

General Session

**BUSINESS  
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Gaining Advantage in a Dynamic Project Landscape

**Oil Sands: Growth Continues**



**PROGRAM CO-CHAIR**

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The Oil Sands Developers Group



**42<sup>ND</sup> ANNUAL ECC CONFERENCE**

**SEPT. 1<sup>ST</sup>-4<sup>TH</sup> 2010 - RITZ CARLTON GRANDE LAKES - ORLANDO, FLORIDA**

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# Shaping the Energy Future



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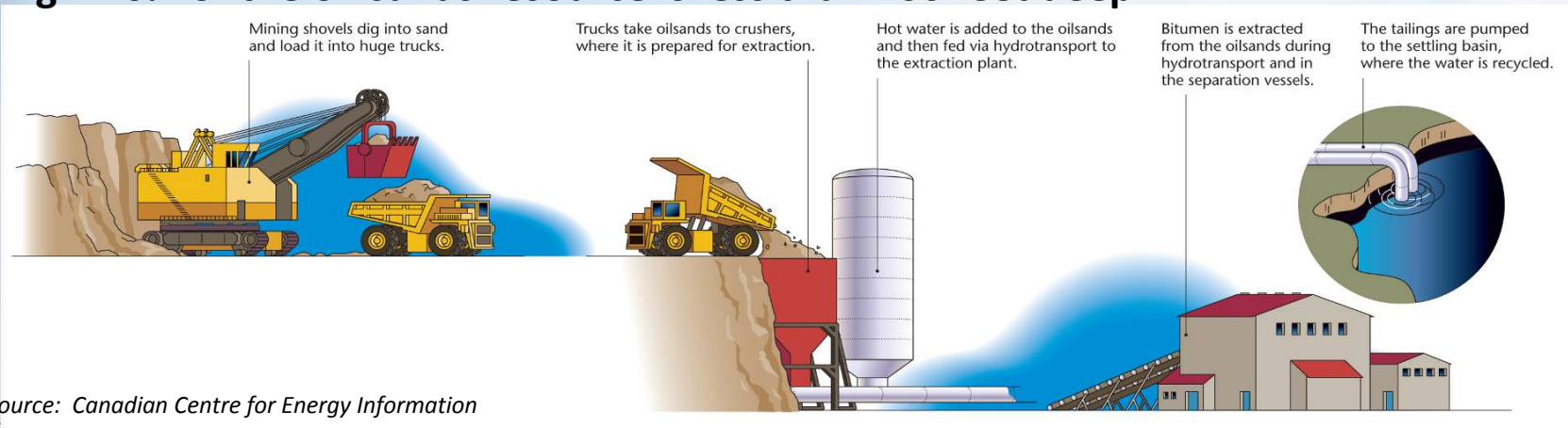


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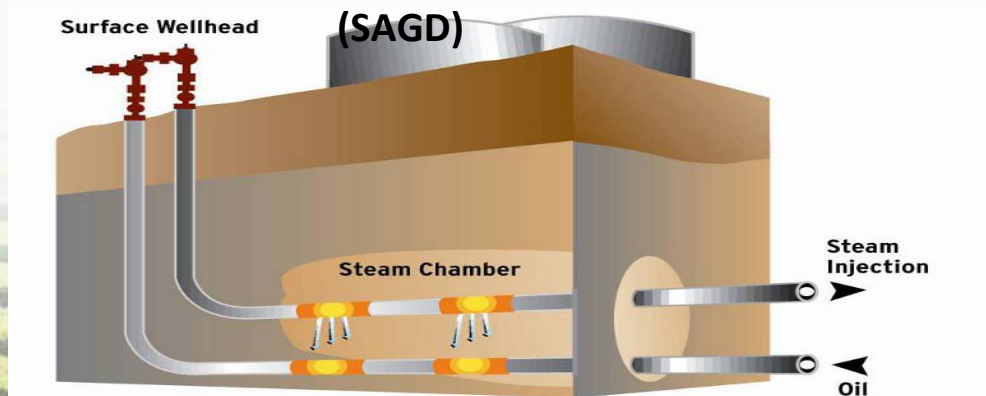
# Oil sands production technologies have significantly evolved...

**Mining – 20% of the oil sands resource is less than 200 feet deep**



**In-Situ – 80% of the oil sands resource is more than 200 feet deep**

**Steam Assisted Gravity Drainage**

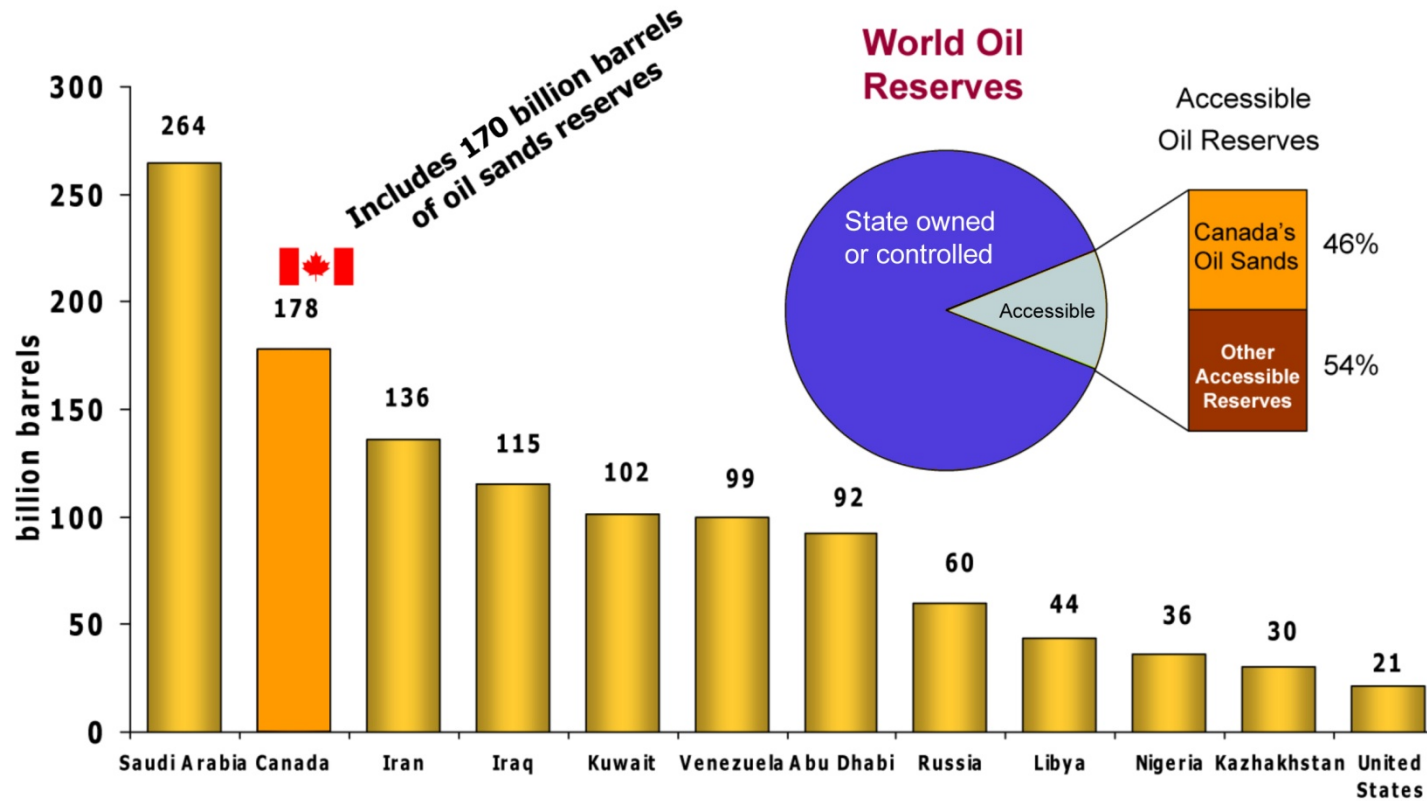


- In-situ operations:**
- Do not have mines
  - Or tailings ponds

# Oil sands are built on a history of innovation and technology

- Improvements in technical efficiency
- Reduction in environmental impacts
- Reduction in operating costs
- Increase in reserves base

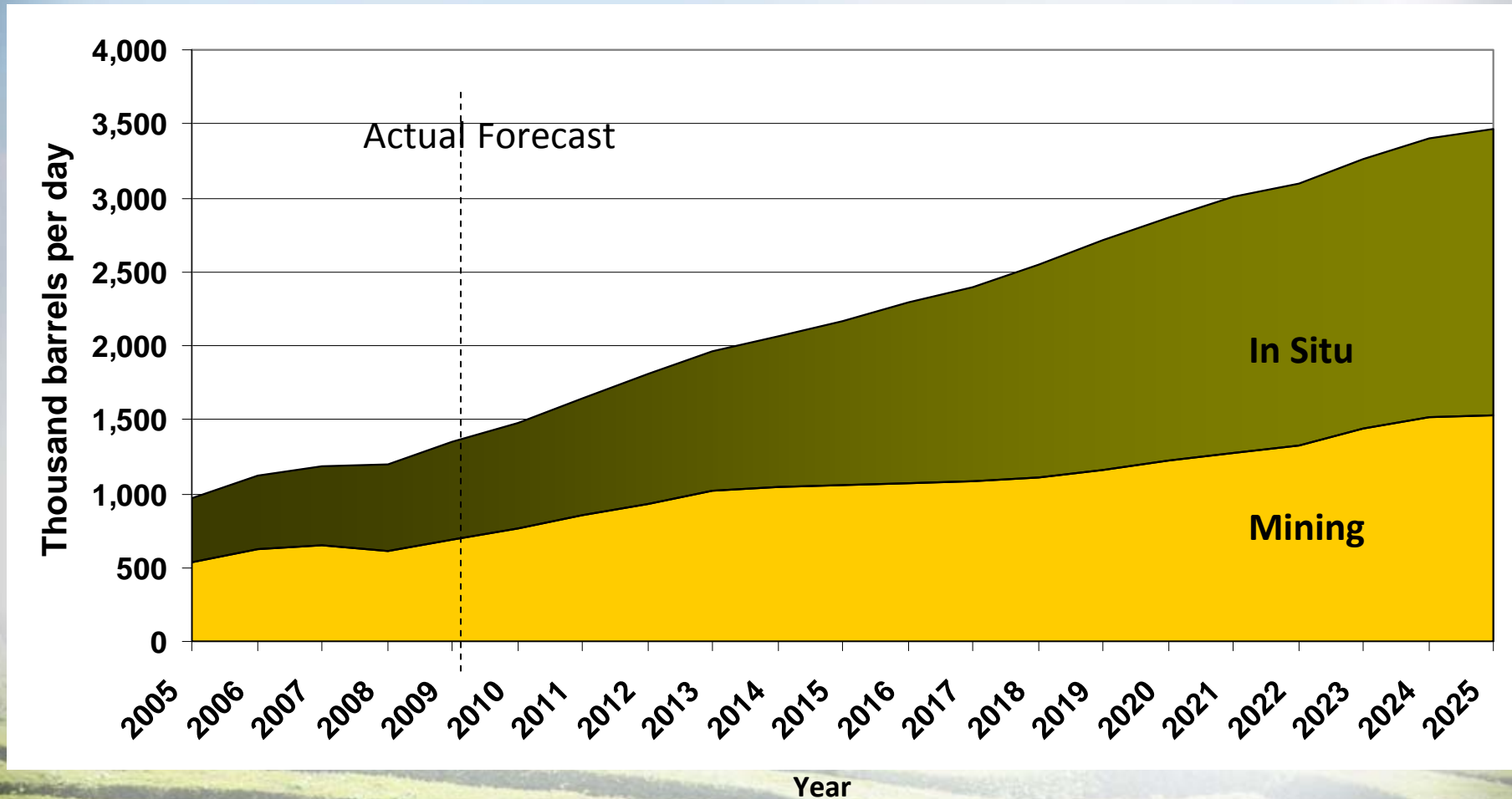
# Today...oil sands are a globally significant resource



Source: Oil & Gas Journal Dec. 2008

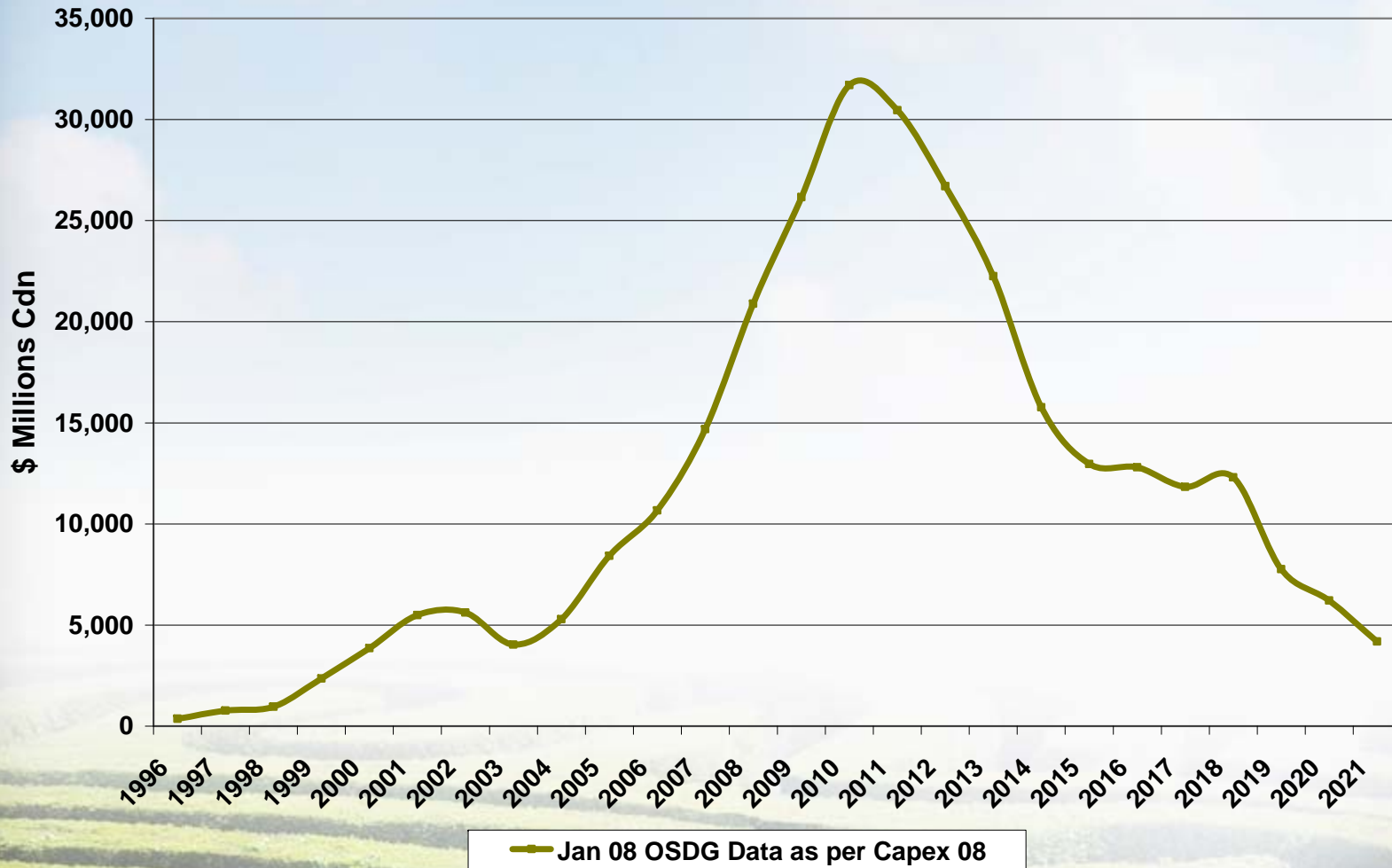
# Oil Sands In-situ and Mining Bitumen Production

## Growth Case - Western Canada Oil Sands

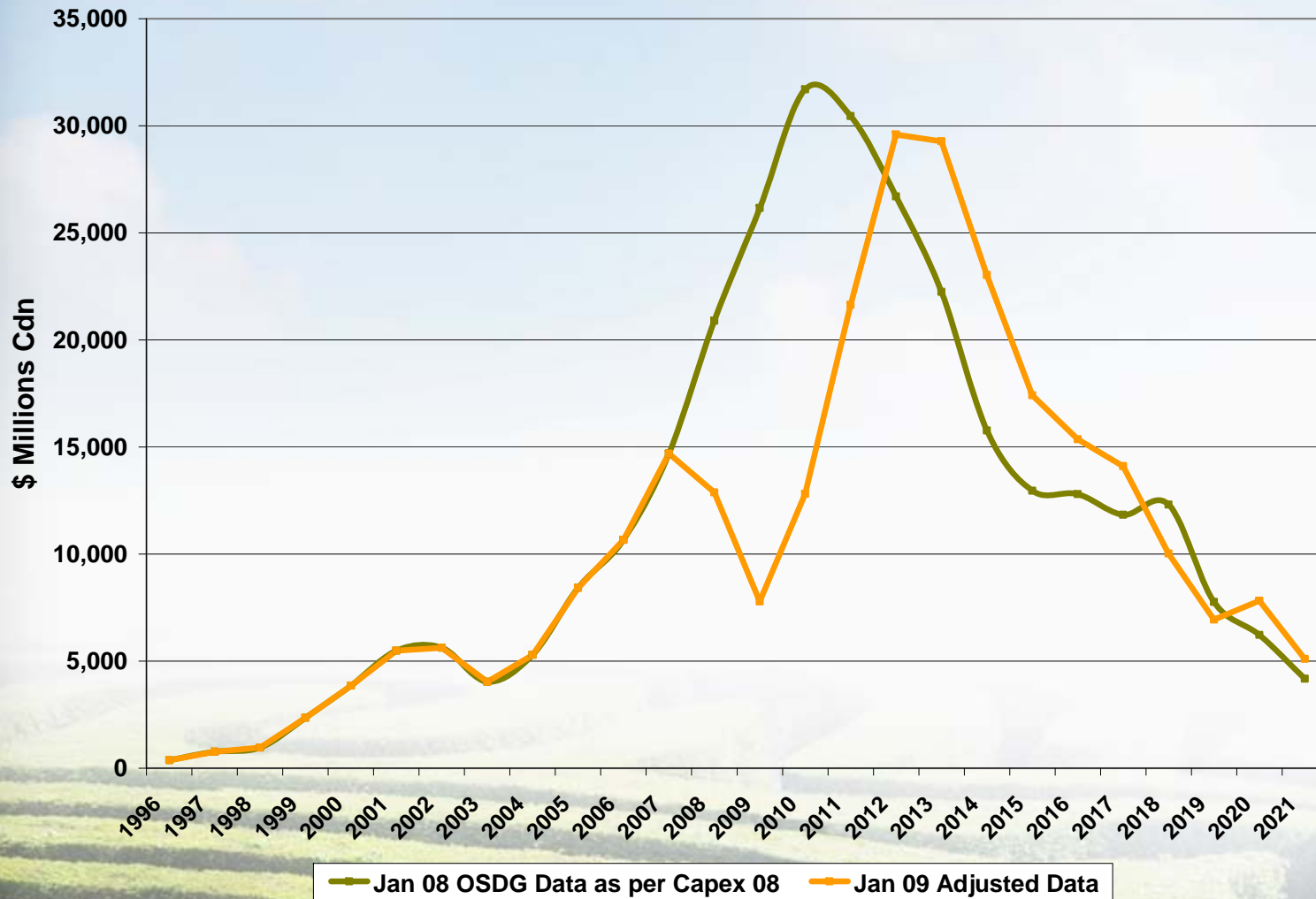


Source: CAPP – June 2010 Crude Oil Forecasts, Markets and Pipelines

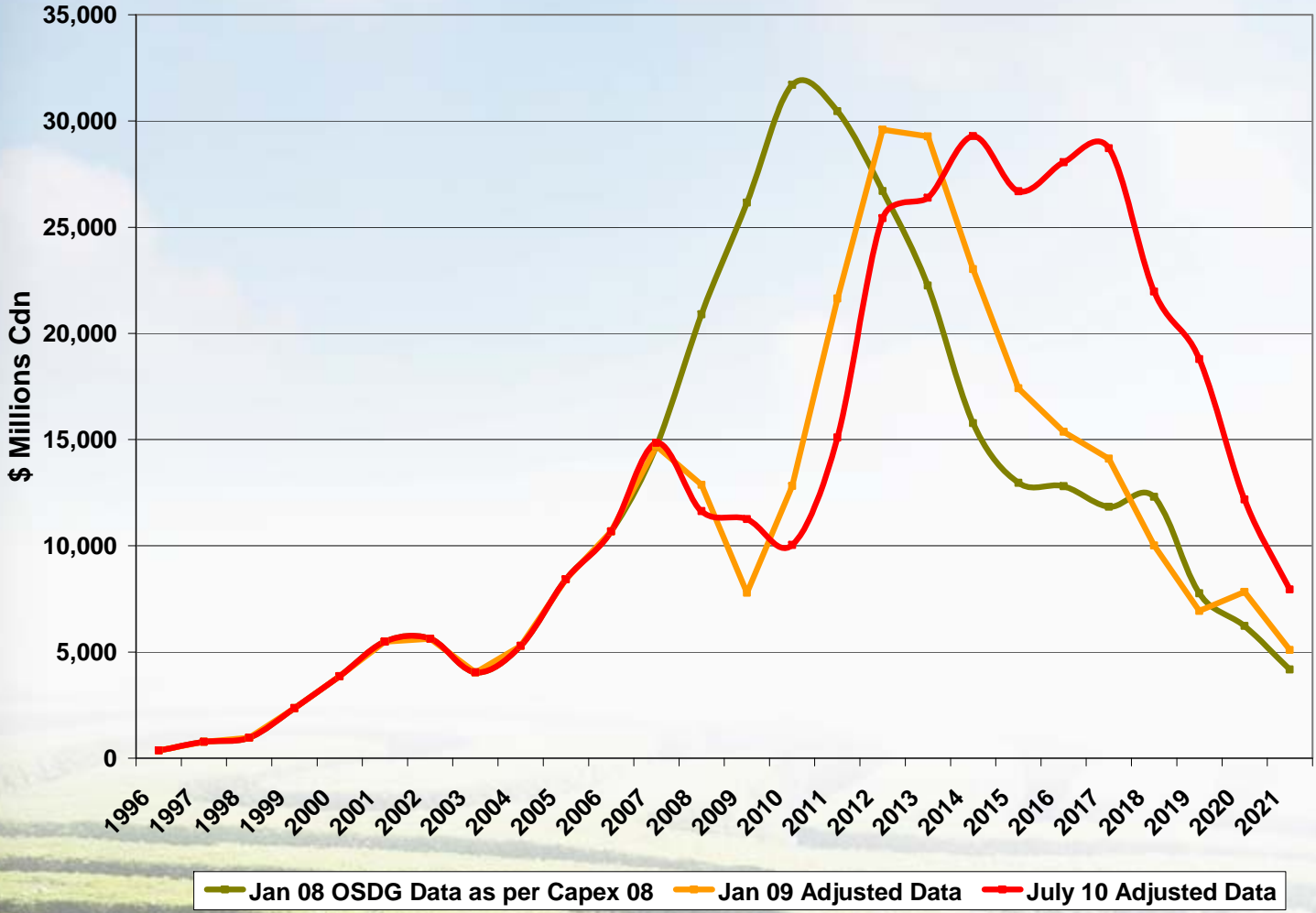
# Oil Sands Capital Expenditure Forecast - Pre Economic Turmoil (Jan. 2008)



# Oil Sands Capital Expenditure Forecast – During Economic Turmoil (Jan. 2009)



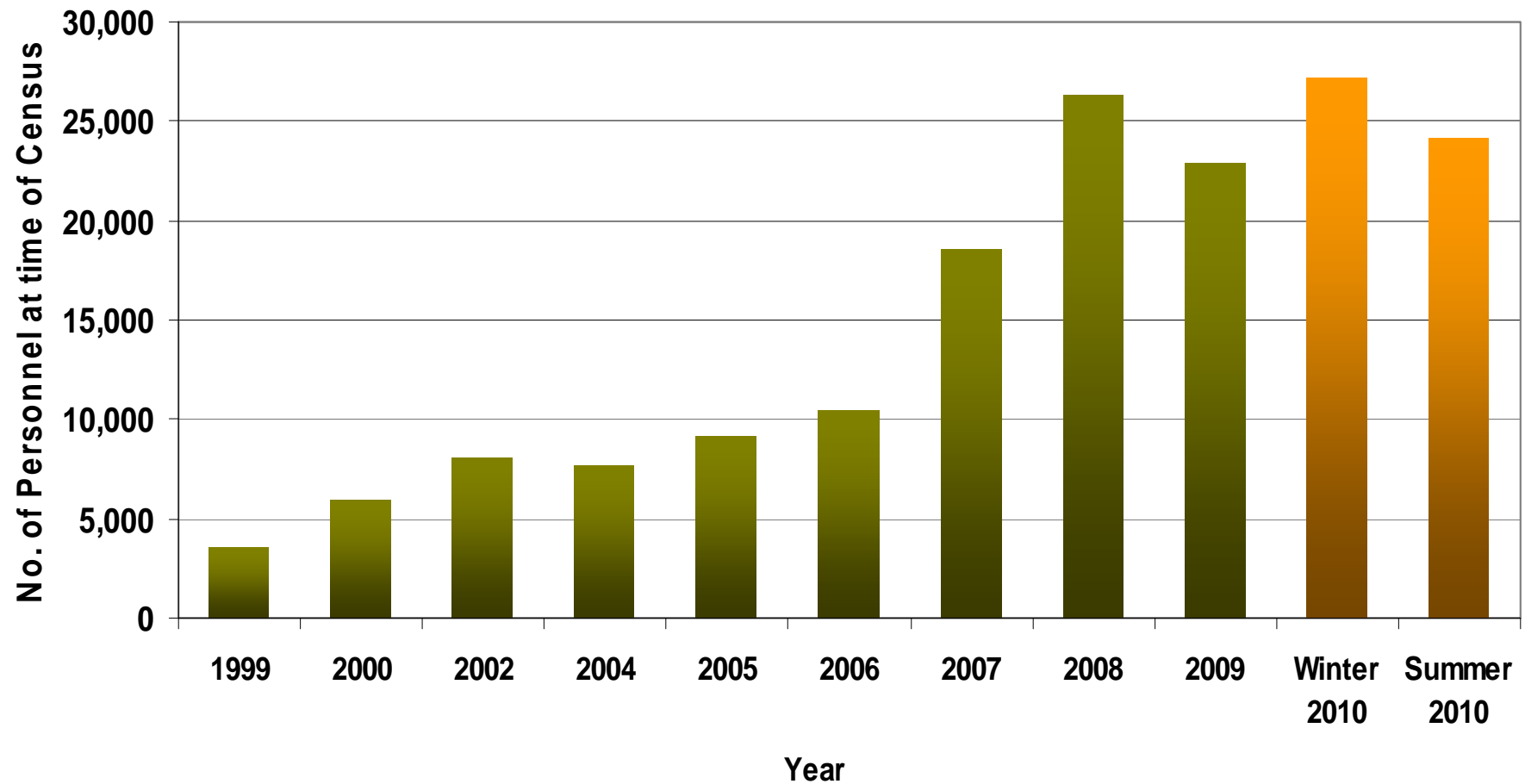
# Oil Sands Capital Expenditure Forecast – Post Economic Turmoil (July 2010)



# Short Term Outlook for Oil Sands

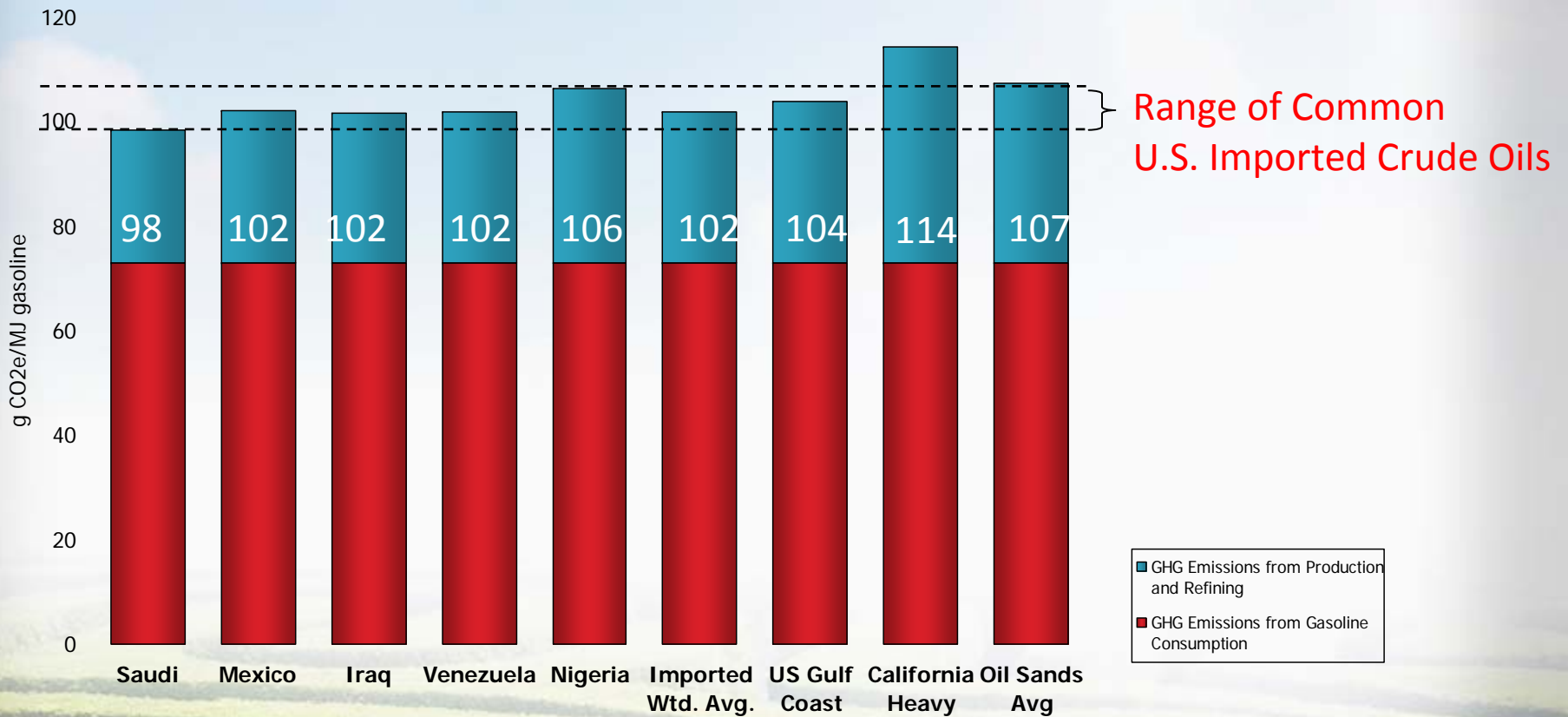
- Projects are being initiated/re-initiated
  - Driven by recovering oil prices and lower costs
  - Projects under construction:
    - Imperial Kearn Lake
    - Shell Jackpine and Shell upgrader including Quest CCS project
  - Projects Re-activated
    - Suncor Firebag Phases 3 and 4
    - Devon Jackfish Phase 3 application in 2010
    - Cenovus Christina Lake – application for phases E, F, G
    - ConocoPhillips/Total – Surmount phase 2
    - Husky/BP – Sunrise phase 1

# Project Accommodation Census – Regional Municipality of Wood Buffalo – 1999 – 2010 \*



\* 1999-2009 Data from annual Regional Municipality Census  
Summer and Winter 2010 Data from OSDG Camp Survey

# Carbon footprint of oil sands is comparable to conventional crudes processed in the U.S.

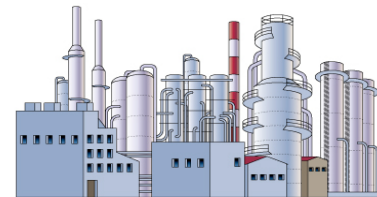


Source: Jacobs Consultancy, *Life Cycle Assessment Comparison for North America and Imported Crudes*, June 2009

# Oil sands emissions have fallen

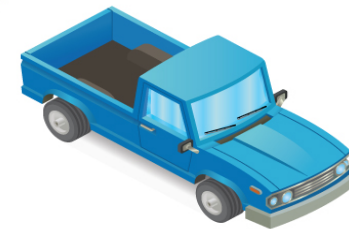
Oil Sands  
Efficiency  
1990 - 2009

GHG  
Emissions  
39%



Vehicle  
Efficiency  
1990 - 2009

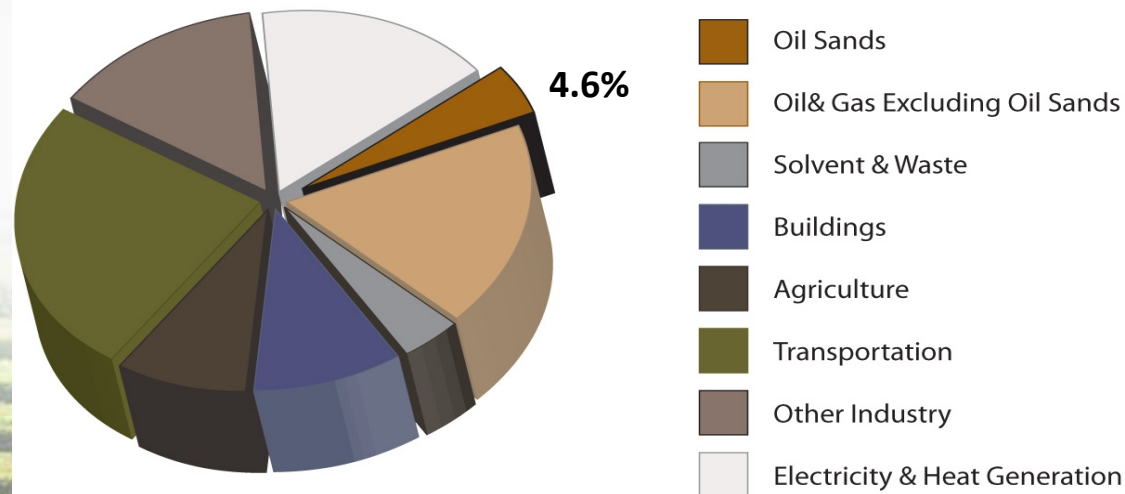
GHG  
Emissions  
11%



# Oil sands GHG emissions

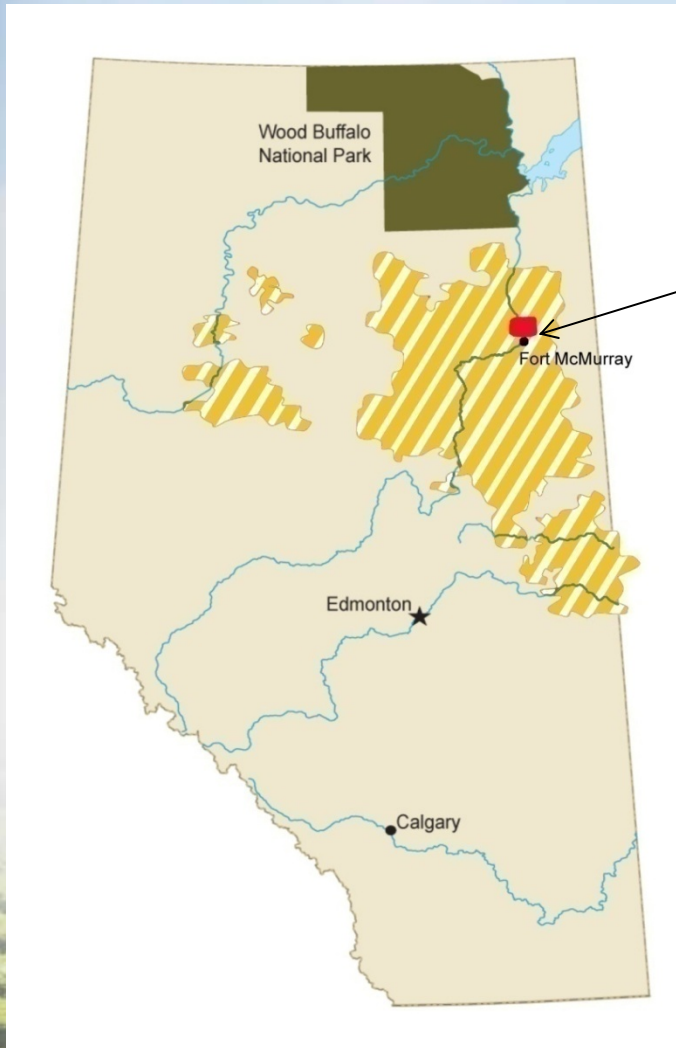
- Oil Sands account for 4.6 per cent of Canada's GHG emissions – Canada accounts for 5 per cent of global GHG emissions
- 1/1000<sup>th</sup> of the world's total emissions - approximately 70 per cent of Canada's crude oil requirements

Canada's GHG Emissions by Sector



Source: Environment Canada

# Boreal Forest Use



**Mineable Area (2.5 %)**



**Mineable oil sands only exists under 0.1 per cent of Canada's total boreal forest**

- 602 km<sup>2</sup> disturbed to date
- 67 km<sup>2</sup> reclaimed to date



2.5 per cent of the area is mineable



97.5 per cent will be developed through in-situ



100 per cent of disturbed land will be reclaimed

# Oil sands use of water resources

- Oil sands currently use 1 per cent of the annual flow of the Athabasca river
- At full oil sands development only 2.2 per cent of the mean annual flow will be drawn
- Water withdrawals are capped at 8 metres<sup>3</sup> per second (8 to 10 per cent of the lowest flows ever recorded)
- In-situ production uses non-potable and saline ground water



## *In Alberta ...*

- Water used for oil sands is about 88 million m<sup>3</sup>
- Water used for agriculture is about 4,100 million m<sup>3</sup>

# Existing and proposed oil sands projects

## 1) Operating Projects: 1.89 M bbl/d

- Mining – 1.057 M bbl/d
- in-situ – 0.833 M bbl/d

## 2) Under Construction: 0.607 M bbl/d

- Mining – 0.390 M bbl/d
- in-situ – 0.217 M bbl/d

## 3) Projects with Regulatory Approval 1.705 M bbl/d

- Mining – 0.880 M bbl/d
- in-situ – 0.825 M bbl/d

## 4) Projects Under Regulatory Review: 1.426 M bbl/d

- Mining – 0.520 M bbl/d
- in-situ – 0.906 M bbl/d

*Data source: OSDG, Nichols Applied Management*

# Production / Production Growth Potential

- Total Existing Capacity: **1.89** MBbl/d
  - Operating and sustaining existing capacity requires expenditures of \$18 Billion per year.
- Total Existing and Under Construction = Production Capacity of 2.5 MBbl/d
- Total Existing, Under Construction and With Regulatory Approval = Production Capacity of 4.2 MBbl/d

# Oil Sands In-situ Projects – Summary

Project Status	Production Capacity (bbl/day)
Projects in Operation	833,500
Projects Under Construction	217,300
Projects With Regulatory Approval	825,500
Projects Under Regulatory Review	906,455
Projects Announced/Disclosed	2,439,000
<b>Total</b>	<b>5,221,755</b>

\*Project information valid as of July 2010. Public sources used.

# Oil Sands Mining Projects – Summary

Project Status	Production Capacity (bbl/day)
Projects in Operation	1,057,000
Projects Under Construction	390,000
Projects with Regulatory Approval	880,000
Projects Under Regulatory Review	520,000
Projects Announced/Disclosed	450,000
<b>Total Production Capacity</b>	<b>3,297,000</b>

\*Project information valid as of July 2010. Public sources used.

# Finding balance



# Appendix

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# Projects Operating – In-situ (1)

In-situ	Bitumen Capacity (bpd)	Region
Canadian Natural Resources Ltd. - Primrose East (Burnt Lake)	40,000	Cold Lake
Canadian Natural Resources Ltd. - Primrose North	35,000	Cold Lake
Canadian Natural Resources Ltd. - Primrose South	45,000	Cold Lake
Canadian Natural Resources Ltd. - Wolf Lake	13,000	Cold Lake
Cenovus Energy Inc. - Christina Lake Phases A-B	18,000	Athabasca
Cenovus Energy Inc. - Foster Creek Phases A-E	120,000	Cold Lake
Connacher Oil and Gas - Great Divide Pod 1	10,000	Athabasca
Connacher Oil and Gas - Great Divide Pod 2 (Algar)	10,000	Athabasca
ConocoPhillips/ Total E&P - Pilot	1,200	Athabasca
ConocoPhillips/ Total E&P - Surrmont Phase I	27,000	Athabasca
Devon Canada Limited - Jackfish 1	35,000	Athabasca
E-T Energy - Pilot	1,000	Athabasca
Husky Energy - Tucker Phase 1	30,000	Cold Lake
Imperial - Cold Lake Phases 1-10: Leming, Maskwa, Mahihkan	110,000	Cold Lake
Imperial - Cold Lake Phases 11-13: Mahkeses	30,000	Cold Lake
Japan Canada Oil Sands - Hangingstone Pilot	10,000	Athabasca

\*Project information valid as of April 2010. Public sources used.

# Projects Operating – In-situ (2)

In-situ	Bitumen Capacity (bpd)	Region
MEG Energy - Christina Lake Reg. Project Phase 1	3,000	Athabasca
MEG Energy - Christina Lake Reg. Project Phase 2A	22,000	Athabasca
Nexen Inc. - Long Lake Phase 1	72,000	Athabasca
North Peace Energy - Red Earth CSS Pilot	1,000	Peace River
Petrobank Energy & Resources Ltd. - Whitesands Pilot	1,800	Athabasca
Shell Canada -Cliffdale Battery	27,000	Peace River
Shell Canada - Orion Phase 1	10,000	Cold Lake
Shell Canada - Peace River Complex - Cadotte Lake	12,500	Peace River
Shell Canada - Seal Battery	10,000	Peace River
Shell Canada - Seal Battery - Expansion	13,000	Peace River
Suncor Energy Inc. - Firebag Cogeneration and Expansion	25,000	Athabasca
Suncor Energy Inc. - Firebag Phase 1	33,000	Athabasca
Suncor Energy Inc. - Firebag Phase 2	35,000	Athabasca
Suncor Energy Inc. - MacKay River	33,000	Athabasca
<b>Total</b>	<b>833,500</b>	

# Projects Under Construction – In-situ

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Cenovus Energy Inc. - Christina Lake: Phase C	2011	40,000	Athabasca
Devon Canada Limited - Jackfish 2	2011	35,000	Athabasca
Laricina Energy - Saleski Pilot	2010	1,800	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh - Leismer Demo	2011	10,000	Athabasca
Suncor Energy Inc. - Firebag Phase 3	2011	68,000	Athabasca
Suncor Energy Inc. - Firebag Phase 4	2012	62,500	Athabasca
<b>Total</b>		<b>217,300</b>	

\*Project information valid as of April 2010. Public sources used.

# Projects With Regulatory Review – In-situ (1)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Andora Energy - Sawn Lake	TBD	700	Peace River
Cenovus Energy Inc. - Christina Lake: Phase D	2013	40,000	Athabasca
ConocoPhillips/ Total E&P - Surrmont Ph. II	2015	83,000	Athabasca
Husky Energy - Caribou Demonstration Project	TBD	10,000	Cold Lake
Husky Energy - Sunrise Ph. 1	2014	60,000	Athabasca
Husky Energy - Sunrise Ph.2-3	2020	140,000	Athabasca
Imperial - Cold Lake Phases 14-16: Nabiye, Mahihkan North	TBD	30,000	Cold Lake
Korea National Oil Corporation - Black Gold	2012	10,000	Athabasca
Laricina Energy - Germain	TBD	5,000	Athabasca
MEG Energy - Christina Lake RP Ph.2B	2013	35,000	Athabasca
Nexen Inc. - Long Lake Ph.2	TBD	72,000	Athabasca

\*Project information valid as of April 2010. Public sources used.

## Projects With Regulatory Review – In-situ (2)

in-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Petrobank Energy & Resources Ltd. - Whitesands - Expansion	2011	1,800	Athabasca
Shell Canada - Orion Phase 2	TBD	10,000	Cold Lake
Suncor Energy Inc. - Firebake Phase 5	TBD	62,500	Athabasca
Suncor Energy Inc. - Firebake Phase 6	TBD	62,500	Athabasca
Suncor Energy Inc. - Meadow Creek	TBD	40,000	Athabasca
Suncor Energy Inc. - Meadow Creek Phase 2	TBD	40,000	Athabasca
Sunshine Oil Sands - Harper Pilot	2010	<1000	Athabasca
Value Creation Group - Terre de Grace Pilot	TBD	10,000	Athabasca
Nexen Inc. - Long Lake Ph. 3	TBD	72,000	Athabasca South
Suncor Energy Inc. - MacKay River Phase 2	TBD	40,000	Athabasca
*Project information valid as of April 2010. Public sources used.	<b>Total</b>	<b>825,500</b>	

# Projects Under Regulatory Approval – In-situ (1)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Alberta Oilsands Inc. - Clearwater Pilot (West)	2012	10,000	Athabasca
Athabasca Oil Sands Corp. - Dover Central Pilot	N/A	2,000	Athabasca
Athabasca Oil Sands Corp. - Dover Commercial Phase 1	2015	40,000	Athabasca
Athabasca Oil Sands Corp. - MacKay River Commercial Phase 1	2014-2022	35,000	Athabasca
Athabasca Oil Sands Corp. - MacKay River Commercial Phase 2-4	TBD	115,000	Athabasca
Athabasca Oil Sands Corp. - MacKay River Pilot	2010	2,200	Athabasca
Blackpearl Resources Inc. - Blackrod Pilot	2011	500	Athabasca
Canadian Natural Resources Ltd. - CSS Follow-up Process	2018	30,000	Cold Lake
Canadian Natural Resources Ltd. - Wolf Lake SAGD	TBD	5,500	Cold Lake
Cenovus Energy Inc. - Borealis Phase A	TBD	35,000	Athabasca
Cenovus Energy Inc. - Christina Lake 1E-F-G	2015-2017	40,000	Athabasca
Cenovus Energy Inc. - Foster Creek Phases F	2015	30,000	Cold Lake
Cenovus Energy Inc. - Foster Creek Phases G	2016	30,000	Cold Lake
Cenovus Energy Inc. - Foster Creek Phases H	2017	30,000	Cold Lake
E-T Energy - Poplar Creek ET-DSP Project Ph. 1	2011	10,000	Athabasca
Excelsior Energy - Hangingstone Experimental	2011	1,000	Athabasca
Grizzly Oil Sands - Algar Lake	2013	11,300	Athabasca
Husky Energy - McMullen	TBD	755	Athabasca

# Projects Under Regulatory Review – In-situ (2)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Japan Canada Oil Sands - Hangingstone Phase 1	2014	35,000	Athabasca
Koch Exploration Canada - Gemini	2012	10,000	Cold Lake
Koch Exploration Canada - Pilot	TBD	1,200	Cold Lake
MEG Energy - Christina Lake Phases 3A,B,C	2014-2018	150,000	Athabasca
Osum Oil Sands Corp - Taiga	2014	35,000	Cold Lake
Pengrowth Energy Trust - Lindbergh pilot	TBD	2,500	Cold Lake
Penn West Energy Trust - Seal Main -Pilot	TBD	3,000	Peace River
Petrobank Energy & Resources Ltd. - May River Phase 1	2014	10,000	Athabasca
Shell Canada - Carmon Creek Phases 1 & 2	TBD	80,000	Peace River
Southern Pacific Resource Corp. - STP McKay Project	2013	12,000	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh - Leismer Expansion Hub	2012-2014	40,000	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh -Leismer Commercial Hub	2012-2034	20,000	Athabasca
Suncor Energy Inc. - Firebag stages 3-6 Debottlenecking	TBD	23,500	Athabasca
Value Creation Group -TriStar Pilot Project	2012	1,000	Athabasca
Canadian Natural Resources Ltd. - Kirby	2013	45,000	Athabasca
Enerplus Resource Fund -Kirby Phase 1	TBD	10,000	Athabasca
<b>Total</b>		<b>906,455</b>	

\*Project information valid as of April 2010. Public sources used.

# Projects Announced/Disclosed – In-situ (1)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Alberta Oilsands Inc. -Clearwater East Commercial	2013	10,000	Athabasca
Alberta Oilsands Inc. - Clearwater North Commercial	2014	10,000	Athabasca
Athabasca Oil Sands Corp -Hangingstone	TBD	50,000	Athabasca
Athabasca Oil Sands Corp. - Dover West Additional Phases	TBD	165,000	Athabasca
Athabasca Oil Sands Corp. - Birch	TBD	88,000	Athabasca
Athabasca Oil Sands Corp. -Dover West Phase 1	2016	50,000	Athabasca
Canadian Natural Resources Ltd. -Birch Mountain East	2016	60,000	Athabasca
Canadian Natural Resources Ltd. - Gregoire Lake 1	2018	60,000	Athabasca
Canadian Natural Resources Ltd. -Grouse Ph.1	2014	60,000	Athabasca
Canadian Natural Resources Ltd. - Leismer Phase 1	2020	30,000	Athabasca
Cenovus Energy Inc. - Borealis Phases B & C	TBD	65,000	Athabasca
Cenovus Energy Inc. - East Fort McMurray	TBD	60,000	Athabasca
Cenovus Energy Inc. -Grand Rapids Phase A	2017	60,000	Athabasca
Cenovus Energy Inc. - Grand Rapids Phase B	TBD	60,000	Athabasca
Cenovus Energy Inc. - Grand Rapids Phase C	TBD	60,000	Athabasca

\*Project information valid as of April 2010. Public sources used.

## Projects Announced/Disclosed – In-situ (2)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Cenovus Energy Inc. - Narrows Lake Phases A-C	2016	130,000	Athabasca
Cenovus Energy Inc. - Steepbank	TBD	30,000	Athabasca
Cenovus Energy Inc. - Telephone Lake: Phase A	TBD	35,000	Athabasca
Cenovus Energy Inc. - Telephone Lake: Phase B	TBD	15,000	Athabasca
Cenovus Energy Inc. - West Kirby	TBD	30,000	Athabasca
Cenovus Energy Inc. - Winefred Lake	2019	60,000	Athabasca
Chevron Canada - Ells River	TBA	35,000	Athabasca
Connacher Oil and Gas - Great Divide Expansion Project	2014	24,000	Athabasca
Connacher Oil and Gas - Hanging Stone Halfway Creek	2013	10,000	Athabasca
Devon Canada Limited - Jackfish 3	2015	35,000	Athabasca
Devon Canada Limited - Kirby	TBD	N/A	Athabasca
Enerplus Resource Fund - Kirby Ph. 2	TBD	25,000	Athabasca
E-T Energy - Poplar Creek ET-DSP Project Expansion	2014	100,000	Athabasca
Excelsior Energy - Hangingstone Build out 1-3	TBD	80,000	Athabasca
Ivanhoe Energy - Tamarack	2014	20,000	Athabasca

\*Project information valid as of April 2010. Public sources used.

## Projects Announced/Disclosed – In-situ (3)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Korea National Oil Corporation - Black Gold Phase 2	2015	20,000	Athabasca
Laricina Energy - Germain Phase 1	TBD	10,000	Athabasca
Laricina Energy - Saleski Phase 1	2013	10,000	Athabasca
Nexen Inc. -Long Lake Phase 4-6	TBD	216,000	Athabasca
North Peace Energy - Red Earth Commercial Project	TBD	20,000	Peace River
North Peace Energy - Red Earth Expansion	TBD	3,000	Peace River
Patch International Inc. - Ells River	TBD	10,000	Athabasca
Penn West Energy Trust - Seal North and Cadotte	TBD	3,000	Peace River
Petrobank Energy & Resources Ltd. - May River Expansion	TBD	90,000	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh - Corner	2015-2016	50,000	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh - Hangingstone	TBD	20,000	Athabasca
Statoil Canada Ltd. - Kai Kos Dehseh - Thornbury	TBD	40,000	Athabasca
Statoil Canada Ltd. - Northwest Leismer	TBD	20,000	Athabasca
Statoil Canada Ltd. - South Leismer	TBD	20,000	Athabasca
Suncor Energy Inc. - Chard	TBD	40,000	Athabasca

\*Project information valid as of April 2010. Public sources used.

# Projects Announced/Disclosed – In-situ (4)

In-situ	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Suncor Energy Inc. - Lewis Phase 1	TBD	40,000	Athabasca
Suncor Energy Inc. - Lewis Phase 2	TBD	40,000	Athabasca
Sunshine Oil Sands - Legend Lake Phase 1	2014	10,000	Athabasca
Sunshine Oil Sands - Legend Lake Phase 2	TBD	20,000	Athabasca
Sunshine Oil Sands - Legend Lake Phase 3	TBD	20,000	Athabasca
Sunshine Oil Sands - Thickwood Phase 1 & 2	TBD	10,000	Athabasca
Sunshine Oil Sands - Thickwood Phase 3	TBD	20,000	Athabasca
Sunshine Oil Sands - Thickwood Phase 4	TBD	20,000	Athabasca
Sunshine Oil Sands - West Ells Phase 3	TBD	40,000	Athabasca
Sunshine Oil Sands - West Ells Phase 4	TBD	40,000	Athabasca
Sunshine Oil Sands - Terre de Grace Phase 1	TBD	10,000	Athabasca
Value Creation Group - Terre de Grace Phase 1	TBD	40,000	Athabasca
Value Creation Group - Terre de Grace Phase 2	TBD	40,000	Athabasca
<b>Total</b>		<b>2,439,000</b>	

\*Project information valid as of April 2010. Public sources used.

# Projects Operating - Mining

Mining	Bitumen Capacity (bpd)	Region
Athabasca Oil Sands Project (Shell) - Muskeg River Mine	155,000	Athabasca
Canadian Natural Resources - Horizon Mine - Phase 1	110,000	Athabasca
Canadian Natural Resources - Horizon Mine - Phase 2/3 : Tranche 1	92,000	Athabasca
Suncor Energy - Millennium/ Steepbank Mine	350,000	Athabasca
Syncrude- Mildred Lake/Aurora North Mines - Stages 1 & 2 & 3 Expansion	350,000	Athabasca
<b>Total</b>	<b>1,057,000</b>	

\*Project information valid as of July 2010. Public sources used.

# Projects Under Construction - Mining

Mining	Est. Start Up Production	Bitumen Capacity (bpd)	Mining
Athabasca Oil Sands Project (Shell) – Jackpine Mine – Phase 1A	2010	100,000	Athabasca
Imperial Oil – Kearl Mine – Phases 1	2012	110,000	Athabasca
Suncor Energy – North Steepbank Mine -Expansion	C suspended	180,000	Athabasca
<b>Total</b>		<b>390,000</b>	

\*Project information valid as of July 2010. Public sources used.

# Projects With Regulatory Review – Mining

Mining	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Athabasca Oil Sands Project (Shell) - Jackpine Mine - Phase 1B	Target 2014	100,000	Athabasca
Athabasca Oil Sands Project (Shell) - Muskeg River Mine - Expansion and Debottlenecking	TBD	115,000	Athabasca
Imperial Oil - Kearl Mine - Phases 2 & 3	2015-2021	200,000	Athabasca
Suncor Energy - Fort Hills Mine - Phase 1 & Debottlenecking	TBD	190,000	Athabasca
Syncrude - Aurora Mine - South	2016-2019	200,000	Athabasca
Syncrude -Mildred Lake Mine - Debottleneck	TBD	75,000	Athabasca
<b>Total</b>		<b>880,000</b>	

\*Project information valid as of July 2010. Public sources used.

# Projects Under Regulatory Review – Mining

Mining	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Athabasca Oil Sands Project (Shell) - Jackpine Mine - Phase 3	TBD	100,000	Athabasca
Athabasca Oil Sands Project (Shell) – Pierre River Mine - Phases 1 & 2	2018-2022	200,000	Athabasca
Suncor - Voyageur South Mine - Phase 1	TBD	120,000	Athabasca
Total E&P Canada - Joslyn North Mine - Phases 1 & 2	TBD	100,000	Athabasca
<b>Total</b>		<b>520,000</b>	

\*Project information valid as of July 2010. Public sources used.

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# Projects Announced/Disclosed – Mining

Mining	Est. Start Up Production	Bitumen Capacity (bpd)	Region
Canadian Natural Resources – Horizon Mine - Phase 2/3 Expansion - Tranche 2-4	TBD	140,000	Athabasca
Total E&P Canada – Joslyn Mine	TBD	100,000	Athabasca
UTS/Teck Resources – Frontier Mine – Phases 1 & 2	TBD	160,000	Athabasca
UTS/Teck Resources – Equinox Mine – Phase 1	TBD	50,000	Athabasca
<b>Total</b>		<b>450,000</b>	

\*Project information valid as of July 2010. Public sources used.

# Disclaimer

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.

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