Environment Canada
and the Oil Sands

May 2011
Presentation Overview

Purpose

1) Provide an update on environmental performance issues related to the development of the oil sands

2) Present a brief overview of Environment Canada role and approach

3) Discuss the oil sands issue moving forward, including policy and implementation issues

Presentation Outline

- Key environmental pressures
- EC role and approach
- Moving forward
General Context

- Alberta oil sands underlie approximately 140,000 km² of Alberta's boreal forest. This represents:
  - 20% of the area of the province of Alberta
  - 40% of Alberta's Boreal forest

- The mineable area represents 2.5% of the area of the total deposit

- The oil sands are the world's second largest oil deposit
  - 97% of Canada's oil reserves
Economic aspects

- Oil sands development is a vital part of Canada’s economy
  - 112,000 direct and indirect jobs
  - 2% of Canada’s GDP
  - $91 billion in investments (1999-2008)

<table>
<thead>
<tr>
<th></th>
<th>Jobs*</th>
<th>GDP ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>20,371</td>
<td>45,474</td>
</tr>
<tr>
<td>Alberta</td>
<td>251,914</td>
<td>1,574,530</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>8,629</td>
<td>18,694</td>
</tr>
<tr>
<td>Manitoba</td>
<td>6,143</td>
<td>11,548</td>
</tr>
<tr>
<td>Ontario</td>
<td>23,200</td>
<td>54,850</td>
</tr>
<tr>
<td>Quebec</td>
<td>10,743</td>
<td>23,172</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>1,229</td>
<td>2,263</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>1,800</td>
<td>3,256</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>257</td>
<td>457</td>
</tr>
<tr>
<td>Newfoundland &amp; Labrador</td>
<td>1,229</td>
<td>2,055</td>
</tr>
<tr>
<td>Yukon Territory</td>
<td>171</td>
<td>423</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>400</td>
<td>1,168</td>
</tr>
<tr>
<td>Nunavut</td>
<td>171</td>
<td>366</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>326,257</td>
<td>1,738,253</td>
</tr>
</tbody>
</table>

* Note measured in "thousand person years" = total number of jobs (times 1000) divided by assumed employment period of 35 years

Source: Canadian Energy Research Institute
Oil Sands Mining: Activities and Environmental Pressures

Mining & Slurry Transport

Pressures
- Truck and "fugitive" emissions (air, greenhouse gases (GHG))
- Particulate matter (air, water)
- Habitat removal (biodiversity)
- Water use (water)

Separation of Bitumen

Pressures
- Tailings ponds (water)
- Fugitive emissions (air, GHG)
- Habitat removal (biodiversity)

Upgrading

Pressures
- Smokestack and "fugitive" emissions (GHG, air)
In-Situ Extraction of Bitumen: Activities and Environmental Pressures

Extraction

Pressures
- Stack emissions (air, GHG)
- Extra energy use (GHG)
- Water use (water)

Transport to Upgrading

Pressures
- Habitat fragmentation (biodiversity)

Taken together, mining and in situ methods of extraction have a number of impacts on different aspects of the environment...
Impacts on Water

• Contamination of the Athabasca River is a high-profile concern
  – Recent studies suggest elevated levels of pollutants near mining sites including hydrocarbons and heavy metals
  – Raises questions about possible effects on health of wildlife and downstream communities
  – Current data cannot generate a “big picture” view of impacts on the ecosystem

• Excessive withdrawals forecast as possible concern during low flow periods
  – Bitumen extraction uses between 1 (in situ) and 3-4 (mining) barrels of fresh (i.e. not recycled) water per barrel of oil recovered
  – Industry demand for water is expected to increase
  – Low flow conditions could damage fish habitat, especially during winter
  – River flow has decreased over past thirty years; trend is expected to continue
Impacts on GHG Emissions

- Between 1990 and 2008, overall oil sands GHG emissions increased by 242% (from 11.7 Mt to 40 Mt), despite a 39% improvement in GHG intensity per unit of energy produced

- The oil sands are Canada’s fastest-growing source of GHGs
  - Oil sands-related emissions are predicted to increase by 50 Mt (130%) between 2008 and 2020, to reach about 90 Mt
  - This increase in oil sands’ emissions by 2020 is about equal to the increase in Canadian emissions overall, raising oil sands’ share of national emissions from ~5% in 2008 to ~12% in 2020
Impacts on Air Quality

- Ambient air quality in Fort McMurray was rated as "Good" >98% of the time in 2008

- However, emissions of air pollutants will increase with increased production
  - Increased emissions of SOx and NOx may put downwind lakes in Saskatchewan and Alberta at risk of acidification
  - Particulate matter identified as possible source of toxins to river and landscape
  - Increased emission of volatile organic compounds are also of concern

Selected Air Pollutants for Oil Sands - 2008, 2020, 2030

Source: Environment Canada's Emissions Outlook, 2010
Impacts on Biodiversity

- Oil sands development will continue to put pressure on vulnerable species (e.g. woodland caribou)

- Removal of landscape features for mining reduces available habitat

- Habitat alteration – pipelines, survey "cut lines", reclaimed land – can make habitat less suitable for forest species

- Beyond habitat issues, oil sands pollutants in the ecosystem could harm wildlife

- Wood Buffalo National Park, Canada's largest, is downstream from the oil sands, and is a major migratory bird nesting site

SARA-listed species in the oil sands area include:
- woodland caribou
- peregrine falcon
- whooping crane
- yellow rail
- northern leopard frog
- western toad
Overview of Environment Canada’s Role

- Environment Canada’s objective is to provide assurance that the oil sands are being developed in an environmentally-responsible manner through discharging its legislative authorities

- Environment Canada is recognized as a science leader
  - Developing world-class monitoring systems for water, air and biodiversity in the oil sands
  - Undertaking research to understand environmental impacts of oil sands pollutants

- Environment Canada has legislative authority relevant to oil sands issues
  - Relevant acts
    - *Canadian Environmental Protection Act 1999* – regulates the release of toxic substances into the environment (air, GHG, water, biodiversity)
    - *Fisheries Act* – regulates the deposition of substances deleterious to fish (air, water)
    - *Migratory Birds Convention Act* – protects migratory birds (biodiversity, water)
    - *Species At Risk Act* – provides protection for species at risk (biodiversity)
  - Other responsibilities
    - *Canada Water Act* (water)
    - *Canadian Environmental Assessment Act* (Minister of the Environment – air, water, biodiversity)
    - *Parks Act* (Minister of the Environment – air, water, biodiversity)
Other Departments’ Roles in the Oil Sands

- **Natural Resources Canada**
  - Administers major programs for oil and gas (Canmet Energy, Program of Energy Research and Development, carbon capture & storage)
  - Administers the Major Project Management Office – improves coordination on regulatory review of major projects
  - National Energy Board – regulator for interprovincial projects

- **Department of Foreign Affairs and International Trade**
  - Provides fact-based outreach and communications on oil sands issues internationally

- **Department of Fisheries and Oceans**
  - Administers habitat provisions of the *Fisheries Act*

- **Indian and Northern Affairs Canada**
  - Supports Aboriginal people to develop healthier, more sustainable communities

- **Canadian Environmental Assessment Agency**
  - Responsible for the *Canadian Environmental Assessment Act*

- **Health Canada**
  - Responsible for Aboriginal peoples’ health issues in areas of Federal jurisdiction

- **Parks Canada**
  - Peace-Athabasca Delta Monitoring Program in Wood Buffalo National Park
Questions Raised About Environmental Performance

- Ongoing domestic and international campaigns targeting oil sands and based on environmental performance concerns
  - Potentially affecting access to US markets
  - Damaging Canada’s “brand”

- Court cases have raised profile of oil sands’ environmental impact
  - e.g. prosecution of Syncrude under the Migratory Birds Convention Act, 1994

- Recent reports have highlighted the need for better monitoring in the oil sands area, including
  - Royal Society of Canada (December 2010)
  - Federal Science Advice Panel (December 2010)

- Experts were unanimous in the conclusion that current programs were insufficient to deliver reliable information at a regional scale concerning environmental performance in the oil sands region
EC Approach: Focus on Improved Environmental Monitoring...

Why the focus on monitoring?

By measuring the levels of pollutants and other aspects of the environment, well-designed monitoring systems can provide the information needed for long term sustainability.

- In December 2010, the federal government committed to leading, in collaboration with Alberta, the development of a world class monitoring system for the oil sands
  - Environment Canada widely acknowledged to have the best science capacity for this work
  - Industry will be expected to contribute funding to the system

- Phase I of a surface water quality monitoring system plan was released in March 2011

- Work on the Phase II system design continues with expanded geographical scope and more elements monitored (air quality, terrestrial and aquatic biodiversity), target for completion is end of June 2011
Is(Are) exempted pursuant to section(s)
est(sont) exemptée(s) en vertu de(s)(l')article(s)

14(a), 20(1)(a), 20(1)(b), 21(1)(a), 21(1)(b)

of the Access to Information Act
de la Loi sur l'accès à l'information