
E&P Economics

Mike Reddin

President & CEO

Davis Petroleum Corporation

Houston Association of Professional Landmen
41st Annual Technical Workshop
April 29, 2010

Agenda

Oil & Gas Prices

Project Economics

- F&D Cost
- Net Present Value
- Payout
- Investor's Rate of Return

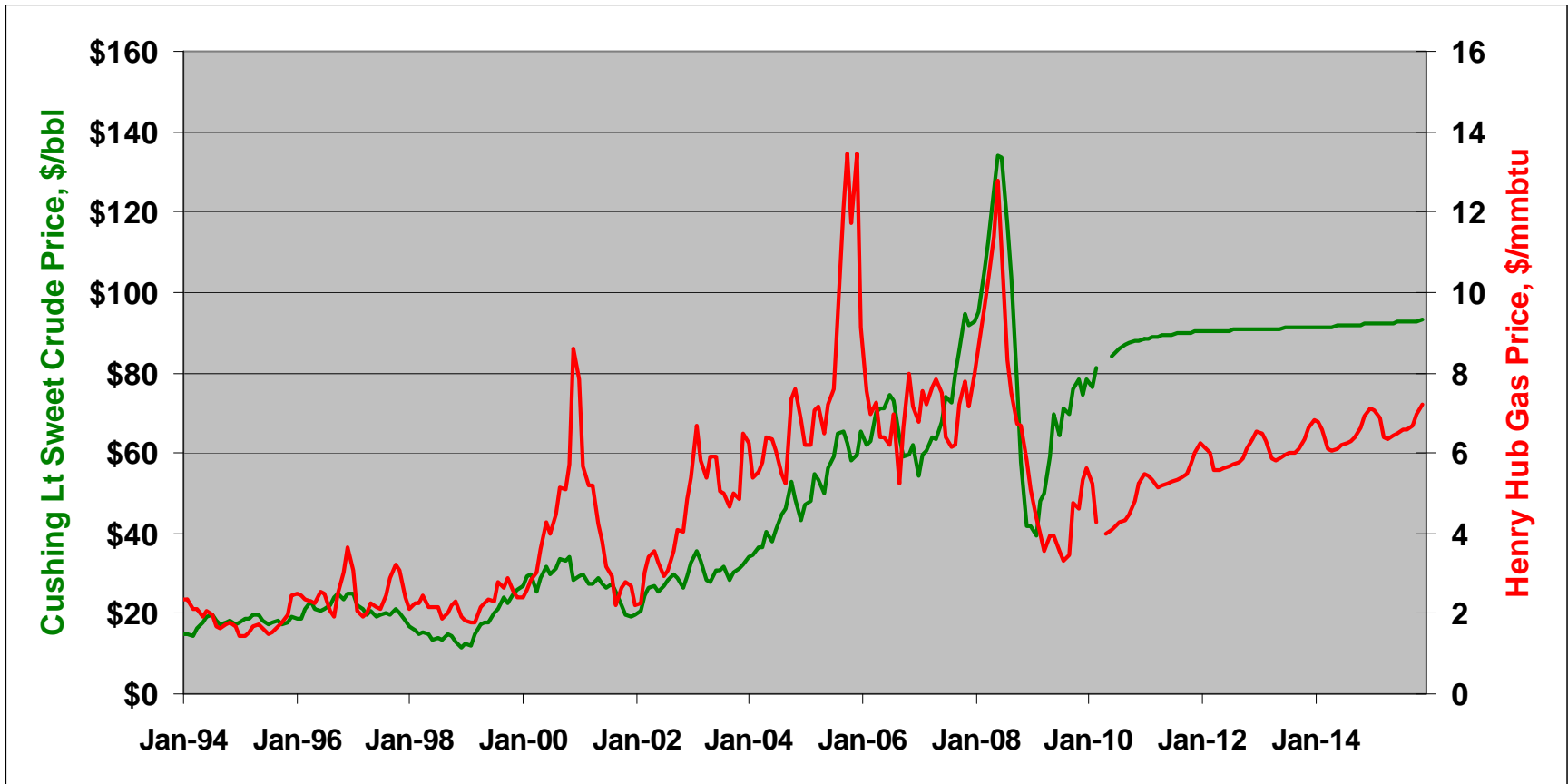
Corporate Economics

- Earnings Before Interest, Taxes, Depreciation, & Amortization
- Investor's Rate of Return
- Cash on Cash Multiple

Examples, Observations & Uses

- Sprinkled Throughout – and HAPL will tell you where to find the Excel spreadsheets

Nymex Oil & Gas Prices, 1994-2015



- One thousand cubic feet (mcf) of “average” dry gas contains one million btu’s of energy.
- One barrel of oil contains approximately 6x as much energy as 1 mcf of gas.
- However, oil sells for 10x the price of gas historically, and long-term futures are 15x.

Index (or Benchmark) Prices vs. Realizations

Oil Prices

- The primary U.S. benchmark crude is WTI, or West Texas Intermediate
- Also known as “light sweet” crude, it’s low-sulfur and 39.6 degrees API
- The benchmark price is for crude delivered to the major hub in Cushing, OK
- This is what you see reported as the Nymex price
- “Realization” is the price received for your crude (different location & quality)
- “Differential” is the difference between the Index and your Realization

Gas Prices

- The primary benchmark is gas with 1000 btu/mcf, delivered at Henry Hub, LA
- This is what you see reported as the Nymex price
- Your realization will differ due to location and btu content
- Gas closer to markets than Henry Hub (e.g., Marcellus) sells for a premium

Price & Tax Assumptions for Economics Shown in this Presentation

Assumed Flat Realizations:

4-21-10 Nymex Strip

<u>Year</u>	<u>Oil</u>	<u>Gas</u>
2011	89.42	5.42
2012	90.54	5.87
2013	91.07	6.16
2014	91.63	6.43
2015	92.53	6.73

5-yr Avg \$91.04 \$6.12

Differential (\$6.04) (\$0.12)

Realization \$85.00 \$6.00

Severance Taxes

- State of Texas assumed
- 4.6% of oil revenue
- 7.5% of gas revenue
- No special incentives

Ad Valorem Taxes

- Assumed included in Lease Operating Expense

Income Taxes

- Ignored

Discounted Cash Flow

- A dollar in hand today is worth more than one in hand next year.
- If you can earn a 10% interest rate (also called a “discount rate”), then:
 - \$1.00 invested today is \$1.10 next year.
 - Similarly, \$1.10 next year has a “Net Present Value” of \$1.00 this year.
 - Given a table of cash flows by year, one can calculate the “NPV-10”.
- If you make investments into a project for five years and then withdraw all the money, and the amount of money you have at the end is the same as what you would have earned in a bank account earning 10% compounded annually, then the Investors Rate of Return (IRR) of the project is 10%.
- This same concept can be applied at different discount rates (e.g., NPV-20).
- By definition, the NPV of a project using a discount rate equal to the IRR is zero.
- Excel can do all this for you – and correct for in-year “compounding”.

Sample Oil Well Economics

Inputs:

Working Interest, %:	100%	
Royalty, %:	25%	
Gross first-year (2012) oil rate, bopd:	50	
Gross first-year (2012) gas rate, mcf/d:	100	
Decline rate, % per yr:	25%	
Severance tax % (oil / gas):	4.6%	7.5%

Lease bonus (2010), \$/acre	2500
Spacing unit, acres	80
Well cost (2011 D&C), M\$	2000
Oil Realization, \$ / bbl	85
Gas Realization, \$ / mcf	6
Lease Operating Expense, M\$ / well / mo.	5

Cash Flow Table:

Year	Capital (M\$)	Gross Oil Prod (Mbbl)	Gross Gas Prod (MMcf)	Gross Revenue (M\$)	Net Revenue (M\$)	Lease Oper Exp. (M\$)	Severance Taxes (M\$)	Cash Flow (M\$)	Cumulative Cash Flow (M\$)
2010	200							-200	-200
2011	2,000							-2,000	-2,200
2012		18	37	1,770	1,328	60	66	1,202	-998
2013		14	27	1,328	996	60	49	886	-112
2014		10	21	996	747	60	37	650	538
2015		8	15	747	560	60	28	472	1,010
2016		6	12	560	420	60	21	339	1,350
2017		4	9	420	315	60	16	239	1,589
2018		3	6	315	236	60	12	165	1,754
2019		2	5	236	177	60	9	108	1,862
2020		2	4	177	133	60	7	66	1,928
2021		1	3	133	100	60	5	35	1,963
Sum	2200	69	138	6682	5012	600	249	1963	

F&D Cost Calc:

Net Capital, M\$:	2200
Net Reserves, MMcfe:	413
F&D Cost, \$/Mcf	\$5.32

Payout:

Calendar Year:	2014
Yrs After Lease:	4
Yrs After Drilling:	3

Disc. CF Metrics:

NPV-10, M\$	775
NPV-20, M\$	199
IRR, %	26%

Sample Dry Gas Well Economics

Inputs:

Working Interest, %:	100%	
Royalty, %:	25%	
Gross first-year (2012) oil rate, bopd:	0	
Gross first-year (2012) gas rate, mcf/d:	600	
Decline rate, % per yr:	25%	
Severance tax % (oil / gas):	4.6%	7.5%

Lease bonus (2010), \$/acre	2500
Spacing unit, acres	80
Well cost (2011 D&C), M\$	2000
Oil Realization, \$ / bbl	85
Gas Realization, \$ / mcf	6
Lease Operating Expense, M\$ / well / mo.	5

Cash Flow Table:

Year	Capital (M\$)	Gross Oil Prod (Mbbl)	Gross Gas Prod (MMcf)	Gross Revenue (M\$)	Net Revenue (M\$)	Lease Oper Exp. (M\$)	Severance Taxes (M\$)	Cash Flow (M\$)	Cumulative Cash Flow (M\$)
2010	200							-200	-200
2011	2,000							-2,000	-2,200
2012		0	219	1,314	986	60	74	852	-1,348
2013		0	164	986	739	60	55	624	-725
2014		0	123	739	554	60	42	453	-272
2015		0	92	554	416	60	31	325	53
2016		0	69	416	312	60	23	228	281
2017		0	52	312	234	60	18	156	437
2018		0	39	234	175	60	13	102	540
2019		0	29	175	132	60	10	62	601
2020		0	22	132	99	60	7	31	633
2021		0	16	99	74	60	6	8	641
Sum	2200	0	827	4960	3720	600	279	641	

F&D Cost Calc:

Net Capital, M\$:	2200
Net Reserves, MMcfe:	620
F&D Cost, \$/Mcf	\$3.55

Payout:

Calendar Year:	2014
Yrs After Lease:	5
Yrs After Drilling:	4

Disc. CF Metrics:

NPV-10, M\$	-34
NPV-20, M\$	-336
IRR, %	9%

Sample Haynesville Well Economics – *assume well fails after 10 yrs*

Inputs:

Working Interest, %:	100%	
Royalty, %:	25%	
Gross first-year (2012) oil rate, bopd:	0	
Gross first-year (2012) gas rate, mcf/d:	3564	
Decline rate = hyperbolic		
Severance tax % (oil / gas):	4.6%	7.5%

Lease bonus (2010), \$/acre	10000
Spacing unit, acres	80
Well cost (2011 D&C), M\$	8000
Oil Realization, \$ / bbl	85
Gas Realization, \$ / mcf	6
Lease Operating Expense, M\$ / well / mo.	5

Cash Flow Table:

Year	Capital (M\$)	Gross Oil Prod (Mbbbl)	Gross Gas Prod (MMcf)	Gross Revenue (M\$)	Net Revenue (M\$)	Lease Oper Exp. (M\$)	Severance Taxes (M\$)	Cash Flow (M\$)	Cumulative Cash Flow (M\$)
2010	800							-800	-800
2011	8,000							-8,000	-8,800
2012		0	1,301	7,806	5,855	60	439	5,355	-3,445
2013		0	611	3,666	2,750	60	206	2,483	-961
2014		0	454	2,724	2,043	60	153	1,830	868
2015		0	372	2,232	1,674	60	126	1,488	2,357
2016		0	321	1,926	1,445	60	108	1,276	3,633
2017		0	286	1,716	1,287	60	97	1,130	4,764
2018		0	260	1,560	1,170	60	88	1,022	5,786
2019		0	239	1,434	1,076	60	81	935	6,721
2020		0	222	1,332	999	60	75	864	7,585
2021		0	208	1,248	936	60	70	806	8,391
Sum	8800	0	4274	25644	19233	600	1442	8391	

F&D Cost Calc:

Net Capital, M\$:	8800
Net Reserves, MMcf:	3206
F&D Cost, \$/Mcf	\$2.75

Payout:

Calendar Year:	2014
Yrs After Lease:	4
Yrs After Drilling:	3

Disc. CF Metrics:

NPV-10, M\$	2893
NPV-20, M\$	483
IRR, %	23%

Corporate Economics – Drill 5 Oil Wells/Yr

Assumptions:

- Form the company with a \$25 million equity infusion; no debt
- Drill 5 oil wells per year for 5 yrs (with same assumptions as "Sample Oil Well")
- Sell the company in 2016 at 4x EBITDA + Cash

Cash Flow Table:

Year	Net Prod. (boe/d)	Net Revenue (M\$)	Lease Oper Exp. (M\$)	Sev. Taxes (M\$)	Over- head (M\$)	EBITDA (M\$)	Capital (M\$)	Cash in the Bank (M\$)	Enterprise Value at 4x EBITDA + Cash (M\$)	Investor Cash Flows (M\$)
2009	0							25,000	25,000	-25,000
2010	0				1,000	-1,000	1,000	23,000	19,000	0
2011	0				1,500	-1,500	11,000	10,500	4,500	0
2012	250	6,638	300	329	1,500	4,509	11,000	4,009	22,046	0
2013	438	11,617	600	576	1,500	8,941	11,000	1,950	37,715	0
2014	578	15,351	900	761	1,500	12,190	11,000	3,141	51,901	0
2015	684	18,152	1,200	900	1,500	14,552	10,000	7,692	65,900	0
2016	763	20,252	1,500	1,004	1,500	16,248	0	23,941	88,933	88,933

Investor Metrics:

Investors Rate of Return	20%
Cash-on-Cash Multiple	3.6x

Conclusion

- With a little practice, you can easily learn to use simple economics to evaluate negotiating alternatives and support decisions.
- Your engineers and financial analysts will likely be happy to work with you.
- Excel is a powerful tool for doing quick analysis.
- Spreadsheets will be posted on the HAPL website, but the samples here are pretty simplistic.