Alberta’s Energy Markets:
Opportunities and Challenges

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Key Issues of the Day

- **Uncertainties in Europe**
  - Greek elections
  - GDP expected to shrink 0.4% in 2012

- **Economic uncertainties in the US**
  - GDP in Q1 revised from 2.2% to 1.9%
  - Jobless rate up in May

- **Iran**
  - Under pressure to stop nuclear program (civilian or nuclear?)
  - Co-operating with inspectors?

- **Slowing growth in Asian Pacific?**
  - China’s Purchasing Managers Index was weak in May.
  - GDP at 7.9% in Q1 – slowest quarter in 13 years

- **Increased crude oil supplies**
  - IEA: global production up 200,000 bpd (91.1 million) in May
The world will continue to need oil for decades to come. Supply depends on:

- Oil sands (Unconventional oil)
- Fields to be found
- Fields to be developed
How is Alberta Positioned to Meet the World’s Energy Demands?

Overview of Alberta’s Crude Oil and Natural Gas Resources
Oil and Gas Investment in Alberta

Total Oil and Gas Investment in Alberta
(1998 - 2011)

Total Cumulative investment: $330 Billion
Over 50% of Total Investment in Alberta

Data Source: Statistics Canada
Alberta’s Natural Gas Resources

World Proved Natural Gas Reserves (Tcf):
- Russia: 1,680
- Iran: 1,046
- Qatar: 896
- Saudi Arabia: 276

Global Natural Gas Production (Bcf/d):
- United States: 59.1
- Russia: 57
- Canada: 15.5
- Iran: 13.2

Alberta’s Natural Gas Industry is Well Placed with Abundant Resource Opportunities

Source: Energy Resource Conservation Board, Petrel Robertson, Gas Technology Institute (GTI)

GIP: Gas in Place is the total gas volume believed to be contained in the reservoir.
NGC: Natural gas from coal (CBM)
Source: Canadian Society for Unconventional Gas
Alberta’s Crude Oil Proved Reserves

Alberta’s Oil Sands represent more than half of the world’s oil resources that are easily accessible

Source: Oil & Gas Journal. December 2010
* Excluding one-half of the reserves in the Neutral Zone.
Can Alberta Deliver its Energy Resources to the World?

Overview of Alberta’s Crude Oil and Natural Gas Markets
Current Alberta Natural Gas Markets

LNG Projects (7 Bcf/d):
1. Shell Project
2. BG
3. Kitimat LNG
4. Shell LNG
5. Douglas Island

Alberta production in 2010: 11.5 (bcf/d)

Alberta Disposition – 2010

<table>
<thead>
<tr>
<th>Market</th>
<th>Bcf per Day</th>
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<tbody>
<tr>
<td>PADD 1</td>
<td>0.26</td>
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<tr>
<td>PADD 2</td>
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<tr>
<td>PADD 3</td>
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<tr>
<td>Western Canada</td>
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<tr>
<td>Total</td>
<td>7.63</td>
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New Shale Gas Production Impeding on Alberta’s Traditional Eastern Markets

Legend
Light Blue – WCSB Gas Production
Dark Blue – US Gas Production
Source: Source: WoodMcKenzie 2009 ; ERCB 2010,
Global Landed LNG Prices

NATURAL GAS OVERVIEW: WORLD LNG PRICES

Federal Energy Regulatory Commission • Market Oversight • www.ferc.gov/oversight

WORLD LNG ESTIMATED JUNE 2012 LANDED PRICES

May 2012

Updated: May 19, 2012
Current Alberta Crude Oil Markets

<table>
<thead>
<tr>
<th>Market</th>
<th>Alberta Exports (Barrels Per Day 000’s)</th>
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<tbody>
<tr>
<td>PADD 1</td>
<td>55</td>
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<tr>
<td>PADD 2</td>
<td>1,237</td>
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<tr>
<td>PADD 3</td>
<td>119</td>
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<td>PADD 4</td>
<td>237</td>
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<td>PADD 5</td>
<td>205</td>
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<tr>
<td>Eastern Canada</td>
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<tr>
<td>Western Canada</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>2,271</td>
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</tbody>
</table>

Source: CAPP – 2011
Crude oil Market Outlook

Alberta’s Crude Oil Market Limited to U.S. Mid West – Huge Potential in U.S. Gulf Coast
North American demand for heavy crude oil increased over the past decade due to increased heavy crude oil refining capacity in the US and strong global economic growth. However, since the recession in 2009:

- Pipeline ruptures, refinery maintenance en route to PADD II ("A") disrupted Alberta crude oil exports into its main market.
- Increasing supplies from Bakken and heavy crude from Alberta with limited pipeline capacity to new markets/tidewater creating a glut of crude oil in Cushing (main storage hub) ("B")
Tight Oil Outlook in the US

Significant Production Growth
• From existing fields and emerging plays
• Bakken production to double to 800,000 bbls/day by 2016-18
• Tight oil plays in general could boost production to 2 million bbls/day
• Total estimated recoverable resources are more than 17 billion barrels

Tight oil impact not as profound as shale gas. Large production possible however:
• Oil is global - demand is very large
• Refineries have spent billions to process more heavy oil. Tight oil is "light"
Despite Increased Tight Oil Production, Heavy Crude Oil Still in Demand
North American Light Crude Prices Not Keeping Pace with Global (Brent) Prices

WTI, SCO and Brent price

SCO/WTI premium due to supply disruptions (Horizon outage & Syncrude turnaround)

Wood River unplanned maintenance

WTI US$/bbl  IPE BRENT US$/bbl  SCO US$/bbl
North American Heavy Crude Prices Not Keeping Pace with Global (Maya) Prices
Access to New Markets Is Critical!

Some Good News on the Horizon...
Natural Gas Access to the West/Southwest

LNG export projects:
1. Shell Project (1.0) Bcf/d
2. BG (2.0) Bcf/d

Pacific Northern Gas: Capacity = 1.1 Bcf per day
Spectra: Capacity = 2.4 Bcf per day

Proposed: Pacific Trails Capacity = TBD

0.25 bcf per day of natural gas moves from AB into BC
2.0 Bcf per day of natural gas moves into BC/US from Alberta System

LNG export projects:
1. Kitimat LNG (Apache) (0.7 Bcf/d)
2. Shell LNG capacity of 1.8 Bcf/d
3. Douglas Island (1.3 Bcf/d)

Total LNG capacity of 7 Bcf day
Kitimat and Douglas underway
BC production: 4.5 Bcf/d in year 2020.
TransCanada to build Shell’s Coastal Gas Link Natural Gas Pipeline to Kitimat

Coastal GasLink route undetermined
TransCanada says it “will take into consideration Aboriginal and stakeholder input, the environment, archaeological and cultural values, land use compatibility, safety, constructability and economics.”
TransCanada Keystone XL & Gulf Coast Project

**Existing:** Keystone (591k b/d)

**Proposed:** Keystone XL Hardisty to Cushing (700k b/d)

Proposed: Keystone XL Cushing to Gulf (500k b/d)

Now called “Gulf Coast Project” (700k b/d)
Enbridge “Gulf Coast Access Project”

**Existing:**
- Canada Mainline System (2.5 million b/d with Lakehead)
- Lakehead System (2.5 million b/d with Canada Mainline)
- Spearhead System (2.5 million b/d with Canada Mainline)

**Proposed:**
- Flanagan South (535k b/d - 2014)
- Seaway:
  - Phase 1: Reversal (150k b/d - 2012/13)
  - Phase 2: Expansion (from 150k b/d to 400k b/d - 2014)
  - Phase 3: Twinning (from 400k b/d to 850k b/d - 2014)

**New Coking Capacity:**
- WRB in Wood River
- Marathon in Detroit
- Motiva in Port Arthur
- BP in Whiting
Access to the East: Enbridge Line 9 Reversal

Currently, there is 734k b/d of pipeline capacity linking Alberta crude oil to Ontario.

In 2010, Alberta exported 252k b/d of light crude oil to Ontario (balance of capacity on pipelines filled with light barrels from Sask, Man and the Midwest

**STATUS**

Application to reverse the first section of line has been submitted to the NEB

Line 9 reversal - Phase 1: Reversal from Sarnia to Imperial Oil Refinery in Nanticoke and United Refining Company's refinery in Warren, Pennsylvania

Phase 2: Full reversal from Sarnia to Suncor refinery in Montreal

Phase 3: Reversal of Portland Montreal Pipeline which would see crude oil flow from Montreal to the seaport in Portland Maine.
Eastern Markets: More Complicated Discussion

• Refined Product Demand:
  – Demand not as strong
  – More competitive
  – Deficit situation in East Coast US?

• Crude Oil Demand:
  – Refineries are simple – can process light crude
  – Crude feed stocks are expensive
  – Cheaper feedstocks available from Bakken
Crude Oil Access to the West: Kinder Morgan TMX

Proposed: Northern Leg (after 2016) +400k bpd
- All crude oil – no RPP’s

Existing: 300k bpd

Proposed: 450k bpd expansion
Mostly crude oil and refined products

Remaining 75k bpd shipped off of Westridge docks to California

150k (from the current 300k bpd) end up in Burnaby and North Washington
Crude Oil Access to the West: Enbridge Gateway

**Proposed:** 525k bpd capacity. All crude oil (SCO, SynBit, DilBit)

**Proposed:** Condensate line from Kitimat back to Edmonton (193k bpd)
Can Alberta Deliver its Refined Products to the World?

Overview of Alberta’s Current Refined Products Market
Refining Capacity in Canada

Source: NRCa
Alberta Refined Products Refining Capacity

Alberta Refineries - Capacity
A) Imperial – 187,000 B/D
B) Suncor -135,000 B/D
C) Shell – 110,000 B/D

Trucked/Railed volumes are estimated

36,000 B/D by pipeline; 14,000 B/D by truck
38,000 B/D by pipeline; 3,000 B/D by truck/rail

Source: StatsCan, Enbridge, Kinder Morgan
Alberta Synthetic Crude Oil Refining Capacity

Alberta Upgraders – Capacity
A. Suncor – 357,000 B/D
B. Syncrude – 350,000 B/D
C. Shell Scotford – 158,000 B/D
D. Opti-Nexen – 58,500 B/D
E. CNRL Horizon – 114,000 B/D

Source: Govt Alberta Fact Sheet – April 2011; ERCB ST-98
The supply-demand deficit is growing in western Canada.

If refining capacity is not added, Western Canada demand for RPPs is forecast to exceed supply by 90,000 b/d by 2020.

Source: Statistics Canada, Purvin & Gertz
Current Alberta Refined Products Markets (Diesel, Gasoline and Jet Fuel)

Unlike Crude Oil, Alberta Has Limited Access to U.S. Mid West for its Refined Products

Source: EIA, 2011 data
Summary

• Alberta energy production and reserves among the highest in the world.
• Lack of North American transportation infrastructure impacting market access. However, some good news to the south.
• North American crude oil production increasing, however:
  – Will still need our heavy crude oil
  – Alaska/Mexican crude oil imports declining
• North American natural gas production increasing, however:
  – Drilling activity focused on liquids rich plays – crude oil
  – Environmental concerns with hydraulic fracturing
THANK-YOU