Canadian Petroleum Growth and Development
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Overview

• Introduction
• Canadian Conventional Oil Production and Forecast
• Canadian Oil sands Production and Growth
• Markets, Pipe lines and Refining
• Conclusion
Introduction

- Canada is the 8th largest Crude Oil producer in the world with 3.1 MMb/d production (CAPP)
- Total oil Reserves are estimated at 178.8 billion barrels as of Jan. 2006 (EIA)
- The most politically stable oil rich country
- Geographically close to the biggest oil market
Canadian Conventional Oil Reserves

- Conventional reserves are estimated to be at 5.2 billion barrels (CAPP)
- WCSB that include Alberta and Saskatchewan has the highest reserves (2.97 billion barrels)
- East Coast Offshore reserves (1.71 billion barrels)

Canadian Conventional Oil Production-2005 (CAPP)

- Conventional production was 552 MMbls
- CSB is the largest producing region (379 MMbls)
- East Coast Offshore production (111 MMbls)
- The conventional crude oil production is declining at rate of 4-5% annually
Natural Resources & Energy Specialization

Canadian Conventional Oil Data-2005

Conventional Crude Oil & Equivalent Remaining Established Reserves in Canada
2005

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<td>Crude Oil</td>
<td>22,992</td>
<td>1,921</td>
<td>1,976</td>
<td>2,076</td>
<td>2,107</td>
<td>2,161</td>
<td>2,216</td>
<td>2,271</td>
<td>2,326</td>
<td>2,381</td>
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<td>2,606</td>
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<td>Pentanes Plus</td>
<td>4,377</td>
<td>4,022</td>
<td>4,092</td>
<td>4,180</td>
<td>4,250</td>
<td>4,320</td>
<td>4,390</td>
<td>4,460</td>
<td>4,530</td>
<td>4,600</td>
<td>4,670</td>
<td>4,740</td>
<td>4,810</td>
<td>4,880</td>
<td>4,950</td>
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<td>Total Pentanes Plus</td>
<td>4,577</td>
<td>4,226</td>
<td>4,306</td>
<td>4,417</td>
<td>4,550</td>
<td>4,620</td>
<td>4,700</td>
<td>4,780</td>
<td>4,860</td>
<td>4,940</td>
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<td>5,080</td>
<td>5,150</td>
<td>5,220</td>
<td>5,290</td>
<td>5,360</td>
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Canadian Conventional Oil Forecast

Conventional Oil Forecast (CAPP)

Natural Resources & Energy Specialization
Canada’s Oil Sands

- Secure, abundant and large crude oil resource in the world
- All of Canada’s bitumen estimated at 1.7 – 2.5 trillion barrels
- Canada holds 60% of investable oil resources as per CIBC

Shell, Western and Chevron Oil Sands Mine
Oil Sands Production

- Current oil sands production is 1.1 million Bbls/day
- Future oil sands production to reach 4.7 million Bbls/day
- Oil Sands projects take about 4 to 6 years to build
- Oil is extracted from the oil sands using surface mining and in-situ processes (SAGD and CSS)

Oil Sands vs. Conventional Oil Production

Chart 1: Canadian Crude Oil Production Forecast

Natural Resources & Energy Specialization
Oil Sands Costs & Profits

- Capital costs to produce 100,000 Bbls/day is in the range of US$7.60 -10.20 billion
- Operating costs are in the range of US$16.20 –18.70 per barrel
- Oil sands profit range from 10-17.5% at NYMEX crude oil prices of US$30 – 50 per barrel
Oil Sands Challenges & Risks

- Lower crude oil prices
- Skilled labor, adequate infrastructure and Royalties
- Higher capital and operating costs
- Environmental issues – GHG and reclamation
- Technological developments
- Delays in construction schedules

Oil Sands Environmental Issues
Refining, Pipelines and Markets

- Canada exports 2.1 MMbbl/d of crude oil to the US (EIA-2005)
- 1.59 MMbbl of the crude oil exports were from Western Canada (CAPP)
- Traditional markets for western Canadian crude are western Canada, Ontario, US Midwest, US Rockies (3 MMbbl/d demand)

Refining

Capacity of Canada’s Refineries (Source CAPP)
Refining

Estimated domestic sales of refined products (Source CAPP)

Natural Resources & Energy Specialization

Pipelines

- There are three major pipelines exporting crude from western Canada to the US
  - Enbridge (2.0 MMbbl/day)
  - Terasen Trans Mountain (282 MMbbl/day)
  - Terasen Express (225 MMbbl/day)
- A shortfall of 1 MMbbl/day pipeline capacity is expected by 2015 (NEB)
Pipelines

Major Oil Pipeline Network to US (Source CAPP)

Natural Resources & Energy Specialization

Pipelines

NEB Supply Forecast and Proposed Pipeline Projects and Timing

Alberta Clipper
Dehleri
Kayenta Expansion
Southwest Ontario
To Western Canada
Athabasca
Kayenta
Southwest Lights
Tank
Supply

1 The pipeline projects are listed alphabetically. Construction dates are proposed by the project sponsors.
2 Ethane in Canada.
3 Total pipeline capacity not out of the WCSB.
Extended Markets

- Extended markets for Canadian crude are
  - The Lower Midwest (lower PADD II)
  - Washington State (PADD IV)

- Highly competitive markets due to dependency on pricing parity

Potential Markets

- Potential Markets are
  - California (PADD V) with 1.5 MMbbls/d demand
  - US Gulf Coast with 6.5 MMbbls/d demand
  - South East Asia
Conclusion

- Conventional oil is declining and future oil supply will be from the OIL SANDS
- The refineries focus should change from Light/Heavy conventional oil to medium sour crude (SYNBIT)
- Pipe line capacity is currently sufficient however growth in oil sands production will need additional 1 MMbbl/d by 2020
- Canada should reach new markets to export new supplies

For more information

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