



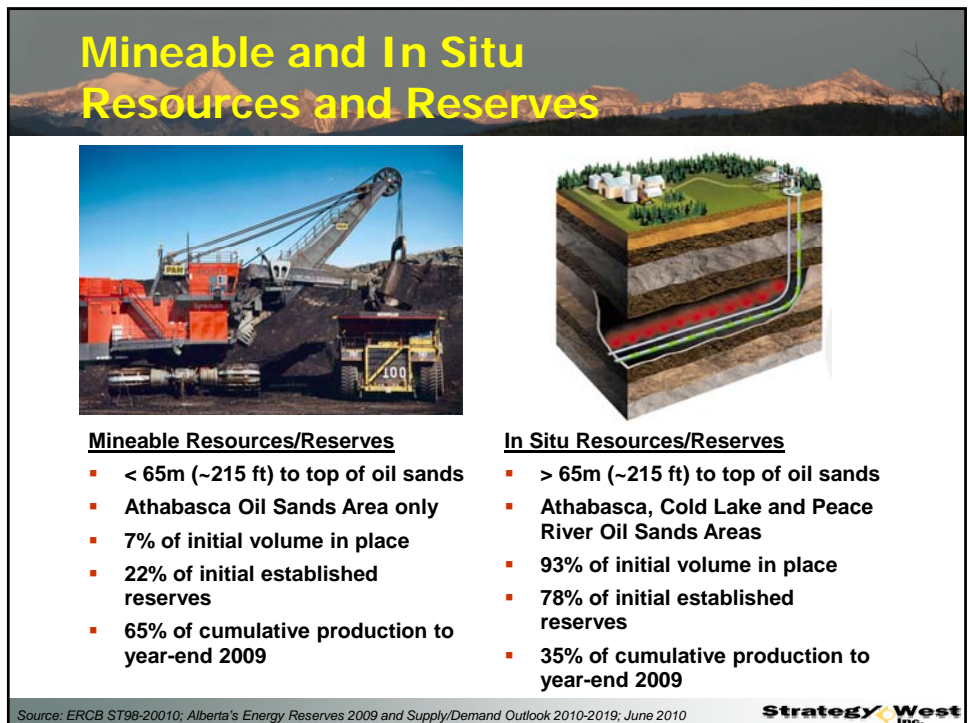
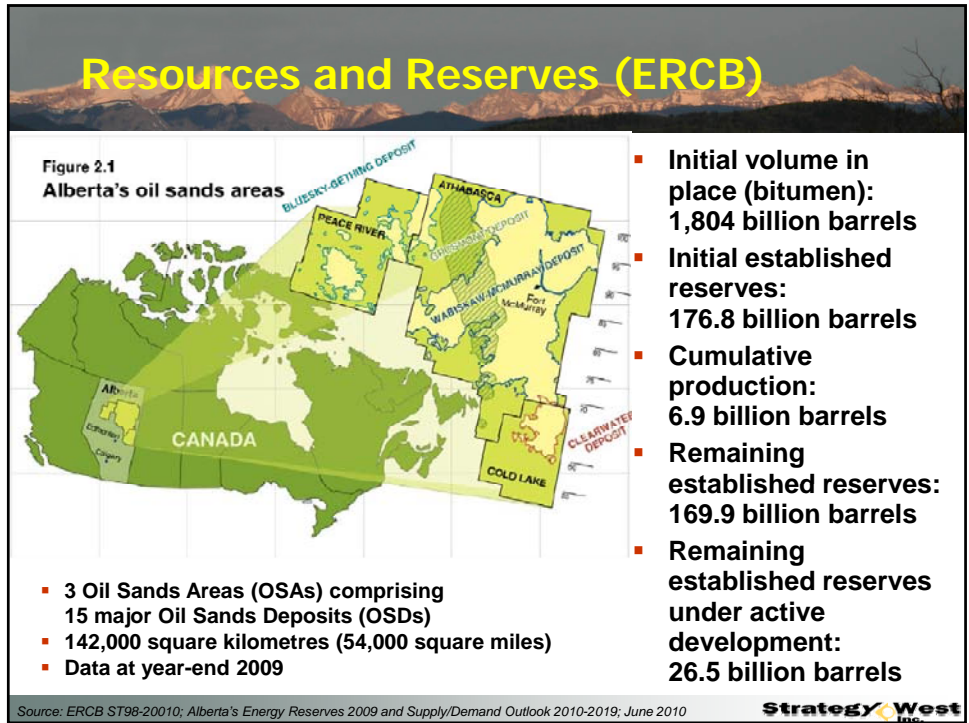
Presentation Outline

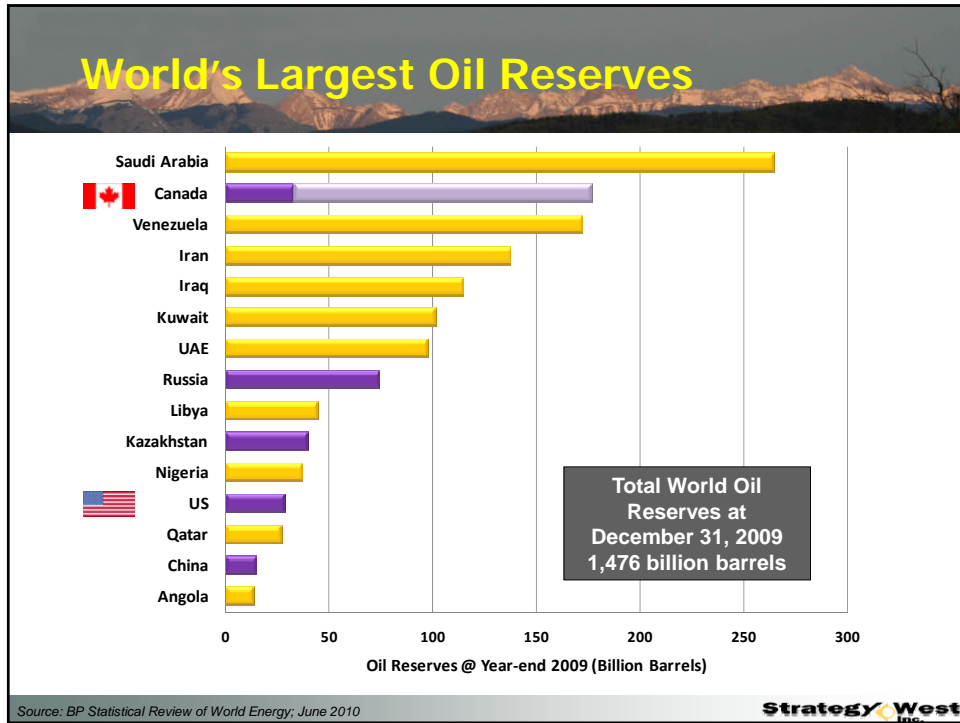
- Introduction
- Industry Overview - Resources & Reserves
- Mining & Extraction
- In Situ Recovery
- Bitumen Upgrading
- Markets
- Challenges
- Industry Outlook
- Conclusions

ALBERTA


2

Strategy West Inc.







Oil Sands to Synthetic Crude Oil



Oil Sands:
Deposits of sand, sandstone or other sedimentary rocks containing crude bitumen



Crude Bitumen:
A highly viscous mixture, mainly of hydrocarbons heavier than pentanes

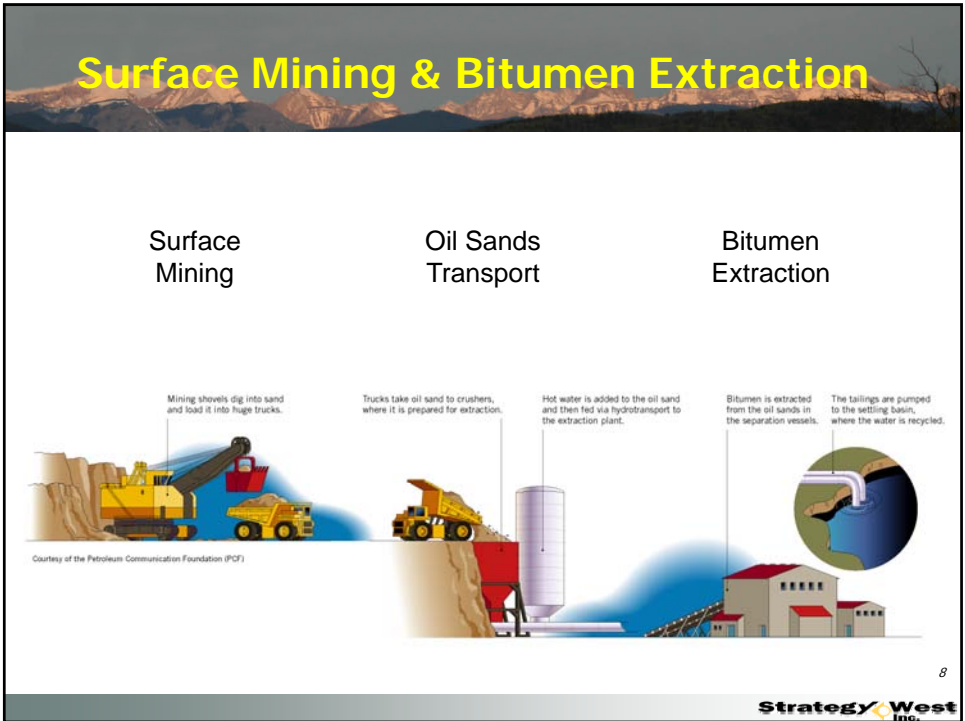
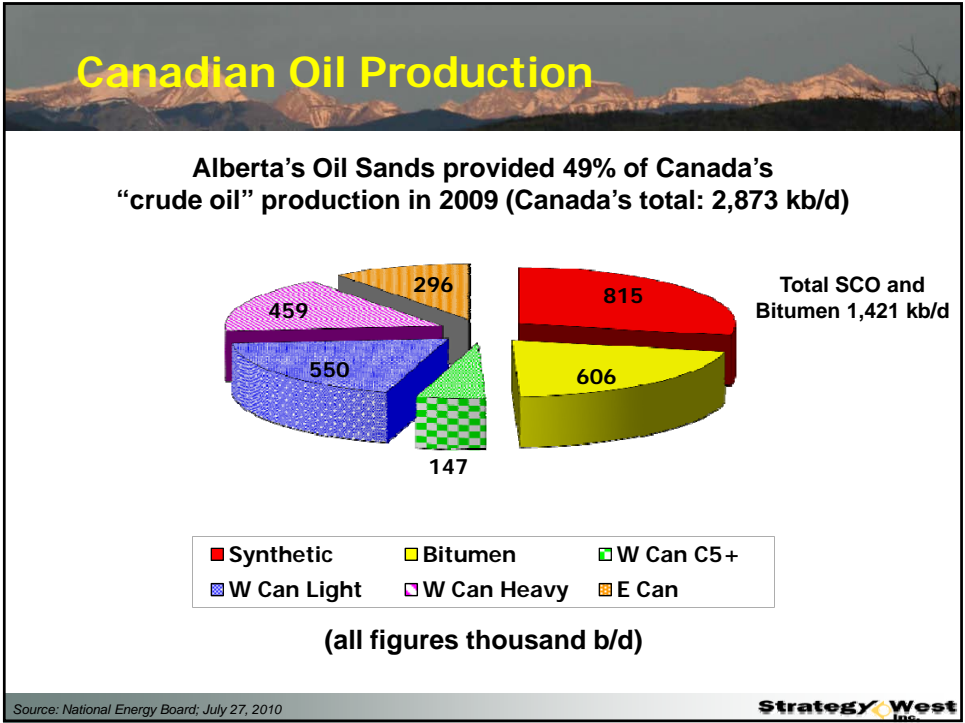


Synthetic Crude Oil:
A mixture of hydrocarbons, similar to light crude oil, that is derived by upgrading crude bitumen or heavy oil

6

Illustrations: Syncrude Canada Ltd.

Strategy West Inc.



Truck and Shovel Mining

- At the Suncor oil sands mine, huge 240 to 380 tonne trucks deliver about 500,000 tonnes of oil sand per day to the ore preparation plants



Photo Courtesy Suncor Energy Inc.

Strategy West Inc.

Albian Double Roll Crusher



Source: Shell Canada Limited

Strategy West Inc.

Albian Conveyors and Storage Silo



Source: Shell Canada Limited

Strategy West Inc.

Albian Rotary Breaker



Source: Shell Canada Limited

Strategy West Inc.

Slurry Preparation



Source: Shell Canada Limited

Strategy West Inc.

Hydrotransport



Source: Syncrude Canada Ltd.

Strategy West Inc.

14

Albian Primary Separation Vessels



15

Photo Courtesy Shell Canada Limited

Strategy West Inc.

Tailings Disposal



16

Strategy West Inc.

Reclamation Cerificates

- Reclamation is required to restore the land to an “equivalent land capability”
- Reclaimed landscape is to be capable of supporting native vegetation and wildlife
- Syncrude received the first oil sands reclamation certificate in March 2008

Gateway Hill Reclaimed Land

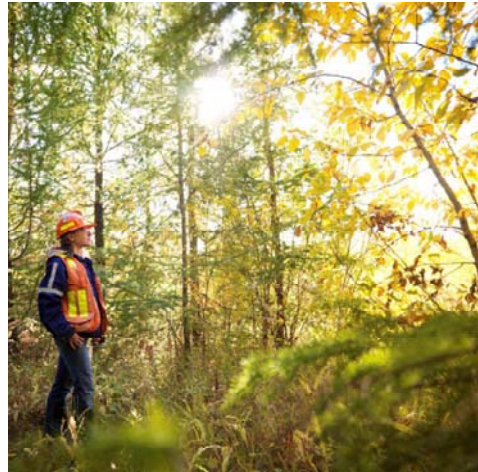


Image Source: Canadian Oil Sands Trust.

Strategy West Inc.

In Situ Recovery

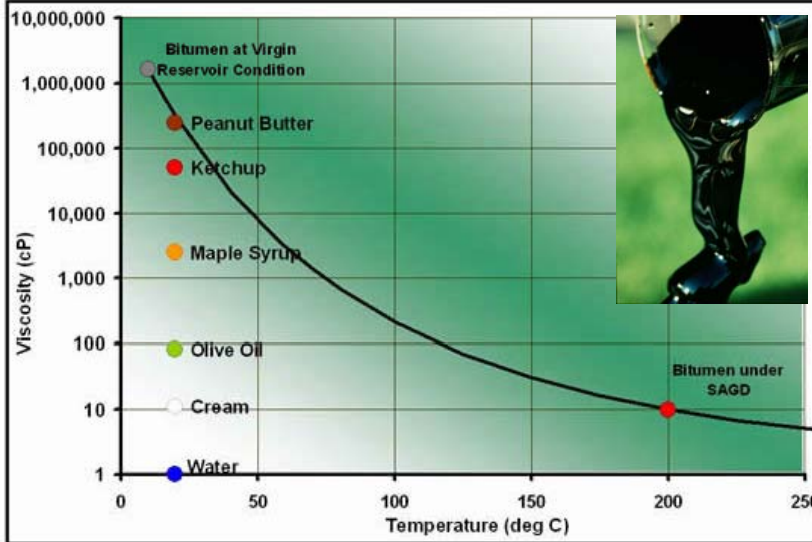
- Primary Recovery
- Secondary Recovery
- Tertiary Recovery
 - Steam Injection
 - Cyclic Steam Stimulation (CSS)
 - Steam Assisted Gravity Drainage (SAGD)
 - In Situ Combustion
 - Toe-to-Heel Air Injection (THAI)
 - Solvent Injection
 - VAPEX
 - N-Solv
 - Hybrid (Steam/Solvent & Steam/Gas) Processes
 - Electric Heating



18

Strategy West Inc.

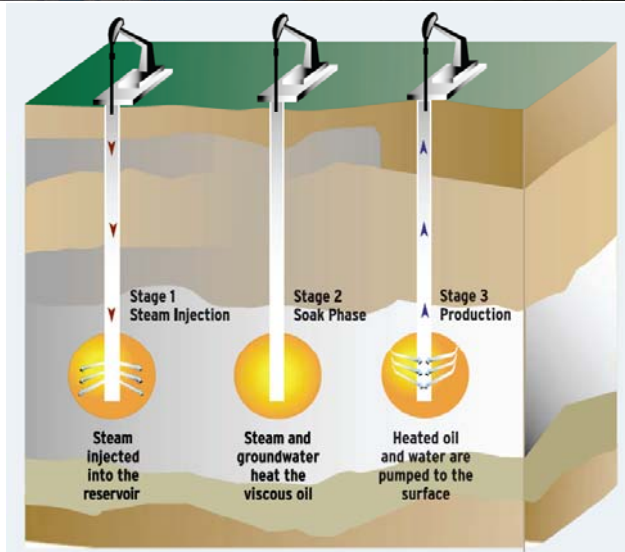
In Situ Recovery: Dealing with Viscosity



Sources: Enerplus; Syncrude Canada Limited

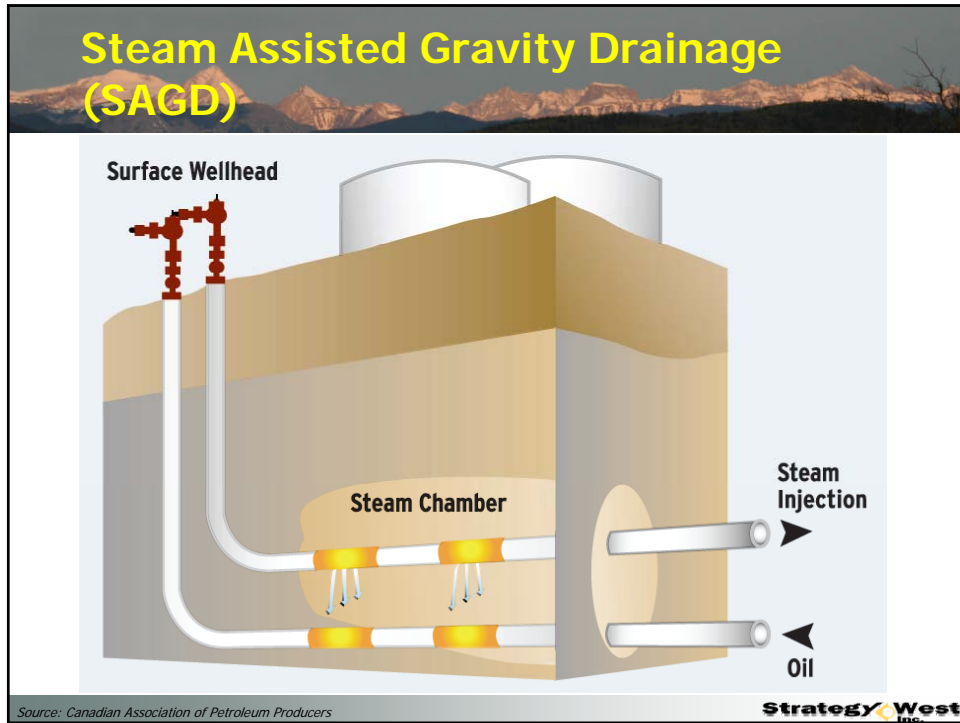
Strategy West Inc.

Cyclic Steam Stimulation (CSS)



Source: Canadian Association of Petroleum Producers

Strategy West Inc.



Upgrading

- Approximately 60% of produced bitumen is being “upgraded” to synthetic crude oil (SCO) and other products before being shipped to downstream markets (refineries)
- The remaining 40% is being blended with diluents before being shipped to downstream markets (refineries)

22

Photo Courtesy Shell Canada Limited

Strategy West Inc.

Upgrading Overview


If the upgrading process includes coking, the coke is removed from the bitumen and used for industrial applications. Another upgrading process will add hydrogen to the bitumen and break up the large hydrocarbon molecules – a process called hydrogen-addition or hydrogen-conversion.

Hydrocarbons are stabilized by adding hydrogen in the presence of catalysts. After stabilization, they are separated into naphtha, kerosene and gas oil.

The utilities plant provides steam, water and electric power to the rest of the plant.

Sulphur can be recovered to be used in fertilizer and other products.

A range of products including light sweet and sour crude oils and diesel products are blended and shipped to markets.



Courtesy of the Petroleum Communication Foundation (PCF)

▪ **Purpose:**

- Produce higher value liquid hydrocarbon products
- Produce valuable byproducts

▪ **Mechanisms:**

- Remove or breakdown bitumen residues
- Remove contaminants

23

Strategy West Inc.

Bitumen-Based Feedstocks to Refined Products

Mines & In Situ Projects


↓ Blended Bitumen ↓

Upgraders

Blended Bitumen →

Synthetic Crude Oil →

Canadian & US Refineries

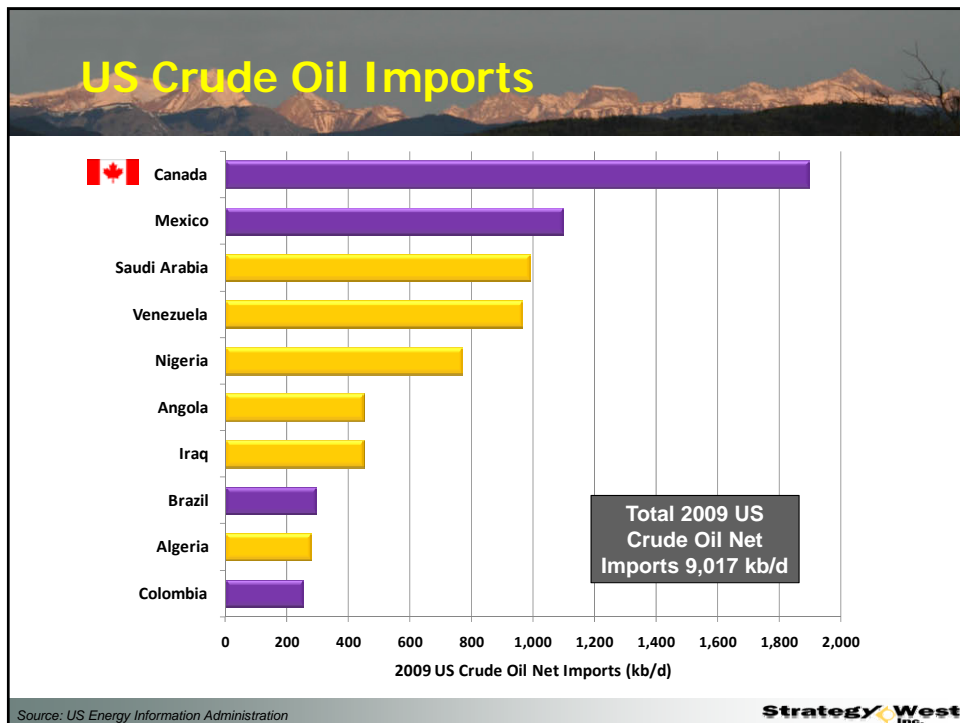
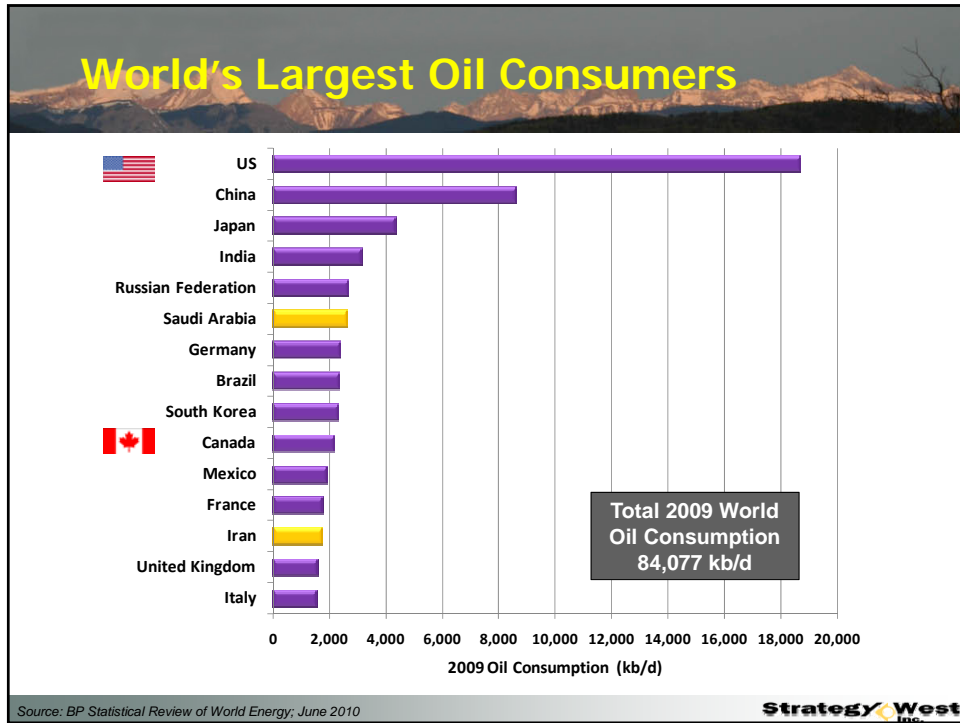


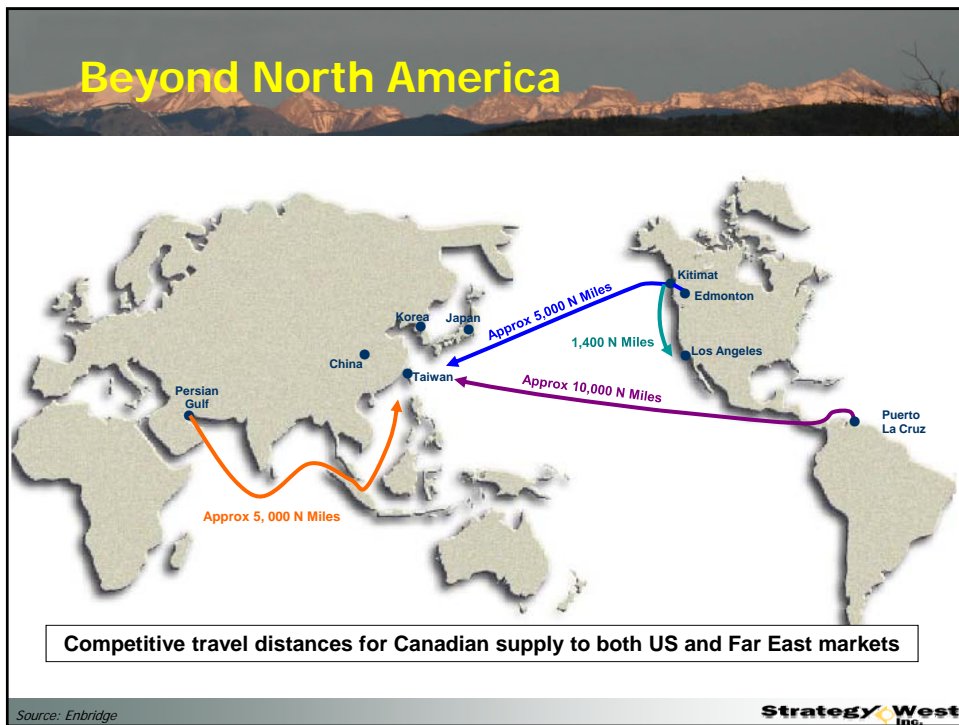
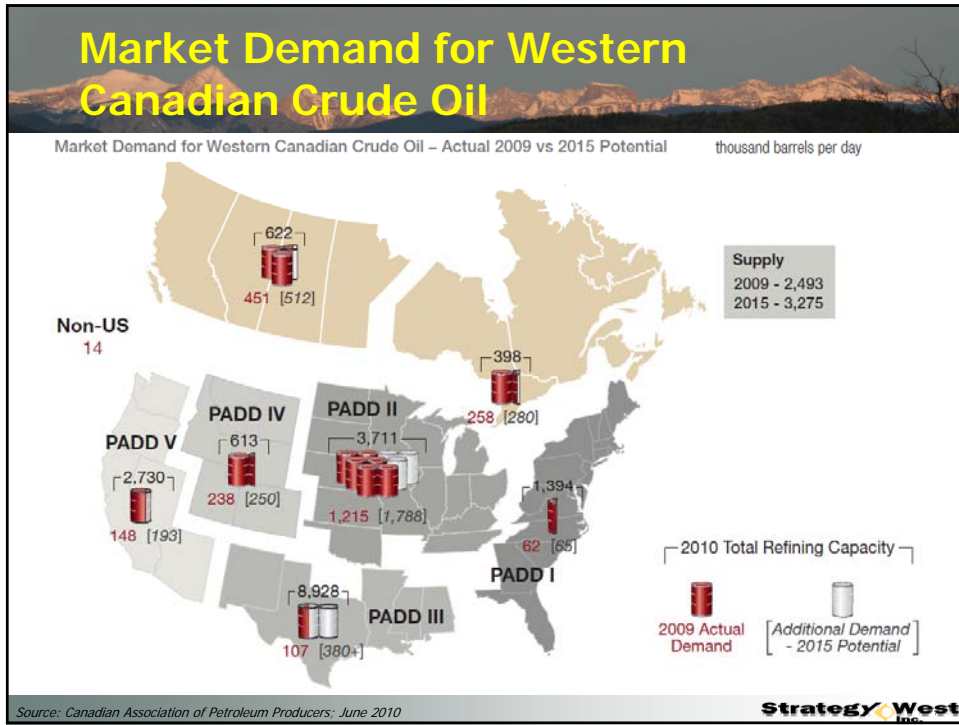
Refined Petroleum Products →

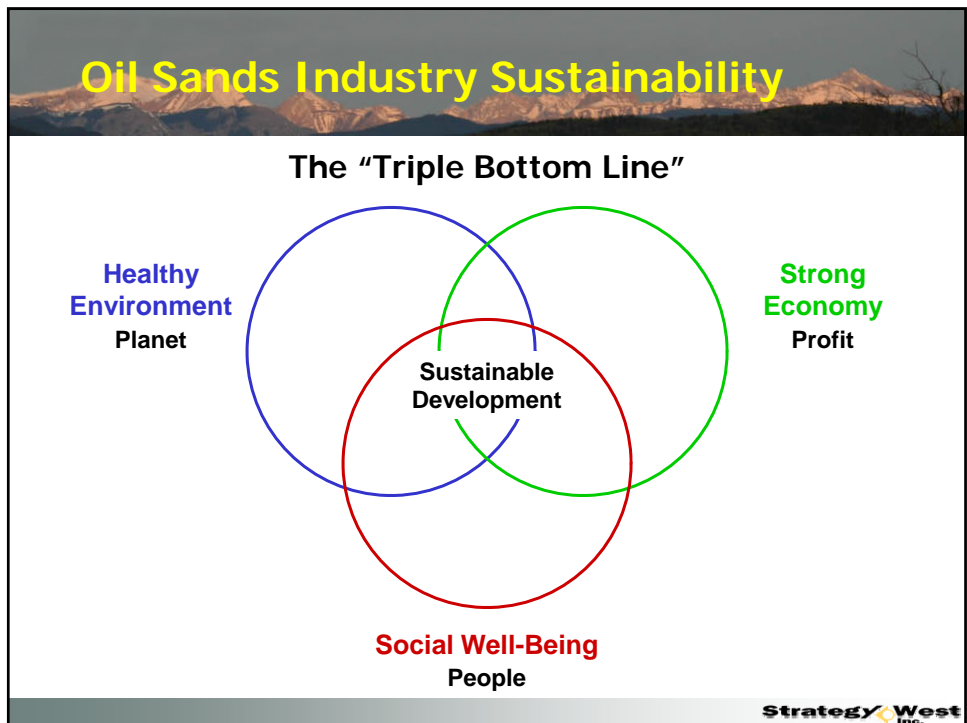
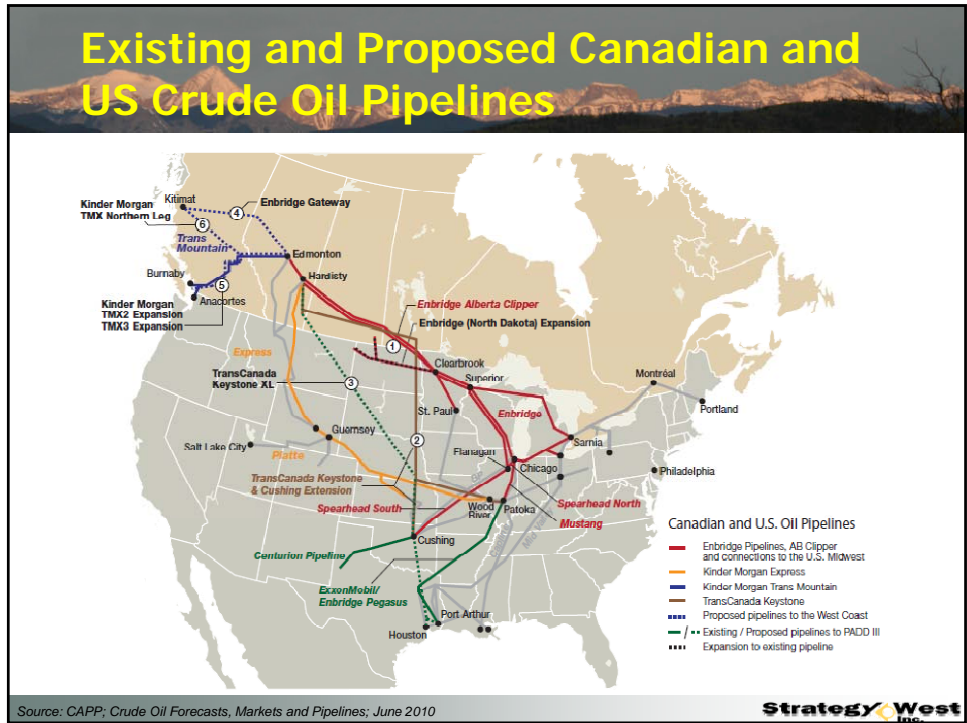
Gasoline
Diesel
Jet Fuel
Fuel Oils
Lubricants
Asphalt
Others

24

Strategy West Inc.







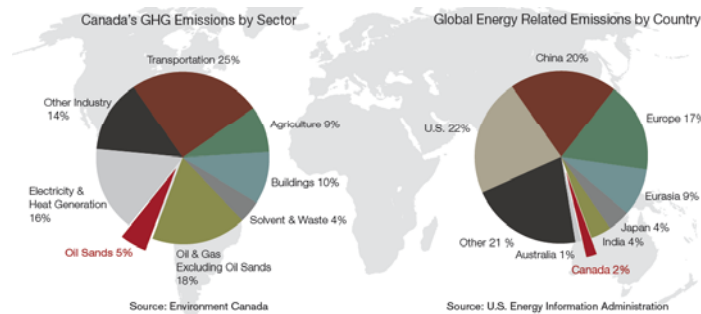
ENGO Attacks/Industry Image

- It is not possible to deal with all of these issues in the time available
- Two major oil sands industry challenges are discussed in more detail:
 - GHG Emissions
 - Tailings Disposal

Strategy West Inc.

Oil Sands GHG Emissions

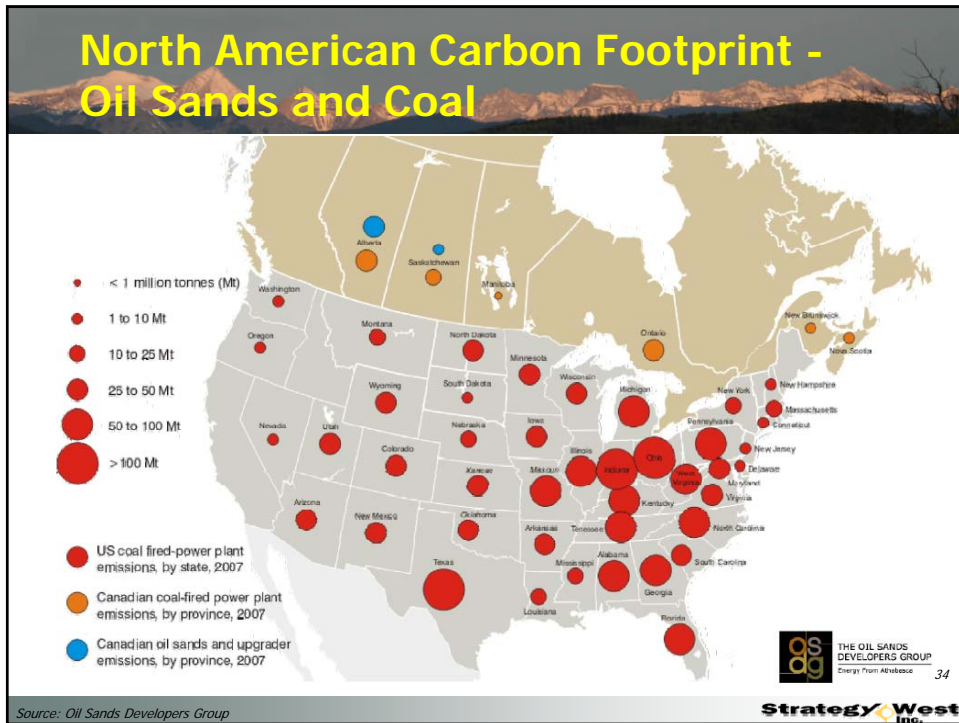
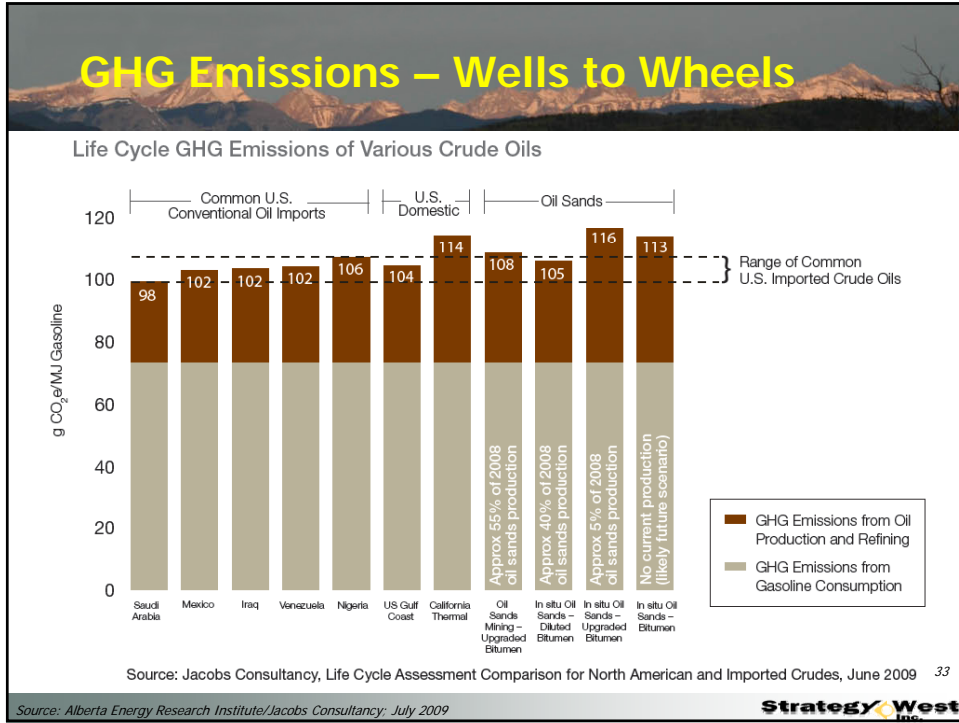
- In 2007, Canada's oil sands industry emitted 38 Mt of GHGs accounting for:
 - Less than 5% of Canadian GHG emissions
 - Less than 0.1% of global GHG emissions



Source: Canadian Association of Petroleum Producers

Strategy West Inc.

32



Industry Options to Reduce GHGs

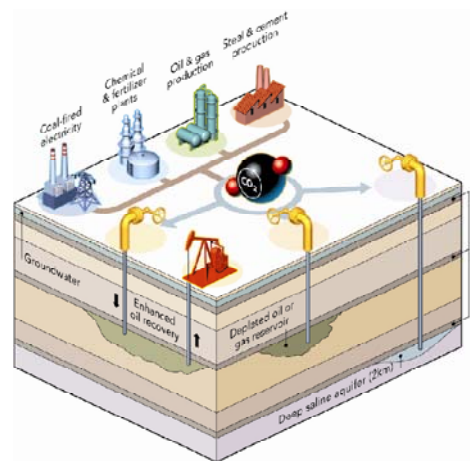
- Improve Existing Processes
 - Reduce energy use
 - Capture fugitive emissions
- Employ New Technologies
 - Gas-fired cogeneration
 - Hybrid steam-solvent in situ processes (i.e., SAP, LASER)
 - In situ combustion processes (i.e., THAI)
 - In situ electric heating (i.e., ET-DSP)
 - VAPEX, N-Solv
- Carbon Capture and Sequestration (CCS)

35

Strategy West Inc.

Carbon (CO₂) Capture and Storage (CCS)

- Capture
 - At large industrial sources
- Transport
 - Through pipelines using existing technology
- Storage
 - In mature oil/gas reservoirs & deep geologic formations.
 - Potential for enhanced oil recovery (EOR)
- Safety
 - Safe and effective over the long-term; however, public concerns must be addressed



Source: Adapted from ICO2N

Strategy West Inc.

Government Investments in Carbon Capture and Storage

- In 2008, Alberta announced a \$2B fund for investment in Carbon Capture and Storage
- Four projects were selected for possible provincial and federal funding:
 - **Shell/Chevron/Marathon - Quest Project**
 - Integrated carbon capture and storage project at the Scotford Upgrader in the Alberta Industrial Heartland
 - **Capital Power/Enbridge – Project Pioneer**
 - Integrated gasification combined-cycle carbon capture power generation facility at the Keephills 3 power plant, west of Edmonton
 - **Enhance/Northwest - The Alberta Carbon Trunk Line**
 - Gasification, CO₂ capture, transportation, enhanced oil recovery and storage in the Alberta Industrial Heartland and central Alberta
 - CO₂ capture from the Agrium fertilizer plant and the Northwest upgrader
 - **Swan Hills Synfuels - in-situ coal gasification (ISCG)**
- **Proposed funding for each project has been announced – final agreements are required**

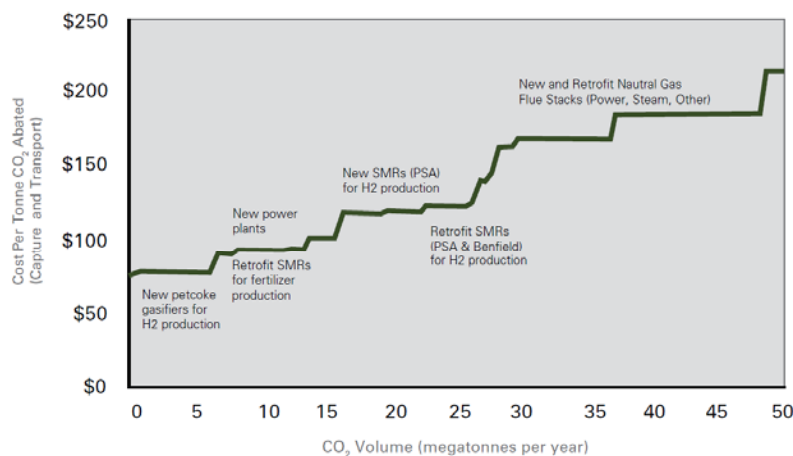
37

Source: Alberta Energy

Strategy West Inc.

CO₂ Supply Potential

CO₂ Supply Potential circa 2020
(includes capture and transport)

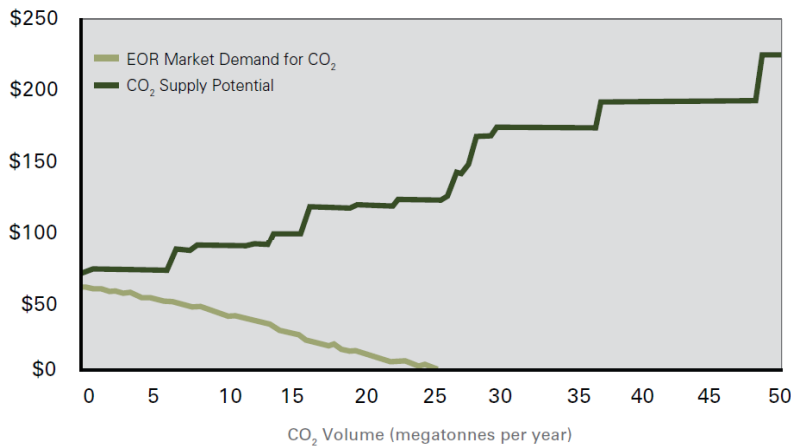


Source: ICO2N, October 2009

Strategy West Inc.

CO₂ Supply & EOR Demand Potential

CO₂ Supply & EOR Demand Potential circa 2020 / 2025
with \$75 Oil Price (WTI)
(Supply cost includes capture and transport costs)



Source: ICO₂N, October 2009

Strategy West Inc.

CCS Summary

- CCS has potential to reduce the carbon footprint of the oil sands industry
- CCS is very costly
 - Gasification of bitumen residues provides the best opportunity for CO₂ capture in the oil sands
 - CO₂ capture from new and retrofitted SMRs may also be feasible
 - CO₂ capture from flue gases is very expensive
- EOR requires low-cost CO₂
- The funding gap must be closed to achieve meaningful capture volumes
 - Government action would be necessary

Strategy West Inc.

ERCB Directive 074

- *Directive 074: Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes, was released February 3, 2009*
- Directive 074 requires operators to:
 - Prepare tailings plans and report on tailings ponds annually
 - Reduce the accumulation of tailings by capturing fine particles, that would otherwise remain suspended in tailings ponds, and placing them in a deposit that is “trafficable”
 - Specify dates for construction, use and closure of tailings ponds and file these dates with the ERCB by September 30, 2009.
- Operators’ compliance plans are available on the ERCB website. Supplemental Information Requests will also be available when they are completed.

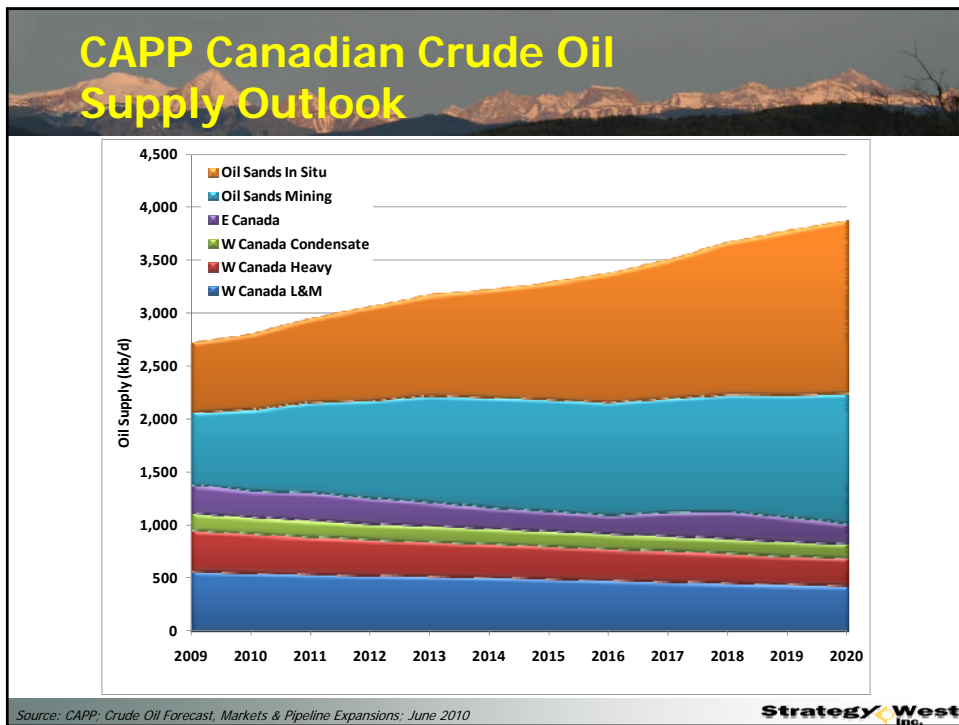
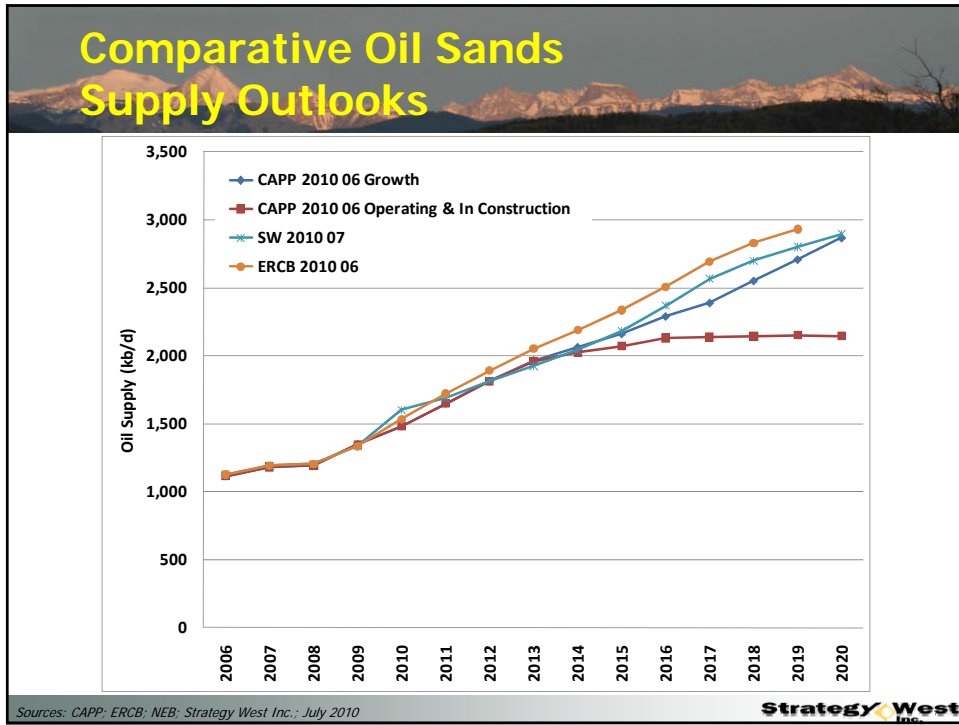
Source: Alberta Energy Resources Conservation Board

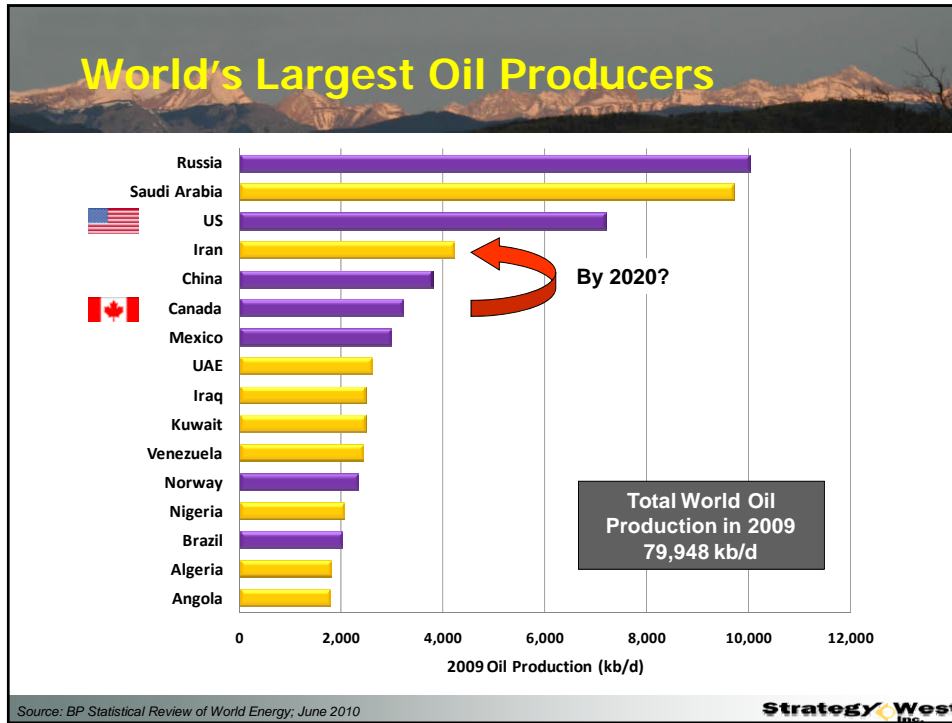
Strategy West
Inc.

Compliance with Directive 074

- ERCB Conditional Approvals
 - Syncrude Mildred Lake and Aurora North (April 22, 2010)
 - MFT centrifugation
 - Commercial demonstration plant to be in operation by August 2011 with start up of a full-scale supplemental tailings plant by June 2015
 - Untreated MFT to end-pit lakes at end of mine life
 - Suncor Fort Hills (April 22, 2010)
 - Thin-lift drying of fluid fine tailings in Dedicated Disposal Areas (DDAs)
 - Pilot testing required
 - Zero inventory of Mature Fine Tailings (MFT) at end of mine life
 - Suncor Base, Steepbank and Millennium (June 17, 2010)
 - TRO (polymer flocculation and thin-lift drying)
 - Untreated MFT to end-pit lakes at end of mine life
 - Imperial Kearn Lake (August 11, 2010)
 - Commence TSRU tailings treatment and disposal in the in-pit DDA by March 31, 2018
 - Tailings pond to be decommissioned by 2038
 - Athabasca Oil Sands Project Muskeg River (September 20, 2010)
 - Atmospheric Fines Drying (AFD)
 - Commercial operations to commence by June 30, 2013
- Plans submitted by CNRL (Horizon) and AOSP (Jackpine) are still under review

Strategy West
Inc.





- ### Conclusions
- Canada's oil sands deposits are among the world's largest hydrocarbon accumulations.
 - The oil sands industry is well established and making a significant contribution to global oil supply.
 - The 2008/2009 financial and economic crisis caused project deferrals and cancellations.
 - Industry growth has resumed; however, the growth rate will depend on oil prices and how industry and government address the many challenges the industry faces.
- Strategy West Inc.**



Thank You

Questions?

Please visit
www.strategywest.com for oil
sands project lists and other
detailed oil sands industry
information

47

Strategy West
INC.