Challenges for Early Movers

The ZeroGen Experience

Presentation to the Expert Meeting on Financing Carbon Capture and Storage

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Challenges for Early Movers

• Global and national setting

• Project overview

• Project deployment challenges

• Some important `open` issues
ZeroGen - global and national setting

- Ratified Kyoto Protocol – 2010 emission trading scheme
- Climate change - public policy and business decision makers
- State energy policies – new coal-fired power stations w/o CCS
- Funding – Federal, State and industry funding commitments
- Australian coal industry
- Integrated Gasification Combined Cycle (IGCC) + Carbon Capture and Storage (CCS), in the future energy mix
Project Overview

- **Location:** Queensland, Australia

- **Current structure:** owned by Queensland Government

- **Technology approach:** IGCC + CCS

- **Timeline:** Stage I - 2012, Stage II - 2017

- **Substantial industry support:** ACALET, ACA, Shell
Project Overview – Project Participants

[Image showing a power station with various labels such as Existing Stanwell Power Station, Proposed ZeroGen Power Station, Proposed Mineral Residue Disposal Area, Central Rail Line Rockhampton to Emerald, Capricorn Highway, and High Voltage Powerline Easement.]

Participating organizations include Queensland Government, Stanwell Corporation Limited, WorleyParsons, RLMS, AGFORCE, Rockhampton Regional Council, AG Asia Pacific, URS, Australian Coal Association, IMBA Petroleum Consultants, and CHRC.
Project Overview

2008
- Initial feasibility 6FA
- Financial planning
- Initial funding from ACALET & ACA
- Approval for 9FA
- Conceptual JV term sheet
- Agreement with Shell
- Discussions with GE, Honeywell and others

2012 – Stage I
- 6FA 82MWh
- Construction competed
- Operation for 5 years
- Location already determined
- Partial funding in place
- 75% CO₂ capture

2017 – Stage II
- 9F 279MWh
- 90% CO₂ capture
- Location TBD
- Funding structure TBD

6FA - 82MWh
9F – 279MWh
GAS
COAL

2009
- Stage I feasibility study
- Composition of investors mix
- Funding programme initiation
- Stage II feasibility study (2012)

2020 – Stage III
Future competitive landscape
- Fuel costs
- CO₂ costs
- Technology costs
Project deployment challenges

- ZeroGen IGCC + CCS identified by Australian coal industry as priority technologies for development
- Challenges for deployment exist in relation to:
  - Political legal and regulatory
  - Technology
  - Community and Stakeholders
  - Financial, Commercial & Economic
Project deployment challenges

Political, Legal and Regulatory

- Permits and regulatory framework
- Consensus and joint undertakings
- Approvals issued for IGCC / CCS
- Fragmented global CO₂ policy
- Globally relevant regulations
Project deployment challenges

Technology
- IGCC technology
- CCS
- Geosequestration
  - Exploration
  - Injection
  - Well design
Location and technology integration
- Site selection
- Construction
- O&M
Project deployment challenges

Community & Stakeholders

- Investment and public community confidence in CCS
- Over 200 interest and stakeholder groups
- Current support from
  - Government
  - Public
  - Industry
  - Commercial
  - Union
Project deployment challenges

Financial, Commercial & Economic

**Financial:** Revenue and profitability dependent on:
- carbon pricing
- government subsidies
- technology efficiency improvements (CapEx, OpEx)

**Financial risk:** Technical, Financial (loan & interest, bankability)

**Commercial:** Identifying L-T investor

**Economic:** Input optimisation of Australian economy and coal industry
Project deployment challenges

IGCC with CCS cost breakdown

$/MW

ZeroGen focus

- CO2 Permit
- CO2 storage
- O&M
- fuel
- capital
Some important `open` issues

**Investment structuring - funding options and schemes**

- Grants enhanced ETS credits
- Industry participants
- Loan guarantees
- Private parties
- ETS for direct investment
- Clean Development Mechanism (CDM) credits

- Funding options will be discussed with Government funds, and commercial banks
- Need for innovative ideas to address bankability of demonstration projects
Thank you