Canada's Oilsands Challenges and Opportunities

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Leading Canada's transition to a clean energy future

The Pembina Institute is a national non-profit think tank that advances clean energy solutions through research, education, consulting and advocacy.





Pembina's Oilsands Experience

- Long history working on oilsands issues (20+ yrs)
- Past and present multi-stakeholder group involvement
- Participation in public hearings for major oilsands projects
- Corporate and public sector consulting
- Over 40 publications on the environmental impacts of oilsands development





Pembina's Perspective

Responsible Oilsands Development:

- Current environmental impacts are addressed
- Science-based **environmental limits** are established
- Future development occurs within science-based limits
 - E.g. Development occurs in a manner which allows Canada to meet international climate commitments
- Revenue from oil sands development used to transition to a clean energy economy



Primary Concern: Pace and scale in the absence of environmental limits



Today...

- 1. Carbon implications of oilsands development
- 2. Water quantity and quality concerns
- 3. Cumulative impacts



Climate Change

Keystone XL – what's all the full about?

- Filling it = 36% increase from current oilsands production
- 6.3 million coal fired plants or 4.6 million cars





Why Alberta's GHG emissions matter

Growth in absolute greenhouse gas emissions in top 10 North American Jurisdictions (1990–2009)



Greenhouse Gas Emissions (Mt CO₂e/year)

Total oilsands emissions will double in 10 years



Source: Environment Canada National Inventory (1990-2008), Environment Canada GHG Forecast 2012

How oilsands GHGs impact Canada's climate commitments:

Projected change in absolute emissions under current policy 2010-2020 (Mt CO2e)





Canada's climate target and the 113 Mt gap





GHG profile for oilsands to worsen



- In situ GHG emissions often higher than mining
- In situ will overtake mining by 2015
- As in situ production increases, industry wide emission intensities likely to continue to increase





Alberta's climate targets



- 2020 target: 50 Mt below BAU
- Alberta's fair share to meet Canada's target: 83 Mt
- >70%
 reductions
 through CCS

2011 Analysis of Alberta's Climate Change Strategy: key findings

- Alberta's current GHG policies likely achieve only 1/3 of target reductions
- Policies deliver less than 14 Mt of the 50 Mt reductions planned



For more details, see Pembina Institute's report: "Responsible Action? An assessment of Alberta's greenhouse gas policies"



Oilsands carbon capture costs

Capturable CO, Emissions in Alberta (from existing and new large emitters)



CO₂ Volume Captured in MT/yr

Raising the bar on climate policy in AB

- Implement an escalating carbon price (starting at \$30/tonne) that applies to all emissions;
- To achieve our targets, economic modelling studies for Canada → we can't leave opportunities on the table if they cost less than \$100 to \$150 per tonne.



Surface Water Use

- Average of 2 to 4 barrels of freshwater used per barrel of bitumen from mining (after recycling)
- Industry licensed to withdraw 652 million m³ from Athabasca River, actual use in 2011 = 143 million m³
- Current provincial/federal surface water quantity management framework:
 - green, yellow, red
 - But "red" ≠ STOP



FIGURE 1. ATHABASCA RIVER FLOW VARIABILITY (1958-2007)

FLOW (M³/SEC)



WEEK

Opportunities: the need for an Ecosystem Base Flow for the Athabasca River

- Ecosystem Base Flow = flow threshold in a river system below which no withdrawals are permitted
- 8 years overdue decision reports
- Low cost policy improvement that supports intent of Alberta's regional planning efforts
- Final framework to be released in 2012?





Downstream pollution

- Proceedings of National Academy of Sciences research:
 - Higher concentrations of priority pollutants (e.g., Hg, Pb) downstream
 - Total PAHs now 2.5–23 times greater than 1960 levels in study lakes.
- Aboriginal concerns
- Unhealthy fish





Water monitoring issues remain unresolved

- 2012: Joint Canada-Alberta implementation plan for oilsands monitoring
- Likely a number of years before data informs decisions
- Recent and upcoming approvals based on data from flawed system
- Implement an independently governed monitoring system before any new project approvals





Cumulative Impacts



- 135,250 km² available to in-situ extraction
- 30 times as large as surface mineable area
- >92,000 km² (65%) already leased with no environmental assessment







Woodland caribou in decline within in-situ oil sands areas





Cumulative impacts on air quality

Opportunities

Air

- Establish and enforce air emission limits to achieve WHO air quality guidelines
- Require oilsands operators to deploy best available technology air emissions reductions
- Land & Species at Risk
- Set thresholds on maximum levels of development → will help alig pace of disturbance with pace of reclamation
- Continue to establish new conservation areas

Conclusions

- 1. Not currently achieving responsible oilsands development
- 2. Pace and scale of oil sands expansion: growth of impacts will trump incremental improvements, economic & risk implications
- **3. Policy & regulations are needed:** companies will not make technology improvements without regulatory driver
- 4. Growing signal demanding change: Canada must meet the demand for more responsible, lower carbon fuels
- Solutions exist: Pembina Institute "Solving the Puzzle" Report – 19 policy solutions

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