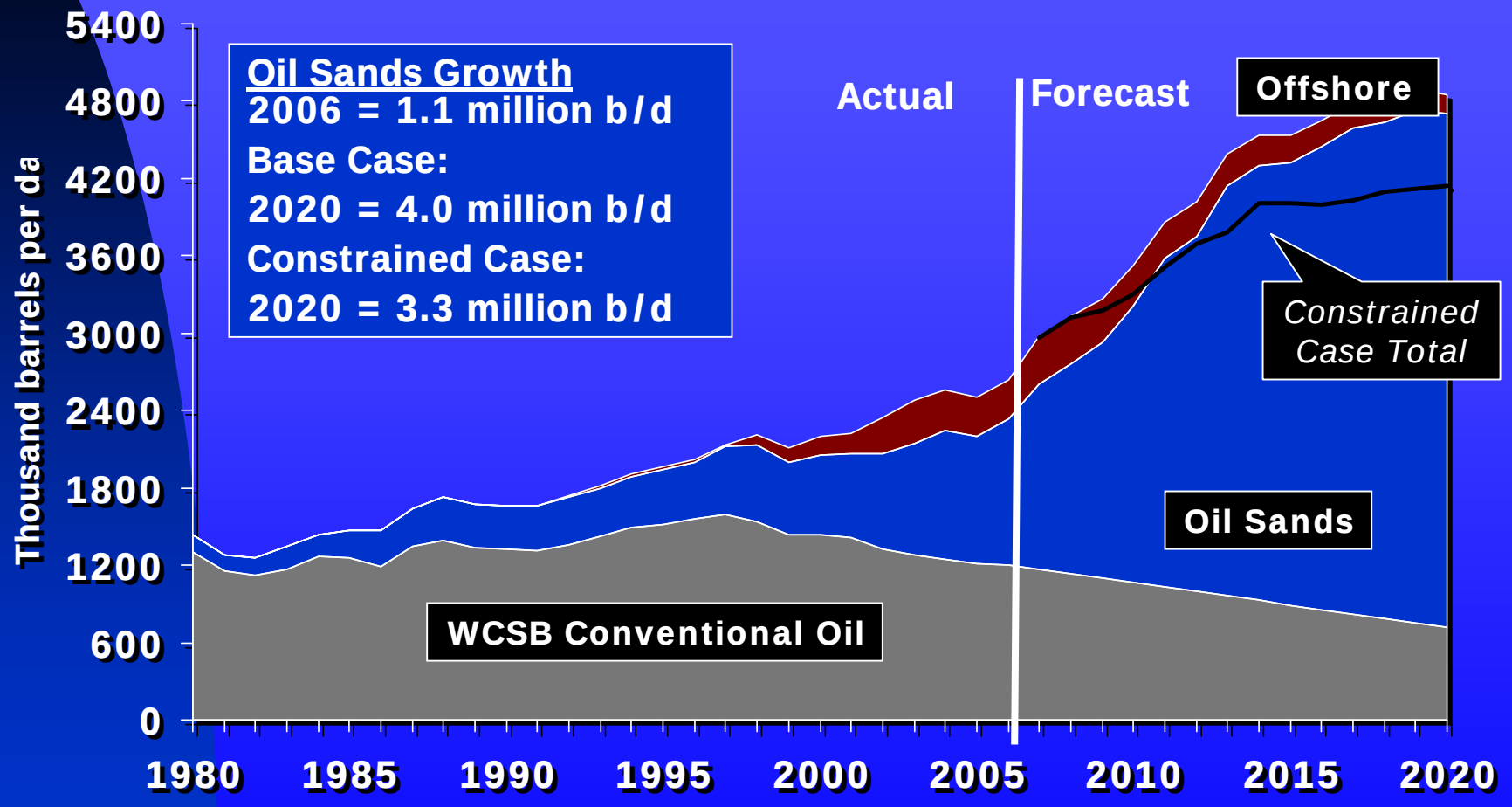
Canada

Canada's Oil and Gas Industry in the North American Energy Economy

- Canada is the world's 3rd largest natural gas producer
- Canada is the world's 8th largest crude oil producer
  - and moving up the list quickly with oil sands production increasing
- Canada is the largest supplier of energy to the United States
- Canada is the fifth largest energy producer in the world
- Canadian energy production has increased by over 80% since 1980

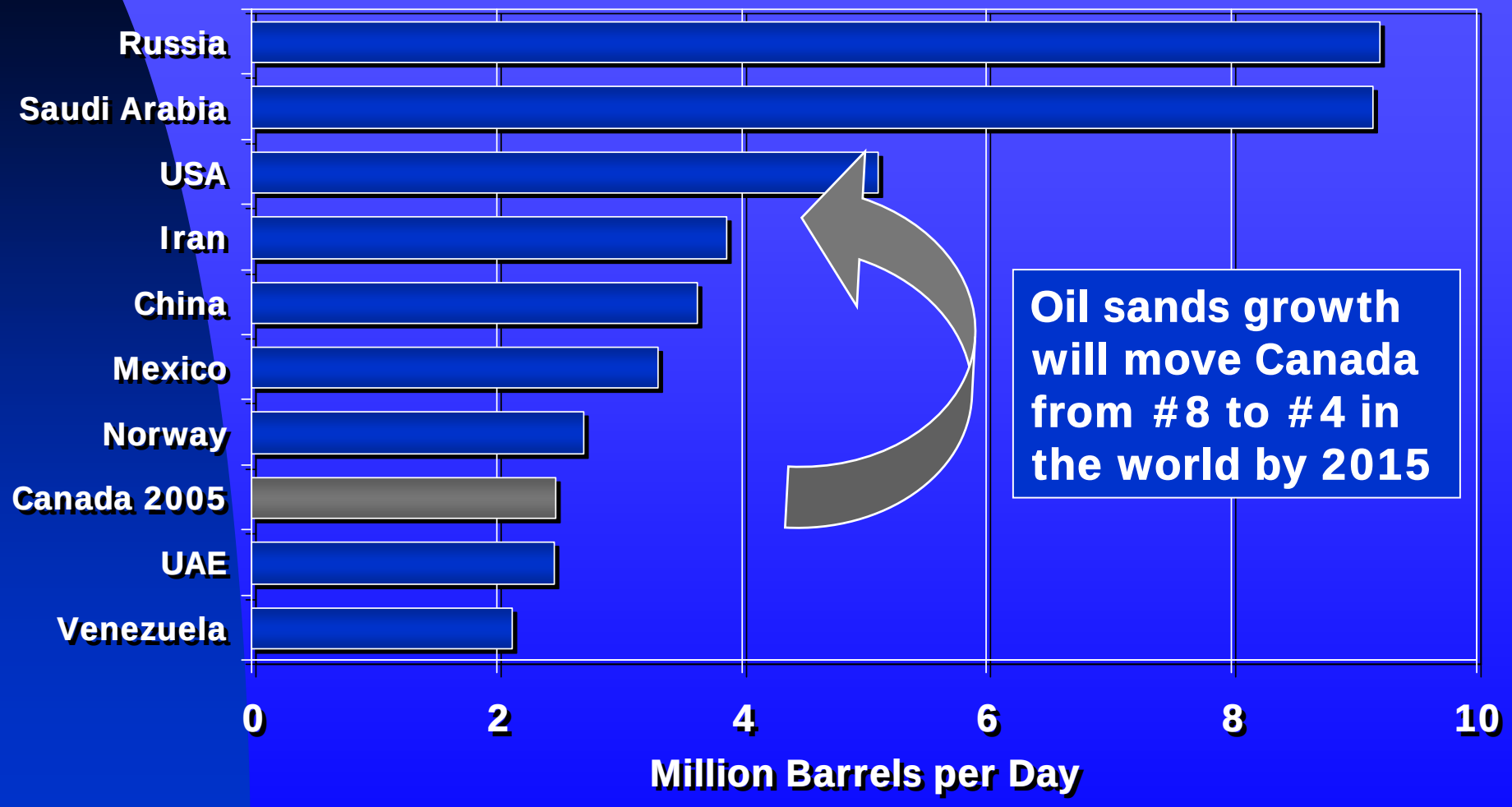
2006	Canadian Natural Gas	Canadian Petroleum
Ranking of importers to U.S.	**#1**	**#1**
Share of U.S. consumption	16%	11%
Share of U.S. imports	86%	16%

Canadian Oil Production
Conventional, Oil Sands and Offshore



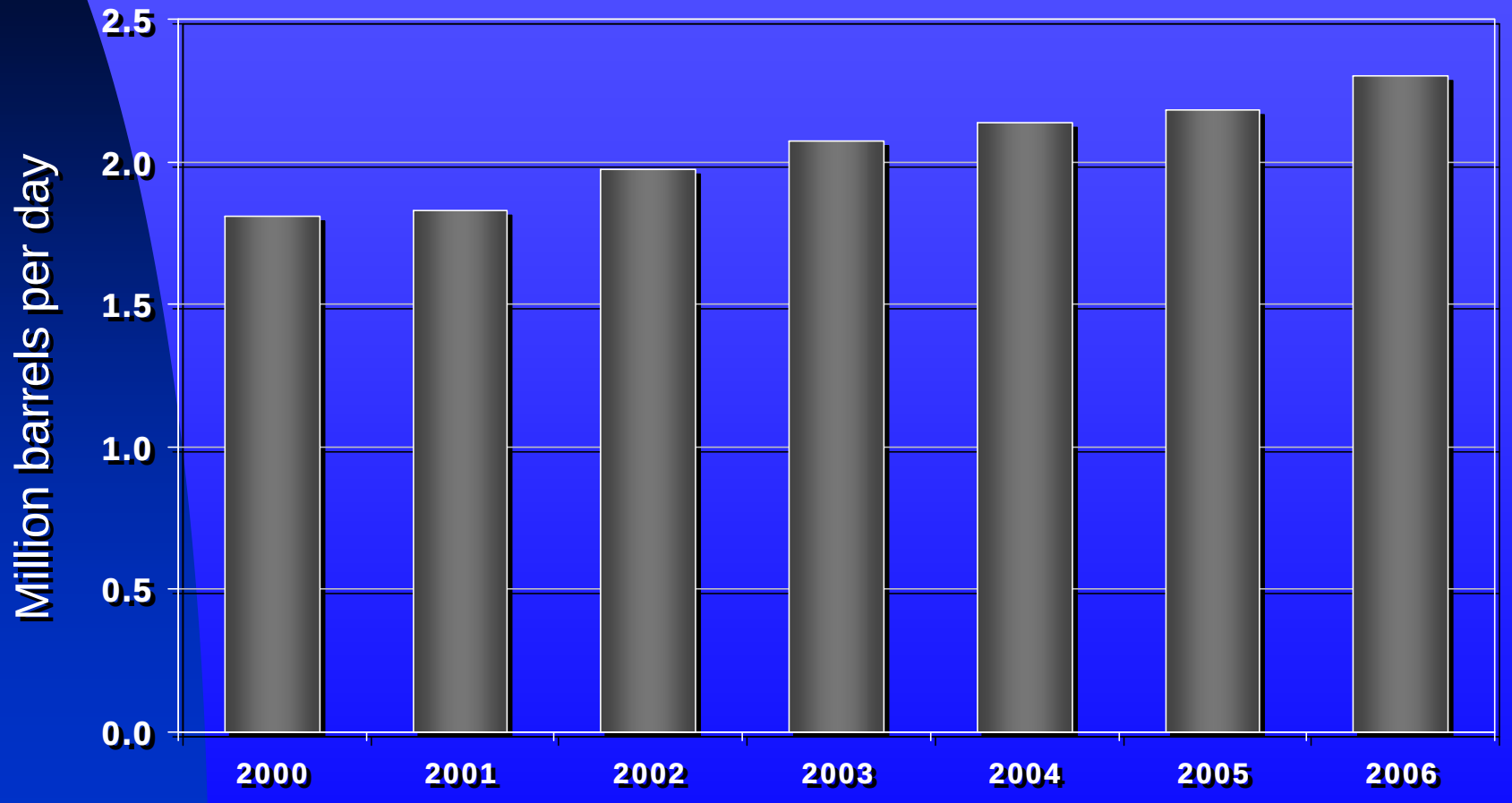
Source: CAPP

Top 10 World Crude Oil Producers in 2005



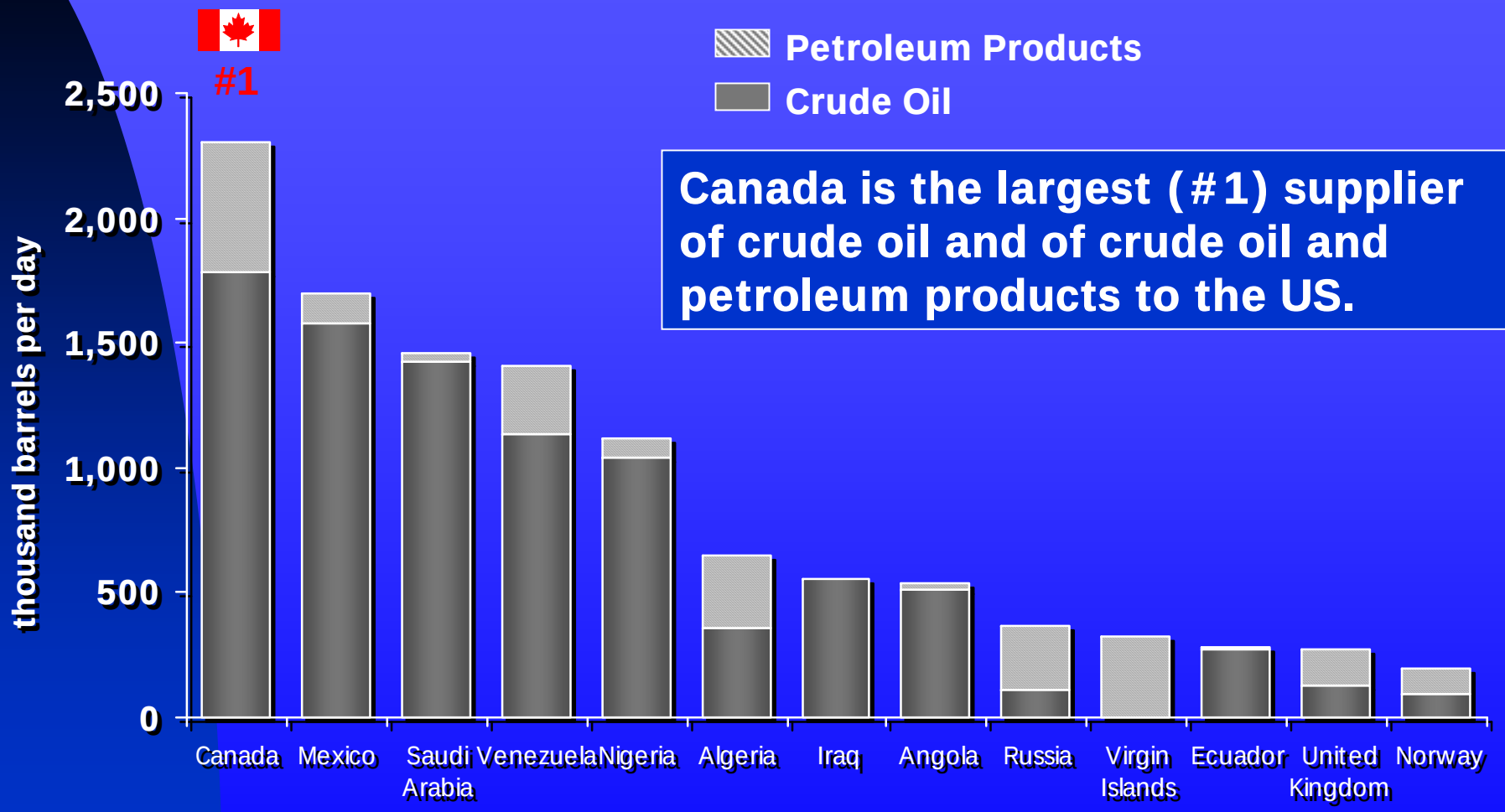
Source: EIA & CAPP

U.S. Crude Oil and Petroleum Products Imports from Canada



Source: U.S. DOE/EIA
2000-2006

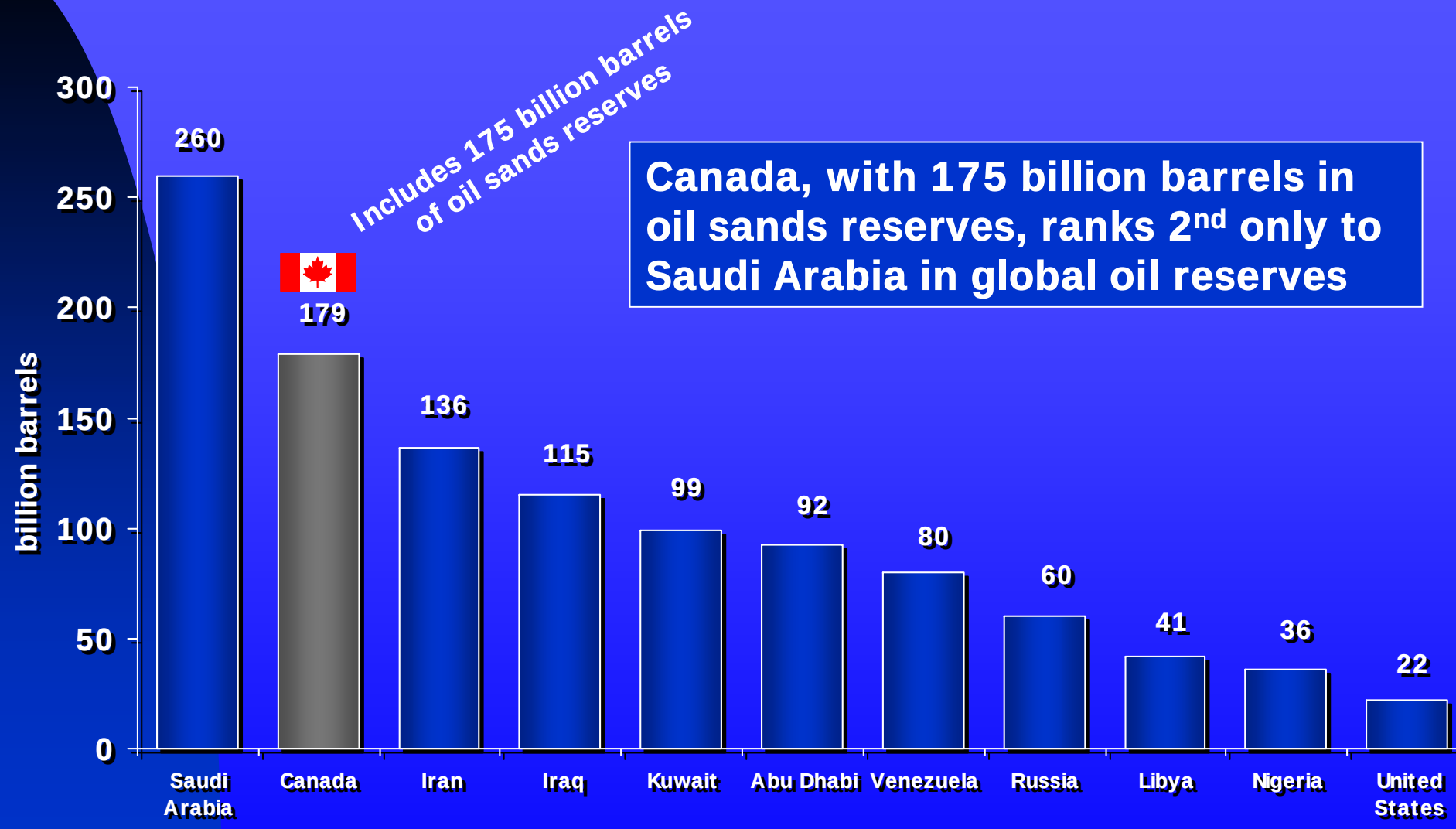
U.S. Imports of Crude Oil and Petroleum Products by Country of Origin



Canada is the largest (#1) supplier of crude oil and of crude oil and petroleum products to the US.

Source: EIA, Jan-Dec 2006

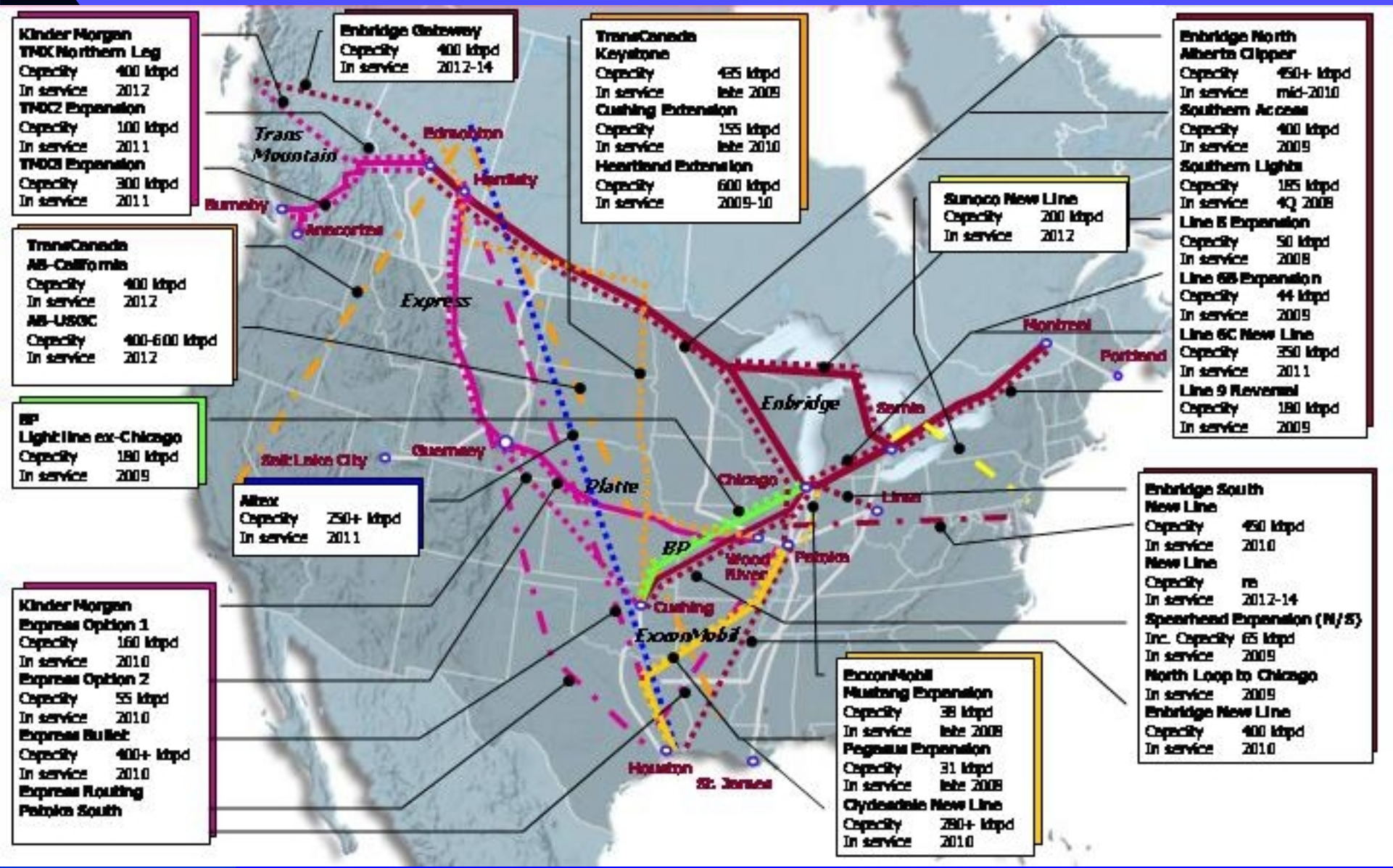
Global Crude Oil Reserves by Country



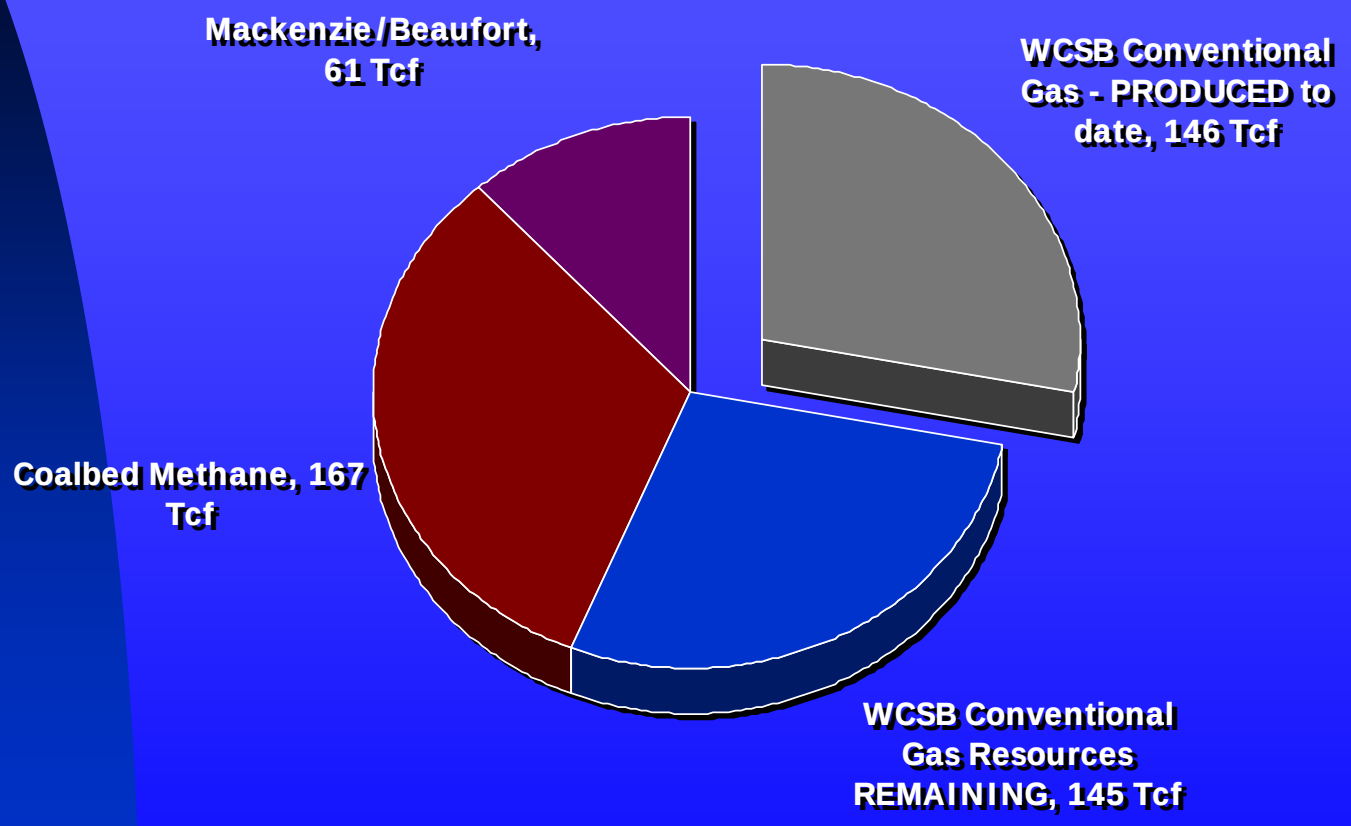
Canada, with 175 billion barrels in oil sands reserves, ranks 2nd only to Saudi Arabia in global oil reserves

Source: Oil & Gas Journal Dec. 2006

Canadian & U.S. Crude Oil Pipelines

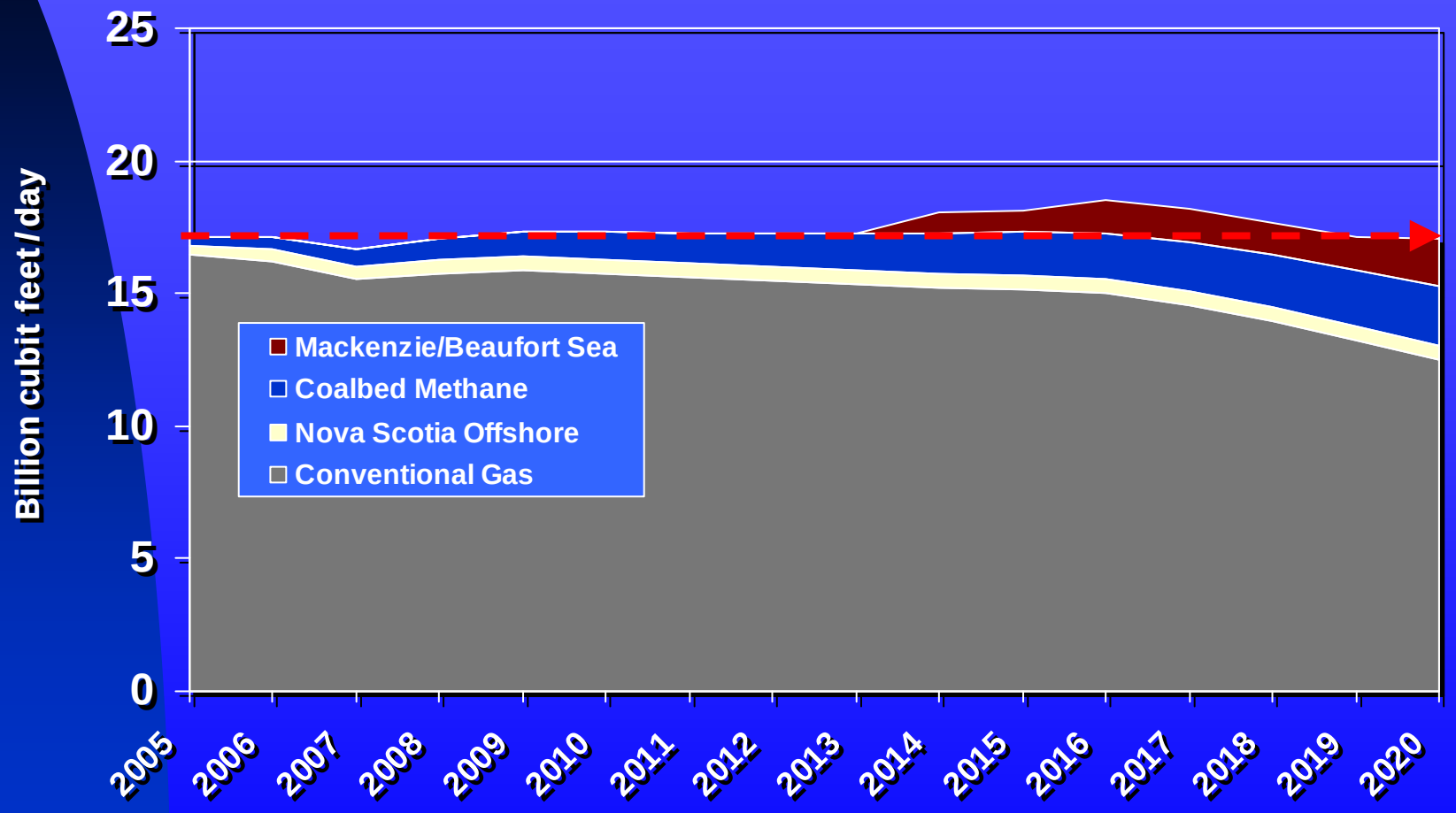


Western Canadian Gas Resources Conventional and New Sources



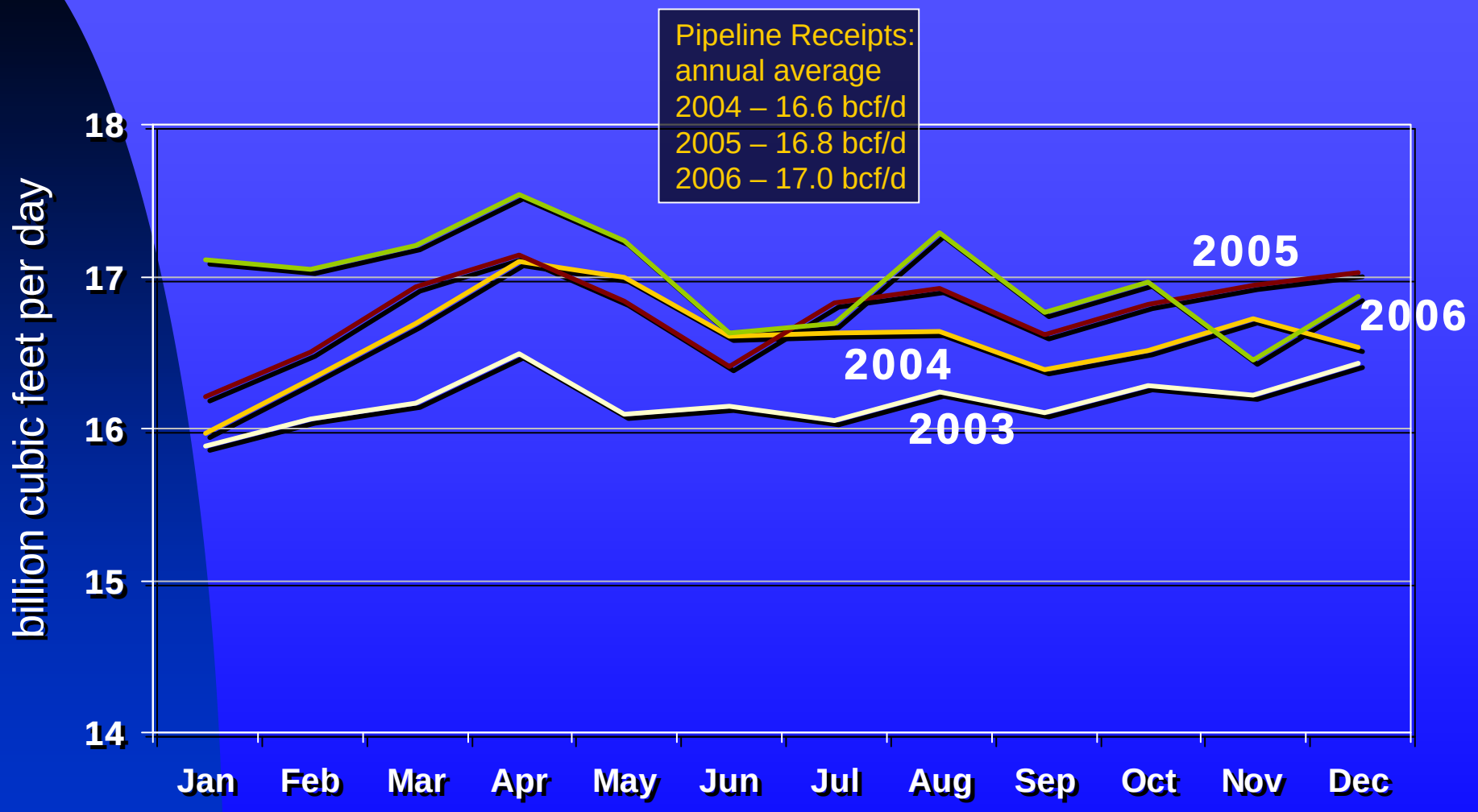
Source: Alberta Energy & Utilities Board/National Energy Board & CERI

Canadian Natural Gas Production Forecast



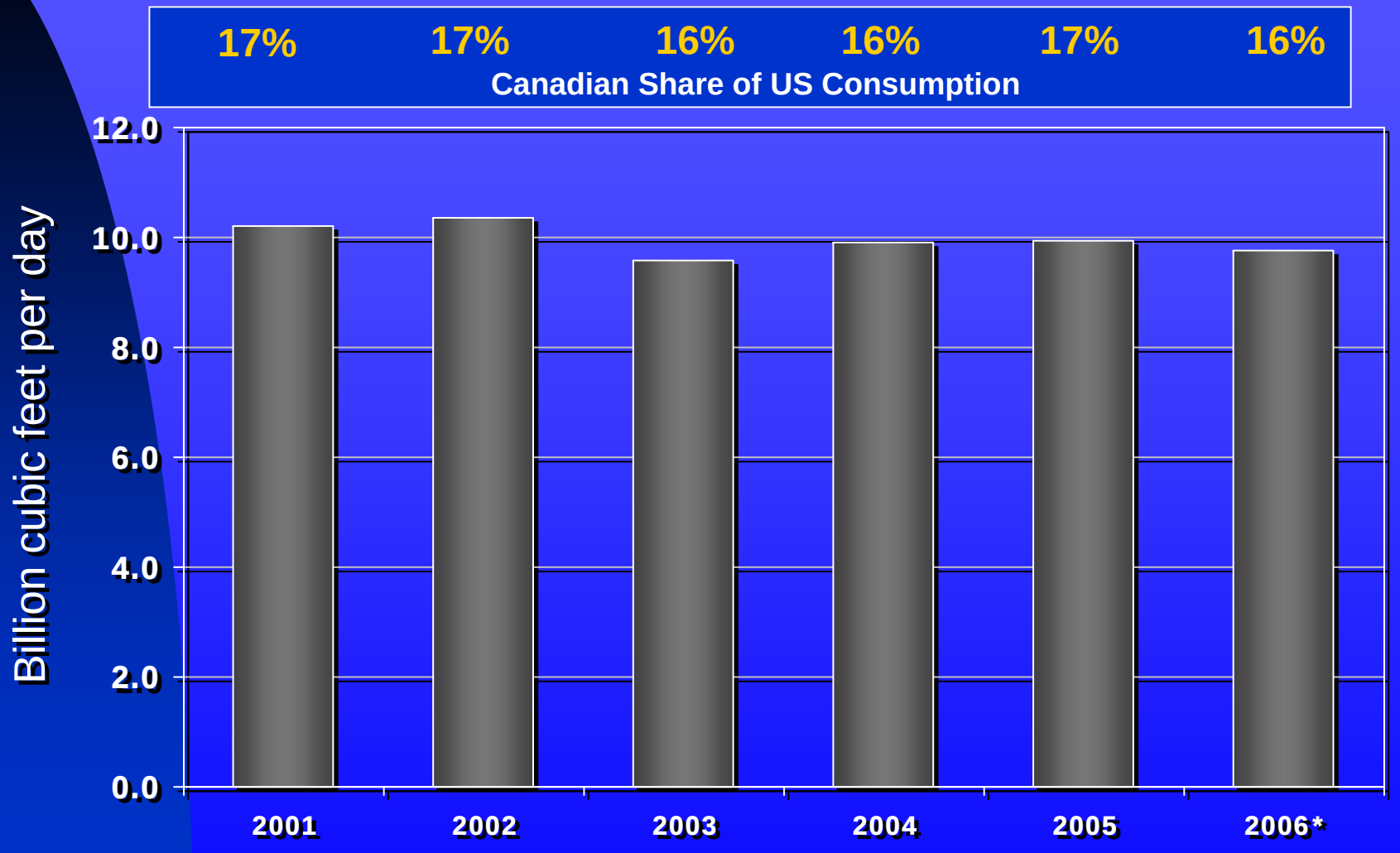
Source: CAPP

Western Canada Natural Gas Production



Source: FirstEnergy Capital

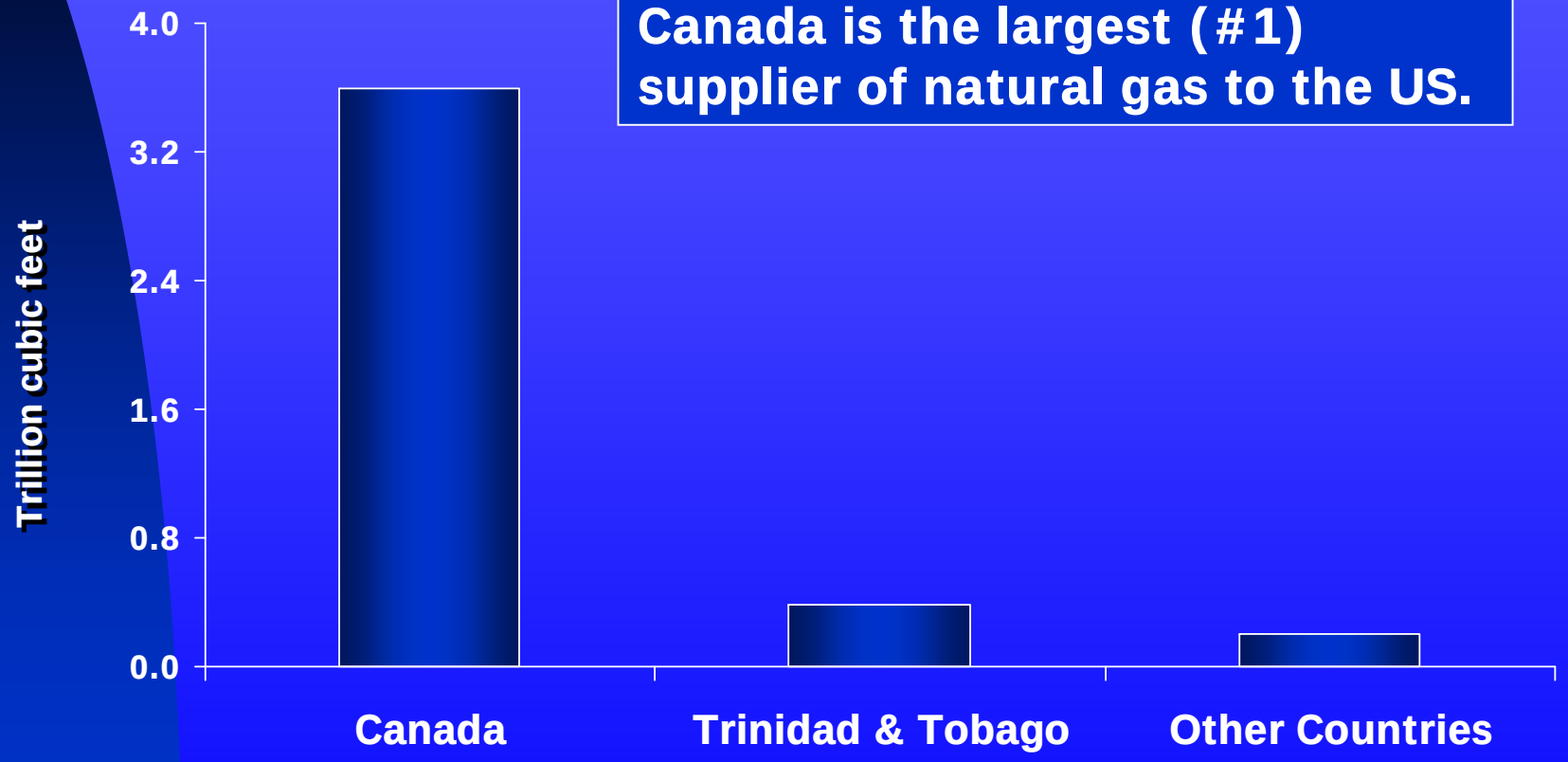
U.S. Natural Gas Imports from Canada



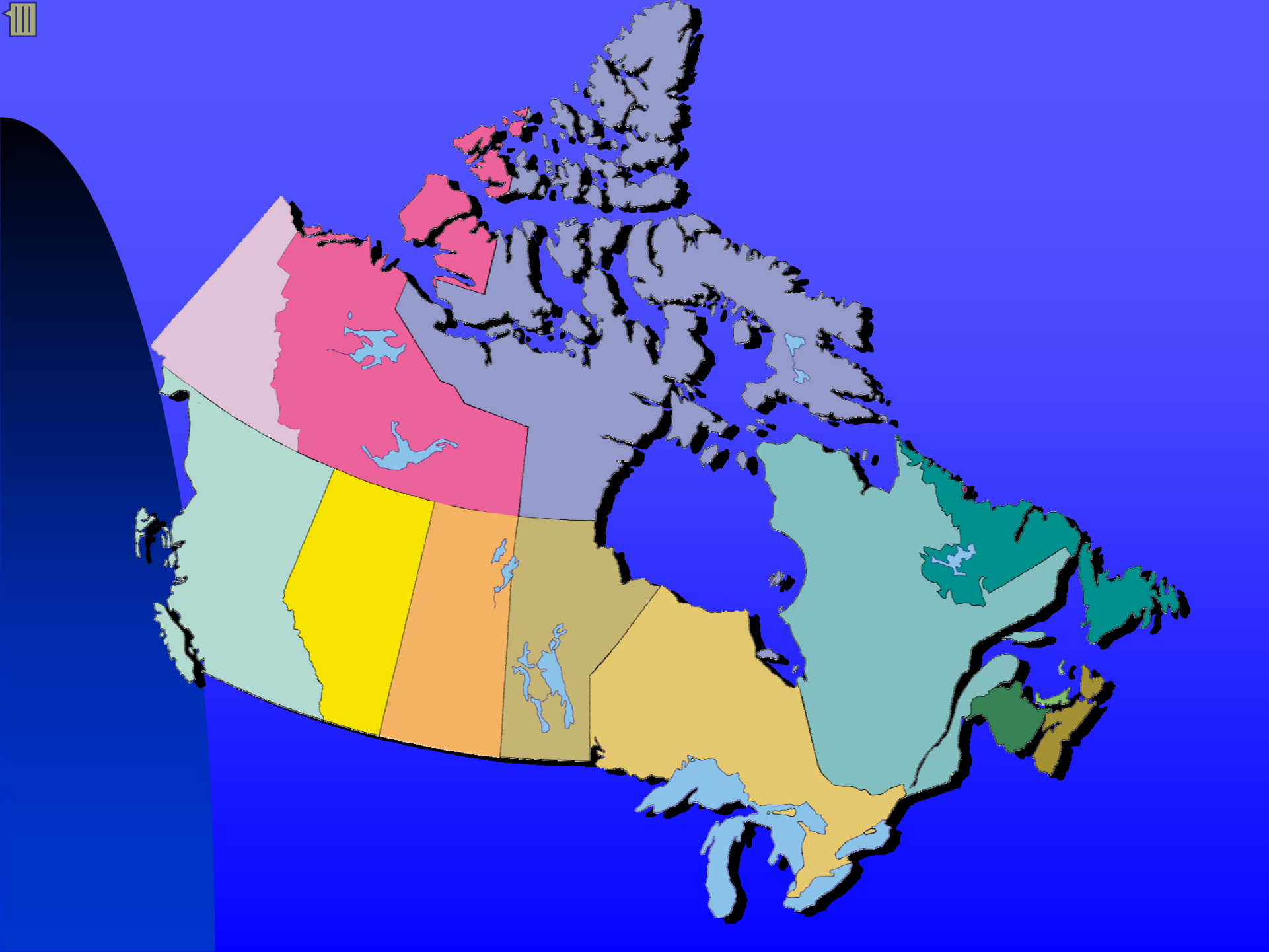
Source: U.S. DOE/EIA

* Jan-Sept. 2006

U.S. Imports of Natural Gas by Country of Origin



Source: EIA, Jan-Dec 2006



Canada

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Oil Sands Production Technologies

20 % less than 50 m deep

Mining & Upgrading

Recoverable reserves = 35 billion barrels

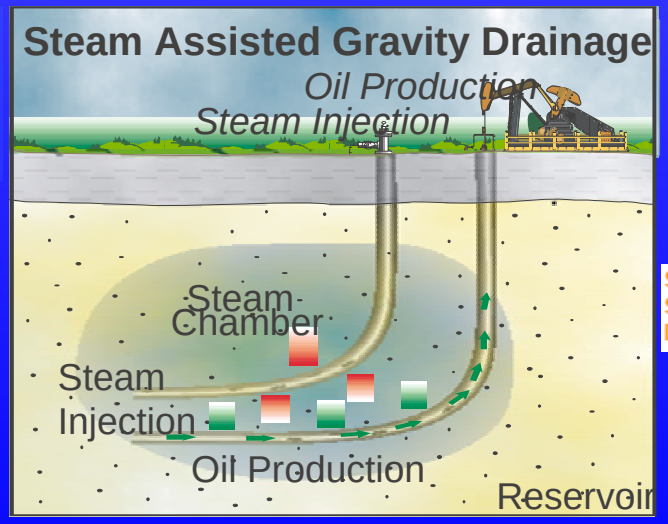
Source: Syncrude

Source: Shell Canada

80 % more than 50 m deep

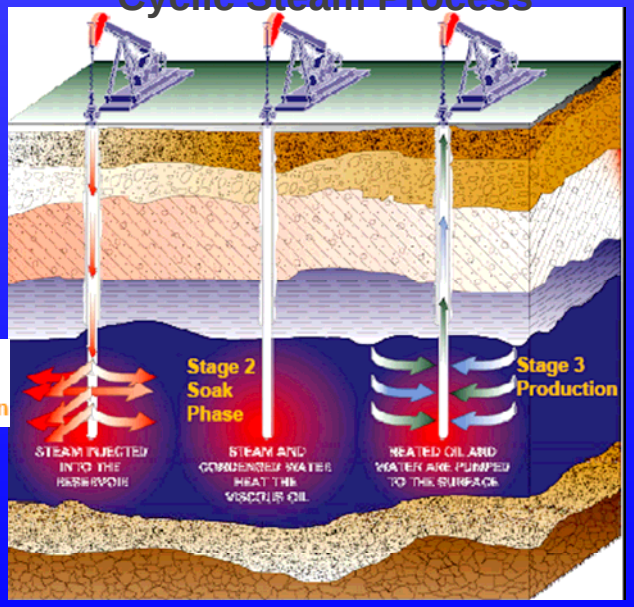
In-situ

Recoverable reserves = 140 billion barrels



Source: Petro-Canada

Cyclic Steam Process



Source: Imperial Oil

Oil sands Mining and Upgrading Process

2 tonnes of oil sands

2 tonnes of oil sands through separator

1.2 barrels bitumen

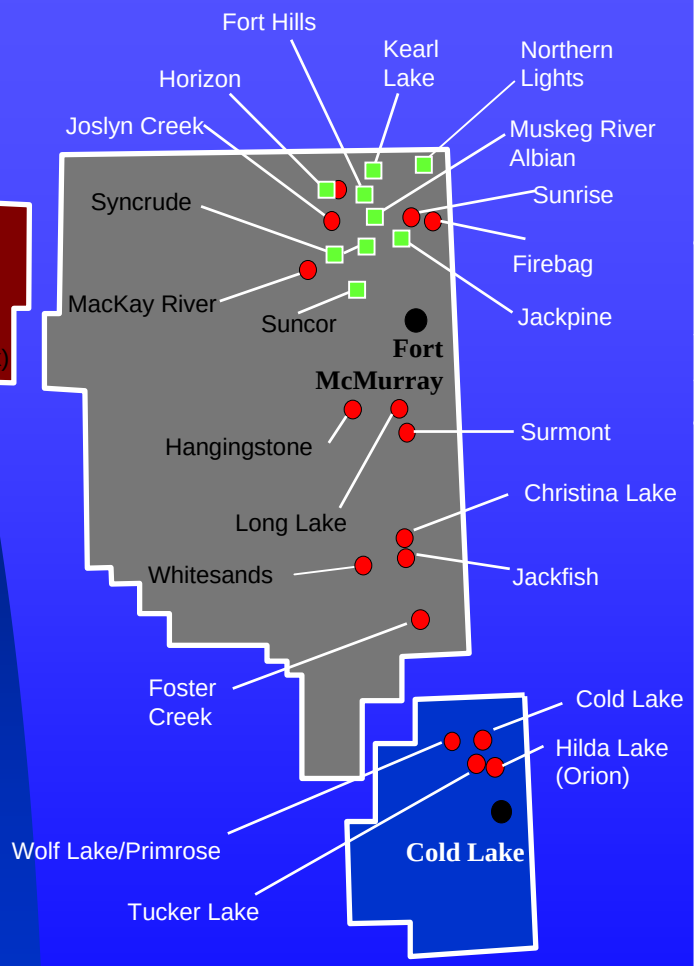
1 barrel synthetic (upgraded) crude oil

4 tonnes material

0.5 - 0.7 mcf/barrel

Photos courtesy of Syncrude Canada

Oil Sands Projects in Three Deposits



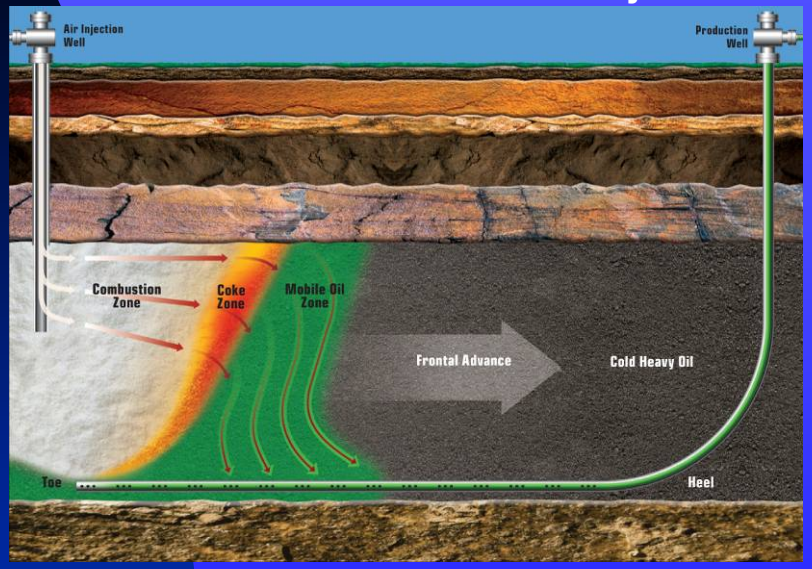
Athabasca – Mining		Barrels per day	
Operator	Project	Initial	Potential
Albian/Shell	**Muskeg/Jackpine**	**150,000**	**550,000**
Suncor	**Base Plant**	**280,000**	**550,000**
Syncrude	**Base Plant**	**300,000**	**600,000**
CNRL	**Horizon (2008)**	**110,000**	**232,000**
Imperial	**Kearl (2010)**	**100,000**	**300,000**
Petro-Canada	**Fort Hills (2011)**	**50,000**	**190,000**
Synenco	**Northern Lights (2010)**	**50,000**	**100,000**
Total E&P	**Joslyn Creek Mine**	**50,000**	**200,000**
Athabasca – In Situ Thermal			
JACOS	**Hangingstone (pilot)**	**10,000**	**30,000**
Suncor	**Firebag**	**35,000**	
ConocoPhillips	**Surmont (2006)**	**16,000**	**110,000**
Devon	**Jackfish (2008)**	**35,000**	**70,000**
Encana	**Christina/Foster (2006)**	**30,000**	**400,000**
Husky	**Sunrise (2012)**	**60,000**	**240,000**
OPTI/Nexen	**Long Lake (2007)**	**70,000**	**140,000**
Petro-	**MacKay River (2009)**	**24,000**	**60,000**
Cold Lake – In Situ Thermal			
Blackrock	**Orion-Hilda Lake pilot**	**500**	**20,000**
CNRL	**Wolf Lake/Primrose**	**50,000**	**120,000**
Imperial	**Cold Lake**	**130,000**	**180,000**
Husky	**Tucker (2006)**	**18,000**	**35,000**
Peace River – In Situ Thermal			
Shell	**Peace River**	**12,000**	**100,000**

Bitumen Upgraders in Alberta
Capacity by 2015

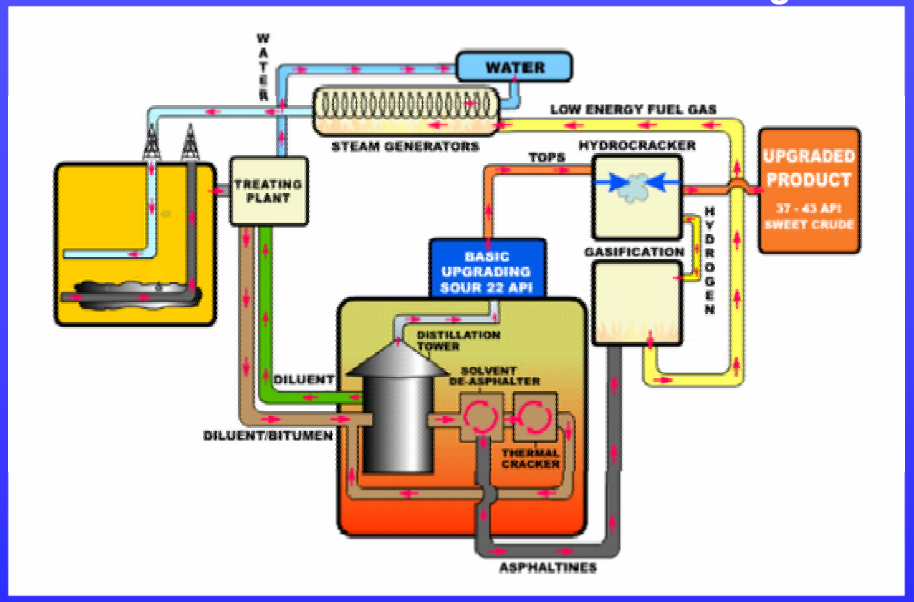
Existing:	Volume (bpd)	
Albian-Scotford	**158,000**	
Husky-Lloydminster	**59,000**	
Suncor	**260,000**	
Syncrude	**350,000**	
Expansions:		Comment
Albian-Scotford	**397,000**	**Expansion w/plans for a total of 555,000 bpd**
Husky-Lloydminster	**65,600**	**Expansion (2011)**
Suncor	**287,000**	**97,000 b/d expansion of Upgrader 2 & in-situ to total planned 357,000 b/d in 2008. Upgrader 3, additional 190,000 b/d to 550,000 b/d in 2012.**
Syncrude	**160,000**	**Phased expansion (2012-2015) – 510,000 bpd**
New projects:		
BA Energy-Heartland	**260,000**	**Phase 1 - 77,500 bpd (2008). 3-phase expansion to 260,000 bpd**
CNRL-Horizon	**232,000**	**Phase 1-3 (2011). Phase 1 in 2008 – 110,000 bpd.**
Nexen/Opti-Long Lake	**173,000**	**On-stream late 2007.**
North American (Kai Kos Dehseh)	**250,000**	**Phase 1 – 76,000 bpd (2012). Phase 2 to 250,000 bpd by 2015**
Northwest Upgrading	**150,000**	**3 phased expansion. On stream in 2010, phase 2 – 2012-2014**
Petro-Canada	**85,000**	**Refinery conversion to upgrader/refinery in late 2008**
Petro-Canada/UTS-Fort Hills	**240,000**	**Phase 1 – 140,000 bpd (2011). Phase 2 - 240,000 bpd by 2014**
PRO (Bluesky)	**50,000**	**Phase 1 on-stream 2011.**
SynEnCo-Northern Lights	**100,000**	**Phase 1 – 50,000 bpd in 2010, phase 2 – 50,000 bpd in 2012**
Total E&P	**85,000**	**On-stream in 2014**

Oil Sands Production Technologies Alternatives to Natural Gas

THAI™ (Toe-to-Heel Air Injection) Petrobank Whitesands Project

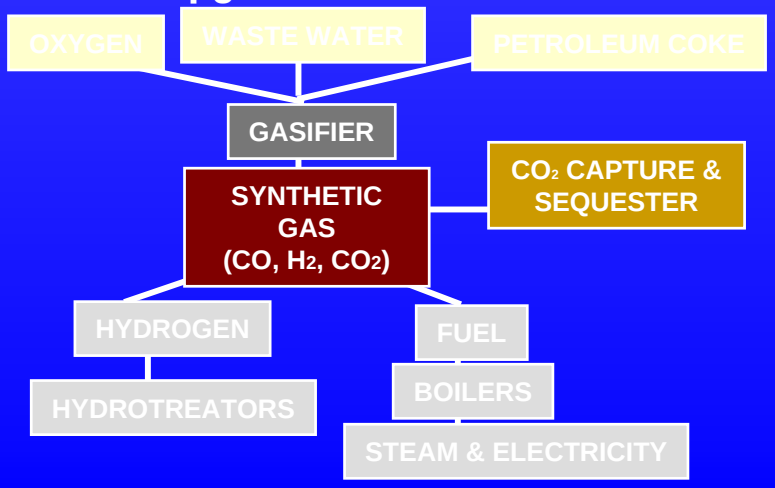
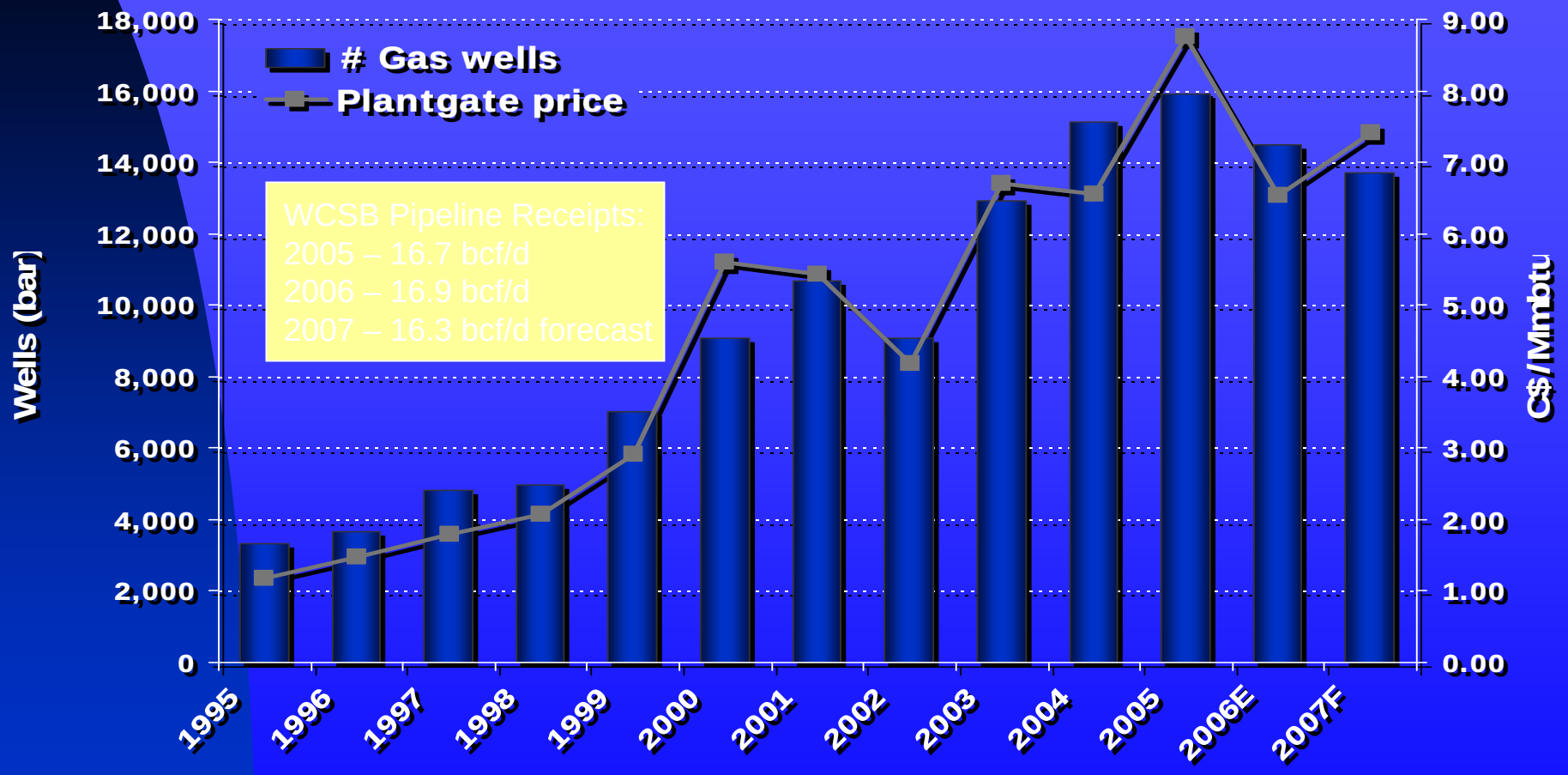


OrCrude Process - Nexen/OPTI Longlake



Multiphase Superfine Atomized Residue - DeerCreek

Suncor 3rd Upgrader - Coke Gasification



Gas Wells Drilled and Natural Gas Price
Western Canada