

# **Valuing Oil & Gas Reserves**

## **Impact & History of Oil & Gas Prices (Part II)**

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# Summary

## Valuing Oil & Gas Reserves // Part I

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More resources, more production, lower prices

- Commodity price impacts reserve value.
- The supply of natural gas has increased significantly in North America in the last 20 years.
- Additionally, the supply of oil has also increased, impacting global oil prices.
- Unlocking minerals with technology from shale formations has caused this dramatic increase in production.
- More production impacts pricing of both natural gas and oil. Both natural gas and oil have seen prices decline since their 2008 peak prices.
- Cost of drilling wells varies by basin and strategy. The Bakken, for example, has seen the average well length increase approximately 50% from 2008 - 2013 and the depth has increased 20%.
- The production boom has created a natural gas surplus in North America where it is currently cheaper to buy natural gas than to produce it.
- As a result of these changes over the last 20 years, the valuation of oil and gas reserves can be tricky.

# Effect on Deal Prices

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Valuations are tricky

## What has this meant to deal prices?

In all but a few key basins, like the Permian, the price of gas reserves has plummeted. In 2015, a client bought gas-only assets in the Marcellus at an auction for \$20M cash. The same assets were purchased by a knowledgeable player two years earlier for about \$55M.

We did an allocation of the purchase price and had to figure out the value of the parts without the help of usable comps.

Components include: three drilled but uncompleted wells, a pipeline gathering system, and rights to about 20,000 acres. Typically, the undrilled acreage with little or no production history in the area can be valued one of two ways:

1. DCF with a haircut from the value level of proved producing acreage. As we will discuss, these haircuts can be as high as 100% in today's market.
2. Transaction prices for purchases of similar acreage.

The big problem was that none of the transactions were recent as they were two or so years old and the market had cratered since then as exhibited by the purchase for about 1/3 of earlier prices.

## So how to value the assets?

We identified with the client that it would take a net \$4.00/mcf received to make the \$4M/well drilling costs economic. We projected the net price they would likely receive based on NYMEX projected futures. The surprising result for me was that it was projected to nine years.

Based on the WACC, we discounted the current transactions for the PV and the WACC for nine years and came up with \$530/acre – previous transactions were over \$2,000/acre. We added the other parts and the estimated values fit.

# The Basics of How to Value Oil & Gas Reserves

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## Part 1: The components

### **Reserve Reports**

Start with a quality analysis completed by an experienced, geophysical company knowledgeable in the area.

The level of the engineer's experience in the area allows them to make the key judgments that drive value:

1. Amount of remaining oil in the owned or leased acreage
2. Volume of produced oil and gas during each part of the projected decline curve
3. Total recoverable oil or gas reserves
4. Allocation to the various categories of reserves (Proved, Probable, Possible)
5. Cost to extract minerals and taxes on it based on location (provided by the drilling company)

# The Basics of How to Value Oil & Gas Reserves

## Part 2: Appraiser assumptions

1. **Reserve Engineering** - They don't estimate the future prices for the oil or gas; that is the responsibility of the valuation analyst, as is the discount rate or haircut for the unproven reserves.
2. **PUDs** - Proven reserves but yet to be drilled.
3. **Unproven Reserves: Probables and Possibles** - These are the highly risky drilling opportunities as categorized by the reserve engineer.

Sample of Value by Category		
<b>Oil</b>		
<b>Proven</b>	<b>GOD<sup>1</sup></b>	<b>Today<sup>2,3</sup></b>
Producing	100%	100%
Undeveloped	75%	25 - 50%
<b>Unproven</b>		
Probables	20%	5 - 10%
Possibles	10%	0
<b>Gas</b>		
<b>Proven</b>	<b>GOD</b>	<b>Today</b>
Producing	100%	100%
Undeveloped	75%	0 - 25%
<b>Unproven</b>		
Probables	20%	0 - 5%
Possibles	10%	0

1) Good Old Days

2) All but Permian

3) Note in some high cost markets PUDs can be lower

# Reserve Reports

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## Reserve reports need market adjustments

Publicly traded companies are required to file a standardized reserve report, discounting the projected output using a fixed nonmarket methodology.

The basics are:

- The forecasted output and associated drilling and production expenses are priced at 1) the current spot price for the commodities or an average of the last 12 months, and 2) discounted at a mandated 10% rate for all categories of reserves.
- Note this is not a market criteria. The market discount rate could be anywhere from 8% to 100% depending on the risk of the reserve category PDP, PUDs, Probables or Possibles.
- The price for the commodity in a market valuation would reflect anticipated future market prices. Usually, NYMEX futures are applied.

Depending on the selected market factors, the market value of the reserves could be much higher or much lower than the PV10 calculation.

# Importance of Leasing Rights

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Reserve reports need market adjustments

We tend to generalize oil & gas lease rights but they can vary.

In the “good ole days,” the big oil companies negotiated terms very favorable to them vs. the mineral rights owners. For example, one producing well with two barrels a day production may hold 500 acres without any drilling obligation from the current operator.

Today, savvy mineral rights holders negotiate new drilling requirements (i.e., the number of wells required to be drilled and restricting rights to various depths, etc.).

The valuation analyst needs to document the nature of the mineral rights owned to properly evaluate the reserves.

# Summary

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## Reserve reports need market adjustments

What a ride – from a high of near \$150/barrel in 2008 to a low of \$26/barrel in 2015-2016.

The current price is edging up, and in early January, West Texas Crude was \$64.30/barrel. Brent prices were slightly higher at nearly \$70.00/barrel.

**What is the outlook?** Actually, a lot more optimistic than in past years – some say \$80.00/barrel by year end.

### **Why? Supply and demand.**

Some forecasters predict that the shale boom cannot keep up with demand, creating upward pressure on prices...(we will see). One analyst says, “U.S. crude supplies have fallen eight weeks in a row for a total drop of more than 39M barrels. That marks the ‘biggest drop in history in the shortest period of time. A sure sign that the US oil market is in deficit versus demand.’”

International Energy Agency estimated average 2017 global oil demand at 97.8M barrels a day, up 1.6% from 2016 and that matched global oil supply, which was down 1.1 million barrels per day from last year.

Therefore, the experts predict increasing prices in 2018. Of course, with higher prices more oil infrastructure by many areas – stay tuned to the outcome.



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