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Sustainable Energy Solutions

Oil Sands Fever
Environmental Implications of Canada's Oil Sands Rush

CERES/Ethical Funds Briefing

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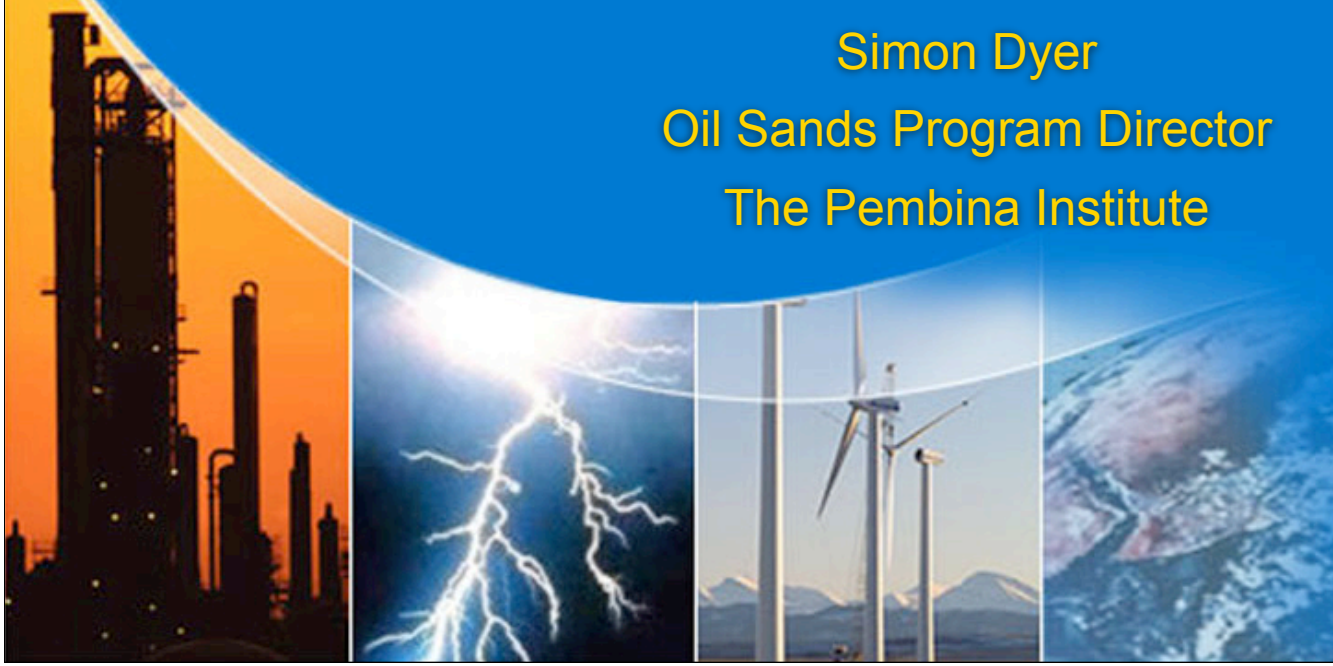

Wind Power by Pembina

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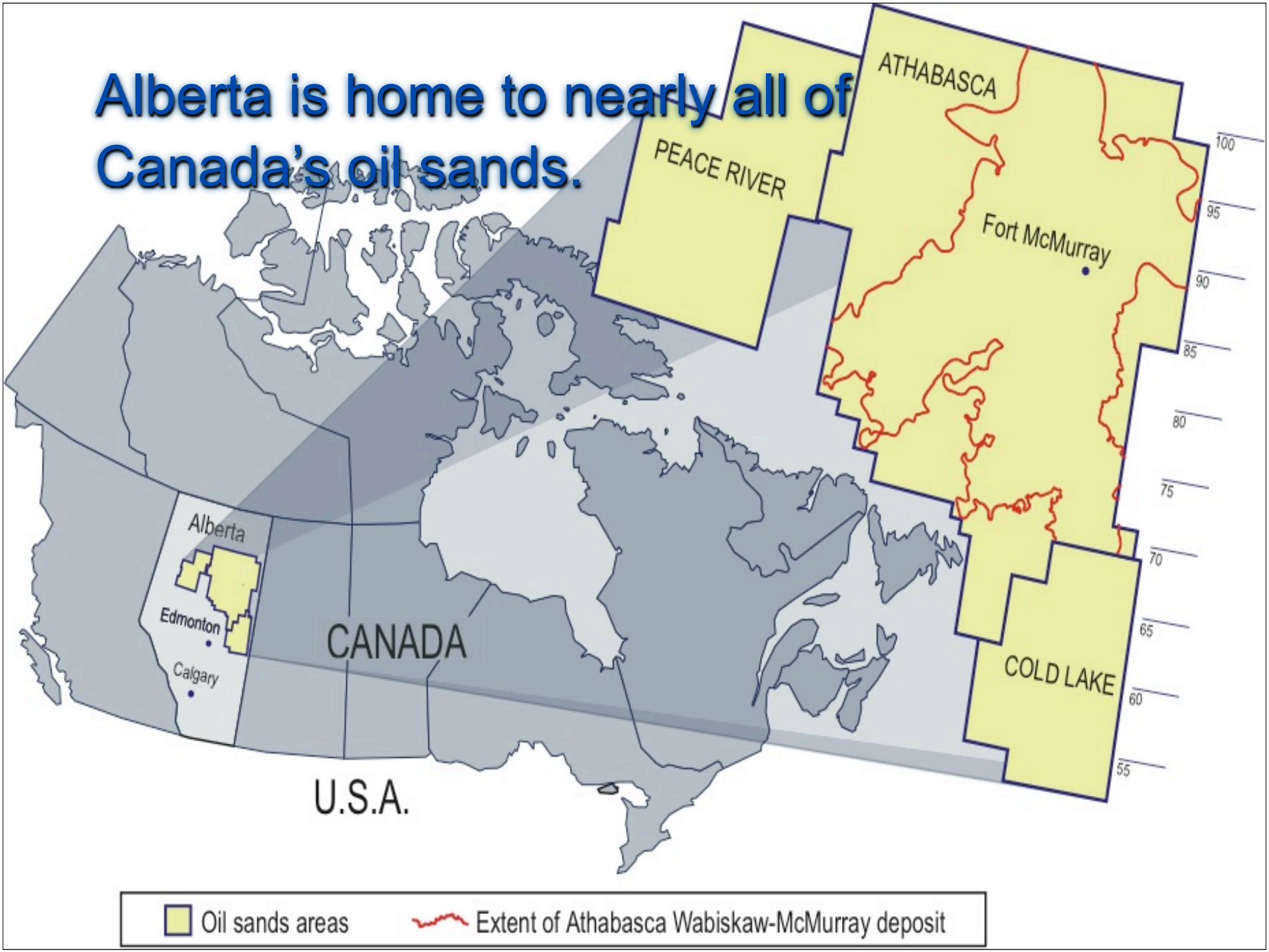
The Pembina Institute

"To advance sustainable energy through research, education, consulting and advocacy."

- Founded in Alberta in 1985
- Focus on energy & environment issues, & environmental economics
  - policy research and analysis
  - public interest advocacy and action
  - corporate environmental analysis and consulting
  - public / school education
- A leading Canadian NGO on oil sands and climate change

Alberta is home to nearly all of Canada's oil sands.



Producing Oil from Tarry Sands

- Oil sands are composed of sand, silt, clay, water and about 10% bitumen.
- Oil sands are either surface mined or the bitumen is extracted in situ (in place).

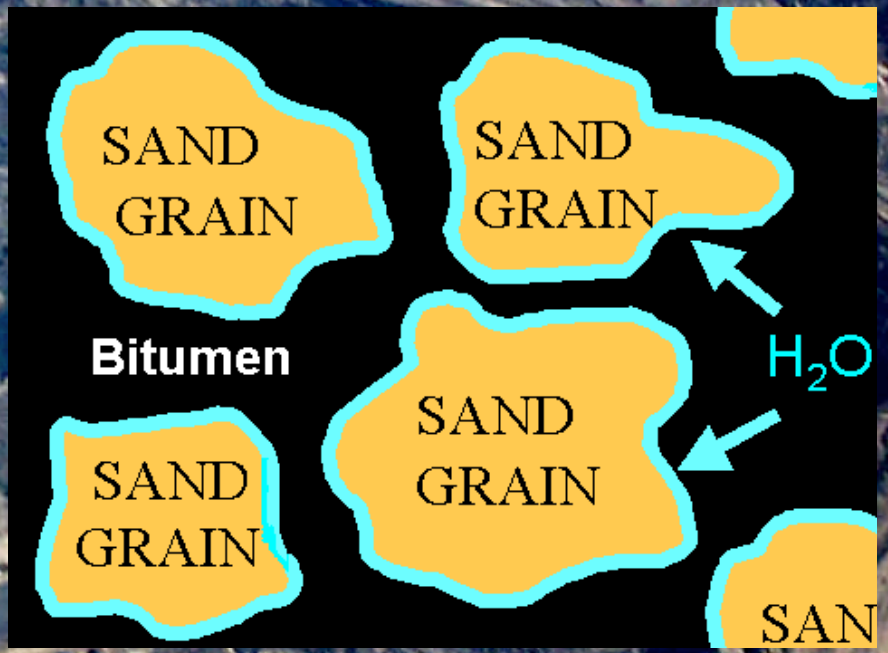
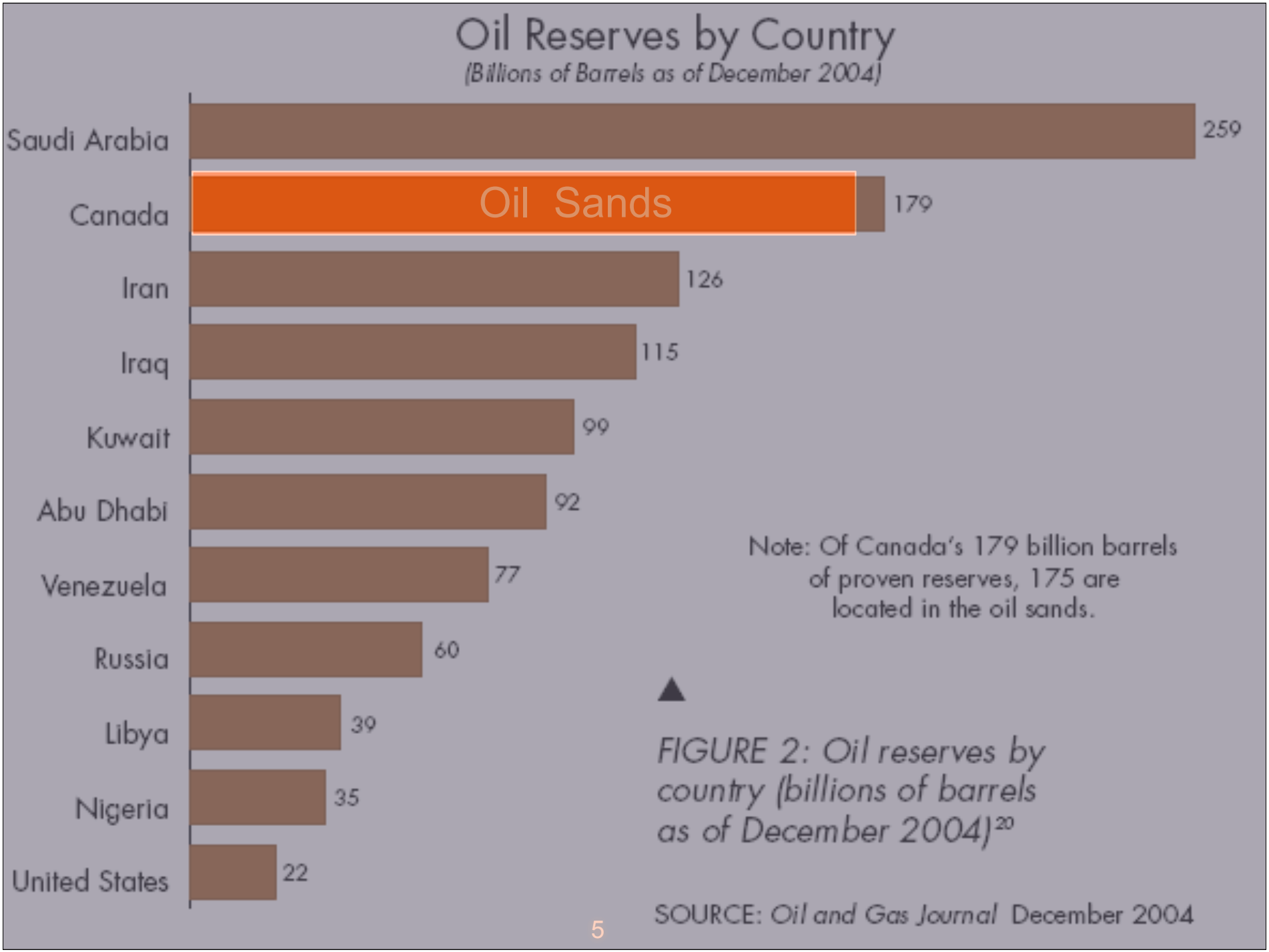


Photo: Chris Evans, the Pembina Institute


Oil Reserves by Country
(Billions of Barrels as of December 2004)
Saudi Arabia
259
Canada
Oil Sands
179
Iran
126
Iraq
115
Kuwait
99
Abu Dhabi
92
Venezuela
77
Russia
60
Libya
39
Nigeria
35
United States
22
Note: Of Canada's 179 billion barrels of proven reserves, 175 are located in the oil sands.
FIGURE 2: Oil reserves by country (billions of barrels as of December 2004)[20]
SOURCE: Oil and Gas Journal December 2004

Surface Mining Production

- To produce one barrel of oil:
  - 4 tonnes of material is mined.
  - 2 – 4.5 barrels of water are used to extract the bitumen.
  - Enough natural gas to heat 1.5 homes for a day is required.

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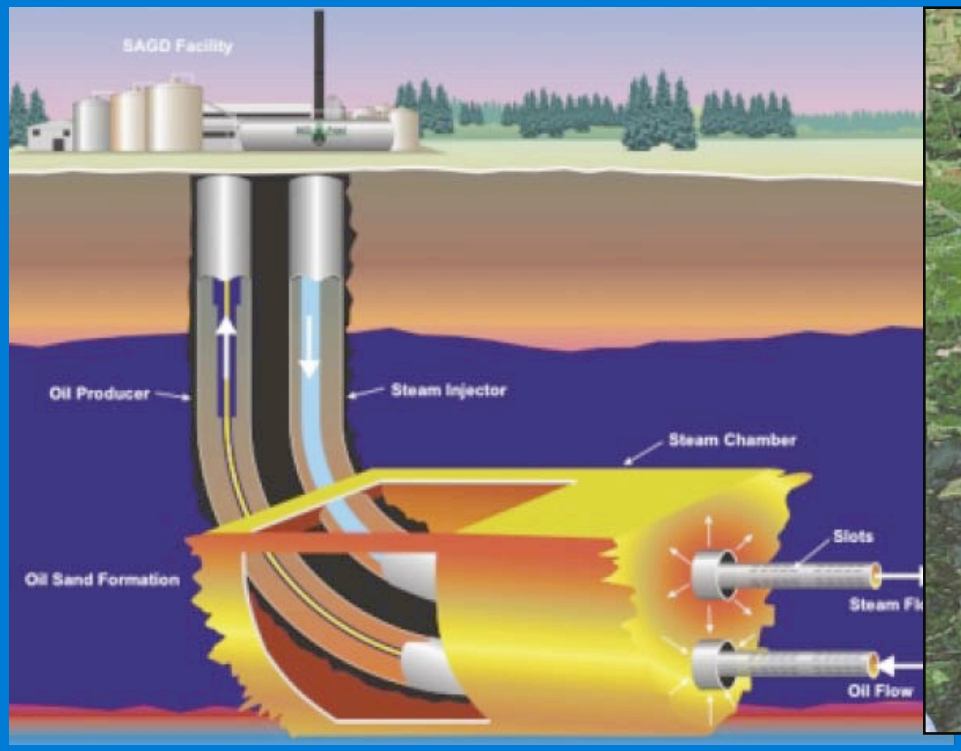
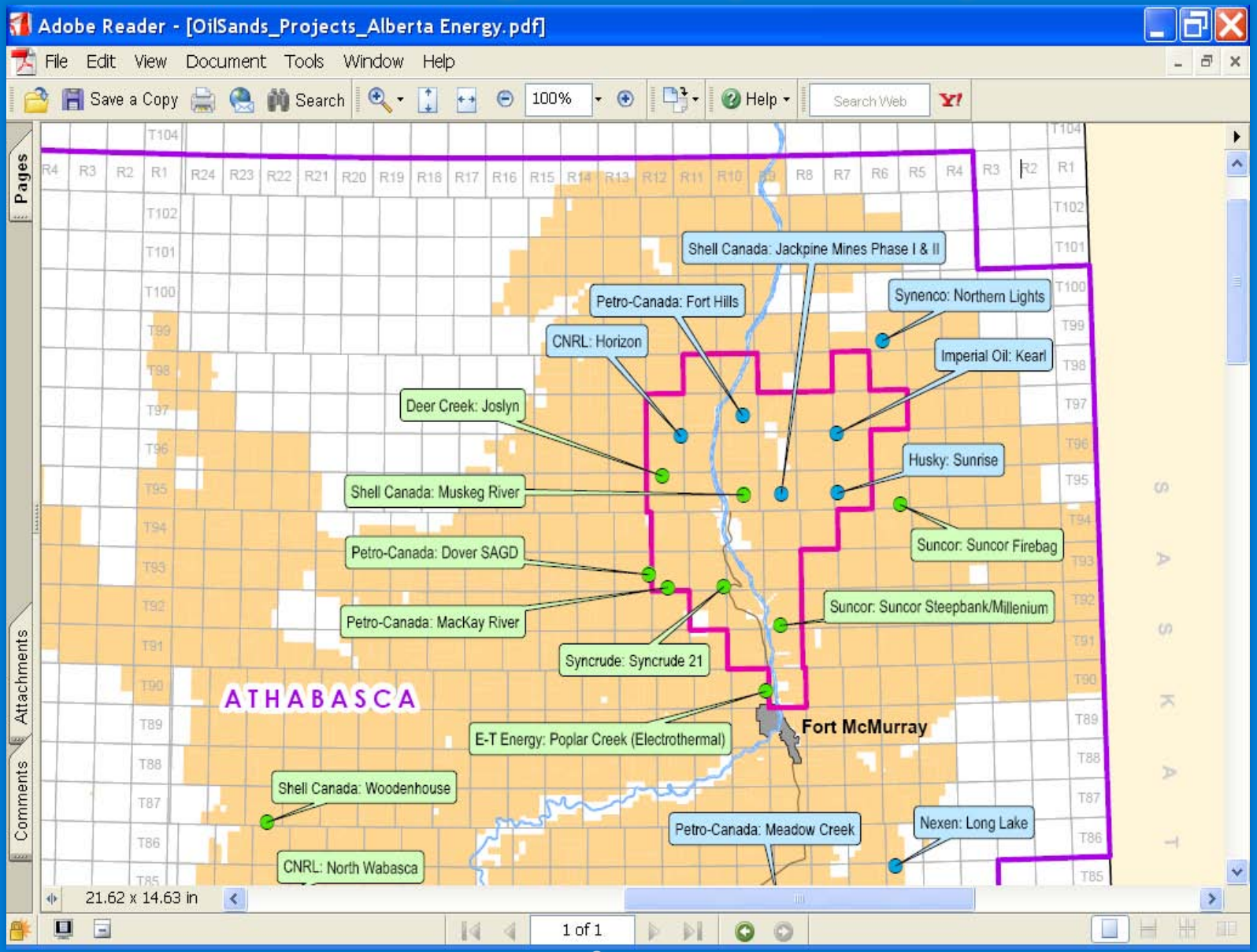
In situ (in place) Extraction



- Over 80% of the bitumen can only be extracted ‘in situ’ whereby high-pressure steam is injected to remove the bitumen from the sand.

Oil Sands Projects (some)

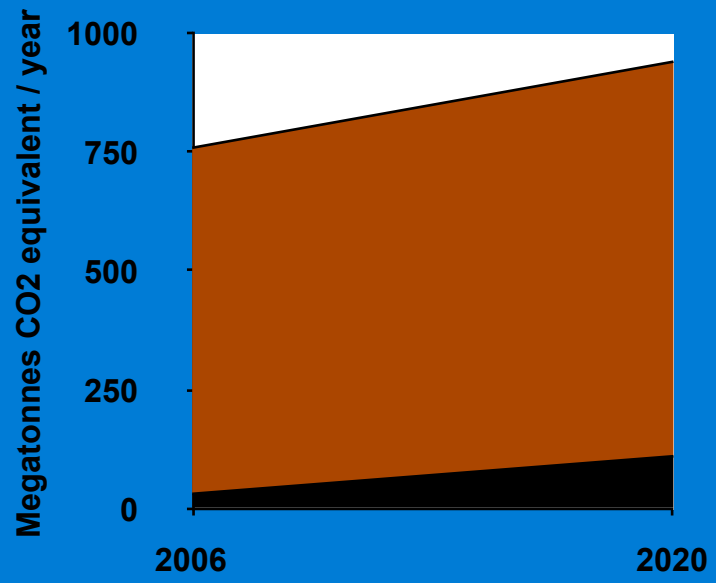


Carbon Reality Check

- Oil sands production is 3-5x more GHG intensive vs. conventional oil
- ~15-40% > carbon intensity on a full life cycle basis
- Sequestration potential + land use changes not accounted for
- Lots of talk, but no implementation of carbon capture and storage

Oil Sands & Global Warming: The Canadian Context

- Fastest growing source of new GHG pollution in Canada
- Up to half Canada's BAU emissions growth (2003-2010)



Boreal Forest Impacts

- 140,000 km^2 of boreal forest underlain by oil sands – area the size of Florida
- 65,000 km^2 already leased – no environmental assessment
- 3,500 km^2 surface mineable area
- Implications for wildlife from habitat loss & fragmentation - e.g. woodland caribou
- Loss of biodiversity, wetlands and wildlife habitat
- Permanent loss of peatlands

Photo: Jiri Rezac, WWF-UK