



## Presentation Outline

- Oil Sands Production Potential – Unadjusted Case
- Oil Sands Industry Challenges and Sustainability
  - Overview
  - Capital Costs
  - Greenhouse Gas Emissions
- Economic Implications
- Oil Sands Production Outlook – Adjusted Case
- Conclusions

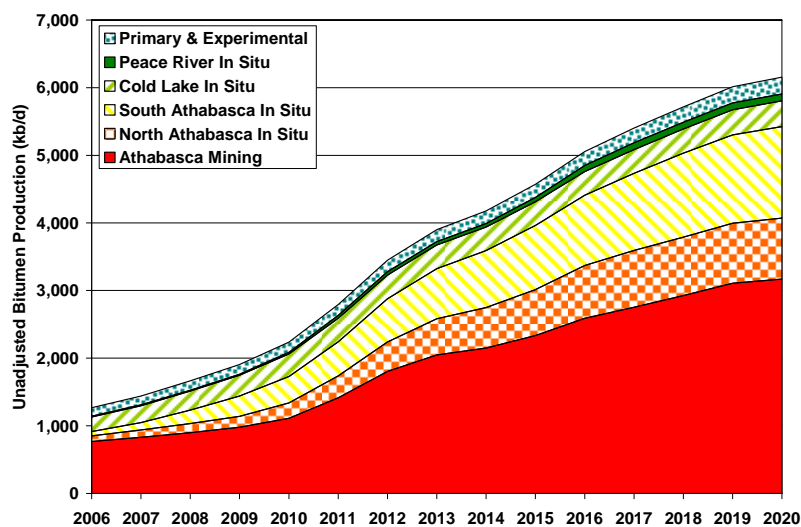
Strategy West Inc.

## Strategy West's Oil Sands Industry Outlooks

- Comprehensive Project Database
  - Used to develop aggregated industry outlooks
- Unadjusted Outlook
  - Assumes all existing and proposed projects are developed and meet their scheduled startup dates
- Adjusted Outlook
  - Project-by-project timing adjustments
  - Project-by-project probability estimates

Strategy West Inc.

## Bitumen Production Outlook - Unadjusted Case



Source: Strategy West Inc.

Strategy West Inc.

## CAPEX – Unadjusted Case

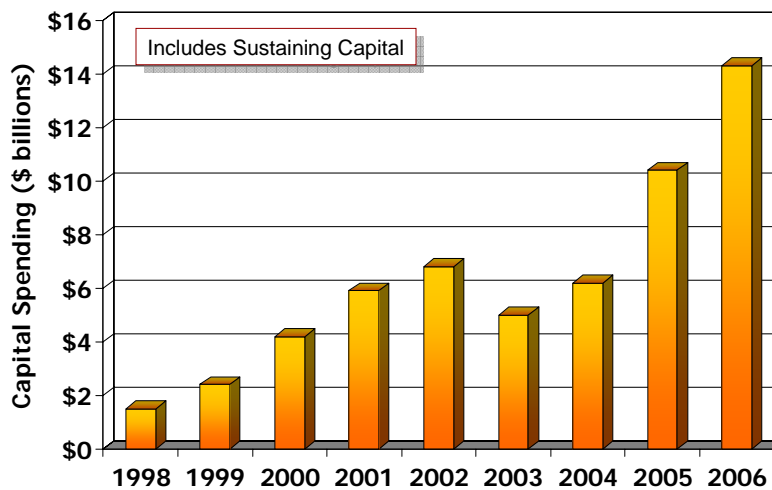
	Production Increase 2008-2020 (million b/d)	Initial CAPEX (2008 C\$ per b/d)	Average Annual Initial CAPEX 2008-2020 (2008 C\$ billions)
Mining & Extraction	2.3	\$40,000 (Bitumen)	\$7.2
In Situ	2.4	\$10,000-\$35,000 (Bitumen)	\$5.4
Incremental Production	4.7		\$12.6
Upgrading	2.7	\$60,000 (SCO)	\$12.6
<b>Total CAPEX</b>			<b>\$25.2</b>

Notes: Does not include sustaining capital  
Does not include capital for GHG emission reduction

Source: Strategy West Inc.

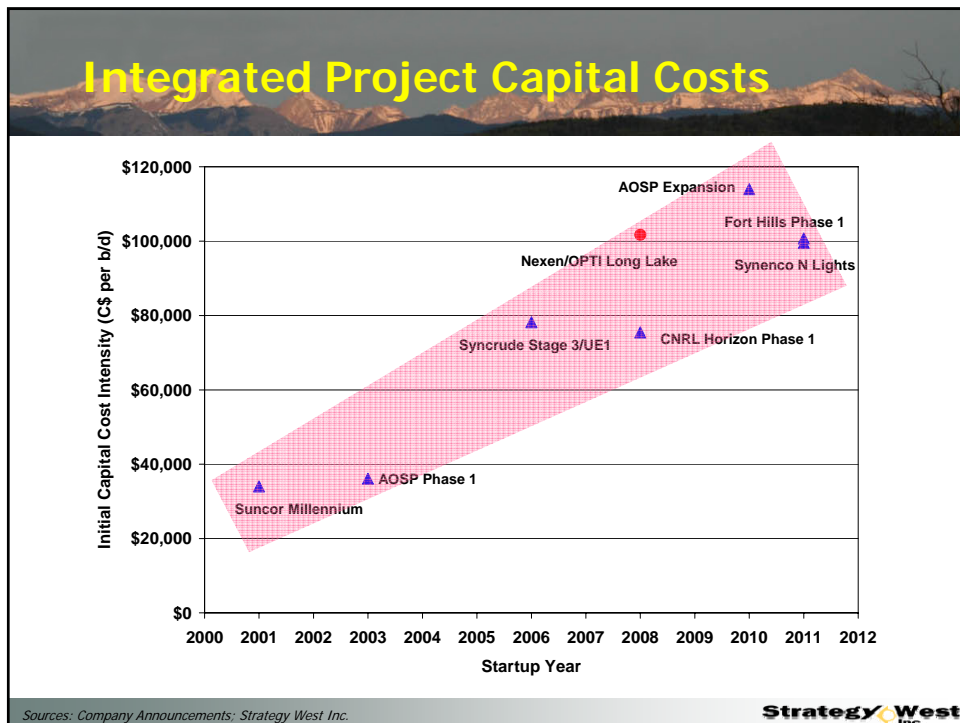
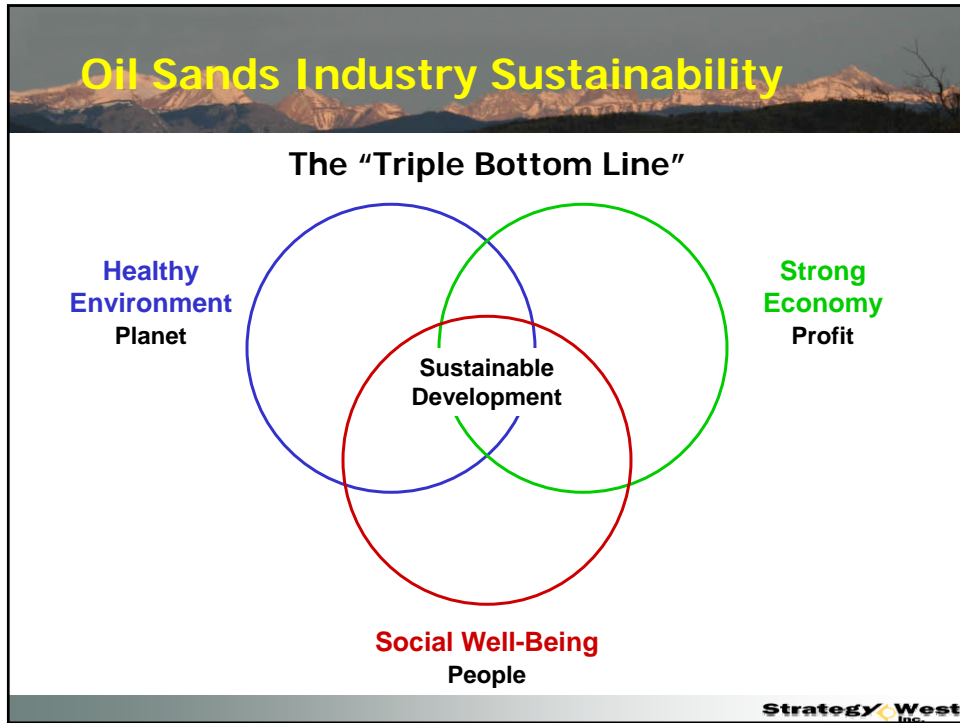
Strategy West Inc.

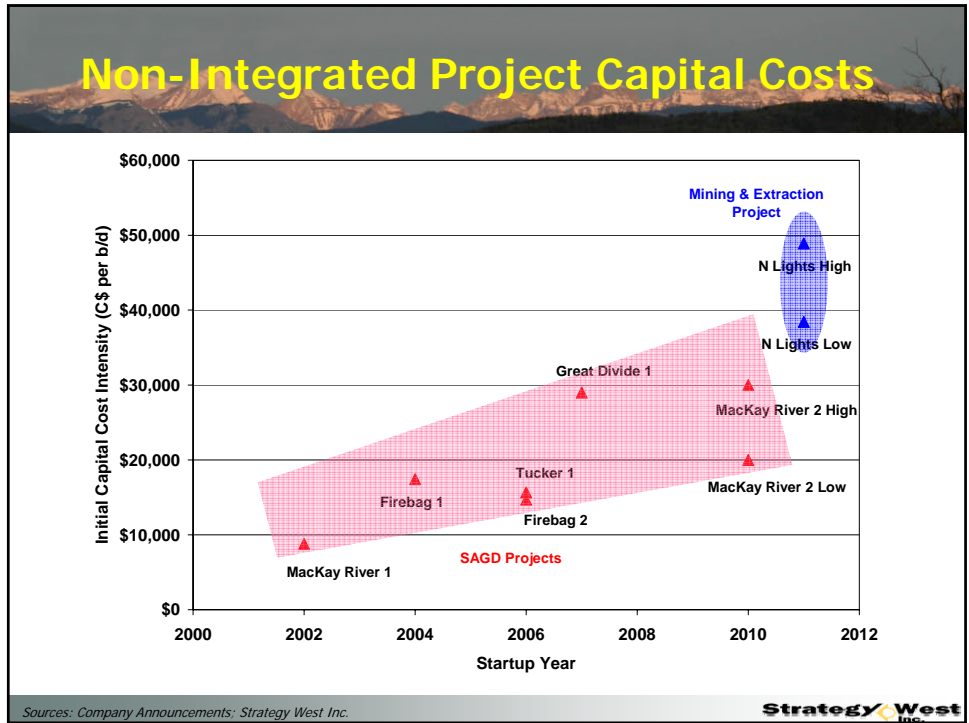
## Oil Sands Historical CAPEX



Source: Canadian Association of Petroleum Producers

Strategy West Inc.



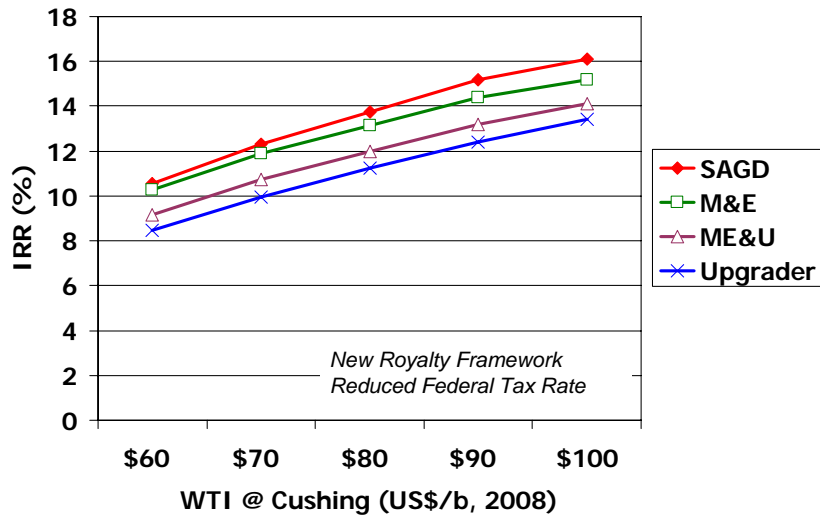


### Hypothetical Oil Sands Projects – Cost Assumptions

	SAGD	Mining & Extraction	Upgrading (Coker)
Product	Dilbit	Dilbit	Synthetic Crude Oil
Initial CAPEX (Real 2008 C\$ per b/d)	\$30,000 (Bitumen)	\$40,000 (Bitumen)	\$60,000 (SCO)
Non-energy OPEX (Real 2008 C\$/b)	\$7.00	\$9.00	\$7.00
Purchased Natural Gas (GJ/b)	1.25	0.30	0.50
SCO Yield	-	-	85%
GHG Emission Penalty (\$/t)	-	-	-

**Strategy West Inc.**

## Hypothetical Oil Sands Projects - Illustrative Investment Returns



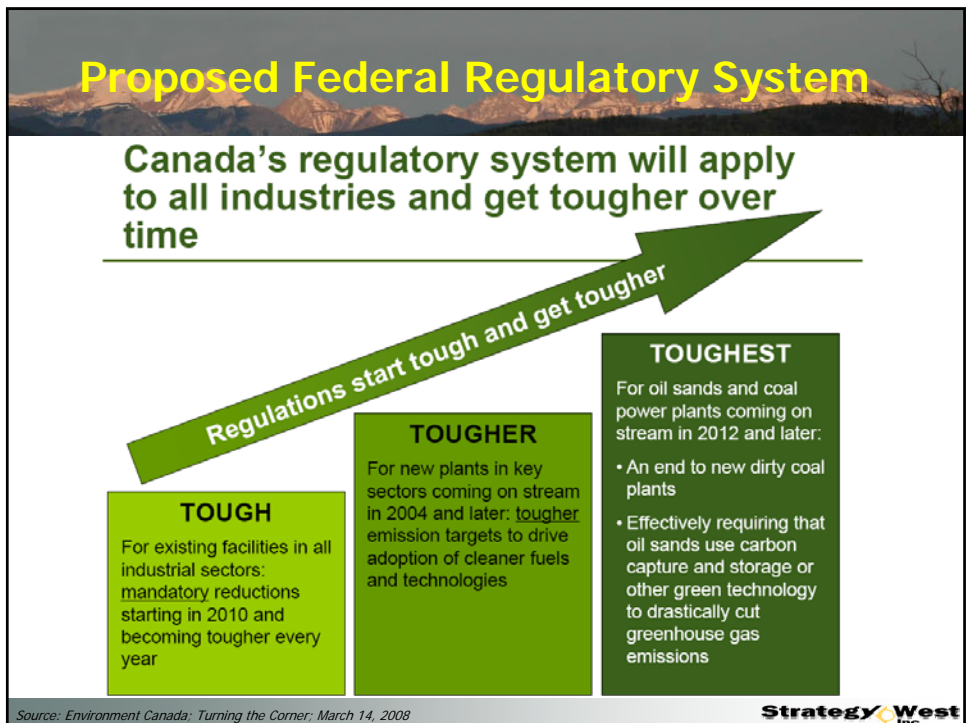
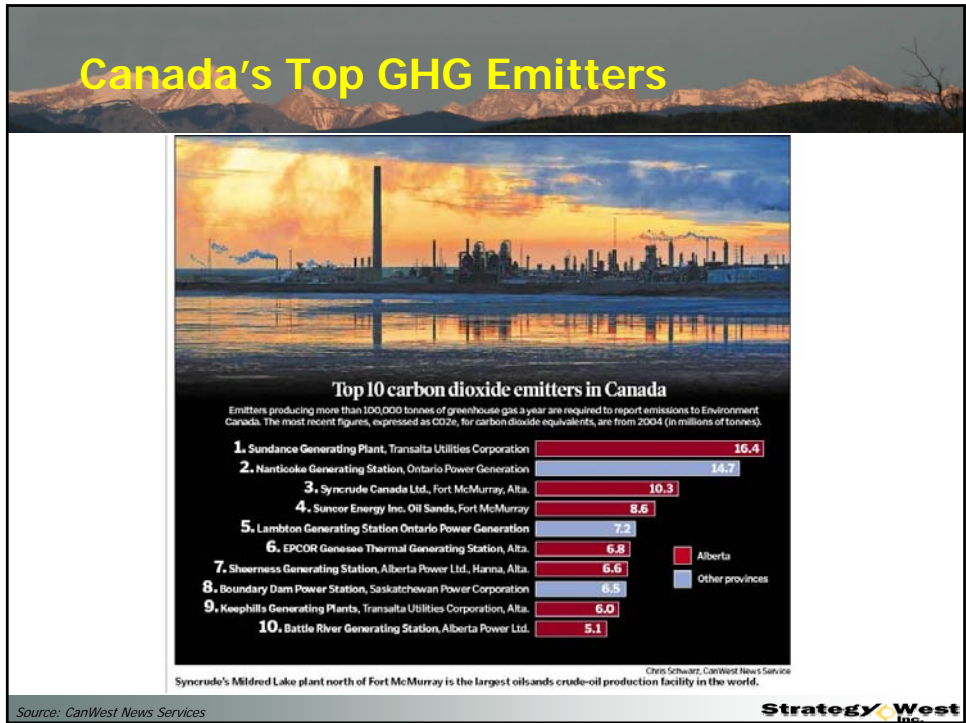
Source: Strategy West Inc.

Strategy West Inc.

## Economic Implications

- Increased oil sands project costs and royalties have raised the oil price investment threshold to US\$60-70/b (WTI at Cushing, OK) not including costs associated with GHG emission compliance
- GHG emission compliance costs will reduce returns on oil sands industry investments and increase the oil price investment threshold

Strategy West Inc.



## Additional Detail – Federal Plan

### Implications of cleaner fuel standard for upgraders and in-situ oil sands plants

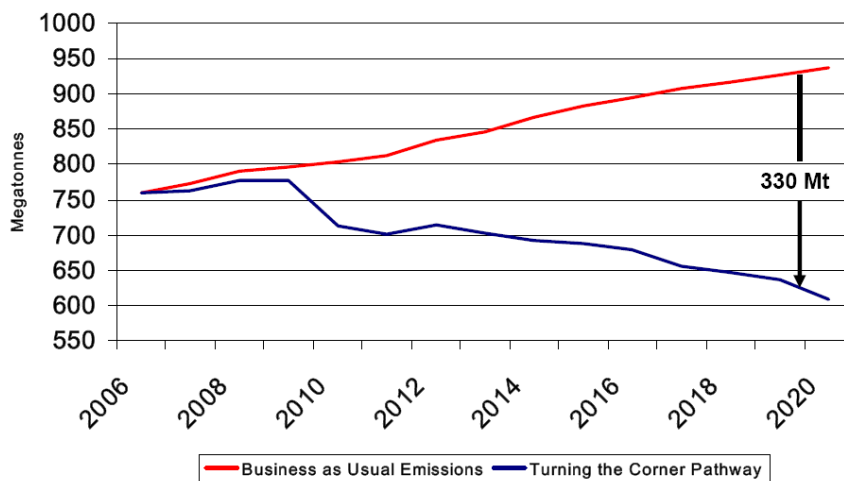
TOUGH	TOUGHER	TOUGHEST
<b>Existing facilities Starting in 2010</b>	<b>New facilities Starting in 2004 to 2011</b>	<b>New facilities Starting in 2012 or later</b>
<ul style="list-style-type: none"> <li>Mandatory reductions becoming tougher every year (18%/2%)</li> </ul>	<ul style="list-style-type: none"> <li>Cleaner fuel standard based on natural gas; standard suspended until 2018 if built capture-ready</li> <li>3-year commissioning period + 2% continuous improvement</li> </ul>	<ul style="list-style-type: none"> <li>From 2012 to 2017: Cleaner fuel standard based on natural gas; standard suspended until 2018 if built capture-ready</li> <li>From 2018 on: Cleaner fuel Standard based on carbon capture and storage technology</li> </ul>
	<ul style="list-style-type: none"> <li>All facilities currently under construction, approved, or at late planning stage would meet the standard</li> </ul>	<ul style="list-style-type: none"> <li>All upgraders that have been through approval process would meet the standard</li> </ul>
		<ul style="list-style-type: none"> <li>7 in-situ plants that have been through approval process are not being designed capture ready</li> </ul>
		<ul style="list-style-type: none"> <li>Those under discussion have time to adjust their design</li> </ul>

Green: in conformity with proposed targets  
Yellow: have time to make adjustments to their design  
Orange: have already received approval and could have to redo some of the approval steps as well as make adjustments to their design

Source: Environment Canada: Turning the Corner: March 14, 2008

**Strategy West Inc.**

## Projected Canadian GHG Emissions under the Federal Plan



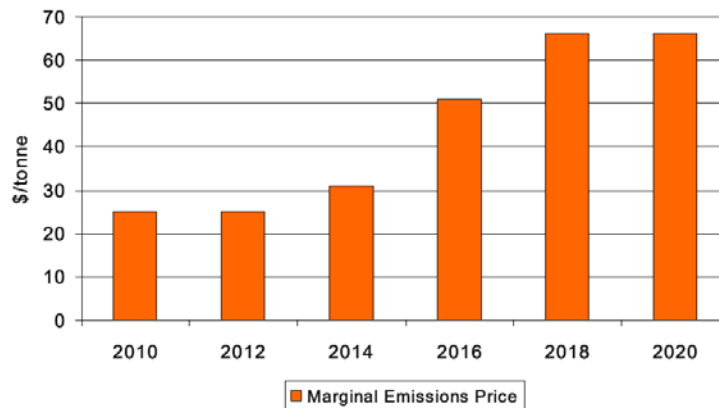
Source: Environment Canada: Turning the Corner: March 14, 2008

**Strategy West Inc.**



## Estimated Price of CO<sub>2</sub> Credits under the Proposed Federal Plan

The price of credits on Canada's carbon market is expected to hit \$65/tonne by 2018



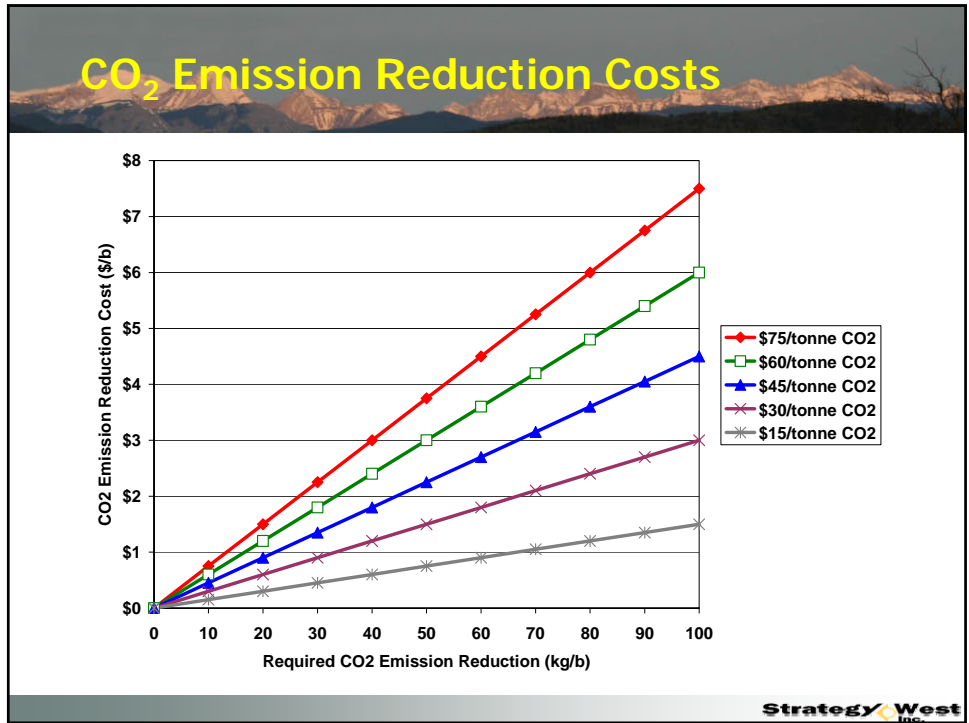
Source: Environment Canada; Turning the Corner; March 14, 2008

Strategy West Inc.

## Oil Sands GHG Emissions

- Illustrative oil sands CO<sub>2e</sub> emission intensities
  - Thermal in situ ~ 65 kg/b
  - Mining and extraction ~15 kg/b
  - Upgrading without gasification ~ 55 kg/b
  - Upgrading with gasification ~ 90+ kg/b

Strategy West Inc.

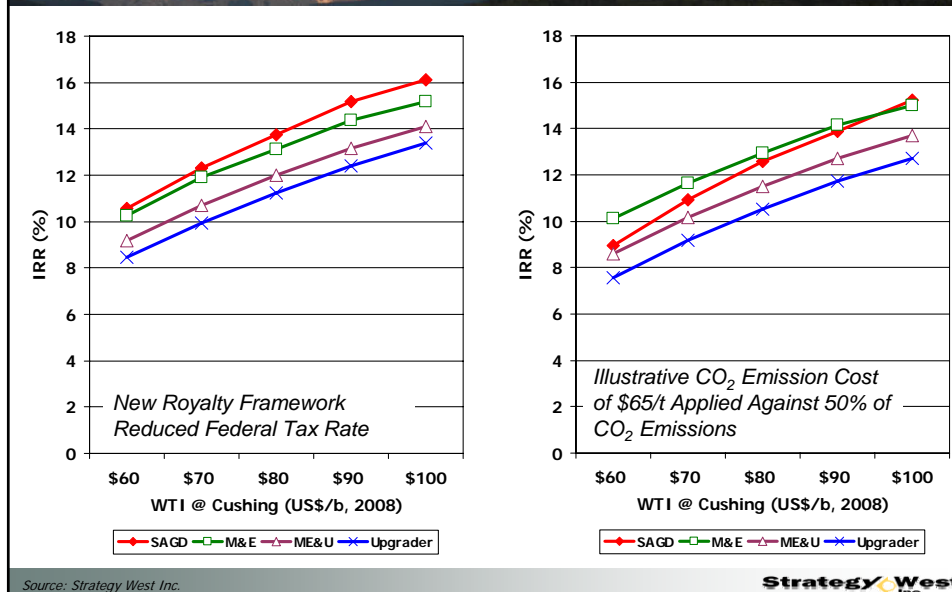


### Hypothetical Oil Sands Projects – Cost Assumptions

	SAGD	Mining & Extraction	Upgrading (Coker)
Product	Dilbit	Dilbit	Synthetic Crude Oil
Initial CAPEX (Real 2008 C\$ per b/d)	\$30,000 (Bitumen)	\$40,000 (Bitumen)	\$60,000 (SCO)
Non-energy OPEX (Real 2008 C\$/b)	\$7.00	\$9.00	\$7.00
Purchased Natural Gas (GJ/b)	1.25	0.30	0.50
SCO Yield	-	-	85%
GHG Emission Penalty (\$/t)	-	-	\$65*
* Illustrative			

Source: Strategy West Inc. **Strategy West Inc.**

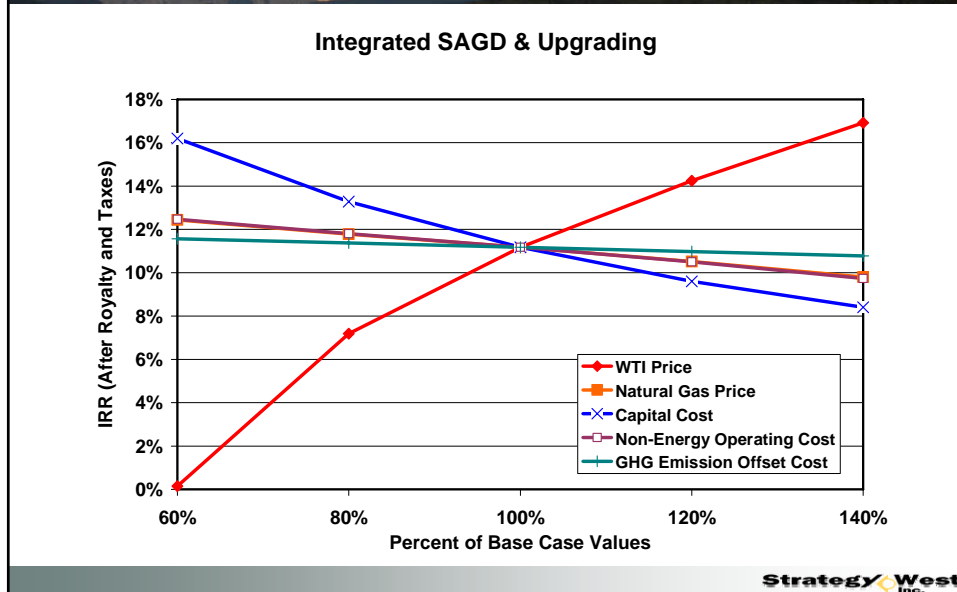
## Hypothetical Oil Sands Projects - Illustrative Investment Returns



## Economic Implications of GHG Emission Compliance Costs

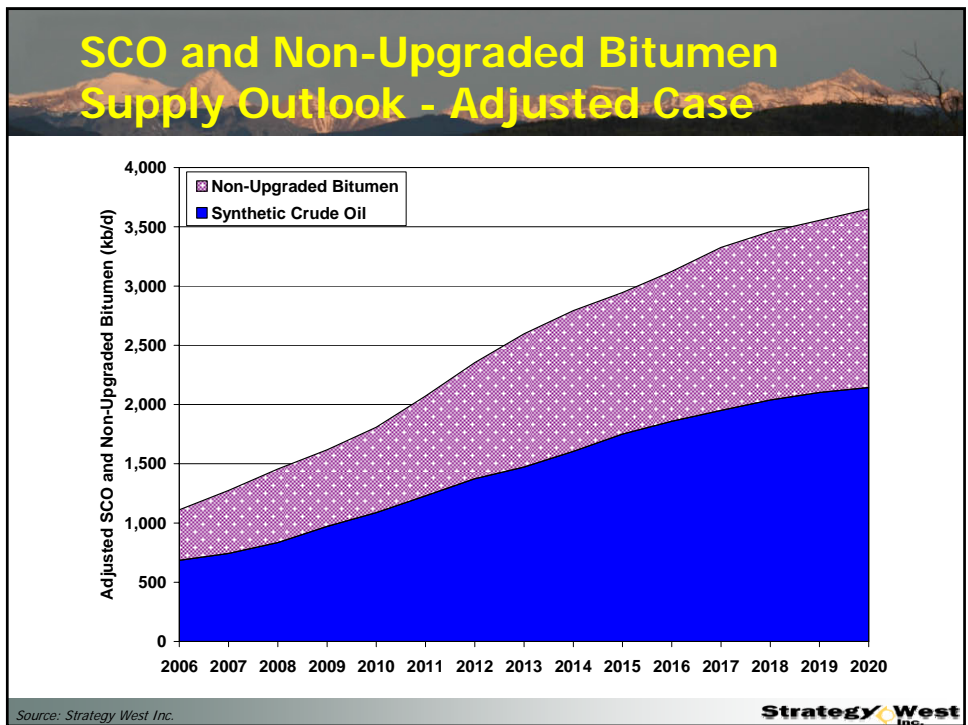
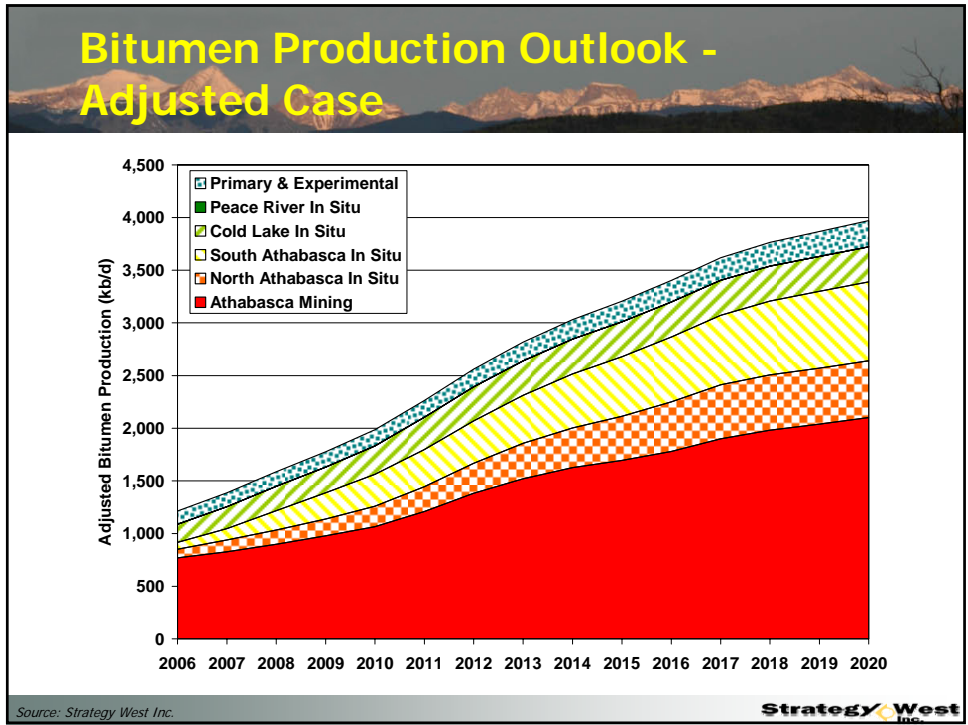
- GHG emission compliance costs would reduce returns on oil sands industry investments
  - Steam-based thermal in situ projects (i.e., SAGD) and upgraders would be affected the most
- GHG emission compliance costs have potential to raise the oil sands project investment threshold to US\$60-75/b (WTI at Cushing, OK) or more
  - Technologies with high emission intensities would experience the largest increases

## Economic Sensitivities



## Key Variables

- The variables with the greatest impact on economic returns are:
  - Product prices/differentials
  - Project capital costs
- While GHG emission compliance costs affect economic returns, their impact is not as great as the uncertainties associated with the above two variables



## CAPEX – Adjusted Case

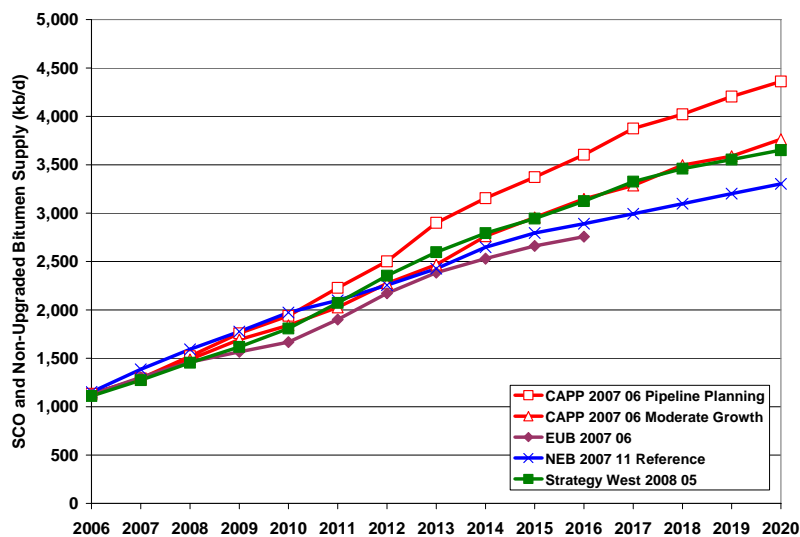
	Production Increase 2008-2020 (million b/d)	Initial CAPEX (2008 C\$ per b/d)	Average Annual Initial CAPEX 2008-2020 (2008 C\$ billions)
Mining & Extraction	1.3	\$40,000 (Bitumen)	\$3.9
In Situ	1.3	\$10,000-\$35,000 (Bitumen)	\$2.9
Incremental Production	2.6		\$6.8
Upgrading	1.4	\$60,000 (SCO)	\$6.5
<b>Total CAPEX</b>			<b>\$13.3</b>

Notes: Does not include sustaining capital  
Does not include capital for GHG emission reduction

Source: Strategy West Inc.

Strategy West Inc.

## Comparative Industry Outlooks



Sources: Canadian Association of Petroleum Producers; Energy and Utilities Board; National Energy Board; Strategy West Inc.

Strategy West Inc.

## Conclusions

- Oil sands projects are experiencing cost pressures but are economically attractive at oil prices of US\$60-75/b (WTI @ Cushing, OK)
- While the many challenges facing the industry will cause project delays and cancellations, these challenges are being addressed and the industry will continue to grow

Strategy West  
Inc.

Thank You

Questions?

Please visit  
[www.strategywest.com](http://www.strategywest.com) for oil  
sands project lists and other  
detailed oil sands industry  
information

Strategy West  
Inc.