BHP Billiton's role in Coal Seam Gas

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What is the nature and extent of BHP Billiton's coal seam gas activities?

Project Agreement with CH4 on ATP364

- Over 1.5 million acres
- In excess of 10 tcf gas-in-place
- CH4 is JV developer and operator on BHP Billiton's behalf, via May 2000 agreement
- First project, Moranbah Gas Project

Queensland mining leases with gas rights

- BHP Billiton Mitsubishi Alliance and BHP Mitsui Coal have extensive mining leases with rights to coal seam gas
- Represents a significant potential resource
- Could supply both Townsville and Gladstone

Illawarra Coal

- Existing degassing operations fuel 94MW gas engines
- Significant potential resource lies within the mining leases

Extraction technologies

- Medium radius drilling
  - forms the basis for the Moranbah Gas Project development
- Tight radius drilling
  - Technology owned by BHP Mitsui Coal and CRC Mining
  - Field trials demonstrated to depths of 250m and laterals of 180m

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Why coal seam gas for BHP Billiton?

- Global coal business
  - Australia - Bowen Basin, Illawarra, Hunter Valley
  - South Africa - Ingwe
  - Colombia – Cerrejon
  - USA – New Mexico
- Global oil/gas business
  - Australia - Bass Strait, Minerva, North West Shelf, Griffin
  - Europe/Middle East/Asia – Liverpool Bay, Algeria, Pakistan
  - America – Gulf of Mexico, Trinidad
- Brings together unique combination of skills
  - Low cost mining focus
  - Coal geology
  - Oil/gas reservoir engineering
  - Gas marketing skills

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History of coal seam gas at BHP Billiton

- Concept initially introduced by BHP Engineering in mid 1980s (known as SeamGas, a JV with USX)
- First attempt of direct transfer of USA fraccing technology
- Moura Mine safety focus due to high gas contents
- Unsuccessful due to tight coal & high cost of specialised equipment
- Moura highwall drilling developed after underground inseam project was stopped following Moura explosion.
- *Focus on 'hole in coal'*
- Trialled surface-to-inseam – genesis of medium radius drilling
- First company to sell coal seam gas on a firm basis
- Initially market was sceptical but then shown that production could be reliable
- Although commerciality was not demonstrated, technical concept worked
- Moura Mine sold (now a gas producer from the BHP Billiton foundations)
- Also received critical Federal Gov't R&D funds for developing tight radius drilling concept – working in conjunction with CRC Mining.

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History of coal seam gas at BHP Billiton (cont'd)

- ATP364P became available & BHP Billiton purchased it – joint initiative of BHP Billiton's Coal and Petroleum Divisions. Business & technology was unproven.
- Limited market and unproven technology reduced BHP Billiton's focus. Also BHP Billiton focussed capital on core businesses.
- BHP Billiton saw value in a venture capital approach and introduced small specialised company (CH4) with large backer (Macquarie Bank) to develop ATP364 in May 2000.
- CH4 successfully demonstrated MRD at Moranbah, and secured rights to supply Townsville Power Station with Enertrade. BHP Billiton elected to participate 50% in Moranbah Gas Project in February 2002.
- Queensland Government strategy and vision was vital in creating this market for coal seam gas.
- BHP Billiton is playing an influential role in the Moranbah Gas Project, through subsurface modelling, project management and of course capital. Further BHP Billiton recognises the different management approach to building a coal seam gas business.
- Potential capital investment flow-on from competitively priced gas e.g. QNI may switch to gas, which could fuel their potential major expansion

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BHP Billiton brings a unique perspective

BHP Billiton brings a unique perspective and capability to coal seam gas, for three reasons:

- Mix of coal and gas expertise
- Being a buyer and seller of gas
- Technology for coal seam gas extraction

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Coal and gas expertise

- BHP Billiton is one of the few companies in the world that can bring this mix
- Have degassing experience from Bowen Basin, Illawarra and New Mexico coal mines
- Have extensive coal geological understanding of coal basins throughout the world
- Have an established gas presence in Eastern Australia, with supply soon to four States from Bass Strait and Minerva

Issues:

- For one side it is a safety & cost concern – the other an opportunity & benefit.
- Tenure/ownership/operating overlap concerns. Legislation difficult & unresolved world wide.
- Both in the one resource but different industries.
- Gas now encroaching on " coal turf ".
- Co-operation is the key.
- Can be of mutual benefit if staged correctly with technical & product issues understood.
- Potentially in competitive energy markets – but can also combine.
- Some potential common infrastructure.
- Different cultures.

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BHP Billiton as a buyer and seller of gas

- QNI, Cannington, BMA and Illawarra Coal are all either direct or indirect users of gas
  - QNI seeking gas for conversion from liquid fuels
  - Cannington buy gas for power generation
  - BMA are a major buyer of electricity in Queensland, with own use gas-fired generation a real possibility
  - Illawarra Coal buy gas to supplement mines gas used in power generation
- BHP Billiton is a major seller of gas
  - With Exxon, sell about 200 PJ pa into Victoria and NSW markets
  - Minerva will be selling into South Australian market later this year
  - Moranbah Gas Project will start delivering gas to Enertrade later this year
  - Illawarra Coal could sell gas to 3rd parties in the future

Key issues:

- Gives BHP Billiton an acute understanding of what makes for a viable gas development and also what makes a viable gas purchase.
- Freer access to gas pipeline infrastructure is essential for growing gas market. Most industry suppliers and users agree pipeline regulation needs overhaul.

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Technology for coal seam gas extraction

- There is in excess of 300 tcf gas-in-place in Eastern Australian coal basins
- Gas market in Australia is one of the toughest markets in the world
  - One of the lowest gas price regimes
  - Illiquid market – few sellers and buyers
- Historically only the sweet spots have been developed – Fairview/ Durham, Scotia/Peat. This represents less than 5% of the potentially recoverable gas.
- Projects now under development are utilising new and lower cost extraction techniques that have the potential to expand what is considered viable to 30% of coal basins.
- These projects include:
  - Moranbah Gas Project, utilising medium radius drilling techniques
  - Camden Project utilising lower cost fraccing techniques
  - Moura Mine, utilising medium radius drilling techniques and trialling tight radius drilling
- If continued to prove successful, gas supply options further afield will struggle to secure markets
- Highlights the significant value add from technology, which has been developed through a long, hard won and ongoing process.

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Key areas where BHP Billiton has a role to play

Due to its unique position and capability in the coal and gas market, BHP Billiton has an influential role to play in addressing these key issues:

- Maximising value of gas in mining leases
  - Development needs to balance the potentially competing objectives of mine safety and secure supply to long term customers
  - Ability to finance the developments, especially given the lack of bank funding for CSG projects to date
- Tenure – coal vs gas: the need for balanced legislation
  - The Qld Govt legislation is a pioneering piece of regulation, which addressed tough issues avoided by many governments globally
  - BHP Billiton experiences the issues daily at its San Juan Mine in New Mexico, where coal seam gas developers own the gas rights to longwall blocks that are being mined
- Gas pipeline access
  - Needs regulation to allow freer access comparable to access to National electricity grid, particularly non-anticompetitive backhaul arrangements
  - Removal of nodal point restrictions
- Gas market growth
  - Gas fired power – BHP Billiton sees a number of opportunities in Queensland and NSW for CBM to fuel new power generation
  - Gas chemicals (methanol, ammonia), GTLs – the potential exists for CBM to supply this very price sensitive market

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Sustainability and coal seam gas

Looking forward, coal seam gas could bring significant sustainability benefits:

- BHP Billiton sees potential for sequestration of carbon dioxide into coal seams
- The Australian Petroleum CRC's GEODISC research paper entitled, "Carbon Dioxide Sequestration Potential of Australia's Coal Basins" stated:
  - the most suitable coal basins include the Bowen and Galilee Basins in Queensland, the Cooper Basin in South Australia, and the Sydney, Gunnedah and Clarence-Moreton Basins in New South Wales.
  - the thick, continuous, high rank coals from these basins have the potential to store large volumes of CO_2
  - total storage capacity of 8960 Mt or 167 Tcf is potentially achievable from 11 potential sequestration sites
- This represents the capacity to store the carbon dioxide emissions from all existing power generation in Australia for the next 20 years
- Key issues are yet to be addressed, such as the permanency of sequestration
- Field trials are needed to test the viability……of what could be a breakthrough technology for addressing the challenge of reducing the carbon intensity of human activities

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