Canada's oil sands – the *in situ* perspective

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Chris Bloomer
IOSA Member
Petrobank

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IN SITU OIL SANDS ALLIANCE

- *In situ* Oil Sands Alliance
- Independent and innovative Alberta-based *in situ* oil sands companies:
  - Athabasca Oil Sands Corp.
  - Connacher Oil & Gas Ltd.
  - Laricina Energy Ltd.
  - MEG Energy Corp.
  - Osum Oil Sands Corp.
  - Petrobank Energy and Resources Ltd.

- Emerging *in situ* oil sands developers

OUR GOAL:

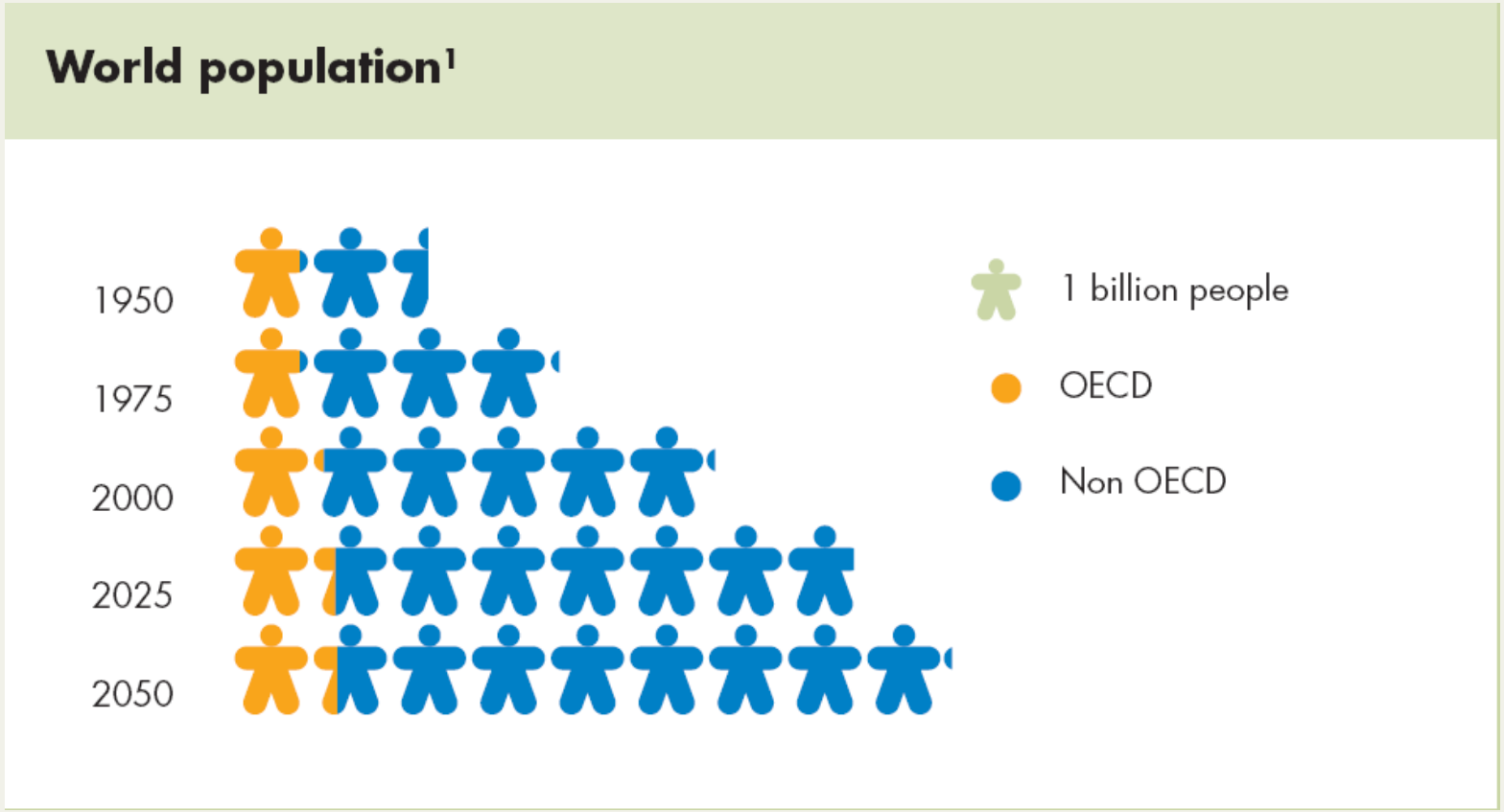
To unlock a safe, secure supply of energy using innovative methods we can all be proud of

"The world can no longer avoid three hard truths about energy supply and demand."

Shell Energy Scenarios to 2050

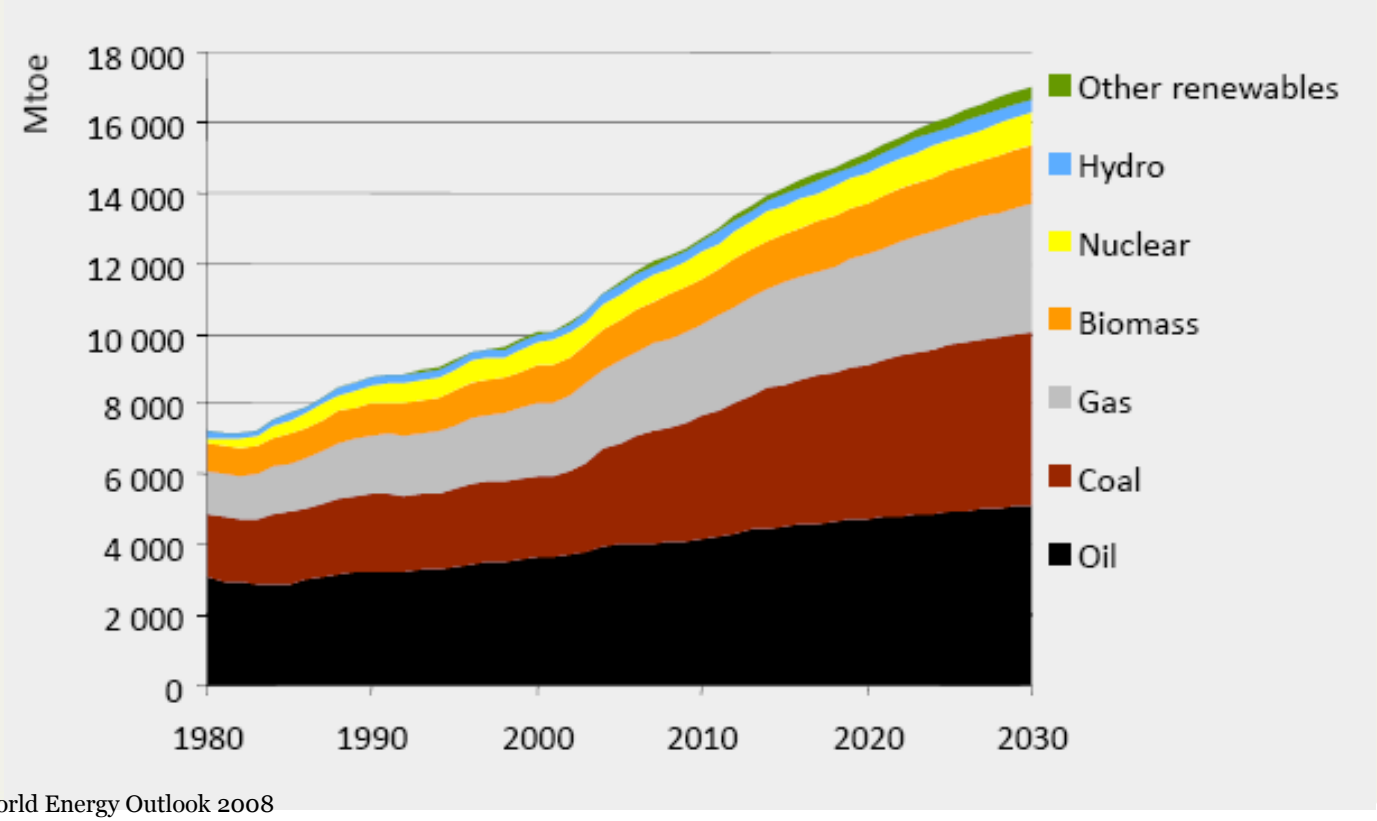
- Step-change in energy use
- Supply will struggle to keep pace
- Environmental stresses are increasing

- Population is a key driver for energy demand



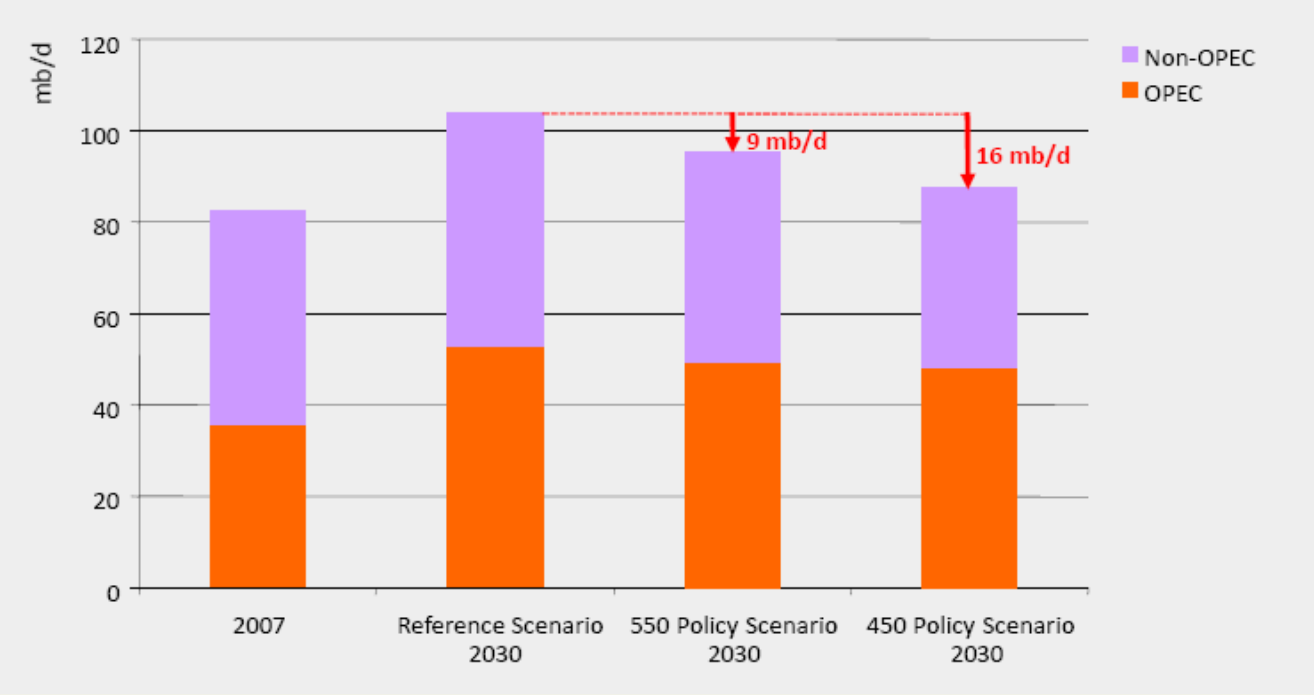
Source: Shell Energy Scenarios to 2050

"World energy demand expands by 45% between now and 2030…"



Source: OECD/IEA World Energy Outlook 2008

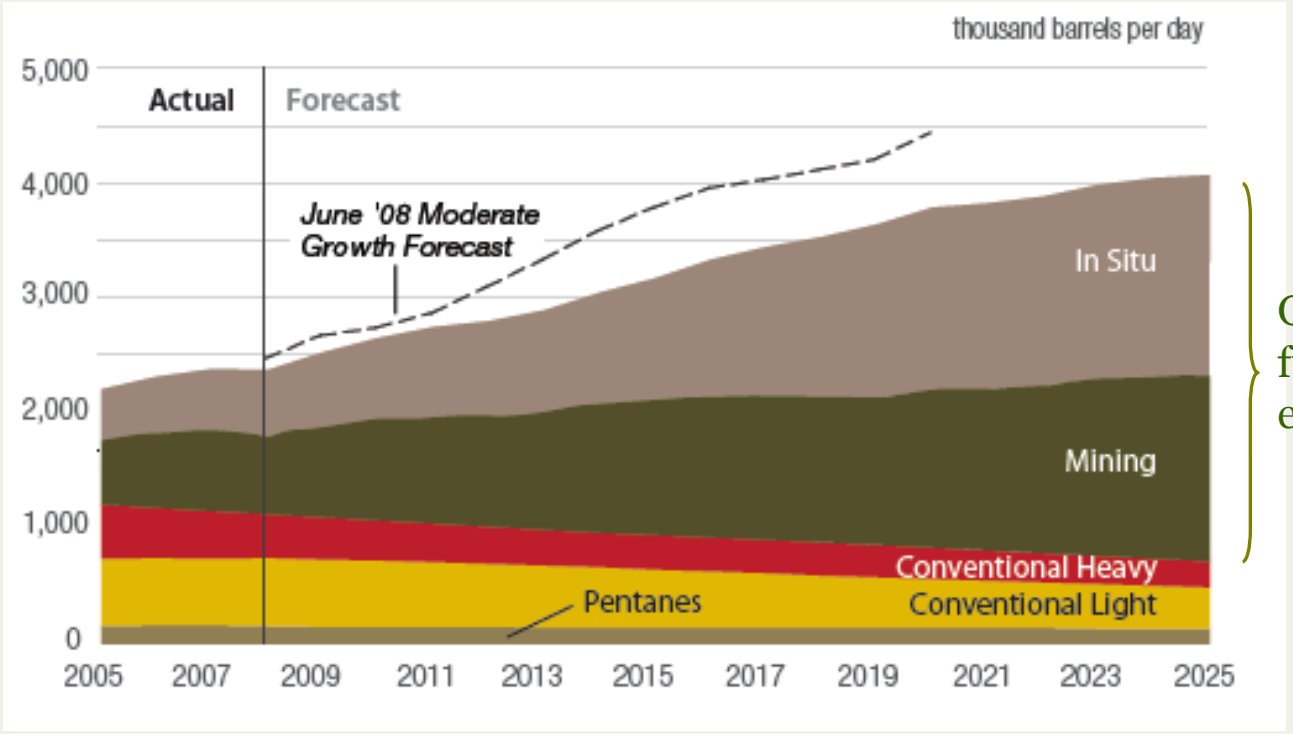
- Even with renewables & energy efficiency measures, oil production between 85 and 105 million barrels per day will be required



Source: International Energy Agency World Energy Outlook 2008

Growing Dependence on the Oil Sands

Western Canada Oil Sands & Conventional Production



Oil sands are the future of Canada's energy sector

Source: Canadian Association of Petroleum Producers, Figure 2.3, *Crude Oil Forecast, Markets & Pipeline Expansions*, June 2009

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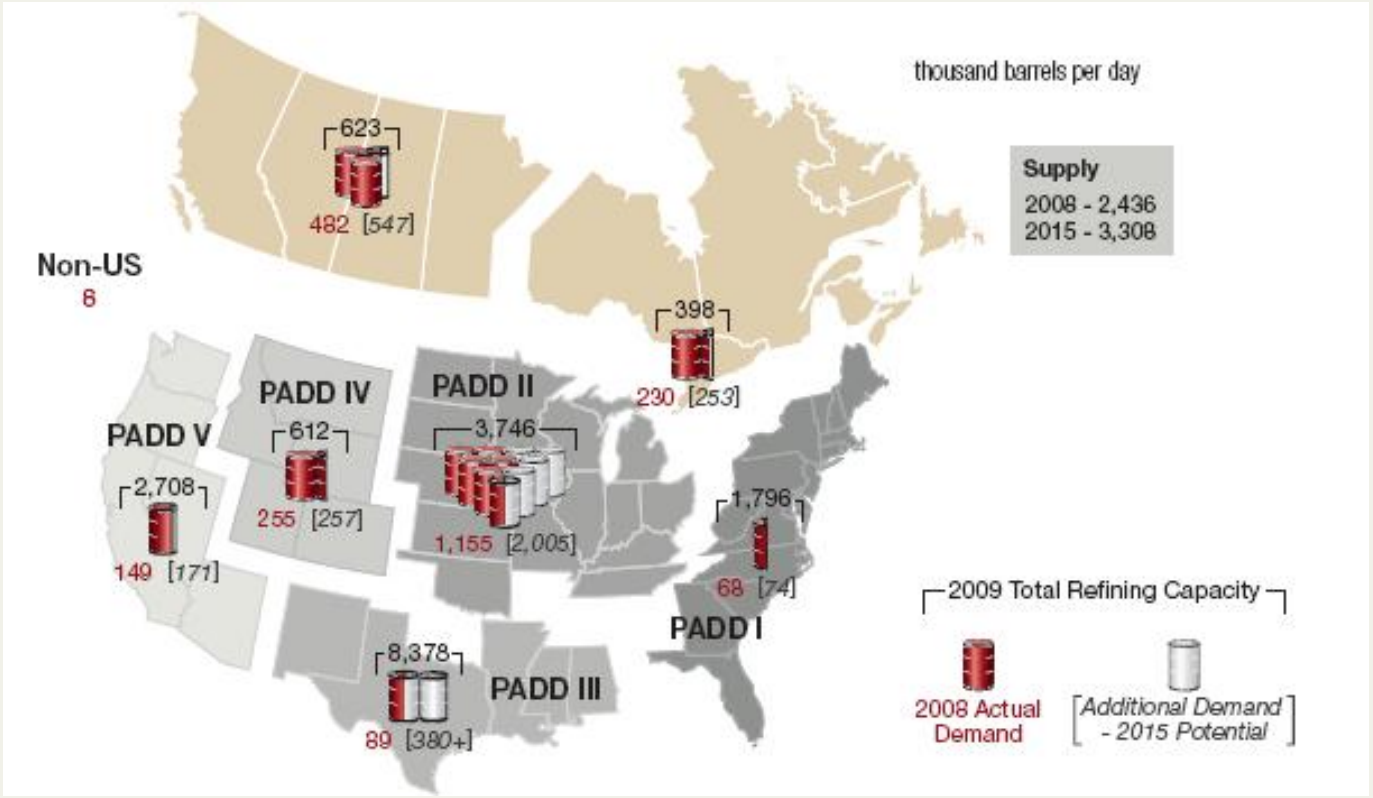
Growing Dependence on the Oil Sands

Market Demand for Western Canadian Crude Oil – Actual 2008 vs 2015 Potential



US Gulf Coast refineries (PADD III) are counting on Canadian oil sands production to replace declining supplies from Mexico and Venezuela

Source: Canadian Association of Petroleum Producers, Figure 3.1, *Crude Oil Forecast, Markets & Pipeline Expansions*, June 2009

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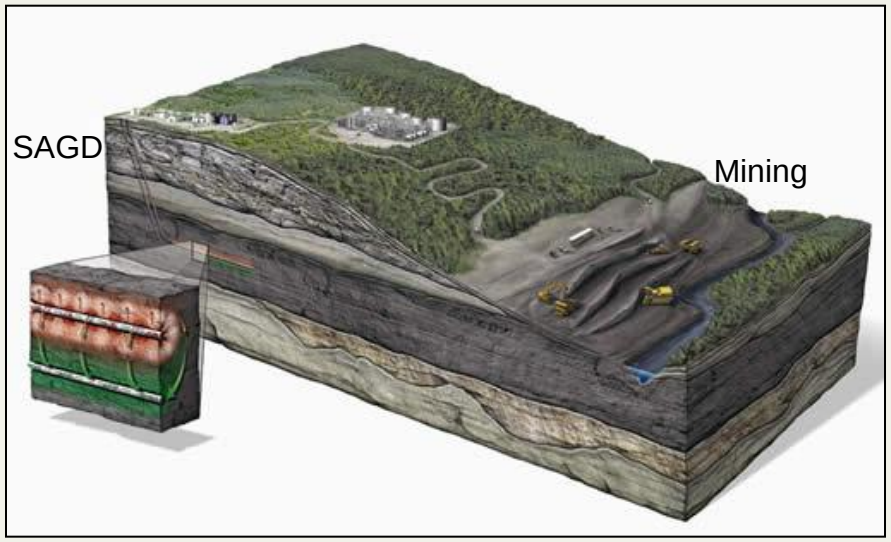
In situ - a Solution for Energy, People and the Environment

- Alberta's oil sands possess 1.7 trillion bbls of bitumen; it is a key global hydrocarbon resource
- 174 billion bbls are currently considered recoverable, with 80% from *in situ* production
  - Development in recovery technology, primarily *in situ*, could increase this to 315 billion bbls (Source: EUB ST98-2007)
- Innovation with *in situ* recovery balances the needs of energy supply with responsible development
  - Surface impacts less than 1/1000th the impact to land from forestry
  - Deeper, non-potable water use with >90% recycle
  - Life cycle emissions ~15% greater than conventional crudes

Alberta *In Situ* Bitumen Technology

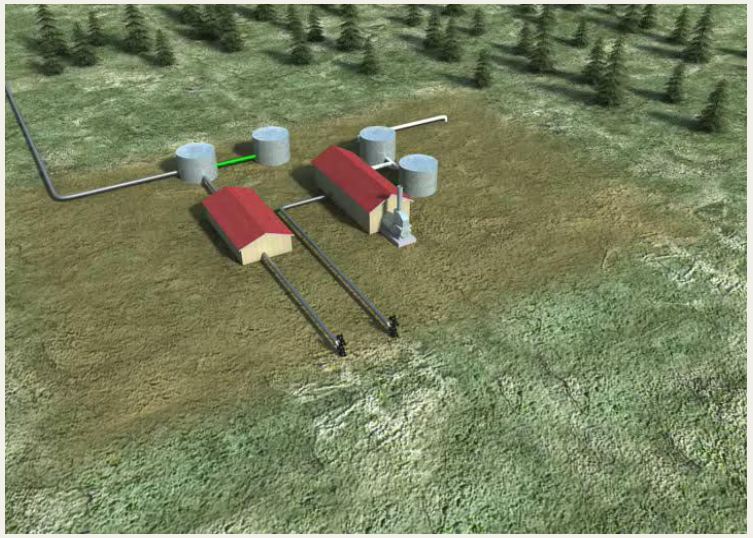
- Most common *in situ* process is Steam-Assisted Gravity Drainage (SAGD)
  - technology home grown in Alberta
  - uses horizontal wells; minimal surface disturbance
- 13,224 i*n situ* wells drilled since 1992
- 9,514 of these wells are currently producing
- 552,000 barrels produced via *in situ* in 2008
- 306.5 million cumulative barrels produced since inception via *in situ* production (as of Dec. 31, 2008)

What is SAGD?



Source: Enerplus Resources

The SAGD Process



Source: Laricina Energy

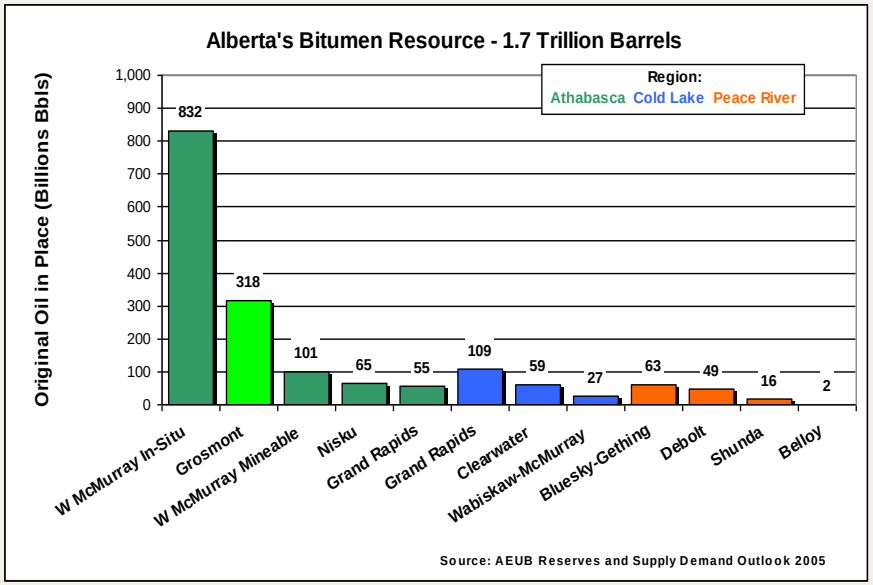
Alberta *In Situ* Bitumen Technology

A SAGD oil sands facility designed to produce 10,000 barrels of bitumen per day for ~ 25 years

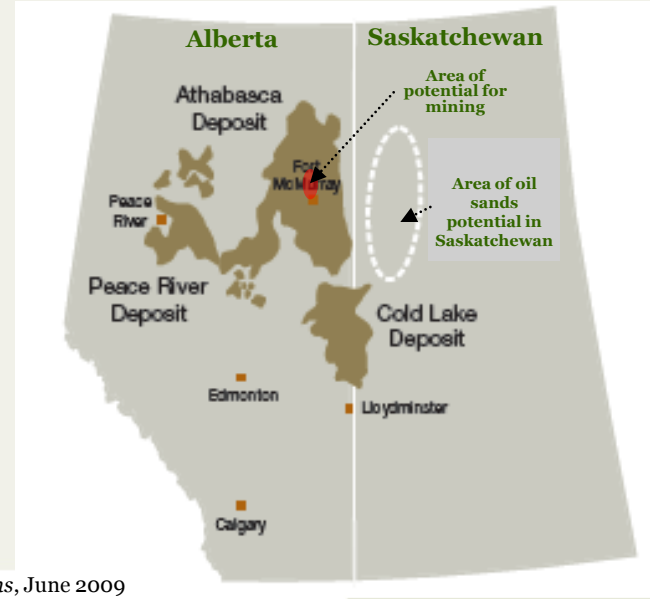
Source: Connacher Oil and Gas Ltd. – Photo of Pod 1 oil sands project at Great Divide

In Situ Potential is Widespread

- Alberta's total oil sands resource covers about 140,000 km²
  - Only 2% of this area is suitable for mining
- *In situ* is more representative of the oil sands and like the conventional business
- *In situ* development is distributing economic activity outside of Fort McMurray
  - Peace River, Wabasca, Cold Lake, Bonnyville



Location of oil sands deposits



Source: Canadian Association of Petroleum Producers, Figure 2.2, *Crude Oil Forecast, Markets & Pipeline Expansions*, June 2009

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SAGD Land Use Intensity

- A SAGD well pair produces 500-2,000 bopd from 1-hectare (2.5 acre)
- Land areas required to produce the same amount of energy as 500 bopd:
  - California-style thermal recovery: ***20*** hectares (50 acres)
  - Wind turbines: ***50*** x 1.5 MW turbines, plus power lines
  - Iowa corn to ethanol: ***750*** hectares (1900 acres)
- 5 million bopd of *in situ* recovery:
  - would require a total of about 10,000 ha in use, equivalent to 100 km² (10x10 km)
  - less than 0.1% of the area would be under active development at any one time

In Situ Land Impact Mitigations

- Local residents are consulted
- Shared land use (e.g. roads/ROW's) with conventional oil & gas, forestry, power transmission
- Extensive flora & fauna studies are mandatory
- Timely reclamation is mandatory
  - A typical clearing-to-reclamation cycle is ~20 years
- No soil contamination is permitted
  - *In situ* facilities constructed to very high standards
- *In situ* siting is flexible

SAGD Water Consumption

- Water for new *in situ* projects is sourced from deep, brackish (non-potable) aquifers
  - River/surface water is not used
- Produced water is 80-95% recycled

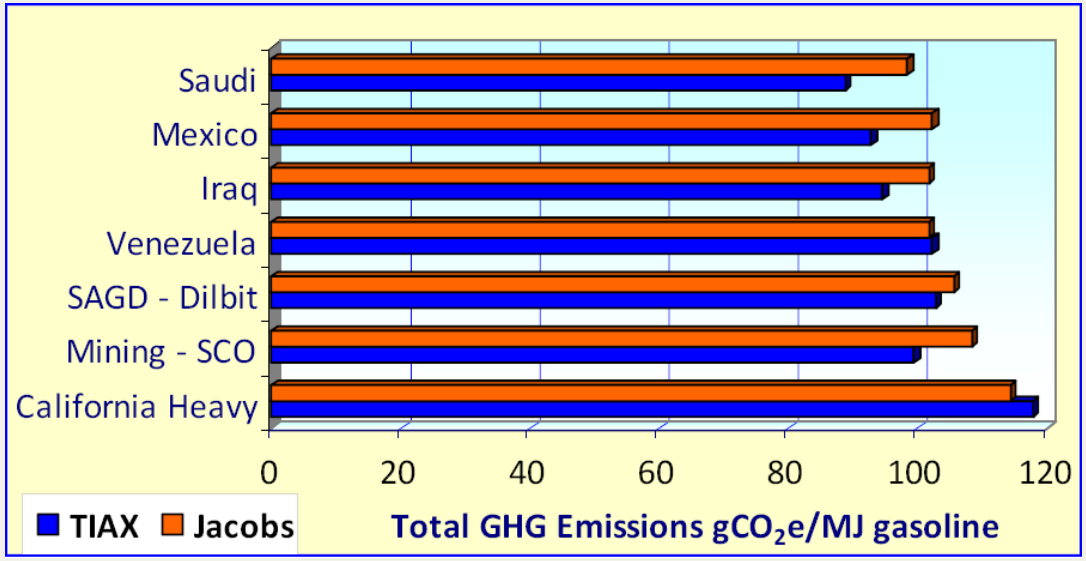
Volume of water used to produce things

Product	Average virtual water content (m^3/ton)
Beef	15,500
Rice	2,291
Wheat	1,334
Corn	909
SAGD Bitumen	0.6

Source : http://www.waterfootprint.org/Reports/ResearchData/Appendix%20XV.xls

Emissions – "Wells-to-Wheels"

- Oil sands emissions are only 5-15% higher relative to the average crude oil processed in the United States, on a "well-to-wheels" basis.
  - California Heavy has higher emissions than oil sands, based on two independent studies (1)
- Most emissions, 70-80%, are released during end use



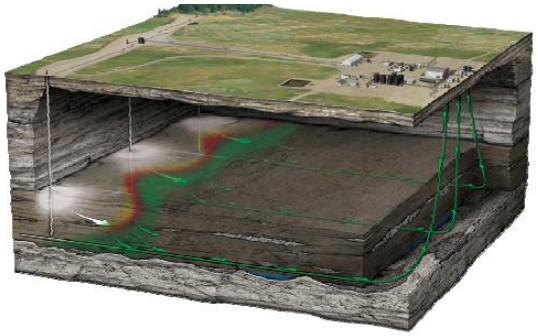
(1) Source: TIAX and Jacobs Consultancy. Source: AERI – Life Cycle Analysis of North American and Imported Crude Oils, July 23, 2009
http://eipa.alberta.ca/home/lifecycle.aspx

Working Hard to Further Reduce Energy Use

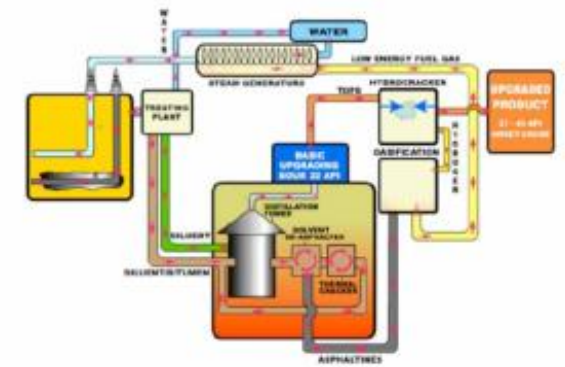
- More efficient use of energy reduces CO_2 generation proportionately:
  - Innovations in reservoir recovery will reduce energy requirements (lower Steam/Oil ratios):
    - Solvent additives to SAGD
    - Cold solvent processes
    - Variants of above
  - Facility synergies between projects
  - Cogeneration

Technology-Driven Solutions

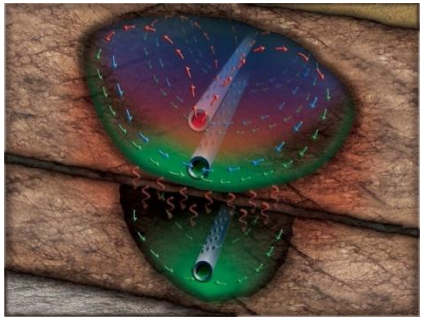
THAI™ (Toe-to-Heel Air Injection)
-Petrobank Whitesands Project



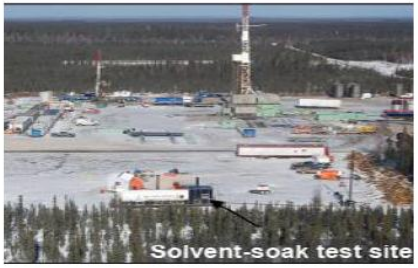
Asphaltene Gasification – Nexen/OPTI Long Lake

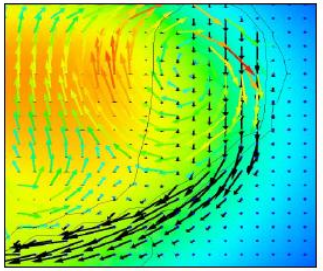


PHARM – Heat Harvesting SAGD - Laricina



Cold Solvent and Solvent Assisted SAGD - Laricina





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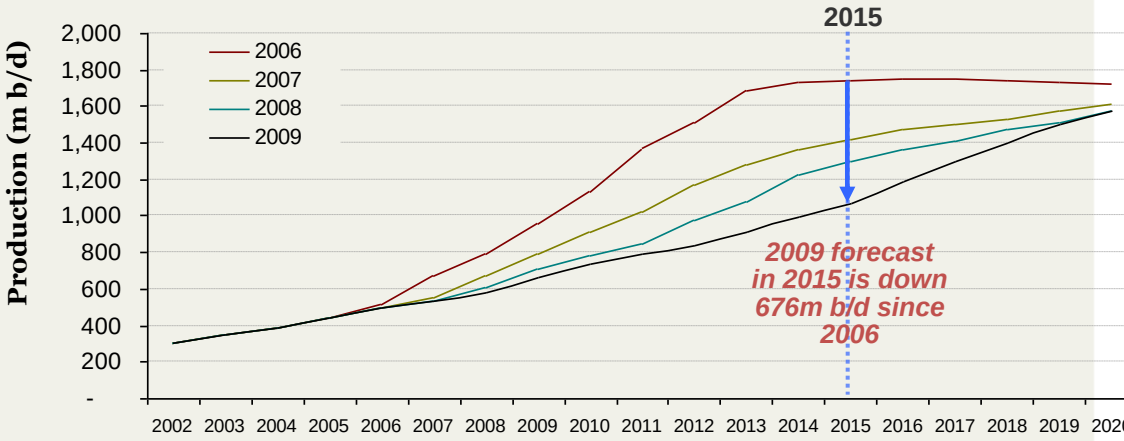
Forecast *in situ* growth is falling

- Since 2006, CAPP's forecast of *in situ* production for 2015 has fallen by 670,000 b/d
- Why the shortfall?
  - Regulatory delays
  - Cost pressures
  - Operational and reservoir challenges
  - Capital market turmoil
  - Environmental pressures (CO_2) and public perception ("dirty oil")
- Major fiscal implications on many levels

Oil sands production, *in situ* only
(CAPP forecasts for 2006, '07, '08 & '09)



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- Future production growth
- Increased provincial revenues
- Increased employment opportunities
- Reinvesting in local communities
- Have spent over $2.5 billion on capital expenditures

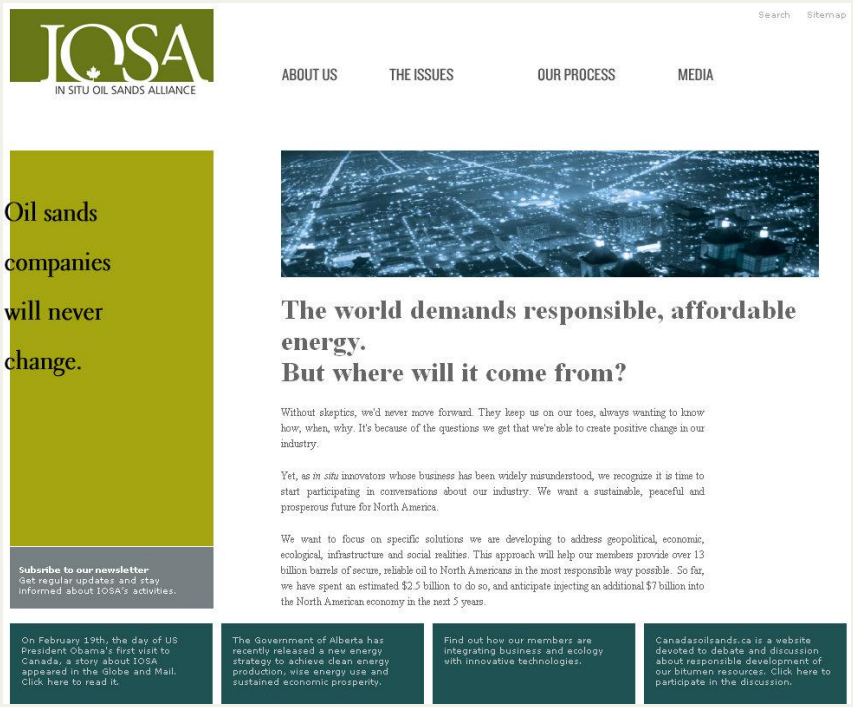
$7 billion injection into North American economy over next 5 years

- 20 billion barrels of bitumen resources
- 1 million barrels of bitumen per day for more than 30 years
- Moderate pace of development an ideal incubator for new technologies
- New technologies lead to advancements for the industry in efficiency, cost and performance, as well as environmental improvements

- Balancing Energy, the Economy and the Environment
- Time to talk about solutions

Learn more about us:

IOSA.ca



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Forward-looking statement

This presentation contains forward-looking information. Actual results could differ materially due to market conditions, changes in law or government policy, changes in operating conditions and costs, changes in project schedules, operating performance, demand for oil and gas, commercial negotiations or other technical and economic factors.