

# Marcellus Shale Well Costs and Production

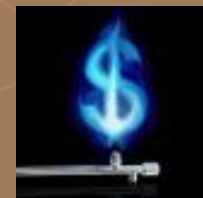
UMRA Watersheds Group Meeting  
December 3, 2010  
Morgantown, WV

Katharine Lee Avary  
Petroleum Geologist  
Morgantown, WV  
avarygeo@gmail.com

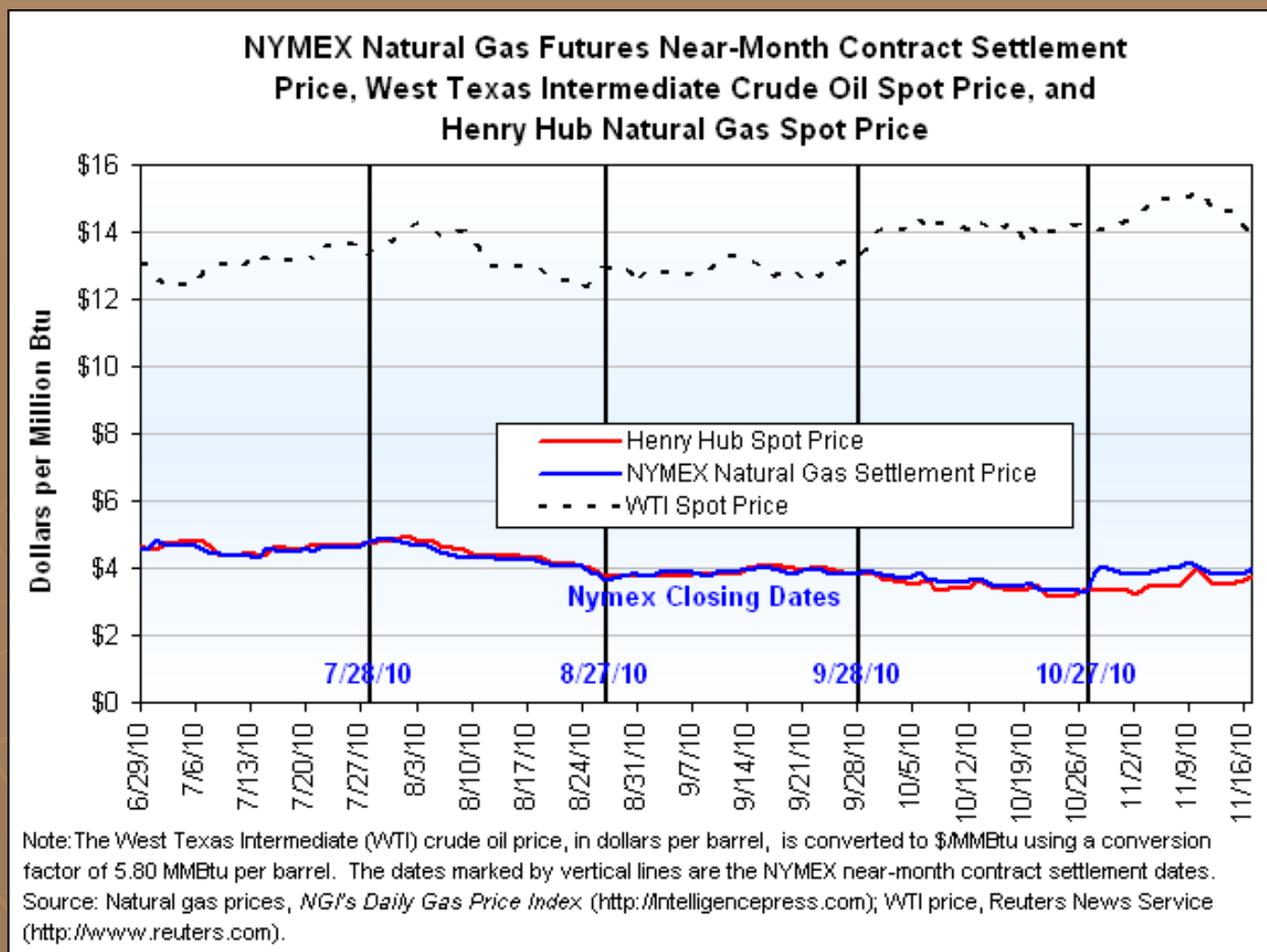
# Units



- ▶ Mcf= One thousand cubic feet
- ▶ MMcf=One million cubic feet
- ▶ Bcf=One billion cubic feet
  
- ▶ What do these mean to you? I use 1-2 Mcf/month in the summer for cooking and water heating and 25-30 Mcf/month during the winter heating season.



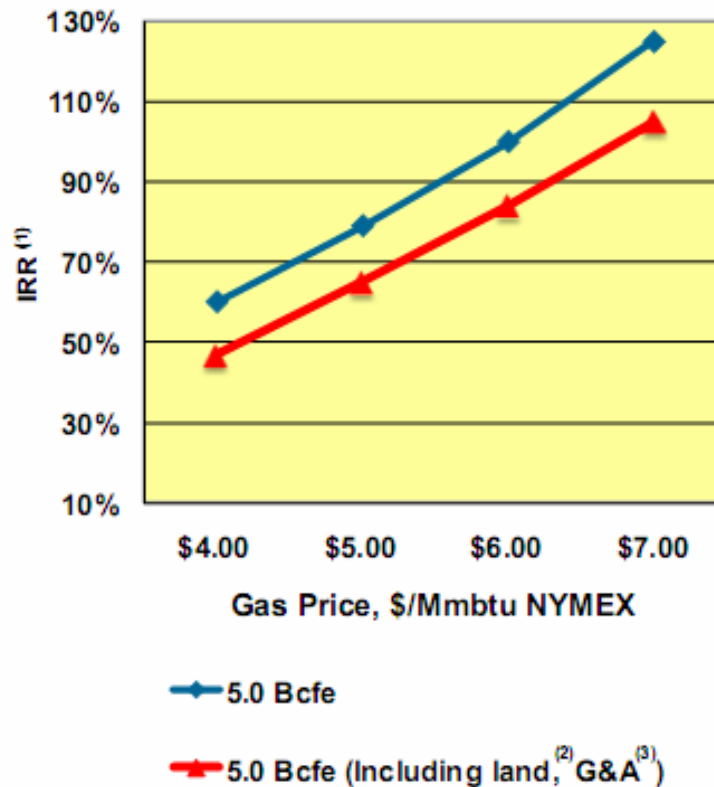
# Natural Gas Prices



## ➔ Marcellus Economics – Fully Loaded

- Southwestern PA – (wet gas case)
- EUR – 5.0 Bcfe (Based on 95 wells in SW PA)
- Drill and Complete Capital \$4.0MM
- F&D – \$ 0.94/mcfe – (5.0 Bcfe)  
– \$ 0.96/mcfe – (5.0 Bcfe incl. land)

Gas Price	5.0 Bcfe	5.0 Bcfe Fully Loaded
\$4.00 -	60%	47%
\$5.00 -	79%	65%
\$6.00 -	100%	
\$7.00 -	125%	105%



- (1) Includes gathering, pipeline and processing costs  
 (2) Land = assumes 80 acre spacing at \$1,000 per acre (Company's historic cost)  
 (3) G&A = \$0.55 per mcfe (current corporate rate)  
 (4) Oil price assumed to be \$60.00/bbl in all scenarios






# Wet Gas Provides Excellent Economics

**\$5.00 NYMEX equates to \$7.28 per mcf price**

\$5.00 NYMEX Henry Hub  
\$75.00 NYMEX WTI  
Based on 9/09 Gas Quality <sup>(1)</sup>  
Assumes Cryogenic Only

Wellhead Production  
1 mcf of Natural Gas

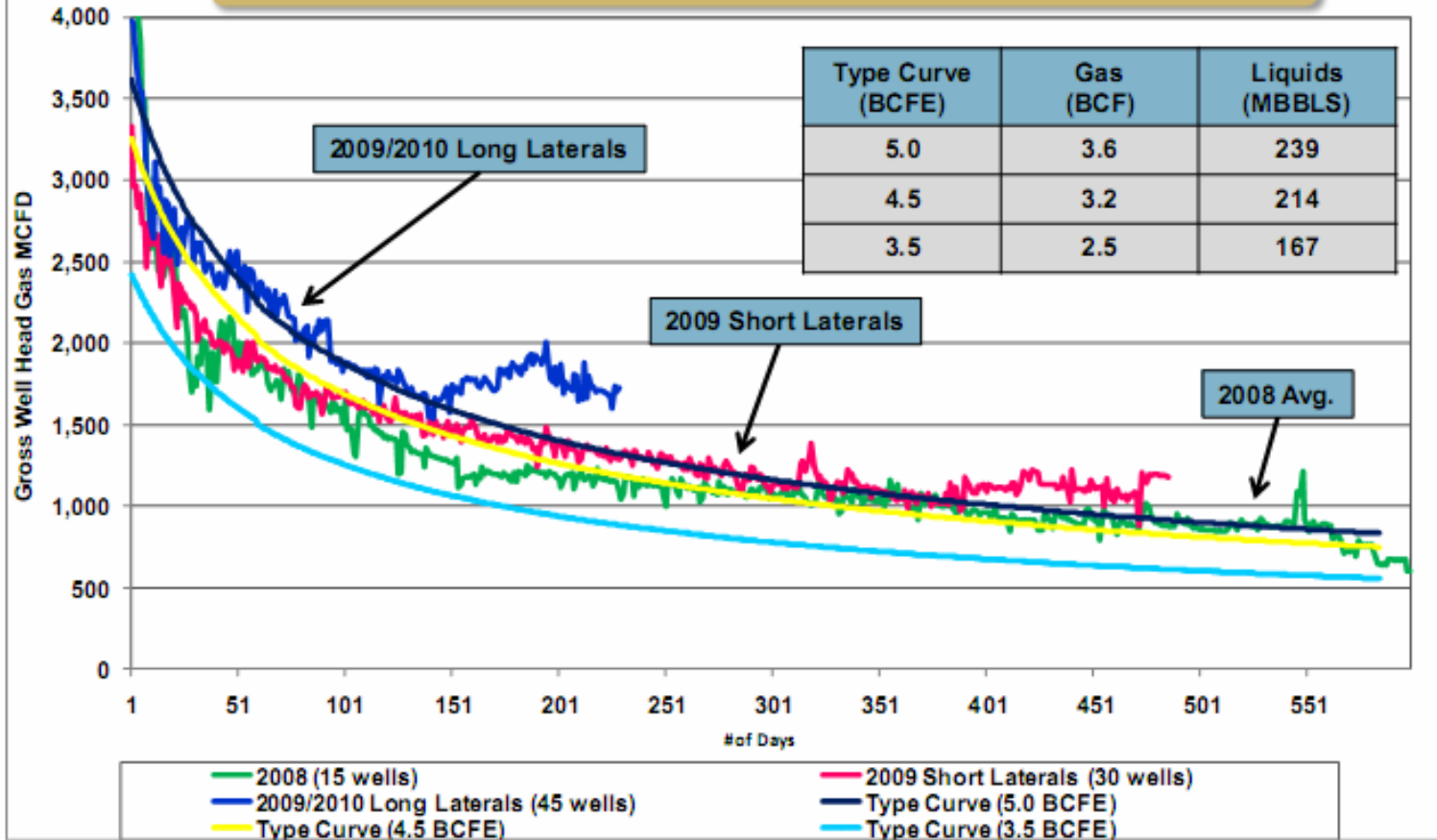
	Natural Gas & Ethanes	NGLs	Condensate
Production by product	.900 mcf	2,450 gallons/mcf	.013 bbls/mcf
			
Gross realized by product	\$4.96 net	\$1.62 net <sup>(2)</sup>	\$0.69 net
		<b>\$7.28 per mcf</b>	
Gathering, transportation and operating expenses		\$0.75 to \$1.75	Will decline over time as volumes increase

<sup>(1)</sup> Realization will change as gas quality changes

<sup>(2)</sup> Uses 3 years correlation factor of oil to NGLs of 56.27% and net realized price of \$34.47 after deductions

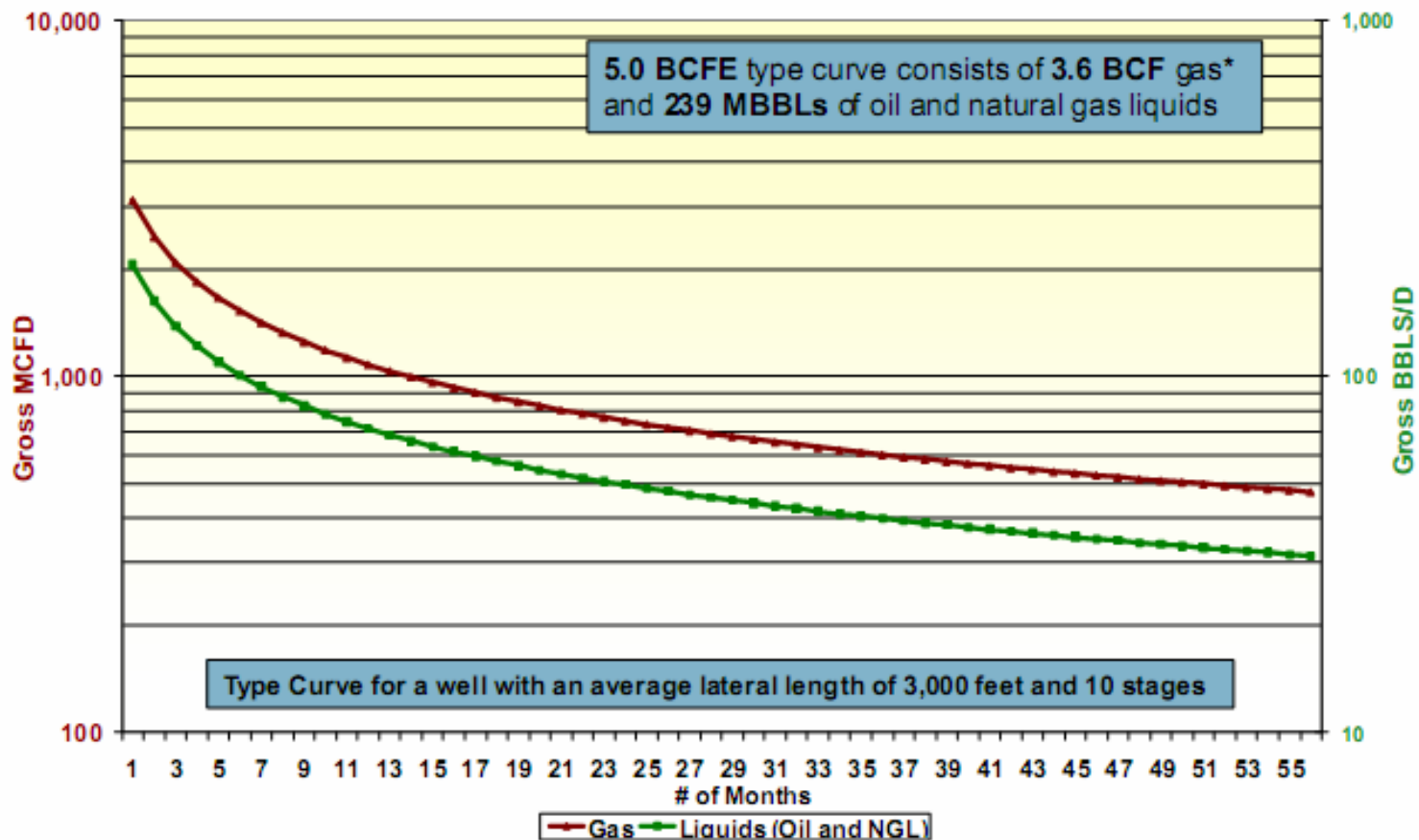
# Well Performance Continues to Improve

Marcellus Zero Time Plot of Gas Only by Well Type – As of June 30, 2010





# Premium Gas Price Plus 28% Liquids

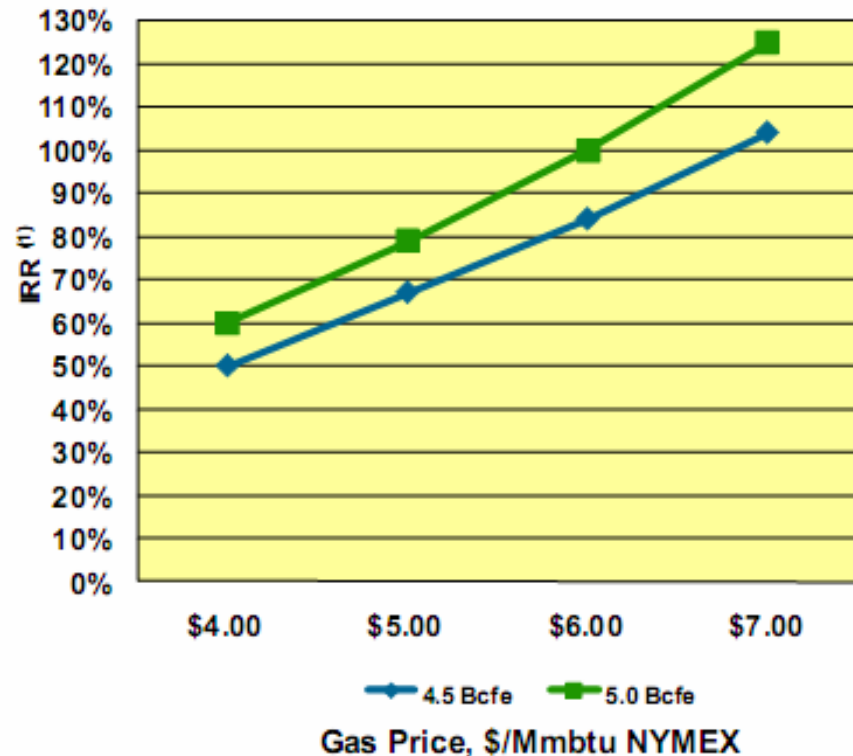


\*Ethanes left in gas stream and blended into pipeline.

## Marcellus Shale Well Economics – Wet Gas Case

- Southwestern Pennsylvania – (wet gas case)
- EUR – 4.5 Bcfe and 5.0 Bcfe
- Capital \$4.0MM
- F&D – \$1.05/mcfe – (4.5 Bcfe)  
– \$0.94/mcfe – (5.0 Bcfe)
- NYMEX Price/Rate of return

	4.5 Bcfe	5.0 Bcfe
\$4.00 -	50%	60%
\$5.00 -	67%	79%
\$6.00 -	84%	100%
\$7.00 -	104%	125%



(1) Includes gathering, pipeline and processing costs  
 (2) Assumes \$60.00 NYMEX oil price





## Marcellus Well Costs

Based upon ~3,000 foot lateral, 10 stage frac and 6 well pad

Site Preparation <sup>(1)</sup>	\$ 270,000
Drilling	1,300,000
Tubulars	330,000
Facilities	250,000
Completion Operations <sup>(2)</sup>	<u>1,850,000</u>
	<u>\$ 4,000,000</u>

(1) Site preparations (permits, location, construction, reclamation, frac pit)

(2) Completion Operations (Frac operations & water management)





## Range Marcellus Shale Fracs

### Bigger Jobs and Lower Costs – Better Well Results

	Proppant, lbs.	Water, gallons	Stages	Lateral Length, ft
2006	923,000	2,225,000	3	1,794'
2007	2,765,000	2,646,000	7	2,198'
2008	3,418,000	3,127,000	8	2,495'
2009 (Short)	3,241,000	3,227,000	8	2,514'
2009 & 2010 (Long)	5,154,000	3,887,000	10	3,038'

Experimenting With Longer Laterals (2,900' to 5,000') and More Stages (9-17)

Recycling Almost All Of Our Water – Better Environmental Results

## Marcellus Play

**EQT**

~500,000 EQT acres

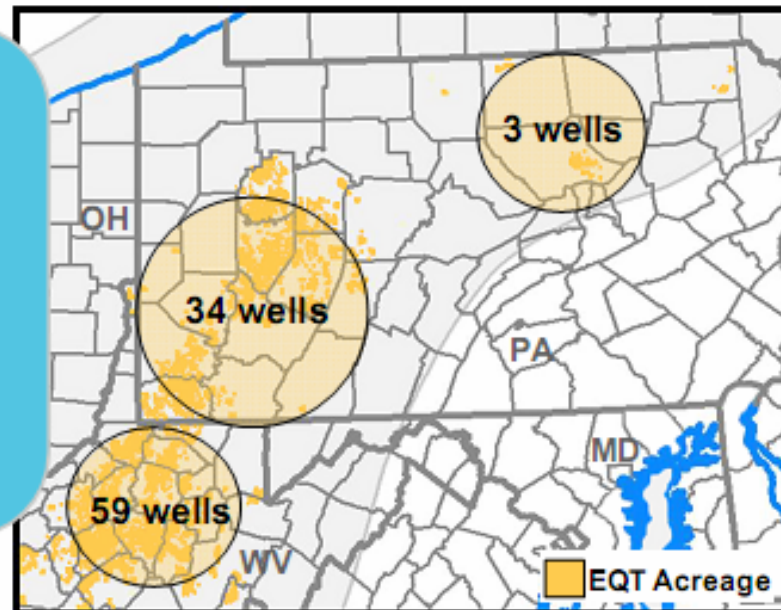
4.0 Tcfe 3P

13.5 Tcfe resource potential

\$3.8 – \$4.2 MM / well

5 – 6 Bcfe EUR / well

96 wells in 2010



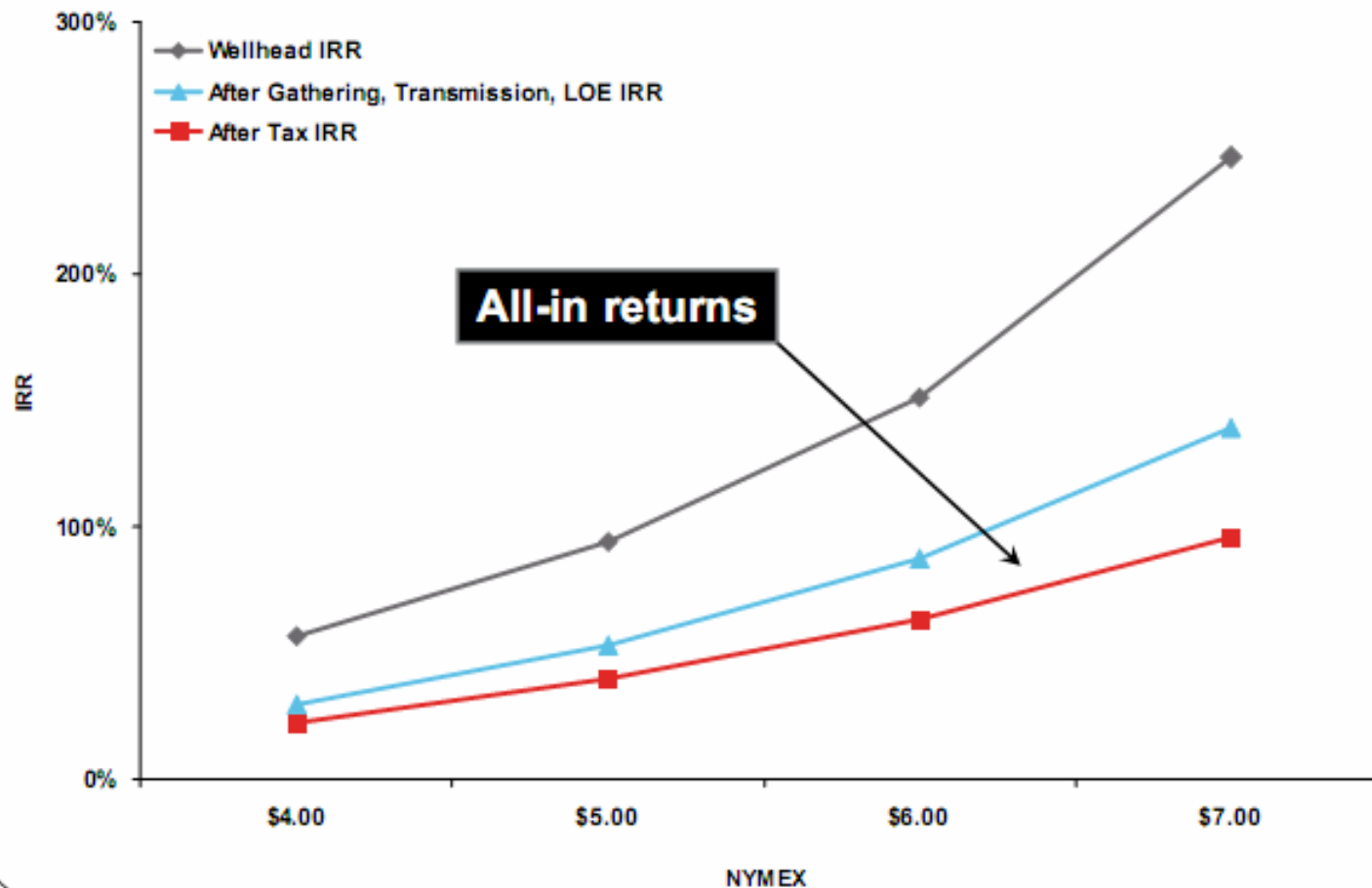
▶ Development costs of \$0.73 / Mcfe

[www.eqt.com](http://www.eqt.com)

6

# Marcellus Economics

40% ATAX Return at \$5.00 NYMEX



www.eqt.com

## Price Reconciliation



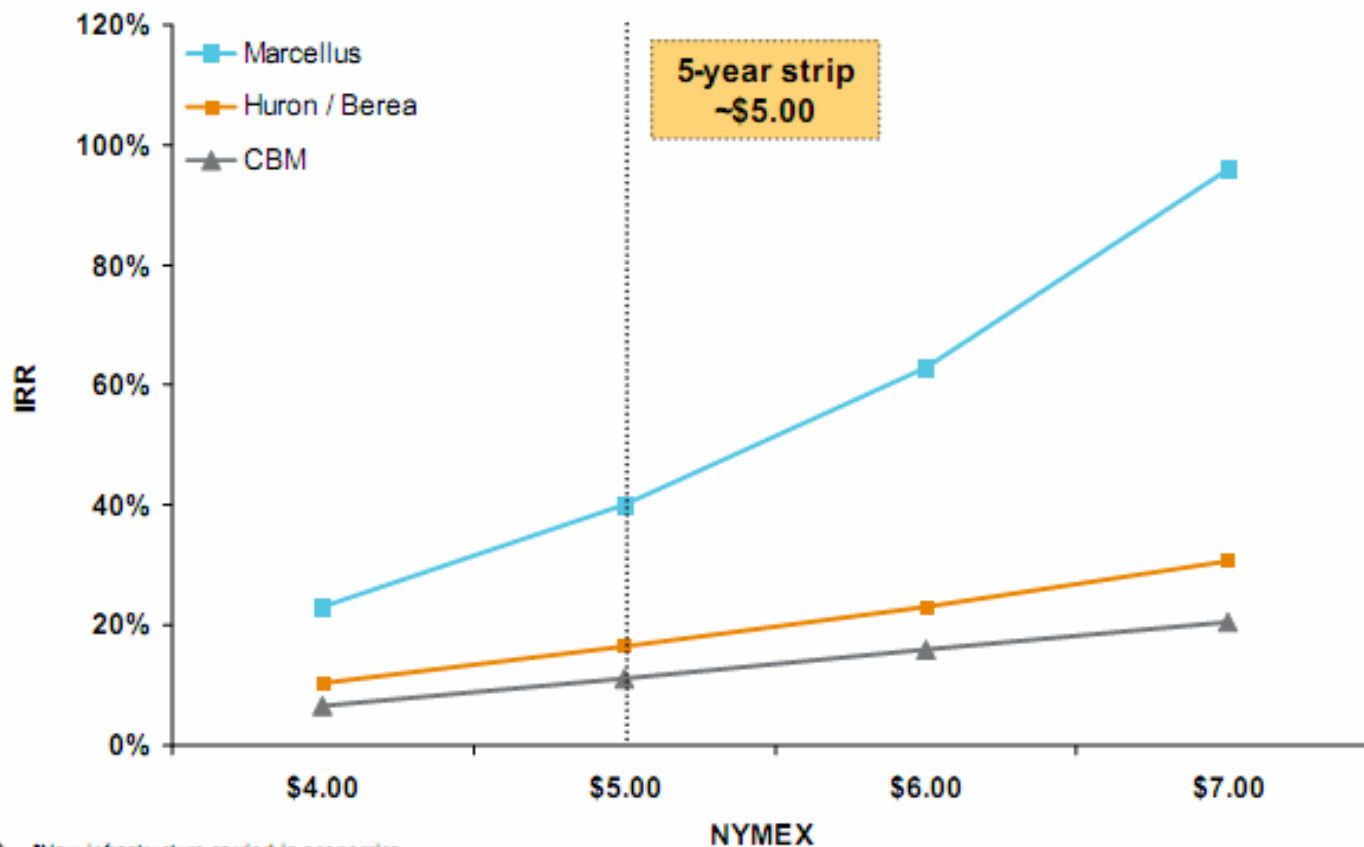
	Three Months Ended September 30,		Nine Months Ended September 30,	
	2010	2009	2010	2009
Average NYMEX price (\$ / MMBtu)	\$ 4.38	\$ 3.39	\$ 4.59	\$ 3.93
Average Btu premium	0.42	0.37	0.43	0.37
Average NYMEX price (\$ / Mcfe)	4.80	3.76	5.02	4.30
Average net liquids revenue	0.66	0.56	0.71	0.41
Average basis	0.05	-	0.14	0.07
Hedge impact	0.53	1.81	0.44	1.38
Average hedge adjusted price (\$ / Mcfe)	6.04	6.13	6.31	6.16
Gathering, processing and transportation revenues to EQT Midstream (\$ / Mcfe)	\$ (1.72)	\$ (1.68)	\$ (1.72)	\$ (1.69)
Average net liquids revenues to EQT Midstream (\$ / Mcfe)	(0.59)	(0.50)	(0.65)	(0.37)
Third party gathering, processing and transportation (\$ / Mcfe)	(0.41)	(0.40)	(0.41)	(0.34)
Total revenue deductions (\$ / Mcfe)	(2.72)	(2.58)	(2.78)	(2.40)
Average wellhead sales price to EQT Production (\$ / Mcfe)	\$ 3.32	\$ 3.55	\$ 3.53	\$ 3.76
<b>EQT Revenue (\$ / Mcfe)</b>				
Revenues to EQT Midstream	2.31	2.18	2.37	2.06
Revenues to EQT Production	\$ 3.32	\$ 3.55	\$ 3.53	3.76
Average wellhead sales price to EQT Corporation	\$ 5.63	\$ 5.73	\$ 5.90	\$ 5.82

## Per Unit Operating Expenses



	Three Months Ended September 30,		Nine Months Ended September 30,	
	2010	2009	2010	2009
Production segment costs: (\$ / Mcfe)				
LOE	\$ 0.22	\$ 0.32	\$ 0.24	\$ 0.28
Production taxes	0.21	0.26	0.23	0.30
SG&A	0.35	0.39	0.42	0.38
	<u>0.78</u>	<u>0.97</u>	<u>0.89</u>	<u>0.96</u>
Midstream segment costs: (\$ / Mcfe)				
Gathering, processing and transmission	0.54	0.56	0.53	0.55
SG&A	0.17	0.18	0.18	0.18
	<u>0.71</u>	<u>0.74</u>	<u>0.71</u>	<u>0.73</u>
Total	<u>\$ 1.49</u>	<u>\$ 1.71</u>	<u>\$ 1.60</u>	<u>\$ 1.69</u>

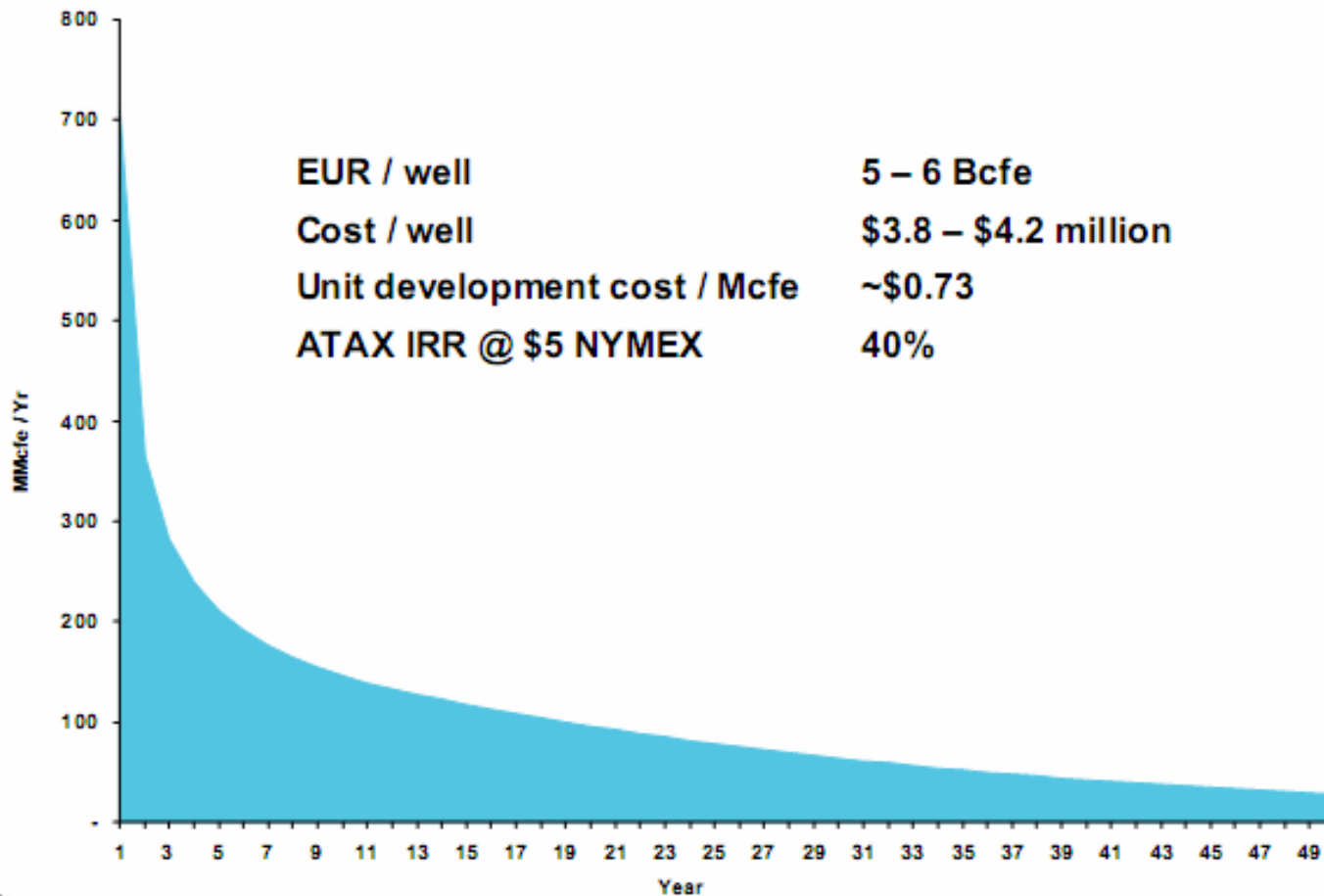
## Rates of Returns by Major Plays



\*New infrastructure carried in economics

[www.eqt.com](http://www.eqt.com)

## Marcellus Horizontal Decline Curve



**EUR / well**

**5 – 6 Bcfe**

**Cost / well**

**\$3.8 – \$4.2 million**

**Unit development cost / Mcfe**

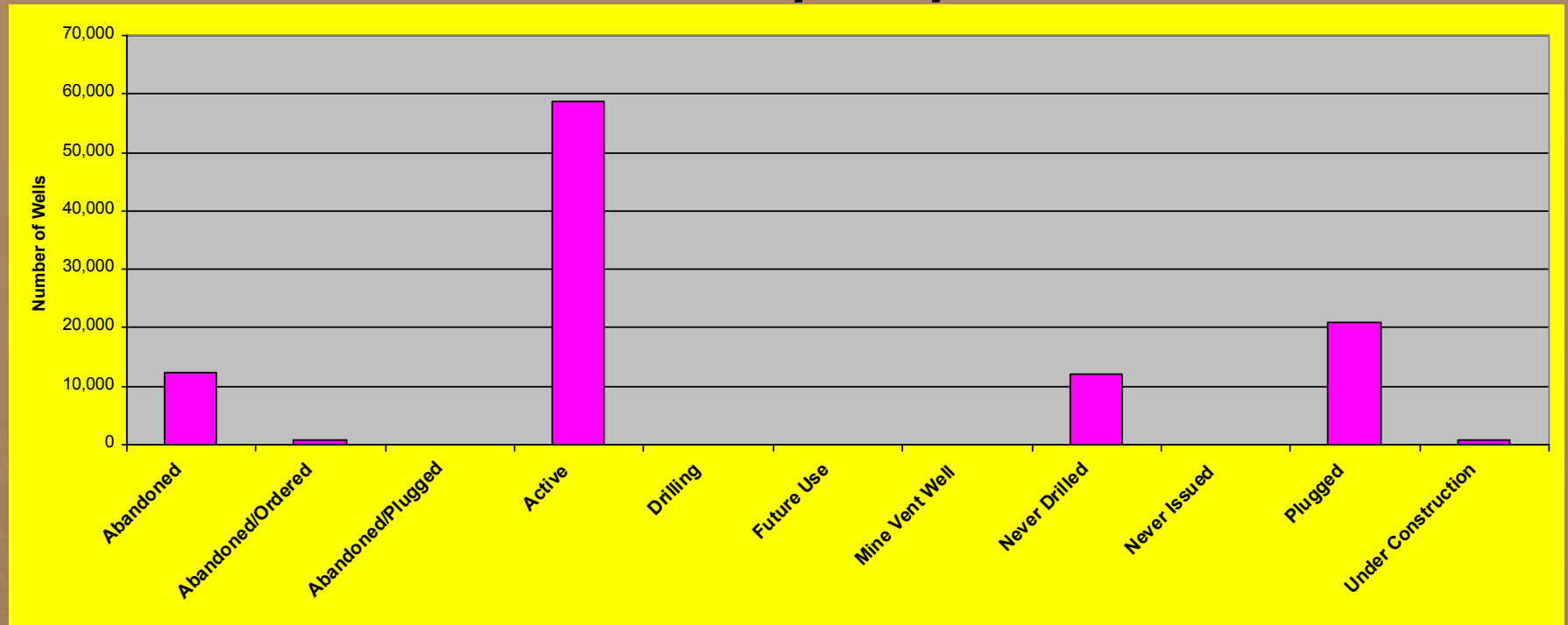
**~\$0.73**

**ATAX IRR @ \$5 NYMEX**

**40%**



# WV DEP Office of Oil & Gas Well Status 11/30/2010



Abandoned 12,211

Active 58,797

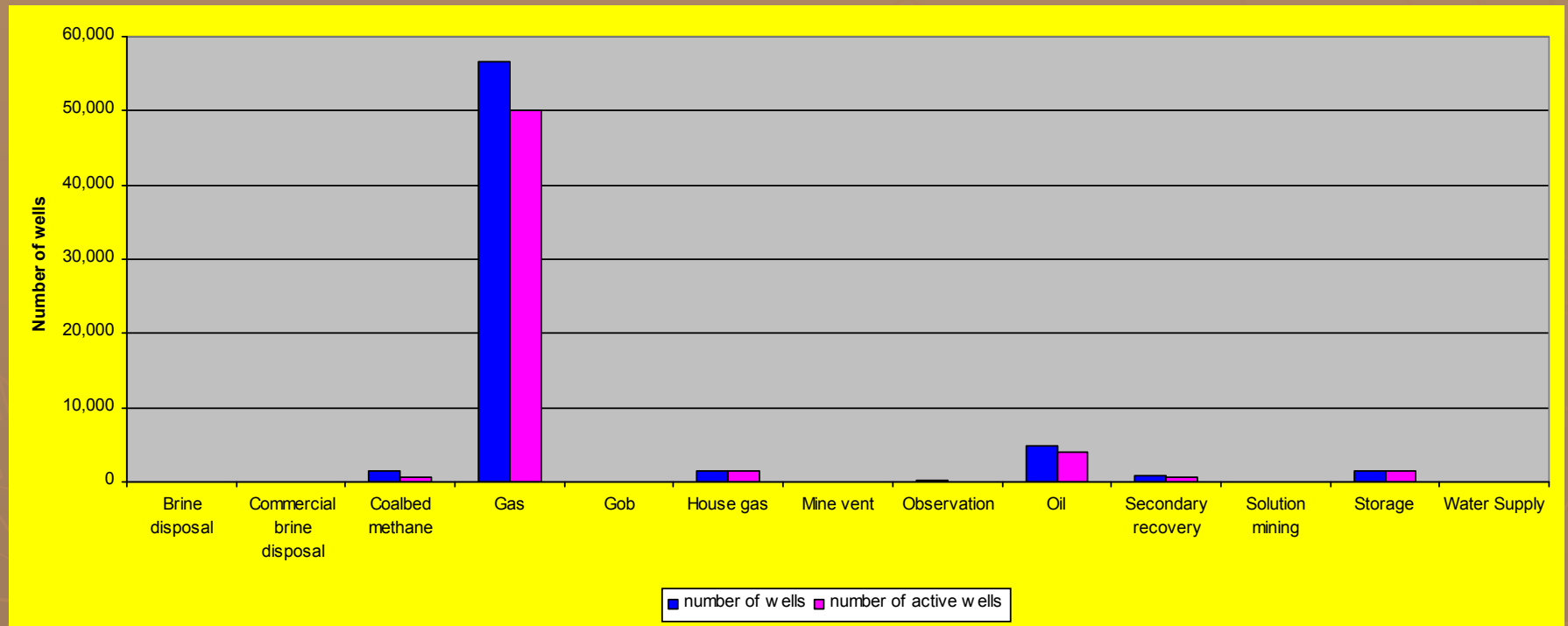
Never Drilled 12,114

Plugged 20,959

**Total: 105,872 wells**

From: [http://apps.dep.wv.gov/oog/wellsearch\\_new.cfm](http://apps.dep.wv.gov/oog/wellsearch_new.cfm)

# WV DEP Office of Oil & Gas Well Type 11/30/2010



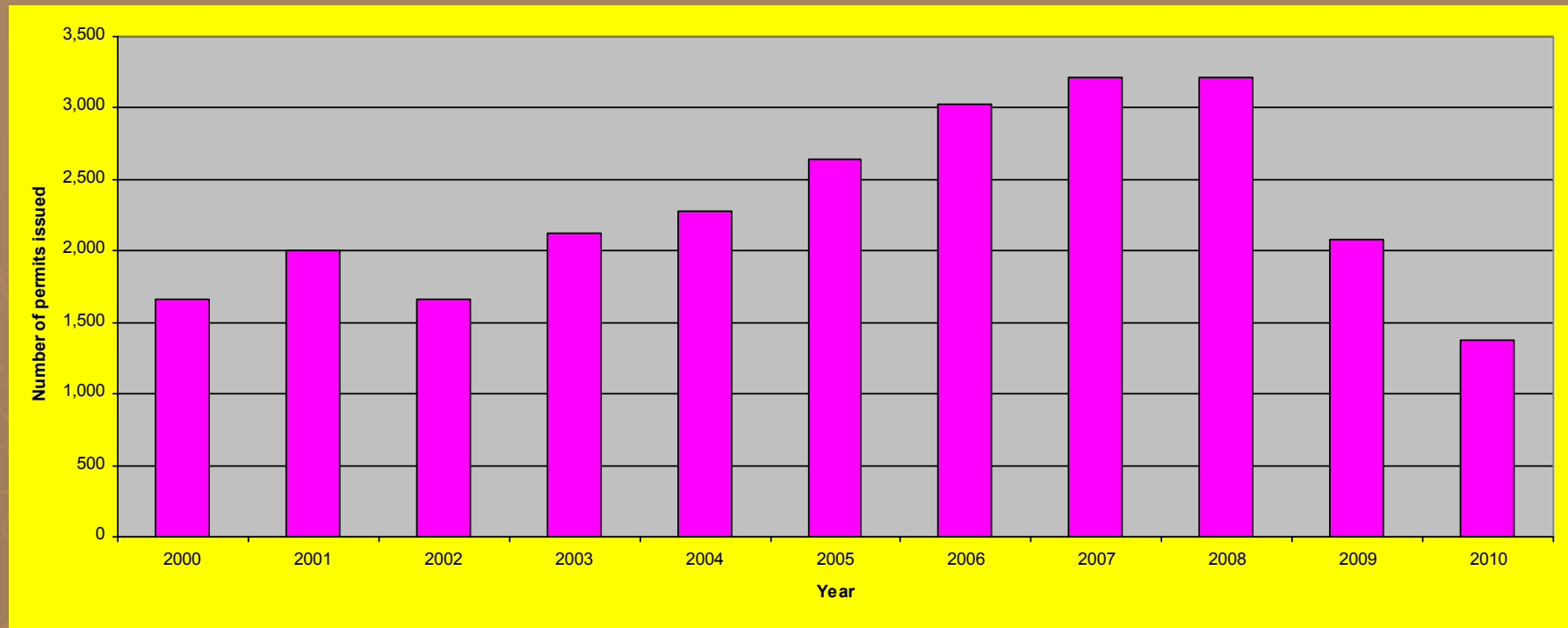
Gas 56,645

Oil 4,871

**Total 67,148 wells**

From: [http://apps.dep.wv.gov/oog/wellsearch\\_new.cfm](http://apps.dep.wv.gov/oog/wellsearch_new.cfm)

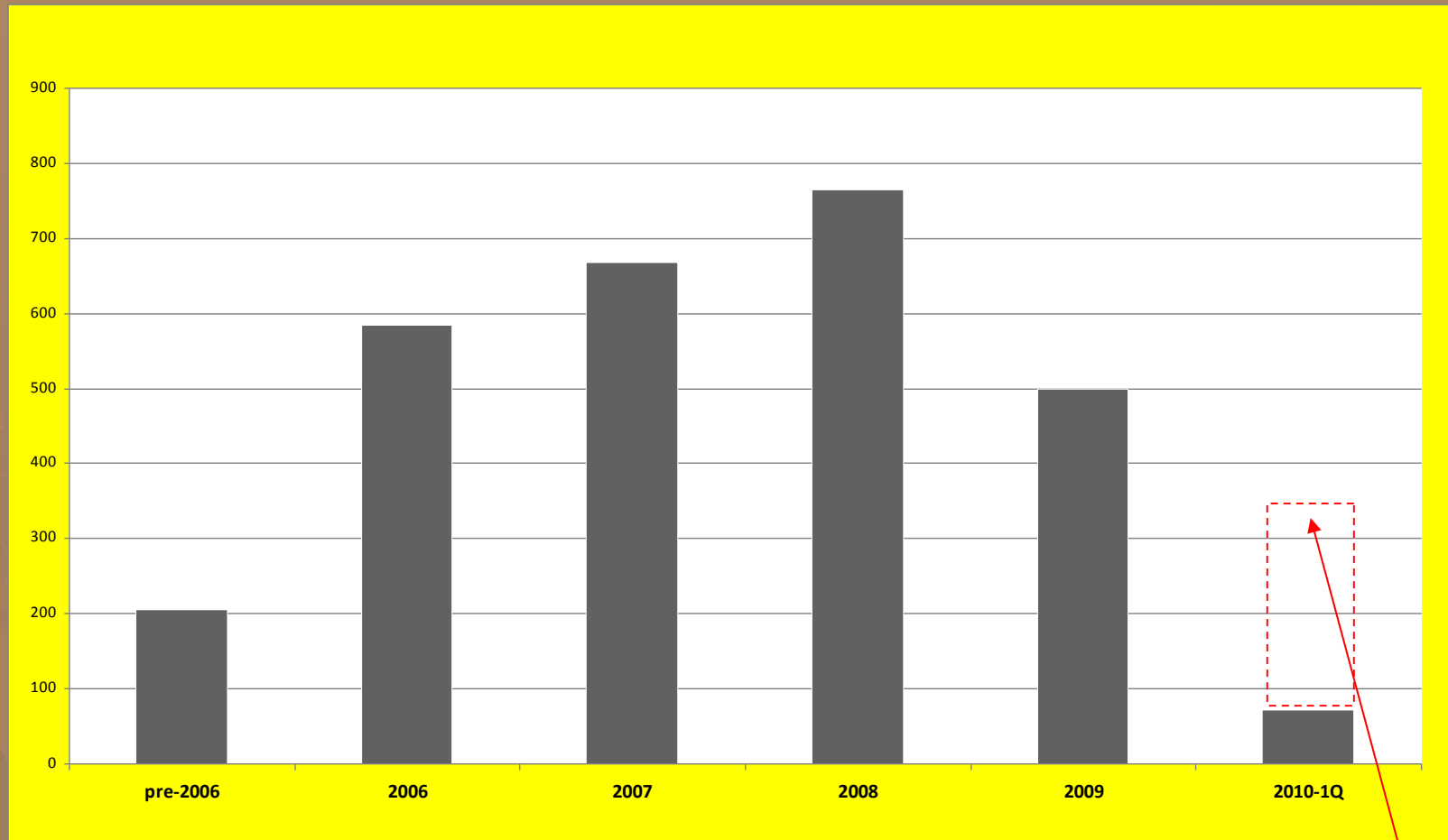
# WV DEP Office of Oil & Gas Well Number of Permits\* Issued per year as of 11/30/2010



\* Permits for all types of well work including drilling new wells, and deepening, fracturing or plugging existing wells

From: [http://apps.dep.wv.gov/oog/wellsearch\\_new.cfm](http://apps.dep.wv.gov/oog/wellsearch_new.cfm)

# Marcellus wells permitted in WV



Source: WVGES

WVDEP OOG 347 permitted YTD

# Annual and Cumulative WV Marcellus Gas Production

