



Our Mission:
to provide networking opportunities in support of
the business interest of the energy industry in Ontario *



April 13th, 2011

Dr. Randy Gossen

President, World Petroleum Council
and
VP, Global Business Relations, Nexen Inc.



"THE GREENING OF THE OILSANDS"

Dr. Randall Gossen
President, World Petroleum Council
Vice President, Global Business Relations, Nexen Inc.
Ontario Energy Network
April 13, 2011



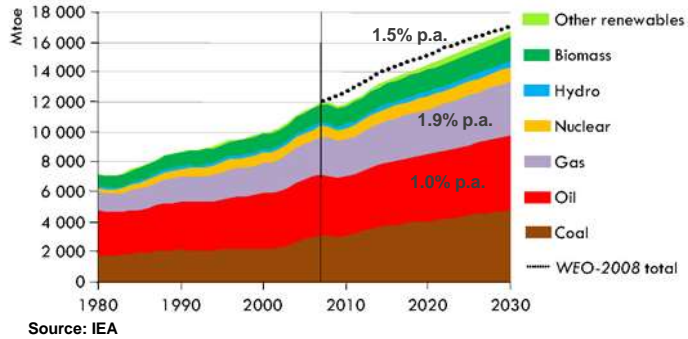
Canada's Oil Sands

- Canada has the second largest oil reserves in the world after Saudi Arabia. 97% of these reserves are found in the oil sands.
- Oil sands are a natural mixture of sand, water, clay and bitumen.
- Bitumen is oil that is too heavy or thick to flow or be pumped without being diluted or heated.
- Oil sands are recovered using 2 primary methods:
 - Mining: accounts for 20% of resource extraction.
 - Drilling (In Situ): accounts for 80% of resource extraction.
- Currently producing approximately 1 ½ million barrels a day (total Canada about 2 ½ million barrels a day)

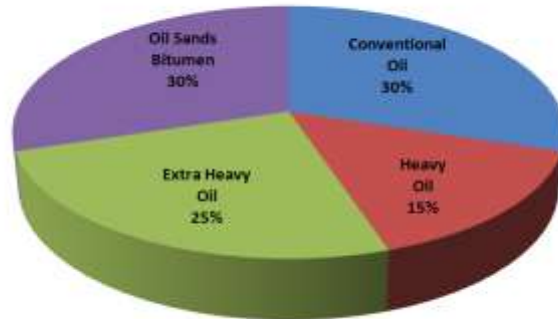
Economic Contribution

- **Contribute \$1.7 trillion to Canadian economy over next 25 years**
- **Stimulates job creation and economic activity throughout Canada**
- **Currently 144,000 jobs across Canada**
 - Growth to 590,000 over next 25 years
 - 103,000 sourced outside Alberta
 - 32% from Ontario
- **Many components produced in central and eastern Canada**
 - \$170 billion goods and services purchased outside Alberta over next 25 years
 - \$55 billion from Ontario

World Primary Energy Demand



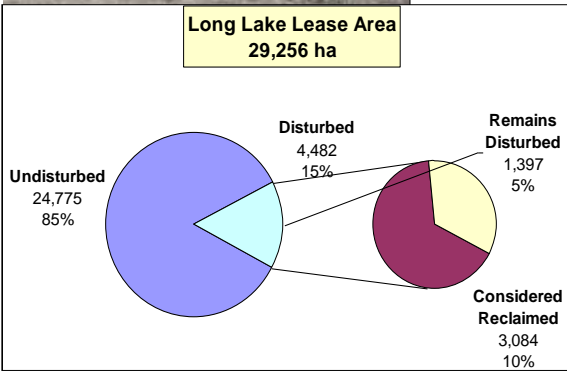
Total World Oil Reserves



Challenges to Development

- Land Use
- Water Use
- Air / greenhouse gas emissions
- Tailings

OIL SANDS COMPARISONS Land Disturbance

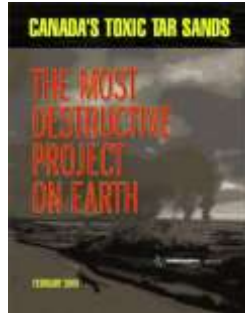


Boreal Forest Impacts:
 Current mine impact = 0.02%
 If all mineable cut at once = 0.15%
 If all in-situ impacted at once = 0.6 % (at max 15% disturbance)

Long Lake Tree Planting:
 37,000 seedlings this summer
 2/3 of Long Lake disturbance considered reclaimed

LONG LAKE vs SYNCRUDE FOOTPRINT

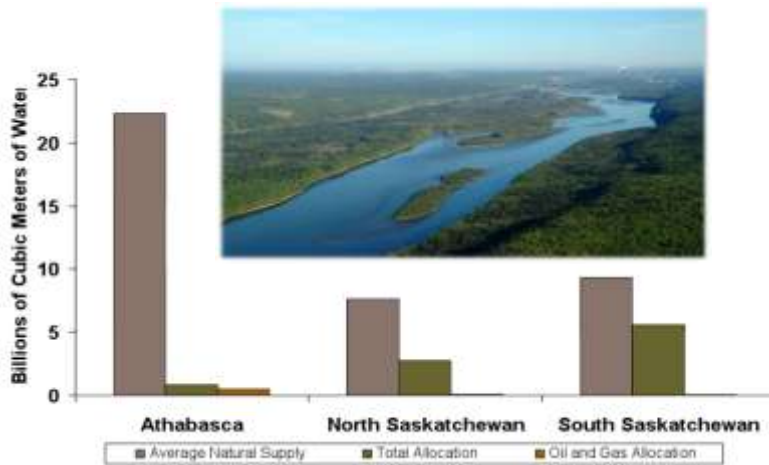




Bison – South Hills Reclamation

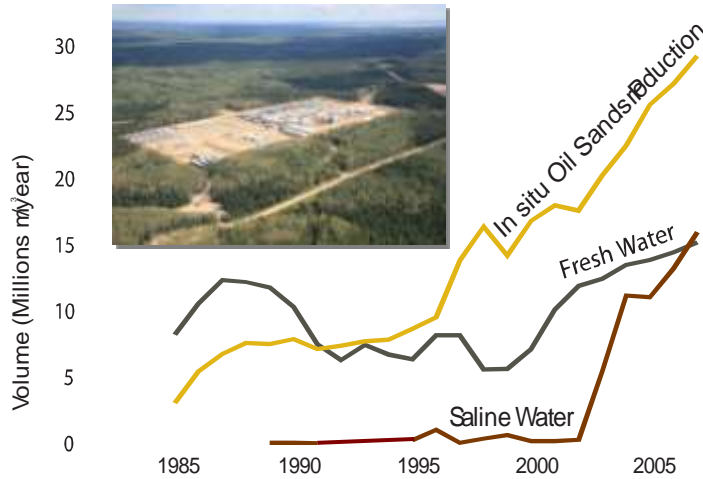


Water use from Alberta Rivers



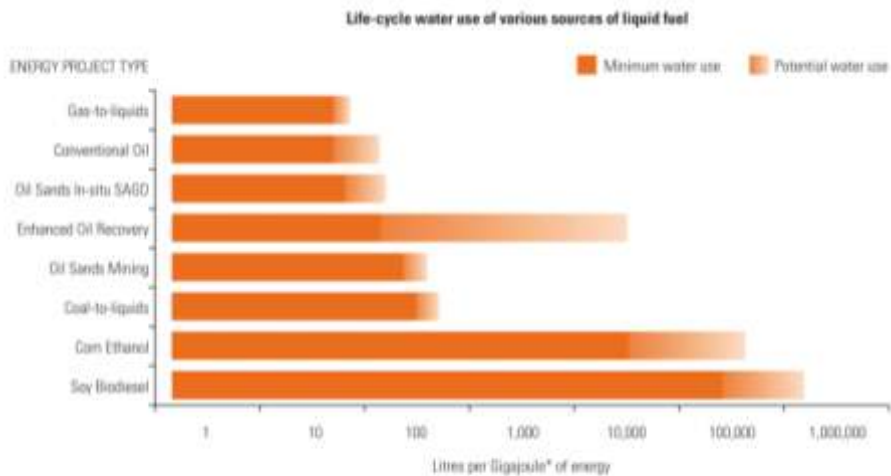
Source: Alberta Environment: state of the basin website

In Situ Oil Sands – Water use



Source: CERA 2009

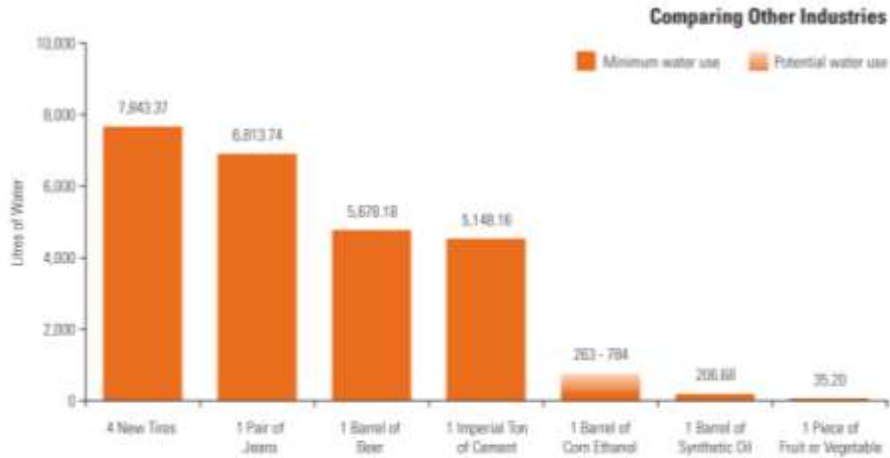
Water Use Oil Sands vs. Other Energy Types



Source: Cambridge Energy Research Associates, 2008.

* 1 Gigajoule = 25 litres (7.5 gallons) of gasoline

Water Use Cont'd Industry Comparison



Source: Southwest Florida Water Management Districts and the Resource Conservation & Development Department, March 2006.

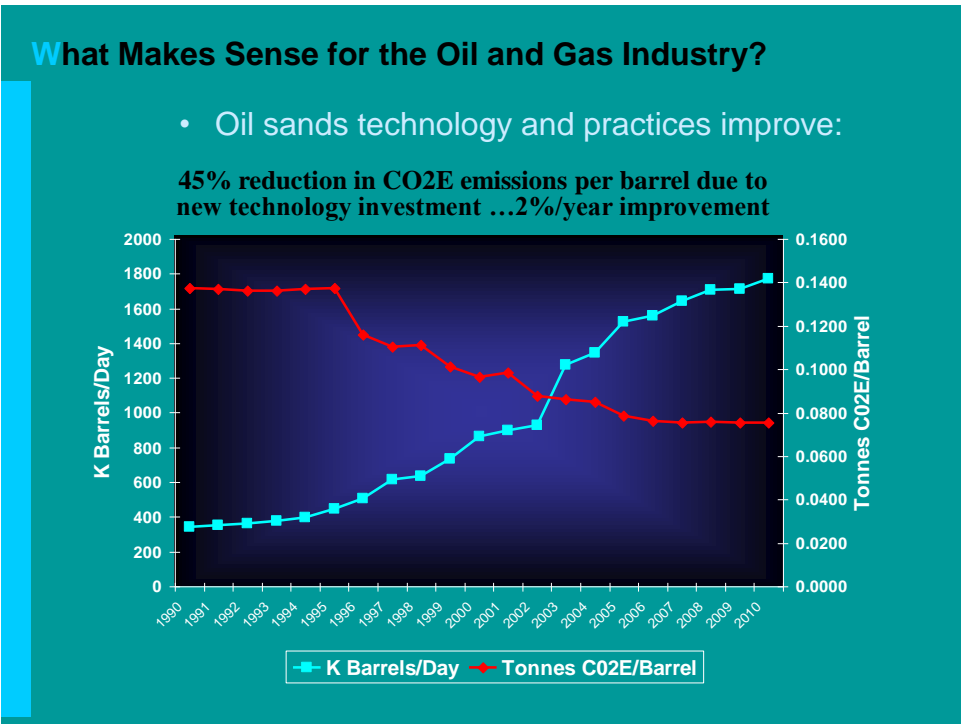
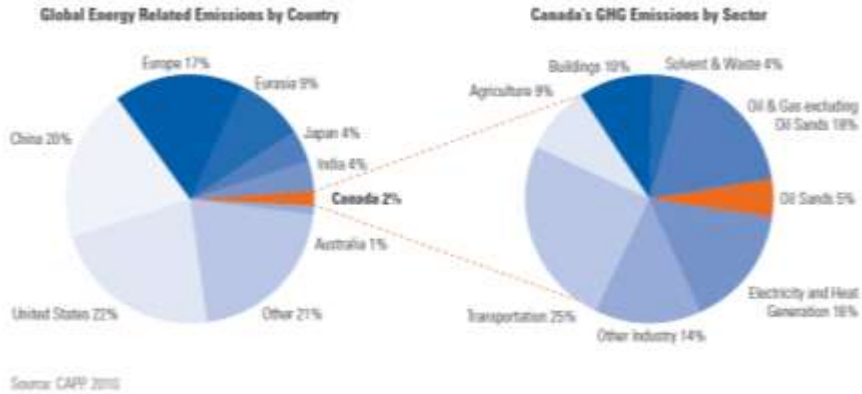
GHG Emissions in Context Oil Sands v. US Coal



Source: Natural Resources Canada, 2009

GHG Emissions in Context The Global Picture

- Less than 0.1% of global GHG emissions
- 5% of Canada's GHG emissions
- GHG intensity reduced by 33% from 1990 to 2007



Tailings Ponds Regulated and Must be Reclaimed

Used by mining facilities, not SAGD

- Produced through bitumen extraction
- Allows for water to be stored and recycled in the mining process
- Comprised of water, clay, sand & residual bitumen

Regulated by the Alberta Government

- Plan and timeline for reclamation required to acquire project approval

First tailings pond will be reclaimed & ready for replanting in 2010.

Technology for dry tailings ponds is in development.

- Reduce water use
- Result in faster reclamation

Tailings reclamation research area before



Reclamation on top of consolidated tailings after

Suncor Energy will be the first oil sands company to transform a tailings pond into a surface solid enough to be actively re-vegetated and reclaimed. Once complete, Wapisiw Lookout (formerly Pond 1) will be a 540-acre area of mixed wood forest and a small wetland, supporting a variety of plants and wildlife. The picture on the right was recently taken following planting of over 600,000 trees.



Technology is Key – Innovation has no borders

Technological innovation will continue to create new solutions to improve energy efficiency in the oil sands.

Technology is expected to have positive impacts on:

- Water treatment / Recycle rates
 - Steam generation, pumping, greater use of non-potable water
- Tailings reduction / separation techniques
 - Settling of emulsions and material handling
- Green house gas emissions reductions
 - Cogeneration, energy efficiency/conservation, carbon capture
- Air quality
 - Monitoring, scrubbing, emissions abatement
- Land reclamation processes
 - Biodiversity, reclamation of wetlands, agriculture of native species

Oil Sands Technology Solutions Energy efficiency is driving new opportunities

Low energy extraction

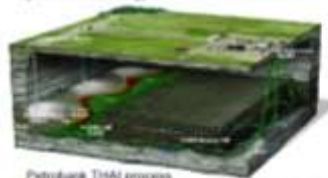
- 35°C instead of 80°C = 1/3 less energy us
- Oil sands producers are working on lowering temperatures

Underground combustion rather than steam

- Toe to Heal Air Injection (THAI) technology
- Working to develop additives that will reduce the need for both water and energy (steam) used in extracting oil sands.
- Utilize electricity rather than steam to warm the heavy oil underground.



Syncretic Low Energy Extraction – Aurora Mine



Petrobank THAI process



Solvent/steam processes (Lancora diagram)

The Keys to Moving Forward

- Invest
- Innovate
- Cooperate



April 13th, 2011

Dr. Randy Gossen

President, World Petroleum Council
and
VP, Global Business Relations, Nexen
Inc.