Technologies, Markets and Challenges for Development of the Canadian Oil Sands Industry

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Canadian Oil Sands: Technologies, Markets and Challenges

- A promising supply of crude oil
- Facing major development challenges
- And high and sensitive supply costs

Paper and cost model accessible on-line:

Source: Canada National Energy Board, 2006
A sneak peek at oil sands: fast historical growth and optimistic outlook

NEB ‘base case’ scenario: with CAPEX capped at 2006 level,

output to double by 2015
(1.2 to ~2.5+ mbbl/d)

Source: Canada National Energy Board, 2006
Current technologies create scale challenges for the industry

2-5 bbl of water input

~0.15 boe NG input

1 bbl of SCO

100-150 kg CO2 output

+12 to +16% more than conventional crude oil

Need for R&D and technological disruptions in the industry

Access to markets is key for further development

- **Downstream markets are saturated**
  - Pipeline capacity not expanding in the short run
  - Investments needed for refineries to adapt to changing slate

- **Inputs supply is constrained in the near future**
  - Growing demand for NG vs. declining WCSB supply
  - Growing demand for condensate (pipeline lines reversal)

*Need for concerted action between regulators and the industry*

Local and global impacts are a major regulatory issue

- **CO2 is a major regulatory challenge:**
  - Oil sands are the fastest growing emission source in Canada (3% of national total today, forecast: 8% by 2012)
  - Regulatory risk for the industry

- **Stress on local infrastructure is high**
  - Soaring costs of oil sands investment (shortage of construction capacity, qualified workforce, ...)
  - Considerable stress on infrastructure (roads, housing, grid...)
  - Taxation system still creates incentives for investment

Need for optimal regulation

Oil sands supply costs are high and growing

Computation based on assessment of historical cost parameters

Current price run-up likely to increase the cost outlook for “green-field” development

Oil sand supply costs are subject to volatility

Scenarios based on historical volatility of main cost parameters

- **SAGD (bitumen)**: \(-$8/+$12\) p. bbl
- **SAGD/Upgr. (SCO)**: \(\pm$7/bbl\)
- **Mining/Upgr. (SCO)**: \(\pm$6/bbl\)

**SAGD bitumen production is most exposed to condensate price changes**

**Long run supply costs are most exposed to NG price and exchange rate changes**

Further research: the behavior of heavy oil markets

- Impact of oil sands development on the **light-heavy spreads**?
- Current work: **co-integration** and **VEC models** of heavy crude markets

Source: Bloomberg
Key take-away on the Canadian oil sands:

- Promising resource for crude oil supply…
- … But major industrial development challenges…
- … And high and sensitive supply cost

Questions?

Paper and cost model accessible on-line: