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Powerful Thinking

Update On Alberta Oil Sands Projects: Keeping Things In Perspective

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Canada Think Day

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OUTLINE

- **The Global Role of Canadian Oil Sands**
  - **where do they fit in global non-conventional**
  - **how competitive are they, cost & quality**
  - **what part can they play in global balances**

- **Types of Oil Sands Development**
  - **mining of shallow reserves (3 current,**
  - ***in situ* bitumen recovery (CSS + Sag-D + ?)**
  - **other Canadian deposits – Sask. *in situ***

Non-Conventional Oils

- It's not just Canadian tar sands
  - heavy oils and bitumens
  - other tar sands – Venezuela
  - oil shales – US, Australia, Baltics, Morocco
- Resources - what's there affects cost/financing
- Technology & experience a positive
- Location matters – spread of op. costs & gov't takes, market and quality issues
- Oil prices, differentials a key revenue factor
- Environmental policy a major threat to costs

Global Spread of Resources

- Extra-hvy crude and bitumen being produced in Calif., W. Canada, Venezuela.
- Kazakhstan, Madagascar also have resources
- IEA estimates 4.3 billion bbl resource base for extra-heavy and bitumen
- Shales in Australia, Estonia, Brazil, US

  - didn’t work in Colorado
- Maybe big resource in China, Russia, India?
- Opportunities for technology sharing

Competitive Ordering

- Heavy conventional oil
  - 10-25° API
  - New heavier fields, North Sea & elsewhere
- Extra-heavy conventional (<10°) - Calif.
- Bitumens - Western Canada
- Other Tar Sands
- Coal-to-Gas, Coal-to-Liquids
- Shale Oils

Unlike Conventional Upstream

- No exploration risk
- High initial costs, very long recovery period
- More like large industrial projects
- Different skill mix, different materials needs

Profitability of Non-Conventional

- **Profitability depends on:**
  - unit price
  - minus government take
  - minus op. costs (inc. cap. recovery)
- **Non-conventionals competitiveness**
  - conventional price greatest risk to all
  - government takes/subsidies in play
  - risk of differential environmental costs

Key Financial Issues

- Local labor a major cost issue
- Climate raises equipment cost
- Suncor & Syncrude set the standard
- Suncor expansion working fully
- Syncrude expansions underway
- Threat of project overload late in the decade

Role of New Technologies

- For Canada, how to make material mobile with less heat to lower gas requirements
  - improved efficiency in heat generation
  - creating heat with residuum rather than gas
  - use of other hydrocarbons like propane (Vapex)
- Besides recovery technologies, improved upgrading, blending and refining are needed
- Economic carbon sequestration has double benefit (Saskatchewan Weyburn project)

Environment & Competitiveness

- Will heavy oils be part of the solution (H_2 source) or part of the problem (more CO_2)?
- Need hydrogen/heat to split out useful oils
- Huge amounts of carbon involved
- Problems with air and water pollution
- Recent big cost overruns in Canada troublesome; not just labor costs?

Quality Issues

- SCO no tops, no bottoms, fat middles
- Nearby US markets want light ends for gasoline heavy ends for asphalt
- US refining equipment set up for more complicated crudes, esp. Calif.
- Asian markets much better fit due to strong middles in product slate & simple refineries + tightening stds

Outlook For Canadian Oil Production 2006 and Beyond

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Canadian Oil Outlook for 2006

						Annual Changes		
1,000 b/d	Q1 '06	Q2 '06	Q3 '06	Q4 '06	2006	2006	2005	2004
Mined Synthetics	632	638	740	683	674	+148	-100	+125
In Situ Bitumen	502	490	501	523	504	+45	+93	+5
Eastern Offshore Crude	388	381	401	414	396	+78	-4	-24
Other Canada*	1,737	1,635	1,633	1,663	1,667	-62	-52	-4
Canada	3,259	3,144	3,276	3,283	3,240	+209	-63	+101

***including NGLs and Other**

Source,* Oil Market Intelligence, *March 2006 (forthcoming).

2006 Bounce, A Last, Last Hurrah

2006 Non-Opec Oil Production Outlook

1,000 b/d	Q1'06	Q2'06	Q3'06	Q4'06	2006	Changes 2006	Changes 2005
FSU	11,684	11,993	12,177	12,450	12,078	+575	+359
Africa	4,041	4,171	4,364	4,445	4,257	+559	+286
So. & C. Amer.	4,369	4,570	4,612	4,643	4,549	+316	+212
North America	14,394	14,374	14,297	14,667	14,433	+324	-505
North Sea	5,355	5,218	4,766	5,375	5,177	-50	-469
Asia	6,901	6,761	6,769	6,850	6,820	-19	+146
Other Europe	570	566	561	557	563	-32	-7
Non-Opec ME	1,632	1,598	1,564	1,540	1,583	-68	-44
Processing Gains	1,920	1,890	1,875	1,920	1,901	+53	+14
Total Non-Opec	**50,868**	**51,140**	**50,986**	**52,446**	**51,363**	**+1,657**	**-6**

***Source*, Oil Market Intelligence, *March 2006 (forthcoming)*.**

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2006 North American Oil Supply

North America						Annual Changes		
1,000 b/d	Q1 '06	Q2 '06	Q3 '06	Q4 '06	2006	2006	2005	2004
US Gulf Crude	1,384	1,535	1,532	1,792	1,562	+278	-175	-45
Alaska Crude	850	850	766	797	816	-93	-48	-62
Other Lower 48*	5,083	5,059	5,024	5,088	5,063	-60	-157	-45
US	**7,317**	**7,445**	**7,321**	**7,677**	**7,441**	**+125**	**-379**	**-152**
Mined Synthetics	632	638	740	683	674	+148	-100	+125
In Situ Bitumen	502	490	501	523	504	+45	+93	+5
Eastern Offshore Crude	388	381	401	414	396	+78	-4	-24
Other Canada*	1,737	1,635	1,633	1,663	1,667	-62	-52	-4
Canada	**3,259**	**3,144**	**3,276**	**3,283**	**3,240**	**+209**	**-63**	**+101**
Offshore Crude	2,790	2,780	2,752	2,765	2,772	+14	-71	+15
Other*	1,027	1,005	948	942	980	-24	+9	+21
Mexico	**3,818**	**3,785**	**3,700**	**3,707**	**3,752**	**-11**	**-62**	**+36**
Total	**14,394**	**14,374**	**14,297**	**14,667**	**14,433**	**+324**	**-505**	**-15**

****including NGLs and Other***

Source, Oil Market Intelligence, *March 2006 (forthcoming)*.

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Medium-Term Supply Outlook

Non-Opec Supply 1995-2015

1,000 b/d	2000	2005	2010	2015	Avg. Ann. Chg. '00-'05	'05-'10	'10-'15
Growth Areas							
FSU	7,918	11,504	14,189	18,597	+7.8%	+4.3%	+5.6%
Africa	2,824	3,694	4,402	5,302	+5.5%	+3.6%	+3.8%
So. & C. Amer.	3,645	4,066	4,927	5,160	+2.2%	+3.9%	+0.9%
Mature Areas							
North Sea	6,309	5,203	4,569	3,128	-3.8%	-2.6%	-7.3%
Non-Opec Mideast	1,976	1,626	1,325	998	-3.8%	-4.0%	-5.5%
Asia	6,234	6,542	6,592	5,216	+1.0%	+0.2%	-4.6%
Onshore Europe	603	596	455	377	-0.3%	-5.2%	-3.7%
North America	14,131	13,887	14,986	13,689	-0.3%	+1.5%	-1.8%
Processing Gain	1,715	1,865	2,350	2,900	+1.7%	+4.7%	+4.3%
Total Non-Opec	**45,354**	**48,982**	**53,796**	**55,367**	**+1.6%**	**+1.9%**	**+0.6%**

Source: Energy Intelligence Research

North American Oil Production

1,000 b/d	2000	2005	2010	2015	'00-'05	'05-'10	'10-'15
US							
Alaska	1,030	909	625	390	-2.5%	-7.2%	-9.0%
Lower 48 States	3,397	2,983	2,179	1,436	-2.6%	-6.1%	-8.0%
Gulf of Mexico	1,419	1,281	1,875	2,000	-2.0%	7.9%	1.3%
NGLs	1,910	1,709	1,787	1,575	-2.2%	0.9%	-2.5%
Other HCs	397	439	375	290	2.0%	-3.1%	-5.0%
Total	**8,153**	**7,320**	**6,841**	**5,691**	**-2.1%**	**-1.3%**	**-3.6%**
Canada							
Alberta/Sask. Conv.	1,164	981	783	606	-3.4%	-4.4%	-5.0%
Alberta Bitumen	288	456	1,073	1,274	9.7%	18.6%	3.5%
Other Onshore	85	63	54	44	-5.8%	-2.9%	-4.3%
Eastern Offshore	145	318	420	441	17.0%	5.7%	1.0%
Synthetics	316	525	1,351	1,773	10.7%	20.8%	5.6%
NGLs	696	693	712	643	-0.1%	0.6%	-2.0%
Total	**2,694**	**3,035**	**4,393**	**4,781**	**2.4%**	**7.7%**	**1.7%**
Mexico							
Offshore	2,385	2,758	2,690	2,370	2.9%	-0.5%	-2.5%
Southern Onshore	549	496	400	318	-2.0%	-4.2%	-4.5%
Northern Onshore	77	84	65	41	1.6%	-4.9%	-9.0%
NGLs	438	429	325	265	-0.4%	-5.4%	-4.0%
Total	**3,450**	**3,767**	**3,480**	**2,993**	**1.8%**	**-1.6%**	**-3.0%**
Total North America	**14,296**	**14,123**	**14,714**	**13,466**	**-0.2%**	**0.8%**	**-1.8%**

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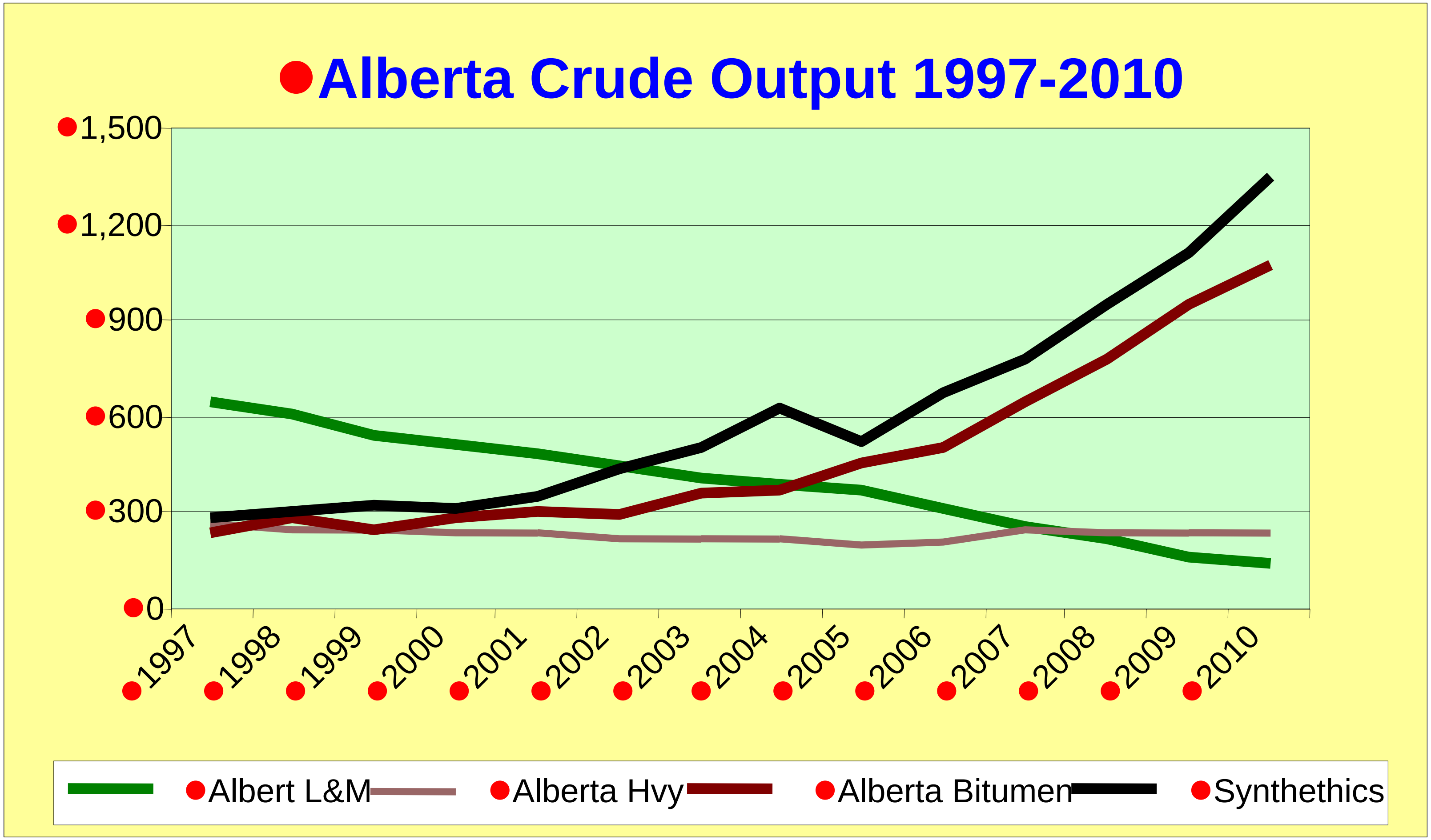
Canadian Oil Sands Growth



Source: EIG*, Oil Market Intelligence, *March 2006

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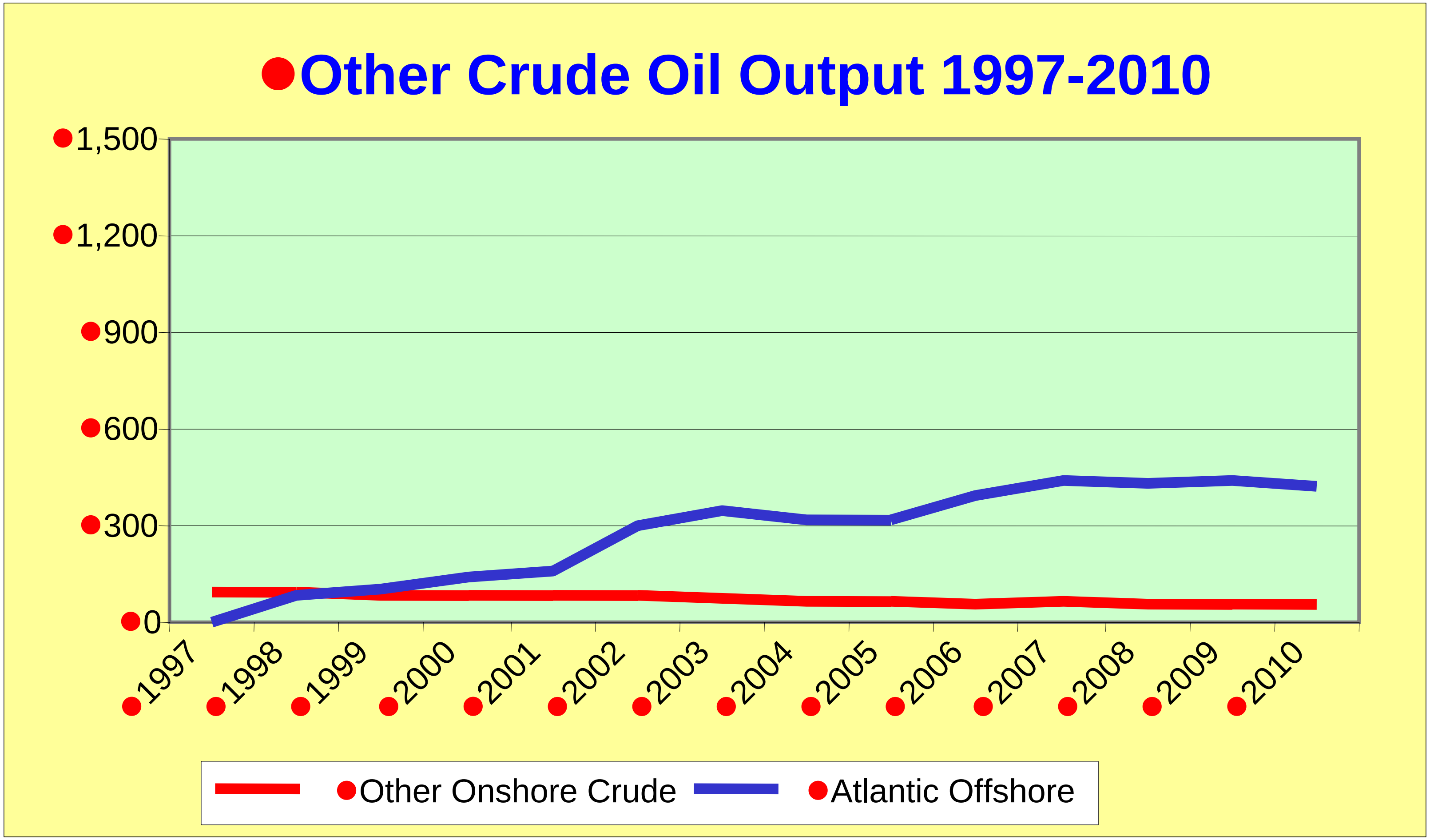
Other Canadian Crude



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Canadian Mining & *In Situ* Projects

Field/Mine	Operator	2006	2010	2015
Oil Sands				
Suncor	Suncor	235	375	400
Steepbank Mine		105	125	125
Millenium		130	125	125
Voyageur			125	150
Syncrude	Syncrude	300	496	578
Mildred Lake		140	160	160
Aurora 1		80	120	120
Aurora 2		80	85	85
Aurora 3 +			131	213
Athabasca Oil Sands	Shell et al	175	325	525
Horizon	CNR		155	270
Total Synthetics		710	1,351	1,773
Bitumen				
Cold Lake	Exxon	195	215	215
Phase 1-10		150	145	145
Phase 11-13		45	40	40
Phase 14-16			30	30
Primrose/Wolf Lake	CNR	95	135	135
Hnaging Stone	Japan Can. O.S.	15	60	60
Foster Creek	EnCana	70	90	90
MacKay	Petro-Canada	30	30	30
Christina Lake	EnCana	40	70	70
Firebag	Suncor	25	100	150
Long Lake	Nexen		50	50
Surmont	Conoco/Total		75	75
Orion	Black Rock		20	20
Meadow Creek	Petro-Canada		80	80
Kearl Lake	Husky		88	100
Horizon SAGD	CNR		40	70
Other		40	20	20
Total Bitumen		510	1,073	1,165
Total Syncrude + Bitumen		1,220	2,424	2,938

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