

SAGD Economics – Challenges and Opportunities

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SAGD Economics – Looking Forward

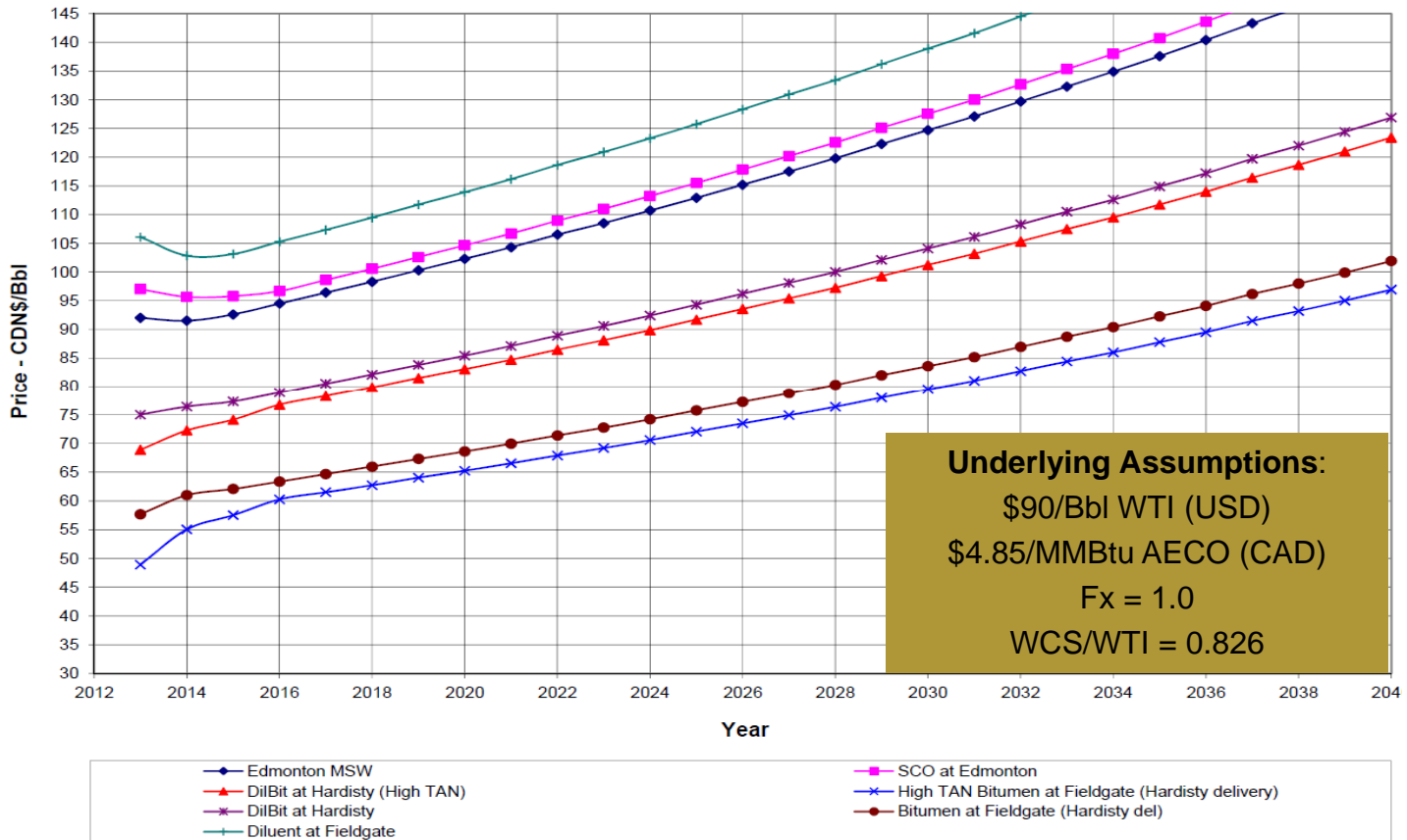
- ❑ **Current Economic Baseline**
 - ❑ Current Price Environment
 - ❑ Current Cost Structure
 - ❑ Current Baseline SAGD Economics

- ❑ **Economic Challenges and Opportunities**
 - ❑ SOR Estimation
 - ❑ Pricing Uncertainty
 - ❑ Cost Escalation
 - ❑ OPEX and CAPEX
 - ❑ Technology Improvements
 - ❑ Solvent SAGD
 - ❑ Infill Wells Plus Methane Co-Injection
 - ❑ Hybrid Cases

- ❑ **Summary**

Current Baseline – Pricing

McDaniel & Associates April 1, 2013 Price Projections for Bitumen using Historical Product and Transportation Offsets



Current Baseline – Cost Structure

❑ New Cost Reality

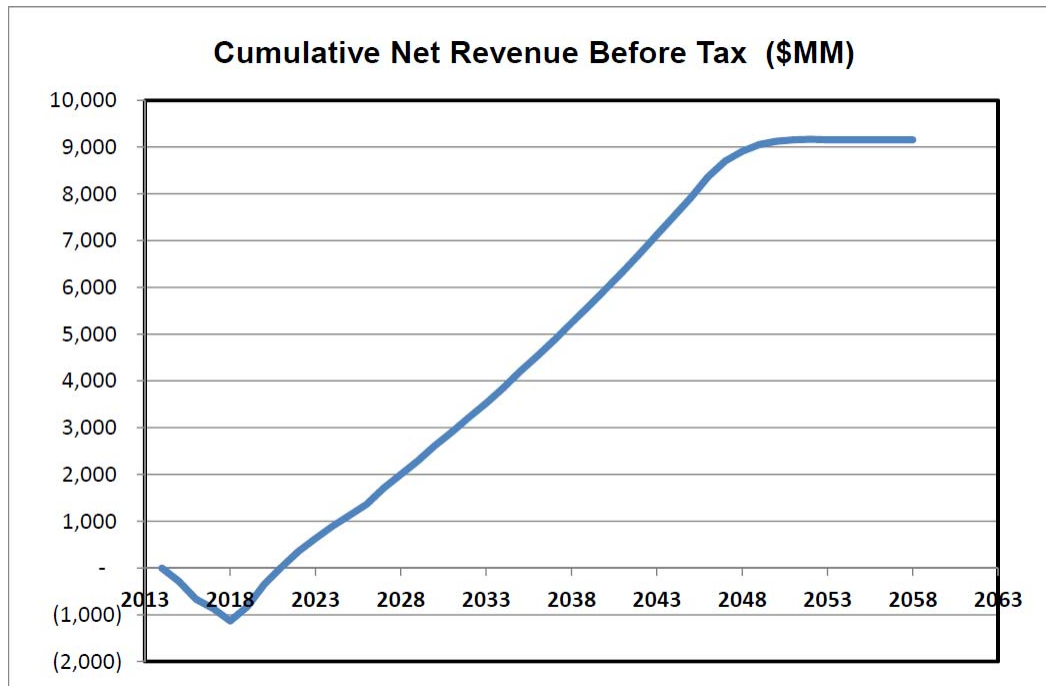
- ❑ Significant Cost Escalation over the last 7–8 years has resulted in materially higher build costs for new projects
 - ❑ Despite the cost escalation, economics generally improved due to increasing bitumen prices
- ❑ Capital cost relief post 2009 was short lived and generally did not live up to expectations
 - ❑ Capital costs proved to be “sticky”
 - ❑ Post 2009, the focus has been on standardized 20,000–30,000 bopd phases instead of mega projects
- ❑ Typical cost metrics being used by industry now appear insufficient and generally optimistic
 - ❑ \$35,000 per flowing BOE only achievable under ideal conditions
 - ❑ \$40,000 – \$50,000 per flowing BOE is more realistic for an “average” projects with an $SOR > 3.0$

Baseline Economics – Inputs

Development Assumptions	
Project Capacity	30,000 bopd
Production Start-Date	2017 (two year ramp-up)
Project Reserve Life Index (RLI)	30 years
Project Steam-Oil Ratio (SOR)	3.30
Recovery Factor	50%
Peak Well-Pair Productivity	650 bopd
Bitumen Quality	High TAN
Initial Capital Intensity	\$43,000/Flowing BOE (\$2013)
Non-Fuel Operating Costs	\$9.50/bbl (\$2013)

Baseline Economics – Output

Economic Output	
BTAX NPV10	\$1.15 billion
Unit Value	\$3.48/Bbl @ 10% BTAX
BTAX Rate of Return	21%



- ❑ Project Payout in 2021
- ❑ \$1.1 billion maximum negative cash flow
- ❑ Cost of Capital not included in value determination

Economic Challenges and Opportunities – Economic Sensitivities

Economic Sensitivities	
Operating SOR	4.0, 2.5
WTI Pricing	\$70/Bbl, \$110/Bbl (2013)
CAPEX Uncertainty	+/- 25%
OPEX Uncertainty	+/- 25%
Technology Upside – Solvent	20% SOR Reduction 20% Productivity Increase
Technology Upside – Infill Wells	10% SOR Reduction

- Hybrid cases including more than one element noted above have also been included

Economic Challenges and Opportunities – SOR Estimation

- ❑ Often the single biggest reason project economics do not match up with projected values
 - ❑ SORs have typically been underestimated, leading to lower production capacity and lower returns
 - ❑ More recently it appears companies are being more conservative in their SOR estimates, potentially leading to economic upside in the future

Economic Output	SOR = 4.0	SOR = 2.5
BTAX NPV10	\$782 million (-32%)	\$1.83 billion (+59%)
Unit Value	\$2.37/Bbl @10% BTAX	\$5.53/Bbl @10% BTAX
BTAX Rate of Return	17.7%	27.8%

Economic Challenges and Opportunities – WTI Pricing

- ❑ Pricing uncertainty, although reflected as changes to WTI, could also represent changes in differentials due to new export capacity or pipeline restrictions

Economic Output	WTI@ \$70/Bbl	WTI@ \$110/Bbl
BTAX NPV10	\$1.94 billion (+70%)	\$1.95 billion (+70%)
Unit Value	\$1.0/Bbl @ 10% BTAX	\$5.91/Bbl @10% BTAX
BTAX Rate of Return	13.6%	27.0%

- ❑ No CAPEX to WTI correlation has been included

Economic Challenges and Opportunities – CAPEX Uncertainty

- Historically, CAPEX has only increased over time
 - Future cost escalation above 2%/yr. is not unreasonable based on history
- A number of operators have moved to modular, non-unique facility designs, facilitating the expectation of reduced costs and/or lower cost inflation over time

Economic Output	Plus 25% CAPEX	Less 25% CAPEX
BTAX NPV10	\$852 million (-26%)	\$1.44 billion (+25%)
Unit Value	\$2.58/Bbl @10% BTAX	\$4.36/Bbl @10% BTAX
BTAX Rate of Return	16.9%	27.0%

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