U of A – Houston Presentation

Canadian Petroleum Growth and Development

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Natural Resources & Energy Specialization

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Overview

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

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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**

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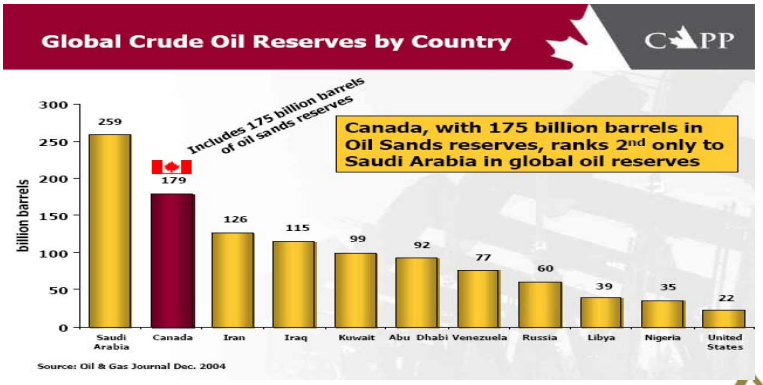
Introduction



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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)**

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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**

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Canadian Conventional Oil Data-2005

CONVENTIONAL CRUDE OIL & EQUIVALENT
REMAINING ESTABLISHED RESERVES IN CANADA
2005
Thousand Cubic Metres

	Remaining Reserves at 2004-12-31	2006 Gross Additions *	2006 Net Production *	Remaining Reserves at 2006-12-31	Net Change in Reserves during 2006
CRUDE OIL					
Conventional Areas					
British Columbia	22 162	1 237	1 928	21 471	-691
Alberta	276 632	27 193	33 060	270 766	-5 867
Saskatchewan	187 502	34 264	24 516	197 251	9 749
Manitoba	3 861	893	812	3 942	81
Ontario	1 947	-214	138	1 595	-352
Quebec	0	-	-	0	0
New Brunswick	0	-	-	0	0
Mainland Territories	6 788	-	1 089	5 699	-1 089
Eastcoast Offshore	138 699	151 951	17 885	272 765	134 166
TOTAL	**837 991**	**215 224**	**79 227**	**773 988**	**136 997**
Frontier Areas					
Mackenzie/Beaufort	53 960	-	-	53 960	0
Arctic Islands	0	-	-	0	0
TOTAL	**53 960**	**0**	**0**	**53 960**	**0**
TOTAL CRUDE OIL	**891 941**	**215 224**	**79 227**	**827 938**	**136 997**
PENTANES PLUS					
Conventional Areas					
British Columbia	6 477	629	466	6 640	163
Alberta	53 536	9 076	8 830	53 782	246
Saskatchewan	262	61	76	247	-15
Manitoba	0	-	-	0	0
Mainland Territories	2 731	-	65	2 676	-65
Eastcoast Offshore	7 446	-	185	7 363	-185
TOTAL PENTANES PLUS	**70 552**	**9 766**	**9 612**	**70 708**	**154**
TOTAL CRUDE OIL & EQUIV.	**782 486**	**224 990**	**88 839**	**898 646**	**136 151**

* Preliminary estimate. Corrections to previous year cumulative production included with gross additions

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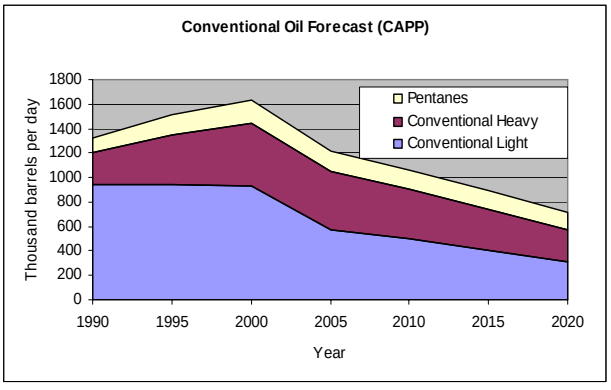
Canadian Conventional Oil Forecast



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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 investbale oil resources as per CIBC**

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Shell, Western and Chevron Oil Sands Mine

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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)**

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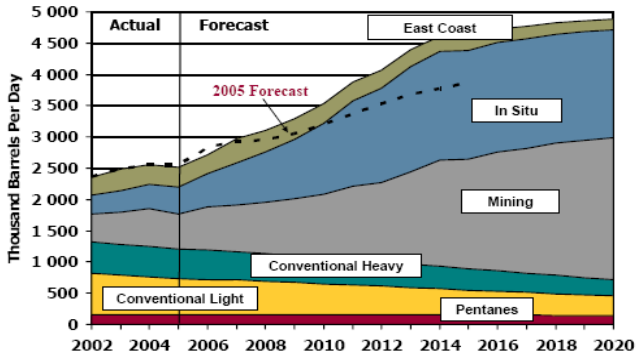
Oil Sands vs. Conventional Oil Production

Chart 1: Canadian Crude Oil Production Forecast



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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**

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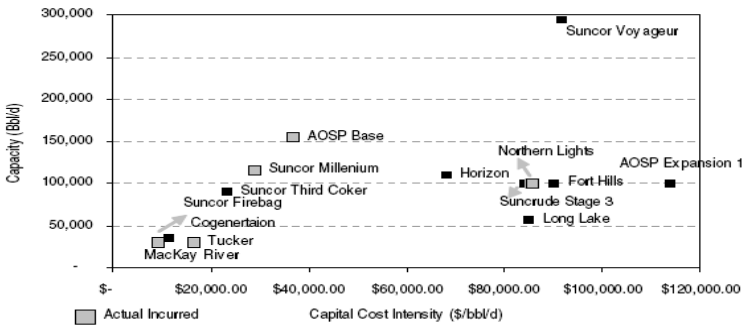
Oil Sands Capital Costs Intensity Trends



Source: CIBC World Markets Inc.

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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**

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Oil Sands Environmental Issues

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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**

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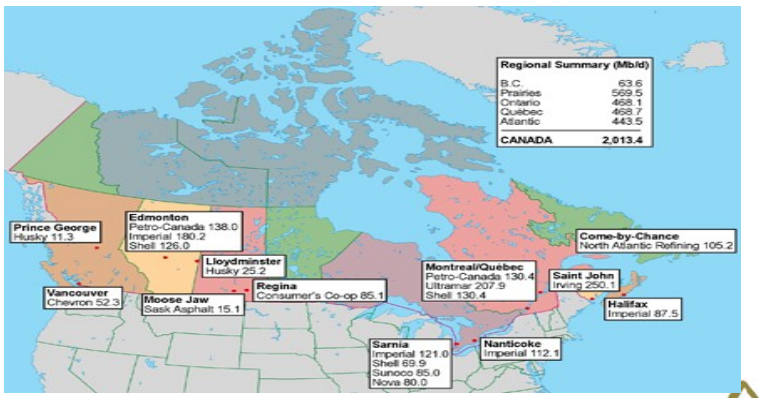
Refining



Capacity of Canada's Refineries *(Source CAPP)*

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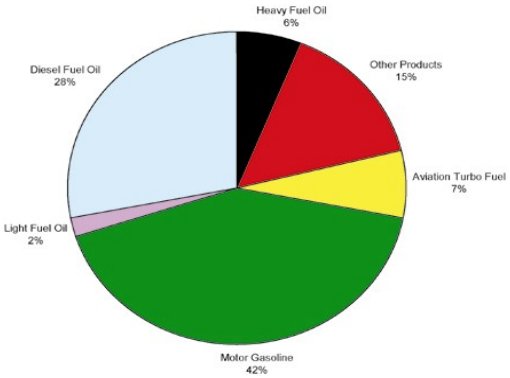
Refining



Estimated domestic sales of refined products *(Source CAPP)*

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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)**

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Pipelines

Major Oil Pipeline Network to US *(Source CAPP)*

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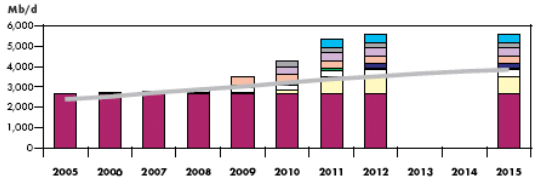
Pipelines

NEB Supply Forecast and Proposed Pipeline Projects and Timing



1 The pipeline projects are listed alphabetically. In-service dates are proposed by the project sponsors
2 Edmonton to Cromer
3 Total pipeline capacity out of the WCSB

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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 MMbls/d demand**
  - **US Gulf Coast with 6.5 MMbls/d demand**
  - **South East Asia**

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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 id 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**

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For more information

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