

# **Economics of Coalbed Methane Development in Canada**

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## Eastern Canada

- Potential recovery: Up to 1.5 Tcf
- No commercial activities as of yet, horizontal test wells have been drilled
- Shallow coals with depth of ~1,000 m and thickness of ~200 ft
- Well density: 2-5 wells/section, depending on formation

## Western Canada

- Potential recovery in WCSB: up to 25 Tcf \*
- Commercial production in the Horseshoe Canyon, and soon in the Mannville
- No commercial production in BC, but exploration is on the rise
- Play characteristics very different from formation to formation

\* Canadian Gas Potential Committee will release the exact estimated number in its next publication.

## Horseshoe Canyon\*

- Shallow with depth between 150-800 m
- Dry, with no-dewatering necessary
- Density: 2-8 wells per section
- Current average production: 150 mmcf/d
- Commingled production is possible
- Low exponential decline
- Average economically recoverable gas: 4-8 Tcf
- Wells drilled to-date: 2,500+

\*Includes Belly River

Sources: Industry data gathered, Phasis Consulting data

## Mannville

- Depth between 600-1,500 m
- Wet coal, with brine and salt water produced with gas
- Density: 2-8 wells per section, but 4 wells/section seems to be the most optimal spacing to produce at
- Current average production (pilot projects): ~75 Mmcf/d
- Quite a steady decline over time
- Commercial production is slated to begin either at the end of '05 or early in '06
- Average economically recoverable gas: 3-10 Tcf
- Wells drilled to-date: 230+

## Ardley

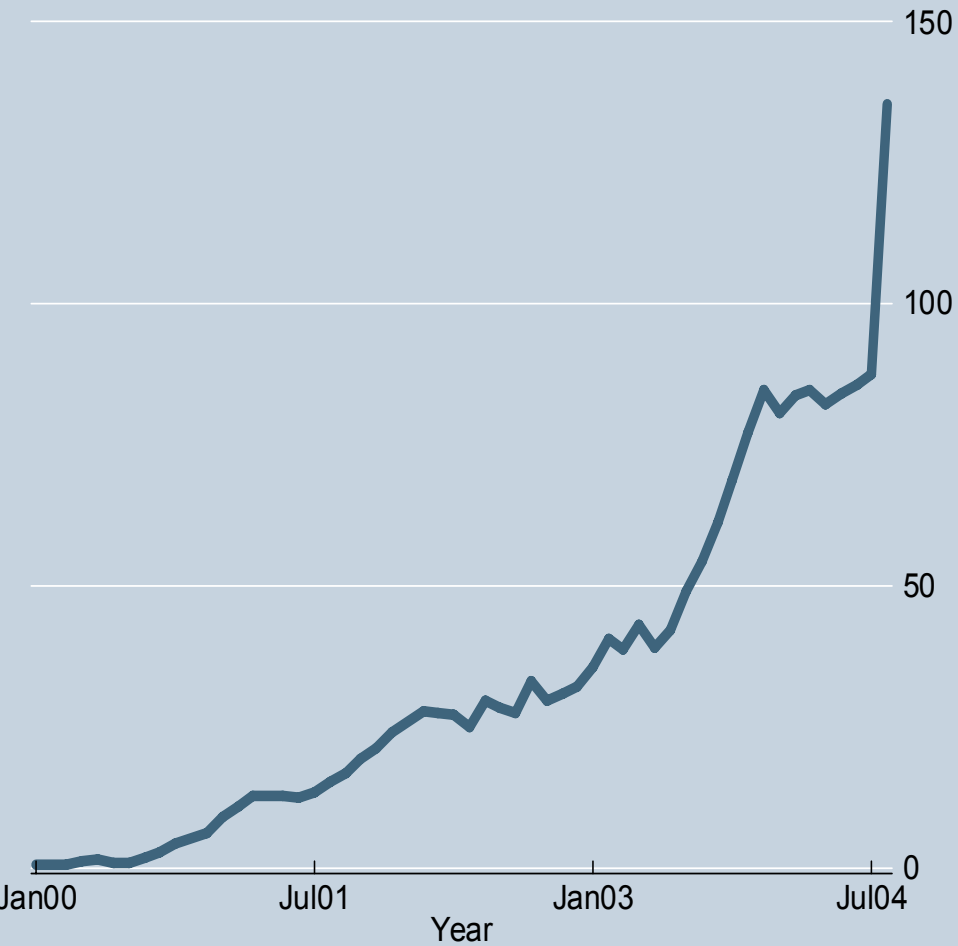
- Depth between 100-400 m
- No commercial production
- Wet coals, with fresh water
- Wells drilled to date: 30

*Sources:* Industry data gathered, Phasis Consulting data

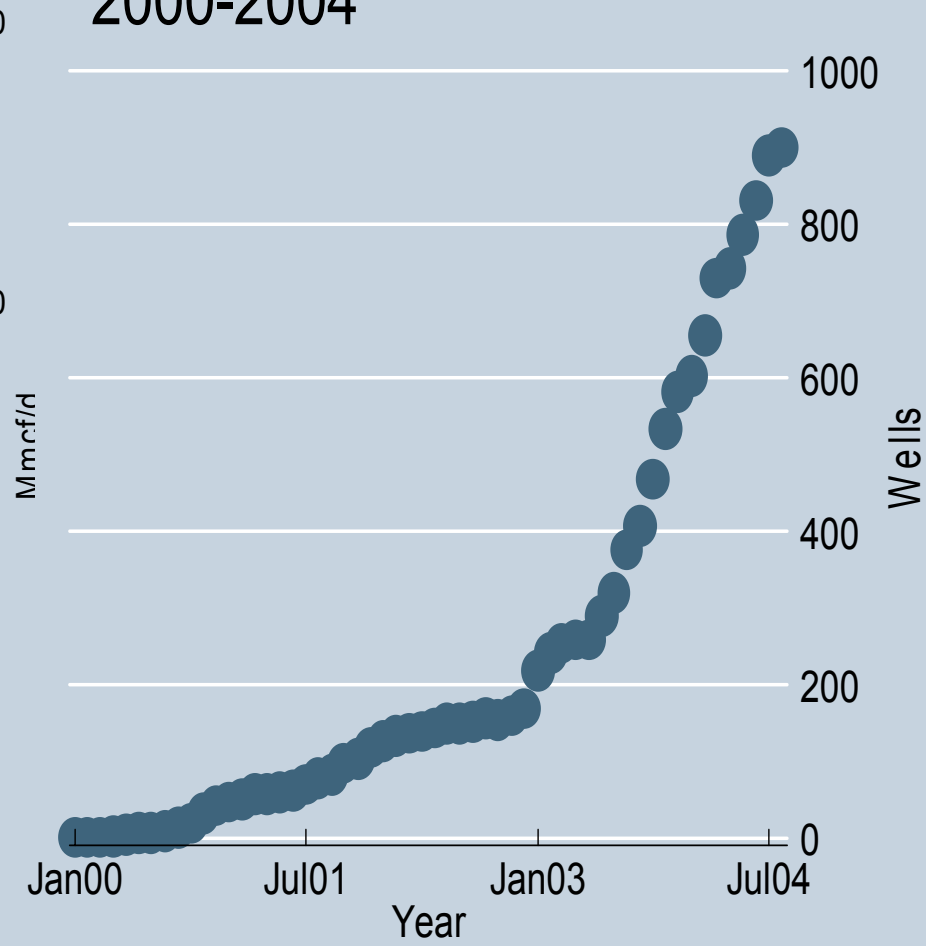
# AB CBM Production Profiles

PHASIS

## CBM Production 2000-2004



## CBM Wells Producing 2000-2004



Note: May include commingled gas.

## Horseshoe Canyon

- Production: 150 Mmcf/d
- Commercial
- Over 35 different companies drilling in the area for ~2 Tcf recoverable gas
- 600+ wells are producing out of a total of 2,500+ drilled wells
- 8 wells/section is economic in the area
- Production declines and continues for up to 35 years

*Sources:* AccuMap, Industry data gathered, Phasis Consulting data

## Mannville

- Production: 75 Mmcf/d
- Not yet commercial- 2 companies could begin commercial production in the area by the end of 2005
- Around 18 different companies are exploring in the area
- 80+ wells are producing out of a total of 230+ drilled wells
- 4 wells/section is economic in the area
- Production is affected mostly by the large amount of brine and saline water that are being produced along with the gas
- Permeability contributes to lower gas rates in the area

*Sources:* AccuMap, Industry data gathered, Phasis Consulting data

## Horseshoe Canyon

<b>Capital Costs:</b>	<b>\$ (000)</b>
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<b>Drilling and Completion (inc. Facilities)</b>	<b>\$248</b>
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<b>Operating Costs:</b>	
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<b>Fixed</b>	<b>\$550-\$600</b>
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<b>Variable (incl. water disposal costs)</b>	<b>\$0.43-\$0.50</b>
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## Mannville

<b>Capital Costs:</b>	<b>\$ (000)</b>
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<b>Drilling and Completion (inc. Facilities)</b>	<b>\$630</b>
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<b>Operating Costs:</b>	
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<b>Fixed</b>	<b>\$850-\$3,200</b>
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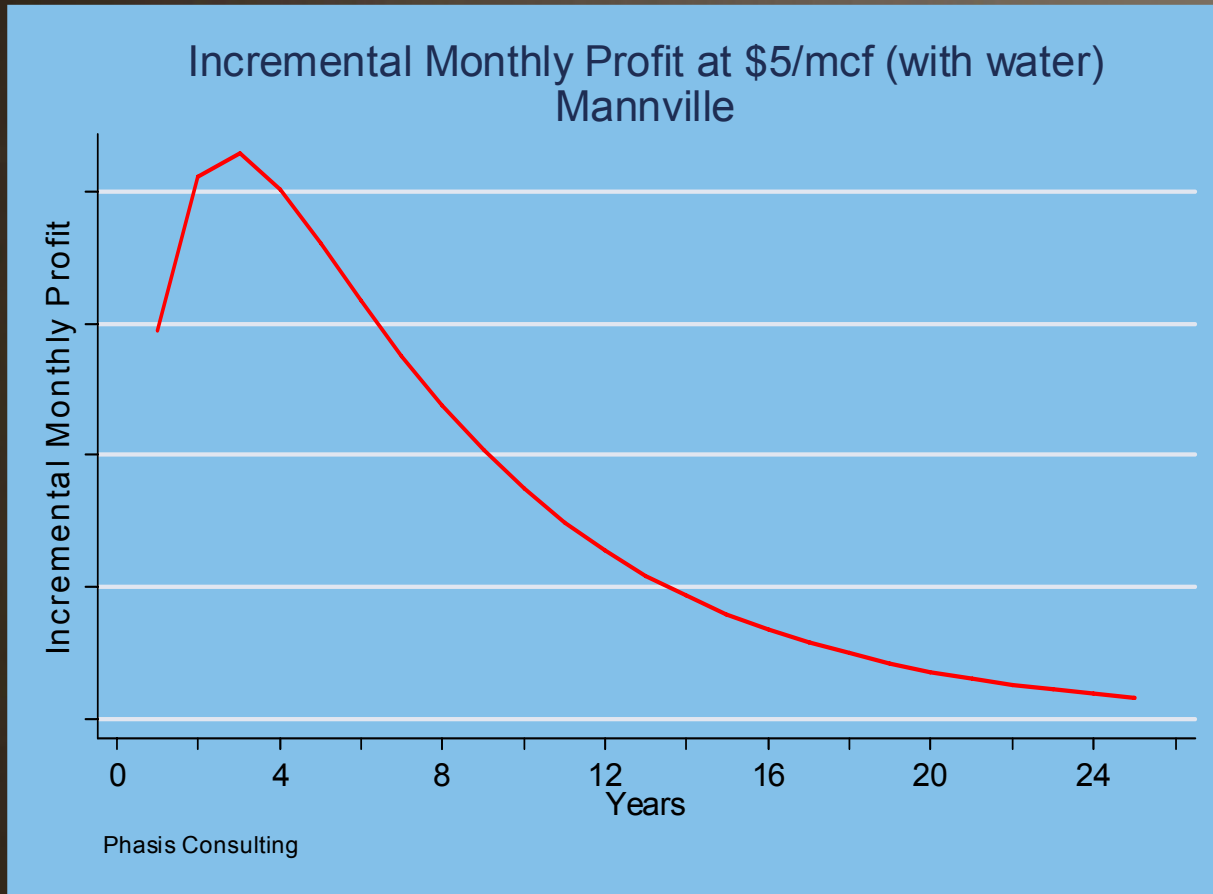
<b>Variable</b>	<b>\$0.45-\$5.50</b>
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<b>Water Disposal</b>	<b>\$0.73</b>
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When polled, industry listed the following 5 constraints as the top issues that must be dealt with in order to continue the business of CBM development in Canada:

1. **Technological**
  - Specific technologies for the unique formations found in Canada are needed
2. **Lack of available data**
  - Production, costs and other data need to be readily available for further analysis
3. **Environmental**
  - Water handling and disposal falls under this category
4. **Regulatory**
  - Royalty and tax issues fall under this category
5. **Economic**
  - Initial investment and how long before a positive return is seen

This graph shows you a real example of what profits, once discounted looks like in the Mannville.



## Assumptions:

**Gas Price:**  
US\$5/mcf

**Drilling/Completion Costs:**  
\$500,000/well

**Water Disposal Cost:**  
\$2.00/bbl

**Spacing:**  
4 wells/section

**GIP:**  
2 Bcf

**Discount factor:**  
10%

## The economics show that:

- Average CBM production is well above 105 Mmcf/d
- Drilling is at a rise in the Horseshoe Canyon and Mannville plays
- The Horseshoe Canyon, as a commercial play is most profitable and it shows a slow decline over time
- The Mannville, despite its constraints, could potentially be commercial, but initial costs are high
- Once constraints are dealt with, the Canadian CBM industry is slated to be profitable for 20-40 years, by which time we expect that production in the Ardley would be commercial

## Phase 2-Analysis of CBM Development in Canada

### Summarized Project Description:

- Collection and analysis of production data from various stakeholders
- Collection and analysis of pressure and gas content data
- Collection and analysis of costs data
- Final analysis to participants following industry review

### Participants:

- Industry and government

### Cost of Study/participant:

- TBD

*If your company would like to participate in either of these projects, please talk to me after the presentation, or you can reach me at (403) 542-3557 or by e-mail [bettina@phasis.biz](mailto:bettina@phasis.biz)*

## Comparative Analysis of International CBM Production

### Summarized Project Description:

- Collection, review and characterization of global CBM production
- Collection and identification of technologies being used globally in the successful global development of CBM
- Assessment of constraints and solutions associated with CBM development globally
- Prepare a comparative analysis of findings to stakeholders

### Participants:

- Industry and government

### Cost of Study/participant:

- TBD

*If your company would like to participate in either of these projects, please talk to me after the presentation, or you can reach me at (403) 542-3557 or by e-mail [bettina@phasis.biz](mailto:bettina@phasis.biz)*

Questions?

**Thank You!**

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