base they need to get comfortable with the industry.
- Also contributing in Europe is the UK CCS Competition. The availability of both grant and the CfD mechanism has provided a potentially financeable framework (subject to risk allocation) and both projects have blue chip sponsors with strong rationale

Banks point of view 3/3

- The bank sounding process for the UK projects has further raised the profile of the opportunity - we have engaged with 12-15 institutions, all of whom have reacted positively to the potential opportunity.
- For White Rose the approach to the finance community has been very structured, focused and is in many respects an education process designed to deliver committed finance when it's required, even if this may be two years in the future.

Conclusions

CCS is gaining momentum with the finance community.

We are now at a cross-roads: momentum will only continue to build if we (banks) see more plant coming on line, more FIDs being taken and more engagement and education of the banking community

One interesting discussion is around the role of the Chinese. We see them doing in CCS what they have done in wind and solar. Investment in CCS in China could be huge and have a material knock on effect on the rest of the CCS market, but we are also starting to see Chinese equity and debt starting to flow to the US and potentially Europe.