ALBERTA VISION FOR OIL SANDS DEVELOPMENT

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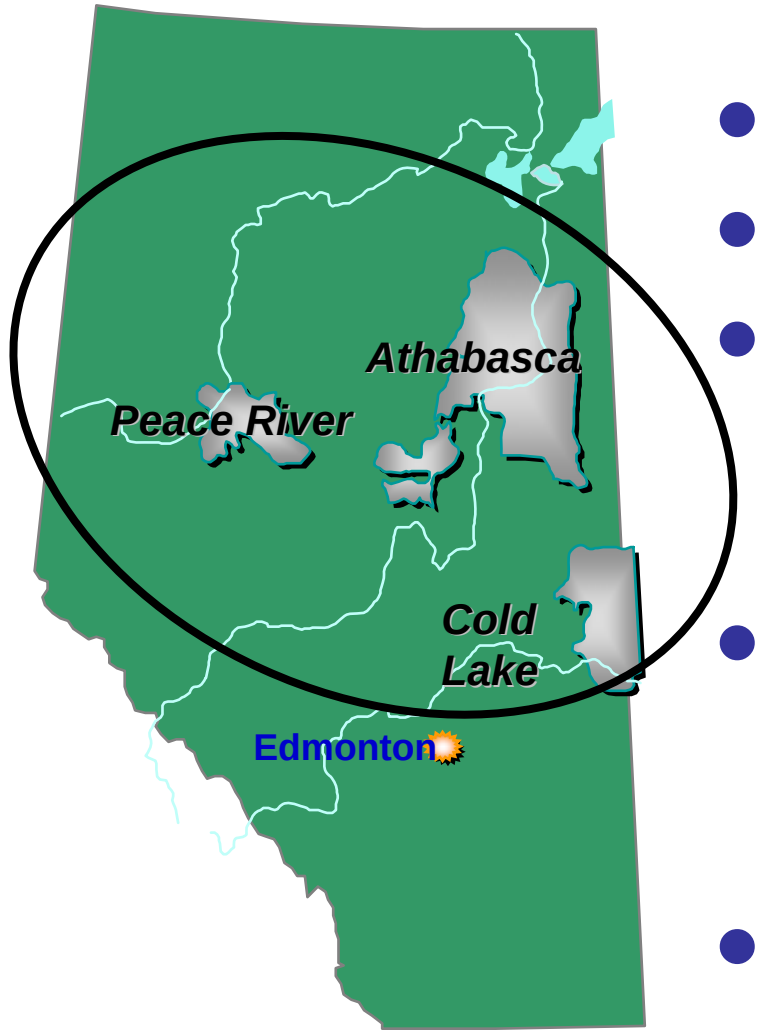
Presentation Outline – Government/Industry Partnership



- Resource Base
- Market Opportunities
- Developing the Vision:
  - Process Integration
  - Eco-Industrial Siting
- Realizing the Vision:
  - Labour Supply
  - Infrastructure
- Large GDP Prize



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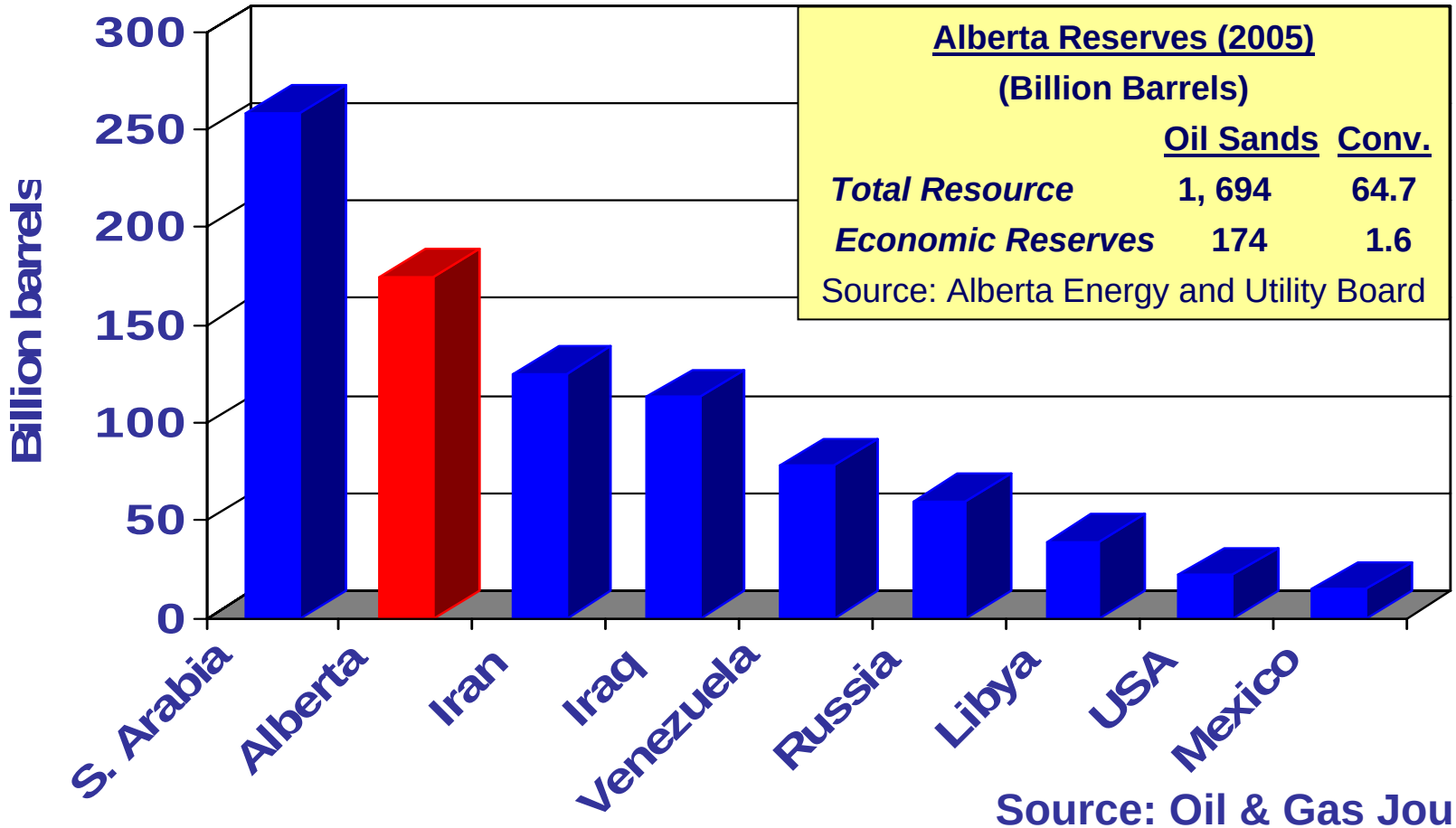
Alberta Comparative Oil Reserves

Ranked as the second largest established oil reserves, after Saudi Arabia.



Source: Oil & Gas Journal

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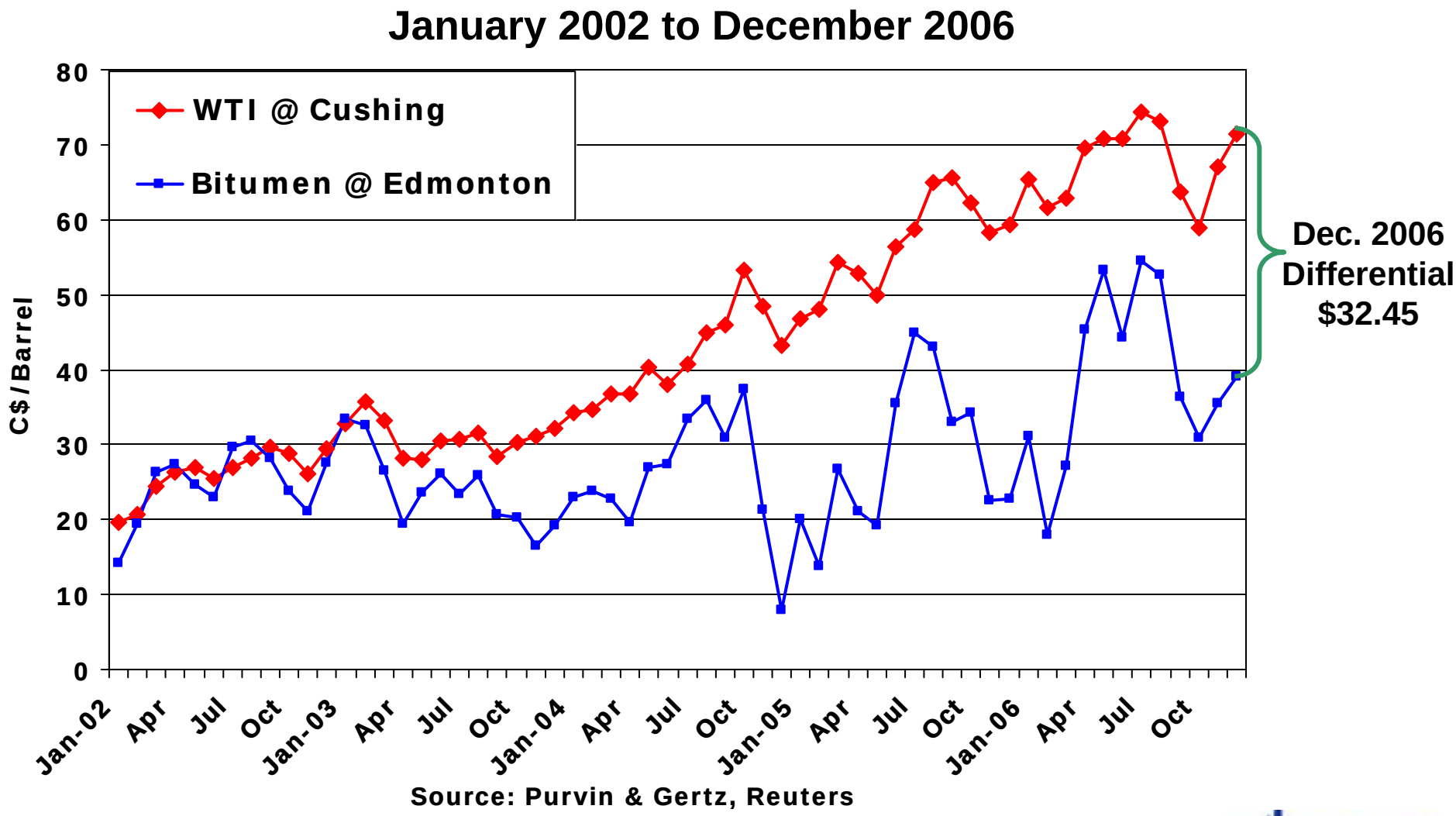
Bitumen Price Differentials





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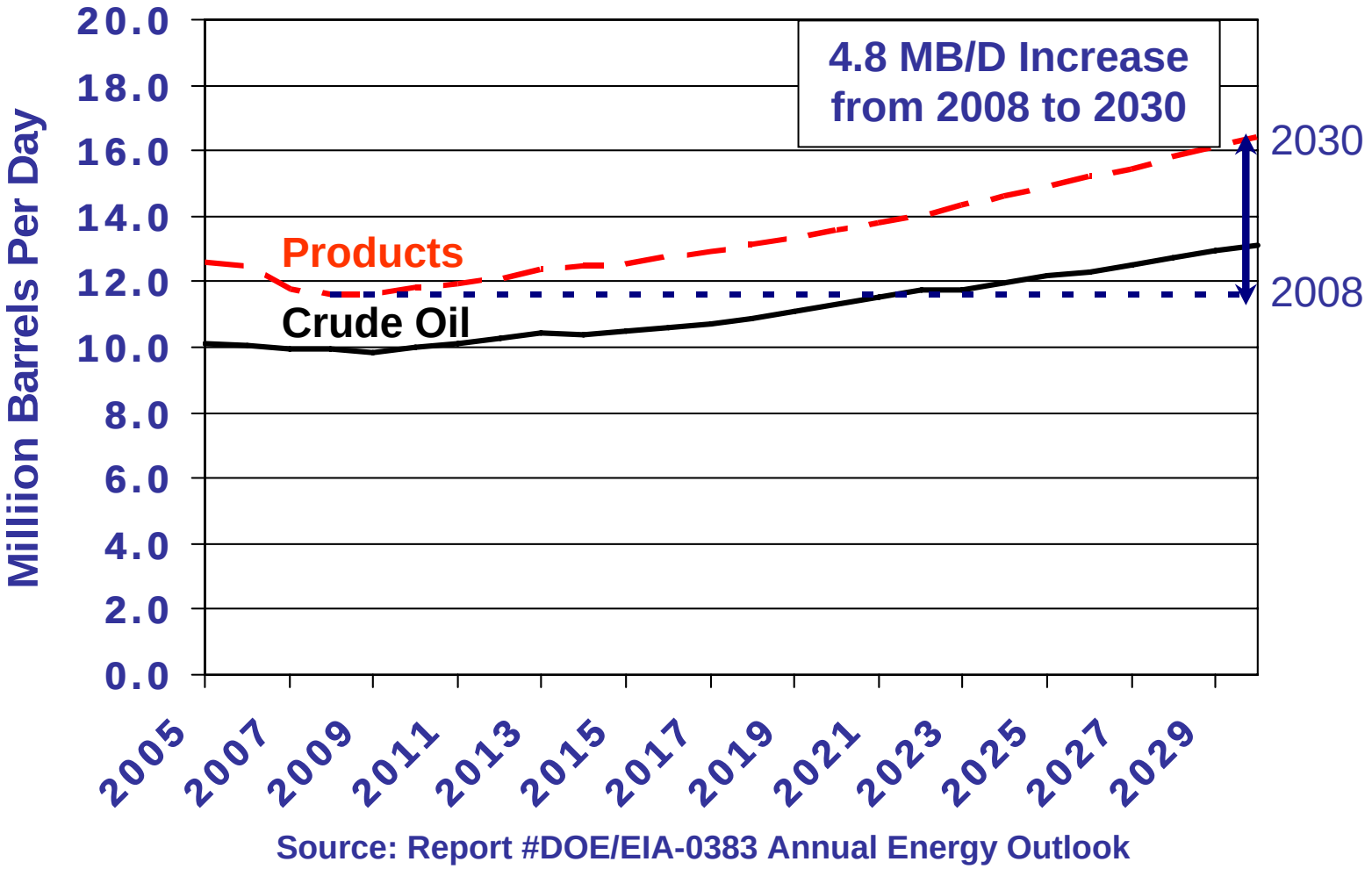
Projected Growth In US Imports



Source: Report #DOE/EIA-0383 Annual Energy Outlook

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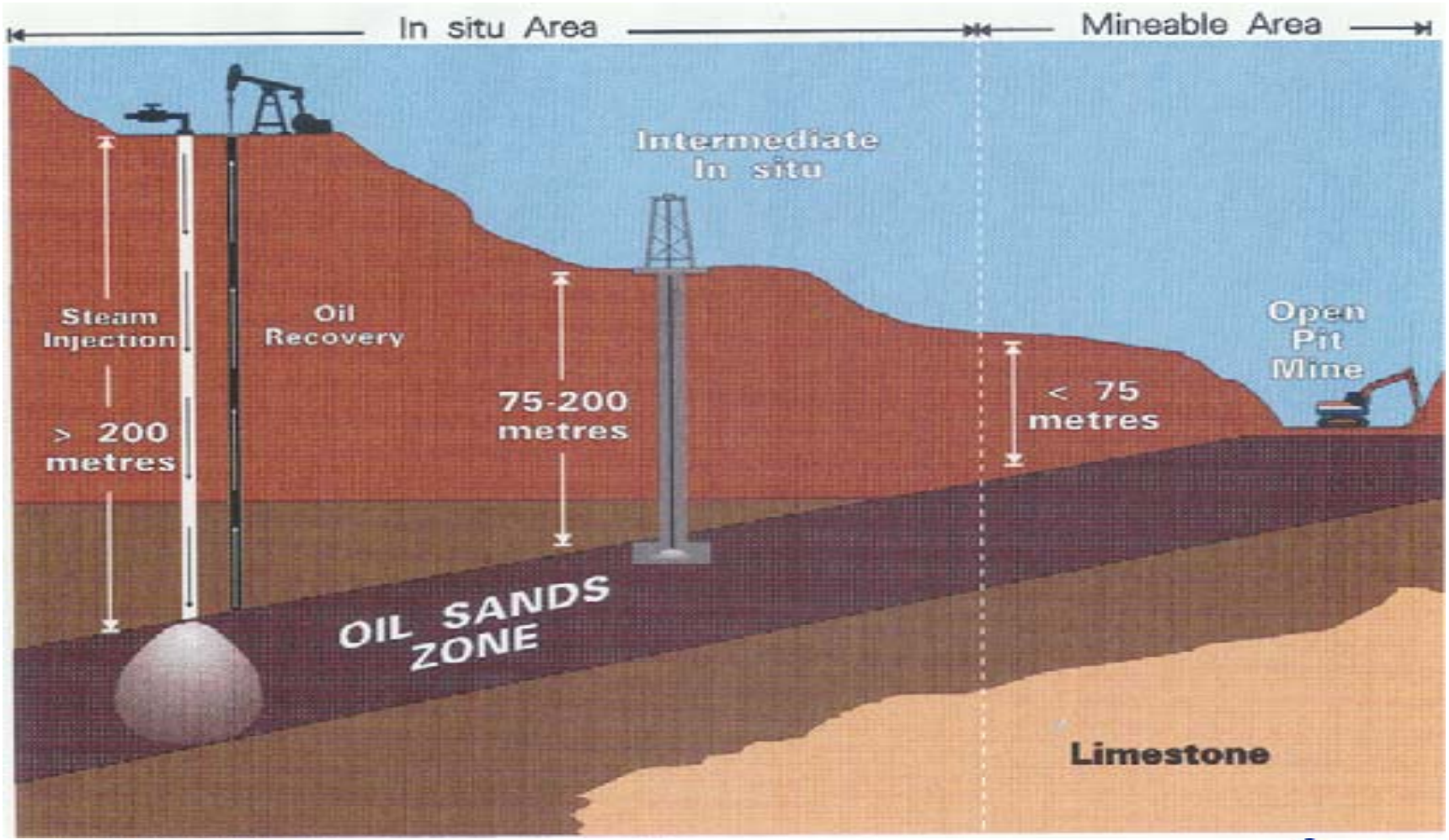

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Role of Hydrocarbon Upgrading Task Force (HUTF)

- HUTF established in February 2004 to produce action plan for achieving maximum value-added for bitumen resources within the province
- Now consists of over 100 members from government and industry
- Chaired by the Alberta Department of Energy, co-chaired by Alberta Employment, Immigration & Industry



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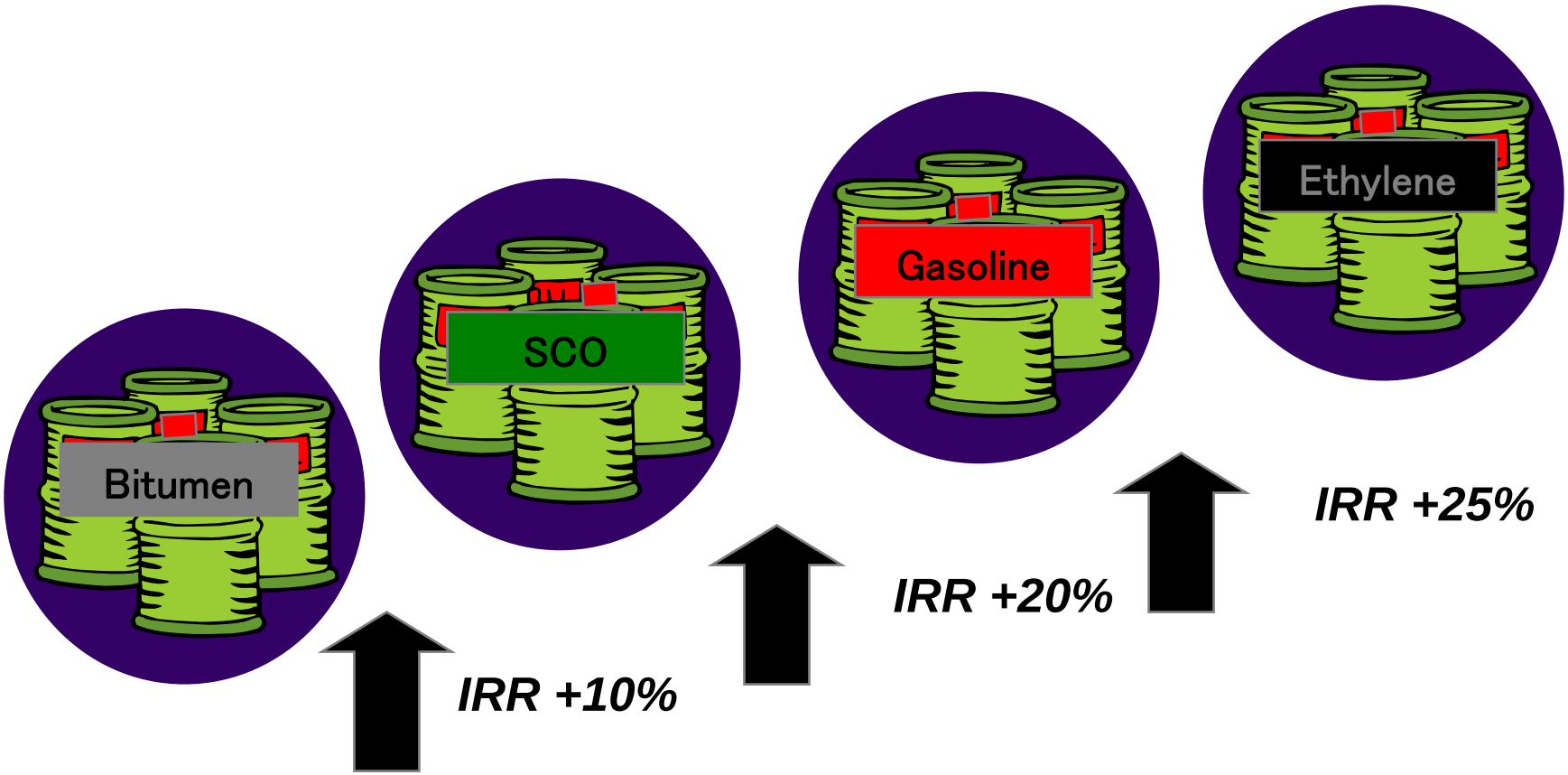
Bitumen Upgrading Value Added Equation

IRR on incremental capital investment



Using historical price ratios

Source: Alberta Bitumen Plant Integration Study, 2006

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Hydrocarbon Upgrading Vision 2020

"Alberta will achieve a competitive hydrocarbon upgrading industry through refining and petrochemical plants that expand the market for Alberta's bitumen resource and produce higher value products in the province."

- 3.6 MBD bitumen output by 2020
  - 1 MBD upgraded to refined products
- 5 MBD bitumen output by 2030
  - 2 MBD upgraded to refined products
- Urgent to capture "window of opportunity" for exporting refined products

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Vision Development Studies

- Tom McCann & Associates Jul 2002
- Purvin & Gertz:
  - Phase I - Integrated Plants Jun 2004
  - Phase II- Midwest/California Mkts. Dec 2004
  - Asian Markets Apr 2005
- IAG Eco-Industrial Sites Feb 2006
- Process Integration Study Mar 2006
- CERI II-Refined Products GDP Aug 2006
- IEEJ Asian Markets 2007



Integration Opportunity

Bitumen

Integration Processing
(upgrading, refining & petrochemical processing)

Fuel Products
Diesel
Kerosene
Gasoline
Hydrogen

Petrochemicals
Ethylene
Propylene
Butadiene
Pyrolysis Gas

Fertilizers
Ammonia SynGas
Ammonium Sulfate
Elemental Sulfur



Integrated Plant Design Basis

- Nominal bitumen capacity of 300 kbd:
  - Bitumen about 40% of light crude value
- Sized to incorporate world scale units for downstream processing
- Multi-fuel central power & steam plant
- Partial oxidation of coke to supply H_2
- Utilize proven technology
- Satisfy Colt Engineering Due Diligence review



Integrated Plant vs. Standalone Upgrader

Based on 300 kbd day feed, upgrader capital at 63% of integrated plant, same input & output unit costs - US $

	Integrated Facility	Standalone Upgrader	Difference
• Capital	$10.1B	$6.4B	58%
• Revenues	$6.3B	$4.0B	57%
• Operating Cost	$3.7B	$3.1B	23%
• Gross Profit	$2.6B	$1.0B	169%
• Before Tax ROI	25.8%	15.2%	
• Before Tax Return on Incremental Capital			44.3%



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Process Integration Study Business Case

- General advantages of integration:
  - Rotating equipment powered by electricity
  - Low cost, zero or negative value fuels
  - Smaller environmental footprint
- Design concept advantages:
  - Lower severity process operations:
    - Coke consumed for H2 and Ammonia syngas
    - Light and heavy ends converted to high value olefins
- Improved rate of return for integration and value-added refined products



Eco-Industrial Site Concept

"An integrated network of raw material suppliers, upgraders, manufacturers, support and infrastructure providers (including logistics) that collaborate for mutual commercial advantage in an environmentally acceptable manner."

- Synergies provide improved operations/costs while reducing environmental impact
- End goal is development of globally competitive facilities in respective areas of focus and geography



Alberta's Eco-Industrial Energy Hub

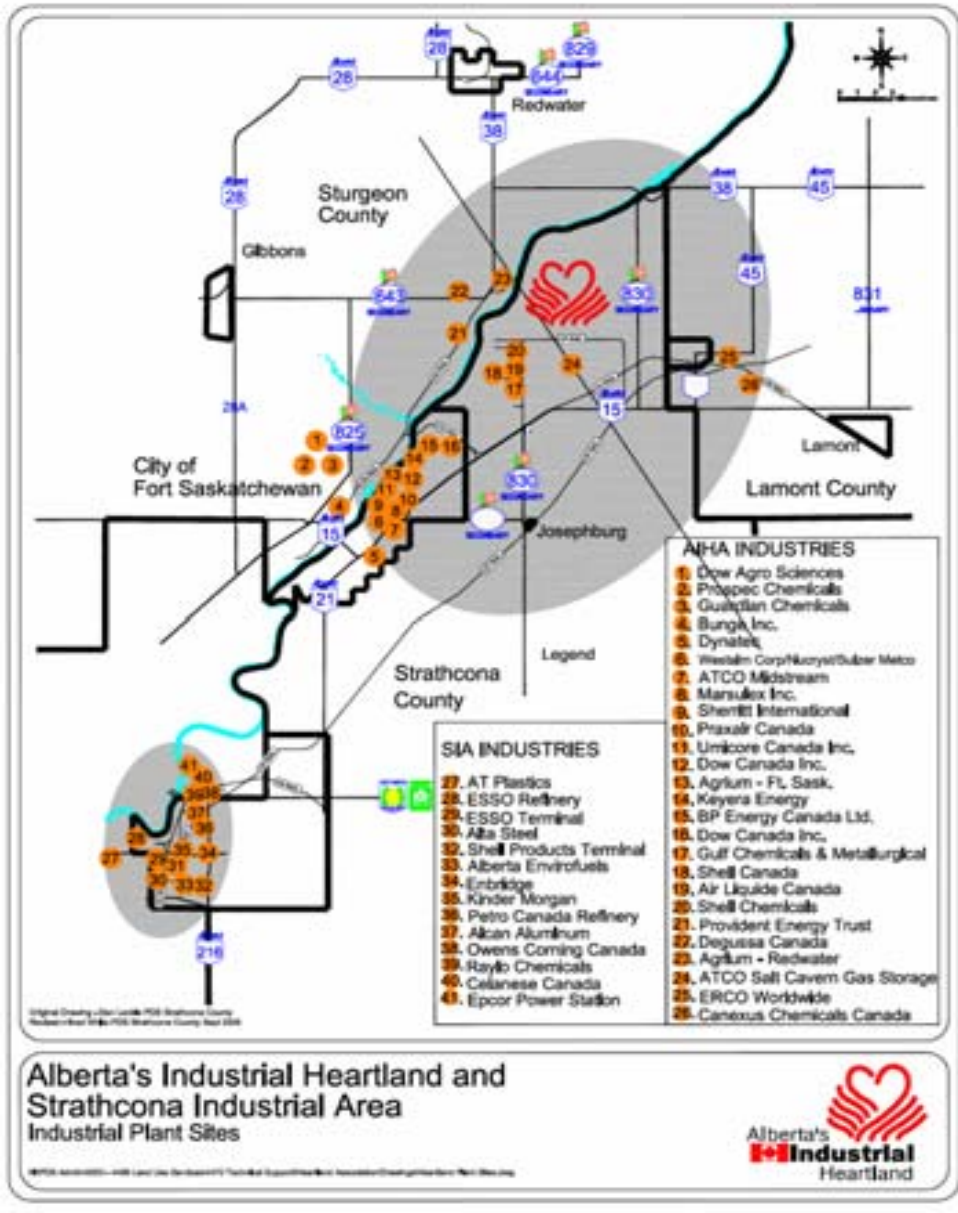
Natural Gas | **Coal** | **Bitumen**

Electricity → **Processing** ← **Upgrading Off-gases**

Processing →
- **Steam to Cogen facility**
- **Market Spec Fuel Products: Mogas, Diesel and Jet Fuels**
  Primary Petrochemicals and co-products: ethylene, propylene, benzene, methanol
- **Waste/By-Products: Sulphur, CO2 Hydrogen**

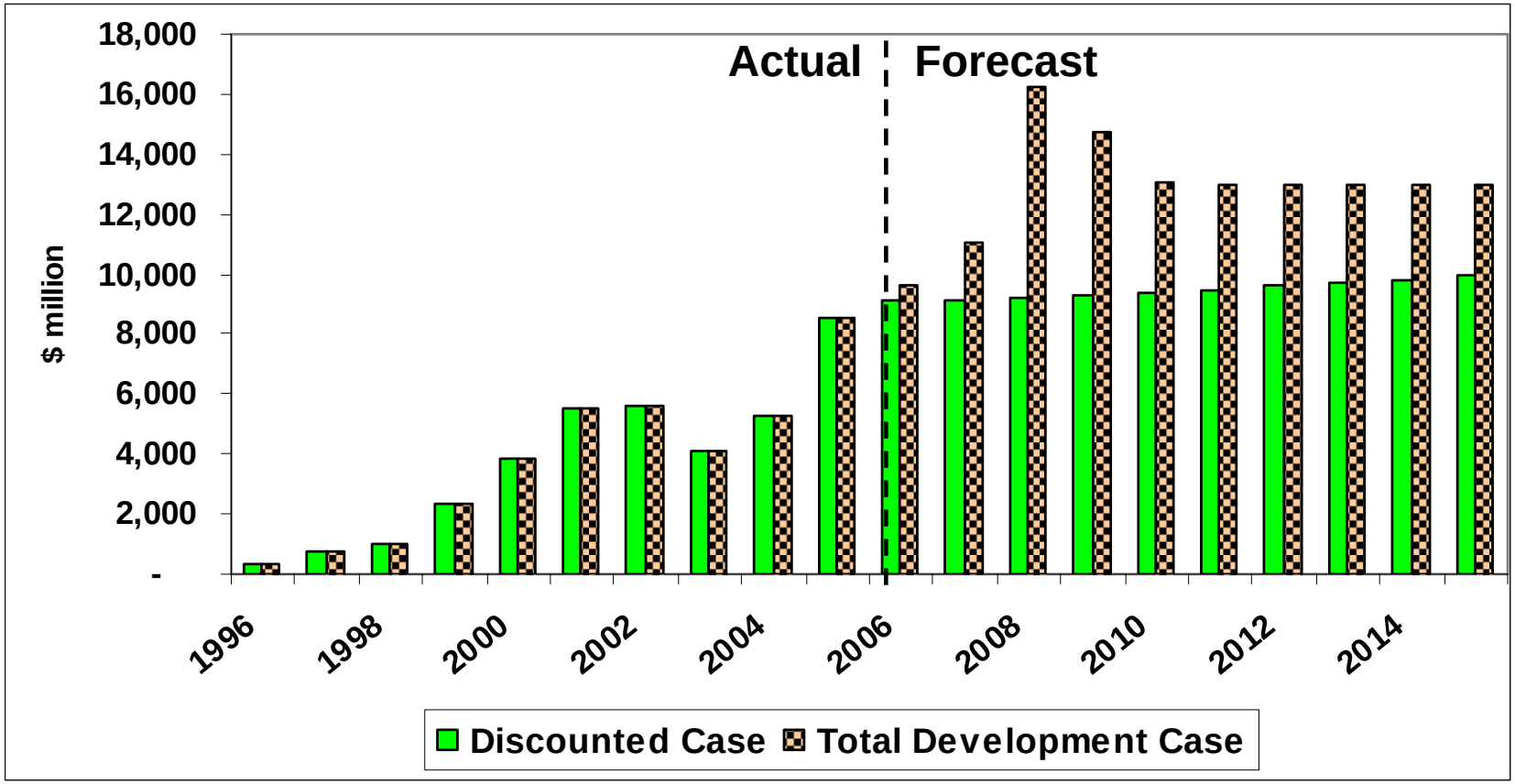
Markets

- Petroleum Fuels
- Alberta Electricity Grid
- Industrial Gases
- Secondary Petrochemicals:
  - Polyethylene
  - Polypropylene
- Fertilizers
- EOR
- Natural Gas in Coal
- Plastics
- Pharmaceuticals



Alberta's Oil Sands Construction Capital Forecast

$37.4 billion to date (1996-2005) - $132.1 billion forecast through 2015



Source: Discounted – RIWG/Nichols Applied Management
Total Development Case – CAPP. Later years adjusted downward by EII for resource limitations.

Does not include sustaining or operations capital, operating expenditures, or capital for related pipelines, co-gen. plants, etc.



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Challenges and Opportunities

- Labour availability:
  - Increased flow of apprentices
  - Made in Alberta immigration policy
- Materials availability:
  - Prefabrication and new technologies
  - Best Practices, supply chain extensions
- Environmental impacts:
  - Stringent but predicable regulatory process
  - Technology solutions, e.g., Industry CO2 P/L, water management, energy efficiency
- $15 Billion funding for infrastructure



Market Drivers Support Adding Value in Alberta

- Broaden and Diversify Markets:
  - Expands product slate to hedge against market risk
  - Diversifies geographically to US Midwest, California and East Asian markets
  - Provides new feedstock for Alberta petrochemical industry
- Value-added activities increase Alberta's revenue to sustain oil sands growth:
  - Training and attracting expanded workforce
  - Supports infrastructure investment



Economic Prize For Oil Sands Upgrading To Finished Products

$150 Billion Investment from 2000 to 2020

		Alberta	Rest of Canada	Total Canada	Outside Canada	Grand Total
GDP - Billion 2004$	Bitumen/SCO	746	179	925	110	1035
	Products	276	93	369	169	538
	TOTAL	1022	272	1294	279	1573

		Alberta	Federal	Other	Total Canada	Outside Canada	Grand Total
Govt. Revenues - Billion 2004$	Bitumen/SCO	46	66	32	144	15	159
	Products	10	39	17	66	24	90
	TOTAL	56	105	49	210	39	249

Sources: CERI Reports – Oct. 2005 and August 2006



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