

ALBERTA DEPARTMENT OF ENERGY

Future Business Solutions for Marketing Alberta's Oil Sands

November 8, 2001

Purpose of Workshop

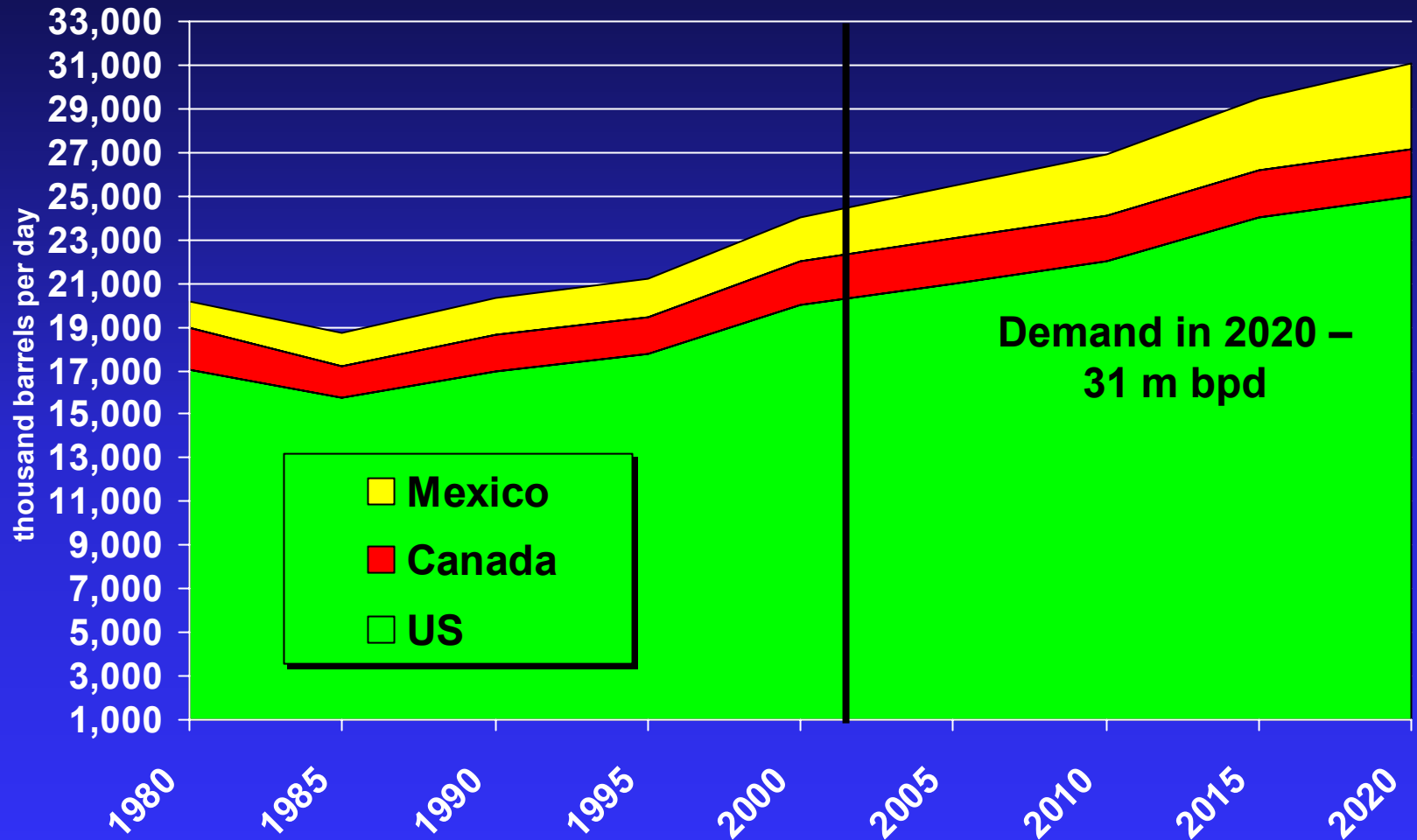
- Examine Oil Sands Market Opportunities
 - ◆ North American supply and demand balance
- Identify Areas of Possible Concern or Incremental Demand for Infrastructure
 - ◆ Production growth
 - ◆ Upgrading and refining
 - ◆ Heavier crude slate & product demand – location/type
 - ◆ Price volatility and diluent availability
 - ◆ Local versus downstream upgrading
 - ◆ Market share/access
- Future Actions

Presentation Outline

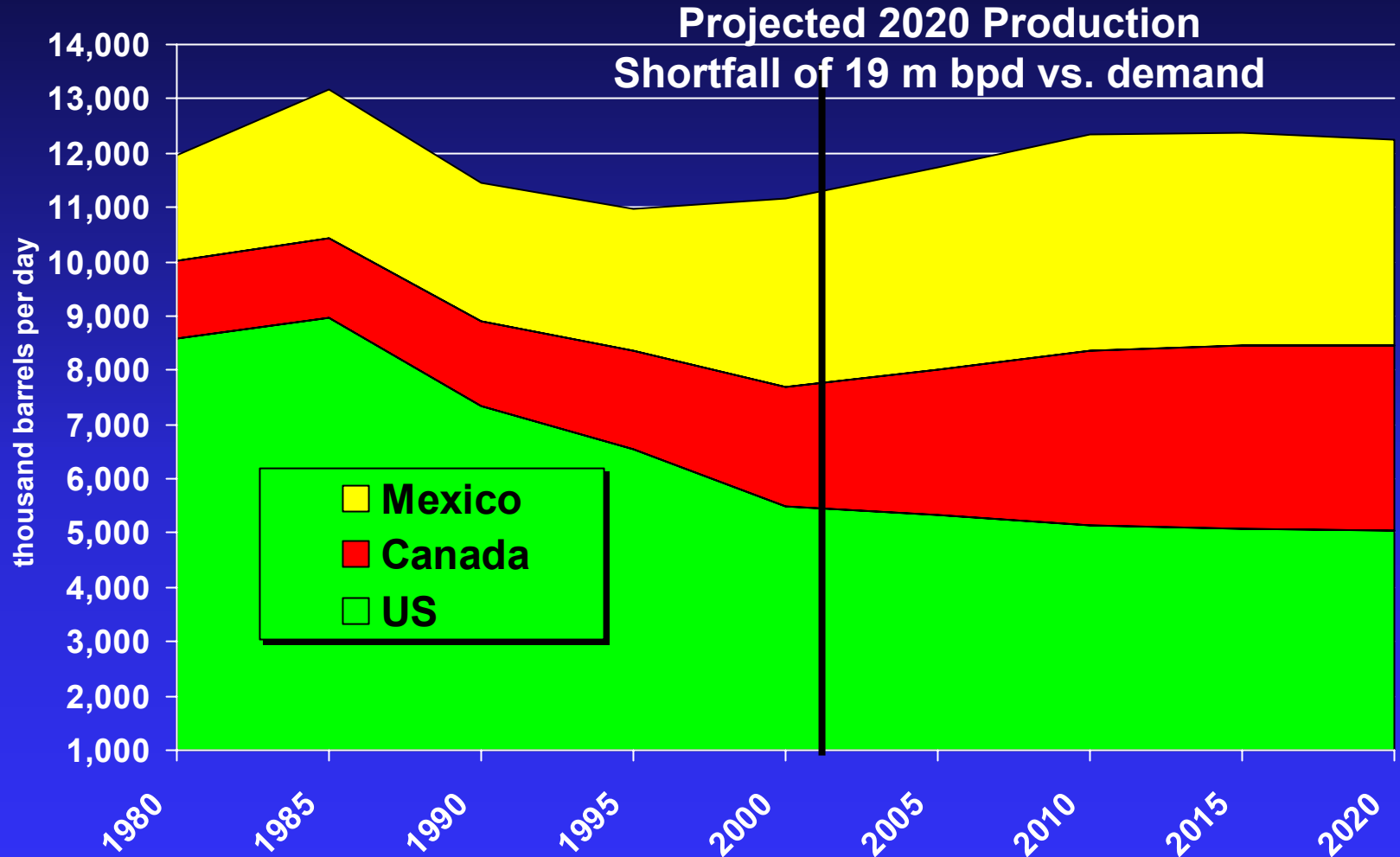
- NA Crude Oil Demand & Supply
- Oil Reserves – source of US imports
- Alberta Oil Sands Investment Activity
- NA Refining Activity
- Alberta Crude Oil Production 1973-2010
- Alberta Upgrading & Refining
- Pipelines & Diluent
- Markets for Alberta's Petroleum Production
- Concluding Points

North American Crude Oil Demand & Supply

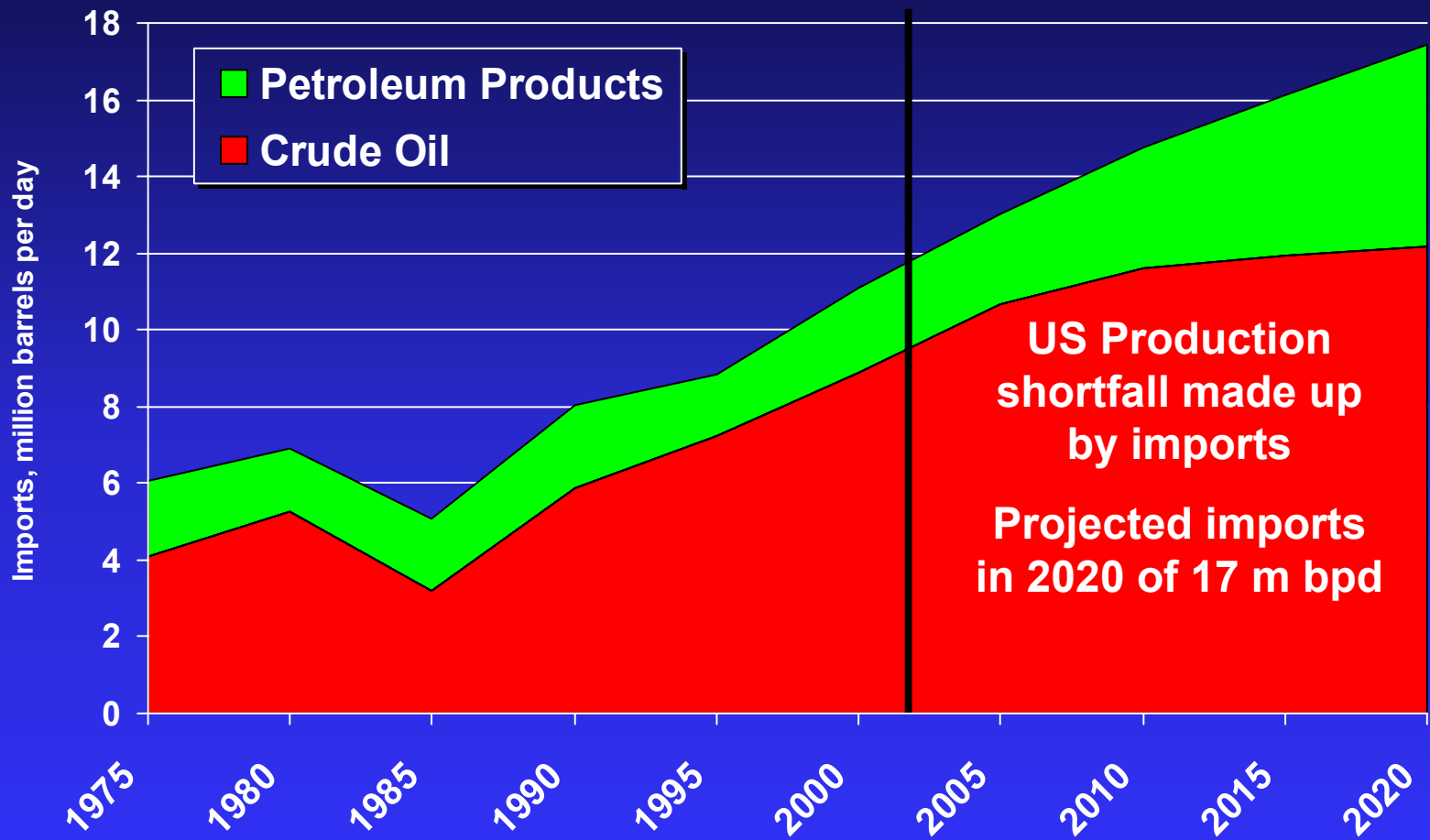
North American Crude Oil Consumption (1980 - 2020)



North American Crude Oil Production (1980 - 2020)



US Imports of Petroleum (1975 - 2020)



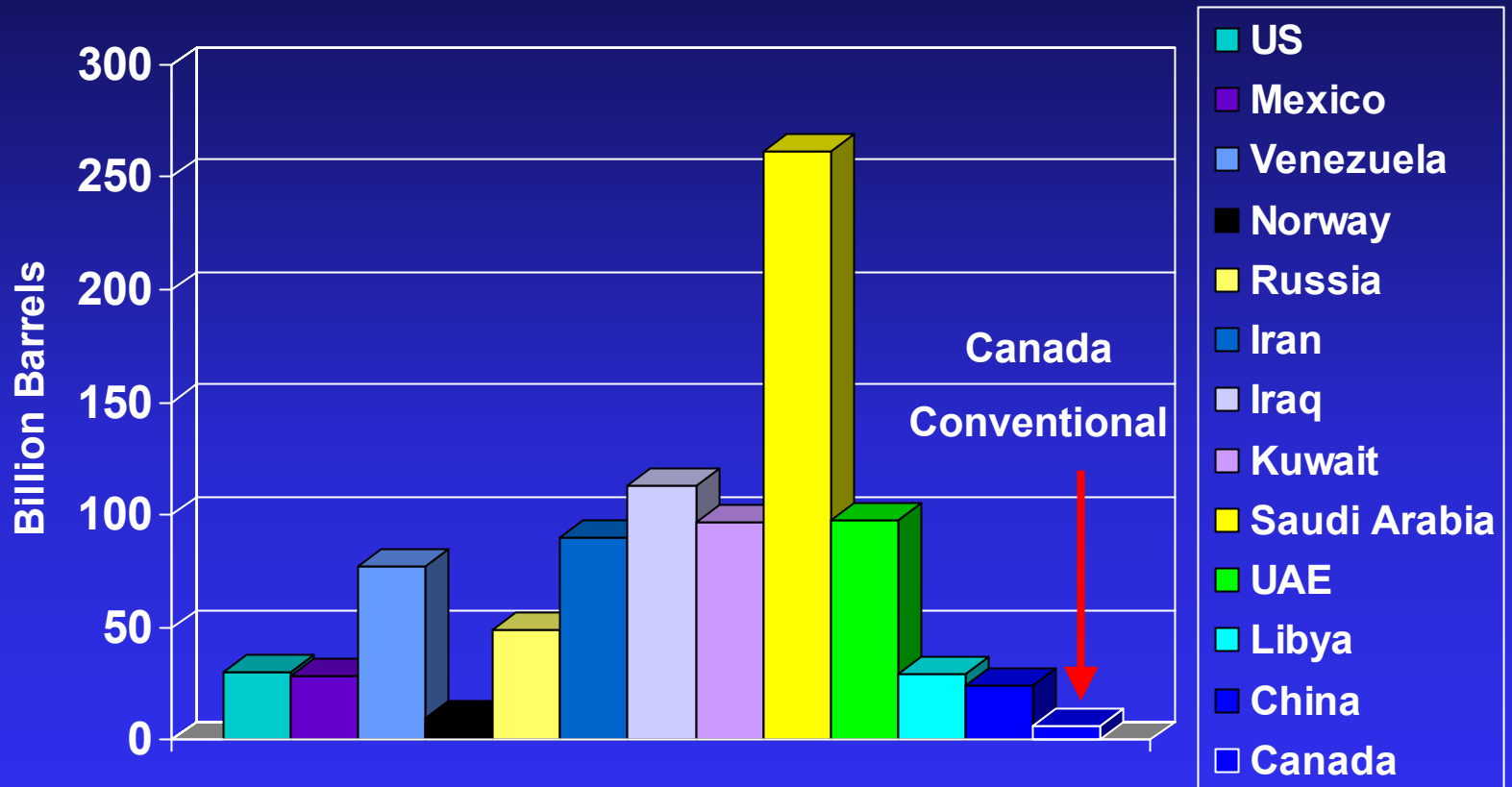
Oil Reserves

- sources of US oil imports

Exports of Crude Oil & Refined Products for 2000 (thousands of barrels per day)



Conventional Oil Reserves – *excluding oil sands*

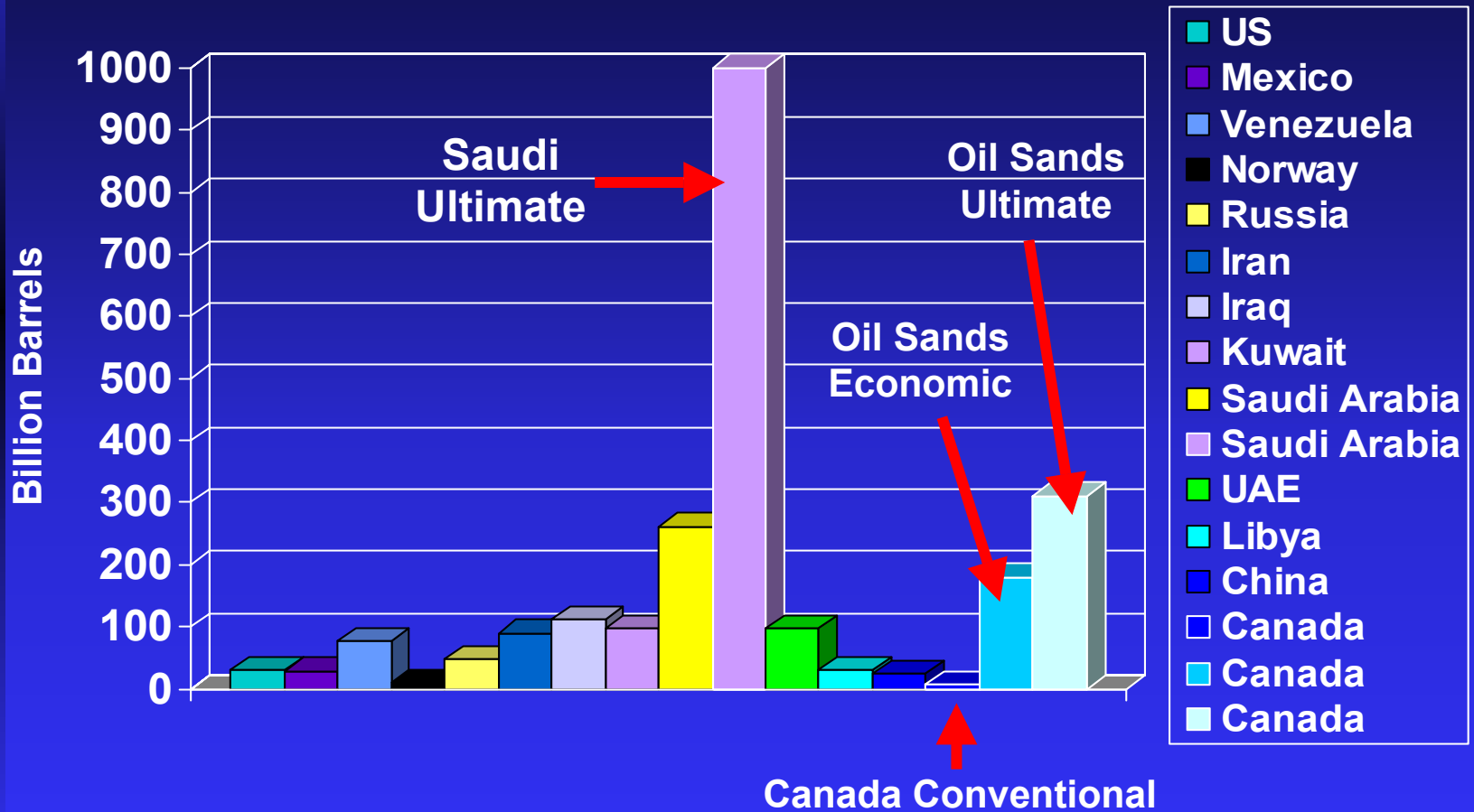


Source: BP/ADDOE

*Canada's reserves are remaining established

Oil Reserves

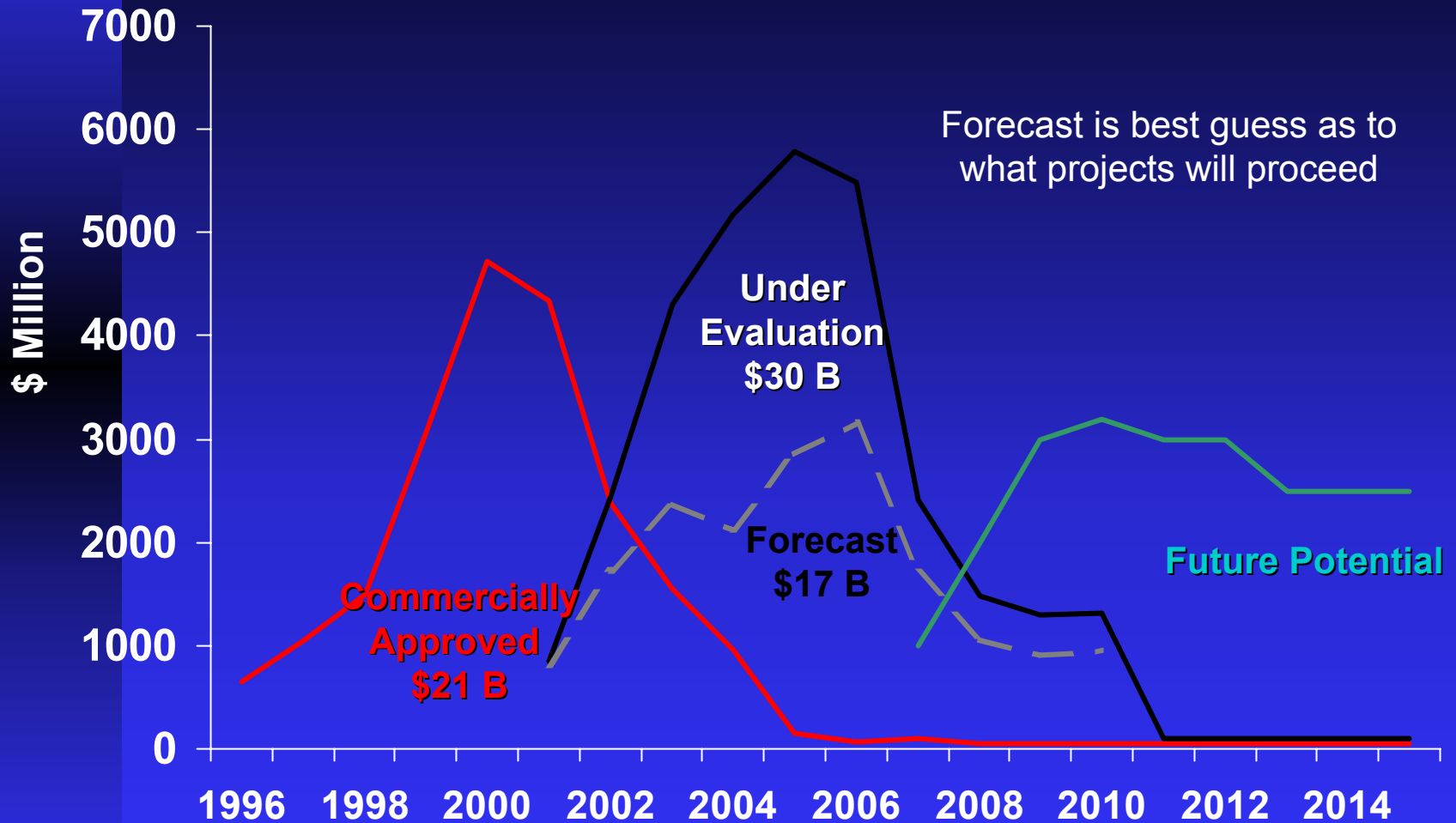
– including oil sands & Saudi Ultimate



Source: BP/ADDOE/EIA

Alberta Oil Sands Investment activity

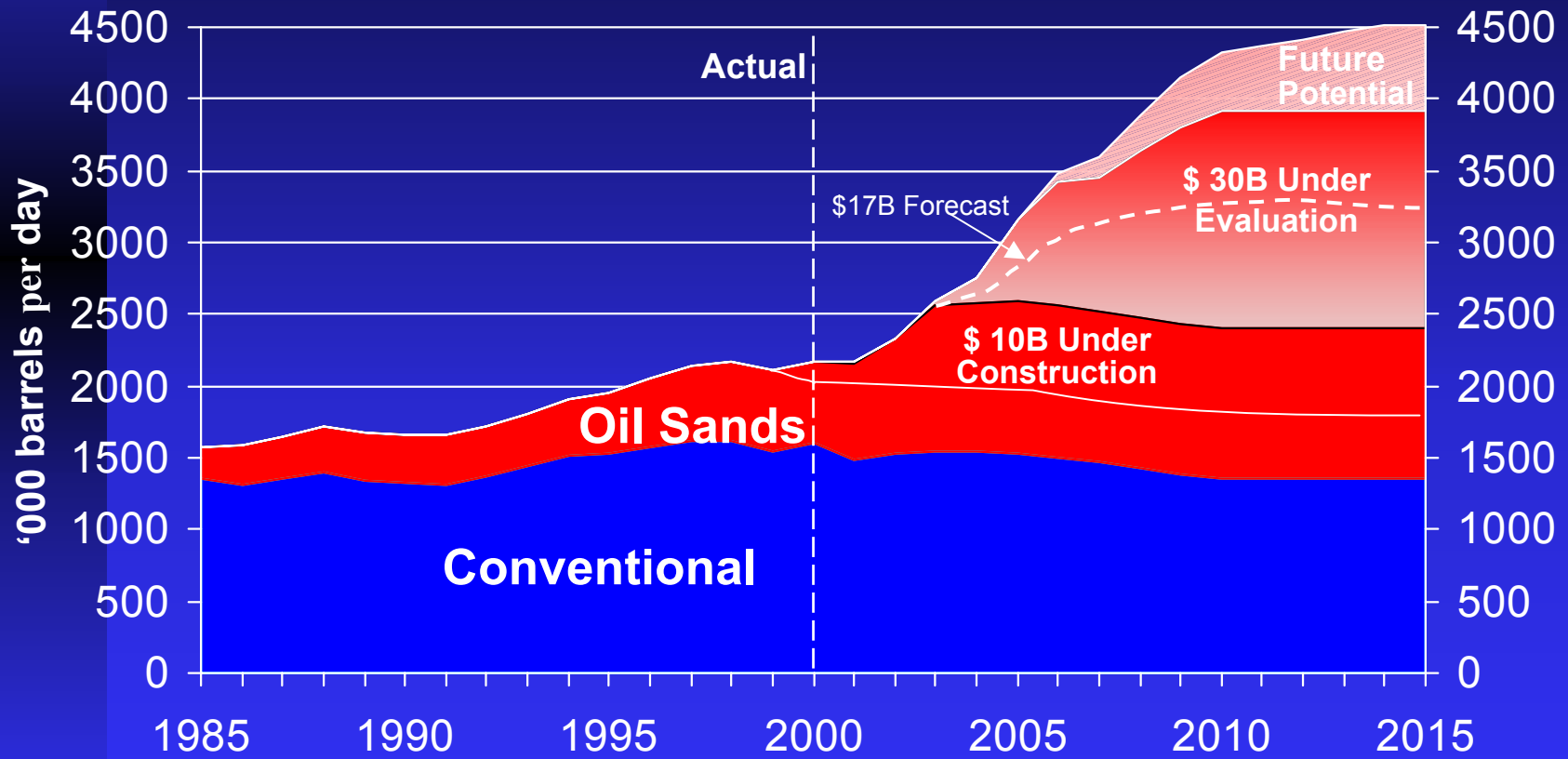
Capital Investment Profile - Current Oil Sands Industry Forecast



Source: AOSD - May/01

Oilsands production - Current Industry Forecast: From 605 k bpd (2000) to 1,900 k bpd (2010)

Western Canadian Crude Oil Production

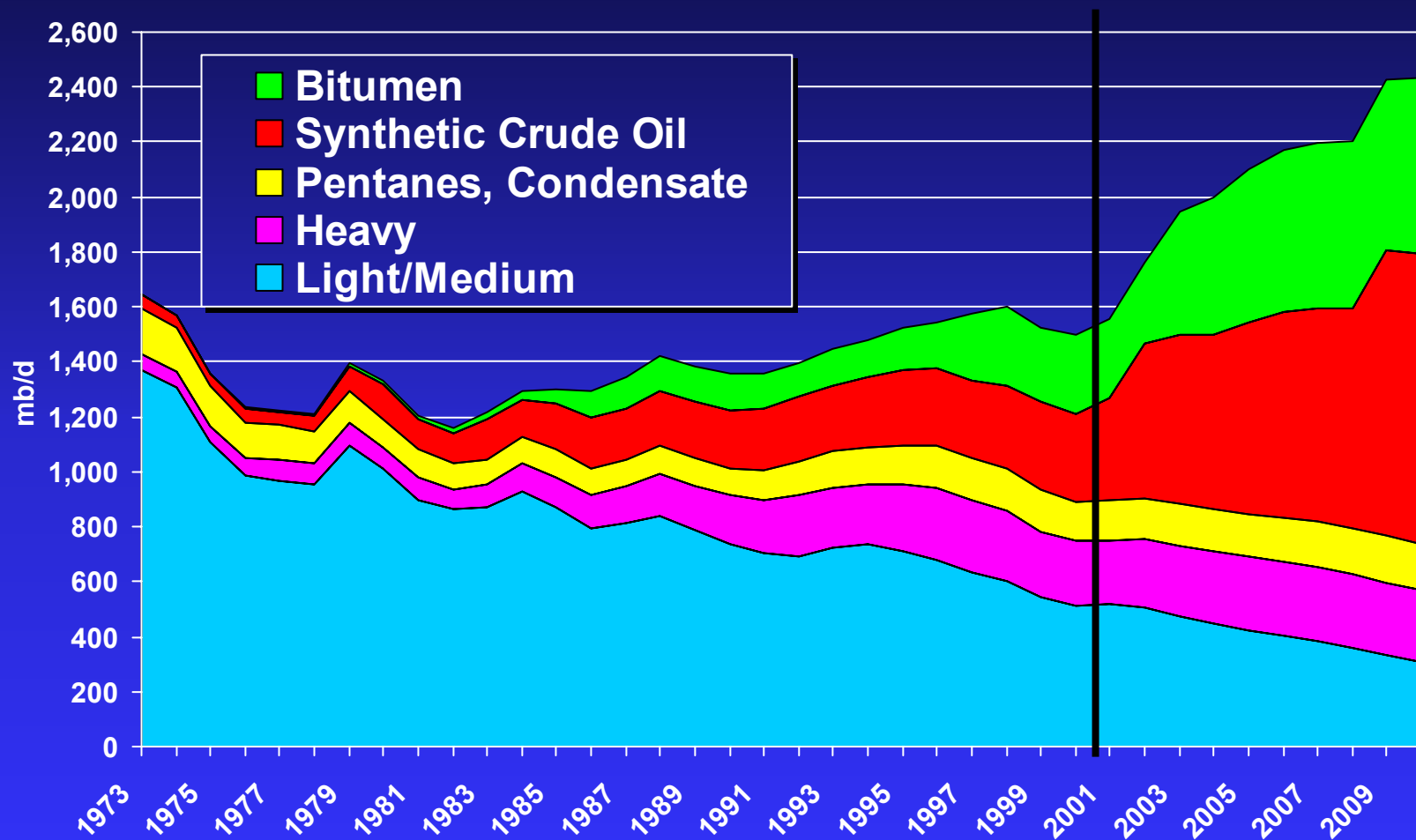


Source: AOSD - May/01

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Alberta Liquid Petroleum Production (1973 - 2010*)

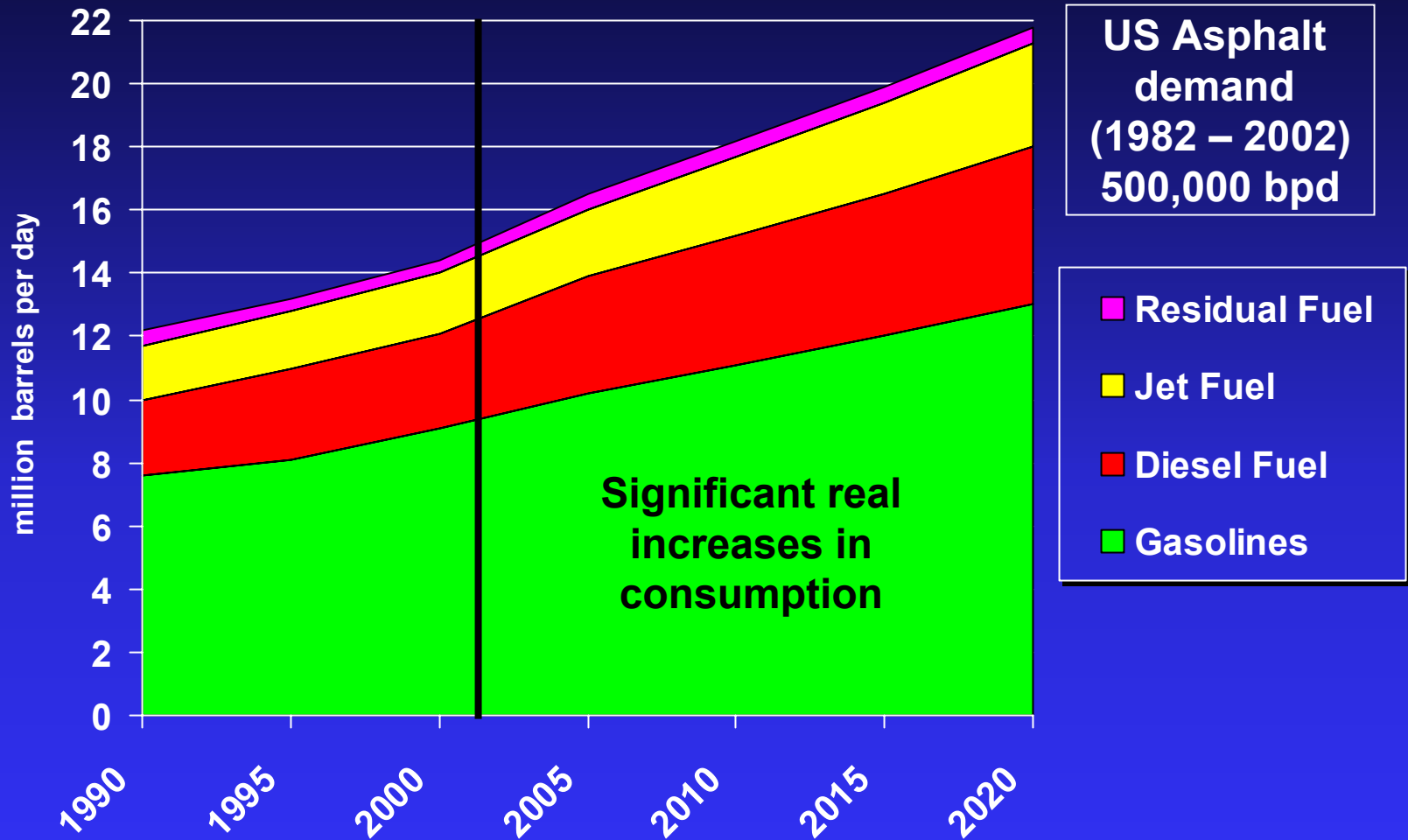


Summary

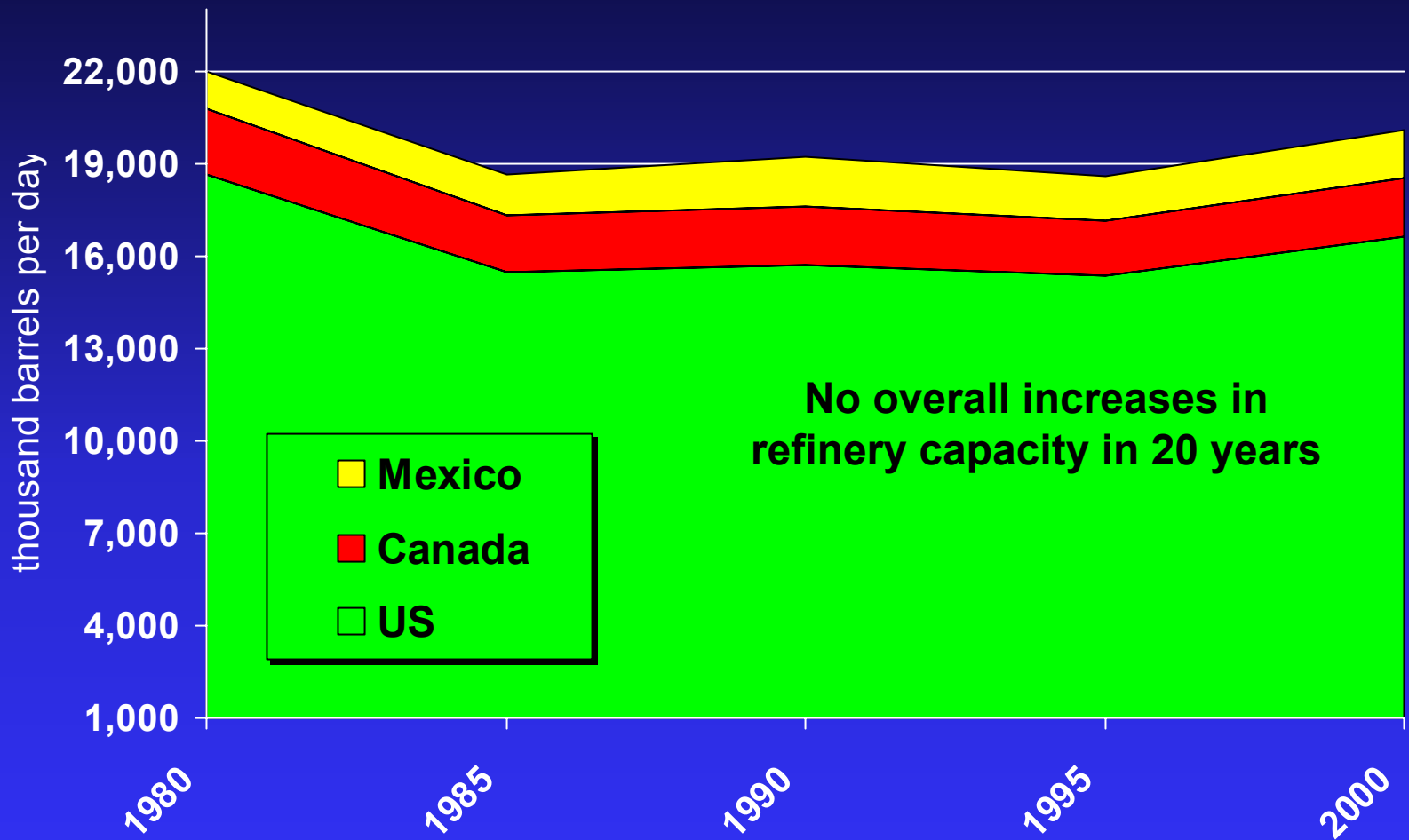
- Over the next 20 years, the US will have to significantly increase oil imports
- Alberta's oil sands are a strategic source of oil for the US
- Alberta's oil sands Industry is responding to this opportunity
- By 2010, Alberta could be producing oil in record amounts creating demands for new infrastructure

North American Refining Activity

North American Product Consumption (1980 - 2020)



North American Refinery Capacity (1980 - 2000)

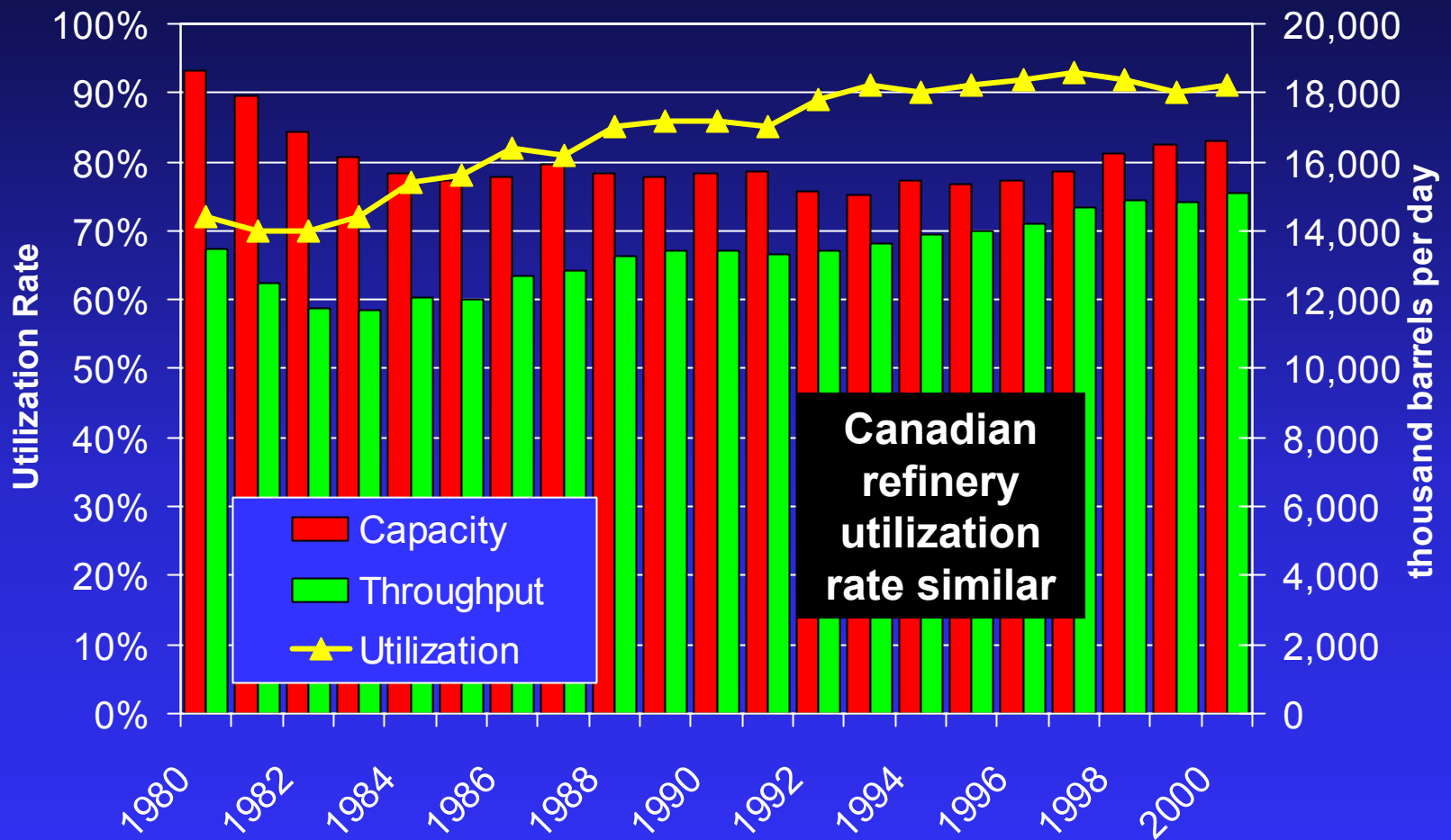


Source: BP

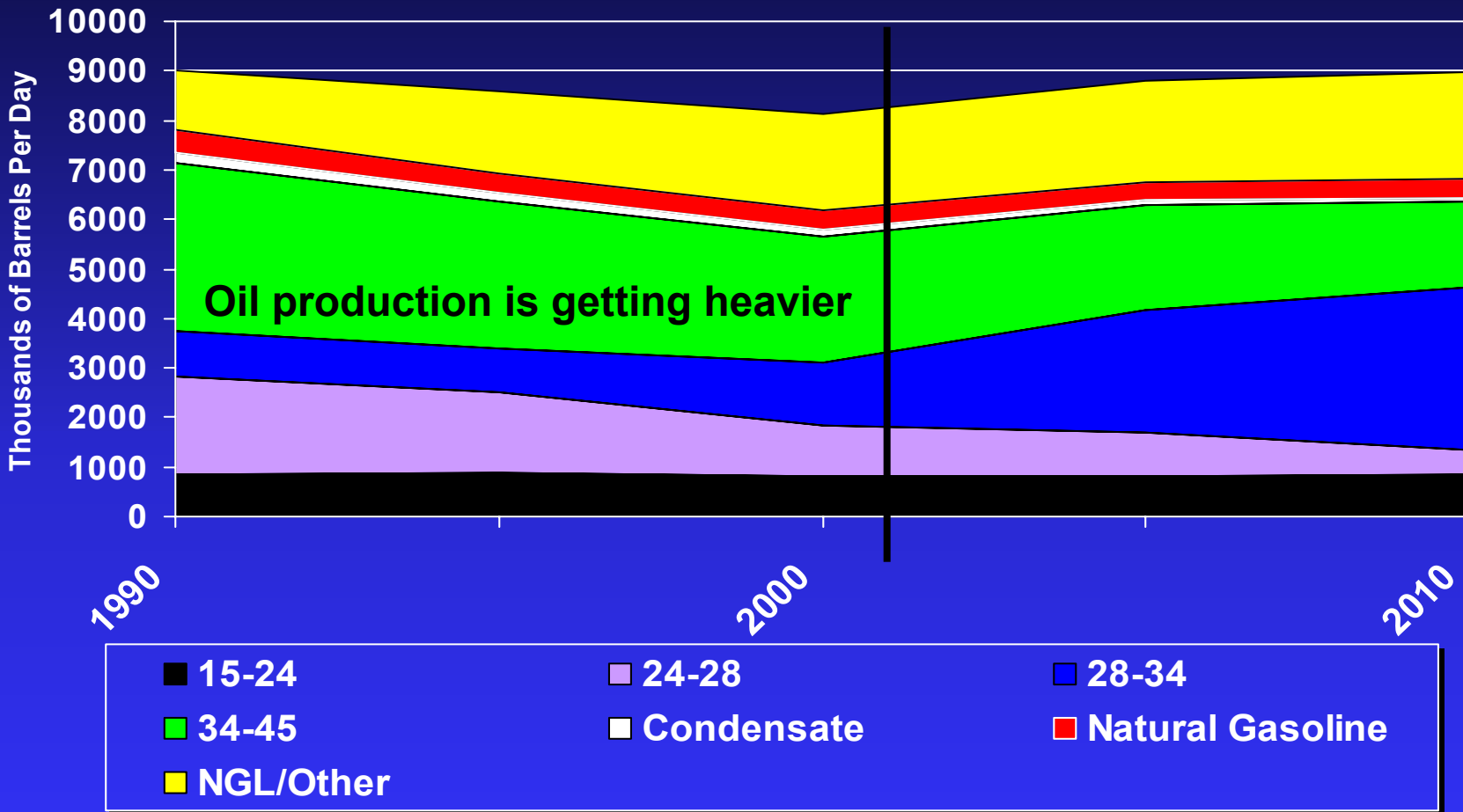
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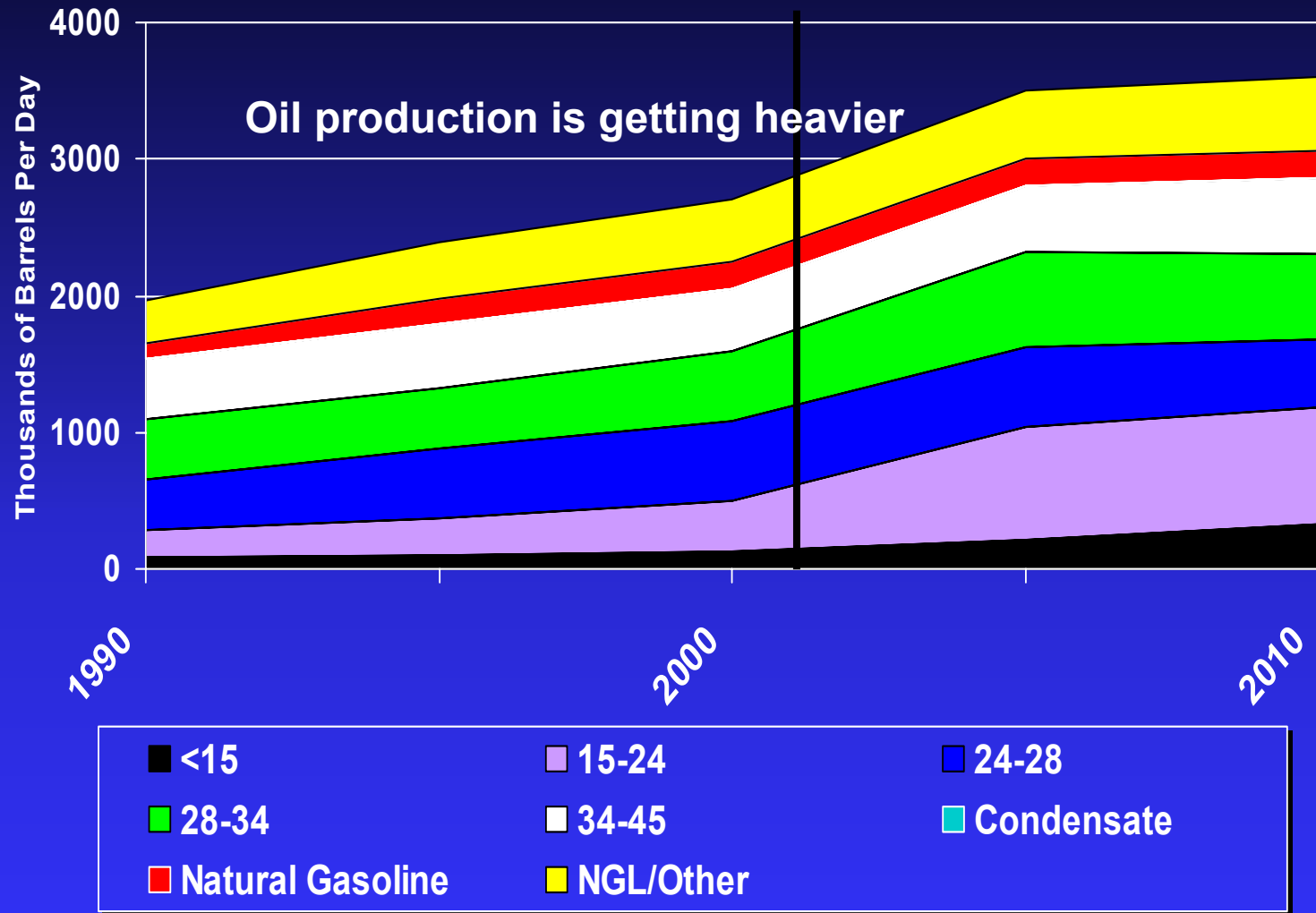
US Refinery Utilization (1980 - 2000)



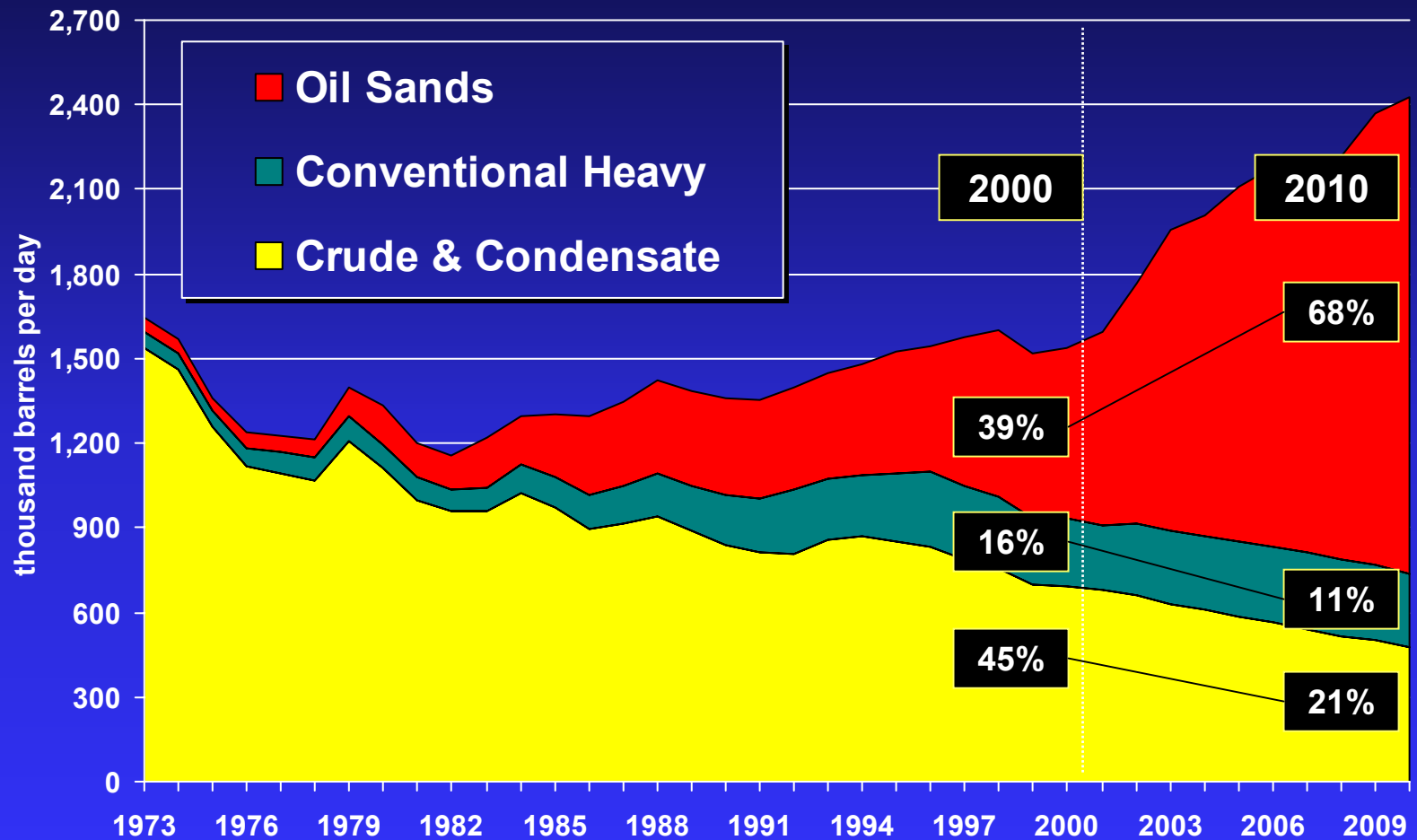
US Oil Production (1990 - 2010)



Canadian Oil Production 1990 - 2010

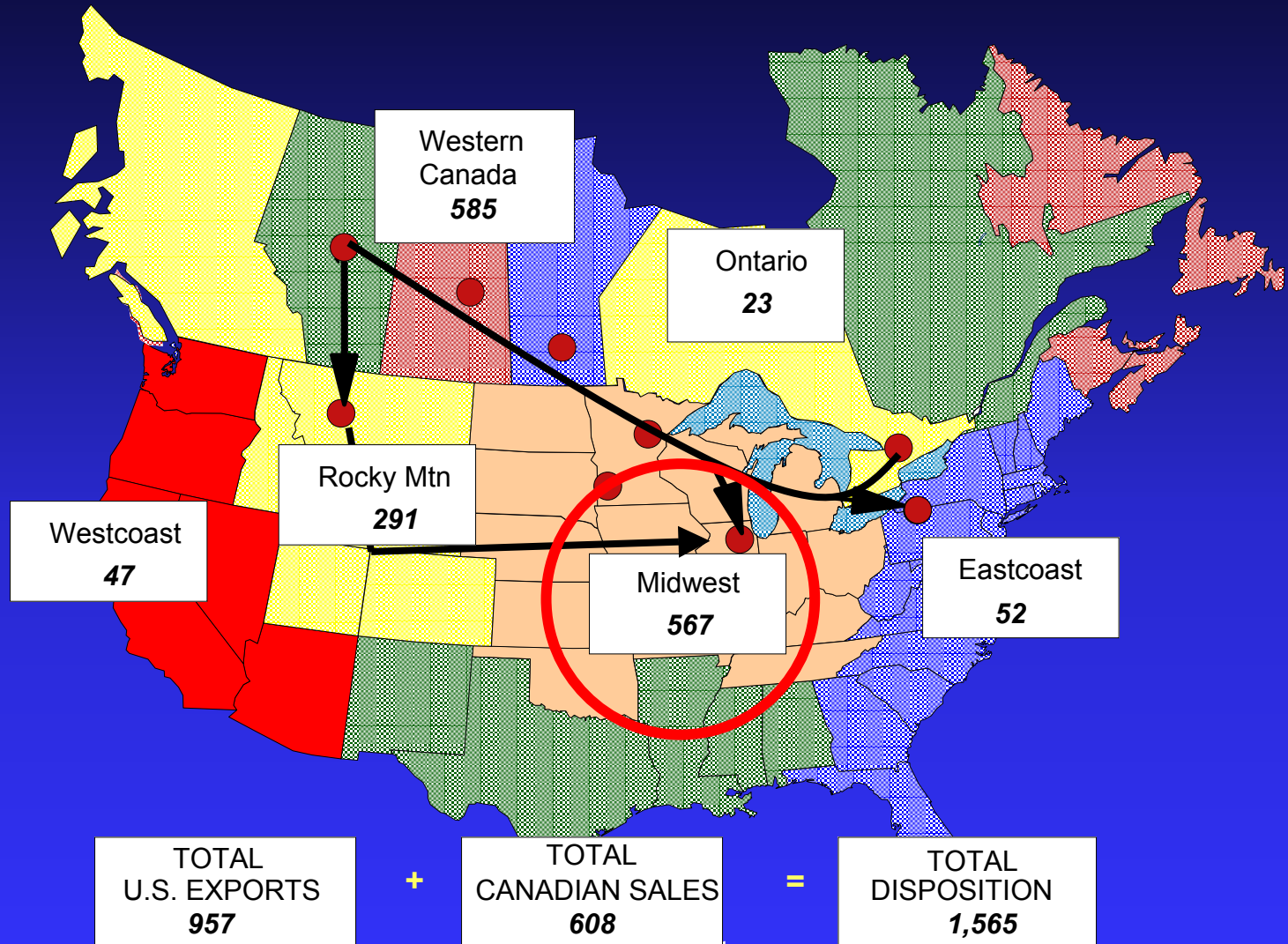


Alberta Liquid Petroleum Production (1973 - 2010)



DISPOSITION OF TOTAL ALBERTA CRUDE OIL - 2000 -

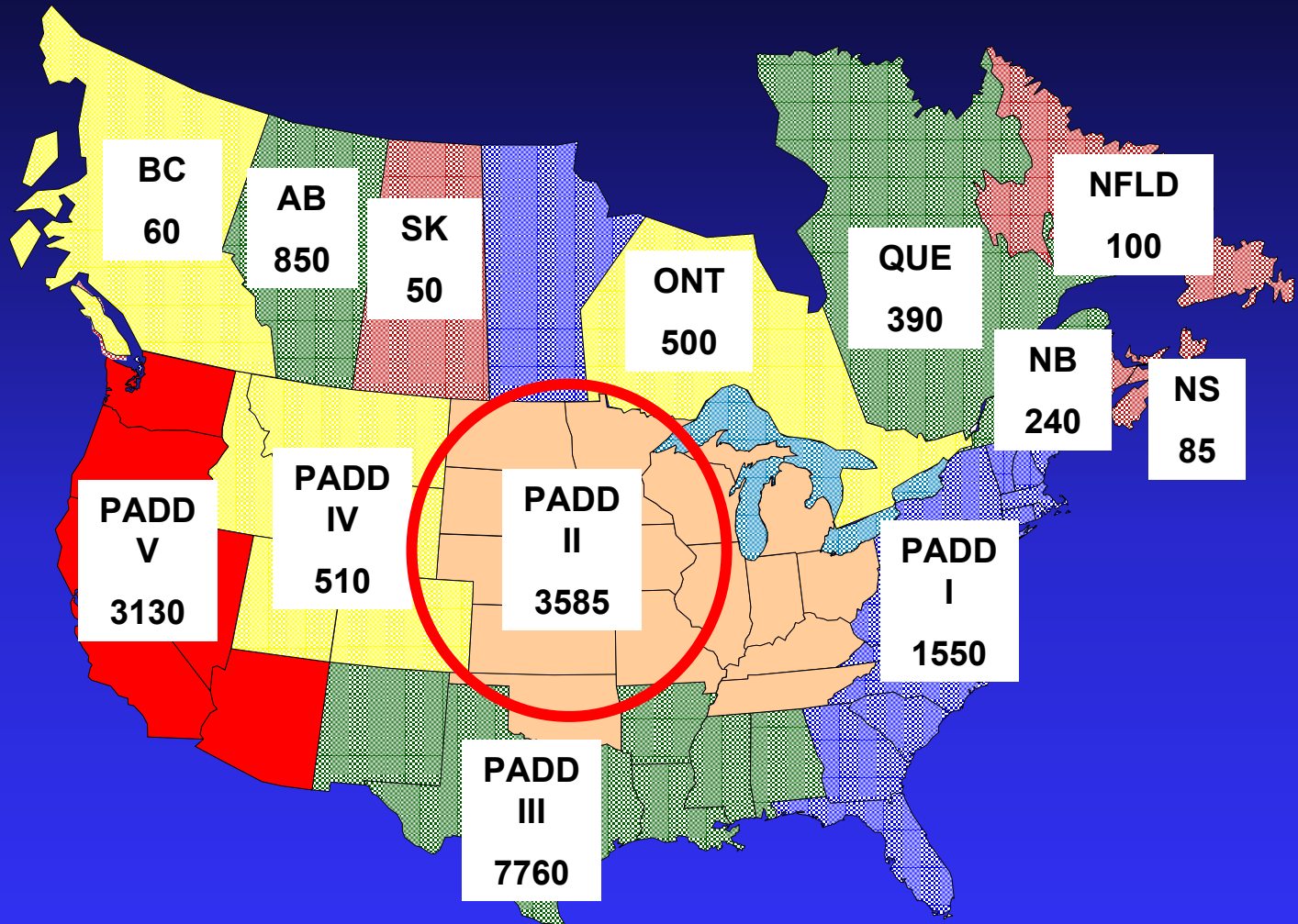
Thousand Barrels Per Day



CANADA AND USA REFINERY CAPACITIES

- 2000 -

Thousand Barrels Per Day

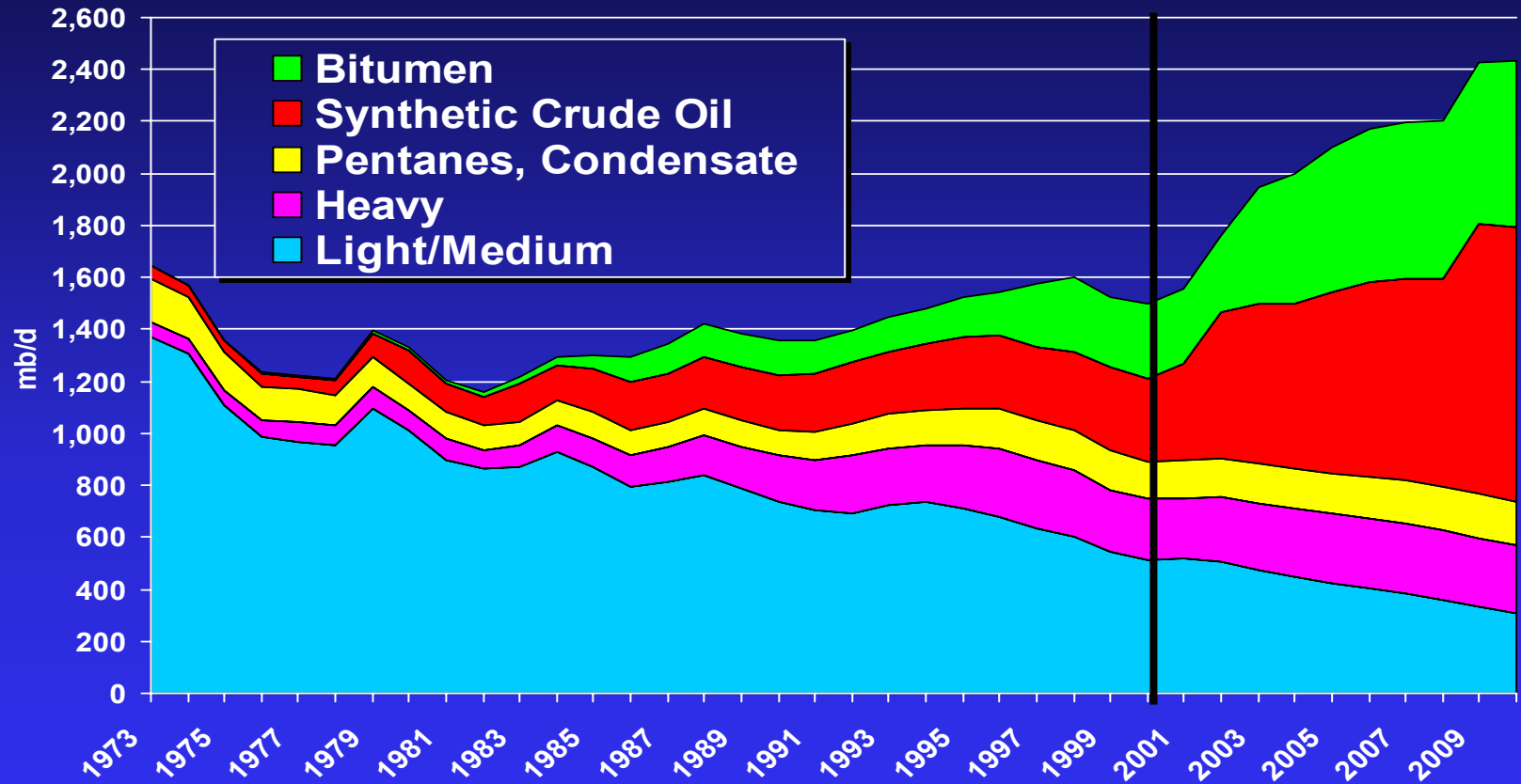


SUMMARY

- Significant growth for RPP projected
- Base demand for asphalt
- No significant increase in refinery capacity since 1980
- Refinery utilization rates > 90%
- New refinery capacity will be needed
- Crude slate is getting heavier – more upgrading facilities required
- Need to look at traditional markets (PADD II)

Alberta Upgrading and Refinery

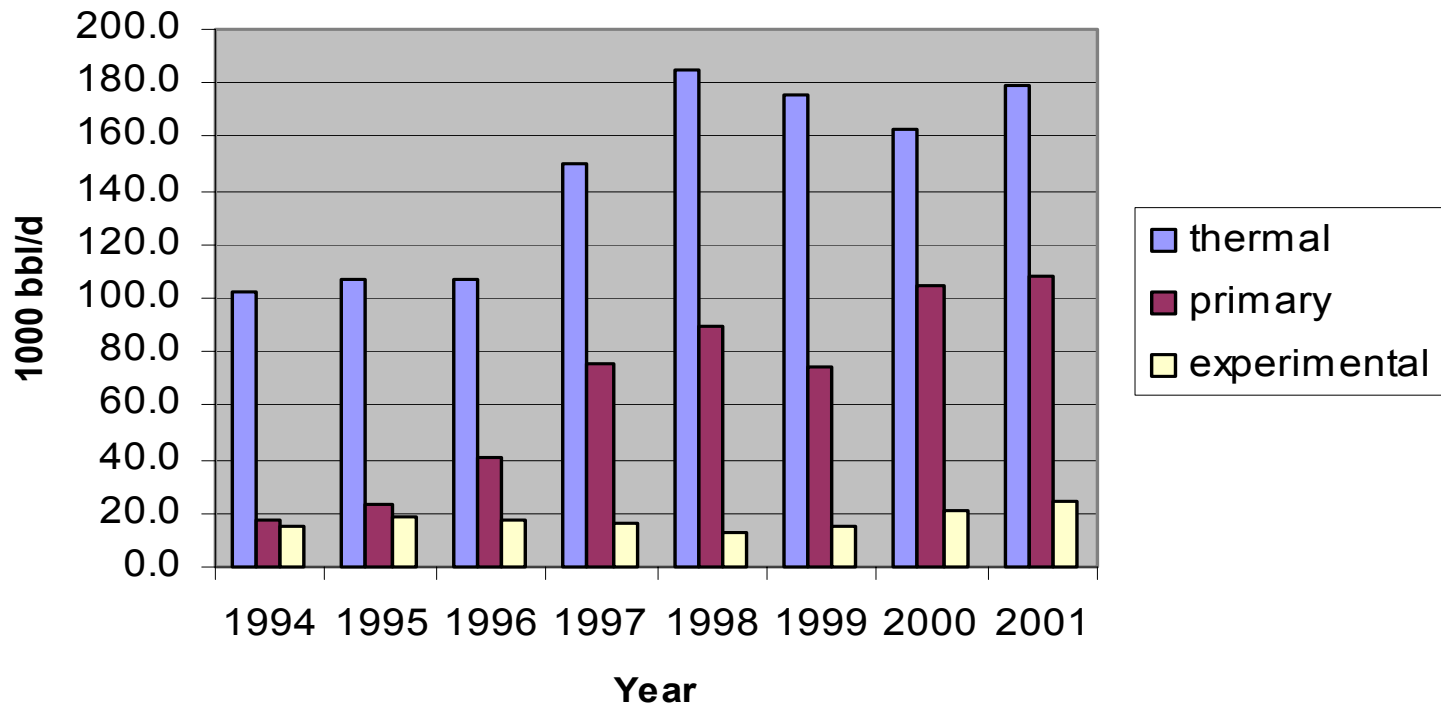
Alberta Liquid Petroleum Production (1973 - 2010*)



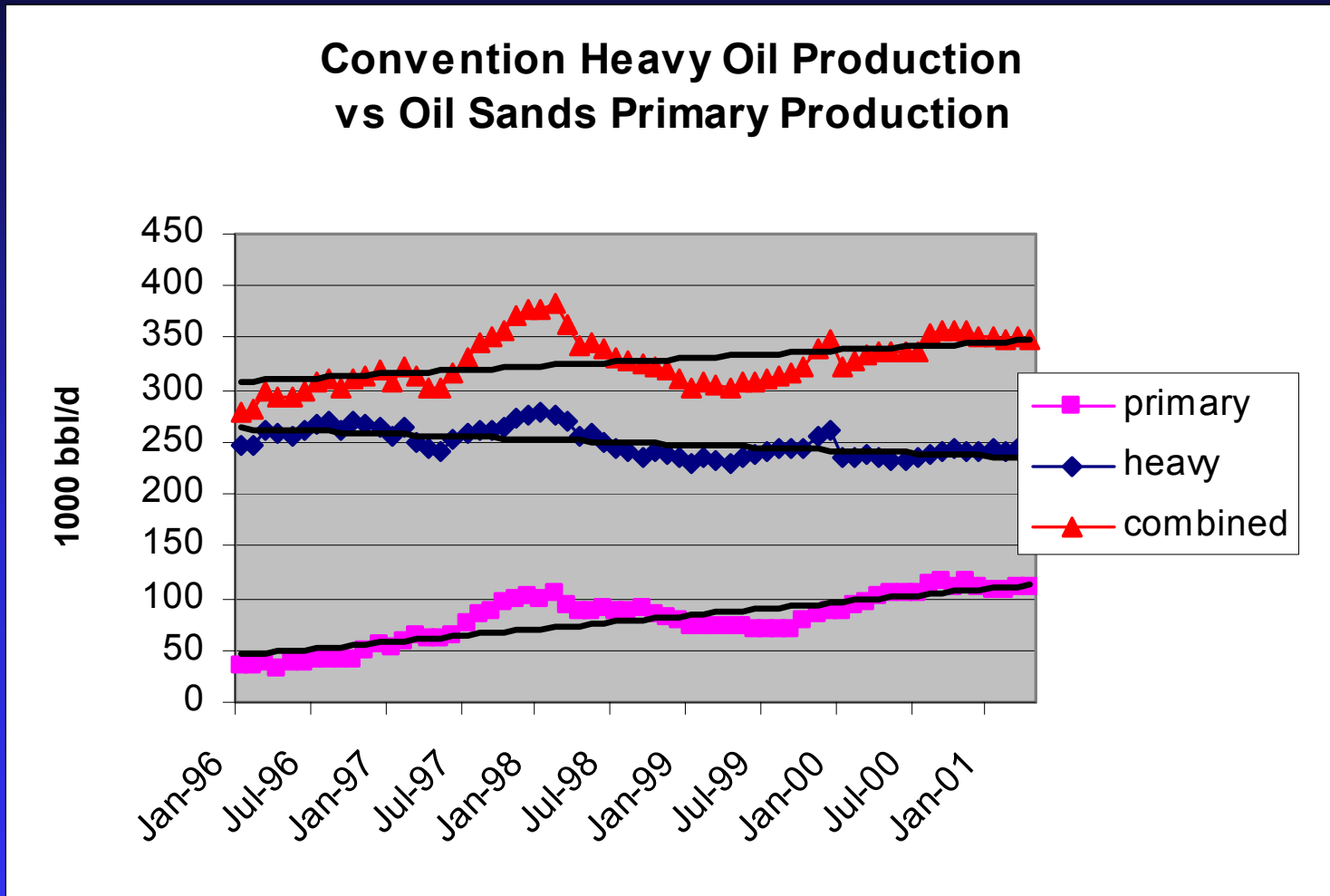
Source: historical data from the AEUB; forecast from ADOE

Bitumen Production

Average Bitumen Production



Primary Bitumen / Heavy Oil Production



Alberta Upgrading - Current

Company	Capacity (bpd)
Shell Scotford	0
OPTI/Nexen	0
Suncor	130,000
Syncrude	210,000
Husky (Lloydminster)	75,000
TOTAL CAPACITY	415,000

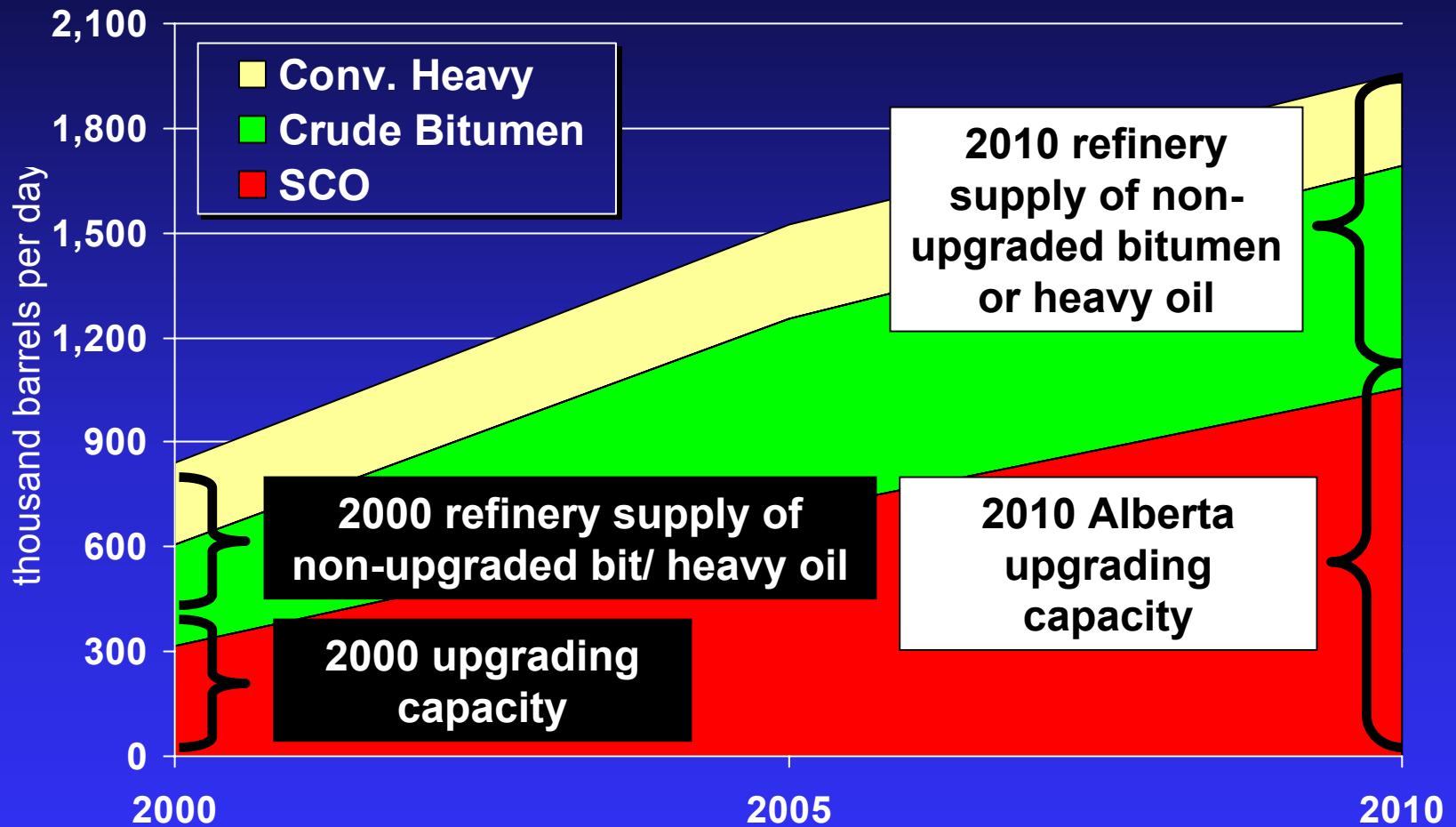
Source: Oil and Gas Journal - 1999

Alberta Refining - Current

Company	Location	Capacity (bpd)
Husky Oil Operation	Lloydminster	25,000
Imperial Oil	Edmonton	179,600
Parkland Refining	Bowden	6,000
Petro Canada	Edmonton	130,000
Shell Canada	Scotford	95,000
TOTAL CAPACITY		435,600

Source: Oil and Gas Journal - 1999

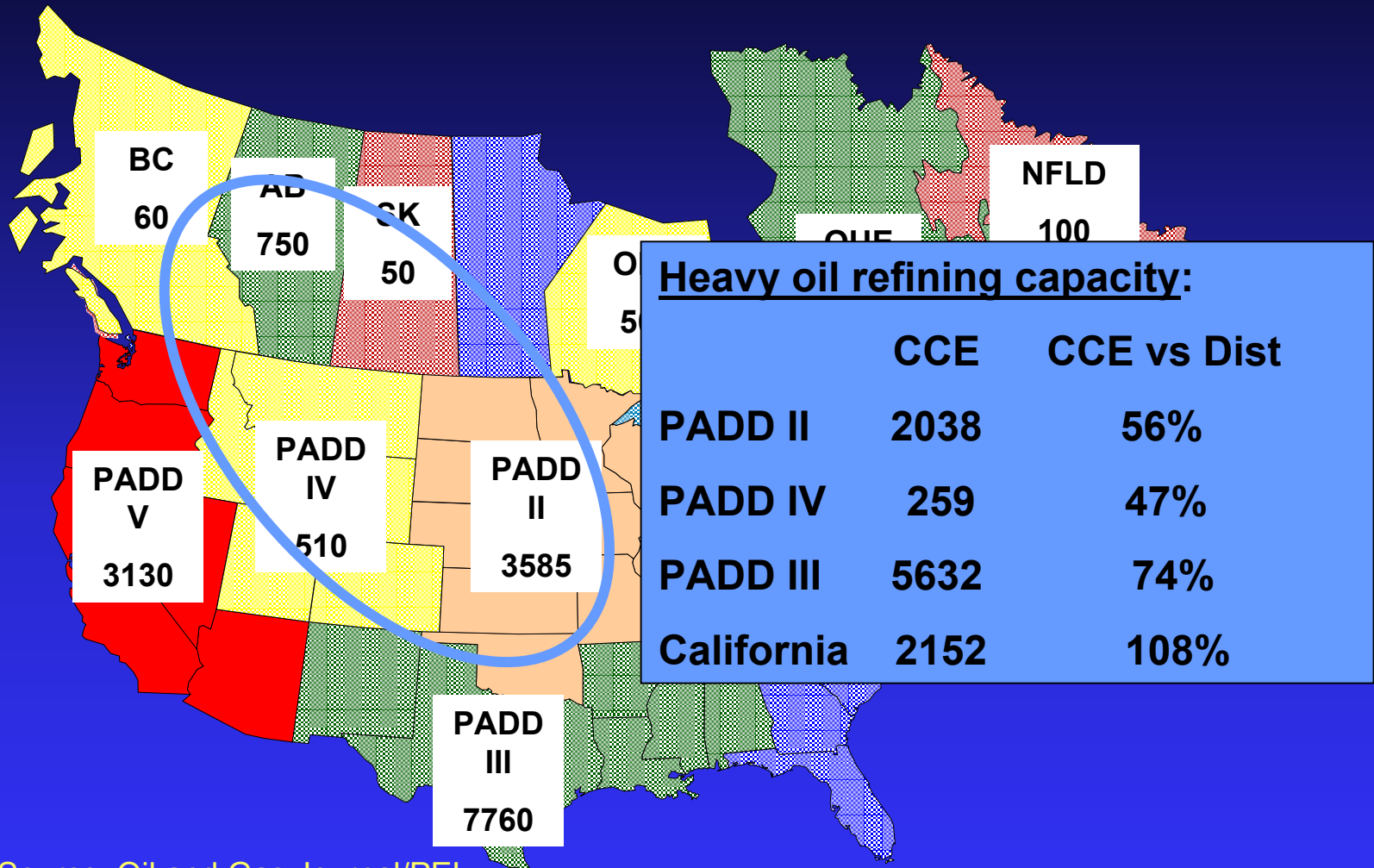
Alberta Upgrading Capacity vs Demand (2000 - 2010)



CANADA AND USA REFINERY CAPACITIES

- 2000 -

Thousand Barrels Per Day

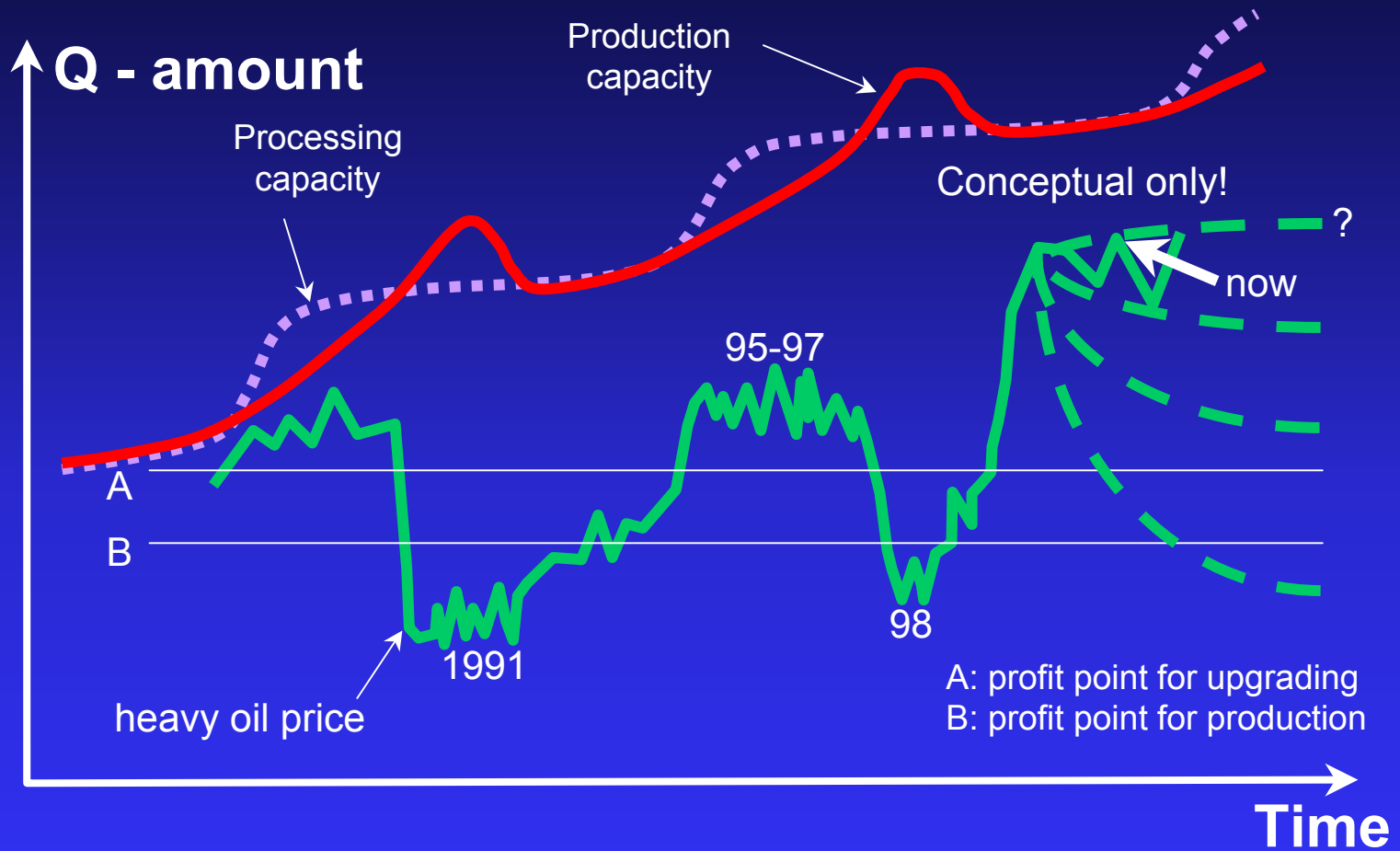


Source: Oil and Gas Journal/PEL

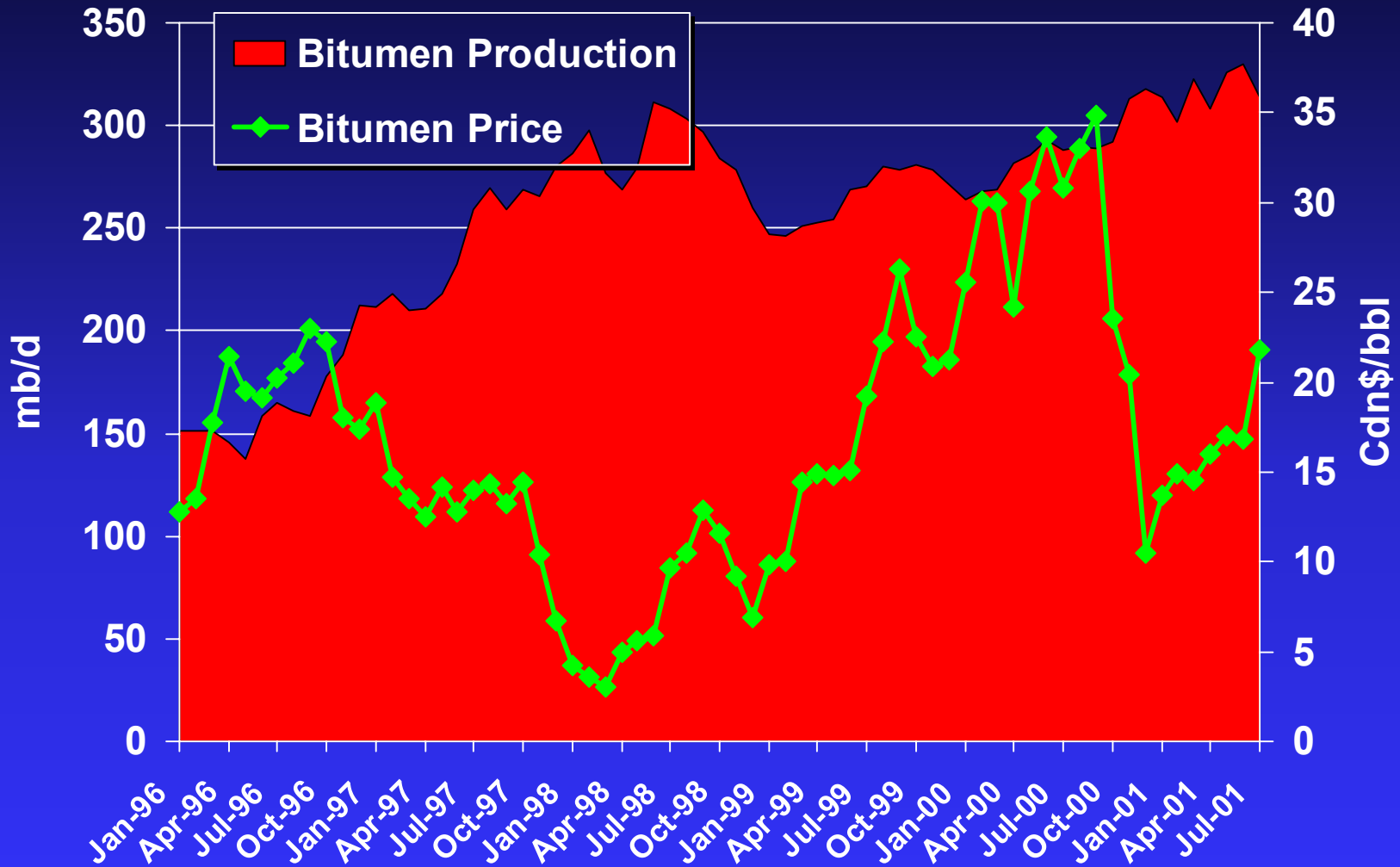
*includes upgrading capacity

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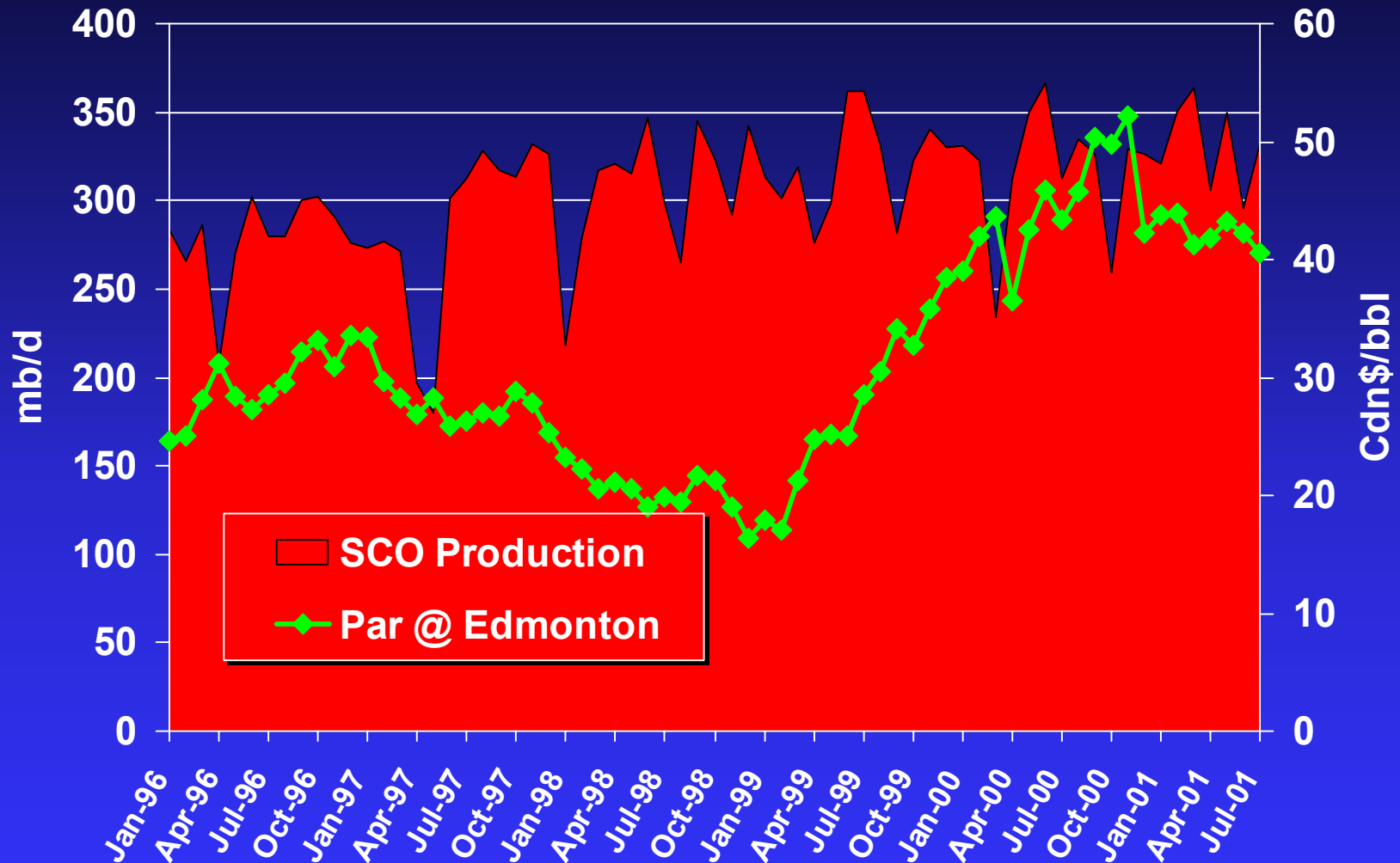
Conceptual Differential Price Cycle



Alberta Bitumen Production and Price versus Time (Jan 96 - Jul 01)



Alberta SCO Production and Price versus Time (Jan 96 - July 01)

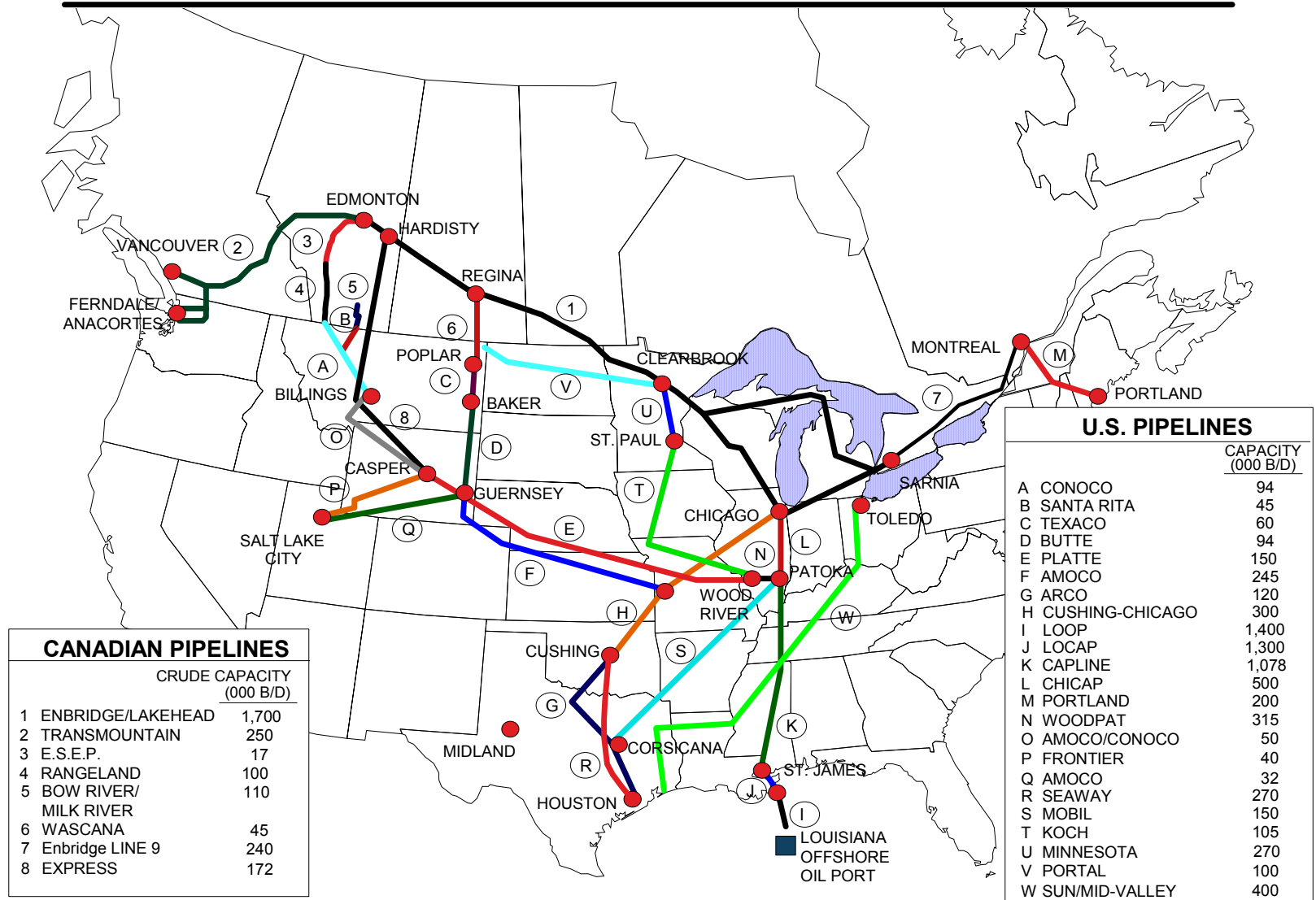


Summary

- By 2010, 79% of projected Alberta production will require upgrading
- Given announced projects, new incremental upgrading capacity will be required
 - ◆ Should it be here, or downstream?
- Conceptually, when upgrading capacity < supply, price of bitumen/heavy oil is down
- Bitumen prices currently depressed (over supply)
- SCO price > WTI
 - ◆ Will this continue?

Pipelines & Diluent

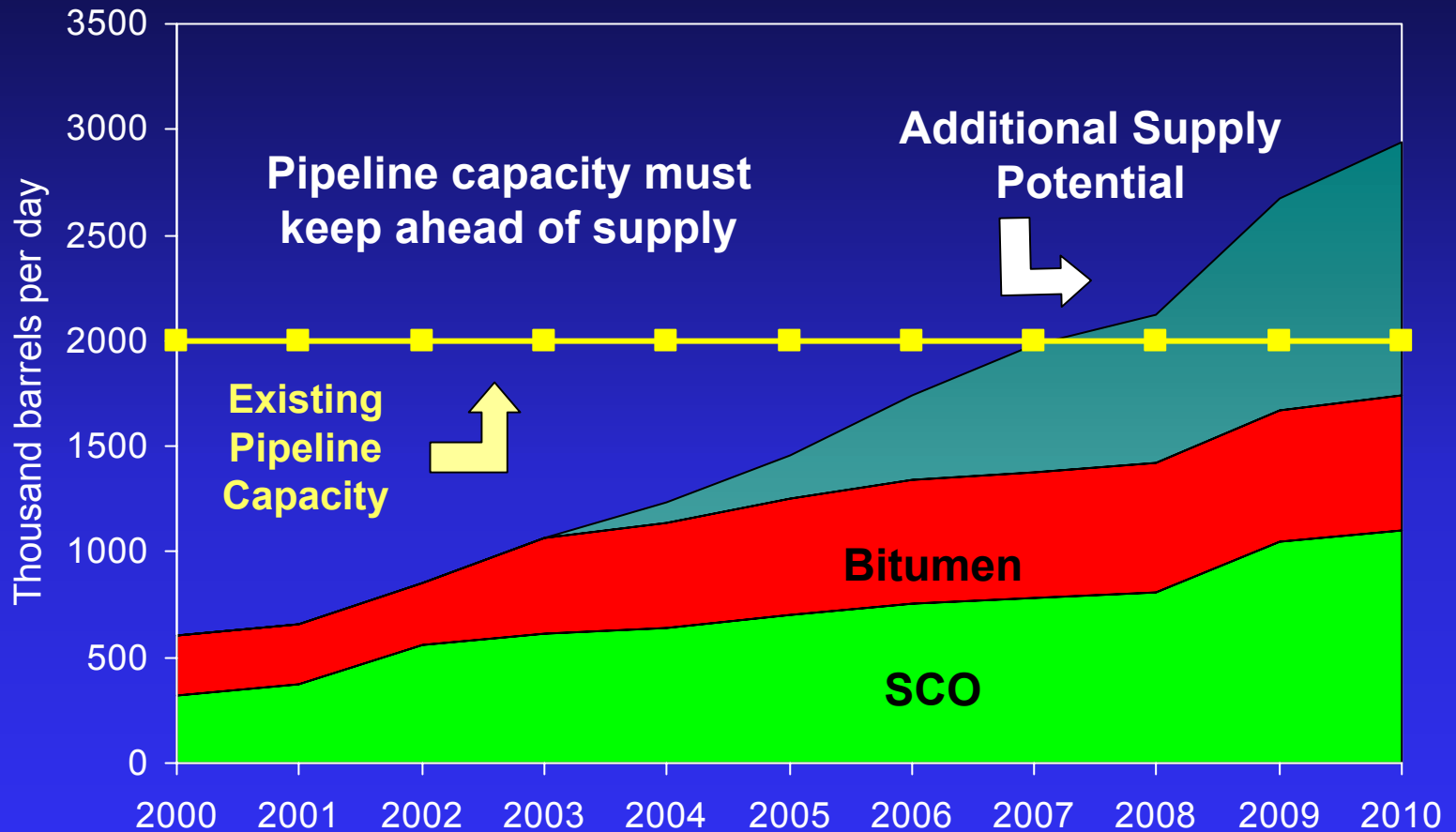
Major Canadian and U.S. Crude Oil Pipelines



Announced Pipeline Projects

Company	Project	Investment (\$million)	Timing 1999 - 2003
AEC/Koch/CNRL	Cold Lake Pipeline System	\$143	2000-2002
Imperial/Amoco/ Koch	Thicksilver Pipeline	\$250	1999-2001
Shell/BHP/BC Gas/TMPL	Corridor Pipeline	\$690	2000-2002
Enbridge	Terrace Expansion	\$140	2000-2002
TOTAL PIPELINE INVESTMENT		\$1.2 Billion	

Oil Sands Supply vs. Pipeline Capacity (2000 - 2010)



Diluent

- Local upgraders reduce the need for diluent
 - ◆ not required at the upgrader (integrated projects)
 - ◆ recovered and recycled to the field (midstream projects)
 - ◆ SCO shipped rather than blended bitumen
- Forecasts show a supply shortfall is expected for C5+ by 2005
- Cold Lake currently has access to diluent, Athabasca does not

Diluent Alternatives

- Conventional Crudes
- Refinery Naphtha
- Synthetic Crude Oil
- Imported Condensate
- Caroline Condensate
- Synthetic diluent
- Heated bitumen lines
- Upgrading

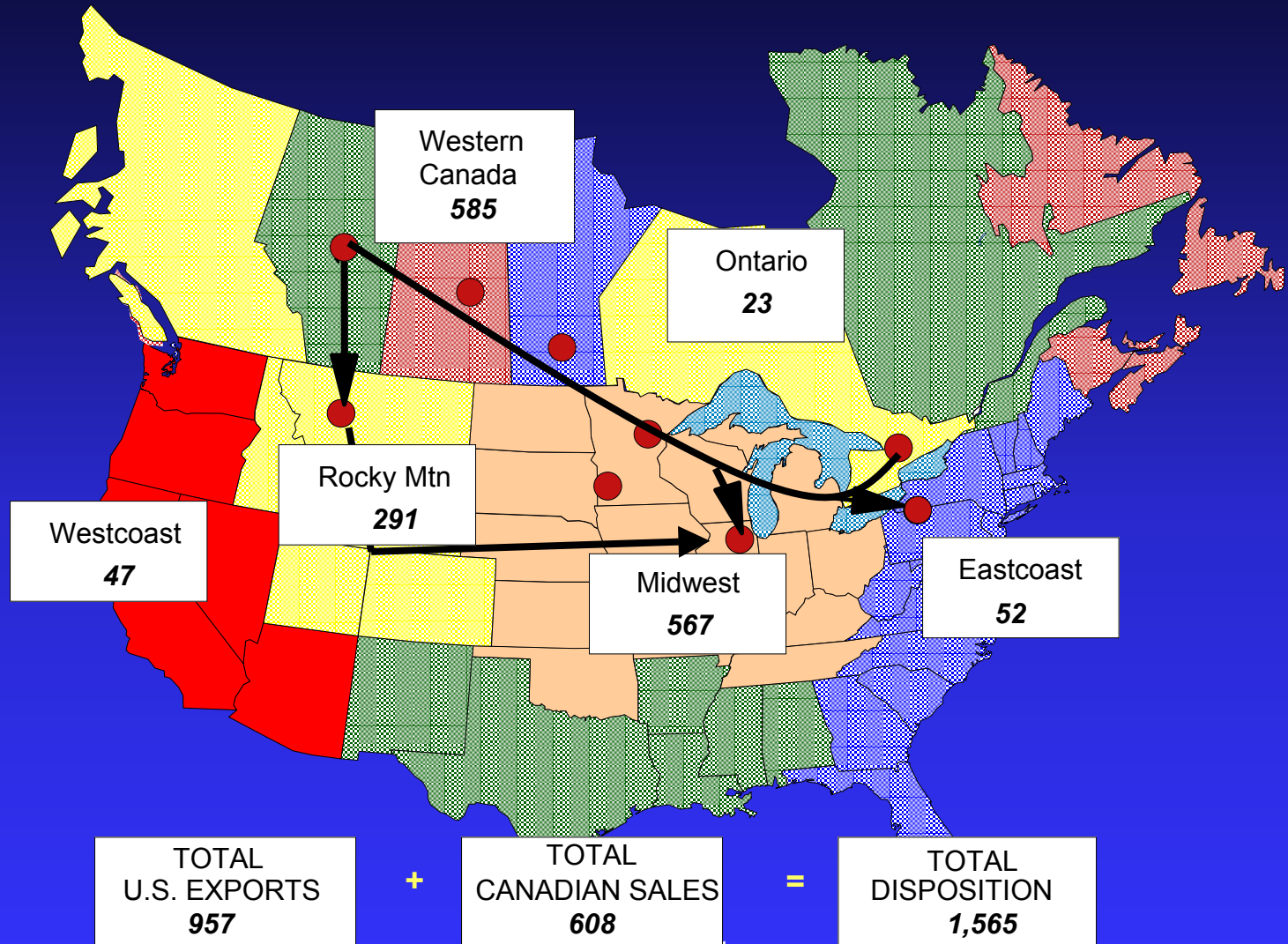
Summary

- If projects proceed as projected, new pipelines will be required
 - ◆ Need to determine which market area to serve
- Diluent shortage projected
 - ◆ More an Athabasca than Cold Lake problem
 - ◆ Need to develop alternatives, of which upgrading is one
- Different diluents → different blends
 - ◆ Must ensure that blends meet refiner requirements

Markets for Alberta's Production

DISPOSITION OF TOTAL ALBERTA CRUDE OIL - 2000 -

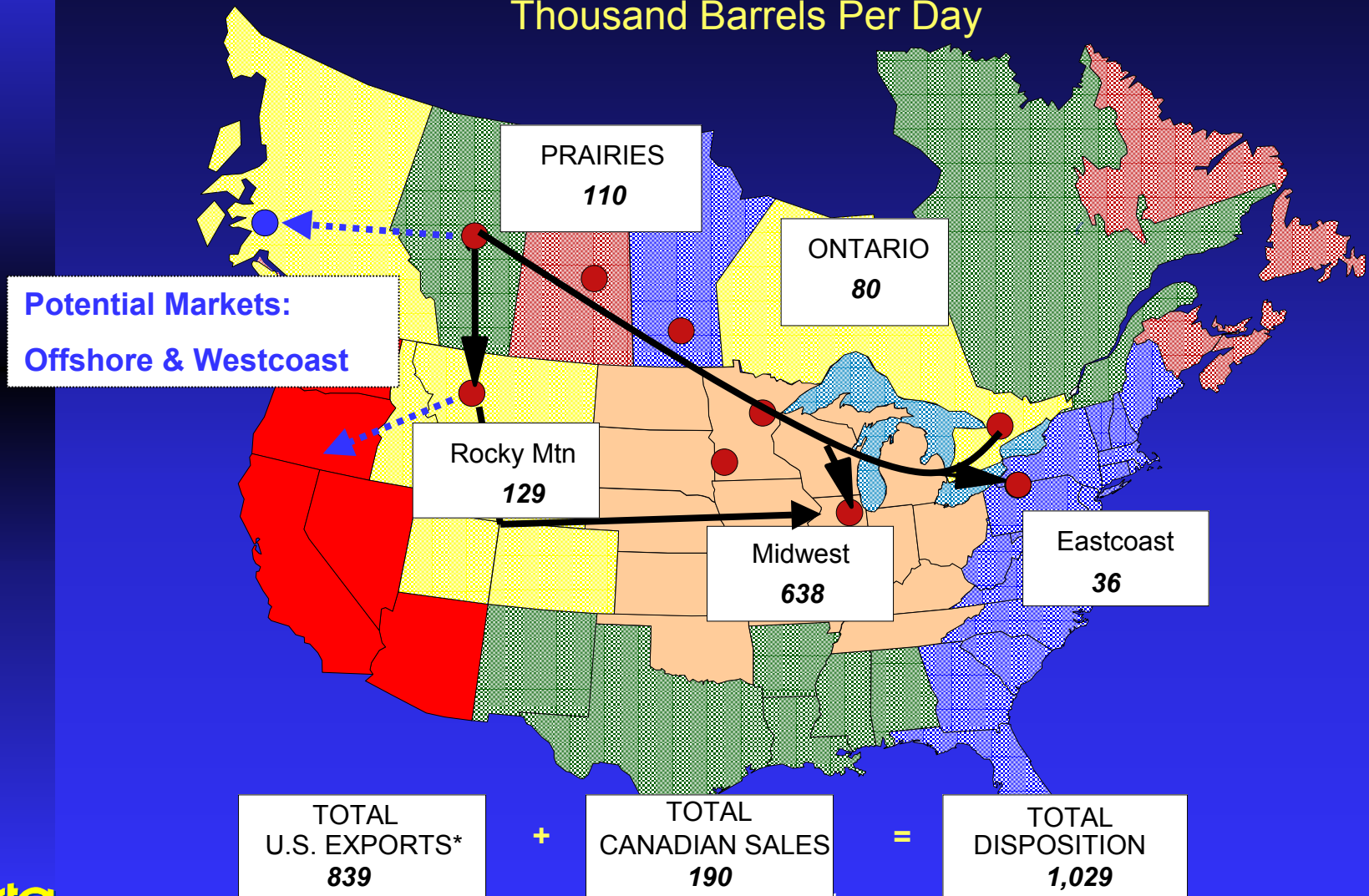
Thousand Barrels Per Day



DISPOSITION OF CANADIAN BITUMEN & HEAVY CRUDE OIL

- 2000 -

Thousand Barrels Per Day



Market Opportunities

PADD II – US Midwest

- Current Weighted Average Crude Slate:
 - ◆ Total volume: 3,400 thousand bpd
 - ◆ 34 degrees API - 1.32 Sulphur
- PADD II domestic production declining
- PADD III imports to PADD II declining
- Canadian imports – large growth potential
- Possibility of increased foreign competition

Market Opportunities

PADD IV – Rocky Mountain

- Current Weighted Average Crude Slate:
 - ◆ Total volume: 480 thousand bpd
 - ◆ 32 degrees API - 1.0 Sulphur
- PADD IV domestic production declining
- PADD II imports to PADD IV declining
- Canadian imports – large growth potential

Market Opportunities California

- Current Weighted Average Crude Slate:
 - ◆ Total volume: 1,900 thousand bpd
 - ◆ 24 degrees API – 1.33 Sulphur
- Canadian imports – modest potential
- Intense competition from Mexico and Ecuador

Bitumen Blends – Potential Demand (1000 bpd)

Market	Incremental Increase 2000/2005	Incremental Increase 2000/2010
PADD III/ W. Canada	175	475
PADD IV California	Small 20	Small 100
Far East	0	0
TOTAL	195 +	575 +

Source: Eagle/PEL

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Synthetic Crude Oil – Potential Demand (1000 bpd)

Market	Incremental Increase 2000/2005	Incremental Increase 2000/2010
PADD III/ W. Canada	500	1,000
PADD IV California	100 Small	200 Small
Far East	Small	100
TOTAL	500 +	1,200 +

Potential Market Opportunities versus Supply Projections

- 2010 supply forecast vs incremental bitumen market:
 - ◆ Conservative forecast : market under-supplied by 223,000 BPD
 - ◆ High forecast: market over-supplied by 200,000 bpd
- 2010 supply forecast vs incremental SCO market:
 - ◆ Conservative forecast : market under-supplied by 400,000 BPD
 - ◆ High forecast: market over-supplied by 200,000 bpd

Summary

- Natural market areas for incremental Alberta production:
 - ◆ PADD II, PADD IV, California, Far East
- Potential markets exist
 - ◆ Depends to what extent SCO is substitute for WTI
 - ◆ Have to meet fuel standards (e.g resolve diesel centane number)
 - ◆ Depends on the rate of growth of supply capacity (aggressive growth could lead to over-supply of bitumen and SCO in the market)

Concluding Points

- Always be a demand for a heavy oil/bitumen commodity
 - ◆ downstream asphalt demand & processing capacity already exists
- Always be an SCO market
 - ◆ SCO will help offset declining WTI production
- Possible emerging intermediate market for partially upgraded blends
 - ◆ Quality standardization
- Upgrading will be required
 - ◆ Value added opportunities for Alberta
- Strategic alliances with refineries
 - ◆ Helps secure long-term development potential

What's Next?

■ Additional upgrading capacity in the Province?

- ◆ When should it be done?
- ◆ Who should be involved?

■ Market changes

- ◆ Should Alberta companies invest in downstream refining?
- ◆ Should producers ship RPP rather than bitumen?

■ Role of the Government

- ◆ Is there a role for Government to play?