



Canadian Metals Outlook '10

David Daly

CAPP Manager Fiscal Policy
Canadian Association of
Petroleum Producers



Canadian Oil and Gas Overview and Outlook

*Metals Service Center Institute
Canadian Fall Outlook: Forecast 2010
David Daly*

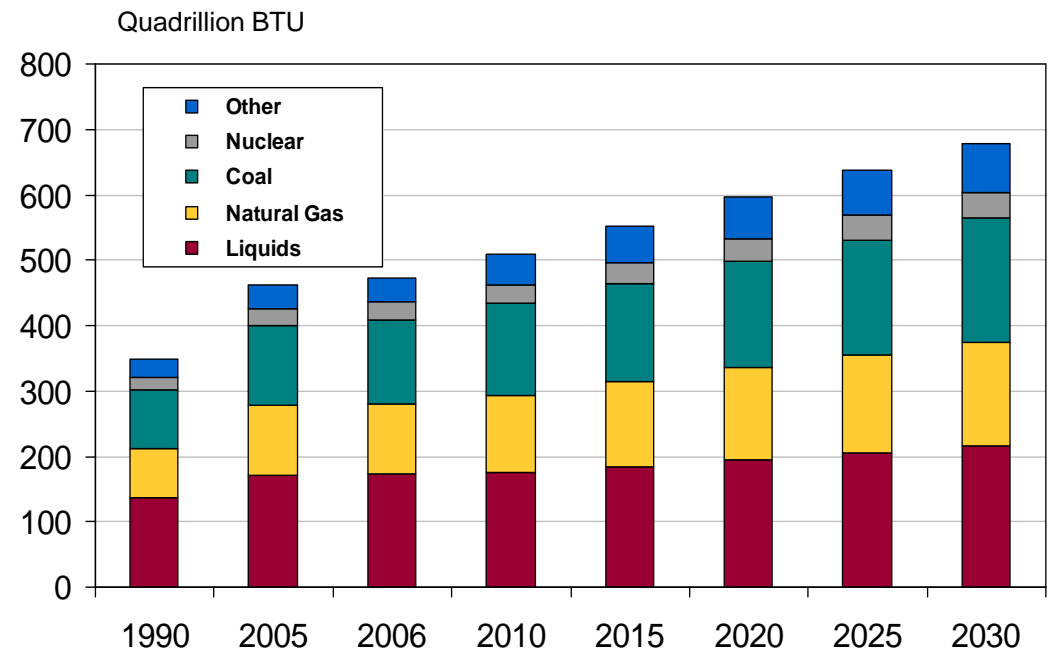
*Manager Fiscal Policy, Canadian Association of Petroleum Producers
November 10, 2009*

Global Energy Outlook



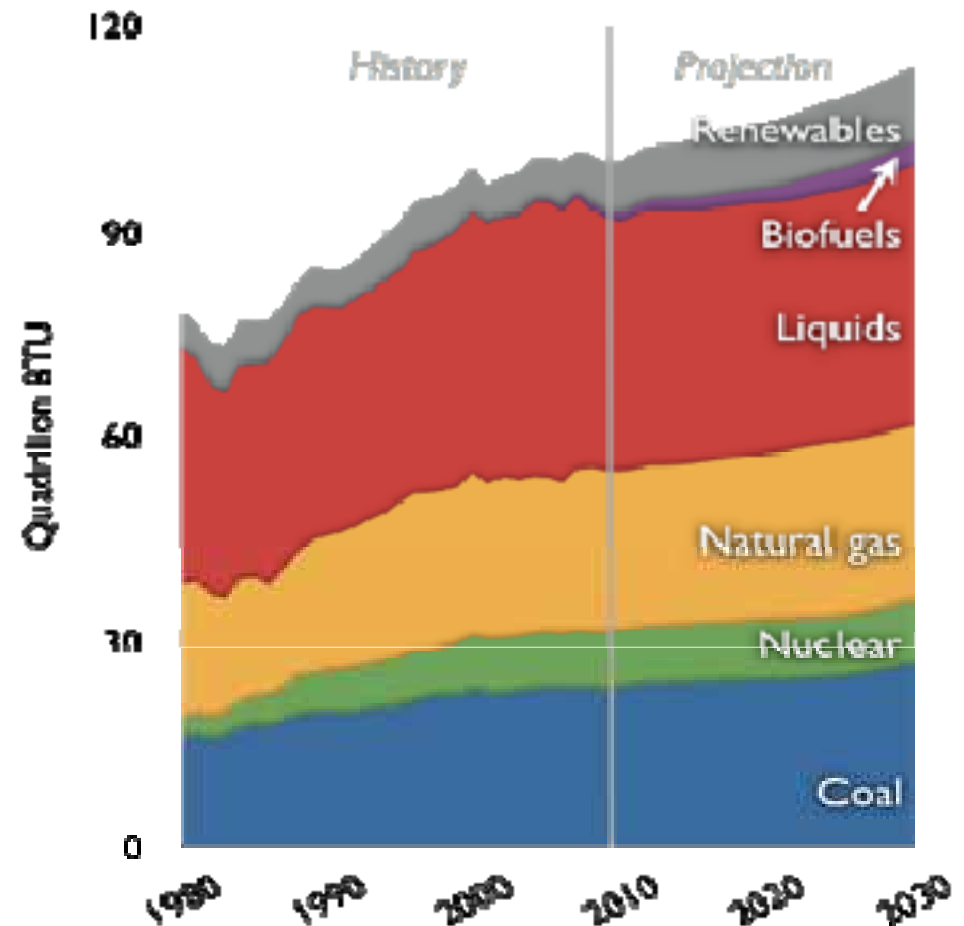
- **Significant energy demand growth:**
 - Population, standards of living
- **Need all forms of energy:**
 - Increasing role for renewables
 - Continuing reliance on hydrocarbons (predominant energy supply source)
 - Increasing role for non-conventional crude oil & natural gas
- **Environmental challenges**
- **Technology is a key lever for sustainable growth**

World Energy Demand 1990 - 2030
EIA – International Energy Outlook 2009



- **NA energy demand growth:**
 - Continues, but growth slower than global demand
- **Crude oil & natural gas remain important components of energy supply:**
 - Increasing focus on unconventional supplies
- **Opportunity for increased use of natural gas**

U.S. energy demand, 1980–2030



Source: EIA, International Energy Outlook

Key Canadian Oil and Gas Industry Challenges

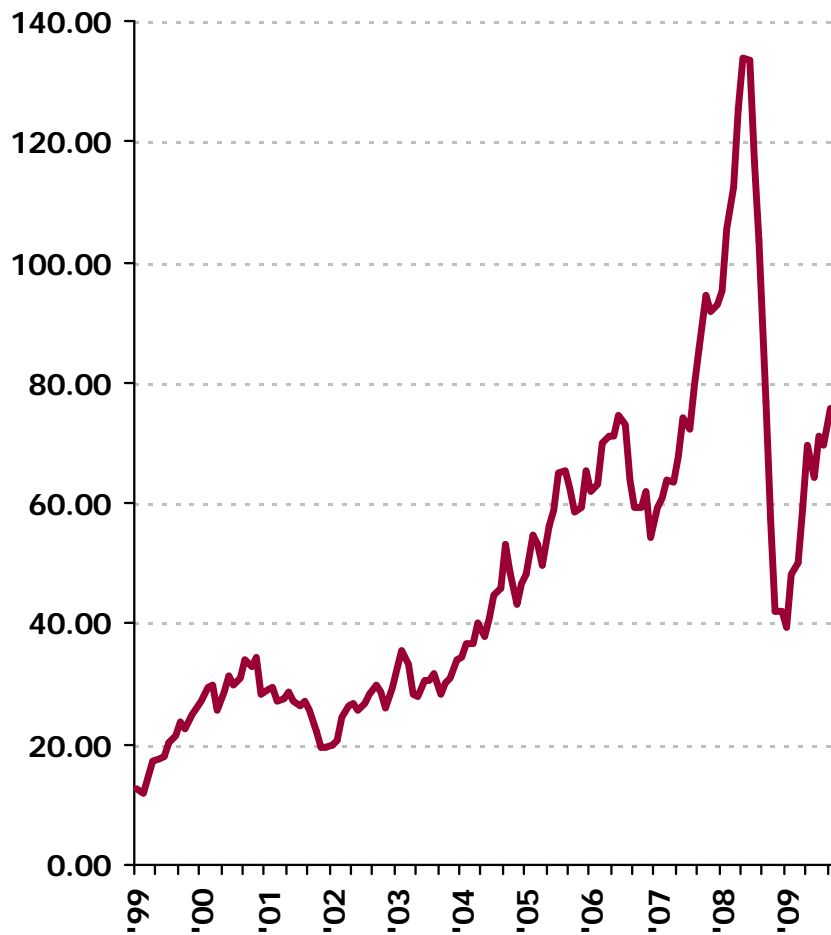


- **The Current Storm**
 - Commodity price decline
 - Financial market uncertainty...but improving
 - Cost structure “sticky”
 - Evolving public policy environment in Canada and U.S.
- **The Near Term Implications**
 - Demand destruction
 - Significant reductions in oil & gas investments
 - Industry consolidation (e.g., Petro-Canada/Suncor merger)
- **Ongoing Challenges**
 - Competitiveness
 - Environmental performance
 - Public perception of industry

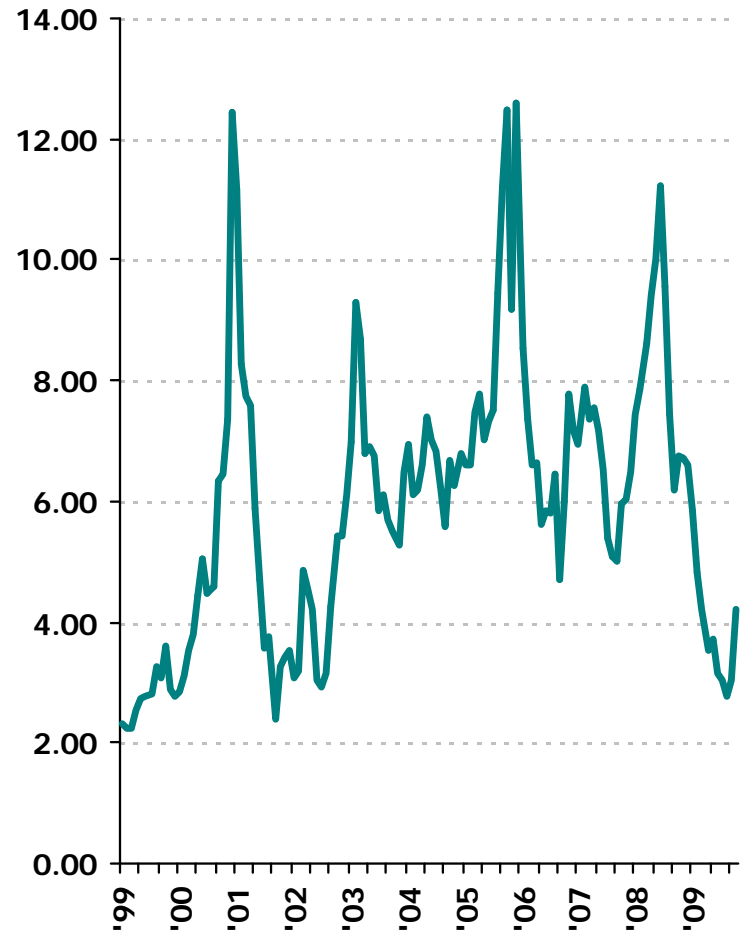
Crude Oil and Natural Gas prices



Crude Oil Prices
(WTI NYMEX)
\$US per barrel



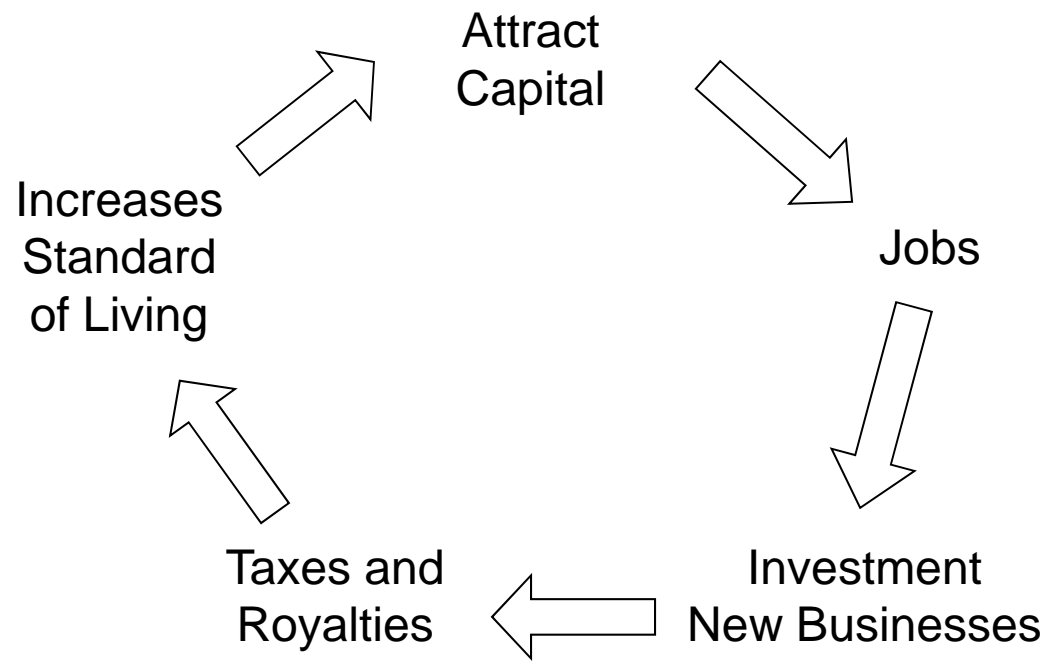
Natural Gas Prices
(AECO Daily Spot Price)
\$Cdn/mcf



Canada's Oil and Gas – Impact on the Canadian Economy over next 25 years



- **The oil & gas industry will invest C\$1.1 trillion (2008) dollars**
- **Will result in growth in Canada's GDP of C\$3.5 trillion (2008) dollars**



Industry Capital Spending Cdn \$billions



Oil & Gas Investment Spending:
2008: \$54 billion
2009: \$34 billion (estimate)
2010: \$40 billion (forecast)

Northern Canada

'08	'09F	'10F
\$0.4	\$0.5	\$0.5

Oil Sands

'08	'09F	'10F
\$18	\$10	\$12

WCSB

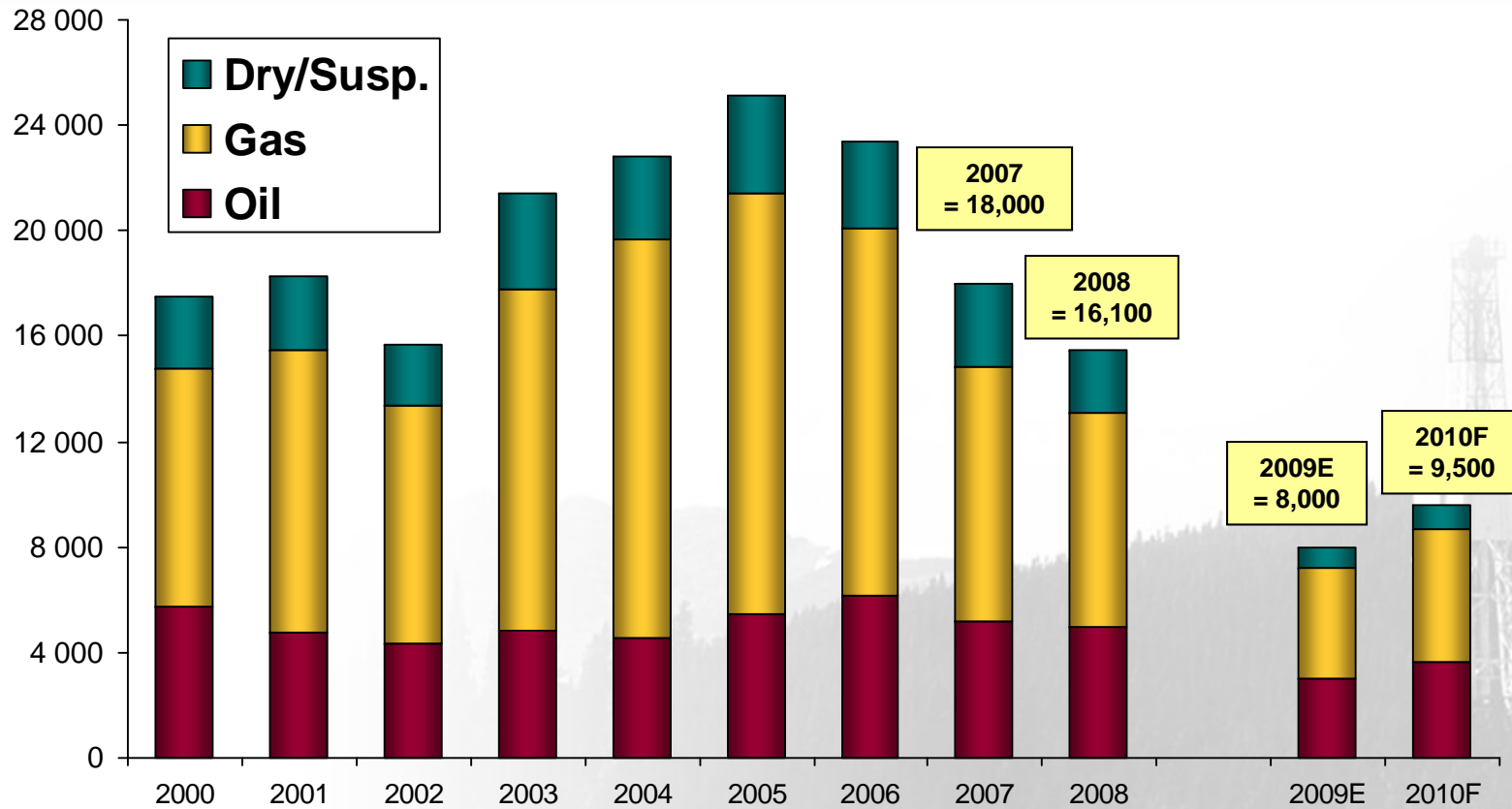
'08	'09F	'10F
\$34	\$22	\$25

East Coast Offshore

'08	'09F	'10F
\$1.3	\$1.5	\$2.5

Note:
Spending in Canada excludes spending associated with mergers & acquisitions

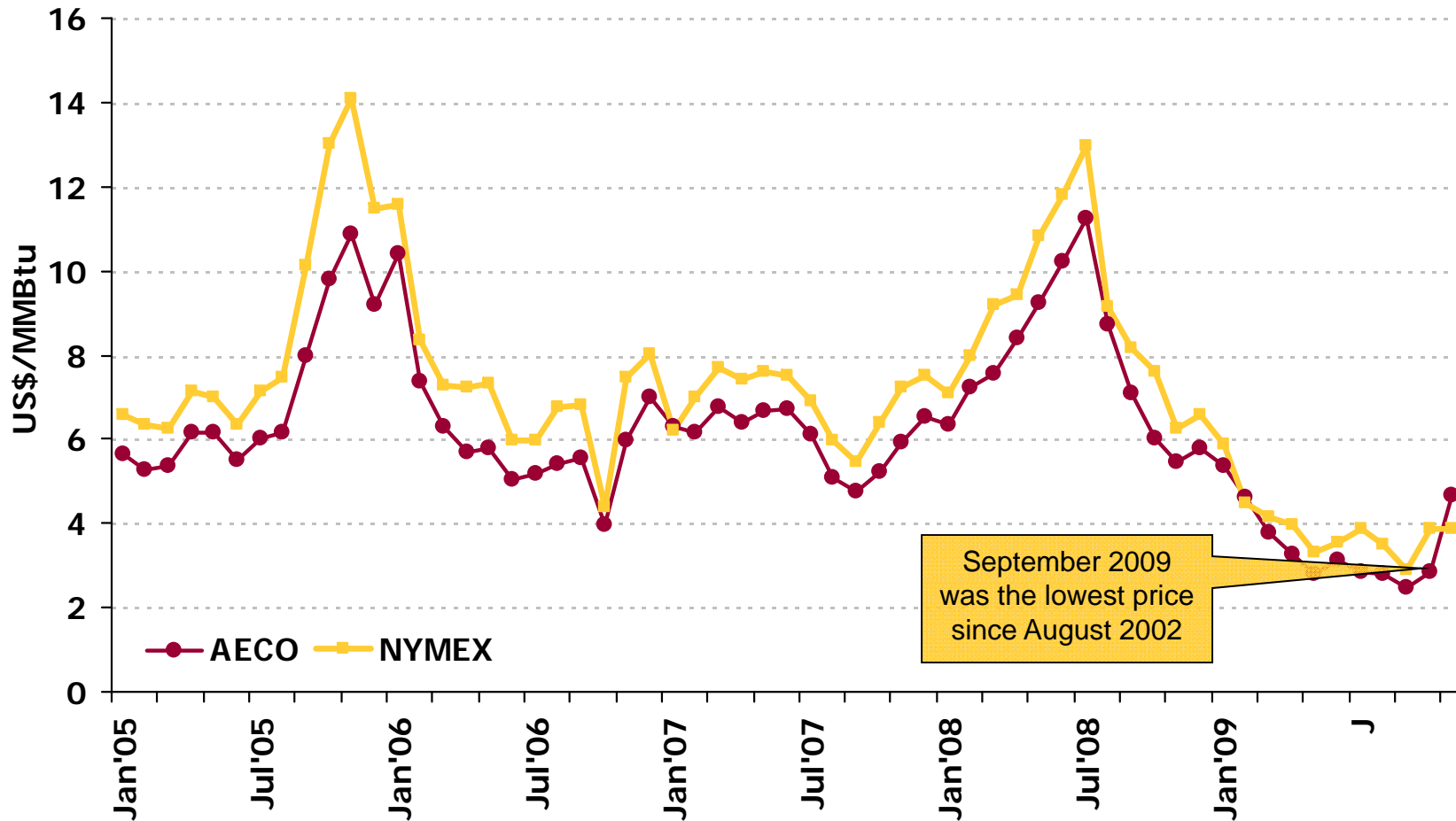
Total Wells Drilled in Western Canada



Source – CAPP. Based on Rig Release

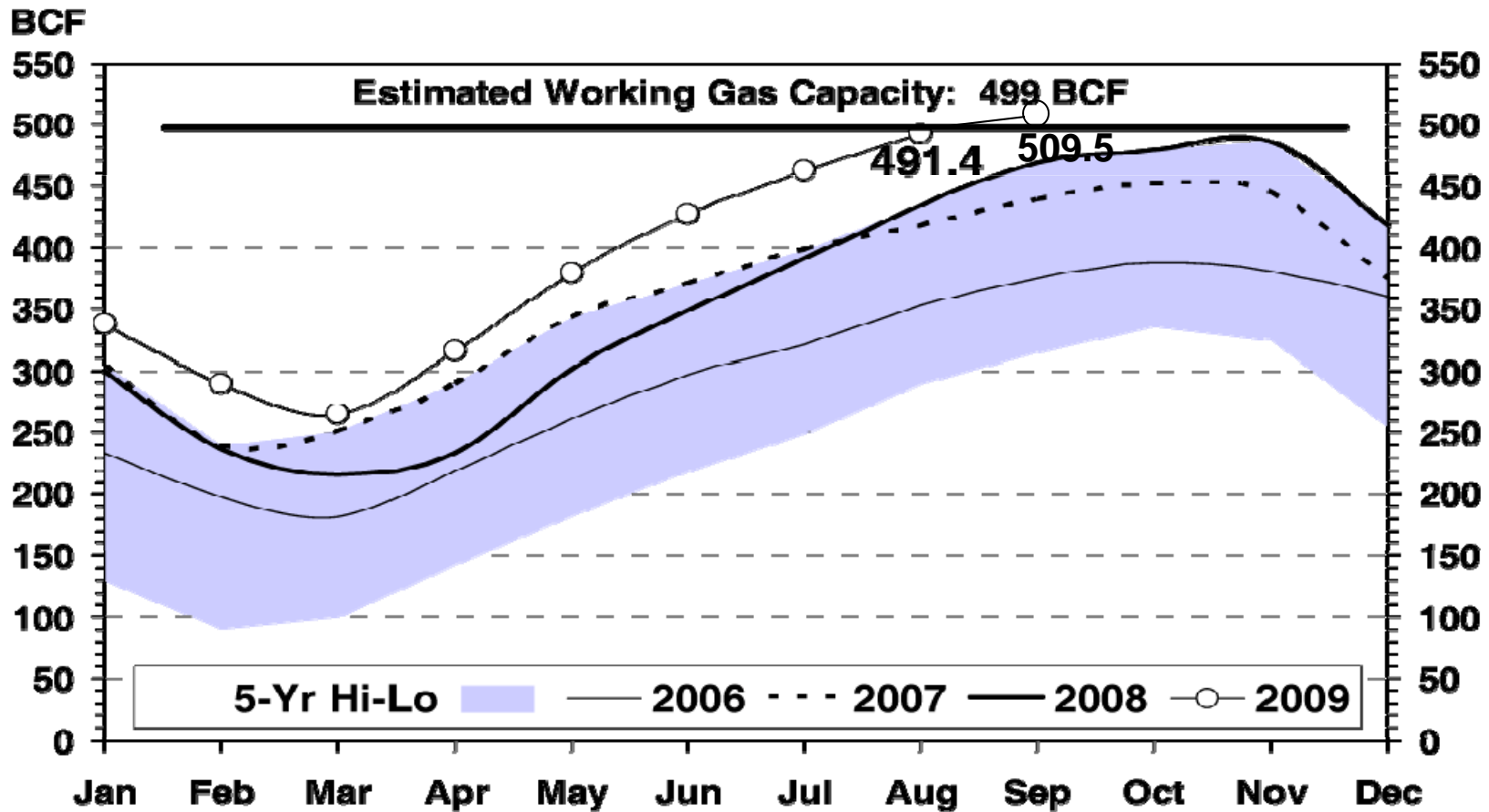
Natural Gas

Canadian and US Natural Gas prices



Source: CAPP Natural Gas Report

Natural Gas in Storage – Western Canada



Source: FirstEnergy Capital Corp.

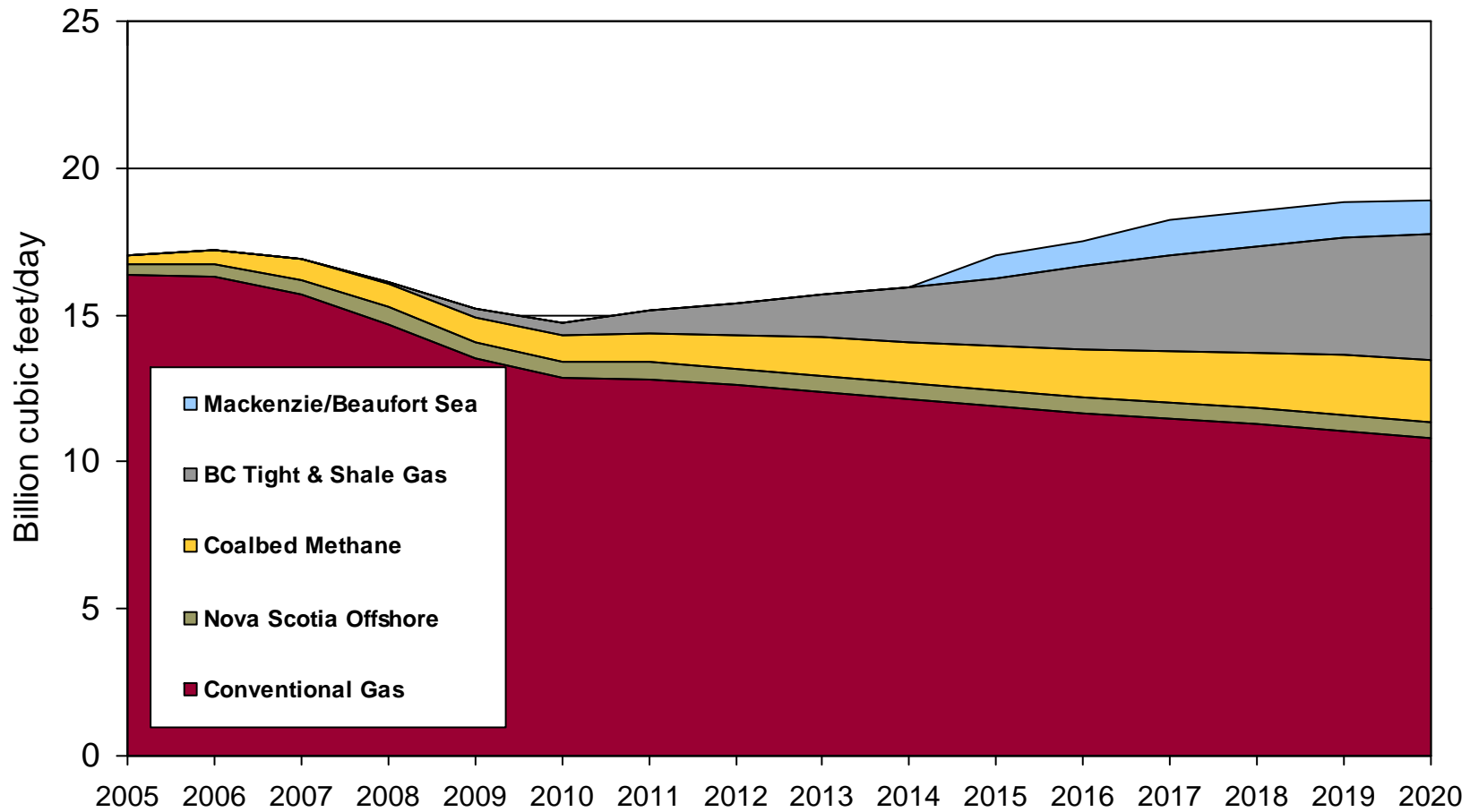
Unconventional Natural Gas Basins



- Technology has unlocked vast supplies of shale gas across North America
- Robust supply outlook for unconventional gas
- Game changing for the natural gas industry
 - Reserves
 - Economics
 - Location
 - Technology
- US shale gas is close to market



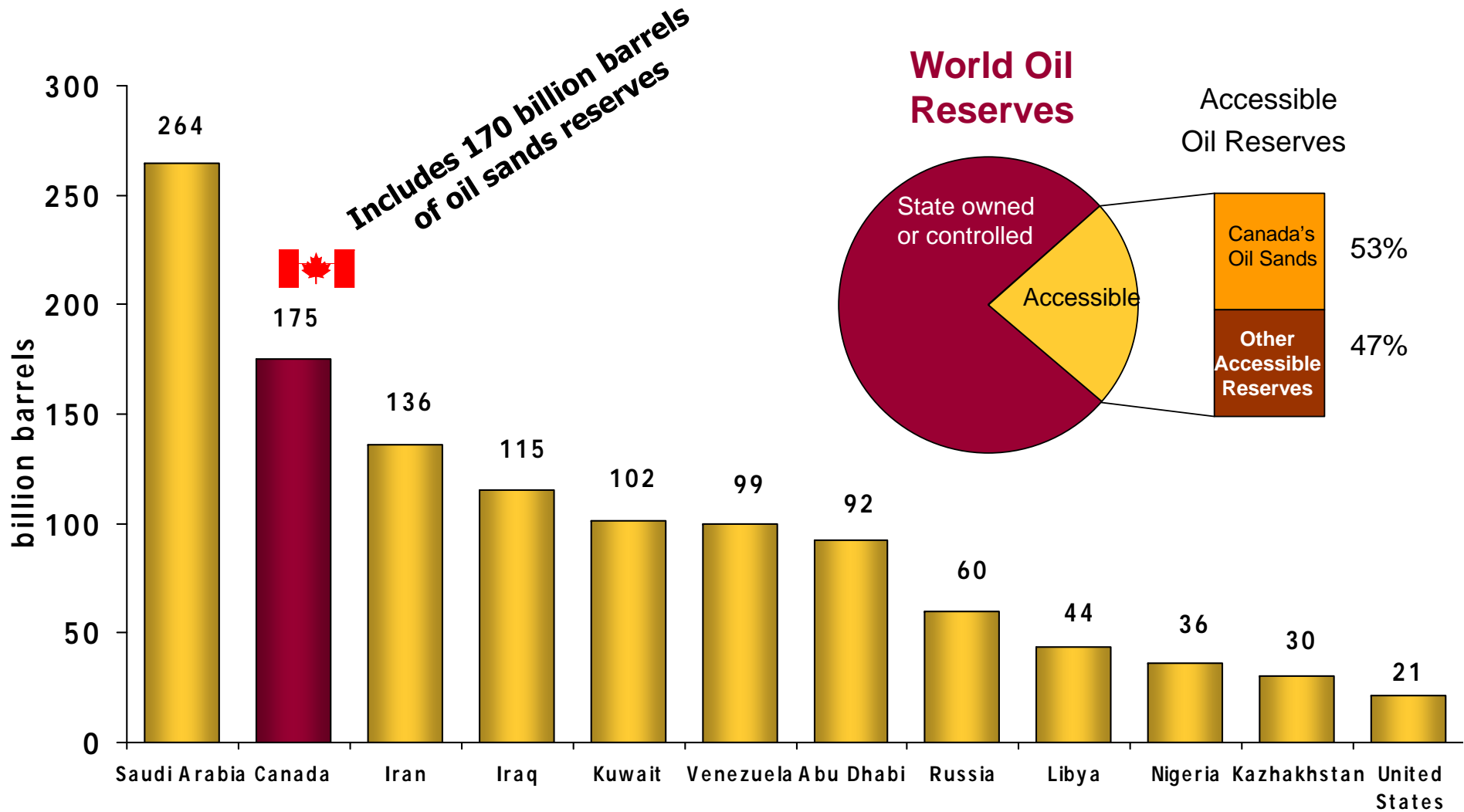
Canadian Natural Gas Production Forecast



Sources: CAPP

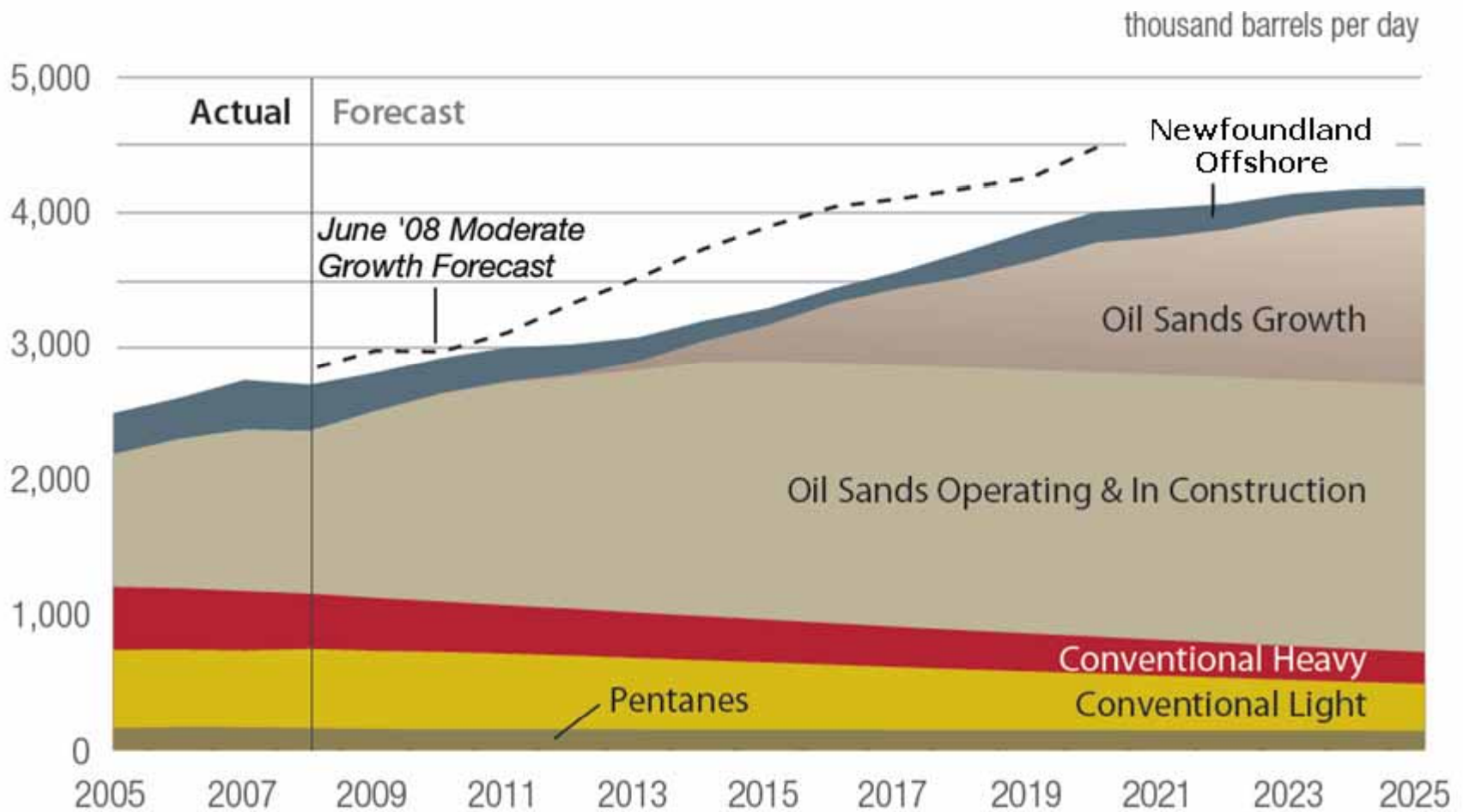
Crude Oil

Global Crude Oil Reserves by Country



Source: Oil & Gas Journal Dec. 2008

Total Canadian Oil Production



Atlantic Canada Developments



Oil fields
Gas fields

Eastcoast Capital Spending
\$ billions



Anticosti Basin

Magdalen Basin

Hibernia
Start-up – November 1997
2008 = 139,000 b/d

Hebron/Ben Nevis

Terra Nova
Start-up - January 2002
2008 = 103,000 b/d

Scotian Basin

Sable Offshore Energy Project
Start-up – December 1999
2008 = 430 mmcf/d & 20,000 b/d liquids

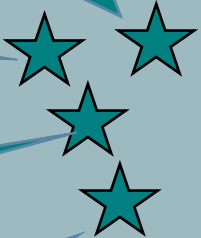
Jeanne d'Arc Basin

White Rose
Start-up – November 2005
2008 = 101,300 b/d

Deep Panuke

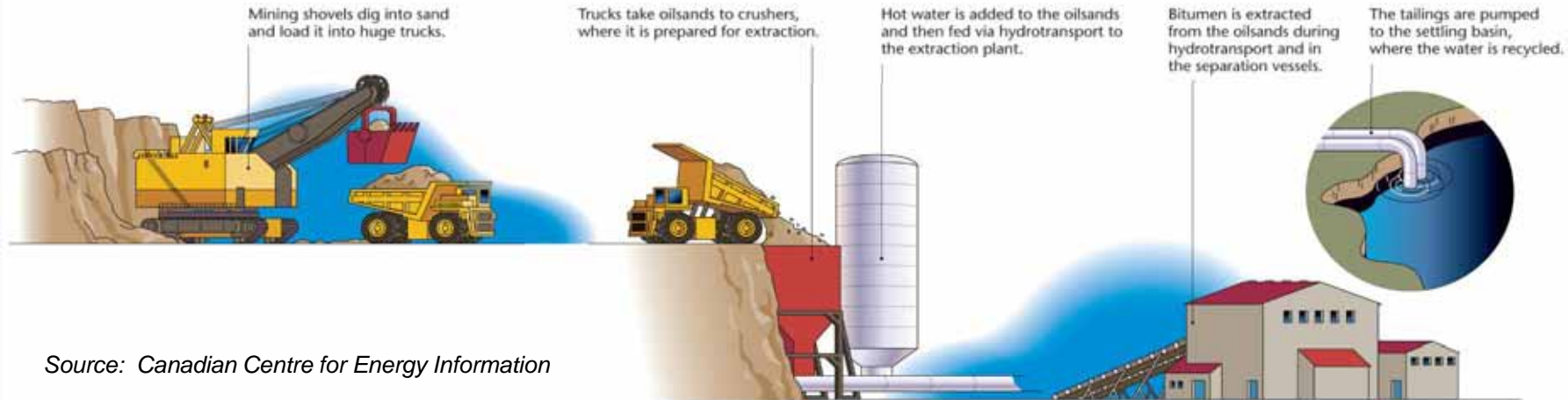
St. John's

Halifax



Oil Sands Production Technologies

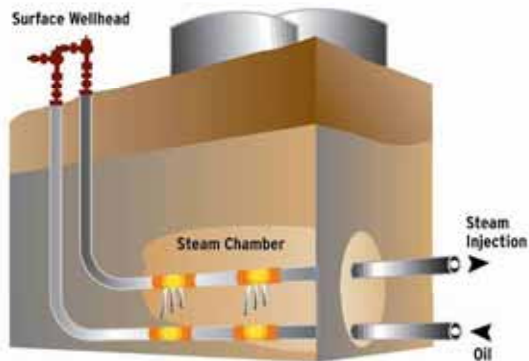
Mining – 20% of the oil sands resource is less than 200 feet deep - 2.5% of Surface Area



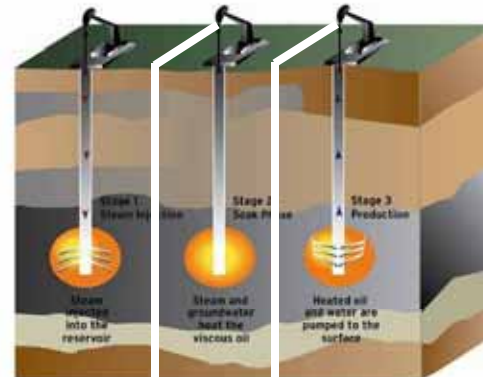
Source: Canadian Centre for Energy Information

In situ – 80% of the oil sands resource is more than 200 feet deep – 97.5% of Surface Area

Steam Assisted Gravity Drainage



Cyclic Steam Process



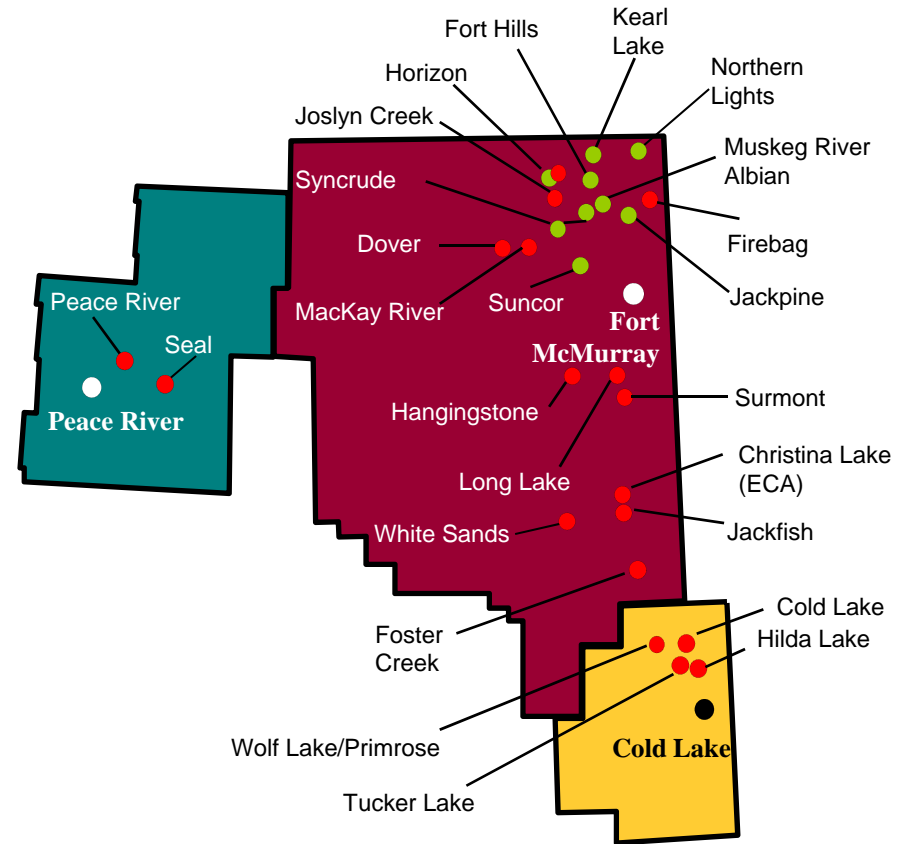
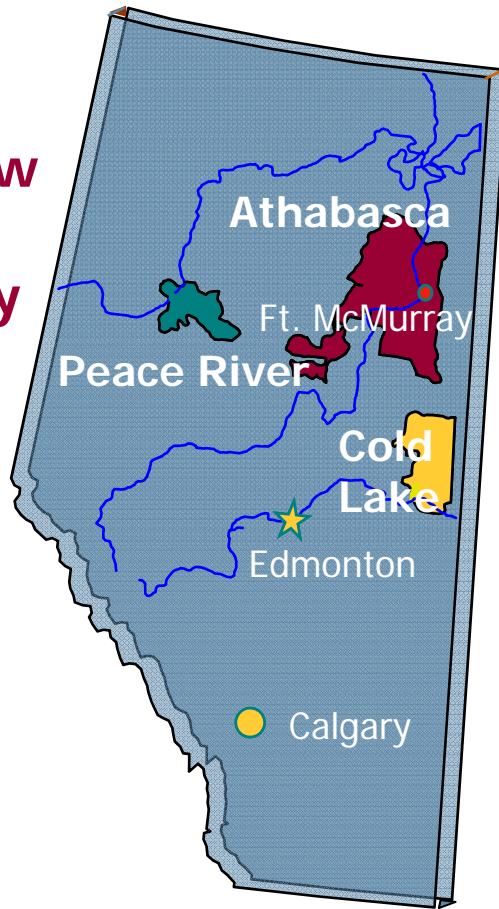
In Situ:

- No mines
- No tailings ponds
- No water from the Athabasca River

Oil Sands Projects in Three Deposits

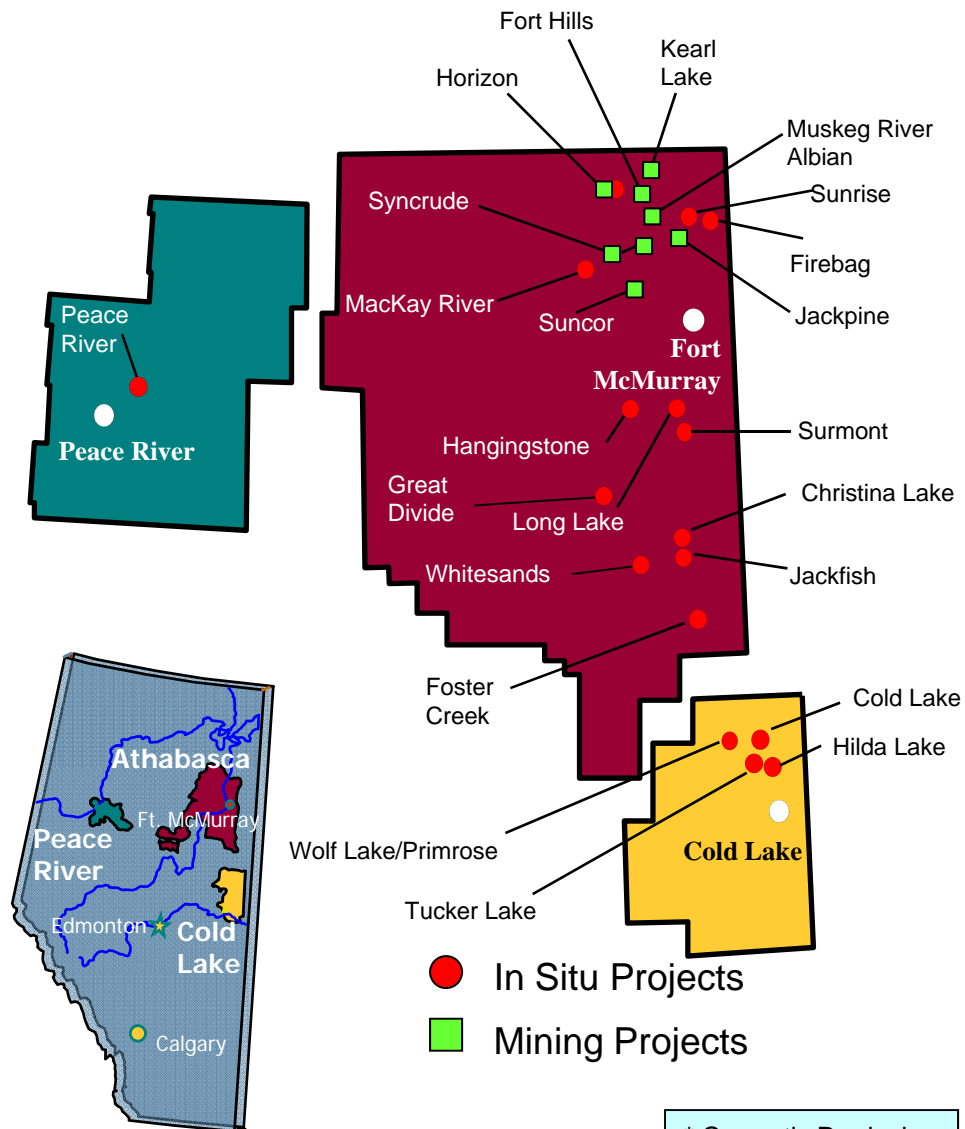


- Oil sands production now 1.3 million barrels per day
- \$110 billion built from 2000-2010



- In Situ Projects
- Mining Projects

Mining and Thermal Oil Sands Projects in Three Deposits



- In Situ Projects
- Mining Projects

* Currently Producing

Athabasca – Mining			
Operator	Project	Existing or initial bpd	Potential bpd
Albian/Shell	Muskeg/Jackpine*	155,000	570,000
CNRL	Horizon*	135,000	577,000
Suncor	Main Operations*	320,000	440,000
Suncrude	Main Operations*	407,000	595,000
Imperial	Kearl (2012)	110,000	310,000
Suncor	Fort Hills	165,000	190,000
Total E&P	Joslyn Mine	100,000	200,000
Athabasca – In Situ Thermal			
Connacher	Great Divide*	10,000	44,000
ConocoPhillips	Surmont*	27,000	110,000
Devon	Jackfish*	35,000	70,000
Encana/ConocoPhillips	Christina/Foster*	140,000	400,000
JACOS	Hangingstone (pilot)*	10,000	45,000
OPTI/Nexen	Long Lake/South*	72,000	428,000
MEG	Christina Lake*	3,000	210,000
Petrobank	Whitesands*	1,800	103,600
Suncor	Mackay River	33,000	73,000
Suncor	Firebag*	95,000	369,000
Husky/BP	Sunrise	50,000	200,000
Statoil	Kai Kos Dehseh	10,000	240,000
Cold Lake – In Situ Thermal			
CNRL	Primrose/Wolf Lake*	120,000	150,000
Husky	Tucker*	30,000	30,000
Imperial	Cold Lake*	140,000	170,000
Shell	Hilda Lake	10,000	20,000
Peace River – In Situ Thermal			
Shell	Peace River*	13,000	100,000

Environmental Stewardship - Land, Water, Air

- **Oil Sands Mining:**

- Mineable area 1/10 of 1% of Canada's boreal forest
- Disturbed mining area ~1/2 area of Edmonton
- Stringent regulatory requirements
- Reclamation activities underway (condition of project approval)
- Reclamation takes time - 12% of mined area to date is actively being reclaimed
- Alberta holds \$675 million in reclamation security bonds from industry

- ***In-situ* Oil Sands**

- Operations have much smaller footprint (primarily road and pipeline infrastructure)
- Impact about 15% of lease surface area



Environmental Stewardship: Water



- ***In situ* Oil Sands**

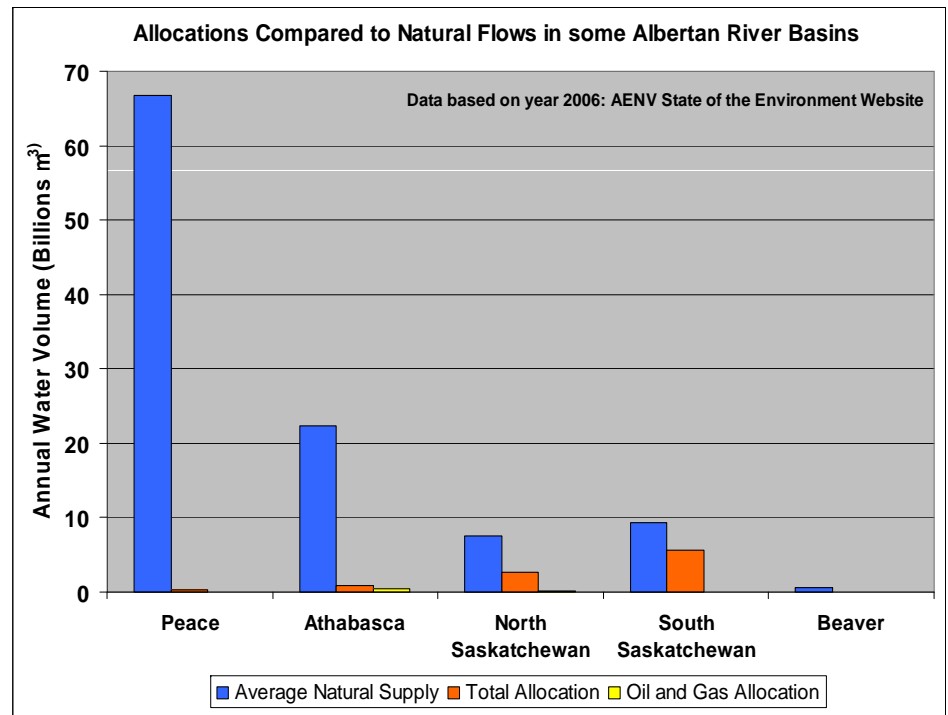
- Up to 95% recycle
- Increasing use of non potable (saline) water

- **Oil Sands Mining**

- Used < 1% of annual flow of Athabasca River in 2008.....could grow to 3% with new projects
- Withdrawals restricted during periods of low flow
- AB has 30% improvement target in water use by 2015
- Stringent water management plan in place for Athabasca River

- **Tailings Ponds**

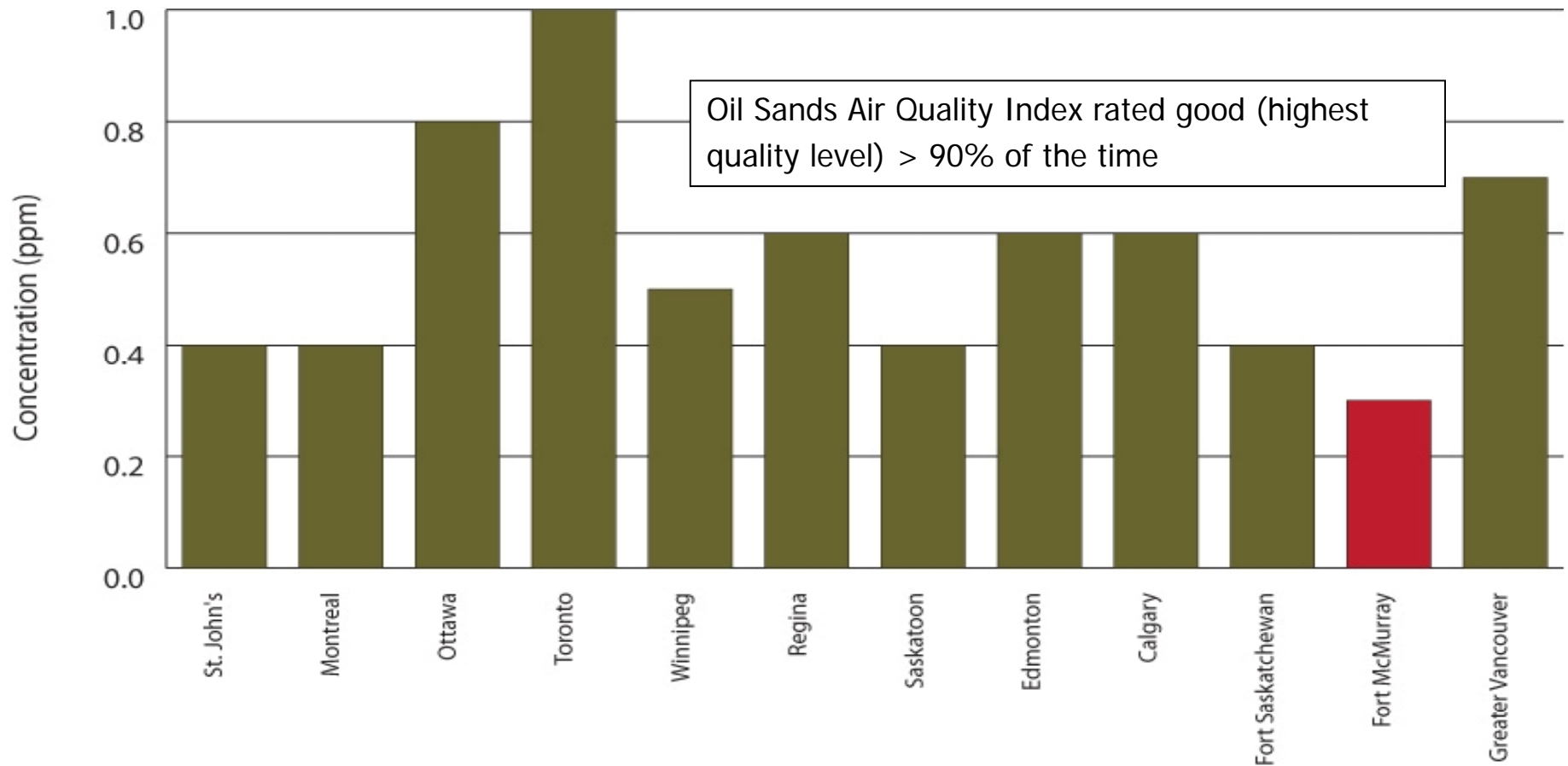
- No return of untreated wastewater to river
- Used water stored in tailings ponds (up to 85% recycle)
- Water quality monitored since the 1970s; no change in surface water quality since inception of oil sands mining



Environmental Stewardship: Air




Annual Average Nitrogen Dioxide Concentrations in Major North American Cities



Source: CASAhome.org

 5 year average

 Fort McMurray 5 year average

Environmental Stewardship: GHG Emissions



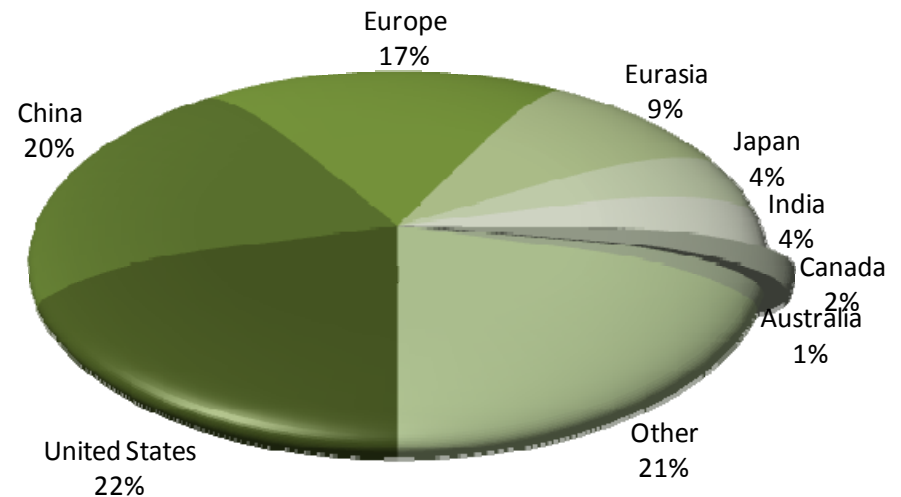
- **Improvements being demonstrated:**

- GHG intensity reduced by 33% from 1990 to 2007
- Government regulations to limit GHG emissions will result in continued improvements
- New technologies being applied
- Growth in production will add to GHG emissions

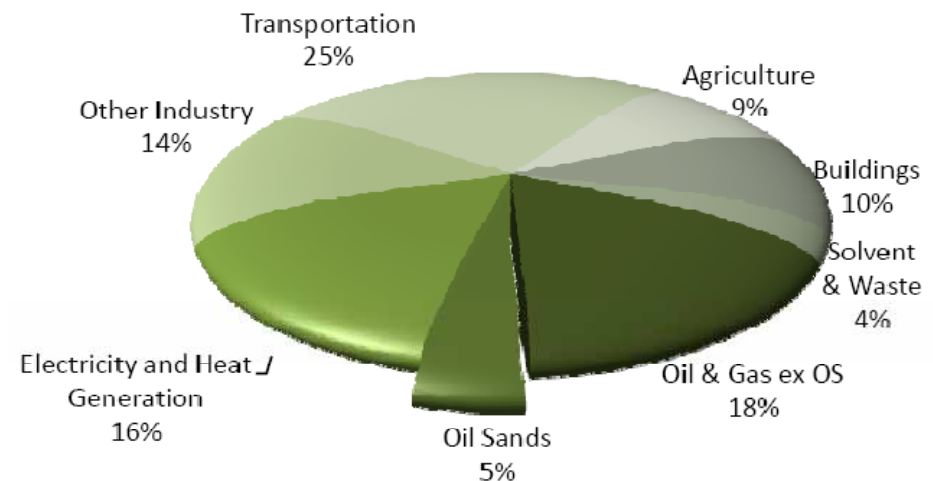
- **GHG emissions from oil sands.....in context:**

- 5% of GHG emissions in Canada
- equivalent to 0.5% of total U.S. GHG emissions
- less than 0.1% of global GHG emissions

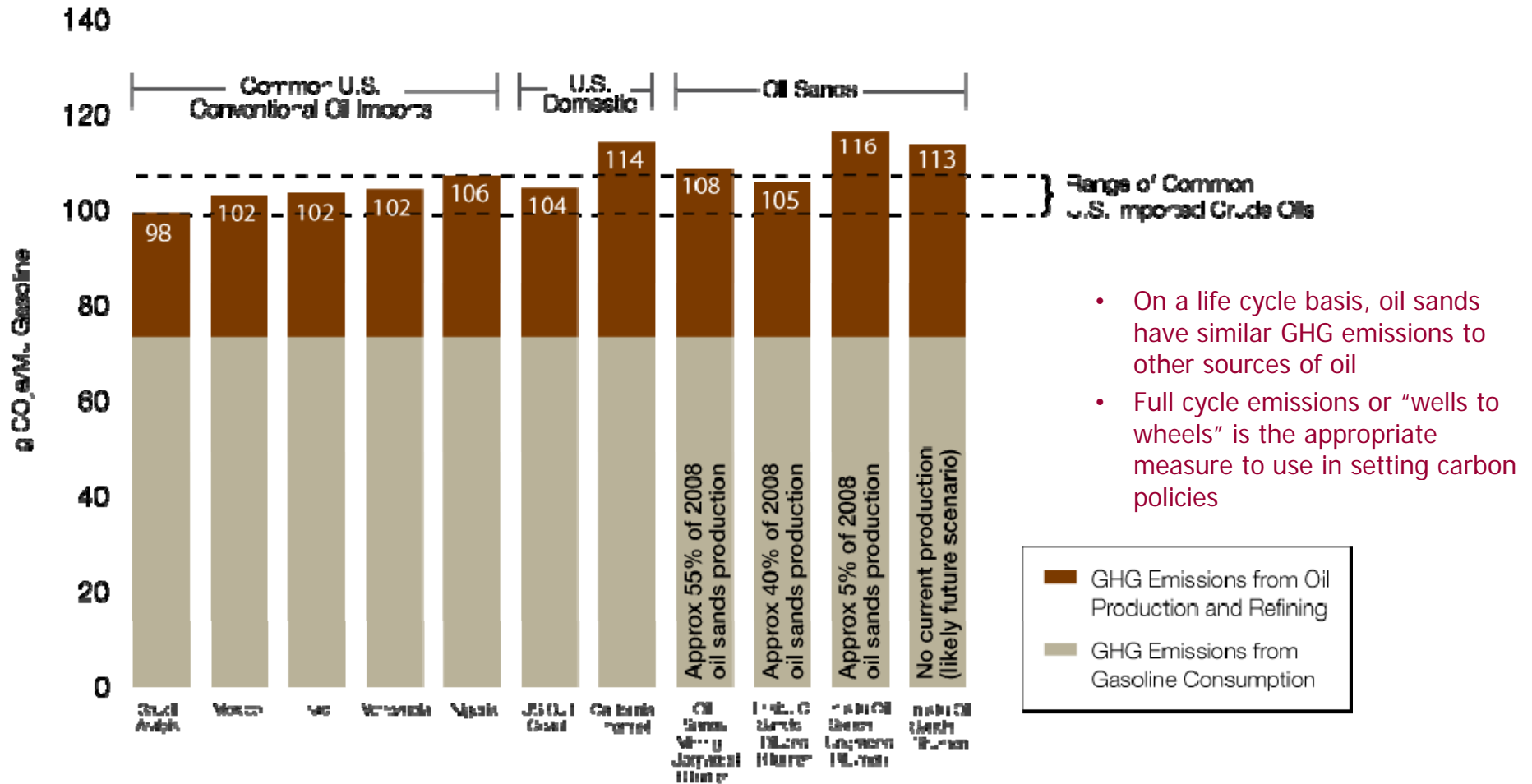
Global Energy Related Emissions By Country



Canada's GHG Emissions By Sector



Full Cycle GHG Emissions by Crude Oil Type



Source: Jacobs Consultancy, Life Cycle Assessment Comparison for North American and Imported Crudes, June 2009

Oil & Gas Sector - Principles to Guide Canadian Climate Change Policy



1. Balance: economy, environment, energy security.
2. Predictability and stability to support longer term investments, designed for Canadian circumstances.
3. Align with policy of major international competitors, or adjusting for differences, so as not to undermine competitiveness (particularly for EITE sectors).
4. Promote technology development & deployment necessary for significant future reductions in GHG emissions.
5. Recognize and allow for regional diversity of energy systems and industrial structure, and harmonize policy requirements across jurisdictions.

New Technologies: Reducing Environmental Impacts

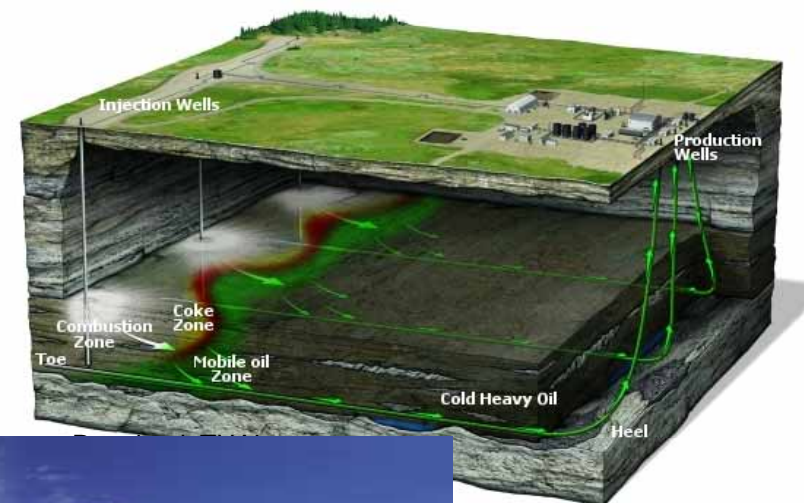
- **Less energy = less GHG:**

- Low energy extraction (35°C instead of 80°C)
- Uses ~ 1/3 energy



- **Less water:**

- THAI process uses underground combustion rather than steam
- New processes use electricity instead of steam to heat bitumen
- Other processes use solvent to reduce the need for both water and energy (steam)



- **Saline (non-potable) water:**

- Some new projects use 100% saline water
- Other *in situ* oil projects significantly increasing saline water use



State of the Canadian oil and gas industry

The outlook is mixed – keys to watch for



- **Crude oil and oil sands**
 - Prices recovering – particularly for heavy oil
 - Costs for new oil sands coming down slowly
 - Projects being re-examined
 - New tight oil resources (Bakken) are attracting attention
- **Natural gas**
 - Prices remain low, supply and storage are strong
 - New unconventional gas (shale) supplies
 - Natural gas drives majority of drilling activity
- **Keys to watch for:**
 - Natural Gas
 - US conventional gas supply - now that drilling has slowed
 - Natural gas storage levels
 - slow drilling reducing supply
 - cold weather increasing demand
 - Competitiveness of Canadian unconventional gas
 - Crude Oil
 - Continued recovery of global oil demand – China/India



Achieving Balance - Energy, Environment, Economy



- **Providing Energy Security**

- Safe, secure and reliable energy

- **Ensuring Environmental Stewardship**

- Strict regulations
- Technology advances

- **Generating Economic Benefits**

- Jobs and revenues across North America

