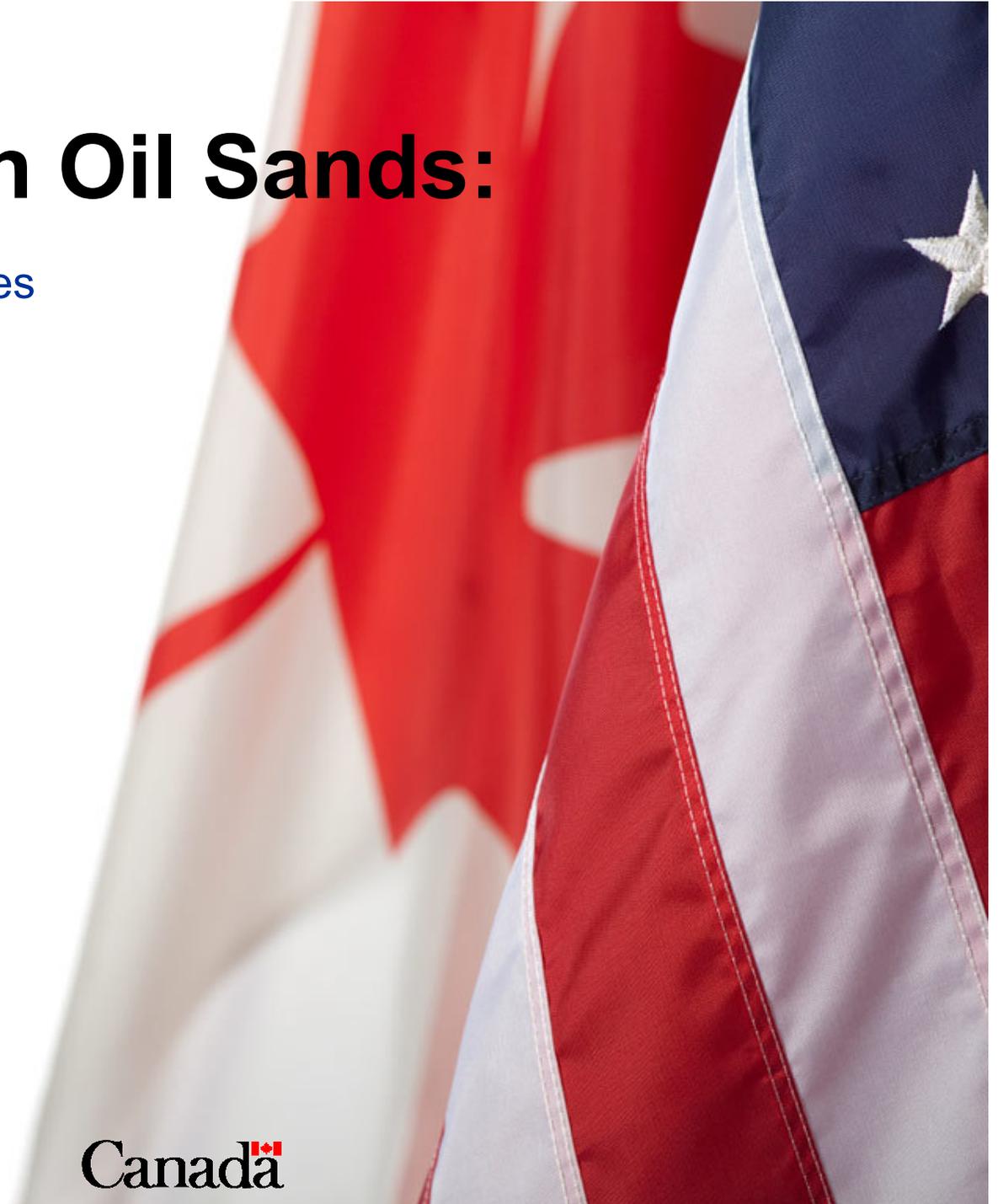


The Canadian Oil Sands:

Opportunities and Challenges

Canada 

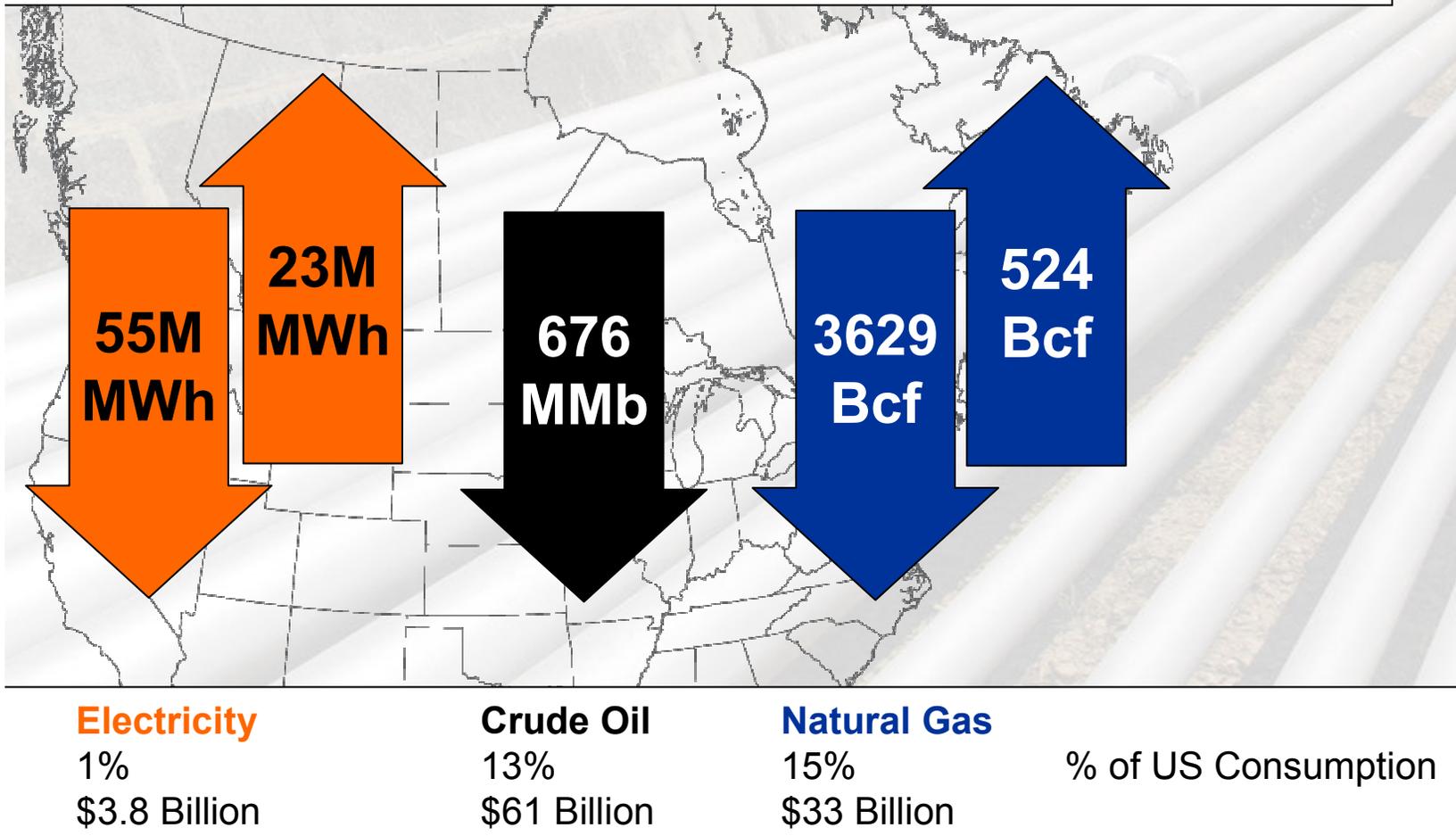


Canada US Energy Trade (2008)

Canada's energy exports to the US = \$122 billion

Canadian exports satisfied 9% of total US demand

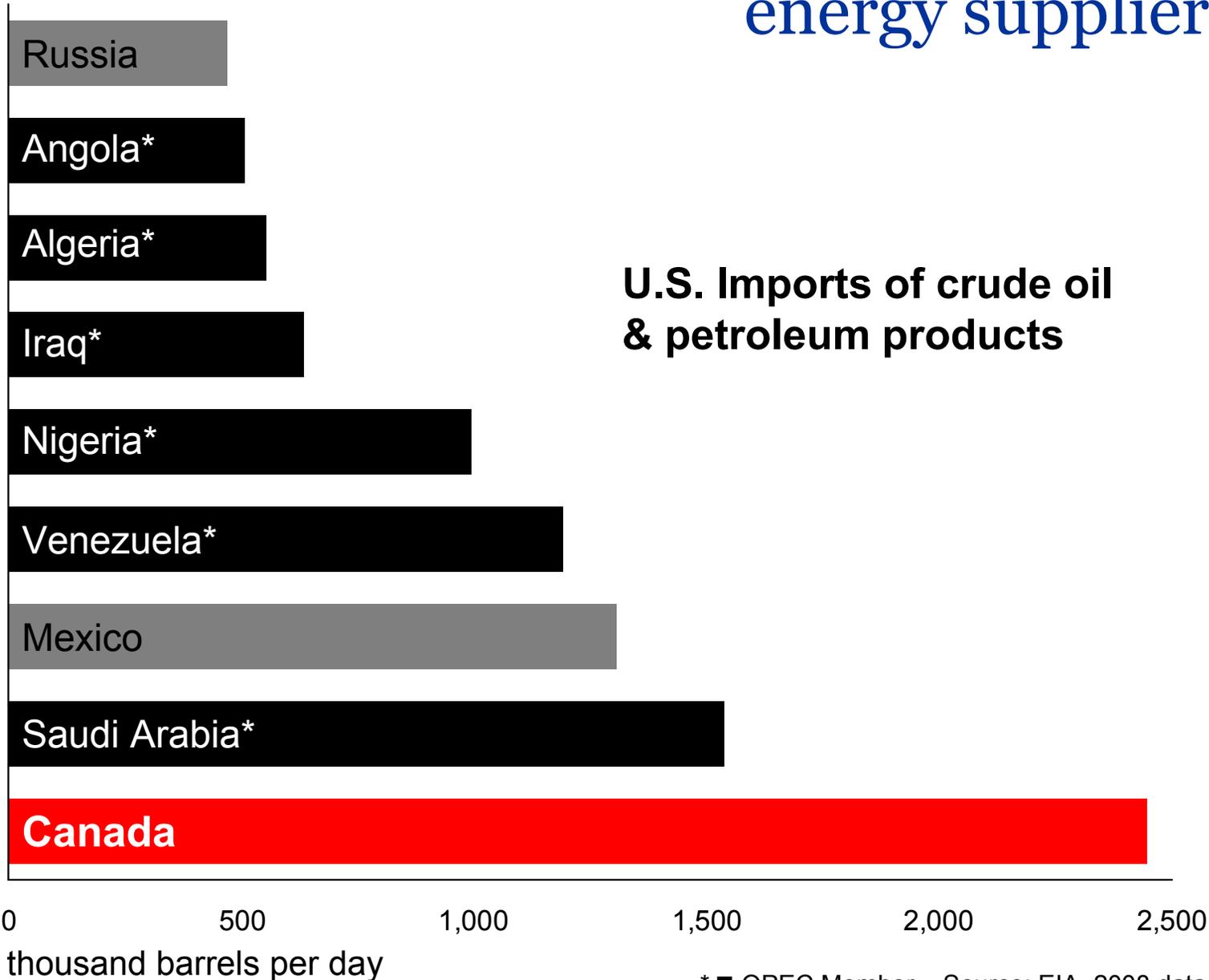
Cross-border direct investment in energy is approx. \$90 billion



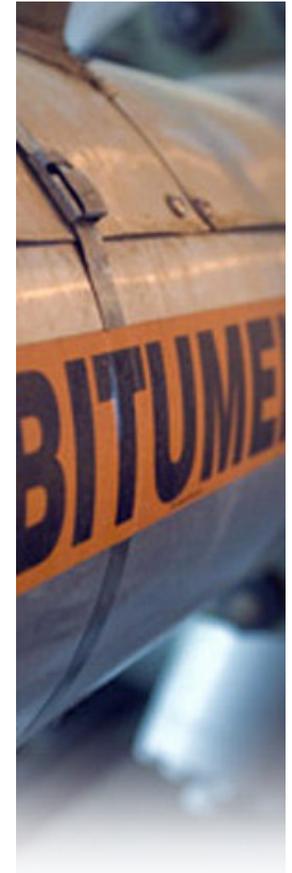
Providing Energy Security



Canada is your largest & most secure energy supplier



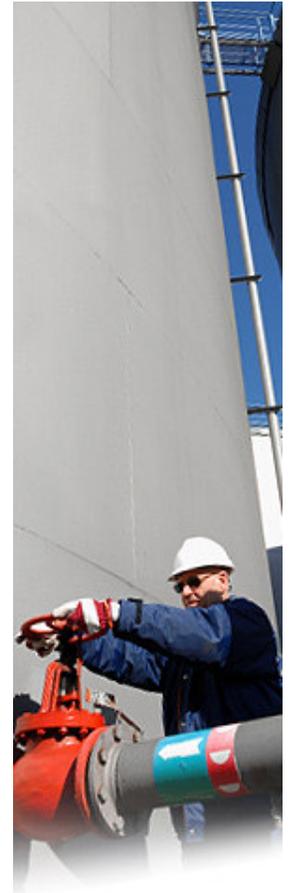
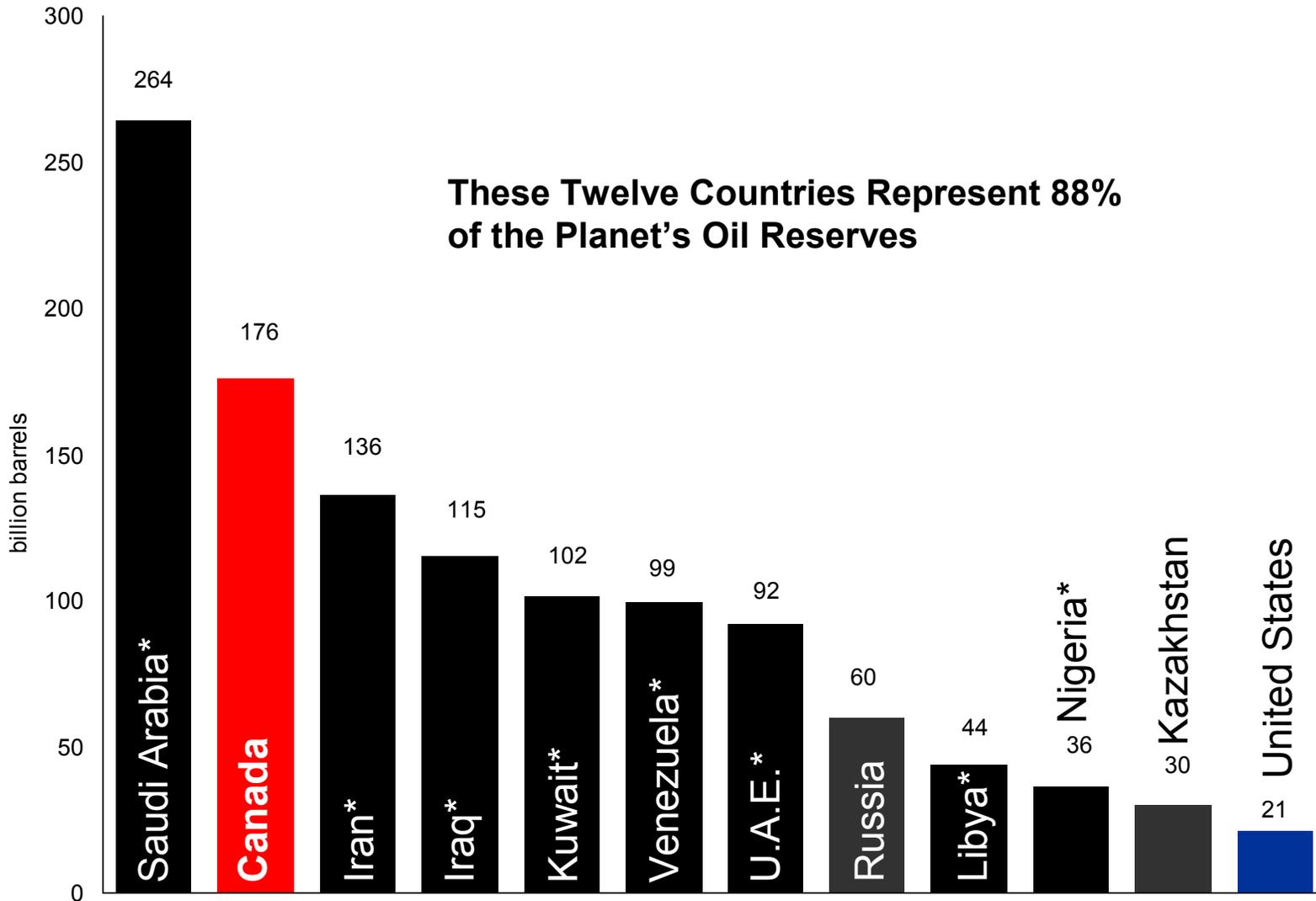
* ■ OPEC Member Source: EIA, 2008 data



Providing
Energy
Security

Canada

Oil Reserves by Country



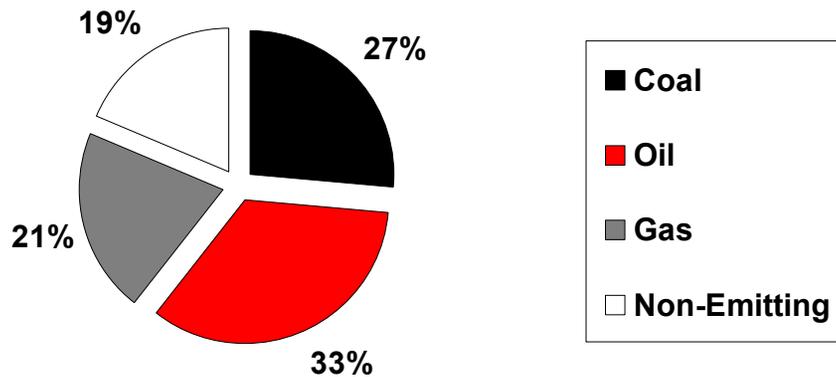
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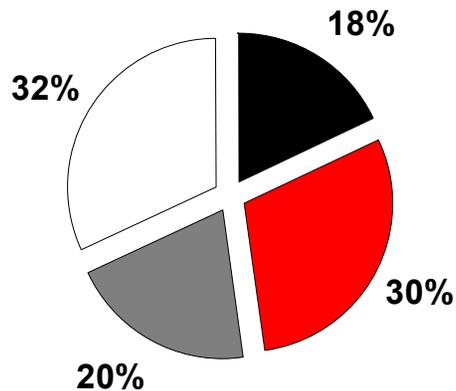
* ■ OPEC Member Source: EIA, 2008 data

Oil Sands are needed as we transition to a lower carbon economy

World Energy Outlook Primary Energy Demand 2007

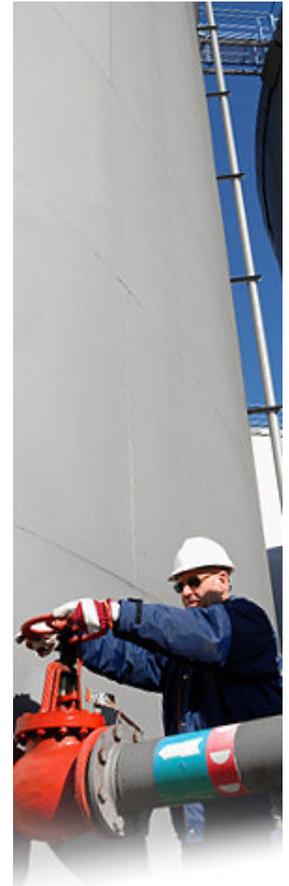


Primary Energy Demand 2030*



* This scenario assumes atmospheric CO₂ stabilization at 450 ppm

- Canada, like others, is investing in renewables, cleaner fossil fuels, and energy efficiency
- The transition to a lower carbon economy will be long and oil will be a dominant fuel for decades
- Oil sands are part of a global shift to heavier crudes as lighter crudes are depleted



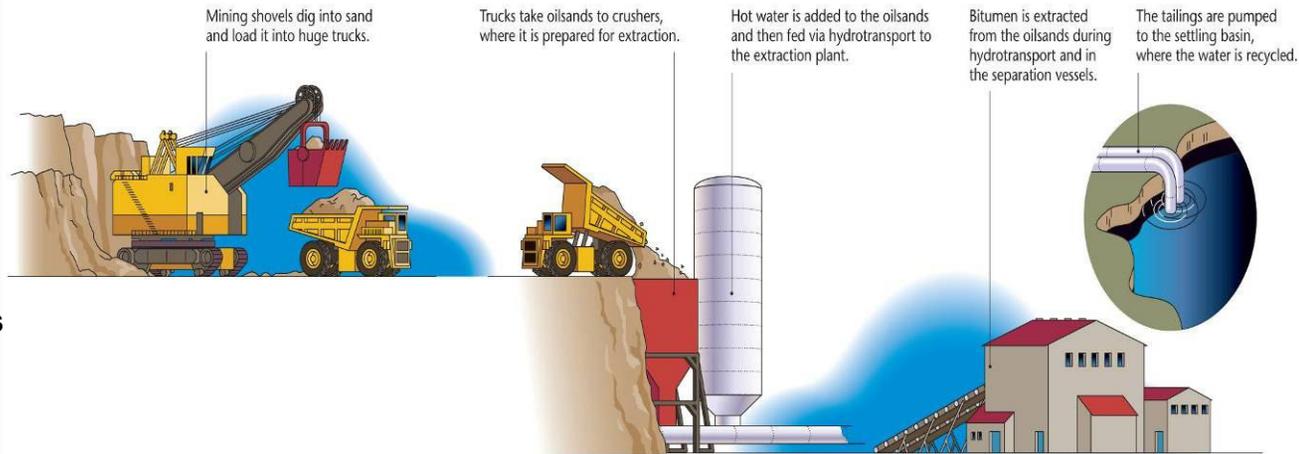
**Providing
Energy
Security**

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Oil Sands Production Technologies

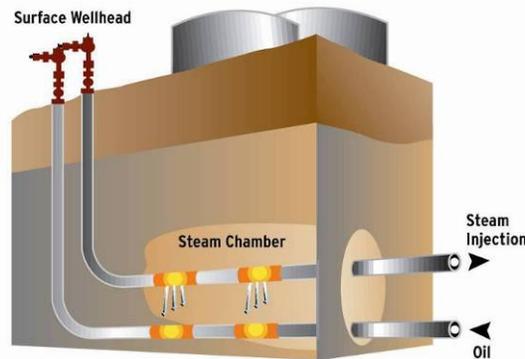
Mining:

- 20% of resource
- 55% of current production
- The mineable area represents 3% of the total oil sands area

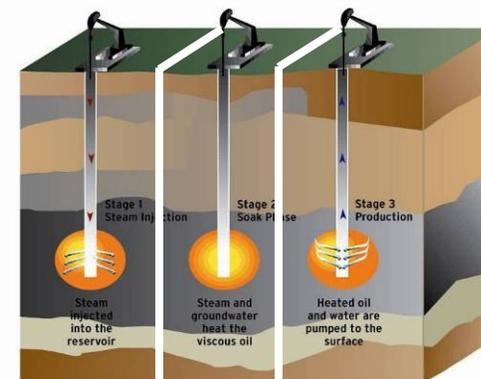


In Situ (drilled): Steam Assisted Gravity Drainage

- 80% of resource
- 45% of current production
- No tailings ponds
- No water drawn from the Athabasca River
- Smaller footprint



Cyclic Steam Process



Canada

Economic Benefits

Oil Sands Heavy Hauler Trucks

- The 200th Caterpillar 797 hauler delivered April 2009



Oil Pipeline Construction

- Billions of dollars of pipelines being built
- Using steel and creating jobs
- Major regional economic stimulus



Refinery expansions underway

- Several expansions and modifications are underway
- Providing significant jobs and local benefits



**Generating
Economic
Benefits**

Canada

Regulations

The oil sands are subject to a strict regulatory regime

- The Provinces have primary jurisdiction over the development of their resources:
 - Mines and Minerals Act
 - Oil Sands Tenure Regulations
 - Oil Sands Conservation Act
- The Government of Canada has important levers:
 - Canadian Environmental Assessment Act
 - Fisheries Act
 - Canadian Environmental Protection Act
 - Navigable Waters Protection Act
 - Migratory Birds Convention Act
 - Species at Risk Act



**Ensuring
Environmental
Stewardship**

Canada

Land Use

Oil sands facilities are large and can take years to reclaim

- After over 40 years of development, the total area disturbed by mining is 232 mi² – about the size of Chicago, Illinois
- The mineable area (1,900 mi²) represents one-tenth of 1% of Canada's 1.2 million mi² of boreal forest
- Companies must restore land to productive status and reclamation activities are underway
- 12% of mined area to date is actively being reclaimed, and Alberta holds \$820 million in reclamation security bonds from industry
- Most future development will be drilled rather than large mines



**Ensuring
Environmental
Stewardship**

Canada

Fresh Water

It takes 1 – 5 net barrels of water for each barrel of oil produced

Drilled Oil Sands (in situ)

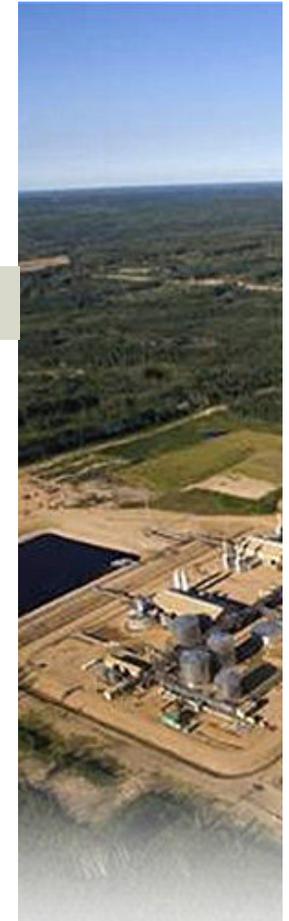
- 90% of the water is recycled (net 1 barrel)
- New projects increasing use of non potable water

Mined Oil Sands

- 75% of the water is recycled (net 3 to 5 barrels)
- Amounts to less than 1% of average flow of Athabasca River
- Governments have set withdrawals limits from the river

Tailings Ponds

- Producers not permitted to return wastewater to river
- Regulations in place to reduce the amount of tailings
- Surface water quality monitored since the 1970s – no evidence of any impact since the inception of oil sands mining

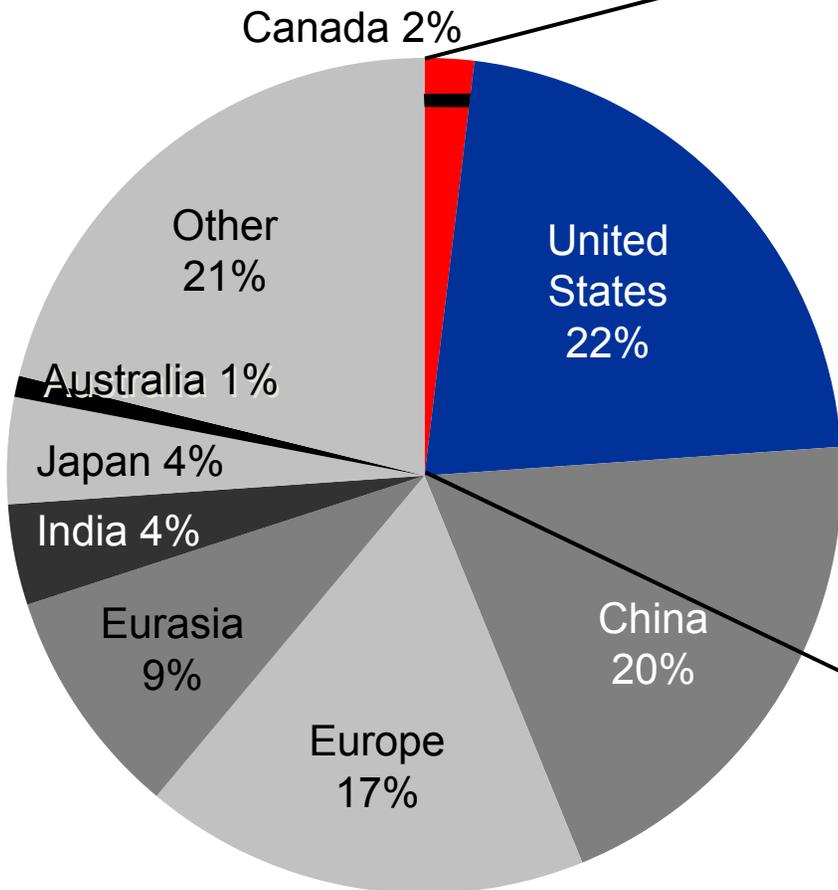


**Ensuring
Environmental
Stewardship**

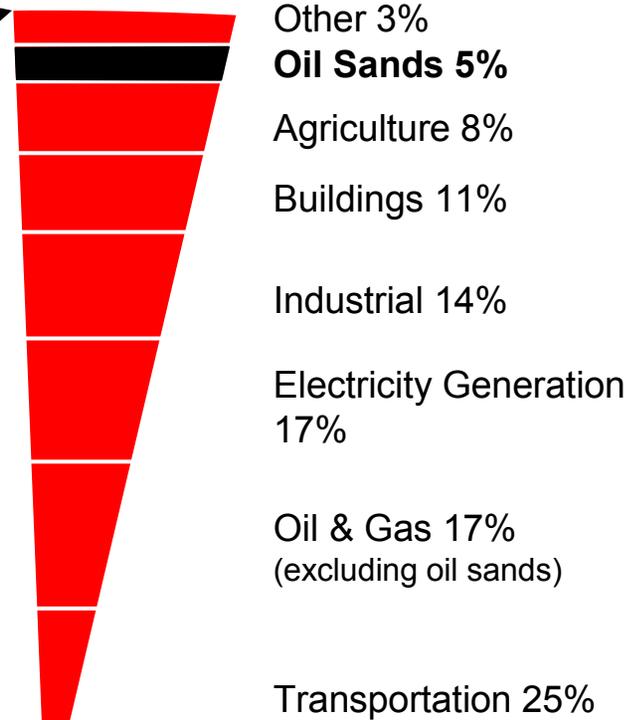
Canada

Greenhouse Gas Emissions

GHG Emissions by Country



Canada's GHG Emissions by Sector

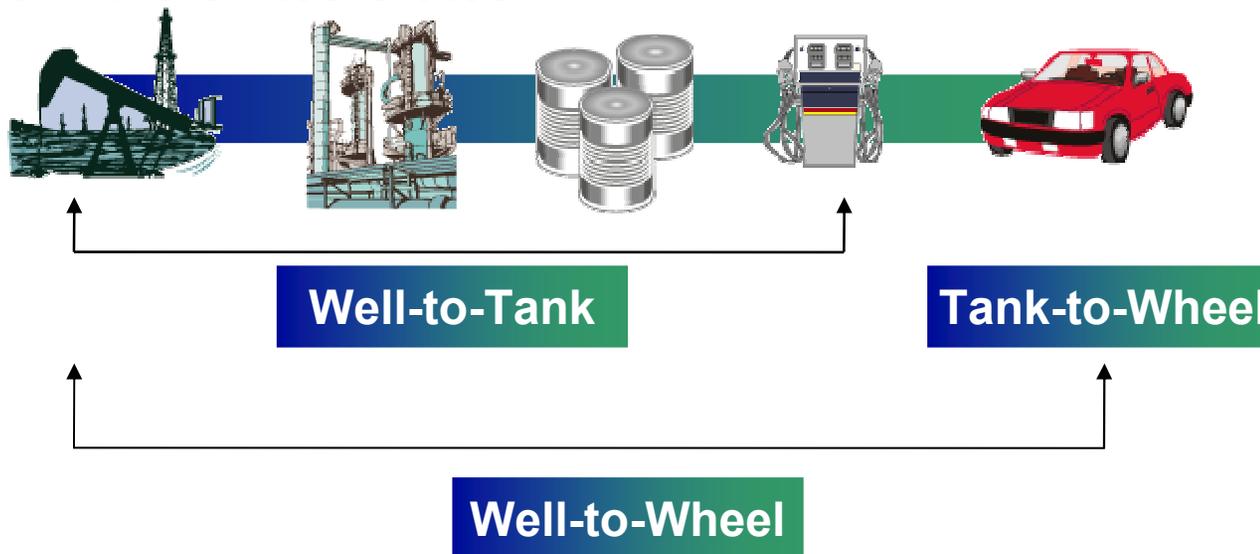


**Ensuring
Environmental
Stewardship**



Lifecycle GHG Emissions

- Between 1990 and 2007, oil sands GHG emissions intensity was reduced by 33% (well to tank)
- About three quarters of GHG emissions occur when the fuel is consumed (tank to wheel)
- On average, oil sands crude has lifecycle GHG emissions (well to wheel) that are 10% higher than the average crude used in the United States

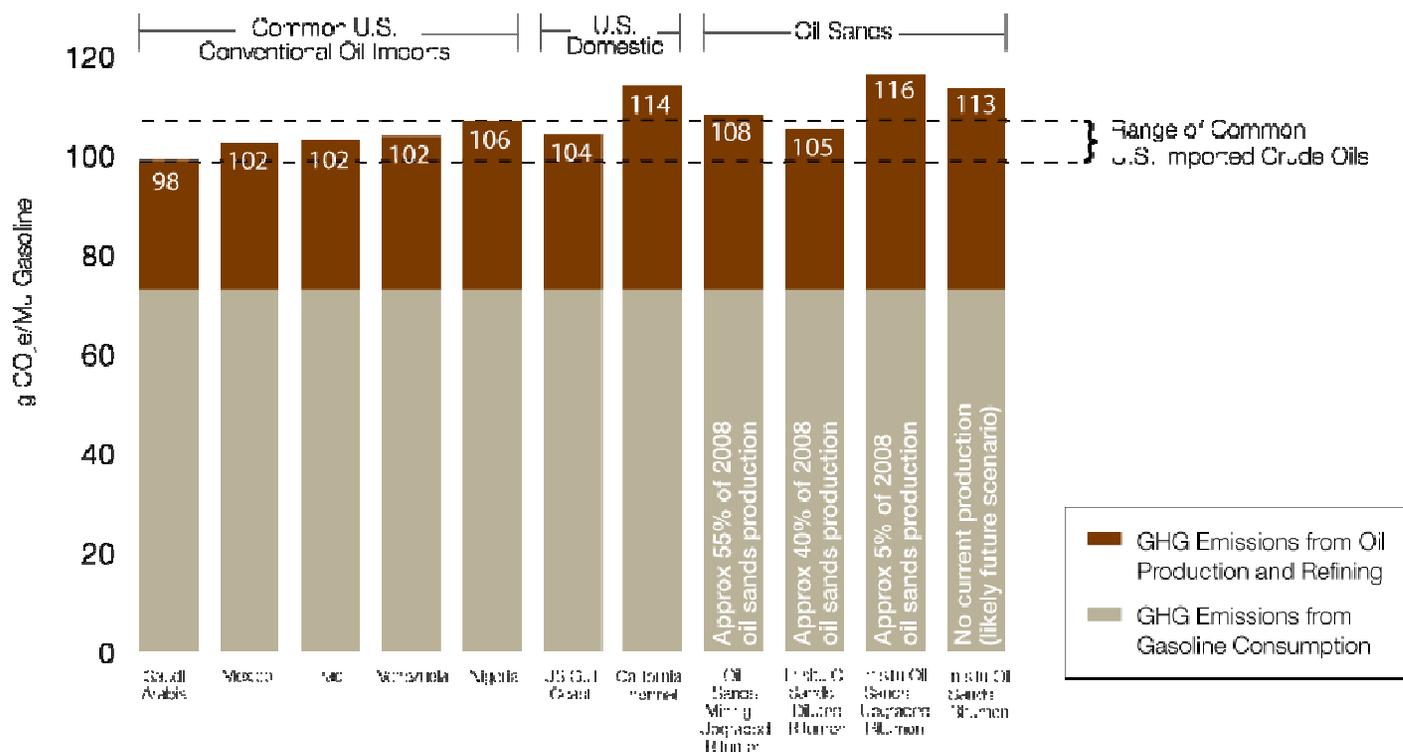


Ensuring
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Canada

Well-to-wheel GHG Emissions by Crude Type

- Oil sands derived fuels generally have 10% higher emissions than other crudes used in the United States
- Emissions for conventional crudes will increase over time with the global shift to heavier crudes while new technologies will further decrease GHG emissions from the oil sands



Canada's GHG Policies

National Target to reduce GHG emissions by 17% below 2005 levels by 2020, 90% electricity by non-emitting sources

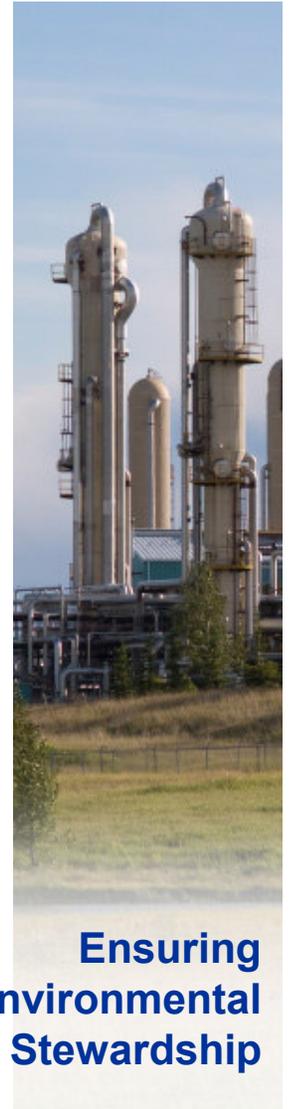
- We are investing in renewables:
 - Fastest growing energy sector with \$1.5 B investment
 - Renewable fuel standard supported by \$1.5 B investment and R&D (\$500 M) for next generation biofuels
- We are moving aggressively on energy efficiency
 - Residential, buildings, transportation, integrated communities, other.
- And we are working to bring down emissions from fossil fuels
 - Over \$1.4 billion committed by Canada and Alberta towards major CCS demonstration projects involving the oil sands

**Ensuring
Environmental
Stewardship**

Canada

New Technologies

- Investing in carbon capture and storage
 - Quest project will inject 1.1 m tonnes of CO₂ per year
 - The Alberta Carbon Trunk Line
- Game-changing Technologies
 - Solvent Assisted Drilling
 - Toe to Heel Air Injection (THAI)
- New Tailings Pond Technologies
 - Extract water from tailings to create a solid landscape



Ensuring
Environmental
Stewardship

Canada

Summary:

- The oil sands are a strategic resource that will contribute to energy security for Canada, North America and the world for decades to come.
- Developing the oil sands has led to significant economic benefits throughout North America.
- There are significant environmental challenges in the areas of air, land and water.
- Improvements have been made in each of these areas, but more must be done.
- We have the regulatory framework to support our objectives for improved environmental performance.
- Governments and industry are making the investments in technology to achieve our objectives in environmental performance.



Canada



Environment

Energy

Economy

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