Canadian Heavy Oil Association

Alberta Oil Sands Industry Update

Presented to:
Crude Oil Quality Group (COQG)
Courtyard Marriott Hotel, Long Beach, Ca. Feb 26, 2009
Overview

- Alberta Oil Sands
  - Bitumen is still there

- Change in direction or course correction?

- Crude price impact
  - Short term vs long term

- Changes in plans
  - Who is changing what and why

- Outcome
173 billion barrels of proved oil sands reserves remain
Crude Oil Reserves – billion barrels

Source: Oil & Gas Journal, 2007
Reference: Alberta Oil Sands Strategy
CHANGES TO
THE ALBERTA OIL SANDS BUSINESS

What a difference a year makes
Have We Been Here Before?

WTI Price History - 1986 to present

Crude Oil Prices
(WTI NYMEX)
$US per barrel

$US/bbl

$ US/bbl

Jan 21/09
### Planned Alberta Investment – March 2008

#### Inventory of Major Alberta Projects

<table>
<thead>
<tr>
<th>Sector</th>
<th># Total Projects</th>
<th>Value of Projects ($millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Related</td>
<td>7</td>
<td>$83.0</td>
</tr>
<tr>
<td>Biofuels</td>
<td>17</td>
<td>$2,324.0</td>
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<tr>
<td>Chemicals &amp; Petrochemicals</td>
<td>5</td>
<td>$442.0</td>
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<tr>
<td>Commercial/Retail</td>
<td>124</td>
<td>$8,625.4</td>
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<tr>
<td>Commercial/Retail and Residential</td>
<td>14</td>
<td>$4,185.8</td>
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<tr>
<td>Forestry &amp; Related</td>
<td>2</td>
<td>$72.0</td>
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<tr>
<td>Infrastructure</td>
<td>284</td>
<td>$17,111.5</td>
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<tr>
<td>Institutional</td>
<td>211</td>
<td>$13,232.9</td>
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<tr>
<td>Manufacturing</td>
<td>1</td>
<td>$12.0</td>
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<tr>
<td>Mining</td>
<td>7</td>
<td>$2,945.4</td>
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<tr>
<td>Oil &amp; Gas</td>
<td>15</td>
<td>$4,140.0</td>
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<tr>
<td><strong>Oil Sands</strong></td>
<td><strong>52</strong></td>
<td><strong>$162,609.0</strong></td>
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<tr>
<td>Other Industrial</td>
<td>11</td>
<td>$160.4</td>
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<tr>
<td>Pipelines</td>
<td>37</td>
<td>$11,943.8</td>
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<tr>
<td>Power</td>
<td>42</td>
<td>$10,971.0</td>
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<tr>
<td>Residential</td>
<td>138</td>
<td>$6,439.3</td>
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<tr>
<td>Tourism/Recreation</td>
<td>109</td>
<td>$9,319.5</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1076</strong></td>
<td><strong>$254,917.0</strong></td>
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</tbody>
</table>

**Source:** Alberta Economic Development

Oil Sands

>$C162 billion

TOTAL

>$C254 billion
Achievable?

Industrial Construction Projects
>100 MM Cdn (2004Q3 - 2011Q3)
Generated 2007-05-31 12:32
### Inventory of Major Alberta Projects

#### Summary

<table>
<thead>
<tr>
<th>Project Sector</th>
<th>Number of Projects</th>
<th>Value of Projects ($Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Related</td>
<td>6</td>
<td>$85.9</td>
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<tr>
<td>Biofuels</td>
<td>17</td>
<td>$2,009.0</td>
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<tr>
<td>Chemicals &amp; Petrochemicals</td>
<td>6</td>
<td>$457.0</td>
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<tr>
<td>Commercial/Retail</td>
<td>112</td>
<td>$10,842.1</td>
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<tr>
<td>Commercial/Retail and Residential</td>
<td>16</td>
<td>$5,543.5</td>
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<tr>
<td>Infrastructure</td>
<td>352</td>
<td>$21,403.2</td>
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<tr>
<td>Institutional</td>
<td>232</td>
<td>$14,333.2</td>
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<tr>
<td>Manufacturing</td>
<td>5</td>
<td>$104.5</td>
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<tr>
<td>Mining</td>
<td>7</td>
<td>$2,852.9</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>10</td>
<td>$7,882.0</td>
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<tr>
<td><strong>Oilsands</strong></td>
<td>49</td>
<td><strong>$163,203.0</strong></td>
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<tr>
<td>Other Industrial</td>
<td>13</td>
<td>$241.4</td>
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<tr>
<td>Pipelines</td>
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<td>$11,487.5</td>
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<tr>
<td>Power</td>
<td>46</td>
<td>$12,410.5</td>
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<tr>
<td>Residential</td>
<td>134</td>
<td>$7,143.6</td>
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<tr>
<td>Tourism/Recreation</td>
<td>110</td>
<td>$10,728.0</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1148</strong></td>
<td><strong>$270,727.3</strong></td>
</tr>
</tbody>
</table>

*Procurement activities under direction of associated School Board

**Source:** Alberta Economic Development
Oil Sands Industry Challenges

- **Realities of the current state**
  - Oil price decline
  - Financial market turmoil – debt & equity
  - Project Costs remain misaligned with current price
    - Project deferral and cancellation

- **Ongoing**
  - Environmental performance
    - Air, water, and land
    - Public perception of industry

- **Balance – energy, environment, economy**
  - Demonstrating real improvements
Changes

- Production forecasts have been adjusted downward
  ⇒ Still growing but at a slower pace

- Minimal change in the first five years 2008-2012 period
  ⇒ Up to 300,000 barrels per day less in 2012-2017 period

- Deferrals in upgrader projects means more heavy blend and less upgraded light produced

- Deferrals are intended to bridge the current high level of uncertainty
  ⇒ financial & credit crunch
  ⇒ Cost of new facilities
  ⇒ Price of oil
  ⇒ Policy (Environmental)
Results

- Slow down of the rate of growth
  - More of sustainability focus

- The “gold rush” is over
  - High cost projects are not viable
  - Adjustment to $40 oil means not all projects will proceed

- The industry is doing a lot of “rethinking”
  - Reducing cost

- Environmental drivers
  - Greenhouse gas, CO2, water, land
    - Impact of best approach to sustainability
Announcements

- Production forecasts adjusted
- Upgrader projects withdrawn/cancelled
- Production project applications withdrawn
- Capital spending plans reduced
  - Projects extended
- Oil Sands production forecasts still strong
  - Add two years to the schedule
The update reflects announced changes to product schedules

- 300,000 barrels per day less in the forecast period
- more heavy blend and less upgraded light

**total oil sands production**
- 3.3 million BPD in 2020
- 79% of all Western Canada oil production

**mining and in-situ methods**
- will be essentially equivalent
  - 1.62 million BPD mining
  - 1.64 million BPD in-situ.

**CAPP = Canadian Association of Petroleum Producers**
4000 +/- kBPD
## Announcements

### Summary of Recent Announcements of Oil Sands Project Delays

<table>
<thead>
<tr>
<th>Project</th>
<th>Bitumen Volume (kb/d)</th>
<th>Original Stated In-service</th>
<th>News Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA Upgrader Phase 1 - 3</td>
<td>70 x 3</td>
<td>2009, 2010, 2013</td>
<td>Construction has been halted</td>
</tr>
<tr>
<td>CNRL Horizon</td>
<td></td>
<td></td>
<td>Cutting spending</td>
</tr>
<tr>
<td>Imperial Oil Kearl Phase 1</td>
<td>100</td>
<td>2010</td>
<td>Investment decision in 2009</td>
</tr>
<tr>
<td>Korea National Oil Company (KNOC) Phase 1</td>
<td>10</td>
<td>2010</td>
<td>Delayed for a year</td>
</tr>
<tr>
<td>Laricina Energy Ltd</td>
<td>1.8</td>
<td>Q3 2009</td>
<td>Delayed 17-18 months; cap changed to 600 t/d</td>
</tr>
<tr>
<td>Germain Saleski</td>
<td>1.8</td>
<td>Q4 2009</td>
<td>Delayed 6-9 months; cap changed to 1.2 kb/d</td>
</tr>
<tr>
<td>Opti Long Lake Phase 2</td>
<td>72</td>
<td>2013</td>
<td>Sanctioning subject to various factors</td>
</tr>
<tr>
<td>Patch International – Els River</td>
<td>10</td>
<td>2011</td>
<td>Project on hold</td>
</tr>
<tr>
<td>Petro-Can Fort Hills Mine Phase 1 Phase 2</td>
<td>190</td>
<td>Q4 2011</td>
<td>Decision for go-ahead will be deferred until sometime in 2009</td>
</tr>
<tr>
<td></td>
<td>130</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>Petro-Can Fort Hills Upgrader 1 Petro-Can Fort Hills Upgrader 2/3</td>
<td>165</td>
<td>2012</td>
<td>Decision on go-ahead deferred indefinitely</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>Shell Jackpine 1B</td>
<td>100</td>
<td>2012</td>
<td>Suspending expansions for now</td>
</tr>
<tr>
<td>Shell Carmon Creek (in-situ) Phase 1-2</td>
<td>50 x 2</td>
<td>2008; 2017</td>
<td>Withdrawn application due to potential changes in design change, more info to be provided in early 2009</td>
</tr>
<tr>
<td>StatoilHydro Upgrader</td>
<td>250</td>
<td>2014</td>
<td>Withdrawing application – project cancelled</td>
</tr>
<tr>
<td>Suncor Voyageur Upgrader Project</td>
<td>300 (orig = 350)</td>
<td>2012</td>
<td>Completion delayed by 1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suncor Firebag Phase 5 Phase 6</td>
<td>68</td>
<td>Q1 2012</td>
<td>Schedule flexible to mkt conditions</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>Q3 2012</td>
<td>Schedule flexible to mkt conditions</td>
</tr>
<tr>
<td>Syncrude Stage 4 Expansion</td>
<td>140</td>
<td>2015</td>
<td>Re-evaluating plans</td>
</tr>
<tr>
<td>Total Joslyn Mine</td>
<td>100</td>
<td>2013</td>
<td>May ’08 – on-stream date moved to 2014</td>
</tr>
</tbody>
</table>

*Source: CAPP*
## Production

<table>
<thead>
<tr>
<th>Bitumen Capacity</th>
<th>Mining</th>
<th>In-Situ</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>1,018</td>
<td>689</td>
<td>1,707</td>
</tr>
<tr>
<td>Construction</td>
<td>100</td>
<td>167</td>
<td>267</td>
</tr>
<tr>
<td>Approved</td>
<td>840</td>
<td>494</td>
<td>1,334</td>
</tr>
<tr>
<td>Application</td>
<td>635</td>
<td>955</td>
<td>1,590</td>
</tr>
<tr>
<td>Disclosed</td>
<td>210</td>
<td>220</td>
<td>430</td>
</tr>
<tr>
<td>Announced</td>
<td>593</td>
<td>1,106</td>
<td>1,699</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td>3,396</td>
<td>3,631</td>
<td>7,027</td>
</tr>
</tbody>
</table>

|                |        |         |       |
| suspend         | -      | 73      | 73    |
| withdrawn       | -      | 103     | 103   |
| **subtotal**    | -      | 175     | 175   |
| **TOTAL**       | 3,396  | 3,806   | 7,202 |

### Suspended:
- Suncor Firebag Phase 3 62.5 kbdp
- Connacher Great Divide 10 kbdp

### Withdrawn
- Total Joslyn Phase 3A 15 kbdp
- Shell Carmon Creek 1 37.5 kbdp
- Shell Carmon Creek 2 50 kbdp

*Source: Strategy West*
Bitumen Production

- Announced
- Disclosed
- Application
- Approved
- Construction
- Operating

Mining

In-Situ

K BPD

1000

500

0
## Bitumen Upgrading

<table>
<thead>
<tr>
<th>Upgrading Projects</th>
<th>Capacity bitumen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>1,209</td>
</tr>
<tr>
<td>Construction</td>
<td>90</td>
</tr>
<tr>
<td>Approved</td>
<td>884</td>
</tr>
<tr>
<td>Application</td>
<td>705</td>
</tr>
<tr>
<td>Disclosed</td>
<td>-</td>
</tr>
<tr>
<td>Announced</td>
<td>1,264</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td>4,152</td>
</tr>
<tr>
<td>suspended</td>
<td>210</td>
</tr>
<tr>
<td>withdrawn</td>
<td>363</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td>574</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>4,725</td>
</tr>
</tbody>
</table>

**Suspended:**
- **BA Energy – Phase 1** 54 kbdp
- **Suncor Voyageur 1** 156 kbdp

**Withdrawn**
- **Synenco Northern Lights 1** 56 kbdp
- **Synenco Northern Lights 2** 56 kbdp
- **StatOil Hydro 1** 75 kbdp
- **StatOil Hydro 2** 175 kbdp

*Source: Strategy West*
Bitumen Upgrading

Bitumen Upgrading Facilities - Status

- Operating: 1,200 kBPD
- Construction: 90 kBPD
- Approved: 883 kBPD
- Application: 705 kBPD
- Announced: 1,264 kBPD
Upgrading Bitumen

Bitumen Upgrading Facilities - Status

- Operating
- Construction
- Approved
- Application
- Disclosed
- Announced

Suspended/Withdrawn: 573 kBPD
• **Petro-Canada Fort Hills Upgrader**
  - 165 kbdupgrader (approved) Phase 1
  - 175 kbdupgrader (approved) Phase 2/3
    - *Postponed indefinitely*

• **NorthWest Upgrading**
  - Merchant upgrader
  - 50 kbdupgrader (approved) Phase 1
  - 100 kbdupgrader (approved) Phase 2/3

• **BA Energy**
  - Merchant upgrader (under financial restructuring)
• Production plans remain in place
• Less upgraded bitumen on the market
• More diluted bitumen
  ⇒ DILBIT
  ⇒ SYNBIT
• Sustainability questions
• Rethink of upgrading strategy
Western Canadian Crude Potential Markets

Market Potential for Western Canadian Crude – 2007 Actual vs 2015 Estimates

Source: CAPP
Bitumen blends

- No mined bitumen is sold as a bitumen blend
- Thermal produced bitumen must be diluted to be transportable
- Pipeline specification is viscosity (350 cSt @ 4-8 C)
- Corresponding gravity 20-22 API

Diluted bitumen

- Diluted with
  - **Naphtha (DILBIT)**
    - Natural gas condensate: 20-30%
  - **Synthetic crude oil (SYNBIT)**
    - Sweet bottomless synthetic: 50%

The diluent type has processing implications
In the Pipeline?

- **Synthetic Crude Oil**
  - Light, sweet, bottomless
    - 31 – 38 API, sulphur typically <0.2 wt%
      - Syncrude SSP, Suncor OSA, Albian Premium
      - Opti/Nexen Premium Synthetic (on stream)
      - Husky
      - CNRL Horizon
  - Heavy, sour with bottoms
    - Suncor OSB, BA Energy, Albian Heavy

- **Other Blends**
  - Controlled quality blends
    - Western Canadian Select (WCS)
      - Bitumen, conventional crude, diluent and...
The Future

- **Long term strategy**
  - 40 years supply of oil in the ground

- **Alberta Oil Sands production volumes will continue to increase**
  - Slower pace than initially envisioned

- **Product blend is shifting**
  - Upgrader project cancellations
    - Shift away from premium sweet synthetic
      - More bitumen blends

- **Infrastructure/pipeline projects continue**
  - Improved access to US and emerging markets

- **Opportunity to rethink the best upgrading strategy**
Visit the CHOA website for more information

WWW.CHOA.AB.CA