



BITUMEN MARKETS

&

ECONOMICS

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Outline

- What is Bitumen?
- Oil Sands Markets
- Prices & Differentials
- Project Economics
- Summary

Characteristics of Heavy Oils/Oil Sands

- Crude Bitumen is a thick, sticky form of crude oil, sometimes referred to as “extra-heavy” crude oil.
- Heavy oils/oil sands vary widely around the world.
- Alberta may have 40% of the world’s Original Oil In Place
- Alberta bitumen has a very high viscosity – hard to flow.

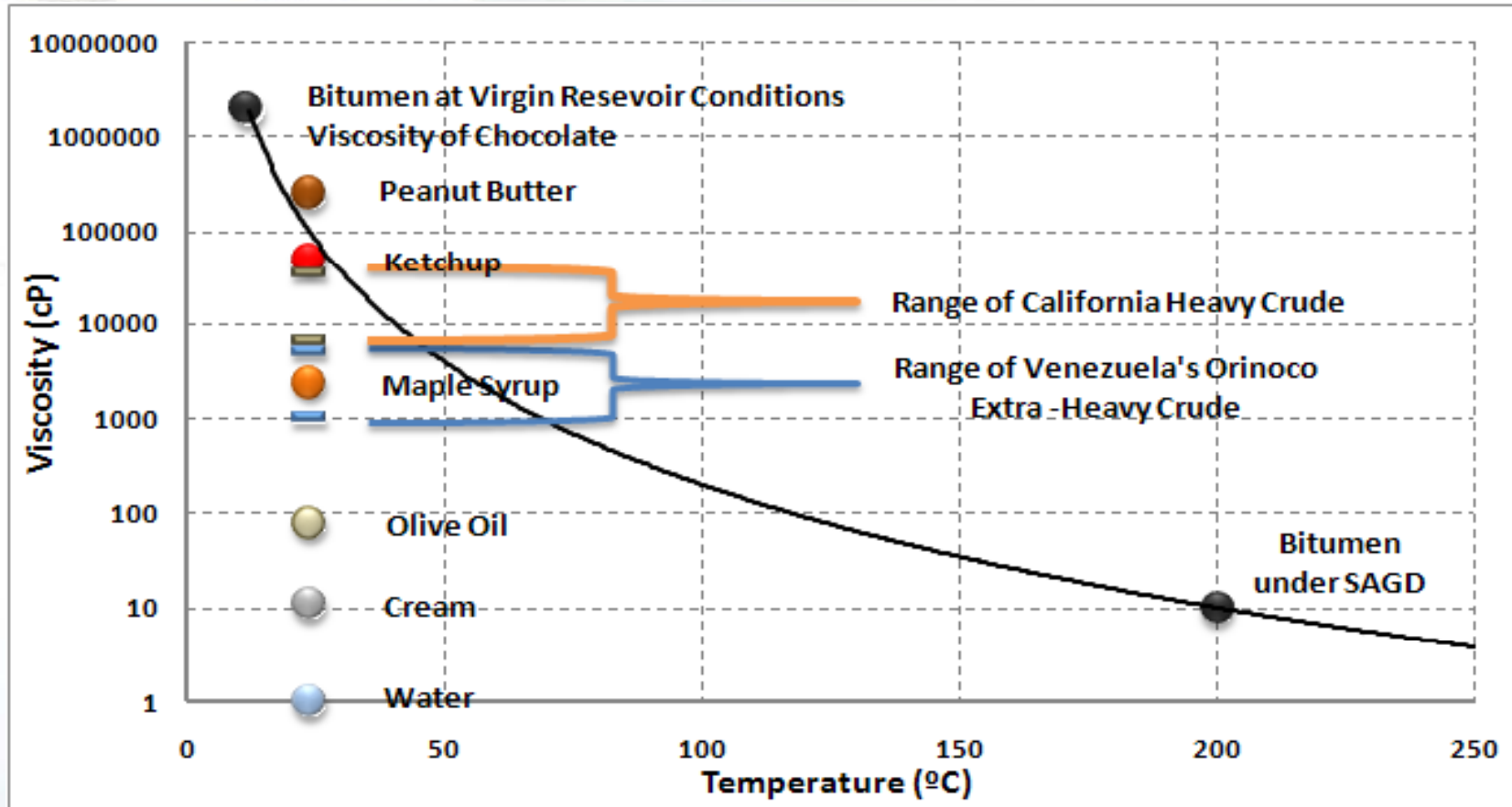


Heavy Oils/Oil Sands Resources

Deposit(s)	Country	API	Viscosity	OOIP (billion bbls)	Reservoir Depth (feet)
Kern River	California, USA	10-15	500-10000	4	850
West Sak	Alaska, USA	17-21	20-90	3	3900
Duri	Indonesia	17-21	330	5	500
Athabasca	Alberta, Canada	8-10	1000000	2200	0-1300
Orinoco Belt	Venezuela	8-10	100-5000	1360	2200
Various	FSU			900	
Others	Various			458	
TOTAL				4930	



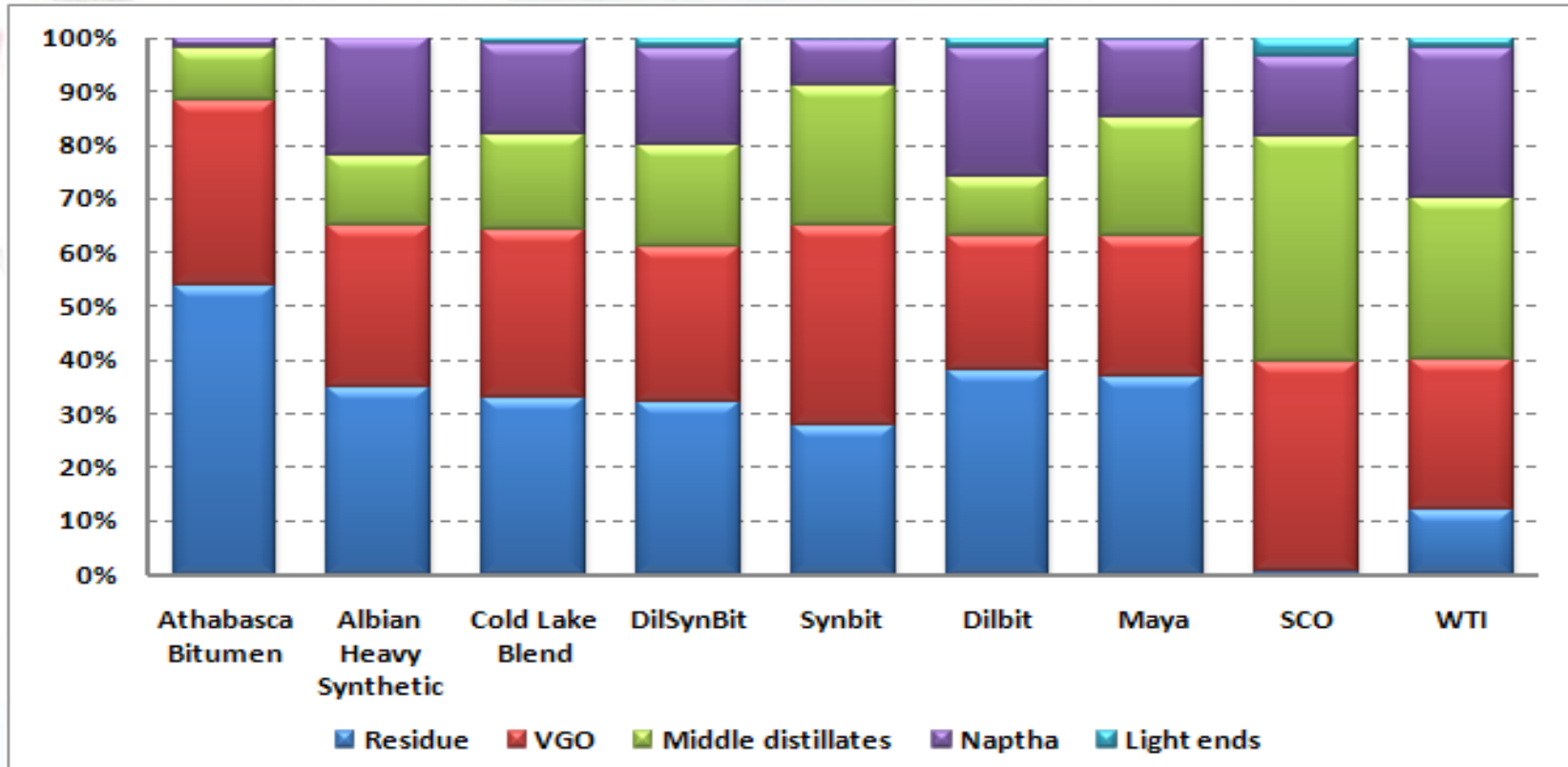
Characteristics of heavy oils/oil sands



Source: ADOE after Enerplus



Crude Yields



Source: Wood Mackenzie

- **Dilbit Comparable to Maya ... Some Discount**
- **Value Depends on Market for Products; e.g., Diesel**



Distribution of Oil Sands Production

**TABLE 2-1
ESTIMATED ALLOCATION OF DILUTED BITUMEN, 2009
(Thousand Barrels per Day)**

		Distribution by Fuel					Raw Bitumen*
		DilBit	SynBit	SCO	SCO in Synbit	Total SCO	
Distribution by Market	Alberta**:		29	266	15	281	318
	Scottford Upgrader			155		155	155
	Suncor		29	111	15	126	163
	Other Canada**			67		67	79
	USA***						
	PADD I			10		10	12
	PADD II	493		262		262	656
	PADD III	79		0		0	55
	PADD IV	28		38		38	64
	PADD V	30		43		43	72
	Other	14		2		2	12
	Total	645	29	687	15	702	1,269

*Raw bitumen includes bitumen processed in upgraders

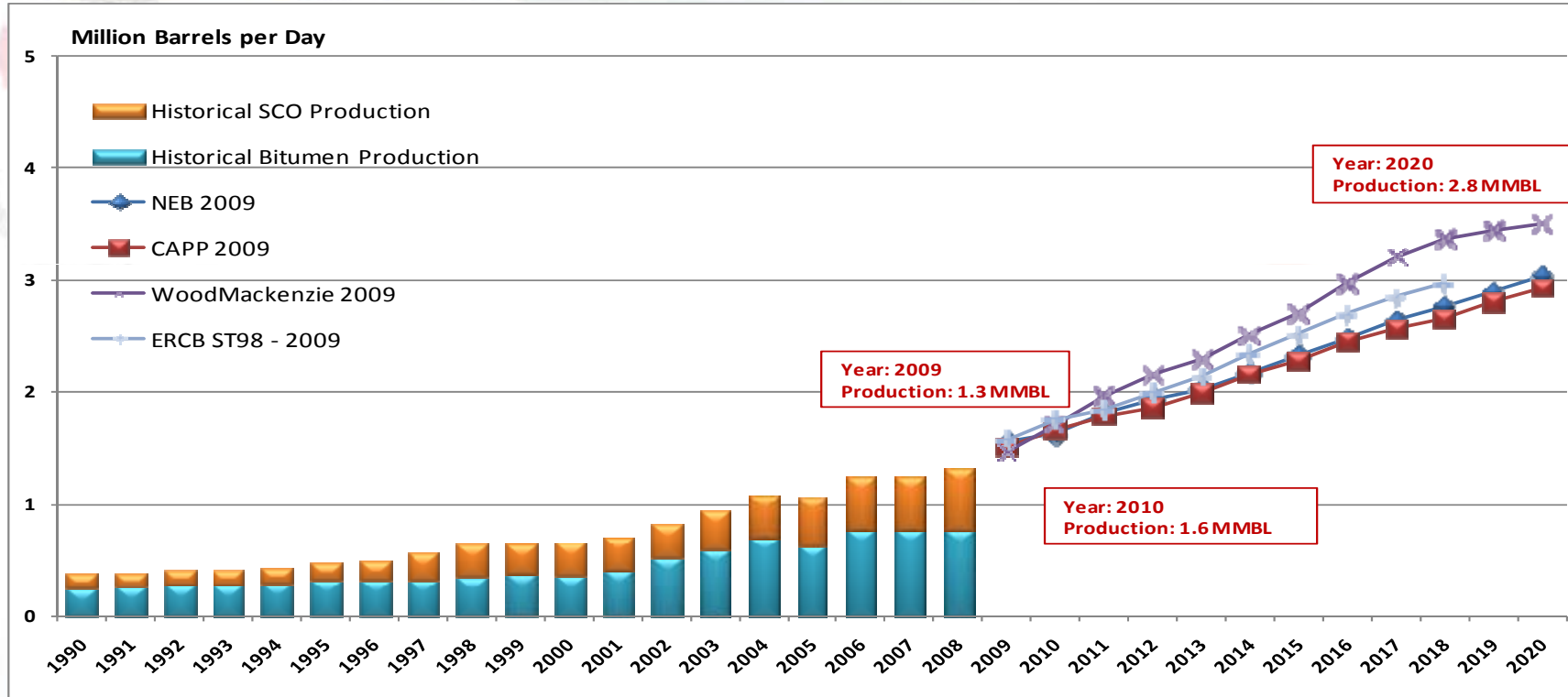
** Estimates based on public information about refinery capacity and feedstock

***Source: National Energy Board Statistics-Estimated Canadian Crude Oil Exports by Type and Destination

- **1.4 M bpd in 2009. 1/3rd sold in Canada, 2/3rds exported to USA**
- **1/2 upgraded to SCO. 1/2 SCO sold in Canada.**



Oil Sands Production Forecast



- **3 M bpd by 2020: 100% Increase!**
- **Strong Extraction Economics**

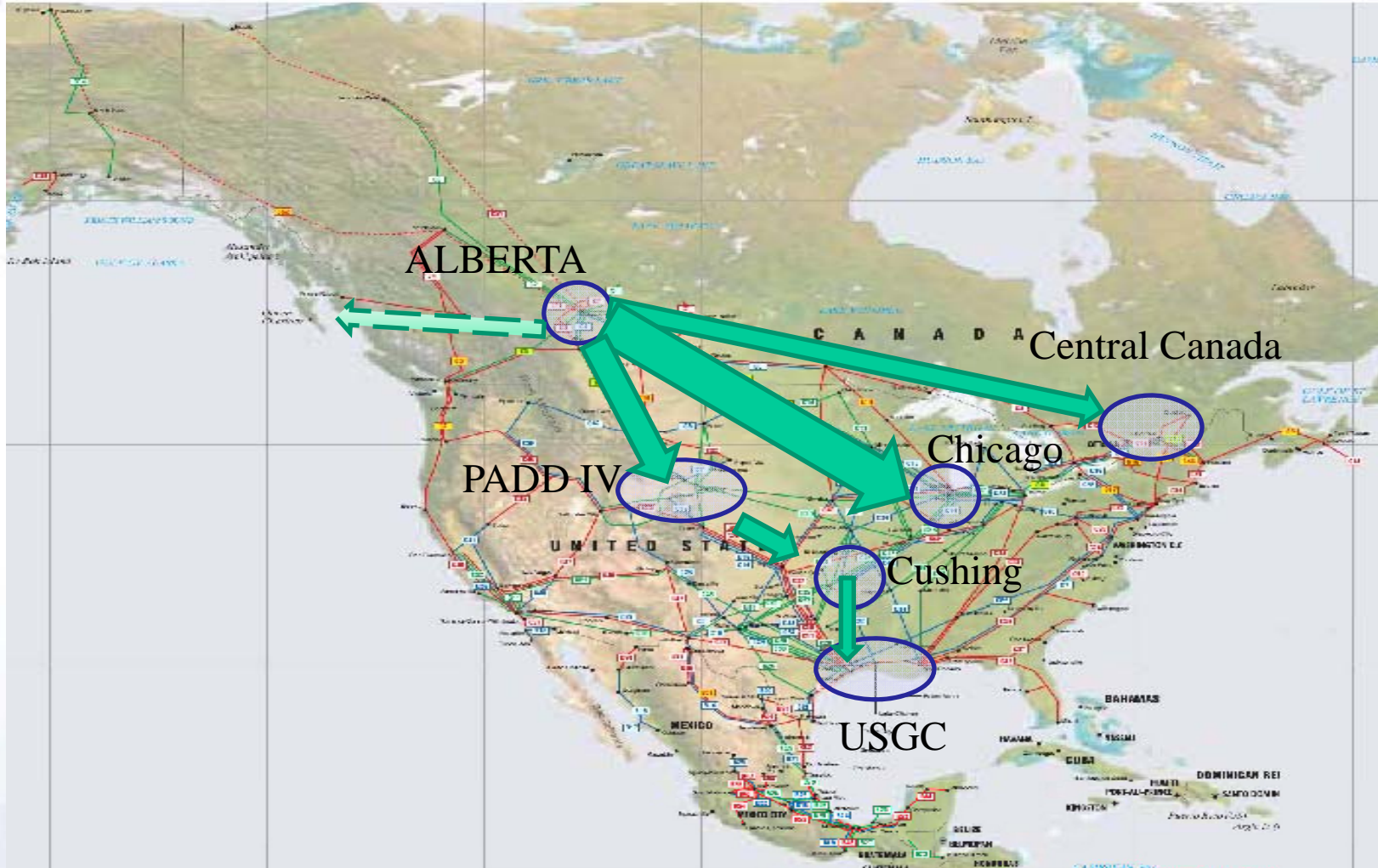




OIL SANDS MARKETS



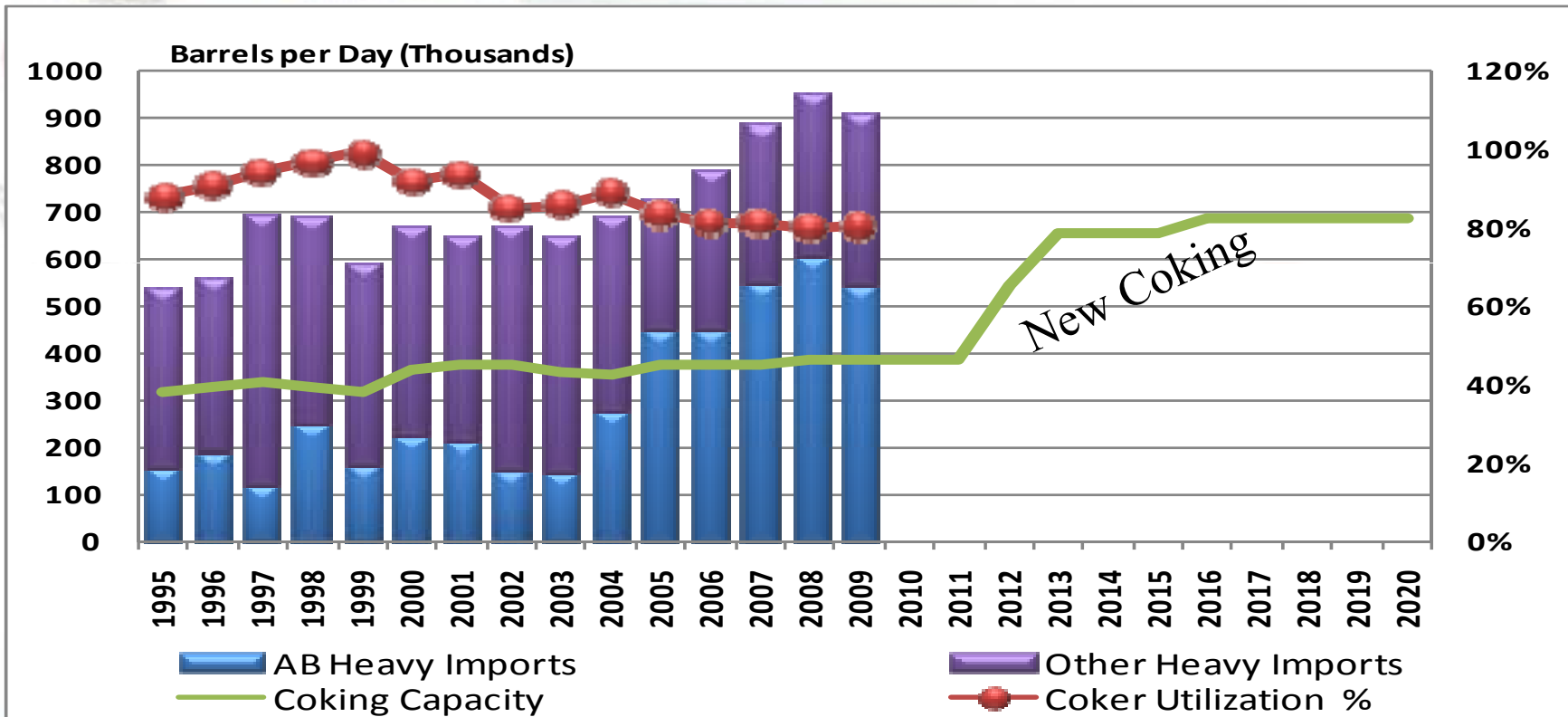
Oil Sands Markets



Barry Rodgers- Economics and Markets Branch
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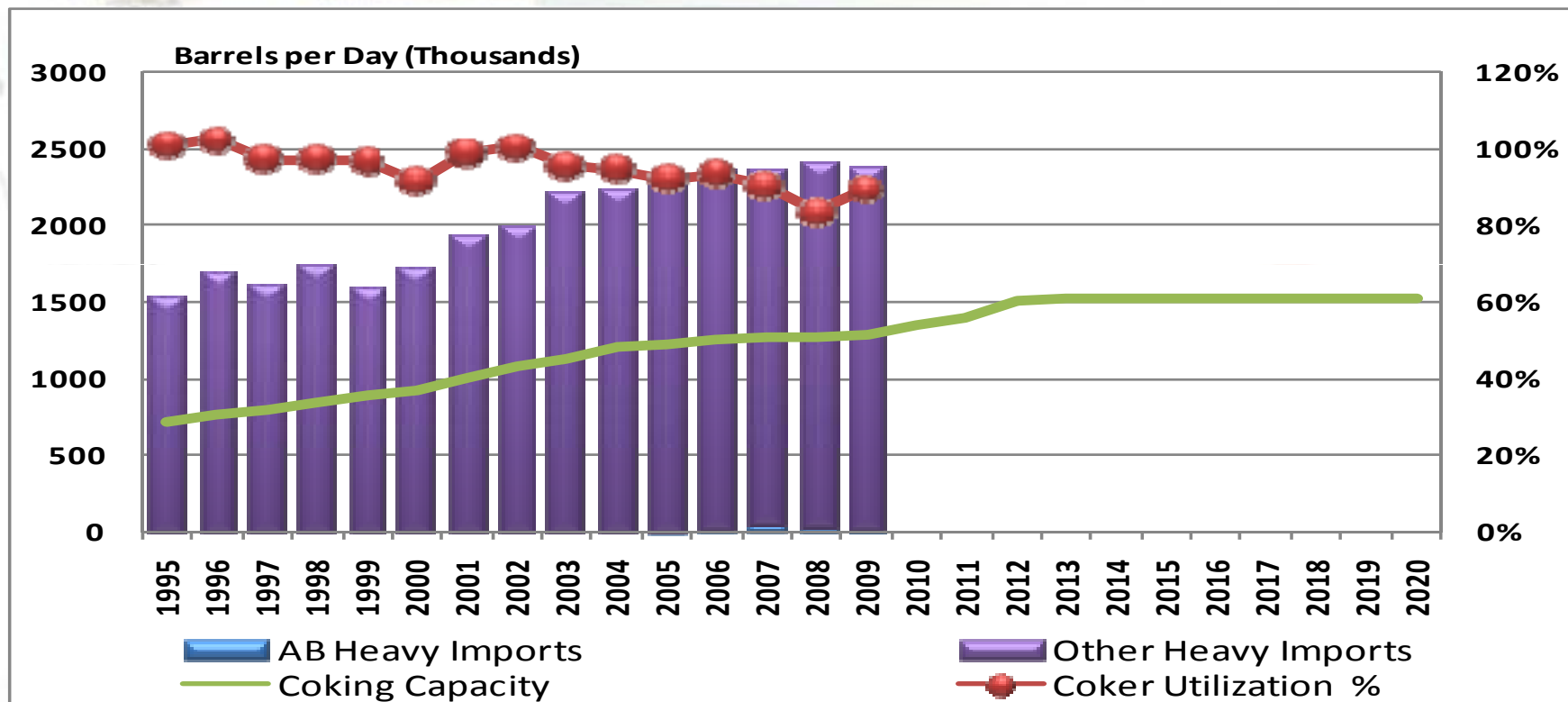
PADD 2 Market



- **PADD 2 = Largest Market. +400 kbpd by 2020**
- **Big Issue ... Longer Term Demand, Shifting Price Parity**



PADD 3 Market



- **PADD 3 = New Market**
- **1 M bpd by 2020 (400 kbpd + Venezuela & Mexico Declines)**
- **Big Issue ... Longer Term Demand**

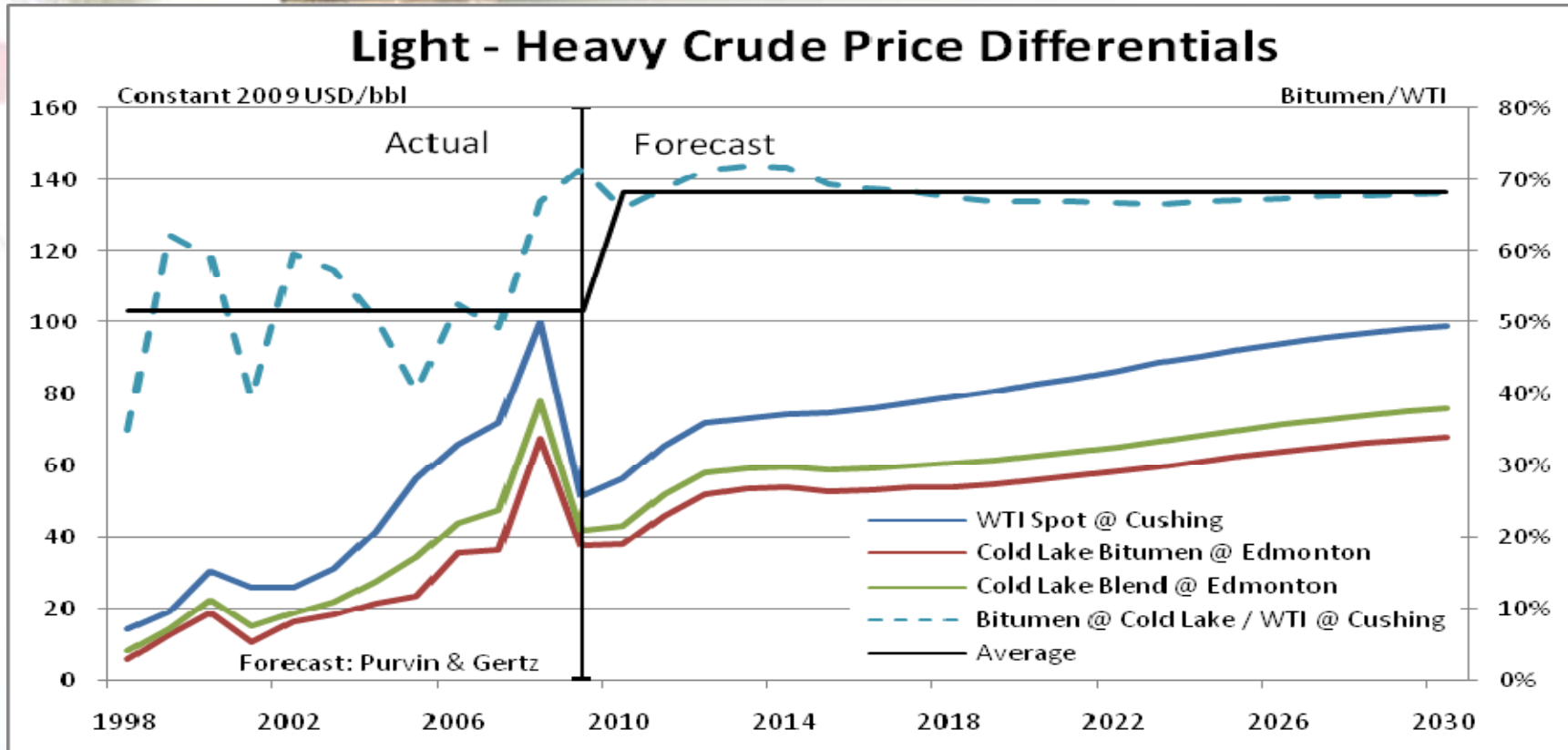




PROJECT ECONOMICS



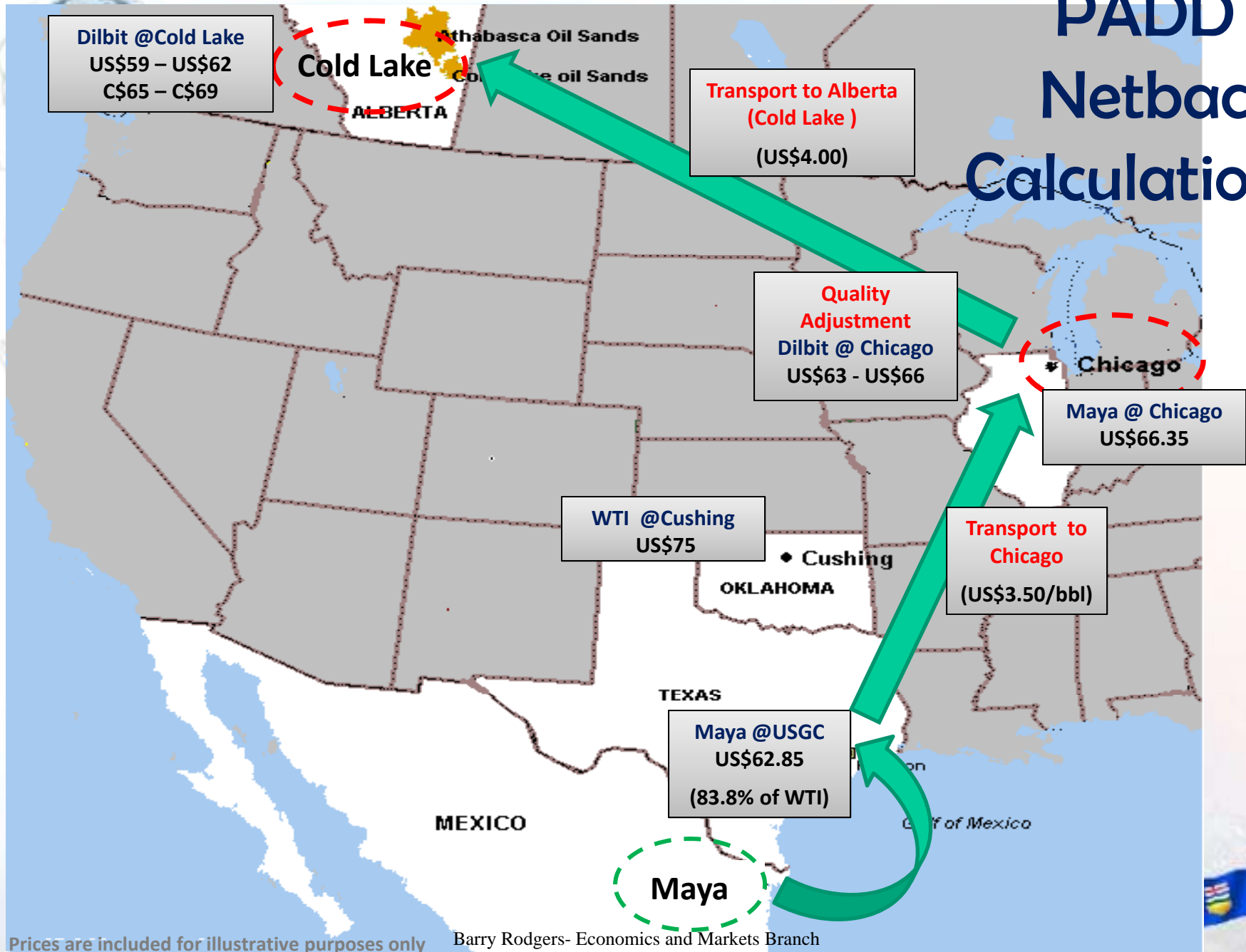
Light-Heavy Differentials



- **Strong Heavy Crude Prices-Narrow Differential**



PADD 2 Netback Calculation

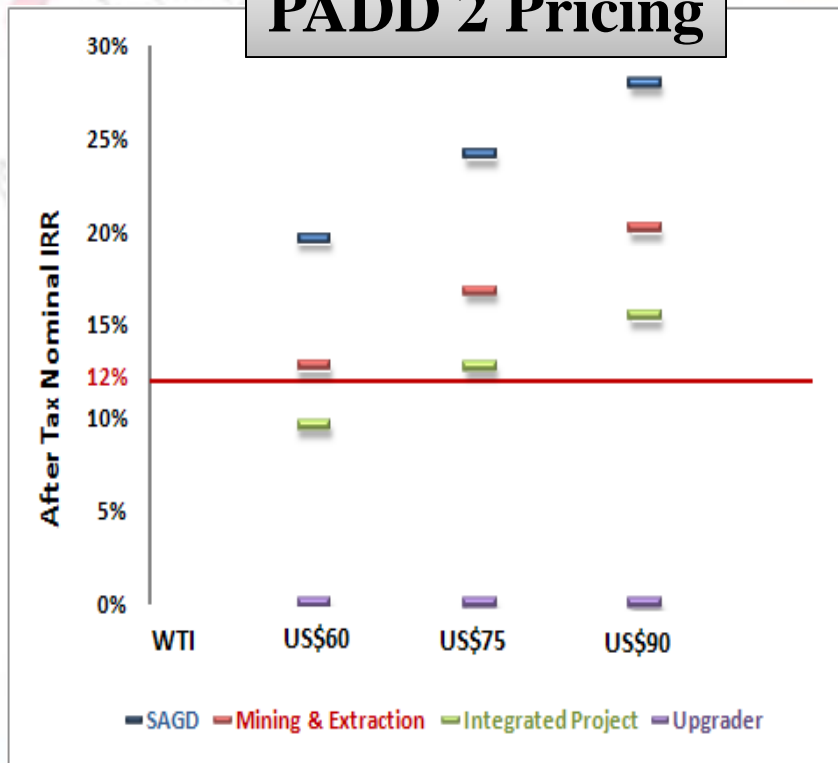


Prices are included for illustrative purposes only

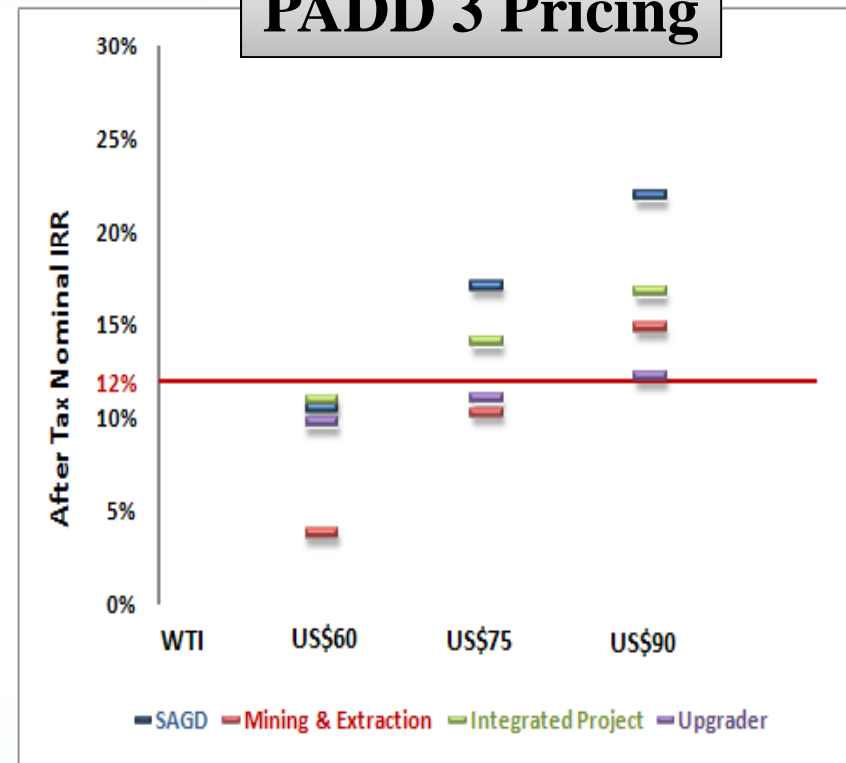
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Go-Forward Project IRRs

PADD 2 Pricing



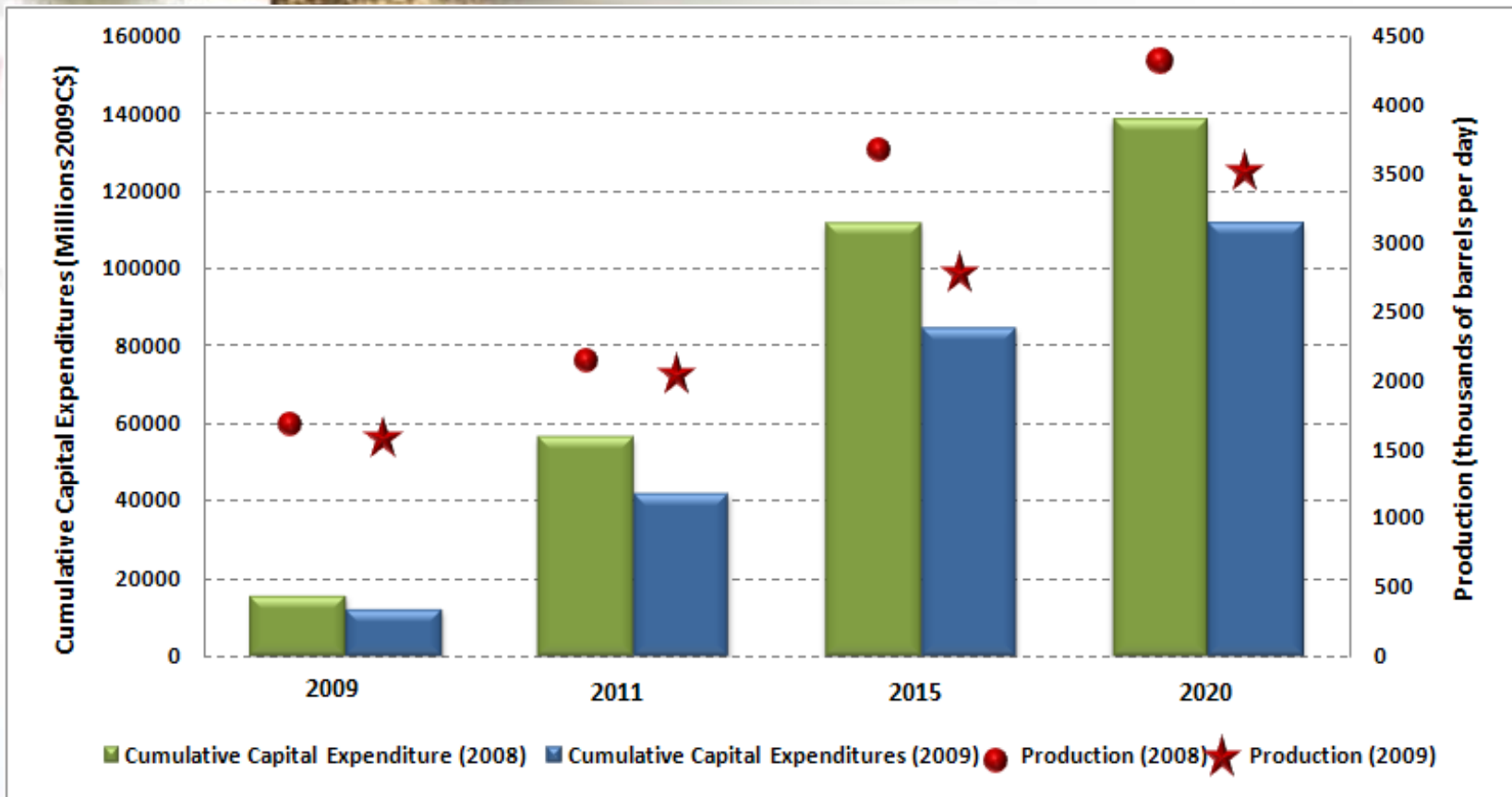
PADD 3 Pricing



- **Extraction Economics Strong but Upgrading Risk**
- **New Markets – Risk Mitigation & Future Growth**



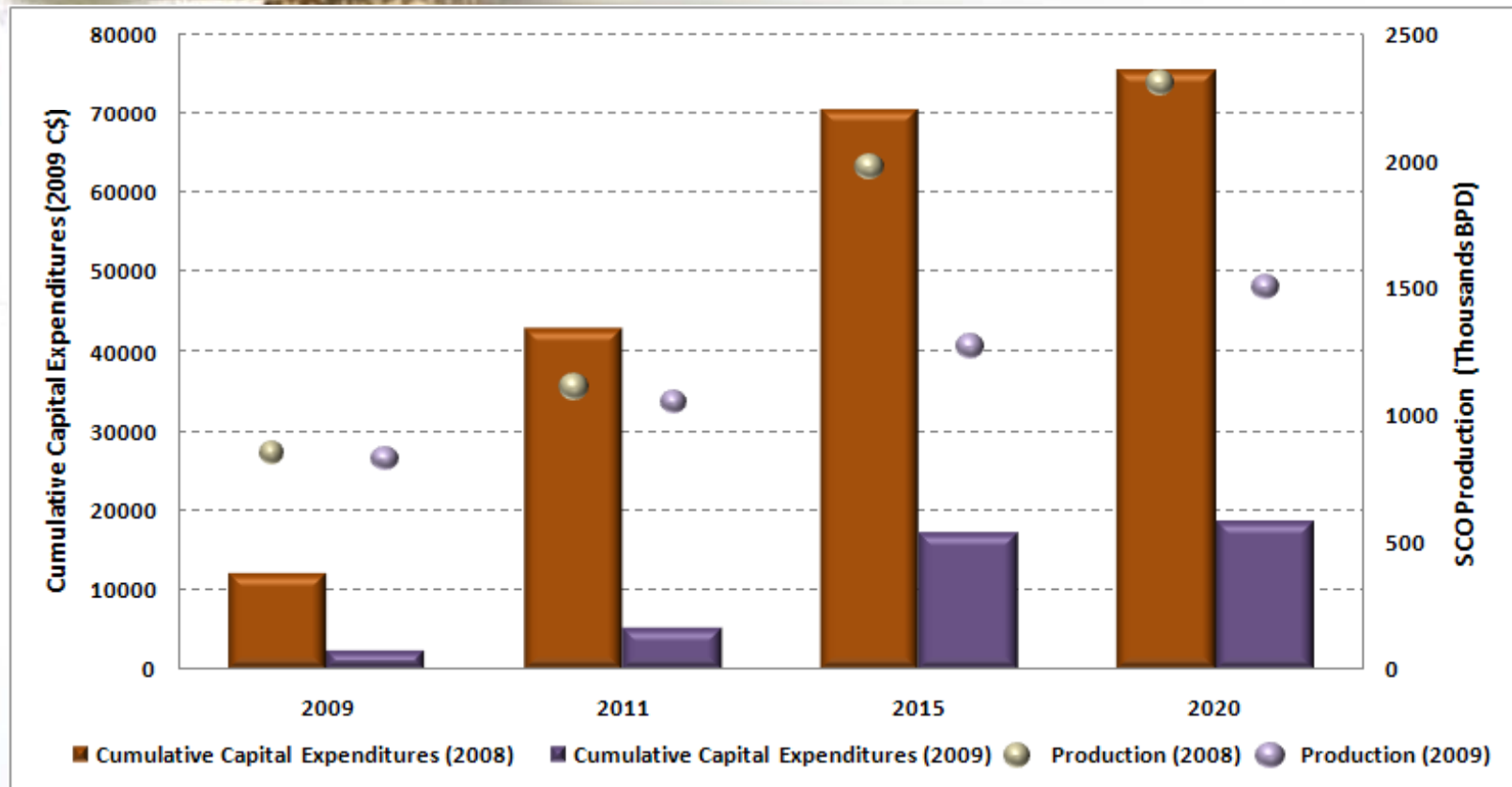
Oil Sands Extraction Investment



■ **Minor Reduction in Extraction Investment. Now Recovering**



Oil Sands Upgrading Investment



■ **Upgrader Investment Remains Weak**





Factors Affecting Upgrading

+ MARKET CONDITIONS

- WIDER L/H DIFFERENTIALS
- DILUENT SUPPLY CONCERNS
- HIGHER PRICE PREMIUM FOR SYNBIT

- MARKET CONDITIONS

- NARROW L/H DIFFERENTIALS
- HIGH CAPEX (GF VS BF)
- LONGER TERM US DEMAND
- INCREMENTAL U.S. COKING CAPACITY
- OFFSHORE COMPETITION



Summary

- Strong Heavy Oil Prices
- Strong Extraction Economics
- US Market Concerns
 - Long Term Demand
 - GHG
- Risk Mitigation & Future Growth
 - New Markets – Pacific Basin

