# **WYOMING**

# Legal and Fiscal Frameworks: Best Practices

**Analysis and Commentary** 

**Daniel Johnston & Co., Inc.** 

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## **Table of Contents**

INTRODUCTION	6
SCOPE	7
DISCUSSION	8
SUMMARY AND CONCLUSIONS	9
REVENUES VS. PROFITS	12
WYOMING - FISCAL STRUCTURE	
ECONOMICS OF ONE \$70.00 BBL OF OIL ON FEDERAL ACREAGE	
ECONOMICS OF ONE \$2.00 MCF OF GAS ON FEDERAL LAND	
ECONOMICS OF ONE \$70.00 BBL OF OIL ON STATE LAND	
Taxation Theory and Application	
ECONOMETRICS	23
EFFECTIVE ROYALTY RATE (ERR)	
EFFECTIVE TAX RATE (ETR)	
ECONOMIC PROFITS	
GOVERNMENT TAKE	
SHALE PLAYS	27
SHALE PLAY CHARACTERISTICS AND IMPLICATIONS	
Reserve Size	
FRACTURED RESERVOIR PRODUCTION PROFILE	
UNCONVENTIONAL PLAYS	
STATISTICAL PLAYS	
TECHNOLOGY PLAYS	
RESOURCE PLAYS - HARVESTING - WYOMING'S FUTURE	
VITAL STATISTICS — NORMALLY PRESSURED LANCE (NPL)	34
VITAL STATISTICS — CONVERSE COUNTY OIL AND GAS PROJECT (CCOGP)	35
RED TAPE	
WYOMING EXPERIENCE	37
NEW MEXICO	38
WYOMING AND COLORADO VS. BLM	38
RED TAPE CLAIMS AND THE NPL AND CCOGP PROJECTS	39
The NPL permitting process began in June 2011	39
The CCOGP permitting process began in 2014 and is still underway	
LEASE SUSPENSIONS AND LICENSE STOCKPILING	41
RACE FOR OPERATORSHIP	
RESERVE REPORTING - BOOKING BARRELS	
BASIC ELEMENTS — TERMINOLOGY AND DEFINITIONS	47
Bonuses – Much of the process begins with bonuses	47
Bonus Bidding — The Equalizer	47
Gross Revenues	51
ROYALTY DETERMINATION	
Historical Rule – At the Wellhead	52
First Marketable Product Rule (FMPR)	
Wyoming Point of Valuation (POV)	56
Netback and Assessment Ratios	
Costs	
Assumed Costs Full-Cycle	
Rentals	
Net Revenues	61

Severance Taxes	62
Property Tax	62
Royalty Equivalency	63
State Income Taxes	64
Economic Profits vs. Accounting Profits	64
Sales and Use Tax	64
Conservation Tax	64
State Income Taxes	65
OVERVIEW OF THE PEER GROUP	68
APPENDIX 1: SYSTEM CHARACTER AND BEHAVIOR	70
Marginal Government Take	71
Economic model	
APPENDIX 2: LICENSE ALLOCATION PROCESS	76
APPENDIX 3: MAKING CHANGES	
ROYALTY DISPARITY	
APPENDIX 4: INCENTIVES AND SLIDING SCALES	
Risk Side vs. Reward Side Changes	
Specific Considerations	
TAXES VS. INCENTIVES	
SLIDING SCALES	
PRICE-BASED FORMULAS	
RATE OF RETURN CONTRACTS	
R FACTOR-BASED SYSTEMS	
PRODUCTION BASED SLIDING SCALES	
DISTORTIONS	
APPENDIX 5: ITEMIZED INCENTIVES	
COLORADO	
MONTANA	
NEW MEXICO	
NORTH DAKOTA	
OKLAHOMA	
TEXAS	
UTAH	
WYOMING	
APPENDIX 6: ACRONYMS AND ABBREVIATIONS	
APPENDIX 7: FISCAL SYSTEM SUMMARIES	
UNITED STATES OCS	
COLORADO GENERAL TERMS	
COLORADO	
COLORADO NCLS	
COLORADO	
COLORADO SHALE	
MONTANA	
MONTANA PRIVATE LAND	
NEW MEXICO NORTH DAKOTA	
OKLAHOMA V&HTEXAS UNIVERSITY LANDS	
UTAH	
UTAH OIL SHALE	
UTAIT OIL BRALE	120

UTAH	121
WYOMING FEDERAL LAND.	122
WYOMING KEY FISCAL ELEMENTS — KEY FACTS	123
BOEM REPORT FISCAL SUMMARY 2011	124
Wyoming Federal Land	124
WYOMING STATE LANDS	126
WYOMING PRIVATE ACREAGE	127
WYOMING NCLS	128
WYOMING OIL AND GAS STATE TAXES	129
APPENDIX 8: PEER GROUP STATISTICS FROM WYOMING	131
APPENDIX 9: GOVERNMENT TAKE COMPARISONS	135
INDEX	136

# **List of Figures**

Figure 1: One Barrel of Oil at \$70/BBL – Federal Land	14
Figure 2: \$70 BBL of Oil on Federal Mineral Acreage	16
Figure 3: One MCF of Gas at \$3.00/MCF	18
Figure 4: Conventional vs. Fracture Production Curves	
Figure 5: Volumes of Proved Undeveloped Reserves	44
Figure 6: Government Take Profile Discounted and Undiscounted	
Figure 7: Peer Group Aggregate Take	
Figure 8: Government Take vs. World Average	
Figure 9: Total Gas Production	
Figure 10: Oil Production on Federal Land	98
Figure 11: Total Oil Production	
Figure 12: Total Oil vs. Federal Production Comparison	101
Figure 13: Total Gas Production vs. Federal	
Figure 14: Government Take Comparisons	135
List of Tables	
Table 1: Peer Group Vital Statistics	10
Table 2: Federal Mineral and Surface Acreage	
Table 3: Division of Revenues and Profits "Take" Federal Land	
Table 4: State and Local Tax Liability for Producers	25
Table 5: Analysis of State Revenues	
Table 6: APD Completion Times in Days	40
Table 7: License Duration	41
Table 8: Acreage of Leases with Speculative Characteristics	45
Table 9: Number of Leases with Speculative Characteristics	
Table 10: Average Lease Bonus Bids	50
Table 11: Wellhead Valuation vs. Marketable Product	55
Table 12: Historical Assessment Ratios in Wyoming	58
Table 13: Rentals	61
Table 14: State Corporate Income Taxes	66
Table 15: Oil and Gas Lease Terms and Royalty Rate Revisions	67
Table 16: Peer Group Composite Fiscal Terms	
Table 17: Comparing Regressive Impact	75
Table 18: Auction Process and Minimum Bids	
Table 19: Royalty Disparity Lobby	80
Table 20: BLM Step Scale	
Table 21: Chronology of Key Indicators	
Table 22: Federal Surface Acreage by State	
Table 23: State Oil Production	
Table 24: State Percentage of Oil Production	
Table 25: Gas Production on Federal Land	
Table 26: Total Gas Production by State	
Table 27: Oil Production on Federal Land	
Table 28: Total Oil Production by State	99

Table 29: Western States Information - Wyoming1	131
Table 30: Peer Group - Lease Terms1	132
Table 31: Effective Severance Tax Rates1	133
Table 32: BLM Approved Applications1	134

#### Introduction

This Study was commissioned by the Wyoming Infrastructure Authority (WIA)<sup>1</sup> pursuant to the 2018 session of the Wyoming state legislature.<sup>2</sup>

Daniel Johnston & Co., Inc. was asked to analyze and evaluate current fiscal terms in Wyoming, with respect to (a) fiscal viability of the terms, (b) sustainability, (c) flexibility and fairness, and (d) competitiveness and placement in the market for petroleum exploration, development and production operations.

The term 'fiscal' in this report is used in the economic sense and not in a legal or philosophical sense. The term 'government' as in the term Government Take represents all government levels or agencies of government including Federal, State, County etc. unless stated otherwise.

This discussion addresses Wyoming's terms and conditions from the perspective of both theory and practice, large companies and small, governments and industry.

This assessment was based in part on Wyoming's position with respect to its regional peers. It was also based on Wyoming and the peer group's standing in the global market for exploration and development capital, and technology.

#### The Peer Group

Colorado	(CO)
Montana	(MT)
<b>New Mexico</b>	(NM)
North Dakota	(ND)
Oklahoma	(OK)
Texas	(TX)
Utah	(UT)
Wyoming	(WY)

As the need arises other regions or states are mentioned or included in order to provide added perspective.

<sup>&</sup>lt;sup>1</sup> Abbreviations and acronyms are summarized in Appendix 1.

<sup>&</sup>lt;sup>2</sup> Section 303(f)(ii) of House Enrolled Act No. 62 ("Act"), the legislature directed the WIA to "complete a study on the tax burdens imposed on oil and gas development in Wyoming" ("Study")

## Scope

The focus of this study is to quantify and characterize the total tax burden imposed on oil and gas producers operating in Wyoming and in the region, including:

- A typical oil producer's royalties and taxes<sup>3</sup> per barrel (bbl)
- A typical natural gas producer's taxes per thousand cubic feet (Mcf) of gas
- Impact of petroleum industry operations on Federal lands vs. State lands
- Royalty, tax rates and permit expenses, for production of federally owned minerals, state lands and fee minerals.
- Comparison of fiscal<sup>4</sup> terms, incentives, advantages and disadvantages of each type of fiscal device or instrument.
- Discussion of Wyoming's competing objectives of encouraging exploration and development activity yet simultaneously maximizing State revenues.

Financial conclusions are based on discounted and undiscounted cash flow analysis of the terms in conjunction with variations in prices, costs, timing and discount rates.

There are a number of inconsistencies with some data sources and as a result some estimates had to be made and caveats supplied in order to conduct this analysis. Furthermore, one of the more common experiences is the variety of terms used for common concepts and fiscal devices. In other words, there is no standard usage. These are explained as they are developed in this report.

Defined terms are capitalized.

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<sup>&</sup>lt;sup>3</sup> Including, but not limited to severance, mineral ad valorem, income, property and excise taxes.

<sup>&</sup>lt;sup>4</sup> The term 'fiscal' is used throughout this report in the broadest sense.

#### **Discussion**

Every State in the Union and every country in the world considers itself unique. And indeed, this is true although some consider themselves to be more unique than others. The States in this Peer Group study have some vast and multidimensional differences but geology is most important. However, some of the boundary conditions impacting petroleum industry activity have little to do with geological conditions. Some are manmade. This is particularly true of the rules, regulations and fiscal terms that govern the business relationship between companies and government agencies.

Federal government influence on the industry through Federal royalties, taxes, rules and regulations has a different impact on some states because of their unique circumstances. This is particularly true of Wyoming and New Mexico because of their geology and because of the large percentage of Federal ownership of land and mineral rights. Utah also has a high percentage of Federal land ownership but it does not have such promising geological potential.

One thing important to all of the states in the Peer Group is that the nature of the industry has changed significantly. In most respects the industry today would be unrecognizable 15 years ago. One of the things that characterized the industry a generation ago was the huge difference between risk and reward. But by today's standards, exploration operations virtually do not exist with shale plays. There have been thousands of wells drilled in the US and almost all of these have encountered the shales that are so important today. The shale formations, locations, thicknesses and characteristics are well known. There is little risk of a dry hole although some results can be disappointing. Many results are sensational. This is what a boom is made of.

Companies will certainly look for and focus on 'sweet spots' in the shale formations, but with horizontal drilling and fracking operations the companies, in some respects, create their own sweet spots.

So, while petroleum operations in the industry have changed so dramatically, fiscal terms and conditions, rules, and regulations designed 30 years ago have hardly changed.

## **Summary and Conclusions**

- 1. Wyoming's Effective Tax Rate is 12.8%, which is 4.3% higher than its peers, and Wyoming's Effective Royalty Rate is 23.7%, which is 3.8% higher. Table 3, Page 24.<sup>5</sup>
- 2. Wyoming takes a larger share of profits on State lands than its peers roughly 2% more according to calculations in Table 3, Page 24. Furthermore, based on published revenue data Wyoming takes 4% more of the profits than its peers, Table 5, Page 26.
- 3. Wyoming netback provisions (transportation deductions between POS and POV) are less favorable to oil companies than most of its Peers. Companies would prefer the approaches used by Texas, North Dakota, Montana, and New Mexico. Table 11, Pages 53-58.
- 4. Wyoming has fewer oil and gas production incentives than its peers and does not provide as many different tax treatments for different categories or types of production. For example, Oklahoma has at least four different tax provisions (incentives) depending production time (tax holiday) and the type of well drilled. Appendix 5, Page 88.
- 5. Higher tax rates do not discourage exploration and production it depends more on geology. The royalty rate on Texas state lands is 25%, 50% higher than Wyoming's 16.6% on state owned lands, Appendix 8, Page 131.
- 6. Production on Federal lands adds delays, red tape and costs. Pages 37-40. Wyoming and New Mexico have the highest rates of production on Federal mineral lands 49% of Wyoming's oil production and 85% of gas production occurs on Federal minerals. New Mexico's Federal oil and gas production represents roughly 49% for oil and 60% for gas. Table 22, Page 92.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>5</sup> Similar results are summarized in Table 4 from revenue data from: Severance Tax Rates on Oil and Gas, L. Silbaugh, January 12, 2018, Colorado Legislative Council, Memorandum, and Energy Information Administration

**Table 1: Peer Group Vital Statistics** 

All of these indicators capture in one aspect or another the character and status of the various members of the peer group. These elements are developed further in the body of this report.

#### **Peer Group Vital Statistics**

	CO	MT	NM	ND	OK	TX	UT	WY
Population (000)	5,684	1,062	2,091	755	3,940	28,704	3,159	574
Total O&G Production value (\$MM)	\$8,943	\$932	\$8,766	\$15,560	\$13,585	\$78,659	\$2,433	\$6,798
Federal Mineral Acreage (MM acres)	29.0	37.8	36.0	5.6	2.3	4.5	35.2	41.6
Federal Land (MM Acres)	23.9	27.0	27.0	1.7	0.7	3.0	34.2	30.0
State Land (MM Acres)	66.5	93.3	77.8	44.5	44.1	168.2	52.7	62.3
State land %	35.9%	29.0%	34.7%	3.9%	1.6%	1.8%	64.9%	48.1%
2017 Gas Production (BCF)	1,683	46	1,293	594	2,514	7,135	315	1,585
Fed Gas Production	661	11	773	60	14	35	197	1,354
Federal % Gas	39.3%	23.9%	59.8%	10.1%	0.6%	0.5%	62.5%	85.4%
2017 Oil Production (MMBBLs)	130.7	20.7	171.4	392.1	165.9	1,272.0	34.2	75.7
Fed Production Oil	4.70	2.70	83.40	32.10	0.90	-	9.20	36.70
Federal % Oil	3.6%	13.0%	48.7%	8.2%	0.5%	0.0%	26.9%	48.5%
Netback Rules	FMPR	At the Well	FMPR	At the Well	FMPL	At the Well	N/A	FMLP
Effective Royalty Rate State Land *	25.0%	24.2%	21.5%	26.3%	20.0%	32.2%	20.8%	27.3%
Effective Royalty Rate Federal Land *	21.3%	20.4%	17.5%	22.6%	16.0%	20.9%	16.9%	23.7%
State Income Tax Rates	4.63%	6.75%	5.9%	4.31	6.0%	0	5.0%	0
Government Take State Lands *	52.2%	52.4%	49.1%	54.4%	47.6%	57.9%	48.0%	52.4%
Government Take Federal Lands *	48.2%	48.4%	45.0%	50.5%	43.4%	45.3%	43.8%	48.4%
Suspended Acres (000)	270	1,076	79				930	593
BLM Approved Applications	319	6	545	263	12	1	160	1,102
Rig Count 2018	33	1	91	55	141	536	8	26

<sup>\*</sup> These figures represent averages that cover various producing properties such as those producing oil or gas, horizontal and vertical wells, stripper wells, production subject to tax holidays, royalty and tax ranges, and various costs and oil prices.

Table 2: Federal Mineral and Surface Acreage

This is a summary of the Mineral and Surface Acres Administered by the Bureau of Land Management. Wyoming, Utah and New Mexico stand out in this repect but Utah is not as geologically endowed as Wyoming and New Mexico.

(Millions of Acres)

(						
	<b>Total Acres</b>	Federal Minerals <sup>(a)</sup>	Federal Surface Lands <sup>(b)</sup>	Split-Estate Federal Mineral <sup>(c)</sup>	BLM Public Lands <sup>(d)</sup>	Indian Trust Minerals <sup>(e)</sup>
Colorado	66.49	29.0	24.1	5.2	8.4	0.8 <sup>(f)</sup>
Montana	93.27	37.8	26.1	11.7	8.0	5.5
N Mexico	77.77	36.0	26.5	9.5	13.4	8.4 <sup>(g)</sup>
N Dakota	44.45	5.6	1.1	4.5	0.1	0.9
Oklahoma	44.09	2.3	1.7	0.5	0.0	1.1
Texas	168.22	4.5	4.5	0.0	0.0	0.0
Utah	52.70	35.2	34.0	1.2	22.8	2.3
Wyoming	62.34	41.6	30.0	11.6	18.4	1.9
Total		699.7	643.2	57.2	264.2	56.0

Source: https://leg.mt.gov/content/publications/Environmental/2006hb790/appendixe.pdf

Notes: This report was based on 1991 data.

- (a) The term Federal Minerals refers to onshore Federal minerals that are part of BLM's responsibilities. The onshore Federal mineral acreage approximates the sum of Federal Surface Lands acres and Split-Estate Federal Minerals acreage shown in the next two columns. As of 1999, the total was approximately 700 million acres.
- (b) Federal Surface Lands include both the public domain and acquired lands of all Federal agencies. With the exception of an estimated 4 million acres of the acquired lands, Federal mineral rights exist in all Federal lands.
- (c) The term Split-Estate Federal Minerals refers to Federal mineral rights under private surface lands. These are patented lands with minerals reserved to the U.S. Reservations may be for single, multiple, or all minerals. The 58 million acres is the mid-point of estimates ranging from 55 to 60 million acres (provided by the Colorado State Office). This results in a significantly lower acreage than that shown in Table 3-2; future updates will address this inconsistency.
- (d) On these public lands, the BLM manages both surface resources and subsurface minerals. The surface acreage is part of the Federal Surface Lands shown in the third column. The mineral acreage is part of the Federal Mineral estate included in the second column. As of 1999, BLM's public lands comprised 264 million surface acres. For an annual update, refer to Table 1-4 of Public Land Statistics.
- (e) As part of its trust management responsibility, the BLM provides technical supervision of mineral development on 56 million acres of American Indian trust lands except for Osage lands. All minerals in Indian trust lands are "leasable." Acreage information was obtained in 1999 from the Real Estate Services staff of the Bureau of Indian Affairs.
- (f) Ute Mountain Ute oil and gas in New Mexico are managed by Colorado BLM.
- (g) BLM's Eastern States is responsible for Federal minerals in the 31 states east of, or bordering on, the Mississippi River.

#### **Revenues vs. Profits**

Many peer group comparisons published about Western State fiscal systems focus on the division of revenue and some focus on the division of profits. Proper analysis requires both.

Also, it is not unusual that the context of a statement, analysis or report does not make clear the approach or focus. Some comparisons refer to 'effective tax rates', in the Peer Group states which range from about 6% to 12%, they are ordinarily referring to a percentage of gross revenues. This is often the combined effect of Severance and Property (or Ad Valorem) taxes and sometimes State taxes. However, 12% of revenues can easily represent 20% of profits.

Various techniques are used to combine fiscal elements, but terminology is not consistent and it can be confusing. Reference to an effective tax rate as described above is not unusual in the US. This is because Federal taxes and royalties are constant and they are common throughout. Because of this, it is often convenient to compare operations on Federal Lands in one State with another and yet ignore Federal royalties and income tax.

#### Wyoming – Fiscal Structure

From an oil company's point of view the fiscal system in each State in the Peer Group consists of both State and County levies as well as Federal fiscal elements. This comprises the bulk of the fiscal/financial conditions under which companies conduct petroleum operations.

There are, effectively, three main systems in Wyoming: Federal, State and private or fee acreage.<sup>6</sup>

The system in Wyoming, like its Peers, is made up primarily of the two main types of fiscal element: (1) revenue-based mechanisms, such as Royalties (either Federal or State), Severance Taxes and Property Taxes (or the equivalent) and (2) profits-based mechanisms such as State and Federal Income Taxes.

Basically, Wyoming's system has 3 revenue-based levies (Royalty, Severance Tax and Property Tax) and 1 profits-based tax (Federal). Discussion and analysis of Wyoming's system, in this report, will focus on both Wyoming's particular fiscal terms alone as well as the collective fiscal structure, which includes Federal elements. Therefore, distinctions and comparisons will be made between terms specific to State Lands in the Peer Group and Federal Lands or Federal Minerals.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>6</sup> For the sake of convenience, this terminology is used to distinguish which system governs petroleum operations from a fiscal point of view. Where possible a distinction is made between Federal ownership of surface acreage vs mineral acreage. When many reports refer to Federal or BLM acreage but it is difficult to tell if they are referring to surface or mineral rights.

This analysis focuses on how these various system elements behave and respond to changes in oil prices, costs, field or project size, production rates, timing etc.

### **Economic and Accounting Structure**

The following formulations illustrate how revenues and profits are distributed on Federal Lands. One is for a barrel of oil and a similar formulation is generated for gas. These calculations honor the basic math in the same sequence that would be experienced in any given accounting period.

The calculations start with Gross Revenues at the point of valuation (POV) for royalty determination purposes. These calculations are based on the assumption that the Gross Revenue value is equal to the product price at the point of sale (POS) less transportation costs and other allowed deductions. Transportation costs are those costs associated with transporting the hydrocarbons from the POV to the point of sale.

Thus, the basis for royalty calculations is often called the *netback* price which is normally less than, but sometimes or equal to, the actual sales price. Calculating transportation costs is referred to as a *netback* or *workback* formula. Each State is different in this respect. While most states use a netback approach they also usually have alternate means by which a fair market value (FMV) for royalty determination purposes can be derived.

There are two general approaches to determining the netback value. The original approach, sometimes called 'The Historical Method' places the valuation point 'at the wellhead'. All costs beyond that point to the point of sale are considered to be transportation costs eligible to be deducted from the sales price.

The other method, referred to as the 'Marketable Product Rule' or 'First Marketable Product Rule' (FMPR) places the point of valuation downstream from the wellhead at the point at which the hydrocarbons (oil, gas or condensate) are in a marketable condition, and could be sold at that point if a market existed.

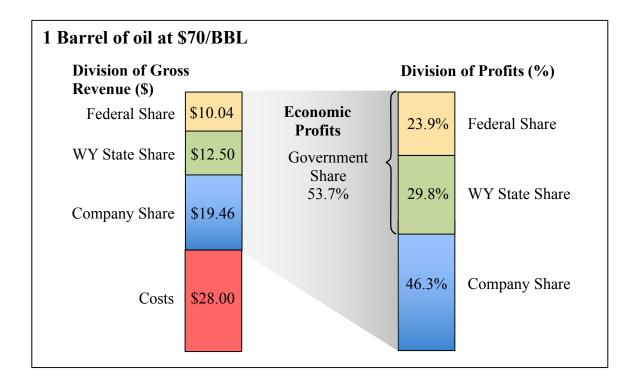
More and more States are subscribing to the FMPR. Texas, North Dakota and Montana do not. They place the POV at the wellhead. Wyoming generally uses the FMPR for Severance Tax and Ad Valorem Tax calculations, but with respect to State Royalties, it depends on the particular contract.

With respect to roylaty determination, companies would prefer Texas and other 'wellhead rule' states. Wyoming allows fewer deductions.

These concepts are discussed further later in this report.

Figure 1: One Barrel of Oil at \$70/BBL – Federal Land

This graph shows two important perspectives, the division of revenues and the division of profits. The Federal share of revenues for a \$70/BBL of oil is \$10.04 or around 14.3%. It is a function of both the Federal share of the Federal royalty and Federal taxes. However, the Federal share of profits is 23.9%. The calculations are shown below. They are based on a \$70/BBL of oil with total costs of \$28/BBL. All other elements in the calculation are simply the fiscal terms (Federal, State and County).



## Economics of One \$70.00 BBL of Oil on Federal Acreage

Gross Revenues	\$70.00	Netback Va	lue	
Federal Royalty	- 8.75	12.5% (48% goes to the State)		
Net Revenues <sup>7</sup>	\$61.25	12.370 (407)	goes to the State)	
Severance Tax	- 3.68	6% Rate		
Property Tax	- 4.13	6.75% Rate	<u>.</u>	
County Tax	- 0.00	0.7370 Kai	,	
Sales and Use Tax +8	- 0.49	0.8%		
Net Revenues	52.95	0.870		
Capital Costs	- 15.50			
Opex (LOE)	- 13.50 - 12.50	Lagga Opar	ating Expenses (LOE)	
Total Costs		-	<b>C</b> 1	
State Taxable Income	\$28.00 24.95	Subtotal All	Costs	
		NI - W/W :	Т	
State Income Tax	- 0.00	No WY inco	ome rax	
Federal Tax Base	24.95	220/ T. D.		
Federal Tax	- 5.49	22% Tax R	<u>ate</u>	
<b>Company Cash Flow</b>	\$19.46			
Division of Revenues (\$ a	nd 9/)			
Federal Share	\$10.04	14.3%	520/ of Fod Povolty + Toy	
State Share	\$10.04 \$12.50	14.3 % 17.9%	52% of Fed Royalty + Tax 48% of Fed Royalty +	
	\$12.30 \$47.46	67.8%	2 2	
Company Share Total Revenues	•		(\$28.00 + \$19.75)	
Total Revenues	\$70.00	100.0%		
Total Costs	\$28.00	40.0%	of Gross Revenues	
<b>Economic Profits</b>	\$42.00	60.0%	of Gross Revenues	
	4			
<b>Division of Profits</b>				
Federal Share	\$10.04	23.9%		
State Share	\$12.50	29.8%		
Company Share	\$19.46	46.3%		
Total Profits	\$42.00	100.0%		
2 0002 2 2 01100	Ψ.2.00	100.070		
Government Take	53.7%		(State + Federal)	
Company Take	46.3%		(= 3000 = 50000)	
company runc	10.0 / 0			

<sup>&</sup>lt;sup>7</sup> In this calculation, there are two different figures both referred to as 'Net Revenues'. While so many fiscal items or concepts go by a many different names. This is an equally frustrating exception. This term is used both ways and is unique to the US onshore.

8 Includes Conservation Tax, Environmental Tax and other miscellaneous levies

Figure 2: \$70 BBL of Oil on Federal Mineral Acreage

The following is an itemized summary of the calculations above.

Federal Royalty	\$8.75	The Federal Royalty is shared with the state. The average split is 50/50% Federal/State. Wyoming gets 48%
Severance Tax Property Tax Sales and Use Tax	\$3.68 \$4.13 \$0.49	Severance Tax is 6% of gross revenue (\$70) less royalty. Property tax, also called Ad Valorem, or County Tax averages 6.75%. Sales and Use, Conservation and other minor taxes - 0.8%
Capital Costs	\$15.50	Drilling and Completion costs
Opex (LOE)	\$12.50	Cost of well operating costs, processing, gathering and storage facilities
Federal Tax	\$5.49	Federal tax 22%
Company Cash Flow	\$19.46	This represents $46.3\%$ of the total profits of \$42/BBL (\$70.00 – \$28.00). i.e. $$19.46/$42 = 46.3\%$

<sup>9</sup> Same tax base as Severance Tax (Net Revenues)



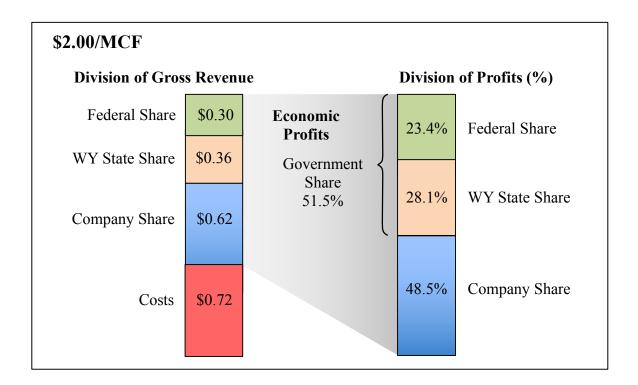
## Economics of One \$2.00 MCF of Gas on Federal Land<sup>10</sup>

<b>Gross Revenues</b>	\$2.00	Netback Value		
Federal Royalty	- 0.25	12.5% (48% goes to the State)		
Net Revenues	\$1.75			
Severance Tax	- 0.11	6% Rate		
Property Tax	- 0.12	6.75% Rate	<b>)</b>	
County Tax	- 0.00			
Sales and Use Tax <sup>11</sup>	- 0.01	0.8%		
Net Revenues	1.51			
Capital Costs (Capex)	- 0.42			
Opex (LOE)	- 0.30	Lease Opera	nting Expenses	
<b>Total Costs</b>		<b>\$0.72</b>	Subtotal All Costs	
State Taxable Income	0.79			
State Income Tax	- 0.00	No WY inco	ome Tax	
Federal Tax Base	0.79			
Federal Tax	- 0.17	22% Tax Ra	nte	
Company Cash Flow	\$0.62			
<b>Division of Revenues (\$ a</b>	<u>nd %)</u>			
Federal Share	\$0.30	15.2%	52% of Fed Royalty + Tax	
State Share	\$0.36	17.9%	48% of Fed Royalty +	
<b>Company Share</b>	\$1.34	66.9%	(\$0.62 + \$1.20)	
<b>Total Revenues</b>	\$2.00	100.0%	,	
<b>Total Costs</b>	\$0.72	36.0%	of Gross Revenues	
<b>Economic Profits</b>	\$1.28	64.0%	of Gross Revenues	
<b>Division of Profits</b>				
Federal Share	\$0.30	23.8%		
State Share	\$0.36	27.9%		
Company Share	\$0.62	48.3%		
Total Profits	\$1.28	100.0%		
I VIII I I VIII	Ψ1.20	100.070		
<b>Government Take</b>	51 7%	(State + Fede	eral)	
Company Take	48.3%	(State + 1 cde	141)	
сопрану таке	40.3 /0			

10 It is assumed that the sales price at the point of sale (POS) is \$3.00/MCF with \$1.00 netback to point of valuation (POV) for royalty determination purposes.

11 Includes Conservation Tax, Environmental Tax and other miscellaneous levies

Figure 3: One MCF of Gas at \$2.00/MCF



The calculations above for oil and gas yielded different Government Takes of 53.7% and 51.7% respectively. Yet, all of the fiscal elements and percentages are identical. The reason there is a difference is that the assumption about costs as a percentage of gross revenues (profitability) was not the same for each. The costs for the barrel of oil were equal to 40% of gross revenues while the costs for the gas amounted to only 36%. The gas was more profitable yet the government share of profits was lower. Same fiscal system, different results. This is because so much of the Government Take is based on royalties or royalty-equivalent fiscal elements and these elements are regressive.

Notice too that the netback gas price used is \$2.00 per MCF. This would imply a gas price at the point of sale of around \$3.00 per MCF (consistent with Opal Hub or Cheyenne Hub prices circa October 2018). The difference, of course, is the cost of the transportation function. This is discussed later in this report with the FMPR concept. This is a realistic ratio as the average 'assessment ratio' for gas is on the order of 65% lately. Or to put it another way, the costs associated with transportation amount to around 35% of the ultimate sales price.

The formulation below is for a barrel of oil on State lands. The costs are the same as before at 40%. The Royalty on State lands is 16.67% and the government take therefore

is higher than on Federal mineral acreage. The State share of profits is unsurprisingly also higher than on the Federal acreage.

The examples above effectively collapse all of the relevant fiscal elements into the equivalent of a single mechanism that could be viewed as an effective tax rate (Government Take).

Conceptually this approach is somewhat abstract in that it is as if all costs are incurred and all revenues are generated and divided in a single accounting period. However, it does provide insight into the division of revenues and profits.



## Economics of One \$70.00 BBL of Oil on State Land

Gross Revenues	\$70.00	Netback Va	lue		
State Royalty	- 11.67	16.67			
Net Revenues	\$58.33	10.07			
Severance Tax	- 3.50	6% Rate			
Property Tax	- 3.94	6.75% Rate			
County Tax	- 0.00	0.7570 Rate	,		
Sales and Use Tax +	- 0.47	0.8% (Sales	and Use + Conservation Tax)		
Net Revenues	50.43	<u>0.670</u> (Saics	and Osc + Conscivation Tax)		
Capital Costs	- 15.50				
Opex (LOE)	- 12.50	Lease Opera	ating Expenses (LOE)		
Total Costs	\$28.00	Subtotal All	• • • • • • • • • • • • • • • • • • • •		
State Taxable Income	22.43		<del></del>		
<b>State Income Tax</b>	- 0.00	No WY income Tax			
Federal Tax Base	22.43				
Federal Tax	- 4.93	22% Tax Rate			
<b>Company Cash Flow</b>	\$17.49				
<b>Division of Revenues (\$ 2</b>	<u>and %)</u>				
Federal Share	\$4.93	7.0%	Fed Tax		
State Share	\$19.57	28.0%	48% of Fed Royalty +		
Company Share	\$45.49	65.0%	(\$28.00 + \$19.75)		
<b>Total Revenues</b>	\$70.00	100.0%			
<b>Total Costs</b>	\$28.00	40.0%	of Gross Revenues		
<b>Economic Profits</b>	\$42.00	60.0%	of Gross Revenues		
D'''					
<b>Division of Profits</b>	04.03	11 70/			
Federal Share	\$4.93	11.7%			
State Share	\$19.57	46.6%			
Company Share	\$17.49	41.7%			
Total Profits	\$42.00	100.0%			
<b>Government Take</b>	58.3%	(State + Fed	eral)		
Company Take	41.7%	,			
Company Lake	71.//0				

#### **Taxation Theory and Application**

Taxation theory and concepts figure heavily in any discussion of fiscal architecture and many of the basic concepts and terms have a prominent role in this report. It is discussed here to help facilitate intercourse between oil company personnel, Federal employees, State employees, consultants, and journalists from different States and backgrounds. This is because there are so many different views and even more disparate terms or names for various fundamental fiscal mechanisms. People can hardly communicate for lack of standards in this respect. It is common that a basic concept or fiscal device can go by many different names.<sup>12</sup> But fundamentals of taxation theory are well established and should be able to provide common ground for discussion and analysis.

With that in mind, one of the most fundamental concepts in taxation theory is that most levies, imposts, duties or taxes are two-dimensional. Their character and behavior depend on: (1) rate and (2) base<sup>13</sup>. It doesn't matter what they are called. A levy may be called a tax while its economic character is more like that of a royalty. This can be sorted out by going back to the fundamentals.

Tax rates and royalty rates vary widely, but their most characteristic and important feature is the *basis* upon which they are calculated.

As mentioned previously, there is a distinction between royalty and royalty-equivalent mechanisms that are *based* on Gross Revenues (or the equivalent) and those fiscal elements that are based on profits (of various sorts).

Fiscal devices that are based on Gross Revenues are regressive. A regressive system, according to taxation theory, is inefficient by definition. It means that when profitability increases the Government share of profits (Take) goes down. This is the case with both Wyoming State acreage as well as Federal acreage in Wyoming and in the Peer Group states.

This is counterintuitive and justifiably so. Logically, in the eyes of most government officials, it should work the other way around or at the very least the Government share should stay constant. This is why so many countries have created sliding scales or adjustment mechanisms to try and either neutralize or overcome the regressive effect of royalties and royalty-equivalent elements. This is discussed later in this report.

However, there are reasons for having the kind of fiscal elements that carry this disadvantage. Royalties are effective and relatively easy to administer compared to most profits-based elements like true taxes (State and Federal). They also guarantee the royalty owner a share of revenues or production in each and every accounting period. With

<sup>&</sup>lt;sup>12</sup> Wyoming's Property Tax is one example. It is also called a Production Tax, County Tax, Ad Valorem Tax or Mill Tax which are not all of the terms used but they are the most common.

<sup>&</sup>lt;sup>13</sup> Sometimes, although usually a minor consideration, definition of the taxable event has in influence. This is an issue with the Property Tax where there is a full year difference between the taxable event and required payment.

profits-based taxes the sovereign, government or landowner must wait until profits are generated and a tax base is established before it receives payment for granting companies the right to conduct petroleum operations on its land.

So, the *inefficiencies* are balanced somewhat by the relative *effectiveness* and ease of administration royalties provide. However, these things are usually not well balanced.

Taxation concepts are not confined to royalties and taxes. For example, unreasonable permitting delays (discussed later in this report) can have a stultifying effect on investment activity and private companies, particularly the smaller ones.

The average independent oil company employs 12 people. For companies this size a drawn out permitting process can be debilitating. But, again, it is nearly impossible to quantify the impact, but logically it must be significant or it certainly is for the independent companies. For example, assuming it would take an extra employee to handle unnecessary red tape this would represent a relatively greater cost to a small company with 12 employees than for a larger company with 50 or 100 employees.

Therefore, inefficiencies associated with red tape are regressive. This is because, in this example, effectively the *rate* is equal to one extra employee but it is *based* on each company not the size of the company.

Another important aspect of royalties or royalty-equivalent elements is that they cause premature abandonment. This is another hallmark of royalties. When a company operation or a particular well reaches its economic limit, it will be an artificial and premature limit with royalties.

In both Wyoming and New Mexico approximately 70% of the wells are stripper wells that, by definition, produce less than 15 barrels of oil equivalent (BOE) per day. However, the average stripper oil well in Wyoming (7,418 wells) produces less than 4 BOPD (around 3.6 BOPD) and the average stripper gas well (11,776 wells) produces 32 MCFD.

The concept of an economic limit looms large for these wells and for companies operating a portfolio with stripper wells.

Stripper wells may only represent a small amount of production but they are responsible for a lot of jobs, particularly for the smaller companies. When they reach their economic limit in Wyoming and companies are ready to plug and abandon a well it will still be profitable but only for the royalty holders. With an effective royalty rate of 25% at the abandonment point there is still a 25% profit margin but not for the oil company. If it

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>14</sup> A BOE includes both liquid hydrocarbons as well as associated gas production converted to a barrel of oil equivalent at a rate of 6 thousand cubic feet per barrel. For example, 12 thousand cubic feet of gas (12 MCF) would have roughly the heating value equivalent of 2 barrels of oil (BOE).

shuts down at that point (the economic limit) the waste can be measured in terms of the effective royalty rate (ERR), in this example, 25%.

#### **Econometrics**

Some of the key metrics associated with fiscal analysis have already been mentions but they are defined more fully here, as follows.

#### **Effective Royalty Rate (ERR)**

This statistic represents the minimum share of gross revenue a government can expect during any given accounting period. An ERR would not exist in a system with only profits-based levies. But in such a system there could be accounting periods in which a company could have sufficient deductions that it would be in a non-tax-paying position and the Government would get nothing.

ERRs comprise fiscal elements such as royalties, or royalty-equivalent instruments where the basis for determination relies on gross revenue, or net revenues (such as Severance or Ad Valorem taxes). The most essential criteria is that these levies are not based on profits. The ERR in Wyoming is comprised of the Federal Royalty, Severance Tax, and Property (or Ad Valorem) Tax.

While the Government Take statistic quantifies the important division of profits, the effective royalty rate (ERR) provides insight into "how" and "when" the government receipts are received. It is also measures how 'front-end loaded' or regressive a system is. The ERR is an important index that adds dimension to the 'Take' statistics—it is an important "companion statistic".

#### **Effective Tax Rate (ETR)**

The effective tax rate comprises the Federal CIT + State CIT, which for Wyoming is only 22% since Wyoming has no State CIT.

**Note:** Use of this terminology is not consistent with all references to an *effective tax rate* within the Peer Group or industry literature. Sometimes the term refers to the combination of severance and ad valorem taxes. Because of this, the term is confusing and cannot be assumed to represent anything specific unless, like here, it is clearly defined

However, a distinction is made here for the purpose of clear communication. As an example, based on this definition, a situation with a State income tax of 10% and a Federal tax of 30% would yield an Effective Tax Rate of 37% (not 40%). This is because State taxes, ordinarily, are deductible for the purpose of calculating Federal tax.

#### **Economic Profits**

Economic Profits are equal to Gross Revenues less Costs.

#### **Government Take**

This statistic represents the total percentage share profits from all royalties, taxes, levies, imposts, duties or any of the means by which the Government (both Federal and State collectively) get a share of Economic Profits.<sup>15</sup>

Table 3: Division of Revenues and Profits "Take" Federal Land

#### The Division of Revenues and Profits 'Take'

From a company point of view Oklahoma provides a higher share of profits on Federal lands. However fiscal terms alone do not determine when and where an oil company will decide to explore for or develop hydrocarbons. Geology is king but fiscal terms are nearly as important.

	СО	MT	NM	ND	OK	TX	UT	WY
Effective Tax Rate	10.0%	9.0%	5.8%	11.5%	4.0%	9.6%	5.0%	12.8%
Effective Royalty Rate	21.3%	20.4%	17.5%	22.6%	16.0%	20.9%	16.9%	23.7%
Gvt Take*	48.2%	48.4%	45.0%	50.5%	43.4%	45.3%	43.8%	48.4%
Fed Share	23.9%	23.8%	24.8%	23.2%	25.2%	24.7%	25.1%	23.9%
State Share**	24.3%	24.6%	20.2%	27.3%	18.2%	20.6%	18.6%	24.5%
Company Take	51.8%	51.6%	55.0%	49.5%	56.6%	54.7%	56.2%	51.6%

<sup>\*</sup> Calculated at costs equal to 40% of Gross Revenues

<sup>\*\*</sup> The Federal Royalty split between the States and the Federal Government is 48%/52% in favor of the Federal Government.

<sup>&</sup>lt;sup>15</sup> With the exception of bonuses.

Table 4: State and Local Tax Liability for Producers

#### State and Local Tax Liability FY 2016-17

Millions of Dollars

The information in this table provides a different point of reference for the relative contributions of the various fiscal slements. The bottom row shows the relative percentages that correspond to the tax rates in the Wyoming system and those used throughout this analysis. An effective tax rate is calculated that corresponds to what is sometimes referenced in this report with respect to the Peer Group.

State	Total Oil and Gas Production Value (Gross) <sup>1</sup>	Production Tax <sup>2</sup>	Property Taxes <sup>3</sup>	Income Taxes <sup>4</sup>	Sales and Use Taxes <sup>5</sup>	Total State and Local Taxes	Effective Tax Rate
Colorado	\$8,943.0	\$57.9	\$469.6	\$33.8	\$8.2	\$569.5	6.4%
Montana	\$931.9	\$98.1	\$4.3	\$1.7	-	\$104.1	11.2%
New Mexico	\$8,766.0	\$338.6	\$138.5	\$12.9	\$92.5	\$582.6	6.6%
North Dakota	\$15,560.3	\$1,461.1	-	\$5.5	\$94.0	\$1,560.7	10.0%
Oklahoma	\$13,585.3	\$442.0	\$74.2	\$101.5	\$15.5	\$633.1	4.7%
Texas	\$78,659.2	3,090.1	\$3,748.5	\$473.4	\$698.1	\$8,010.1	10.2%
Utah	\$2,433.5	\$20.5	\$45.4	\$3.1	\$11.5	\$80.5	3.3%
Wyoming	\$6,798.2	\$340.5	\$386.5	-	\$31.0	\$758.0	11.2%
	100%	5%	5.7%		0.45%	11.2%	

<sup>&</sup>lt;sup>1</sup>Oil and gas production values for 2016 were derived from production and price data published by the Energy Information Administration.

Colorado Legislative Council Staff, Memorandum, Effective Severance Tax Rates on Oil and Gas, L. Silbaugh, Principal Economist, January 12, 2018

<sup>&</sup>lt;sup>2</sup>Production taxes include severance taxes and other various types of production taxes

<sup>&</sup>lt;sup>3</sup>Property taxes are based on 2015 values for production and production equipment paid in 2016. Property taxes paid on pipelines and other utilities are not included. North Dakota does not levy a property tax on oil and gas production equipment.

<sup>&</sup>lt;sup>4</sup>Texas does not have a corporate income tax. However, the state franchise tax applies to every business in the state. Wyoming does not have a corporate income tax.

<sup>&</sup>lt;sup>5</sup>Montana does not have a sales or use tax.

**Table 5: Analysis of State Revenues** 

## **Analysis of Government Take from Revenue Data**

This analysis is based on royalty and tax information from the table above - but the analysis is based on the assumption that costs equal 30% of Gross Production Value (Gross Revenues). It provides a different perspective on the division of profits in the far-right column – an Imputed Government Take. Wyoming has one of the two highest overall Takes (Federal, State and County) despite no State Income Taxes.

State	Total Oil and Gas Production Value (gross) 1	Total State and Local Taxes	Federal Royalty 12.5%	Costs as a % of Gross Revenue 30%	Federal Income Tax 22%	Imputed Gvt. Take	Imputed Company Share
CO	\$8,943	\$570	\$1,118	\$2,683	\$1,006	43.0%	57.0%
MT	\$932	\$104	\$116	\$280	\$95	48.4%	51.6%
NM	\$8,766	\$583	\$1,096	\$2,630	\$981	43.3%	56.7%
ND	\$15,560	\$1,561	\$1,945	\$4,668	\$1,625	47.1%	52.9%
OK	\$13,585	\$633	\$1,698	\$4,076	<b>\$</b> 1,579	41.1%	58.6%
TX	\$78,659	\$8,010	\$9,832	\$23,598	\$8,188	47.3%	52.7%
UT	\$2,434	\$81	\$304	\$730	<b>\$</b> 290	39.6%	60.4%
WY	\$6,798	\$758	\$850	\$2,039	\$693	48.4%	51.6%

## **Shale Plays**

Some of the scale of the shale revolution can be seen in the difference in recoverable reserves. During the conventional years of the 1980s, 1990s and early 2000s a typical vertical oil well produced from reservoirs at around 5,000 feet (average) and ultimate recovery was on the order of 40,000 to 60,000 BBLs of Oil.

Gas well reservoirs were typically deeper at around 6,000 feet and ultimate recoverable reserves were on the order of 500 million cubic feet (MMCF).

By contrast, horizontal shale wells will produce up to 5 times more than their vertical counterparts. This is one reason why 95% of todays wells in the US are horizontal wells or have at least some horizontal component. Typical shale well drilling and completion costs are more than for a verticle well but not 5 times as much. Furthermore, the horizontal leg of a typical shale well is easily on the order of 4,000 to 5,000 feet or more, and in some cases up to 9,000 to 10,000 feet.

The following example provides a rough idea of the magnitude and scale of a modern shale well. This example should be used with caution as there is nearly infinite variety on all elements that go into it but the effort here was to provide a good workable example — rough justice.



## **Shale Type Well Economics**

**Expected Ultimate Recovery (EUR)** 350,000 Barrels

Oil price \$70/BBL **\$24.5 Million Gross Revenues** 

Drilling, Fracking and Completion Cost<sup>16</sup> \$5.5 Million **Operating Costs (full cycle)** \$4.1<sup>17</sup>

\$9.6 Million

C D	024 500	31 (1 1 1 1 1 (0000 )
<b>Gross Revenues</b>	\$24,500	Netback Value (\$000s)
Federal Royalty	- 3,063	12.5% (48% goes to the State)
<b>Net Revenues</b>	\$21,438	
Severance Tax	- 1,286	6% Rate (based on Net Revenues)
<b>Property Tax</b>	- 1,447	6.75% Rate
County Tax	- 0	
Sales and Use Tax +	- 49	0.8% (Includes Conservation Tax and other)
<b>Net Revenues</b>	18,661	
Capital Costs	- 5,500	
Opex (LOE)	- 4,100	Lease Operating Expenses
<b>Total Costs</b>	\$9,600	Subtotal All Costs
<b>State Taxable Income</b>	9,061	
<b>State Income Tax</b>	- 0	No WY income Tax
Federal Tax Base	9,061	
Federal Tax	- 1,993	22% Tax Rate
<b>Company Cash Flow</b>	\$7,068	

October 2018 Journal of Petroleum Technology (JPT)

17 Includes bonuses and rental payments and represents the accumulated operating costs for the life of the well i.e. 'full cycle'. Fixed costs assumed to be \$60,000 per year and variable costs \$8/BBL.

#### **Shale Play Characteristics and Implications**

Wyoming has a variety of geological conditions and investment options in the petroleum sector. But just as most provinces in the Peer Group states, shale has come to dominate. There are a number of reasons for this despite the fact that in most other parts of the world shale plays, almost regardless of their geological potential are not happening or at least not on the scale or with the same enthusiasm as in the US. Unlike the US, they do not have the extensive infrastructure, water resources or existing markets in such close proximity to the shales.

One of the most notable characteristics of a shale play, and other 'tight' source rocks or reservoir rocks is the fractures.

The term *shale* has virtually become synonymous with fractures either natural or induced. And, one of the most characteristic aspects of a fractured formation is the production profile. Fractured well decline curves have a distinct feature, a steep initial production decline—a sharp downward hyperbolic curve. For example, a typical Bakken or Three Forks well (North Dakota) may *come in* at 400 – 600 BOPD but after 12 months it will easily be producing at about one half (1/2) to one third (1/3) that rate. In the first full year of production, the *flush production stage*, it can produce about half (50%) or more of its expected ultimate recovery (EUR) and then the production decline will level out somewhat into the more modest phase of the hyperbolic decline. A typical Barnett shale gas well (Texas) may initially produce from 1 to 2 million cubic feet per day (MMCFD) but will decline around 50% in the first year.

By contrast, a conventional well might produce only 10 - 20% of its reserves in the first full year of production and the decline rate will be much slower. This can be seen in Figure 1. One of the virtues of a shale production profile is that the reserves are produced more quickly and present value discounting doesn't have as great a negative effect as it would with a slower-producing conventional well. Companies achieve payout much sooner.

#### Reserve Size

As mentioned above, conventional US oil wells of the past produced around 50 - 60,000 BBLs of oil in a 25 to 30-year lifetime compared to 300,000 – 400,000 BBLs for today's horizontal shale wells.

Gas well production and recoverable reserve statistics are hard to compare because much of the gas information is based on barrels of oil equivalent (BOE). This statistic has questionable value for a couple of reasons. A typical BOE statistic provides no clue as to

<sup>&</sup>lt;sup>18</sup> One rare exception to this generalization is the Vaca Muerta (Dead Cow) shale in Argentina which is booming right now and expected to reach 500,000 BOPD and 4 Billion cubic feet per day (BCF). Note: these are early estimates which should always be used with caution. https://www.bbva.com/en/vacamuerta-worlds-second-largest-shale-gas-deposit/

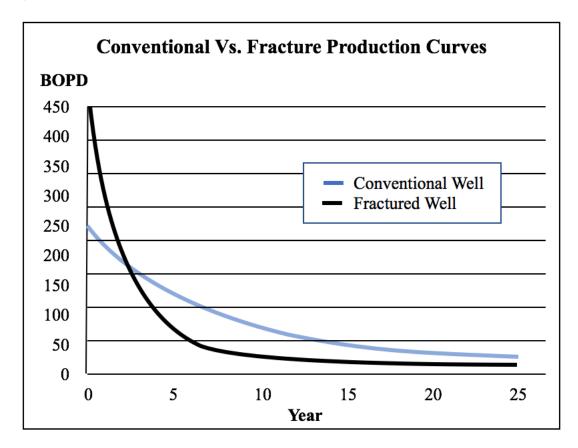
how much of the statistic is based on true liquids as opposed to gas. Most oil wells also produce gas (*associated* gas) and most gas wells produce associated liquids such as condensate. Converting gas to oil equivalent at a ratio of 6 MCF per barrel which is fairly universal bears no direct relationship to *value*. The 6:1 ratio represents a thermal equivalency or heating value parity. Oil prices these days relative to gas are around 20 - 25 times as great which is a *price parity* conversion rate (\$70/BBL v \$3/MCF).

#### **Fractured Reservoir Production Profile**

This graph illustrates a typical production profile for a fractured reservoir with either natural or induced fractures. It is contrasted with the kind of decline curve found with most conventional, vertical wells.

One of the most characteristics features of a fracture play (shale) is the steep decline rate. With many shale reservoirs, the percentage of recoverable reserves produced in the first year can be up to 50% or more.

Figure 4: Conventional vs. Fracture Production Curves



#### **Unconventional Plays**

The term 'unconventional' often implies unusual technical and financial challenges and normally higher drilling and production costs than a conventional play (often associated with a vertical well). With respect to shale, the term is still often applied although shale operations are no longer truly technically unconventional as far as petroleum operations are concerned (i.e. drilling and producing). Most of the technical aspects of shale operations consist of field-proven, off-the-shelf equipment, services and techniques.

However, there are still enough problems and boundary conditions to justify the classification somewhat.

These conditions would theoretically justify corresponding fiscal/contractual terms to mitigate some of the added frustrations, financial burden and attendant risks. Or, special and unconventional fiscal terms or mechanisms might be expected to encourage a specific sector of the industry such as shale. These can take a variety of forms. The simplest and most effective incentive would be lower Government Take but this too is rare. It is not as if governments force these terms on an unwilling industry. Even some of the toughest terms in the industry for conventional or unconventional plays is determined by the marketplace – usually through competitive bidding. Therefore, what may be considered inordinately high Government Takes are mostly 'self-imposed' by industry.

While there are certainly many examples of contract/fiscal terms and conditions that might be considered to be unconventional or at least accommodating in some fashion or another they ordinarily have not correlated well with unconventional plays.

However, robust profit potential like we are seeing in the US shale plays these days was not something that ordinarily correlated with *unconventional* enhanced oil recovery (EOR) or rehabilitation projects of the past. Besides, just as in the past, the terms are market driven.

Otherwise, there hasn't been a significant response in fiscal terms for unconventional plays. Robert Beck of Anadarko's International Gas Commercialization team told Forbes:

"Most of the fiscal terms that the other countries have in place are totally incompatible with unconventional development." 19

The general tenor of his remarks was one of frustration and many oil company personnel share this opinion but do not necessarily confine it to unconventional petroleum operations.

<sup>&</sup>lt;sup>19</sup> Jeff Schlegel, Omar Samji, D. Stringer, M. Rockhill, *Obstacles to Foreign Development of Shale Gas*, E&P (Nov. 1, 2013).

#### **Statistical Plays**

Fractured reservoirs are nothing new. The Austin Chalk in Texas was a famous example of a fracture play. The main characteristic was the drilling success rates. Exploration drilling had about the same success rates as development drilling. A well almost always found some hydrocarbons (technical success) but the results were significantly lognormal. Some wells were spectacular producers but these represented only about 15-20% of the wells and were located in "sweet spots" where the natural fracture density was greatest. These wells would often represent 70-80% of the production from a balanced portfolio of wells. The fractures were not detectible by any technique other than to simply drill. A company had to drill enough wells, a statistically significant sampling, to guarantee a reasonable chance of finding some of the sweet spots. Because of this it was often referred to as a 'statistical play'.

#### **Technology Plays**

As the statistical formula evolved, the Chalk became a drilling boom. Later, fracking technology (*acid fracs*<sup>20</sup>) launched a second boom. Then, with horizontal drilling, as the technology matured, the Chalk experienced a third boom especially when it was combined with fracking technology. Thousands of wells were drilled in the Chalk trend that stretched from Southwest to Northeast Texas. Now the industry is re-visiting this trend and drilling the Eagleford Shale which underlies the Chalk and is considered to be the main source rock for the Chalk.

#### **Resource Plays - Harvesting - Wyoming's Future**

Today's shale boom is the result of all of these developments, investment philosophies, and technology. The shales, and similar such plays, go beyond a pure technology or statistical play. Some reservoirs simply require drilling on a grand scale. These occur where the location, volume and extent of a reservoir are well known and the techniques are already established, a hallmark of the US shale revolution.

In these situations, what is most efficient is an ongoing drilling program to *harvest* the resource. These plays therefore are typically characterized by high-density and large-scale drilling operations.

The concept of harvesting a resource play is the driving force behind two big projects in Wyoming: the Naturally Pressured Lance (NPL) project, which has been approved by the BLM and the Converse County Oil and Gas Project (CCOGP) awaiting approval. These projects are a sign of the times. The greater efficiency of these kinds of investment strategies and operations will yield relatively greater rewards for both industry and government.

<sup>&</sup>lt;sup>20</sup> The Chalk wells were typically fracked with acidic fluids because the Chalk was a carbonate rock similar to limestone which dissolves in acid.

Each of these projects are classic examples of a harvesting operation. This can be seen in the scale of the operations, the total acreage, the number of wells and proposed drilling schedule. The NPL project proposes drilling roughly one well per day for 10 years. At one well per day the CCOGP would take nearly 14 years do drill all of its 5,000 proposed wells.

One beneficial aspect of today's horizontal drilling technology is that such high-density drilling programs can take place from multi-well drilling pads and the use of walking rigs that do not require rigging down and back up for each individual well. This will significantly reduce the operational footprint on the land. Typical vertical drilling of the past would have required a separate site-specific drilling location for each well and the attendant infrastructure requirements such as roads and processing and storage facilities and gathering lines. Many of the requisite roads, pipe, processing and storage facilities for these two harvesting operations have not yet been constructed but there will be far fewer with the kind of development plans for these projects than for conventional vertical drilling operations.

Aside from this, and just as importantly, is the water issue. Water goes hand-in-hand with these operations. It is required for drilling fluids, which is not a major requirement but also for the fracking operations which can be substantial at 2-5 million gallons per well (equivalent to 3-8 Olympic-sized swimming pools). The CCOGP estimates 2-3.4 million gallons per well. And just as important is the produced water and how to handle that. It is expensive. The water cut for recent wells in the Power River Basin is on the order of 30-40%. Therefore, a well producing 1,000 to 2,000 barrels of fluid per day will produce 300-700 barrels of briny water per day. This will need to be either reinjected or produced into evaporation ponds. But there is not much evaporation during a Wyoming winter.

There are numerous other issues but it was important to mention a few, particularly the water – access to water for the CCOGP is a particularly thorny issue.

## Vital Statistics — Normally Pressured Lance (NPL)

County Sublette (East-central Wyoming)
Company Operator Encana 70% (Jonah Energy initial)
Initial Application June 2011 (Scoping Report submitted)

Jobs 875 full time over life of project

Project Life 40 years
Area 141,080
Wells 3,500

18 pads

Depth 6,500 to 13,500 ft.

Rigs 10

Drilling Time 10 years – 350 Wells per year

Reserves

Oil No mention of condensates or natural gas liquids found

Gas 7 TCF

Water 25,000 Barrels recycled water per well to drill

Approval ROD (The Decision Section 3) 2018<sup>21</sup>

Status Jonah Energy approved to submit site-specific drilling + Assumed Gas Price \$2.57/MCF (based on Fed estimate of gross revenues)

WY Royalty Receipts \$1.1 Billion (Fed estimate)

Other Jonah disagreement over Path of the Pronghorn

 $<sup>^{21}</sup>$  U.S. DOI BLM NPL Natural Gas Development Project, Wyoming - Pinedale Field Office 28 August 2018, Record of Decision issued

#### Vital Statistics — Converse County Oil and Gas Project (CCOGP)<sup>22</sup>

County Converse (West-central Wyoming)

Companies Chesapeake, Anadarko, Devon, EOG and SM

Proposal to BLM 2014<sup>23</sup> **Initial Application** 8,000 over project life<sup>24</sup> Jobs

Project Life 40 years

150,000 acres<sup>25</sup> (most quoted acreage in industry literature) Area

Public Lands<sup>26</sup> 88,000 surface acres 6% BLM

965,000 mineral acres 64%

**Public Surface** 64,000 acres 4% Forest Service

State Surface 7% Private Surface 83%

State + Private 46% mineral acres

Wells 5,000

16 wells per section

Average Well 30 - 50 BOPD

1,500 pads

Depth

Rigs 50

**Drilling Time** 10 years

Reserves

Oil 1.37 MMBBLS

5.79 TCF - 4,266 GOR Gas

Water 50,000 - 80,000 BBLS per well

2.1 MM - 3.4 MM gallons

9,750 acre ft per year

About 3 billion gallons of produced water per year

<sup>&</sup>lt;sup>22</sup> https://www.oilandgas360.com/public-government-agencies-divided-over-5000-well-oil-gas-megaproject-in-wyoming/

<sup>&</sup>lt;sup>23</sup> https://eplanning.blm.gov/epl-front-

office/projects/nepa/66551/105286/139021/CC EIS Scoping Report.pdf

<sup>&</sup>lt;sup>24</sup> BLM statistics, https://www.blm.gov/programs/planning-and-nepa/plans-indevelopment/wyoming/converse-county-oil-and-gas-project

25 This (150,000 acres) is the most often quoted statistic for the CCOGP area

<sup>&</sup>lt;sup>26</sup> BLM statistics

Disposed of through evaporation ponds or reinjection

Approval Waiting

Other "Split Estate" Only 10% of surface is Fed owned

but BLM owns over half of the resources

Site Restoration \$10,000 bond required,

but reclamation cost estimates range from \$65,200 to \$100,000 to clean up deeper, longer-reach wells.

## **Red Tape**

One of the more important, but non-fiscal, elements of conducting petroleum operations in any country or province is the nature of the bureaucratic process. Part of the analysis of country/political risk is an assessment of the authorization and permitting protocols, process, costs, fees and timeframes.

This aspect of doing business in a given province or jurisdiction is difficult to quantify in terms of economic impact, but there are some indicators that help capture and quantify the relative efficiency of the process. For example, an ordinary part of country risk analysis is the yield spread or default spread on government bonds relative to the US government bond market. Doing business in the US is considered to be essentially risk free in this context because US AAA bonds are the gold standard against which other countries are measured.<sup>27</sup> However, this is one of rare examples of how country risk can be quantified.

While doing business in the US is considered nearly risk free in this respect, relative to most other countries, it is only one aspect of the business environment. On another level, some places are famously frustrating, inefficient, and time consuming when it comes to the authorization process and doing business with 'the authorities'.

Often referred to as *red tape*, the term applies to inordinately and unreasonably long and frustrating aspects of the bureaucratic process.

Industry and governments, government agencies, provincial authorities and municipalities can experience considerable frustration with each other, with the processes, and with ordinary communications between government officials, company personnel and citizens.

In this respect, the US government is criticized for alleged inefficiencies and delays with respect to applications for drilling permits (APDs) on federal land. However, this kind of industry grievance is age-old and universal. This does not mean it is an invalid complaint and it is not confined to industry criticism.

## **Wyoming Experience**

The time and effort required to overcome Federal objections and requirements is a complaint from both industry and state governments. In Wyoming, it is claimed that the average processing time for a drilling permit through Wyoming's bureaucratic process is 60 days while the BLM takes over 200 days. Moreover, the dual approval process is an obvious duplication of efforts.

<sup>&</sup>lt;sup>27</sup> In the capital asset pricing model (CAPM), US Treasuries are used as the 'risk free rate' benchmark.

<sup>&</sup>lt;sup>28</sup> Mark Watson, https://www.energy.senate.gov/public/index.cfm/files/serve?File\_id=B4DFC599-8B2E-4063-8C4C-F47B9E4B3377

Some of the ramifications of the problem are best described by Mark Watson, Director of the Wyoming Oil and Gas Conservation Commission:

More of the proposed wells in Wyoming are encountering a combination of minerals by drilling through and producing from a mix of federal, fee, and state minerals. The uncertainty and potentially long wait times for BLM approval of fracking operations will act as encouragement for operators to exclude the federal minerals from the planned well. This will potentially strand the federal minerals, leaving them out of the production of the well and creating waste. There have already been several cases of federal minerals being excluded from drilling and spacing units that have been approved by the Wyoming Oil and Gas Conservation Commission due to the length of time it takes the BLM to approve an APD.<sup>29</sup>

#### **New Mexico**

Another example of the importance of this issue is New Mexico, which is the one other state in the Peer Group with nearly the same magnitude of Federal lands as Wyoming and good geology. Utah, for example, has considerable Federal land ownership but is geologically inferior to New Mexico and Wyoming. New Mexico Governor Martinez has urged the Congress to reduce bureaucratic red tape and streamline the permitting process, where it is reported that federal authorities take an average of 250 days to approve a drilling permit application.

These delays have created a backlog, the Governor says, that amounts to a potential loss of \$2 million a day. It represents loss of good jobs and economic growth and delays in State revenues from royalties and taxes.

Further approvals required for horizontal drilling and fracking operations add to this.

## Wyoming and Colorado vs. BLM

In June 2016, a Wyoming federal district court issued its final decision in the case, State of Wyoming, State of Colorado v. U.S. Dept. of Interior.<sup>31</sup> The case began in 2012 when the BLM claimed authority to regulate hydraulic fracking on Federal and Indian land.

The Court held that the Fracking Rule,<sup>32</sup> was unlawful, that the BLM failed identify a regulatory gap needed to be addressed. It claimed, "the agency had proposed a solution in search of a problem" that it would simply overlap existing regulations.

<sup>30</sup> New Mexico Governor: Red Tape Slows Oil and Gas Projects AP Albuquerque, N. M. 6 June 2018, https://www.usnews.com/news/best-states/new-mexico/articles/2018-06-06/new-mexico-governor-congress-should-address-red-tape

<sup>&</sup>lt;sup>29</sup> Ibid.

<sup>&</sup>lt;sup>31</sup> Case No. 2:15-CV-043-SWS

The distinction between legitimate conduct of the bureaucratic process and unrealistic, unreasonable legislation and regulations is blurry. But there are many complaints,

Still another example is where the Colorado legislature is considering requiring a 2,500foot buffer zone between drilling operations and dwellings. It is claimed by industry that this could allegedly cripple normal drilling activity. It became a ballot initiative in 2018.33

The counterpoint is, that there are dangers of short-cutting environmental laws and that it is not appropriate to exclude the public from the permitting process. Public hearings, transparency, and environmental impact studies are simply mandatory, by any standard, but the process should be reasonable.

However, as is often the case, a valid test of reasonableness does not exist, but the time difference between the BLM and State approvals processes in New Mexico and Wyoming does appear to be extreme.

This kind of thing discourages investment activity and New Mexico's governor Martinez's claims of a \$2 MM per day cost (or waste) is impressive. There is a cost, no doubt, but it is beyond the scope of this report to try and verify a claim like this.

There are other examples of the industry's experience confronting the maize of rules and regulations. Another troublesome area is where Federal officials and rules do not allow access to the lands under Federal control.

## Red Tape Claims and the NPL and CCOGP Projects

## The NPL permitting process began in June 2011.

It took over seven years to obtain approval for the NPL project in August 2018. With this decision, the company now has the right to apply for drilling permits (APDs). Hopefully it will not take 260 days to receive a permit as the NPL development plan calls for drilling 3,500 wells over a 10-year period. It is beyond the scope of this report to comment on the reasonableness of the permitting process for the NPL or the length of time. However, it is worth mentioning as this project is often held up as the poster child of bureaucratic sludge and red tape and 7 years, by world standards, is a long time. Furthermore, much of the technology that existed 7 years ago and described in the proposed development plans have evolved significantly and render some of the proposed operations obsolete. Fortunately, most of the technological evolution will potentially benefit all parties in terms of operational efficiency, environmental impact and economics – if the companies can survive such long lead times.

<sup>&</sup>lt;sup>32</sup> Fed. Reg. 16,128

<sup>&</sup>lt;sup>33</sup> https://energymarketingpro.org/energy-news/tulsas-rebellion-energy-makes-100-million-commitment-topowder-river-basin/

## The CCOGP permitting process began in 2014 and is still underway.

The CCOGP is based on a 5,000 well drilling program. Environmental concerns with this project are considerable because of the need for huge amounts water for fracking operations and the need to deal with produced water.

Shale operations, characterized by horizontal drilling and fracking operations are notable for the large amounts of water required but Converse County is an arid part of the state. This is one important thing that distinguishes this project from the NPL.

**Table 6: APD Completion Times in Days** 

Time to Complete an APD on Federal and Indian Lands								
Current time to complete an APD is 260 days, or nearly 9 months with the BLM. But some projects have gone much longer.								
Year	Days to Completion	Year	Days to Completion					
2005	154	2012	228					
2006	218	2013	194					
2007	196	2014	227					
2008	212	2015	220					
2009	247	2016	257					
2010	236	2017	260					
2011	307							
Source: BLM			•					

## Lease Suspensions and License Stockpiling

Lease suspensions are the kind of things that often attract criticism. This is because the rules and regulations can allow companies to hold onto acreage indefinitely with the attendant labels or accusations of hoarding, stockpiling or warehousing of acreage.

A company's ability to hold on to acreage without overt exploration or development activity is the hallmark of this concept. The key license provisions that govern this concept deal with license term, duration, relinquishment provisions for unused or unworked acreage, license extension provisions, suspension options or rights, and so forth.

All of the Peer Group have provisions that allow for license extensions as well as suspensions that allow companies to hold on to acreage for extended periods in some cases. One source estimates that taxpayers have lost more than \$80 MM in lost rentals alone (not to mention delayed royalties and taxes).<sup>34</sup>

The lease extensions and suspension options have purpose though and this is particularly true in the context of today's shale operations and the harvesting principle. It takes time to amass a properly sized acreage position for a large-scale harvesting operation like the NPL or the CCOGP. It is usually the case in the Peer Group states that landholdings are scattered and splintered and can range in size. However, critics will hastily point out that some leases have been held for decades with no production. It is hard to argue that some of this kind of activity or rather lack of activity may be some form of unsavory warehousing or stockpiling.

**Table 7: License Duration** 

## License Duration

The duration provisions and extension or suspension options determine how long a block can lie fallow and unworked.

	CO	MT	NM	ND	OK	TX	UT	WY	Fed
Primary Lease Term (Years)	5	10	5-10	5	3	5	5	5	10
Extension	1 Yr Incs	Yes with cause	1 Yr	2x180 days	Yes	No	Yes	5 Yrs + 1 Yr Incs	No
Suspended Federal Lease Acres (000s)	270	1,076	79				930	593	

Incs = Increments

Source: http://www.glo.texas.gov/wslca/downloads/conferences/2016/Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

Wilderness Society, "Land Hoarders: How Stockpiling Leases is Costing Taxpayers", https://wilderness.org/sites/default/files/TWS%20Hoarders%20Report-web.pdf

WIA Fiscal System Study 2 November 2018

41

<sup>&</sup>lt;sup>34</sup> The Wilderness Society's report: "Land Hoarders: How Stockpiling Leases is Costing Taxpayers".

## **Race for Operatorship**

Another aspect of the stockpiling issue has to do with the deluge of drilling permit applications Wyoming has seen lately. With 400-500 application hearings a month, the Wyoming Oil and Gas Conservation Commission has a 10,000 – 12,000 application backlog. The onslaught is part of a "race for operatorship" due to a rule that allows a company to obtain operatorship of a drilling operation if it is granted a permit regardless of the percentage ownership in the lease.<sup>35</sup>

This is a classic example of unintended consequences or distortions that can arise with rules and regulations that are not prepared for changing circumstances. The industry has changed, companies respond, and governments try to keep up. So, earlier this year the Commission revised policy requiring applicants to submit rig schedules indicating a serious commitment in order to obtain priority for review.

The company activity, which just a few years ago would have seemed bizarre, is mostly based on the changing nature of the industry and the demands of efficient shale operations consistent with the notion of harvesting as discussed in the context of the a CCOGP or NPL project.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>35</sup> Mark Watson, Journal of Petroleum Technology, October 2018, pg 36

## **Reserve Reporting - Booking Barrels**

In addition to the ease of 'stockpiling' acreage due to low rentals and royalties on federal land, oil and gas companies have another important reason for acquiring (stockpiling) acreage.

"As of 2017, nearly 26 million acres of federal land were under lease to oil and gas developers in the United States. But according to the Bureau of Land Management (BLM), which oversees the federal government's onshore subsurface mineral estate, not all of these leases are poised for future production. In fact, in 2017, less than half of the nearly 26 million acres were producing any oil and gas." <sup>36</sup>

Mark K. DeSantis for the Center for American Progress.

Acquiring acreage, in a shale play in particular, allows companies to increase their reported reserves – or 'book barrels'. In 2008, the Securities and Exchange Commission (SEC) relaxed oil and gas reserve disclosure requirements. In a nutshell, it allowed companies to book more barrels than they were previously able to do.

Reported or "booked" reserves are a key stock market index and increases in a company's reserves base has a direct positive impact on a company's stock price, or market capitalization (Market Cap).

The more reserves a company can book the lower their finding costs and the higher their reserve replacement ratio. Shareholders and analysts follow these trends.

Increased reserves also help companies raise capital through reserve-based lending.

Following the SECs relaxed reserves reporting requirement, reported proved undeveloped (PUD) reserves increased significantly. Acquiring additional acreage, especially under these rules and in a shale play is an important part of that process. This is because, as discussed earlier, shales are well-defined, non-exploration operations. Much of the acreage in a known trend can relatively easily be classified as proved but yet to be developed – PUD.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>36</sup> "Oil and Gas Companies Gain by Stockpiling America's Federal Land", by Mark K. DeSantis, https://www.americanprogress.org/issues/green/reports/2018/08/29/455226/oil-gas-companies-gain-stockpiling-americas-federal-land/

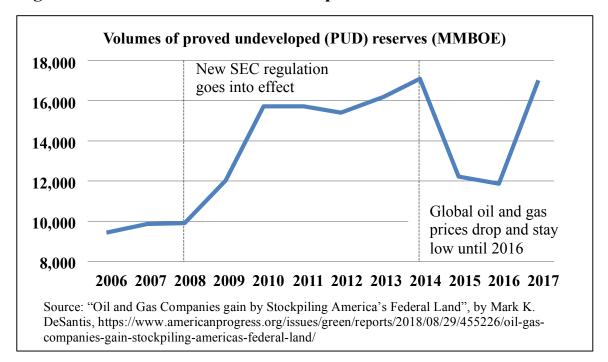


Figure 5: Volumes of Proved Undeveloped Reserves

This graph shows a sharp increase in booked barrels (PUDs) resulting in the SEC rule change which until 2008 were more difficult to enter into a company's books. It also shows the impact of oil prices because in order to 'book barrels' they must be commercially feasible which is partly a function of oil prices.

The natural questions are: Do the companies plan to develop the acreage? How soon? Do they have a real obligation or commitment to develop the acreage? If not, how long do the license provisions allow this acreage to lie fallow?

## **Speculative Leases**

Another perspective on the subject of lease stockpiling or warehousing, is the concept of 'speculative leases'.

Existing oil and gas leases on federal lands in six states were screened for four characteristics, using BLM data, to determine the extent of unreasonable speculation. Below are tables showing acreage and leases with 'speculative characteristics'.<sup>37</sup>

<sup>&</sup>lt;sup>37</sup> "The Cost of Speculation in Federal Oil and Gas Leases", Energy & Natural Resources, Oct 3, 2017 https://www.taxpayer.net/energy-natural-resources/locked-out-the-cost-of-speculation-in-federal-oil-and-gas-leases/

**Table 8: Acreage of Leases with Speculative Characteristics** 

## Acreage of Leases with Speculative Characteristics by State

This table shows speculative lease <u>acreage</u> with four key characteristics with Wyoming leading significantly in speculative lease acreage.

	Colorado	Montana	New Mexico	Utah	Wyoming	Total
Bid of \$10 or less per acre	200,945	95,799	39,602	164,169	777,553	1,278,068
Speculative Company	119,046	44,319	31,281	150,512	585,352	930,510
Non-Competitive	61,060	38,515	1,760	55,575	124,759	281,669
Isolated	112,510	96,279	75,476	42,768	330,001	657,034
Total with 1 Characteristic or More	361,515	186,292	109,564	284,880	1,344,621	2,286,872

Source: https://www.taxpayer.net/energy-natural-resources/locked-out-the-cost-of-speculation-in-federal-oil-and-gas-leases/

**Table 9: Number of Leases with Speculative Characteristics** 

## **Number of Leases with Speculative Characteristics by State**

This table, similar to the one above, shows <u>number</u> of speculative leases, again Wyoming leads significantly.

	Colorado	Montana	New Mexico	Utah	Wyoming	Total
Bid of \$10 or less per acre	237	152	61	153	785	1,388
Speculative Company	209	95	70	135	595	1,104
Non-Competitive	90	44	1	35	113	273
Isolated	192	199	153	44	316	904
Total with 1 Characteristic or More	470	342	220	262	1,357	2,651

Source: https://www.taxpayer.net/energy-natural-resources/locked-out-the-cost-of-speculation-in-federal-oil-and-gas-leases/

Taxpayers for Common Sense (TCS) identified four characteristics of federal oil and gas leases that indicate they might be unreasonably speculative, given the likelihood these leases will be terminated without ever reaching production.

The logic underpinning this analysis is compelling and is reproduced as follows.

#### The four factors are:

#### 1. Parcels leased for less than \$10/acre.

Rationale: According to the CBO, the industry developed only 8 percent of parcels that were leased for \$10/acre or less in one eight-year period, compared to 25 percent of parcels that were leased for \$10/acre or more.

# 2. Parcels leased by companies that are not exploration and production companies.

Rationale: Many of these leaseholders have never filed a production report or drilled a well and are not recognized as "active" operators by state oil and gas agencies. Their ownership of a lease can only be regarded as speculative, and unlikely to lead to production by the leaseholder.

#### 3. Parcels leased non-competitively.

Rationale: Before a parcel can be leased non-competitively, it must be made available in a competitive auction and receive no bid. A parcel's failure to attract bidding is an indication of its low potential for production. Only 3 percent of non-competitive leases issued in the years 1996-2003 were ever developed.

#### 4. Leases isolated from producing leases or infrastructure.

Rationale: If leases are "isolated" – not reasonably close to producing leases or the corresponding infrastructure (e.g., roads, pipelines) and known reserves – then it is more likely they are speculative.

#### Speculative Leasing by the Numbers

Taxpayers for Common Sense analyzed BLM data for all onshore oil and gas leases authorized in six western states between July 2007 and July 2017. The subset of leases on which production has not yet been recorded were screened to identify how many had one or more of the above characteristics of unreasonable speculation.

Whether this view on 'speculative' leases is accurate or not it is based on what appears to be 'main stream' thinking and it has some logical appeal. It is fairly easy to stockpile acreage on federal land because minimum bonus bids are low and rentals are not high enough to dissuade speculators and because of the relatively loose duration and relinquishment provisions as well as suspension and extension provisions.

## **Basic Elements** — Terminology and Definitions

Terminology and definitions for the various royalties, taxes and levies are not consistent throughout the Peer Group states or the global market. Terms and definitions in this report are consistent with the most common usages. However, alternate terms and definitions are provided and explained as appropriate.

This is important because there is a plethora of different terms for various fiscal elements, concepts and metrics. Furthermore, there is almost no consistency to the names applied to or terms used for different fiscal instruments or even concepts.

While the states in the Peer Group do not use the same terminology most of them do have equivalent taxes or levies to those found in Wyoming in terms of the tax base and the calculation/accounting sequence as outlined above.

The United States is relatively unique with numerous layers of different fiscal elements. This is particularly true of the mechanisms such as the Severance Taxes and Ad Valorem, or Property Taxes that have more of the economic characteristics of a royalty than of a profits-based tax (such as State and Federal taxes). In fact, in most of the world, use of the term *tax* implies a profits-based levy.

The following discussion follows the general sequence of events or concepts associated with petroleum operations in terms of the key fiscal elements, terminology, economic aspects, and analytical metrics.

## Bonuses – Much of the process begins with bonuses.

Bonuses are not considered to be a normal fiscal element in this analysis, or most others. This is because they are not specifically required nor legislated other than when minimum thresholds are established. Also, instead of a percentage, the rate is denominated in terms of dollars based on acreage (\$/acre). Beyond that, bonuses are established by the market, i.e. *self-imposed* or *self-inflicted*. The magnitude of the bonuses relative to the fiscal elements described above is low. However, bonuses are tax deductible and are thus represented as such in the calculations above as they have been included with operating costs.

# $Bonus\ Bidding --- The\ Equalizer$

There are two important dimensions to the subject of bonuses: the important theoretical position they hold, and the relatively modest amount of money involved – usually.

Bonuses have long held a dynamic position in the industry as being one of the two main components of what constitutes risk capital. Exploration operations, mostly drilling costs are the other component. With conventional exploration operations bonuses (often called

signature bonuses) could be significant and were unpopular as they resided on the risk side of the investment spectrum. Bonuses are paid whether or not a discovery is made. Royalties and taxes are only incurred if a discovery is made, developed and produced.

In almost all countries around the world, oil and gas leases, licenses or contracts are offered through a competitive bidding process and awarded to the highest bidder. The key bid parameters include bonuses, royalties, production sharing, or special petroleum taxes.

With provinces like those in the Peer Group most fiscal elements are fixed and leave little flexibility for variations in such things as geological potential. Bonus bidding allows the market to weigh the differences and quantify them in terms of a bonus bid. Therefore, the bidding process therefore allows the free market to establish a fair value. However, this is not a spotless theory.

In 1983 when the BOM (now the Bureau of Offshore Energy Management – BOEM) changed the license allocation scheme from a tract nomination system to an area-wide leasing system, average bonuses dropped by nearly an order of magnitude. The generally accepted theory mentioned above has trouble with this sort of behavior. The difference was governed by the allocation system, which can obviously be important but the geology, fiscal terms and oil prices hadn't changed. Allocation of license rights is discussed further later in this report. Another anomaly worth keeping mind is that many governments for their bid rounds will place a ceiling on the bid parameters if the parameter has to do with a royalty or profits-based mechanism. The reason they do this is in order to avoid overbidding. There is considerable history of this problem and some of the most recent examples are the Mexican license rounds of the last 2 years. After some extremely aggressive bidding in some of the early rounds the government began to set maximum thresholds. It is bidding behavior like this that casts a shadow over the reputed efficiency of the marketplace.

With Federal leases in the US, a company must bid at least \$2 per acre, but bids can range much higher. Bonus bids contribute about 5 percent of all federal onshore oil and natural gas revenues. The rest comes from royalties and taxes.

There is much discussion about the size of bonuses for acreage in the shale plays. Aside from some of the sensational claims of inordinately high bonuses, the magnitude of most bonuses is dwarfed by drilling costs, and even more so by associated revenues from the acreage.

With conventional exploration operations, the effect of the bonus is magnified by the relatively low exploration drilling success rates on the order of 20-35%. Furthermore, these success rates represent only technical success, where a discovery is made, but may not necessarily be a commercially viable discovery. Therefore, commercial success rates are less, around 15-25% depending on the region.

Technical success rates with unconventional shale operations these days are virtually 100%. Not all shale wells end up being a commercial success but shale wells have more

of the characteristics of a development well. So, while a bonus for conventional exploration operations lies on the risk side of the equation, bonuses for a shale operation lie more on the reward side.

A typical shale well in the Niobrara with 300-400 thousand barrels of oil equivalent (MBOE) will generate \$20 - \$30 MM in revenues. Drilling, completion, and operating costs can be on the order of \$10 - \$15 MM. But the bonus for a 60-acre well spacing at \$1,000/acre is only \$0.06 MM.

**Table 10: Average Lease Bonus Bids** 

## Average Bonus Bids Oil & Gas Lease Sale Auctions \$/Acre

The federal acreage bonus bids are for all onshore US. However, because of the large percentage of Federal acreage in New Mexico and Wyoming these BLM statistics are fairly meaningful. These states probably had some of the greatest influence on these statistics. The Landmarks are from industry literature but well documented.

	Federal Acreage*	Wyoming Acreage Landmarks
Year		
2004	35	
2005	46	
2006	51	
2007	48	\$76 average <sup>38</sup>
2008	150	5/6 average
2009	88	
2010	147	\$168 <sup>39</sup>
2011	120	\$474 <sup>40</sup>
2012	149	
2013	193	
2014	170	
2015	230	\$238
2016		
2017		\$355 State Land <sup>41</sup>
2017		\$432 Federal Land <sup>42</sup>
2018		\$5,263 Rebellion PRB <sup>43,44</sup>
2010		\$2,727 State Land PRB <sup>45</sup>
* Source	e: BLM	

<sup>&</sup>lt;sup>38</sup> Statistics for 2006 – 2011 from BOEM. https://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx

<sup>39</sup> Ibid 40 Ibid

<sup>41</sup> https://trib.com/business/energy/wyoming-oil-and-gas-lease-revenue-increases-by-percentin/article 64046af2-f540-5b50-be96-40307bbd77bd.html, These do not represent an average bid. <sup>42</sup> Ibid

<sup>&</sup>lt;sup>43</sup> Tulsa's Rebellion Energy Makes \$100 million commitment to Powder River Basin OK Energy News https://energymarketingpro.org/energy-news/tulsas-rebellion-energy-makes-100-million-commitment-topowder-river-basin/

44 https://af.reuters.com/article/africaTech/idAFL2N1VE1DX, August 28, 2018

<sup>45</sup> Ibid

#### **Gross Revenues**

Gross Revenues in this report represent the netback value of product sales. Statute and constitutional references to this same value or concept use the term 'Gross Product' as the basis for Severance Tax or Property Tax determination. These are often described as Ad Valorem (according to value) taxes and the referenced value is that of either Gross Product or Gross Revenue as it is used and applied in this report.

However, it should be emphasized that there are problems and many sources of confusion with either term but industry-wide, the term Gross Revenues is used most often. The term "Gross Product" is hardly used outside of the legislative purview. Therefore, the term Gross Revenues is used in this context in this report.

However, for the sake of hopefully avoiding confusion down the road, it is worth pointing out that the revenues associated with the ultimate sale of hydrocarbons at the point of sale could also be construed as representing Gross Revenues. This report does not conform to that usage. Sometimes the term "Gross Sales Value" is used to represent the revenues generated at the downstream point of sale. It is this value that is netted back.

Here, therefore, the term Gross Revenues refers to the Netback value of oil and gas which, for all practical purposes<sup>46</sup>, is equal to the value at the point of sale (POS) less transportation costs from the point of sale to the point of valuation (POV) which, in Wyoming, for oil, is usually at the outlet of the initial storage facility or at the lease automatic custody transfer (LACT) unit. For gas, it is at the outlet of the initial dehydrator, or at the inlet to the initial transportation-related compressor, custody transfer meter or processing facility, whichever occurs first.

<sup>&</sup>lt;sup>46</sup> In actual fact, determination of the Netback value or the POS is ultimately a matter of contract interpretation, statute or the Constitution with respect to State Royalties, Severance Taxes and Property Taxes respectively.

## **Royalty Determination**

Federal Royalty – The onshore federal oil and gas royalty *rate* is 12.5%. Wyoming receives 48% of the Federal Royalty.

Wyoming State Royalty is  $1/6^{th} = 16.667\%$  of Gross Revenues<sup>47</sup>

Unlike Federal royalties established by statute, State royalties effectively set at 16.75% are a function of the specific contract between the company and the state, the contract interpretation and case law precedent.

Royalty determination, or rather determination of the royalty *base*, among the Peer Group is handled a number of different ways. They all deal with the value upon which royalties are based and this can impact the Severance and Ad Valorem Taxes as well.

Royalty calculations are one of the most commonly disputed issues between oil companies and governments or landholders. The disputes revolve around the calculation of 'value' of the hydrocarbons subject to the royalty—the *base*.

The reason for this is that royalties have historically been based on 'wellhead' value. However, hydrocarbons are rarely sold at the wellhead, because oil or gas, in its raw form, is rarely in a marketable condition at the wellhead.

Hydrocarbons are often sold far downstream from the wellhead and require some effort to process and transport them to the point of sale.

The difference between the wellhead value and the sales price is a function of the activities and costs associated with dealing with the hydrocarbons between the wellhead and the point of sale. These can include dehydration, gathering, treating, processing, compression, and storage costs (which are sometimes referred to collectively as processing costs) and transportation costs.

There are two fundamental approaches to royalty determination in the United States and they each deal with how these costs are treated: *at-the-well*, or the *historical rule*, and the *first marketable product rule* (FMPR).

#### Historical Rule - At the Wellhead

The at-the-well rule is based on a concept in property law where the landlord or lessor's claim to the royalty is when the oil or gas stream is severed at the wellhead and converted from real property to personal property. The historical rule therefore bases the royalty calculation on wellhead value. It uses a netback formula to determine that value by

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>47</sup> In some cases when interest is low the state will offer royalty rates at 12.5%.

deducting all the costs associated with processing and transportation from the sales price which is downstream from the wellhead.

Netback calculations typically involve deducting all post-production costs (beyond the wellhead) from the downstream sales price. These can include gathering, dehydration, treating, processing, compression marketing and transportation.

Therefore, under the historical rule, the production function ends and the transportation function begin at the wellhead. Courts supporting the at-the-well rule do not focus on the condition of the product at the wellhead. Instead of evaluating the quality of the product, these courts use the point at which the product was severed from the wellhead as the place for valuing the royalty.

Application of this rule, however, is not always simple. Variations in the relevant contract language ('market price at the well', 'market value at the well', 'royalties at the well') for the historical rule have generated many disputes regarding, essentially, the petroleum operations that take place between the wellhead and the point at which the hydrocarbons actually begin to move through the transportation infrastructure.

So, the historical rule essentially sees two categories of cost: production costs which end at the wellhead and the transportation function, which involves all costs beyond that point. Companies prefer this approach because they can deduct all costs beyond the wellhead, referred to as post production costs, from the sales price for royalty determination purposes.

## First Marketable Product Rule (FMPR)

For all practical purposes the FMPR rule makes a distinction between the pre-wellhead (production) costs, the post-production *processing* costs (gathering, dehydration, treating, processing, compression and marketing), and the actual transportation function where molecules are ready for transport beyond the processing and storage facilities.

The Marketable Product Rule, (Marketable Condition Rule, or Minority Rule), is viewed as an extension of the lessee's 'implied covenant to market'. <sup>48</sup> The FMPR rule views some of the costs beyond the wellhead as a production costs, as opposed to transportation costs.

Under this rule, the value used, for royalty determination purposes, is a function of the value of the first marketable product. Therefore, the company must bear all of the post-production costs to the point at which the oil or natural gas is first 'marketable'. This does not necessarily require the existence of an actual commercial market, but it does require that the production be in a condition where it could be sold at that point if a

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>48</sup> The fundamental legal basis for the wellhead rule does not dispute the validity of the implied covenant to market but interprets its application differently.

market existed.

Accordingly, under the FMPR rule, dehydration, gathering, treating, processing, and possibly some compression costs are treated as part of the production function and are not part of the netback costs. Under the historical rule almost all of these costs are considered to be 'post production' and thus part of the transportation function.

Under the FMPR these costs are borne by the producer, but there is some variation among the states as to the treatment of transportation costs beyond that point.

For example, Colorado requires the producer to bear all costs, *including* transportation costs, necessary for a first marketable product.

West Virginia simply defines the marketability point as the sales point. The implication is the producer bears all post-production costs up to the point of sale.

Wyoming is an FMPR State. It is one of the few states that outlines the rules in statute for the Severance Tax and essentially places the royalty POV downstream from the wellhead. The Property Tax is treated the same way but it is not a statutory directive.

Under both systems, at-the-wellhead and FMPR there are alternatives to determining a fair market value at the POV. For example, if the transportation function is not handled by an arms-length third party, another approach may be best. This may be based on comparable sales approach or some other means.

Table 11: Wellhead Valuation vs. Marketable Product

#### Wellhead Valuation vs. Marketable Product Valuation

This table is about how or where states establish a point of valuation (POV) for royalty determination purposes.

Oil companies would prefer to deduct all costs from the point of sale to the wellhead. It essentially puts the lessor in the position of paying for its share of post-production, pre-transportation costs. Oil companies would ordinarily not prefer the FMPR approach.

Colorado	Marketable Product (marketable condition and location - extreme version)
Montana	At the Well
New Mexico	Initially "at the well" now in the marketable product category but not statutory
North Dakota	At the Well
Oklahoma	Marketable Product (More extreme version)
Texas	Historical Rule - At the Well
Utah	
Wyoming	Marketable Product. Statutory (although Wyoming attempts to avoid classification into either the majority or minority rule.
Federal (Onshore)	Marketable Product: The federal regulations implementing the Mineral Leasing Act of 1920 (MLA) require lessees to put oil and gas into marketable condition largely at their own expense; however, the regulations allow certain deductions.

M. Salzman, "Royalty Litigation Update – Where We Have Been, Where We Are, and Where We May Be Going, in Kansas and Beyond" § 18.01 § 18.02 § 18.03

https://www.wsmtlaw.com/blog/caution-new-federal-oil-and-gas-royalty-regulations-take-effect-january-1-2017.html

B. Keeling, "A New Era in Oil and Gas Royalty Accounting" Baylor Law Review, Fall 2017, 69 Baylor L. Rev. 516

<sup>&</sup>quot;CAUTION: New Federal Oil and Gas Royalty Regulations Take Effect January 1, 2017" Oil & Gas Brian Tooley Wednesday, 02 November 2016

## **Wyoming Point of Valuation (POV)**

The statute that governs Severance Tax determination in Wyoming specifically describes a FMPR approach but does not use the term.

#### Wyoming Statutes Title 39. Taxation and Revenue § 39-14-203.

Oil POV W.S. 39-14-203 (b)(iii) The production process for crude oil or lease condensate is completed after extracting from the well, gathering, heating and treating, separating, injecting for enhanced recovery, and any other activity which occurs before the outlet of the initial storage facility or lease automatic custody transfer (LACT) unit

Natural Gas POV W.S. 39-14-203(b)(iv) The production process for natural gas is completed after extracting from the well, gathering, separating, injecting and any other activity which occurs before the outlet of the initial dehydrator. When no dehydration is performed, other than within a processing facility, the production process is completed at the inlet to the initial transportation related compressor, custody transfer meter or processing facility, whichever occurs first;

The POV for State Royalties depends on the contract language and case law interpretation of the contract. By contrast the Severance Tax is governed by statute as outlined above. Property, or Ad Valorem taxes are a product of the State Constitution. However, for royalty determination purposes and for all practical purposes, Federal Royalties, and State Severance and Property Taxes are treated the same – FMPR. This is also generally true of most contract interpretation for State Royalties. It is not an at-thewellhead State.

#### **Netback and Assessment Ratios**

As mentioned previously, Netback refers to eligible deductions for royalty or ad valorem tax calculation purposes<sup>49</sup>. While all of the states treat these costs differently the amount of costs associated with any particular function (dehydrating, gathering, processing, truck or pipe) can range widely depending on infrastructure availability and distance to market.

Not all agencies or organizations use the netback or work-back terminology. In Wyoming the concept is alive but it is commonly referred to as an assessment ratio. However, there are some references in the Statutes to *netback* and the netback concept. For example, as shown in the following table the taxable value or basis for gas in 2017 was only 66% of the actual Gross Sales Value. The netback (or transportation) costs therefore represented 34% of the sales price. The transportation costs for oil were much less at around 8% (i.e. an assessment ratio of 92%).

<sup>&</sup>lt;sup>49</sup> Both Severance and Property Taxes are 'Ad Valorem' taxes

The assessment ratio (for natural gas) typically goes up in times of higher prices and drops with falling prices. This is because while the prices may fluctuate, transportation costs are less likely to fluctuate as much. There is a slight dependency relationship between oil and gas prices and operating costs associated with the transportation function but most of the cost of transportation is depreciation of capital expenditures previously incurred. And, there is only a partial dependency relationship between oil and gas prices and associated operating costs.

**Table 12: Historical Assessment Ratios in Wyoming** 

This table shows the results of netback. For example, it indicates that if a barrel of oil were to sell for around \$50/BBL it would be assessed at roughly 91% of that price for royalty determination purposes - \$45.5/BBL – the netback price. Gas sales have a deeper netback. For example gas, at the point of valuation in Wyoming has historically been assessed at around 60-70% of that price. Netback (transportation) costs are roughly one third (35%) of the sales price.

	Gross Sales Value	Taxable Value	Oil Assessment	Gross Sales Value	Taxable Value	Gas Assessment
Year	Oil	Oil	Ratio	Gas	Gas	Ratio
1999	\$954.5	\$894.1	93.68%	\$2,085.0	\$1,539.5	73.84%
2000	\$1,553.3	\$1,464.1	94.25%	\$4,387.9	\$3,498.0	<b>79.72%</b>
2001	\$1,151.0	\$1,081.8	93.99%	\$4,876.4	\$3,899.5	<b>79.97%</b>
2002	\$1,188.8	\$1,102.8	92.76%	\$3,371.4	\$2,573.1	76.32%
2003	\$1,366.5	\$1,266.6	92.69%	\$6,726.6	\$5,299.8	<b>78.79%</b>
2004	\$1,779.4	\$1,645.9	92.49%	\$8,695.7	\$6,870.6	<b>79.01%</b>
2005	\$2,326.3	\$2,154.7	92.62%	\$12,239.0	\$9,838.5	80.39%
2006	\$2,814.5	\$2,565.0	91.13%	\$10,736.0	\$8,622.6	80.32%
2007	\$3,161.1	\$2,871.9	90.85%	\$9,019.3	\$7,361.8	81.62%
2008	\$4,528.0	\$4,115.0	90.88%	\$14,586.4	\$12,112.2	83.04%
2009	\$2,714.8	\$2,459.0	90.58%	\$7,624.6	\$5,896.4	77.33%
2010	\$3,626.5	\$3,286.1	90.61%	\$10,014.4	\$7,584.0	75.73%
2011	\$4,552.3	\$4,130.1	90.73%	\$9,635.6	\$7,040.7	<b>73.07%</b>
2012	\$4,692.6	\$4,263.1	90.85%	\$6,555.6	\$4,348.7	66.34%
2013	\$5,399.7	\$4,913.5	91.00%	\$7,373.9	\$5,083.0	68.93%
2014	\$6,115.9	\$5,590.6	91.41%	\$8,255.2	\$5,840.9	<b>70.75%</b>
2015	\$3,561.1	\$3,250.2	91.27%	\$4,748.6	\$2,919.3	61.48%
2016	\$2,703.5	\$2,466.5	91.23%	\$3,992.2	\$2,395.7	60.01%
2017	\$3,528.0	\$3,226.5	91.45%	\$4,760.3	\$3,143.4	66.03%

#### Costs

This term in this report, includes all capital costs, both tangible and intangible (Capex), as well as operating costs (Opex). This is a standard usage and definition in the industry. Bonuses have been included with operating costs here and although this may not be theoretically pure it is mathematically correct. Bonuses are tax deductible.

Operating costs are often referred to as Lease Operating Expense (LOE), the costs of operating and maintaining property and equipment on a producing oil and gas lease.

Numerous references are made here to "costs as a percentage of gross revenues". It represents the relationship between cumulative costs and cumulative revenues full-cycle — over the life of a well, project, or field.

This metric is useful for a number of reasons, mostly analytical. In order to compare one system with another, for various purposes, this statistic provides a baseline. Also, it provides comparative insight into one project versus another.

For analytical purposes, it can place all systems on an equal footing as far as assumptions about price and costs are concerned. On average, in the Peer Group, when prices are relatively stable, costs usually range from 30% to 50% of gross revenues. For example, if capital costs and operating costs each amount to \$15/BBL (for a total of \$30) and average oil price is \$70/BBL the costs equal 43% of gross revenues. This would not be surprising for typical unconventional operations.

In extremely profitable regions, like the Middle East, costs can range as low as 10 - 20%. Gulf of Mexico operations usually range from 25 - 35%.

These generalizations do not apply when prices fluctuate significantly although costs are not an independent variable. With higher prices, companies can drill more expensive wells and rig day rates and ancillary services go up but not in tandem.

## **Assumed Costs Full-Cycle**

Part of the analytical process requires assumptions with respect to prices, costs, production rates etc.

It is common in the industry for costs to amount to around 30 - 40% of gross revenues<sup>50</sup>. For example, if oil prices are stable at around \$100/bbl then total costs associated with generating those revenues will likely be around \$30/bbl (capital costs and operating costs). The range of costs can be fairly wide in the global context from 10% to nearly 50%. For analytical and comparative purposes in this report, it is sufficient to assume

<sup>&</sup>lt;sup>50</sup> The range of costs can be significant depending on field size, reservoir and water depths, reservoir pressures, fluid properties, oil and gas prices, etc. However, 30% is a good working number for analytical and quick comparisons. It places all systems on the same level.

something on the order of 30%. The difference in system behavior with higher or lower costs forms part of this analysis.

#### Rentals

Fees paid for acreage held by a company are usually referred to as rentals or delay rentals. Rentals may be viewed as operating expenses by some - but technically they are not. They are paid whether or not a well is drilled. However, they are insignificant compared to all other fiscal instruments or costs. They are based on acreage and typically, in the Peer Group, range from \$1.5 - \$2.5/acre per year. There are a number of variations on this theme but they are modest and subtle. These too have been included in the operating cost category with bonuses.

On Federal land, before production begins an annual rental of \$1.50 per acre is paid for the first 5 years. The rental increases to \$2.00 per acre thereafter.

**Table 13: Rentals** 

	Rentals									
This table compares Rentals for the peer group states and Federal Acreage										
	CO	MT	NM	ND	ОК	TX	UT	WY	Fed	
Current Annual (Delay) Rental	2.50/acre	\$1.50	\$.25, \$.50, or \$1/acre	\$1/acre	Primary term \$1/acre, Secondary term \$4/acre	\$10/acre	\$2/acre	\$1 non produce \$2 for produce	\$1.5 to \$2/acre	
Extension Term Rental	\$10 or market with RR increase	Yr 6 \$1.25 Yr 7- 10 \$2.5	\$1.25/acre	\$10 & \$20/acre	50% of bonus	NA	Yes	No	NA	
Delay rental for life of lease	Yes	Yes	Yes	Yes*	No	No	No	Yes	Yes	
Shut in Royalty Rate	\$4/acre	\$400 per lease or annual rental	2X or 4X rental	\$1,600	\$1/\$3	Double rental	\$2/acre	\$2 to \$50 pre acre	NA	

<sup>\*</sup> There was another source that didn't agree with the ND delay rental for life of lease

Source: http://www.glo.texas.gov/wslca/downloads/conferences/2016/Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

#### **Net Revenues**

The most common use of this term refers to Gross Revenues less Royalty (i.e. 12.5% Fed or 16.67% Wyoming State Royalty). This is the conventional definition and the one used in this analysis. However, this term was used for two different concepts as seen in the economic formulations for a barrel of oil and an MCF of gas. When people use the term Net Revenues, in the onshore provinces in the US this quirky little problem exists. It is almost nonexistent offshore in the US Gulf of Mexico or elsewhere in the world because it is so rare to have more than one royalty-equivalent fiscal levy.

Unlike so many things in this report that have such a wide range of names, this term is an anomaly.

#### **Severance Taxes**

The Wyoming Severance Tax *rate* is 6% (4% on Stripper Wells<sup>51</sup>).

The basis for determining the Severance Tax is gross revenue less Federal Royalty or State Royalty. Severance Taxes behave like royalties in that they are not a function of profits. Therefore, a Severance Tax of 6% cannot be directly compared to a Federal or State Royalty rate. Instead, for example a 6% Severance Tax has the characteristics of a 5.25% royalty relative to a Federal Royalty of 12.5%. This is because the Federal Royalty is deductible for the purpose of calculating the Severance Tax. So, the combination of a 12.5% Federal Royalty and a 6% Severance Tax (effectively 5.25%) will have the exact effect (mathematically and economically) as a 17.75% royalty.

## **Property Tax**

# (County Tax, Ad Valorem, Mill Tax, or Ad Valorem Property Tax, County Gross Products Tax).

Wyoming's Property Tax is a perfect example of what can cause frustration and difficulty communicating. This levy goes by many names. Others do too but this is one of the more frustrating.

Wyoming Property Tax *rates* may change annually depending on the county and based on mill rates. There are various sources that yield different rates and different ways of estimating what the average rate is.<sup>52</sup> The Property Tax *rate*, used in this report, is 6.75%.

One problem with this tax that was discovered in 2015 with the price crash is that payment of the tax was not required for a full year after the taxable event. When many companies went bankrupt in 2015-2016 they left behind unpaid Property Taxes. With most other types of tax the payment is due shortly after the taxable event. So, for example, this problem with Property Taxes was not as severe with Severance Taxes.

The Property Tax essentially behaves in the same way as the Severance tax base on Net Revenues. It is not profits-based. It too has more of the characteristics of a royalty. Thus, just as with Severance Taxes the effective royalty rate for the Property Tax is less than the stated tax rate of 6.75% (assumed in this report). This is because the Federal Royalty is deductible for the purpose of calculating these taxes. This is why both Severance and Property Taxes are regressive.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>51</sup> Defined as a well producing 10 BOPD or less if price is over \$20/BBL or 15 BOPD if average price is under \$20/BBL.

<sup>&</sup>lt;sup>52</sup> "Wyoming Oil and Gas State Taxes", IB WY 2016-002, January 25, 2018, See file: Wyoming O&G Taxes BLM.docx. This source gives an average rate of 6.85%.

## **Royalty Equivalency**

As mentioned previously, the Wyoming Severance and Ad Valorem taxes have more of the characteristics of a royalty than a profits-based tax. These and similar such taxes are either based on Gross Revenues or some variation on that theme.

Converting these mechanisms to a royalty equivalent is straightforward. For example, assuming a royalty rate of 12.5%, Net Revenues equal 87.5%. A 6% Severance Tax based on 87.5% of Gross Revenues is equal to a Gross Revenue-based Royalty of 5.25%.

$$6\% * (100\% - 12.5\%) = 5.25\%$$

Therefore, Wyoming's 6% Severance and 6.75% Property taxes behave like at 5.25% and 5.9% royalties respectively and at those rates are on par with the Federal royalty rate of 12.5%. The total royalty effect is 23.66%.

The combined Effective Royalty Rate (ERR) is a function of the Federal Royalty, Severance Tax and Property Tax, as follows:

## **Federal Lands Effective Royalty Rate**

	Name-plate Royalty/Tax <u>Rate</u>	Effective Royalty <u>Rate</u>	Wyoming <u>Share</u>
Federal Royalty	12.50%	12.50%	6.00%
<b>Severance Tax</b>	6.00%	5.25%	5.25%
Ad Valorem Tax	<u>6.75%</u>	<u>5.91%</u>	<u>5.91%</u>
<b>Royalty Equivalent</b>	25.25%	23.66%	17.16 %

## **Wyoming State Lands Effective Royalty Rate**

	Name-plate Royalty/Tax <u>Rate</u>	Effective Royalty <u>Rate</u>	Wyoming <u>Share</u>
WY State Royalty	16.67%	16.67%	16.67%
Severance Tax	6.00%	5.00%	5.00%
Ad Valorem Tax	<u>6.75%</u>	<u>5.63%</u>	5.63%
Royalty Equivalent	29.42%	27.20%	27.40%

Sometimes the Severance and Ad Valorem Taxes jointly are referred to as "**Production Taxes**" and a distinction is made between them and the Royalty.

#### **State Income Taxes**

Not all States levy a corporate or personal income tax. Wyoming does not, but most of Wyoming's Peers do and the average rate is 5%. The basis for determining State income taxes is Accounting Profit. Deductions include royalties, severance taxes, property or ad valorem taxes and deductible costs. Income taxes are neutral i.e. neither progressive nor regressive. State Tax is deductible for the purpose of determining Federal CIT.

## **Economic Profits vs. Accounting Profits**

A distinction was made above when it was said that the tax basis for calculating a State income tax was 'Accounting Profits. This is because the concept of an economic profit is as simple as subtracting Costs from Gross Revenues. However, none of the taxes mentioned in this report or found in the US are actually based on true economic profits. As mentioned above the tax base for a State Income Tax would be equal to Gross Revenues less Royalties, Severance Taxes, Property Taxes and costs. This is a far cry from true economic profits (Gross Revenues less costs) - thus, the term *Accounting Profits*.

#### Sales and Use Tax

Wyoming does not impose a sales tax on the production of minerals, but on supplies and equipment used in conducting petroleum operations. This includes gas processing facilities, and sales of tangible business assets (such as pipe and other tubulars). Additionally, certain services rendered within an oil or gas well site are subject to the tax.

Also, services performed constructing a well past the stage where the casing is set, or to work-over, or stimulate a well.

However, services that must be completed prior to the setting of production casing, including seismic operations and other geologic services, or deepening of an existing well are exempt.

All of the states have a Sales and Use Tax (or Sales Tax). The official rates in Wyoming depend on the nature of the transactions and the industry. While the tax rate ranges around 5%, for the petroleum industry production operations there is virtually no tax base. So, the effective rate for the industry is less than one half of one percent (0.45%). This figure is confirmed in the revenue data for the State of Wyoming. The tax represents only around 0.45% of Gross Revenues.

#### **Conservation Tax**

The Conservation tax is a relatively obscure tax, not mentioned often in industry publications and reports on the subject of Federal or State petroleum taxation or fiscal

terms. Furthermore, like the Sales and Use Taxes there are different rates quoted by various sources.  $^{53}$  The most reliable rate is 0.04%.  $^{54}$ 

## **State Income Taxes**

Wyoming has no State Income Tax.

<sup>53 (</sup>NCLS — 0.05%) and (CSLB — 0.04%) 54 https://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx page 70

**Table 14: State Corporate Income Taxes** 

## State Corporate Income Tax Rates and Brackets for 2018<sup>55</sup> February 7, 2018

In addition to regular income taxes, many states impose other taxes on corporations such as gross receipts taxes and franchise taxes. Some states also impose an alternative minimum tax and special rates on financial institutions

State	Rates		Brackets
Colorado	4.63%	>	\$0
Montana	6.75%	>	\$0
New Mexico	4.80%	>	\$0
New Mexico	5.90% <sup>56</sup>	>	\$500,000
	1.41%	>	\$0
North Dakota	3.55%	>	\$25,000
	4.31%	>	\$50,000
Ohio		(a)	
Oklahoma	6.00%	>	\$0
Texas		(a)	
Utah	5.00%	>	\$0
Wyoming		None	

<sup>(</sup>a) Nevada, Ohio, Texas, and Washington do not have a corporate income tax but do have a gross receipts tax with rates not strictly comparable to corporate income tax rates. Texas has a franchise tax.

New Mexico reduced its corporate income tax from 6.60% in 2016 to 6.2% in 2017 then 5.9% in 2018.

Source: Tax Foundation; state tax statutes, forms, and instructions; Bloomberg BNA

Adapted from: https://taxfoundation.org/state-corporate-income-tax-rates-brackets-2018/

#### **Federal Income Taxes**

The Federal Tax *rate* is 22%. The tax *base* is equal to gross revenues less Royalty, Severance Tax, Property or Ad Valorem Tax, State Income Tax and other eligible deductions which are comprised mostly of other minor taxes, depreciation or amortization of capital costs, depletion allowance and operating costs.

<sup>&</sup>lt;sup>55</sup> State Corporate Income Tax Rates and Brackets for 2018, Morgan Scarboro Policy Analyst https://files.taxfoundation.org/20180717150707/Tax-Foundation-FF5711.pdf

<sup>&</sup>lt;sup>56</sup> New Mexico's income tax has changed. It was 6.6% in 2016 and now, 2018 is 5.9%.

Table 15: Oil and Gas Lease Terms and Royalty Rate Revisions

## Oil and Gas Lease Terms and Royalty Rate Revisions – Jan 14, 2016

This table from the Colorado State Land Board summarizes their estimate of an "Effective Tax Rate". This source gives a different (lower) estimate of Wyoming's Property Tax (which they refer to as Ad Valorem) at 6.2%

Notice too, the use of the term Ad Valorem Production Tax in reference to, evidently, Wyoming's Property Tax.

	CO	MT	NM	ND	OK	TX	UT	WY
O&G Taxes								
Severance Tax Oil	1.86%-5%	.76- 12.76% <sup>57</sup>	3.75%	11.5%	2-7%	4.60%	5%	6.00%
Severance Tax Gas	1.86%-5%	.76- 12.76%	3.75%	5.0982/ mcf	2-7%	7.50%	5%	6.00%
Conservation Tax	.7–1.5%		.19 - .24%				0.02%	0.04%
Ad Valorem Tax – Property	4 – 15% (4.87%)	3%					1%	
Ad Valorem Production Tax			1–1.5%			2.12%		6.20%
School Tax			3.15- 4%					
Effective Tax Rate	6.80%	7.6%	6.85%	10- 11.5%	3.30%	6.7%	6% (est)	11.7%

Source: http://www.glo.texas.gov/wslca/downloads/conferences/2016/Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

WIA Fiscal System Study 2 November 2018

67

<sup>&</sup>lt;sup>57</sup> These numbers in Montana look odd but this is because of a tax holiday in the early months of production.

## **Overview of the Peer Group**

Within the Peer Group there are some modest differences in fiscal architecture, terminology and definitions, but regardless of this, the basic concepts are hard to avoid. Most means by which government agencies tax the industry are based on either gross revenues or accounting profits.

From industry perspective, the division of profits (Take) is the bottom line in many (but not all respects).

By world standards, the government (State and Federal combined) share of profits (Take) is lower than what might be considered 'average'. Government Take for in the Peer Group states is around 43 - 54% compared to the rest of the world at 65 - 70%. As mentioned previously, almost all published Government Take statistics exclude bonuses and theoretically the bonus bidding in Wyoming and the rest of the Peer Group would make up the difference. <sup>58</sup> But, as mentioned before, it is not a spotless theory. <sup>59</sup>

Within the Peer Group, Wyoming's share of total Government profits (Government Take) on State lands is one of the highest at around 53%. The Federal Government gets a slightly lower share at 47%.

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>58</sup> "Bonuses enhance upstream fiscal system analysis", D. Johnston, A. Derman, Oil & Gas Journal, 8 Feb., 1999. pp. 51-55.

<sup>&</sup>lt;sup>59</sup> "The Bidding Dilemma" D. Johnston, Petroleum Accounting and Financial Management Journal, Spring 2002, Vol. 21, No. 1, pp. 72-86.

**Table 16: Peer Group Composite Fiscal Terms** 

## Simplified Fiscal Terms – Federal Acreage

This table contains generalized fiscal terms assumed for the peer group analysis and 'peer group composite' terms (PCT) for comparison and analytical examples and purposes.

	CO	MT	NM	ND	OK	TX	UT	WY	PCT
Fed Royalty	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
Severance Tax	5%	8%	3.75%	5%	2%	5%	4%	6%	5%
Ad Valorem	5%	1%	2%	6.5%	2%	4.6%	1%	6.75%	5%
State CIT	4.63%	6.75	5.9%	6.4%	6%	-	5%	-	5%
Federal CIT	22%	22%	22%	22%	22%	22%	22%	22%	22%
ERR	21.0%	20.4%	17.5%	22.6%	16.0%	20.9%	16.9%	23.7%	21.25

The assumed severance taxes and ad valorem taxes are based on published rates and published effective rates to come up with a rough average.

As profitability increases throughout this range, government Take increases from around 57% to 70%. This graph in combination with Figure 1 illustrates to a large extent how remote the current terms are from what is happening worldwide.

# **Appendix 1: System Character and Behavior**

Every system has its own unique fingerprint. Wyoming's system is unique but it is not substantially different than its peers. All of these systems are influenced most by their royalties and royalty-equivalent fiscal mechanisms. Because of this, as mentioned previously, the systems are regressive by world standards and by US Gulf of Mexico standards. In Wyoming, roughly 75% of the total Government Take comes from the royalty-equivalent fiscal elements. This describes one of the most significant features of the Wyoming terms as well as that of the Peer Group.

The example calculation below compares two situations, one where costs are 30% of gross revenue and the other with costs as a percentage of gross revenue equal to 0%

#### **Example**

Royalty Rate Tax Rate	25% 20%				
A 100.0 B - 25.0 C 75.0 D - 30.0 E 45.0 F - 9.0 G 36.0  70.0% 48.6% 51.4%	100.0 - 25.0 - 75.0 - 0.0 - 75.0 - 15.0 - 60.0  100% 40.0% 60.0%	Gross Netback Revenue Royalty Gross Revenue less Royalty Costs (assumed) Tax Base Tax (20%) Company Cash Flow  Economic Profits Government Take (% Share of Profits) Company Take			
Economic Profits = Government Take =		Gross Revenue minus Costs $(A - D)$ Gvt. Revenues/Economic Profits $(B+F)/(A-D)$			
Company Take =		Company Cash Flow/Economic Profits $(G)/(A-D)$ ] or $100\%$ - Government Take			

The results from these two perspectives, shows how the system responds to different situations resulting in different degrees of profitability. This can be the result of different prices, costs, or differences in field size. A large field would likely have greater economy of scale than a smaller field and hence a different degree of profitability even if prices were the same and the cost of oil field services were similar.

This system is regressive. In other words, as profitability improves, the government's share of profits goes down from 48.6% to 40%.

## **Marginal Government Take**

The calculation based on the assumption that costs are zero can seem unrealistic or abstract but this is a widely used technique. Analyzing a system from this perspective is almost always called *marginal government take*. This example is one use of the techniques – it helps illustrate the regressive behavior of the hypothetical system outlined above

This approach also quantifies the result of a price increase. If prices were to suddenly increase by \$10/BBL in a system like this and there was no corresponding increase in costs (which is not an unreasonable assumption in the short term) the incremental share of this windfall would be split 60/40% in favor of the company.

All of the examples and calculations up to this point have been based on undiscounted cash flow analysis. With present value discounting, all of the characteristic features described so far, especially the regressive effects, are magnified.

#### Economic model

An economic model was developed to further illustrate system behavior. The following assumptions were used for discounted cash flow analysis.

It was based on the following assumptions:

Oil Price \$50/BBL (No escalation of oil price)

Discount Rate 10%

1<sup>st</sup> year of production 2020 (project year 3)

Production to Reserves (P/R) ratio 29%
Production duration 10 years
Total production 5MM BBLS
Total Costs Variable

(The production profile assumed resembles production shown in the figure below.)

X-axis = production years Y-axis = production volume

The following graph is based on a 10% discount rate and various degrees of profitability represented by costs as a percentage of gross revenues.

Figure 6: Government Take Profile Discounted and Undiscounted

This graph further illustrates the regressive nature of the Wyoming system on Federal Land. It is not unusual for a system to be regressive but this particular system and those of the Peer Group are quite regressive and this attribute is magnified with present value discounting as shown here.

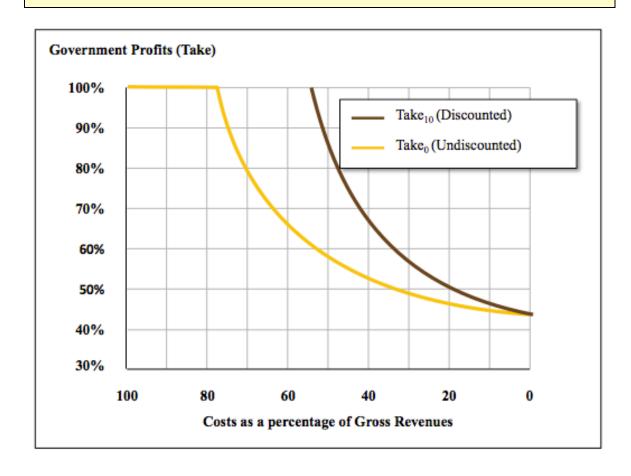


Figure 7: Peer Group Aggregate Take

This graph below shows the Peer Group bandwidth in terms of Government Take from both discounted and undiscounted perspectives. Any one of the individual states would fit within these bands. Wyoming would be at the higher end in each case.

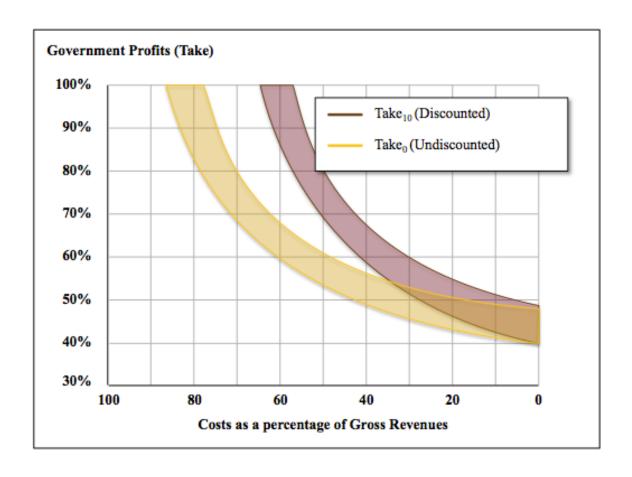
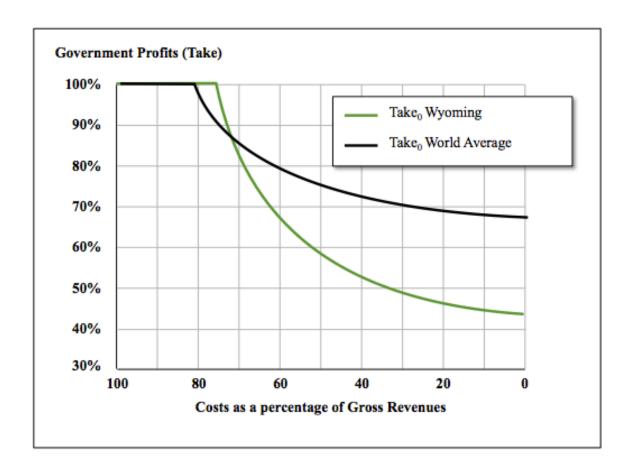


Figure 8: Government Take vs. World Average

This graph shows the response of Wyoming fiscal terms compared to world average terms within the full spectrum of profitability. World average government share of profits, 'take' is 70% when costs as a percentage of gross revenue are 30%. Wyoming terms on Federal land yield a government take of around 44-48%.



**Table 17: Comparing Regressive Impact** 

## **Peer Group Regressive Impact**

This example is based on discounted cash flow analysis (10% DCF) and shows that Wyoming terms are some of the most regressive.

State	Government Take with costs = 30% of Gross Revenues	Marginal Government Take with costs = 0% of Gross Revenues	Delta
Colorado	48.2%	41.4%	6.8%
Montana	48.4%	42.1%	6.3%
Oklahoma	45.0%	39.5%	5.5%
New Mexico	50.5%	43.5%	7.0%
North Dakota	43.4%	38.4%	5.0%
Texas	45.3%	38.3%	7.0%
Utah	43.8%	38.4%	5.4%
Wyoming	48.4%	40.5%	7.9%

## **Appendix 2: License Allocation Process**

The means by which governments award rights to conduct petroleum operations is an important part of managing natural resources. The allocation or auction process can be as important as some fiscal instruments. It can be as important as determining a royalty rate or a tax rate. One of the most accepted means of allocating rights is through competitive bidding and theoretically this is the best measure of a fair market value.

However, empirical evidence is not wholly supportive. There have been numerous examples in the past of bidding anomalies or where industry has clearly overbid for licenses or rights such as in Venezuela 1996 +, Libya 2006, Mexico 2016-2017, and in the Gulf of Mexico where the concept of *winner's curse* was popularized and when in 1983 the BLM changed from a tract nomination system to an area wide leasing system. Average bids dropped by an order of magnitude but licensing activity increased fourfold.

While it is beyond the scope and purpose of this report, there are many issues and considerations with respect to the allocation or auction process that have links to the bureaucratic process and bureaucratic efficiency. Unfortunately, to many in the industry, bureaucratic efficiency is an oxymoron.

**Table 18: Auction Process and Minimum Bids** 

Auction Processes and Minimum Bids										
	со	MT	NM	ND	ок	TX	UT	WY	Fed	
Auction Process*	S/O	О	S/O	О	S	S	S	О	О	
Minimum Bonus Bid + 1 <sup>st</sup> Yr Rental	No	No	\$30-\$40 per acre	\$1	No	\$100's to \$1,000s per acre	No	\$1	\$2/acre	
Nominated acreage							Yes	Yes	Yes	

<sup>\* (</sup>S) is Sealed Bid (O) is Open Bid

Federal land is allocated on a tract nomination system and some states use it as well.

Source: http://www.glo.texas.gov/wslca/downloads/conferences/2016/Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

Wyoming's upturn in bonus receipts in 2017 was attributed *possibly* to the allocation method. Revenue reportedly increased by over 800 percent from 2016. This was discussed by Jason Crowder<sup>60</sup> who said:

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>60</sup> Jason Crowder, assistant director for the Office of State Lands and Investments, Trust Land Management Division.

"It's unclear what exactly made the revenue shoot up so dramatically, other than the state's decision to switch to an online auctioning system which allows out of state companies to easily bid on Wyoming land. That's the only thing we can point to. 61

During the downturn of 2016, combined revenue from auctioning BLM and State Lands added up to about \$16 million. In 2017 Wyoming received \$146 million.

The state ordinarily brought in around \$5 to \$7 million from leasing state land, even in boom years. In 2017, the State Lands brought in \$60 million.

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 $<sup>^{61}\</sup> https://trib.com/business/energy/wyoming-oil-and-gas-lease-revenue-increases-by-percent-in/article\_64046af2-f540-5b50-be96-40307bbd77bd.html$ 

## **Appendix 3: Making Changes**

Monitoring industry activity and contemplating changes is a normal part of managing natural resource assets and conducting due diligence. This is particularly important during times when industry fundamentals are changing, or when commodity prices and markets are particularly volatile or technology is changing the nature of the business.

Industry metrics provide insight into a provinces' competitive position, as well as, occasionally, what kind of response a change may provoke. The nature of any contemplated change is driven by the objectives as well as the anticipated market responses.

There are a number of reasons for making changes:

Encouraging special technology or research

Gaining a larger share of revenues, profits or rent
Offset regressive elements in a system
Increasing industry investment activity
Extend economic life or reduce the economic limit of operations
Increasing local employment
Developing or improving infrastructure
Incentivizing particular sectors

## **Royalty Disparity**

In the Peer Group, one consideration of a basis for change is the disparity between ordinary State royalty rates and the 12.5% Federal royalty. Because the States get half of the Federal royalty they would benefit from an increase and the two states with the most Federal acreage are New Mexico and Wyoming.

One organization quantifies the difference between the current Federal royalty and alternate royalties of 16.67 and 18.75%. Their resulting estimate is that "between \$490 and \$730 million in additional revenue would have been generated and distributed to states in the Rocky Mountain West," 62 with the higher Federal royalty rates.

Whether or not these figures are accurate is not the most important point here. The magnitude of the numbers is impressive, but the overarching thesis and most important point is that the States have a vested interest in both the actual 12.5% royalty as well as any change in Federal royalties. This is particularly true for Wyoming and New Mexico with the greatest share of Federal lands and production.

The main consideration is what the impact of an increase might be and the natural question:

 $<sup>^{62}</sup>$  Center for Western Priorities, Update June 18, 2015 http://www.westernpriorities.org/wpcontent/uploads/2015/06/Royalties-Report\_update.pdf

"Would higher royalty rates significantly impact investment activity?"

Theoretically any change will have an impact. The industry has many examples of macro-changes and obvious results in investment activity, positive and negative. But empirical evidence is hard to find for nuanced changes. There is also considerable experience with unintended consequences, distortions or false economies resulting from ill-conceived changes or designs.

Depending on the magnitude of a change, consequences may be impossible to measure. Even with relatively large changes, measuring industry response can be elusive for a number of reasons because all other variables such as oil or gas prices are unlikely to hold following a change.

Considerations of making a change in Federal Royalties are on-going exercises. It was explored in a BOEM study in 2011<sup>63</sup> that specifically addressed Federal acreage in Wyoming as one of the few US Onshore provinces included in the study. A more recent example is the June 2017 Government Accountability Office (GAO) report.<sup>64</sup>

WIA Fiscal System Study 2 November 2018

<sup>&</sup>lt;sup>63</sup> OCS Study BOEM 2011-xxx, "Comparative Assessment of the Federal Oil and Gas Fiscal System" https://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx

<sup>&</sup>lt;sup>64</sup> GAO-17-540 "OIL, GAS, AND COAL ROYALTIES, Raising Federal Rates Could Decrease Production on Federal Lands but Increase Federal Revenue", https://www.gao.gov/assets/690/685335.pdf

**Table 19: Royalty Disparity Lobby** 

## **Royalty Disparity Lobby**

These numbers were not generated by Daniel Johnston & Co., Inc. Regardless of whether or not these figures are accurate the magnitude is impressive. They appear to have been simply algebraicly grossed up from 12.5% Federal royalty to the State royalty rate.

"Between \$490 and \$730 million in additional revenue <u>annually</u> would have been generated and distributed to states in the Rocky Mountain West, if royalty rates were increased to 16.67 percent or 18.75 percent."

Western Priorities Circa fiscal year 2014<sup>65</sup>

This assumes that 50% of the revenues go to the states and 50% to the U.S. Treasury.

New Mexico and Wyoming stand out.

State	Potential State gair difference between 12 and Hypothetical Federa	2.5% Federal rate	Actual State Royalty Rates (Generalized)
	16.67%	18.75%	
Colorado	\$46,192,000	\$69,233,000	16.67%
Montana	\$5,736,000	\$8,597,000	16.67%
New Mexico	\$190,908,000	\$286,133,000	18.75%
Utah	\$53,752,000	\$80,563,000	16.67%
Wyoming	\$192,122,000	\$287,952,000	16.67%
Total	\$488,710,000	\$732,479,000	
Other			
North Dakota			18.75%
Texas		25%	
Federal		12.5%	

Adapted from Western Priorities 18 June 2015 Update

http://www.westernpriorities.org/wp-content/uploads/2015/06/Royalties-Report\_update.pdf

<sup>65</sup> Ibid

## **Appendix 4: Incentives and Sliding Scales**

There are many types of changes that may fulfill Governments objectives. They are mostly driven by the objective as outlined above.

Adjustments to a fiscal system can be either positive or negative (good or bad) from an oil company point of view. The industry is strongly averse to changes that increase the company share of risk or costs or those that reduce company share of profits.

These changes can focus on the risk-side or the reward-side of the industry balance between risk and reward.

### Risk Side vs. Reward Side Changes

Risk-side adjustments include a variety of options that usually focus on the risks and costs associated with exploration and appraisal activity. Risk-side adjustments are usually designed to increase investment activity. These can include:

Investment uplifts
Interest cost recovery or special deductions
Investment credits

### **Specific Considerations**

- Severance tax incentives
- Rules updates to modernize deductions to keep up with new technologies such as horizontal drilling and fracking and multi-well pads
- Sales Tax Incentives

Just like royalties or taxes, analysis of incentives can often be broken down into rate and base. For example, a typical uplift is based on the amount invested in exploration operations. A company may spend \$10 MM on exploration operations but will be allowed to tax deduct \$13 MM against state taxes. This is a 30% uplift (rate) based on qualifying exploration expenditures.

Also, incentives are often available for gas. Approximately 60% of the systems worldwide have different provisions in the system/contract for gas. Typically, these involve lower royalty rates.

Wyoming does not have a corporate income tax so it would not apply in this case.

Interest cost recovery is already available for Federal tax calculation purposes but it is referred to as a deduction. Many countries do not allow such a thing so where it is enacted it is considered an incentive. In the US, deducting interest expenses has been a fact for many years so it is not a potential incentive.

Reward-side adjustments usually focus on royalty or tax rates. They can be adjusted to either increase or decrease government share of profits. Reducing the government share of profits (by various means) is usually referred to as an incentive. An example is the new US tax law that reduced taxes from 35% to 22%. This is a classic (and large) adjustment but this incentive is aimed at industrial activity in general, not just the oil industry.

Adjustments that increase government share of profits are rarely referred to as a disincentive but that is the net effect. Ordinarily such increases in royalty rates or tax rates apply only to future petroleum operations. This kind of change is never received well by industry but it depends on the situation, and unsurprisingly, it depends also on the rate and the base.

### Taxes vs. Incentives

Also, there can be a layered royalty or royalty-equivalent mechanisms just as there can be different layers of tax base. For example, a state income tax may be based on gross revenues less royalty less deductions. Federal income tax then would be levied on gross revenues less ordinary cost-based deductions and less state income tax. Both are profits-based but based on different definitions of what constitutes taxable profits. True economic profits, as discussed above, are equal to total gross revenues less the costs associated with generating those revenues. Thus, in most systems, and particularly those in the US, none of the levies (royalties or taxes) are based on true economic profits. Yet, the government take statistics reduce all of these rent extraction mechanisms into a statistic that represents the division of true economic profits.

## **Sliding Scales**

Sliding scales are fiscal mechanisms designed to increase or reduce effective taxes or Take based on profitability. The main objectives of a sliding scale or adjustment mechanism is ordinarily to achieve a dimension of system flexibility, in the context of taxation theory, and this means mitigating or eliminating the regressive effect of royalty or royalty-equivalent elements in the system.

It would ordinarily be inappropriate for a government to not have some form of royalty in order to guarantee some share of revenues in each accounting period regardless of profitability (or the amount of deductions). But, as mentioned earlier, royalties are regressive. Not only this, royalties, by definition, cause premature abandonment of otherwise economic operations.

Sliding scales typically or hopefully will respond to changes in profitability, prices or costs. With the price shock of 2008 - 2014 the percentage share of profits in the Peer Group went down by a few points. The Federal share of profits also went down but not by as much, especially where the Fed shares half of its royalties with the states.

The one challenge of designing a progressive system that can respond to changes in profitability is the means by which the government monitors and measures profitability. Profitability is a function of costs, prices as well as timing. It is not easy to confidently capture all of these elements without considerable manpower and oversight. Thus, it is not common that a sliding scale leverages off of a true measure of profitability but will use a proxy.

The most common mechanisms are structured in such a way that government receives a greater share of profits during times when there is greater profitability and conversely a lower share with lower profitability. One example would be where a government's royalty is a function of oil prices, i.e. higher prices —higher royalties, lower prices — lower royalties. There is some initial appeal to this concept but it is simplistic.

A mechanism based in-part on oil prices cannot adjust for variations in costs. So, half of the equation is missing with a simple price-based instrument. Adjusting on the basis of prices is only a proxy for profitability.

Unfortunately, any measure or attempt to measure true profitability, requires measurements of both prices/gross revenues, as well as costs.

The four main sliding scale structures include:

- Price-based formulas
- Rate-of-Return (ROR) Systems.
- R-factors
- Production-based Scales

In looking at the use of sliding scales or efforts to provide flexibility in these contracts, roughly 70% of them use sliding scales for oil while only 40 use a sliding scales or incentives for gas. Of the countries or systems with sliding scales:

- 80% are Production based
- 20% use an R-Factors or rate-of return formulas
- 18% use Price
- 20% of the sliding scales have multiple parameters (e.g. Daily Production and an R-Factor)

The earliest and most common designs were based on production. With a production-based structure each tranche of production is subject to a specific tax or royalty rate. With higher production rates the royalty or tax increases. Conversely with lower production rates taxes or royalties adjust downward. The term "incremental" sliding scale is sometimes used to further identify this.

### **Price-based Formulas**

Some systems have contract or fiscal elements governed, in part, by levels of oil or gas prices (like Alaska in 2007). Formulas based on price fluctuations are often referred to as windfall profits taxes. An example, in its simplest form, would be where a royalty rate would increase 5 percentage points if prices exceeded a certain level such as \$100/BBL. These are sometimes referred to as windfall profits taxes.

#### Rate of Return contracts

Rate of return-based systems are referred to as "Resource rent royalties (or taxes)", "Trigger taxes", or the "World Bank Model". The government collects a share of cash flows in excess of specified internal rate return (ROR) thresholds. For example the system may increase the tax rate once the company had achieved an internal rate of return of 20%

### **R Factor-based Systems**

R Factor-based systems base their adjustments (in taxes or royalties) on the 'ratio' of a company's cumulative receipts divided by accumulated costs. In effect, it is a payout formula. The payout status is usually measured yearly.

The point at which the R Factor is equal to 1 is the point at which payout for the company occurs. For example, a system could have a mechanism that levied a special petroleum tax of 10% prior to payout (R=1), increasing to 15% thereafter.

## **Production Based Sliding Scales**

Production-based systems leverage off of, as the name implies, either production rates (BOPD) or accumulated production. These are the oldest and have been the most common types of adjustment mechanisms worldwide. For example, a production-rate-based scale might be designed as follows:

Production Rate BOPD	Royalty Rate
0 - 2,000	10%
2,000 - 4,000	20% > 4,000
30%	

These mechanisms are almost always 'incremental' in that each tranche or layer of production is subject to its own unique royalty rate. Therefore, if the property is producing 4,000 BOPD the total royalty rate is not 20%. It would be 15% (a weighted average).

For years, the **BLM** used a production-based scale (shown below).

The table below is an existing production based sliding scales for onshore US royalties, which are rare - only applicable to leases issued between May 3, 1945 and August 8, 1946, as well as, all competitive leases issued after August 8, 1946 and prior to December 22, 1987<sup>66</sup>

Table 20: BLM Step Scale

### Schedule "B" Step Scale

This BLM sliding scale (referred to as a "Step Scale") is tyical of many such adjustment mechanisms. It is designed to increase government *share* of profits, or revenues, with more profitable operations. It is based on the assumption that higher production rates correlate with higher profitability (which is not necessarily the case). Production rates are only a proxy for a measure of profitability. Nevertheless, production-based sliding scales are the most common type of sliding scale.

1. Oil - When the average monthly production for a field in barrels per well per day is:

Over         Not Over         Royalty         Over         Not Over         Royalty           0         50         12.5%         130         150         19%           50         60         13%         150         200         20%           60         70         14%         200         250         21%           70         80         15%         250         300         22%           80         90         16%         300         350         23%           90         110         17%         350         400         24%           110         130         18%         400         25%						
50         60         13%         150         200         20%           60         70         14%         200         250         21%           70         80         15%         250         300         22%           80         90         16%         300         350         23%           90         110         17%         350         400         24%	Over	Not Over	Royalty	Over	Not Over	Royalty
60         70         14%         200         250         21%           70         80         15%         250         300         22%           80         90         16%         300         350         23%           90         110         17%         350         400         24%	0	50	12.5%	130	150	19%
70         80         15%         250         300         22%           80         90         16%         300         350         23%           90         110         17%         350         400         24%	50	60	13%	150	200	20%
80     90     16%     300     350     23%       90     110     17%     350     400     24%	60	70	14%	200	250	21%
90 110 17% 350 400 24%	70	80	15%	250	300	22%
	80	90	16%	300	350	23%
110 130 18% 400 25%	90	110	17%	350	400	24%
	110	130	18%	400		25%

2. Gas – Including inflammable gas, helium, carbon dioxide and all other natural gases and mixtures thereof, and on natural or casinghead gasoline and other liquid products obtained from gas, when the average production for the month in Mcf of gas per well per day is:

Over	Not Over	Royalty
	5,000 Mcf	12 1/2%
5,000 Mcf		16 2/3%
Source: https://www.onrr.gov/re	eportpay/PDFDocs/stepscale.pdf	

### **Distortions**

As mentioned previously, it is not easy to anticipate potential problems or distortions any particular design may inspire. The BLM type of design outlined above created some unexpected consequences in both Alaska and California. Years ago, California had special fiscal terms for fields where average production per well was less than 3 BOPD. So, this created an incentive for the companies to drill extra wells that they might not

WIA Fiscal System Study 2 November 2018

<sup>66</sup> https://www.theoilandgasreport.com/category/faqs-of-federal-oil-and-gas-leases/

otherwise drill or to keep otherwise uneconomic wells on line so that the average for the field stayed below 3 BOPD.

This kind of behavior is why scales like these are so rare in today's world. However, there are production-based designs that are more efficient but with production-based systems there is no flexibility or response to a spike or drop in oil prices.

**Table 21: Chronology of Key Indicators** 

	Chronology of Key Indicators										
Year	WTI Spot (\$/BBL)	Henry Hub Gas (\$/MMBTU)	Avg. Federal Bonuses \$/Acre	BLM Approved Applications	Rig Count USA	Rig Count World					
2000	30.38	4.31			918	1,913					
2001	25.98	3.96			1,156	2,242					
2002	26.18	3.37			830	1,829					
2003	31.08	5.49			1,032	2,174					
2004	41.51	5.90			1,192	2,395					
2005	56.64	8.81	154		1,383	2,746					
2006	66.05	6.75	218		1,649	3,043					
2007	72.34	6.98	196		1,768	3,116					
2008	99.67	8.86	212	6,617	1,879	3,306					
2009	61.95	3.95	247	4.487	1,089	2,304					
2010	79.48	4.39	236	4,090	1,546	2,985					
2011	94.88	4.00	307	4,244	1,879	3,465					
2012	94.05	2.75	228	4,256	1,919	3,518					
2013	97.98	3.73	194	3,770	1,761	3,412					
2014	93.17	4.39	227	3,767	1,862	3,578					
2015	48.66	2.63	220	3,508	978	2,337					
2016	43.29	2.52	257	2,184	509	1,593					
2017	50.80	2.99		2,486	876	2,029					
2018	65.31	2.95			1,019	2,184					
3Q											

#### WTI from EIA

Note: US Gas prices dropped 8 years before oil prices crashed (due to shale gas)

**MMBTU** = Millions of British Thermal Units [equal to roughly a thousand cubic feet of methane gas (MCF)].

**Note:** Typical converstion of gas to barrel of oil equivalent is 6 MCF per barrel based on the heating values (6:1 — thermal parity). However, price parity is different. The 3Q 2018 price was parity 22:1 (\$65.31/2.95).

## **Appendix 5: Itemized Incentives**

The following summary of incentives focuses on incentives for exploration and development, and enhanced recovery. Incentives on stripper wells, marginal field incentives, flaring and venting reduction incentives etc. are not included. Incentives that have expired or are no longer available are also left out.

From the peer group vantage point overall tax burdens for Montana, North Dakota, Texas, and Wyoming are high compared to Colorado, Oklahoma, New Mexico and Utah. But the overall tax burden isn't enough to offset advantages such as geology, or disadvantages such as infrastructure bottlenecks.

From an international perspective, all of the states in the peer group have quite low tax burdens compared to other producing countries.

With that in mind, incentives certainly play a part albeit a minor part in investment decisions.

#### Colorado

Colorado has few if any meaningful oil and gas exploration incentives and or exemptions as compared to other western states.

#### Montana

New vertical wells receive a reduced tax rate of 0.5% for the first 12 months of production.

New or recompleted horizontal wells receive the reduced tax rate for the first 18 months of production.

Wells brought back into production after not producing for 5 years also qualify for the new well drilling incentives.

After the 12 or 18-month tax holiday, well production returns to the 9% tax rate.

These incentives were controversial and inspired efforts to repeal the tax holiday. The basic logic was that the wells were virtually tax free in the first 12-18 months of production, which is typically the most productive time period for a horizontal, fracked well.<sup>67</sup>

<sup>&</sup>lt;sup>67</sup> Montana Communities Cannot Afford the Oil and Gas Tax Holiday, November 2016 Montana Budget & Policy Center, http://montanabudget.org/report/2016\_oil\_gas\_tax\_holiday, https://meic.org/2017/01/repeal-oil-gas-tax-holiday/

### New Mexico

New Mexico offers reduced severance tax rates for qualified enhanced oil recovery projects and well work-over projects. Both rate reductions depend on West Texas Intermediate (WTI) annual average price when it drops below a specified price per barrel.

Source: us-tax-credits-and-incentives-for-oil-and-gas-producers.pdf

#### North Dakota

An oil production incentive reduces the extraction tax rate when crude prices are low. Effective starting January 1, 2016, the oil extraction tax rate was reduced from 6.5% to 5% and will fluctuate between 5% and 6% whenever the "average price" per barrel is above or below a trigger price of \$90/bbl for 3 consecutive months. The trigger price of \$90/bbl is subject to an annual adjustment based on changes in the producer price index for industrial commodities.

Enhanced recovery projects receive either exemptions or rates reductions to the oil extraction tax.

ND also offers a 2% oil extraction tax rate on qualifying Non-Bakken/Three Forks new wells.

Source: us-tax-credits-and-incentives-for-oil-and-gas-producers.pdf

#### Oklahoma

Source: 2016-oil-gas-taxation-comparison rev.pdf

Oklahoma has gross production base tax rate of 7%. There is an incentive tax rate of 4% for qualified deep wells for a period of up to 60 months and a 1% incentive tax rate on qualified horizontal wells for a period of 48 months.

Effective July 1, 2015, the above incentives expired and were replaced with an incentive tax rate of 2% for all new wells. The new rate is in effective for the first 36 months of production, after which, the tax rate reverts to the 7% base rate.

In addition to the gross production tax, Oklahoma levies a petroleum excise tax on the production of oil and natural gas equal to .095 of 1% of the product's gross value. Oklahoma provides a rebate for its gross production tax (.095 of 1% of the product's gross value) to encourage reestablishment or enhancement of production of existing wells and encourage drilling new wells.

The rebate of tax is equal to 6/7ths of the 7% base gross production tax rate. Wells currently qualifying for the rebate are as follows:

- The reestablished production of a well that is non-productive for one year (Expires July 1, 2020),
- The enhancement of production through work-over or recompletion (Expires July 1, 2020).
- Wells meeting the criteria of being economically at-risk (Expires July 1, 2020). There have been no significant changes in tax law since 2015.

Source: Oklahoma Tax Commission and North Dakota Red Book

Note: The Oklahoma incentive program is controversial.

"Oilmen won a big victory when legislators made permanent one of the juiciest tax breaks in the United States. Schools, meanwhile, are having to cut classes, administrators and teachers to make up a growing revenue shortfall."

"OKLAHOMA CITY – Oklahoma's Democratic candidate for governor is calling for an end to oil production tax incentives, but lawmakers and observers said getting that policy through after one of the state's largest tax increases in history would be a difficult feat." 69

### **Texas**

2016-oil-gas-taxation-comparison rev.pdf

Oil produced from Enhanced Oil Recovery (EOR) projects is taxed at 2.3% of the market value. Oil produced from wells that have been inactive for 2-year or 3-year are exempt from the tax for 10 years.

Source: Texas Comptroller of Public Accounts and North Dakota Red Book

http://www.rrc.state.tx.us/oil-gas/publications-and-notices/texas-severance-tax-incentives-past-and-present/presenttax/

<sup>&</sup>lt;sup>68</sup> Taxing Lessons - When the oil boom went bust, Oklahoma protected drillers and squeezed schools, Reuters, L. Cohen and J. Schneyer, May 17, 2016

https://www.reuters.com/investigates/special-report/usa-oklahoma-bust/

Debate rages over how to tax oil production, C. Sweeney The Journal Record, September 10, 2018

### Utah

Utah's severance tax is 3% on the first \$13 per barrel and 5% on anything over \$13 per barrel. This tax is in addition to a normal ad valorem tax on the reserves and a 0.2% conservation tax. (Utah's Ad Valorem tax is based on equipment and minerals<sup>70</sup>)

New development wells are exempt for the first 6 months of producing and new wildcat wells are exempt the first 12 months.

All transportation and processing costs can be deducted for tax calculation purposes. Enhanced oil recovery (EOR) projects receive a 50% tax rate reduction on incremental production.

New work-over or recompletion projects get a 20% tax credit, up to \$30,000 per well.

There have been no significant changes in tax law since 2015.<sup>71</sup>

## Wyoming

Previously shut in wells are subject to a reduced severance tax rate of 1.5% for five years for renewed production. Wells must have been inactive for two years prior to January 1, 1995. This incentive is canceled if the average price of oil exceeds \$25 per barrel for six straight months.

There have been no significant changes in tax law since 2015.<sup>72</sup>

<sup>&</sup>lt;sup>70</sup> 2016-oil-gas-taxation-comparison rev.pdf

<sup>71</sup> Utah State Tax Commission and North Dakota Red Book

<sup>&</sup>lt;sup>72</sup> Wyoming Department of Revenue and North Dakota Red Book

**Table 22: Federal Surface Acreage by State** 

	Federal Lands by State								
This table compa	res federal acreage to tot	al state acreage showi	ng the percentage of						
$\mathbf{c}$	each state. Utah and Wy		est percentage of						
federal land. Texa	as and Oklahoma have th	e lowest percentage.							
State	Federal Land	<b>Total State</b>	Percentage of						
State	Acreage	Acreage	Federal Land						
Colorado	23,870,652	66,485,760	35.9%						
Montana	27,003,251	93,271,040	29.0%						
New Mexico	26,981,490	77,766,400	34.7%						
North Dakota	1,736,611	44,452,480	3.9%						
Oklahoma	701,365	44,087,680	1.6%						
Texas	2,998,280	168,217,600	1.8%						
Utah									
Wyoming	Wyoming 30,013,219 62,343,040 48.1%								
Sources: https://b	allotpedia.org/Federal_la	and_ownership_by_st	ate						

**Table 23: State Oil Production** 

	State Oil Production (MMBBLS)										
	2010	2011	2012	2013	2014	2015	2016	2017			
Colorado	29.2	35.4	45.3	57.8	90.4	118	112	126			
Montana	21.8	20.9	23.3	25.9	26.6	25	20	18			
N Mexico	35.2	37.3	43.9	51.9	63.7	68	70	88			
N Dakota	106.6	141	226.7	294.6	374.9	404	351	360			
Oklahoma	67.9	76.9	93.9	114.7	139.5	166	155	165			
Texas	426.4	529.2	724.1	927.1	1157.6	1,257	1,163	1,272			
Utah	13.9	15.6	19.1	23.3	27.7	25	21	25			
Wyoming 21.6 22.2 25.2 29.3 38.7 42 33 3											
Source: https:	//www.eia.	gov/dnav/j	pet/hist/Lea	afHandler.	ashx?n=PE	T&s=MC	RFPCO2&	f=A			

**Table 24: State Percentage of Oil Production** 

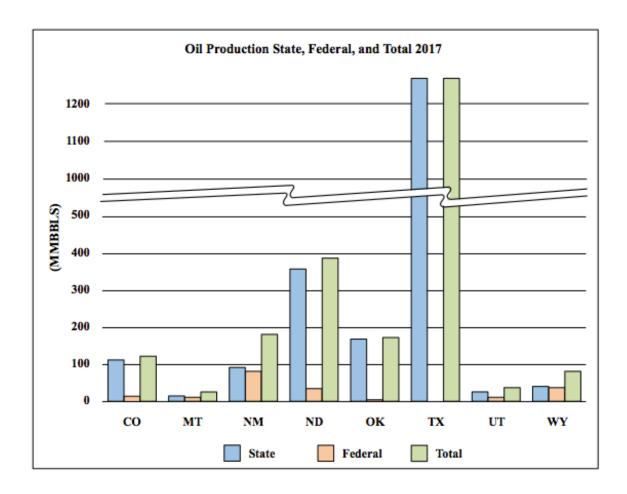
State Percentage (MMBBLS) (State/Federal)									
	2010	2011	2012	2013	2014	2015	2016	2017	
Colorado	88.5%	89.8%	91.3%	92.9%	94.6%	95.8%	95.8%	96.1%	
Montana	86.2%	86.4%	87.9%	88.4%	89.0%	88.5%	86.6%	86.0%	
N Mexico	53.7%	52.2%	51.3%	50.5%	51.0%	46.0%	48.0%	51.2%	
N Dakota	92.3%	92.5%	93.6%	94.3%	95.0%	94.0%	92.9%	91.8%	
Oklahoma	99.7%	99.6%	99.5%	99.6%	99.6%	99.4%	99.4%	99.7%	
Texas	99.9%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Utah	56.3%	59.3%	63.2%	66.6%	67.7%	67.4%	68.2%	73.4%	
Wyoming 40.1% 40.7% 43.5% 46.1% 50.9% 48.6% 45.9% 51.0%									
Source: https:	//www.eia.	gov/dnav/	pet/hist/Lea	afHandler.a	ashx?n=PE	T&s=MCR	RFPCO2&f	ΈA	

Table 25: Gas Production on Federal Land

	Gas Production on Federal Land (BCF)								
This table shows gas production on federal land for the peer group states from 2010 to 2017, with Wyoming producing nearly half of total gas over that time period.									
,, yennig pre	2010	2011	2012	2013	2014	2015	2016	2017	
Colorado	678	719	739	718	754	680	643	661	
Montana	32	27	20	16	16	14	13	11	
N Mexico	851	826	810	789	783	801	787	773	
N Dakota	11	13	17	21	25	38	47	60	
Oklahoma	16	14	16	15	15	20	18	14	
Texas	21	31	55	49	40	35	37	35	
Utah	291	296	325	304	288	272	235	197	
Wyoming 1,958 1,840 1,794 1,603 1,543 1,549 1,465 1,354									
Source: File -	federal_pr	oduction_I	FY2008-20	17_2018-0	)6-15				

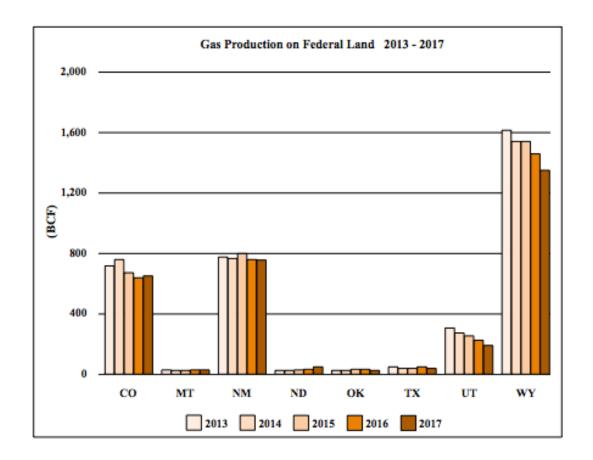
## Figure 10: Oil Production State, Federal, and Total

The figure below, although, skewed due to the high production numbers for Texas still provides an idea of how much of an impact federal lands have, or don't have for that matter. New Mexico and Wyoming have significant federal production as compared to state or total production. Texas and Oklahoma have almost no federal production.



The graph below depicts gas production from 2013 to 2017. Colorado, New Mexico, Utah, and Wyoming have significant production on federal acreage, while Montana, North Dakota, Oklahoma, and Texas production is insignificant.

Figure 11: Gas Production on Federal Land

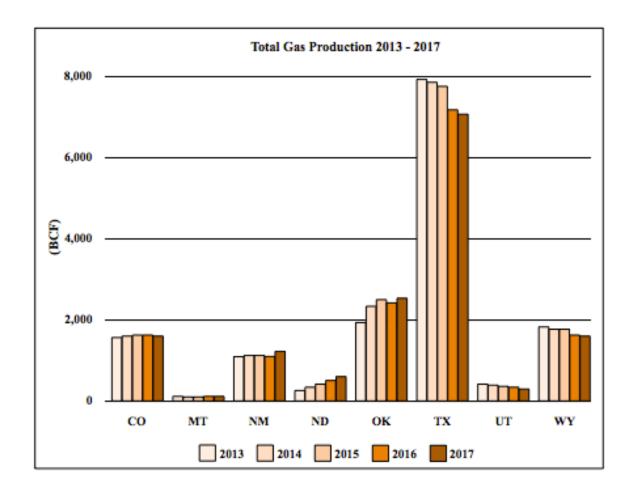


**Table 26: Total Gas Production by State** 

Total Gas Production (BCF)								
This table shows total gas production in the peer group states from 2010 to 2017.								
	2010	2011	2012	2013	2014	2015	2016	2017
Colorado	1,578	1,638	1,709	1,605	1,643	1,689	1,686	1,683
Montana	87	75	67	63	59	51	48	46
N Mexico	1,292	1,237	1,216	1,172	1,230	1,245	1,230	1,293
N Dakota	82	97	172	236	326	471	532	594
Oklahoma	1,827	1,889	2,023	1,994	2,331	2,500	2,468	2,514
Texas	6,716	7,113	7,475	7,634	7,985	7,890	7,225	7,135
Utah	432	548	490	471	455	417	365	315
Wyoming	2,306	2,159	2,022	1,858	1,794	1,809	1,662	1,585
Source: https:	//www.eia	gov/dnav/	ng/ng nroc	l sum de	snm mmc	fahtm N	ote: numbe	ers above

Source: https://www.eia.gov/dnav/ng/ng\_prod\_sum\_dc\_snm\_mmcf\_a.htm, Note: numbers above are for "Marketed Production"

In the graph below Texas and Oklahoma are the biggest gas producers in the peer group. From this perspective, Texas is an anomaly. There is so little federal acreage in those two states the contrast is understandable.



**Figure 9: Total Gas Production** 

Five states accounted for about 65% of total U.S. dry natural gas production in 2016:<sup>73</sup>

- 1. Texas-24%
- 2. Pennsylvania—20%
- 3. Oklahoma—9%
- 4. Louisiana—6%
- 5. Wyoming—5%

Most of Wyoming's gas production comes from the Green River Basin in the southwest of the state and most of it is exported to other states. Coalbed methane (CBM) after a long decline contributes only 10% of production.

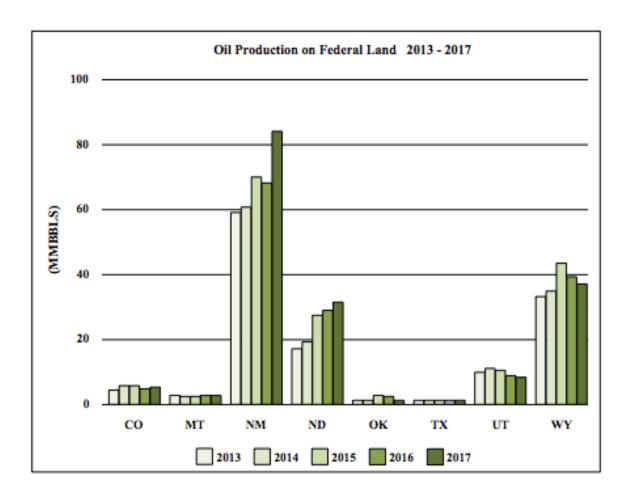
<sup>&</sup>lt;sup>73</sup> https://www.eia.gov/energyexplained/index.php?page=natural gas where

Table 27: Oil Production on Federal Land

Oil Production on Federal Land (MMBBLS)								
This table sho	This table shows oil production on federal land from 2010 to 2017 for the peer group.							
	2010	2011	2012	2013	2014	2015	2016	2017
Colorado	3.8	4.0	4.3	4.4	5.2	5.2	4.9	5.1
Montana	3.5	3.3	3.2	3.4	3.3	3.3	3.1	2.9
N Mexico	30.4	34.2	41.7	50.9	61.3	79.8	76.2	83.6
N Dakota	8.9	11.4	15.6	17.7	19.7	25.9	27.0	32.2
Oklahoma	0.2	0.3	0.5	0.5	0.6	1.0	0.9	0.5
Texas	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Utah	10.8	10.7	11.1	11.7	13.2	12.1	9.7	9.1
Wyoming	32.3	32.4	32.7	34.2	37.4	44.4	39.3	37.1
Source: File – federal_production_FY2008-2017_2018-06-15								

New Mexico, Wyoming, and North Dakota lead in oil production on federal land, with New Mexico producing about 70 MMBBLS per year.

Figure 10: Oil Production on Federal Land



**Table 28: Total Oil Production by State** 

Total Oil Production (MMBBLS)								
This table shows total oil production for the peer group from 2010 to 2017.								
	2010	2011	2012	2013	2014	2015	2016	2017
Colorado	33.0	39.4	49.6	62.2	95.6	122.8	116.5	130.7
Montana	25.3	24.2	26.5	29.3	29.9	28.6	23.2	20.7
N Mexico	65.6	71.5	85.6	102.8	125.0	147.7	146.4	171.4
N Dakota	115.5	152.4	242.3	312.3	394.6	429.6	377.8	392.1
Oklahoma	68.1	77.2	94.4	115,2	140.1	166.8	155.7	165.9
Texas	426.7	529.5	724.4	927.4	1,157.9	1,257.0	1,163.2	1,272
Utah	24.7	26.3	30.2	35.0	40.9	37.1	30.5	34.2
Wyoming	53.9	54.6	57.9	63.5	76.1	86.4	72.6	75.7
Source: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPCO2&f=A								

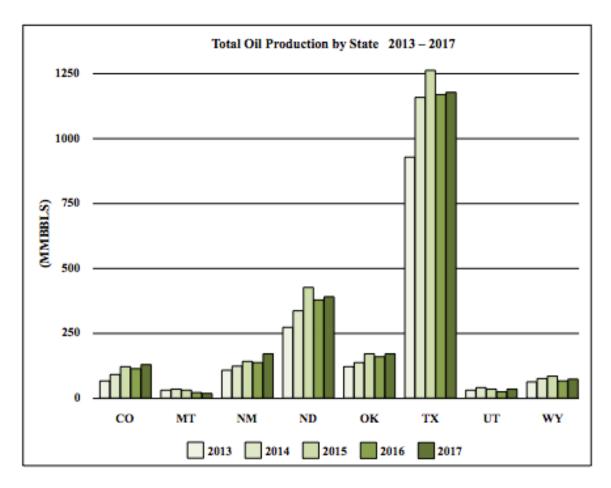
Wyoming crude oil production ranks eighth in the US. Wyoming produced 75.6 million barrels of crude oil in 2017, up from 72.6 million barrels in 2016.<sup>74</sup> This comports with the information in the table above.

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 $<sup>^{74}\</sup> www.wsgs.wyo.gov/energy/oil-gas-facts$ 

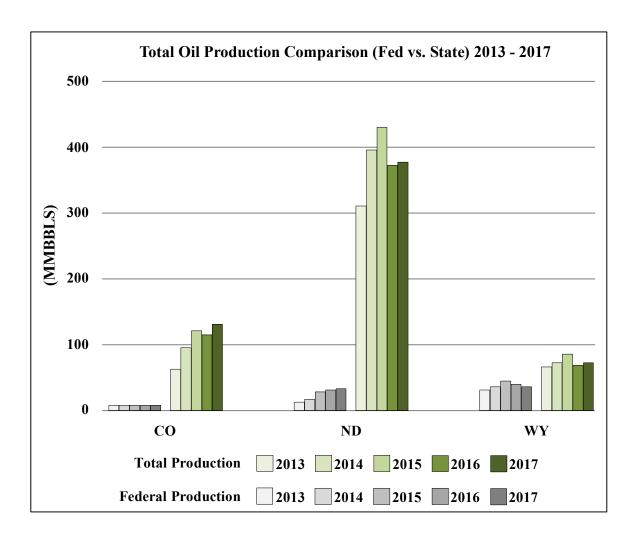
The graph below shows annual oil production from 2013 to 2017. Again, Texas is an outlier and skews the graph.

**Figure 11: Total Oil Production** 



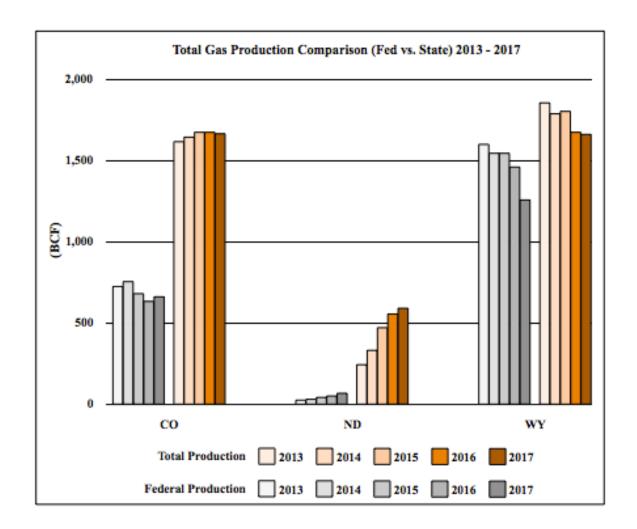
The graph below compares total production to federal production. In this comparison federal oil production in Wyoming is significant as compared to total production.





The graph below shows federal gas production as compared to Wyoming's total gas production is lopsided when compared to other states.

Figure 13: Total Gas Production vs. Federal



## **Appendix 6: Acronyms and Abbreviations**

% Percentage

Obegrees (as in Centigrade)

¢ Cents

\$ United States Dollar \$M Thousands of Dollars \$MM Millions of Dollars

AAPG American Association of Petroleum Geologists

AASHTO American Association of State Highway and Transportation Officials

APD Applications for Permit to Drill AFE Authorization for Expenditure

AFMSS Automated Fluid Minerals Support System

AGR Access to Gross Revenue API American Petroleum Institute

Avg. Average bbl Barrel BBL Barrel BBLs Barrels

BCF Billion Cubic Feet (Gas)

BCFD Billion Cubic Feet (of gas) per Day
BLM Bureau of Land Management
BMP Best Management Practice
BOE Barrels of Oil Equivalent
BOPD Barrels of Oil per day

CAA Clean Air Act

CEQ Council on Environmental Quality
C/F Carry Forward (as in CR/CF)
CFR Code of Federal Regulations
CNG Compressed Natural Gas

C/R Cost Recovery

C/R C/F Cost Recovery Carry Forward CAPEX Capital Expenditure (also 'capex')

Capex Capital Expenditures
CBM Coal Bed Methane

CCOGP Converse County Oil and Gas Project

CIT Corporate income tax

Cum. Cumulative

DA Development Area
DCF Discounted Cash Flow

DD&A Depreciation, depletion and amortization

Dev. Development

DOI United States Department of the Interior

EIS Environmental Impact Statement

E&P Exploration, development, and production EMV Expected Monetary Value (same as EV)

EOR Enhanced Oil Recovery or EOR Contract (See IPC and IOR)

EPA Environmental Protection Agency

ERR Effective Royalty Rate ESA Endangered Species Act EV Expected Value (same as EMV)

Expl. Exploration

FEIS Final Environmental Impact Statement FLPMA Federal Land Policy and Management Act

FMPR First Marketable Product Rule FMR Federal Mineral Royalties

G&A General and Administrative expenses (usually same as "overhead")

G&G Geological and Geophysical

GHMA General Habitat Management Area (Sage-Grouse)

GIS Geographic Information System
GLO General Land Office (Texas)

GRP Gross Production Tax (Oklahoma term for equivalent of Severance Tax)

Gvt. Government

IDC Intangible Drilling Cost IOC International Oil Company

IOR Incremental Oil Recovery (similar to enhanced oil recovery EOR)

IPC Incremental Production Contracts (similar to enhanced oil recovery EOR)

IRR Internal Rate of Return (normally the same as ROR)

JIDPA Jonah Infill Development Project Area

JOC Joint Operating Committee

m Meters

NPV Net Present Value

M Thousands

MACRS Modified Accelerated Cost Recovery System (US tax depreciation system)

MBBLS Thousands of Barrels

MBOPD Thousand Barrels of Oil per Day MCF Thousand Cubic Feet (Gas) MCFG Thousands of cubic feet of gas

MM Million(s)

MMBBLS Millions of Barrels

MMBOEMillion Barrels of Oil EquivalentMMBOPDMillion Barrels of Oil per DayMMCFDMillion Cubic Feet (of Gas) per DayMOUMemorandum of Understanding

NAFTA North American Free Trade Agreement

N/A Not available or Not applicable

NCLS National Conference of State Legislatures NEPA National Environmental Policy Act

No. Number

NOC National Oil Company (or Corporation)

NOI Notice of Intent

NPL Normally Pressured Lance

NPV Net present value O&G Oil and Gas

OCM Operating Committee Meeting

OSHA Occupational Safety and Health Administration
Opex Operating Expenditures (Operating Costs)
OPEX Operating Expenditures (also 'opex')
PRMS Petroleum Resources Management System

RDD Research, Development and Demonstration (Same as R&D)

R&D Research, Development

R factor "Ratio" of Company cumulative receipts to cumulative expenditures

R/T Royalty Tax (system) (Also referred to as a 'concession')

ROD Record of Decision

ROR Rate of Return (same as IRR) as in "Rate-of-Return Systems"

ROW Right of Way

S/A Service agreement (or SA)

SEC Securities and Exchange Commission

SLD Straight Line Decline (depreciation or amortization)

SP Success Probability

SPE Society of Petroleum Engineers

SPEE Society of Petroleum Evaluation Engineers

TCF Trillion Cubic Feet
TLCF Tax Loss Carry Forward
U.S.C. United States Code

UoP Unit of Production – or UOP

US United States

US OCS United Stated Outer Continental Shelf

US\$ or USD United States Dollar

USFWS U.S. Fish and Wildlife Service

vs. versus (Latin)

WGFD Wyoming Game and Fish Department

WI Working Interest WPT Windfall Profits Tax

WDEQ Wyoming Department of Environmental Quality

WGFD Wyoming Game and Fish Department

WOGCC Wyoming Oil and Gas Conservation Commission

WYDOT Wyoming Department of Transportation

WYPDES Wyoming Pollution Discharge Elimination System

# **Appendix 7: Fiscal System Summaries**

### **UNITED STATES OCS**

Outer Continental Shelf (OCS) Gulf of Mexico Federal — (Circa 2007)

_		A				
Area		Average 5,000 acre blocks				
		Offshore Louisiana block size = 5,000 Acres				
		Offshore Texas block size = 3 X 3 miles = 5,760 Acres				
Minimum Work Commitments		Seismic some have drilling commitments				
		3 wells on 9 blocks (2 on one block)				
		1,000 -2,000 km Seismic - Average 1,600				
Royalty	12.5% to 209	% in State Waters				
	18.75% Con	tinental Shelf - 16.67% deepwater				
Bonus		Bid Item				
		\$750 K / block 2000 to 2006 <b>\$150/acre</b>				
<b>Production Bonuses</b>		None				
Cost Recovery Limit		Not in the ordinary (PSC) sense				
•		Alternative Minimum Tax may apply				
Taxation		22% Federal Income Tax				
<b>Depreciation</b>		MACRS				
=		UOP for Bonuses				

## **Colorado General Terms**

Federal Acreage – General Terms and proposed New-Lease Revisions

<del>-</del>	01.50							
Rentals		.50 per acre delay rental for years $1 - 5$ , and \$2.00 per acre thereafter (\$494 per km <sup>2</sup> or						
	\$1,280	\$1,280 per square mile.						
Royalty	12.50	% for gas and oil (General Terms)						
Bonus	Bids vary and location-specific.							
Production Box	iuses	None	· ·					
Taxation		22% F	22% Federal Income Tax					
State CIT			4.63% (deductible for determining federal income tax)					
Severance Tax		Severa	Severance Tax is a function of corporate gross income (CGI) Less Royalty					
		2%	CGI < \$25,000					
		3%	$$25,000 \le CGI < $100,000$					
		4%	$100,000 \le CGI < 300,000$					
		5%	$CGI \ge \$300,000$					
		Stripp	er wells are exempt from Severance Tax					
<b>Environmental Tax</b>			0.12% (deductible for determining federal income tax)					
Environmental	Respon		< 2/10 of one mill on value					
<b>Conservation F</b>	-		< 1.50 mills (.7 – 1.5%)					
Property Tax		•	4 – 15% (4.87%)					
F - 3			s by county but is based on two factors:					
			s based on revenue after applying an adjustment factor of 0.875					
			er is based on value of tangible equipment and improvements after					
			ng a factor of 0.29					
** * *			ods outside NAFTA are subject to duties, US, Canadian, and Mexican					
-			goods are duty free.					
		J - 2 - 2 - 2 - 2 - 4 - 4	· J					

### **Effective Tax Rates**

#### Colorado

Colorado State Land Boards January 14, 2016

Federal Acreage-Oil and Gas Lease Terms and Royalty Rate Revisions

Primary Lease Term 10 Years Extension Term NA

**Rentals** \$1.50 - \$2.00 per acre delay rental - (\$494 per km<sup>2</sup> or \$1,280 per square mile).

Royalty 12.5% for gas and oil (General Terms)

Shut-in royalty rate – NA, there are no maximum shut-in years

**Bonuses** No minimum bid

**State CIT** 4.63% (deductible for determining federal income tax)

Severance Tax Oil 1.86% to 5% Severance Tax Gas 1.86% to 5%

Stripper wells are exempt from Severance Tax

**Conservation Tax** .7% to 1.5%

**Ad Valorem Property Tax** 4% to 15% (4.87%)

Varies by county but is based on two factors:

One factor is based on revenue after applying an adjustment factor of

0.875

Another factor is based on value of tangible equipment and

improvements after applying a factor of 0.29

Effective Tax Rate 6.80% (as identified by the Colorado State Lands Board)

**Taxation** 22% Federal Income Tax

**Environmental Response Fund** < 2/10 of one mill on value

## **Colorado** – (Continued)

The following is a quick calculation of the undiscounted government Take based on the published fiscal terms from Oil and Gas Lease Terms and Royalty Rate Revisions, Colorado State Land Boards January 14, 2016

#### Colorado Federal Land

Royalty			12.50%	
Effective Tax			6.80%	
Costs			30%	
CO CIT			4.63%	
Fed CIT Tax			22%	
	A		100.00	Gross revenue
	В	-	12.50	Royalty
	$\mathbf{C}$		87.50	Gross less royalty
	D	-	5.95	Effective tax rate
	$\mathbf{E}$	-	30.00	Costs
	$\mathbf{F}$		51.55	CO CIT tax base
	$\mathbf{G}$	-	2.39	CO CIT
	H		49.16	Federal CIT bas
	I	-	10.82	Federal tax
	J		38.35	
Gvt. Take	=		(B+D+G+I)/(	(A-E)
-	=		45.2%	,

<sup>\*</sup> The basis for determining the Effective Tax Rate = Gross Revenue less Royalty

#### Colorado NCLS

National Conference of State Legislatures (NCSL) Sept. 6, 2018 http://www.ncsl.org/research/energy/oil-and-gas-severance-taxes.aspx

**Primary Lease Term** 5 Years

**Extension Term** 1 year increments

**Rentals** \$2.5 per acre delay rental - (\$494 per km<sup>2</sup> or \$1,280 per square mile).

**Royalty** 12.5% for gas and oil (General Terms)

Shut-in royalty rate – NA, there are no maximum shut-in years

**Bonuses** There is no minimum bid

State CIT 4.63% (deductible for determining federal income tax)

**Federal Tax** 22% Federal Income Tax

**Severance Tax** 

2% if income less than \$25,000

3% of the excess over \$24,999 for income \$25,000-\$99,999 4% of the excess over \$99,999 for income \$100,000-\$299,999 5% of the excess over \$299,999 for income over \$300,000

Exception: Oil produced from any well that produces 15 barrels per day or less of oil, and gas produced from wells that produce 90,000 cubic feet or less of gas per day exempt.

#### Tax on oil shale gross proceeds:

1% in first year 2% in second year 3% in third year

4% in fourth and all successive years

Exception: Oil Shale: The greater of 15,000 tons per day or 10,000 barrels per day are exempt.

#### Ad Valorem tax

Tax Description: Rates vary by county. Severance tax can be reduced to credit 87.5? of ad valorem taxes.

**Conservation Levy** Maximum \$0.0017 of market value at wellhead; or 1.1. mills.

# Colorado

Federal Acreage – Shale Terms

Rentals	0 per acre delay rental for years $1 - 5$ , and \$2.00 per acre thereafter (\$494 per km <sup>2</sup> or 80 per square mile.		
Royalty	% for gas and oil (General Terms)		
Bonus	Bids vary widely and location-specific.		
<b>Production Bon</b>	ses None		
Taxation	22% Federal Income Tax		
State CIT	4.63% (deductible for determining federal income tax)		
<b>Severance Tax</b>	Severance Tax is a function of corporate gross income (CGI) Less Royalty		
	2% CGI < \$25,000		
	$3\%$ $$25,000 \le CGI < $100,000$		
	$4\% \qquad \$100,000 \le CGI < \$300,000$		
	5% $CGI \ge $300,000$		
	Shale oil production qualifies for a Severance Tax exemption 10,000 BOPD		
<b>Environmental</b>	ax 0.12% (deductible for determining federal income tax)		
Environmental	esponse Fund $< 2/10$ of one mill on value		
Conservation Fu	nd Levy < 1.50 mills (0.15%)		
Property Tax	Varies by county but is based on two factors:		
	One factor is based on revenue after applying an adjustment factor of 0.875		
	Another factor is based on value of tangible equipment and improvements		
	after applying a factor of 0.29		
	Note: 87.5% of Property Tax is creditable against Severance Tax		
<b>Import Duties</b>	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican		
-	goods are duty free.		

## **Colorado Shale**

**Effective Tax Rate** 

Federal Acreage – Shale Terms

Colorado State Land Board, Oil and Gas Lease Terms and Royalty Rate Revisions, Jan 14, 2016, Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

6.80%

Rentals	\$1.50 per acre delay rental for years 1 – 5, and \$2.00 per acre thereafter (\$494 per km <sup>2</sup> of \$1,280 per square mile.  12.50% for gas and oil (General Terms)	
Royalty		
Taxation State CIT Severance Tax	22% Federal Income Tax 4.63% (deductible for determining federal income tax) Basis - corporate gross income (CGI) Less Royalty Oil 1.86% to 5% Gas 1.86% to 5%	
Conservation T Ad Valorem Ta	· · · · · · · · · · · · · · · · · · ·	

## Montana

Federal Acreage – Verticals and Horizontal Wells

Area	Horizontal wells are typically spaced 640 acres or 1,280 acres depending on the lateral reach.		
Rentals	\$1.50 per acre delay rental for years $1-5$ , and \$2.00 per acre thereafter (\$494 per km <sup>2</sup> or \$1,280 per square mile.		
Royalty 12.5%	for gas and oil		
Bonus Bids va Production Bon	ary widely and are highly location-specific.  nuses None		
Taxation	22% Federal Income Tax		
State CIT	6.75% (deductible for determining federal income tax)		
	Tax rates for enhanced oil recovery through secondary and tertiary production. Rates range between $5.5\% - 8.5\%$ for well drilled after 1999.		
Severance Tax	<ul> <li>9.26% base rate</li> <li>0.76% of gross value less royalty for the first:</li> <li>18 months (horizontal wells)</li> <li>12 months (vertical wells)</li> <li>– applies to both oil and gas.</li> <li>Stripper wells: oil wells producing ≤ 10 BOPD or 60 MCFD have a severance tax of 6.26%.</li> </ul>		
Environmental	Tax 0.12% (deductible for determining federal income tax)		
Property Tax	3% - Varies by county		

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<sup>75</sup> https://montanapetroleum.org/educational-resources/montana-oil-gas-tax-rates/

## Montana Private Land Private Land - Vertical and Horizontal Wells

Bonus	Bids vary - location-specific
Rentals	\$1.50 per acre delay rental for both oil and gas – or \$960 per square mile.
Royalty	Ranges from 12.5% - 18.75%
Federal Tax	22% Federal Income Tax
State CIT	6.75% (deductible for determining federal income tax)
Severance Tax	9.26%; 0.76% for the first 18 months (horizontal wells)  12 months (vertical wells)  - applies to both oil and gas. Stripper wells: oil wells producing ≤ 10 BOPD or 60 MCFD have a severance tax of 6.26%.  Computed as a percentage of gross value of production less royalty?
<b>Environmental Tax</b>	0.12% (deductible for determining federal income tax)
Property Tax	Varies by county

## **New Mexico**

Federal Land

Bonus	Bids vary	
Rentals	\$1.50 per acre years 1 – 5 and \$2.00 thereafter.	
Royalty	12.5%	
Federal Tax	22% Federal Income Tax	
Severance Tax	3.75% computed as a percentage of gross value of production less royalty.  Deductions (oil and gas)  Royalties paid to federal, state, or Indian governments  Transportation costs  Processing costs when actual price is determined at a point other that at the production unit	
Conservation Tax	0.0019% when oil prices < \$70/BBL 0.0024% when oil prices > \$70/BBL Deductions Royalties paid to federal, state, or Indian governments Transportation costs to first point of sale	
Emergency School Tax	3.15% for oil 4% for gas Deductions Same as deductions for calculating Severance Taxes	
Ad Valorem Production	The Ad Valorem Production tax is effectively a tax on reserves 1 to 1.5% ad valorem tax (based on a formula) <sup>76</sup> Deductions - Same as deductions for calculating Severance Taxes	
Ad Valorem Equipment	(Property Tax) is levied on the same base as the Severance Tax except no credit for royalty paid. Based on 1.50%, a 33% adjustment factor, and a 27% assessment ratio. (Assumed 0.1% tax)	

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<sup>76</sup> https://www.nmlegis.gov, see file: Royalty and Tax Calculations.docx

## North Dakota

Federal Lands – General Terms

Bonus	Bids vary widely based on location
Rentals	\$1.50 per acre for years 1 – 5, \$2.00 per acre thereafter
Royalties	12.5% for gas and oil
Federal Tax	22% Federal Tax
State CIT	6.40%
Resource Taxes	Severance Tax $5.0\% + 6.5\%$ Oil Extraction Tax = $11.5\%$ and $0.0914/MCF$ for natural gas computed as a percentage of gross value of production less royalty.
	Stripper Well – various criteria for exemption from Oil Extraction Tax. The Oil Extraction Tax is reduced to 4% if WTI less \$2.50 is less than the "Trigger" price of \$46.78.
Horizontal Wells	To encourage new Horizontal Wells, the Oil Extraction Tax is reduced to 2% for the earlier of, 75,000 BBLS, 18 months, and \$4.5 MM
<b>Environmental Tax</b>	0.12% on same base as Severance Tax (deductible in determining Federal Tax)
Property Tax	Severance Tax in-lieu of ad Valorem Tax
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.

#### Oklahoma V&H

#### Vertical and Horizontal Wells

Bonus	Bids vary widely based on location		
Rentals	\$1 per acre per year delay rental.		
Royalties	12.5%		
Depletion Allowance	Intangible exploration costs to identify promising sites and Bonus Bids to acquire lease rights are subject to Depletion, either Cost Depletion (UoP) or Percent Depletion (15%).		
	See Depletion Allowance in 'Definitions'		
Federal Tax	22% Federal Tax		
State Tax	6% – deductible in determining Federal Tax		
Resource Taxes	Severance Tax @ 7% * + Petroleum Excise Tax @ 0.095% + Energy Resource Board Fee @ 0.10% + Marginal Well Fee @ \$0.0035/BBL and \$0.00015/MCF		
* Severance Tax Red			
Severance Tax Rea	The Severance Tax rate can be reduced based on oil or gas prices: $4\%$ \$14 \le oil \le \$17 \$1.75 \le gas \le \$2.10 1% oil \le \$14 gas \le \$1.75 In addition, a number of exemptions can reduce the severance tax by up to 6/7ths to 1%. Computed as a percentage of gross value of production less royalty? Use $2-7\%$ DJ		
The exemp	tions for well depth (WD) in feet:		
None 28 m 48 m			

<sup>\*</sup> when the annual indexed Prices are <\$5.00/MCF for gas or <\$30,000/BBL for oil.

**Horizontal Wells** The exemption for horizontal wells is 48 months or until exploration and development costs have been recovered.

Environmental Tax 0.12% on same base as Severance Tax – deductible in determining Federal Tax 0.2% on same base as Severance Tax

<sup>\*\*</sup> no price restrictions for WDs > 15,000 ft.

# **Texas University Lands** University Lands

Bonus	Bids vary
Rentals	Minimum \$25 per acre with the bid – then \$5 per year, (\$49,421 per Km <sup>2</sup> or \$128,000 per sq. mile)
Royalties	Range from 12.5% to 30%, set at 25% since 2003
Federal Tax	22% Federal Tax
Resource Taxes	Severance Tax – referred to as Oil Production Tax: Oil and Condensate = $4.6\%$ Regulatory Tax @ $$0.001875/BBL + Oil$ Field Clean-Up Fee @ $$0.00625/BE$ Gas = $7.50\% + Oil$ Field Clean Up Class @ $$0.000667/MCF$ Marginal Fields – oil ( $<15BPD$ ) – gas ( $<90$ MCFD) qualify for severance tax reductions depending on price (Po = Oil Price, Pg = Gas Price) Oil $25 < Po \le 30$ $25\%$ Gas $3.0 < Pg \le 3.5$ $25\%$ $22 < Po \le 25$ $50\%$ $2.5 < Pg \le 3.0$ $50\%$ Po $<22$ $100\%$ Pg $<2.5$ $100\%$
Ad Valorem Ta	x 2.12%
Property Tax	2.50% levied on fair market value of reserves as determined by Net Present V (NPV)

## Utah

## Federal Lands

Bonus	Bids vary	
Rentals	\$1.50 per acre delay rental for year 1 – 5 and \$2 per acre	
Royalties	12.5% for oil and gas	
Federal Tax Resource Taxes	22% Federal Tax  Severance Tax – 3% of the value from the first \$13.00/BBL or \$1.5/MCF, then 5% on oil and gas – exempt for first 6 months (12 months for new discoveries)  Stripper wells producing ≤ 20 BPD oil or 60 MCFD are exempt from Severance Tax  Computed as a percentage of gross value of production less royalty.	
Property Tax	Rates vary by county (1% estimated)	
Conservation Tax	0.02%	
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.	

## **Utah Oil Shale**

Federal Lands – Oil Shale - research, development and demonstration (RDD)

Bonus			
Rentals	Zero for first 5 year, \$2 per acre thereafter		
Royalties	Zero until commercial production can be established		
Federal Tax	22% Federal Tax		
Resource Taxes	Severance Tax exempt for oil shale – Otherwise 5% for oil and gas. Stripper wells producing $\leq$ 20 BPD oil or 60 MCFD gas are exempt from Severance Tax		
<b>Environmental</b>	Tax 0.12% on same base as Severance Tax		
<b>Conservation Ta</b>	ax 0.2% on same base as Severance Tax		
Property Tax	Rates, based on fair market value, vary by county (1% estimated?		
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.		

# Utah

Federal Lands – Oil Shale

Bonus			
	Zero for first 5 year, \$2 per acre thereafter. Annual rentals are creditable against oyalties.		
Royalties	5% for years 1 – 5 then increases 1% per year to a maximum of 12.5%		
Federal Tax	22% Federal Tax		
Resource Taxes	Severance Tax exempt for oil shale – Otherwise 5% for oil and gas exempt for $1^{st}$ 6 months. Stripper wells producing $\leq$ 20 BPD oil or 60 MCFD are exempt from Severance Tax Computed as a percentage of gross value of production less royalty.		
Environmental	Tax 0.12% on same base as Severance Tax		
<b>Conservation T</b>	ax 0.2% on same base as Severance Tax		
Property Tax	Rates, based on fair market value, vary by county 1% estimated		
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.		

# **Wyoming Federal Land**

Federal Acreage

Bonus	Bids vary - based on location.
Rentals	\$1.50 per acre delay rental for the 1 <sup>st</sup> 5 years, \$2.00 per acre thereafter (\$494 per Km <sup>2</sup> or \$1280 per sq. mile)
Royalties	12.5% for oil and gas Wyoming receives 50% of the Federal Mineral Royalties (FMR) less 2% for "net receipts sharing". 77
Federal Tax	22% Federal Tax
Severance Tax	6% Severance Tax 4% for stripper wells 2 % for first 24 months of production up to 60 bpd or 6 MCF/bbl gas equivalent
Property Tax	Varies by county average is 6.7% in 2018
<b>Import Duties</b>	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.

<sup>77 &</sup>quot;Wyoming Severance Taxes and Federal Mineral Royalties", Dean Temte, Senior Legislative Service Office, Updated July 2010. See file: wyosevtaxes.pdf (Folder: Federal Royalty Split Jul 15)

#### **Wyoming Key Fiscal Elements** — **Key Facts**

http://www.wyoleg.gov/budget/wyosevtaxes.pdf

**State Severance Tax** – Administered and collected by Wyoming Department of Revenue.

Severance tax is assessed on the taxable value of the current year's production.

The Severance tax is imposed for the privilege of severing or extracting minerals or valuable deposits

- The Severance tax is a de-facto excise tax
- The Severance tax is a state applicable tax
- The Severance tax is a creation of the statutes not the Constitution
- The Severance tax and Gross Products tax are applied to the same value (i.e Value of the Gross Product) but this is a statutory requirement for severance taxes while it is a constitutional requirement for Gross Products taxes

http://www.wyoleg.gov/InterimCommittee/2015/SMTPresentationAG-DoR.pdf

**County Gross Products Tax** – Ad valorem property tax based on taxable value of previous year's production.<sup>78</sup>

Taxable value assessed by Department of Revenue and certified to appropriate county and tax district.

Counties bill and collect this ad valorem property tax directly from mineral taxpayers based on certified taxable value and applicable tax district mill levy. http://www.wyoleg.gov/budget/wyosevtaxes.pdf

Gross Products tax is a tax in lieu of tax on the land

- Gross Products tax is a de-facto property tax
- Gross Products tax is currently only a County Applicable Tax
- Gross Products tax is a creation of the Wyoming Constitution and is bound by the aforementioned constitutional constraints

http://www.wyoleg.gov/InterimCommittee/2015/SMTPresentationAG-DoR.pdf

<sup>&</sup>lt;sup>78</sup> As discussed previously in this report the one-year time lag between the accrual and payment of the tax was a problem when prices crashed in 2015. Many companies went bankrupt leaving this tax unpaid. Had it been treated like the Severance Tax the state would not have been 'holding the bag' in many of those bankruptcy cases.

## **BOEM Report Fiscal Summary 2011**<sup>79</sup>

The following summary is included because it provides additional insight into Wyoming's key terms and at the same time shows some different views. Here the Severance Tax is described as having the same tax base as that of the royalty i.e. gross revenues minus transportation and gas processing costs. This differs from the interpretation in this report that assumes further that Federal or State royalties are also deducted to arrive at a tax base.

## **Wyoming Federal Land**

BOEM Report Fiscal Summary 2011 (Assumed Terms)<sup>80</sup>

Bonus	Signature Bonus of \$67 per acre				
Rentals	\$1.50 - \$2.00 per acre				
Royalties	12.5% of gross revenue				
Federal Tax	35% Federal Tax				
Severance Tax	6% of gross revenue				
Property Tax	6.2% of gross revenue				

**Conservation Tax** 0.04%

#### **Bonuses and Other Payment**

A minimum US\$ amount per acre is specified in the notice of sale (\$2 per acre in recent notices). Biddable signature bonuses vary widely. A \$670,000 bonus has been modeled.

#### Rental

Annual rentals are due and payable in advance on the first day of each lease year prior to the discovery of oil or gas. The following table contains the amount of rentals payable under recent lease sales.

Year	Rental US\$
1 - 5	1.5
6 - 10	2

#### Royalty

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<sup>&</sup>lt;sup>79</sup> https://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx

 $<sup>\</sup>frac{80}{\text{https://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx}}{\text{Energy-Program/Energy-Economics/Fair-Market-Value/CERA-Final-Report.aspx}}}$ 

The standard royalty rate on federal lands is 12.5%. Lower rates apply for marginal wells; however, the analysis of such terms is not within the scope of this study.

#### **Income Tax**

All leaseholders are liable to pay federal income tax under the Internal Revenue Code, US code Title 26 (26 USC). Federal income tax is payable at a corporate level on all income generated in the US. Petroleum activities onshore are usually subject to state income tax. The State of Wyoming does not levy income tax.

Federal income tax is levied on gross revenue less royalty, operating costs, abortive exploration (dry hole) costs, intangible development costs, depreciation of other exploration costs (apart from G&G costs and dry hole costs), and tangible development expenditures on a declining balance basis over 7 years, and depreciation of signature bonus and G&G expenses on a unit of production basis. Losses may be carried forward for a maximum of 20 years.

Income tax is levied on increments of taxable income at different rates depending on the level of taxable income. The current maximum federal corporate income tax rate is 35%. See Table II-LXII for applicable corporate income tax rates. We have assumed the maximum rate of 35%.

#### Severance Tax<sup>81</sup>

An ad valorem tax of 6% is levied by the State of Wyoming. The tax is levied on the same basis as royalty, i.e. gross revenue minus transportation and gas processing cost.

#### **Property Tax**

Ad valorem taxes are levied by counties on taxable value of previous year's production. The tax ranges from 6 to 7.3%. We have assumed 6.2%, which is the statewide

#### Oil and Gas conservation Tax

The State of Wyoming levies an oil and gas conservation tax at the rate of 0.04% of gross proceeds from oil and gas production.

<sup>&</sup>lt;sup>81</sup> This definition and definitions similar to this add to the confusion over calculating severance and 'ad valorem' taxes.

# **Wyoming State Lands**

## State Acreage

Bonus	Bids vary						
Rentals	\$1.00 per acre during exploration, (\$247 per Km <sup>2</sup> or \$640 per sq. mile)						
Royalties	16.67% for oil and gas – or 12% if there is limited interest during licensing						
Federal Tax	22% Federal Tax						
Severance Tax	6% Severance Tax (deductible from Fed income tax) 4% for stripper wells 2 % for first 24 months of production up to 60 bpd or 6 MCF/bbl gas equivalent						
Environmental	Tax 0.12% (deductible from Fed income tax)						
<b>Conservation T</b>	ax 8/10 <sup>th</sup> of 1 mill, based on value (0.08%)						
Property Tax	(County Tax or Mil Tax) Varies by county average is 6.85% 82						
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.						

<sup>&</sup>lt;sup>82</sup> "Wyoming Oil and Gas State Taxes", IB WY 2016-002, January 25, 2018, See file: Wyoming O&G Taxes BLM.docx

# Wyoming Private Acreage Private Acreage

Bonus	Bids vary
Rentals	\$1.00 per acre during exploration, (\$247 per Km <sup>2</sup> or \$640 per sq. mile)
Royalties	Range from 12.5% to 18.87% (most common 16.67%)
Federal Tax	22% Federal Tax
Severance Tax	6% Severance Tax (deductible from Fed income tax) 4% for stripper wells 2 % for first 24 months of production up to 60 bpd or 6 MCF/bbl gas equivalent
<b>Environmental Tax</b>	0.12% (deductible from Fed income tax)
<b>Conservation Tax</b>	8/10 <sup>th</sup> of 1 mill, based on value (0.08%)
Property Tax	(County Tax or Mil Tax) Varies by county average is 6.85% 83
Import Duties	Imported goods outside NAFTA are subject to duties, US, Canadian, and Mexican goods are duty free.

<sup>&</sup>lt;sup>83</sup> "Wyoming Oil and Gas State Taxes", IB WY 2016-002, January 25, 2018, See file: Wyoming O&G Taxes BLM.docx

## **Wyoming NCLS**

National Conference of State Legislatures (NCSL) http://www.ncsl.org http://www.ncsl.org/research/energy/oil-and-gas-severance-taxes.aspx

Oil and Natural Gas Severance Tax 6 % of fair market value

**Exceptions:** 

Oil stripper wells: 4%

**Tertiary oil production: Renewed production: Work-over/recompletion production:**4% for first five years
1.5% for first 60 months
2% for first 24 months

**New wells drilled:** 2 % for first 24 months of production up to 60 bpd or 6

MCF/bbl gas equivalent

Oil and Gas Conservation Tax 0.05%

## **Wyoming Oil And Gas State Taxes**

IB WY 2018-002 Information Bulletin January 25, 2018

Mill levy is assessed against the market value of the oil or gas minus the basic royalty. In case of oil, if it must be trucked to a market point, then this transportation charge is also subtracted. If the pipeline is used for transporting, then the mill levy is assessed against the wellhead value.

Tax Variances (see footnotes for detailed description)

- A. Tertiary Oil Production 4% severance tax for first 5 years.<sup>3</sup>
- B. Renewed Production 1.5% severance tax for first 60 months of production.<sup>4</sup>
- C. Workover/Recompletion Production 2% Severance Tax for first 24 months of production after workover/recompletion. <sup>5</sup>
- D. New Wells Drilled 2% severance tax for first 24 months of production up to 60 bpd or 6 MCF/bbl gas equivalent.<sup>6</sup>

**Conservation Tax 0.05%** (effective January 1, 2016)<sup>7</sup>

**Tribal Severance Tax** 8.5% on non-stripper production (Effective 4/1/89)

4% on oil stripper wells (10 bpd or less).8

<sup>1</sup> The historical 6% severance tax on normal production is imposed by four subsections (i, ii, iii, and iv) of Wyoming Statute (W.S.), 39-14-204(a), each subsection imposing a (excise) tax. On March 3, 1999, House Bill 274 was signed into law. This legislation modifies W.S. 39-14-204(a)(iii) and (iv) to reduce the severance tax in each subsection on crude oil by one (1) percent effective January 1, 1999. The reduced rate continued until November 30, 1999, when the average monthly price equaled or exceeded \$20.00 per barrel for three (3) consecutive months. In summary, the severance tax for crude oil was reduced from 6% to 4% for normal production, and stripper and tertiary oil production was reduced from 4% to 3%, effective January 1, 1999, through November 10, 1999.

<sup>&</sup>lt;sup>2</sup> Rick Meese, State of Wyoming, Revenue and Taxation Division see Mineral Division, https://sites.google.com/a/wyo.gov/wy-dor/dor-annual-reports

<sup>&</sup>lt;sup>3</sup> Tertiary production resulting from projects certified by the Wyoming Oil and Gas Conservation Commission after July 1, 1985, and before March 31, 2001, is exempt from two percent (2%) of the severance tax imposed by W.S. 39-14-204(a)(iii) for a period of five (5) years from date of first tertiary production. This tertiary oil tax is applied to incremental production from a baseline calculation. This tertiary incentive has been reenacted effective January 1, 2003 to March 30, 2008 (no tertiary incentive in months where the price exceeds \$27.50 per barrel).

<sup>&</sup>lt;sup>4</sup> Oil produced from previously shut-in wells is exempt from all but 1.5% of severance tax for the first 60 months of renewed production or until the average price received,

exceeds \$25.00 per barrel for six months, whichever occurs first. The oil well must have been shut in from at least January 1, 1993, to December 31, 1994.

W.S.39-14-204(a)(iii) and (iv) for a period of 24 months immediately following the workover or recompletion.

<sup>&</sup>lt;sup>5</sup> Incremental oil or gas production resulting from a workover or recompletion of an oil or gas well between July 1, 1993, and March 31, 2001, shall be exempt from the taxes imposed by

<sup>&</sup>lt;sup>6</sup> Oil and gas produced from wells drilled between July 1, 1993, and March 31, 2003, except collection wells, is exempt from the excise taxes imposed by W.S. 39-14-204(a)(iii) and (iv) for the first 24 months of production on oil production up to 60 bpd or its equivalency in gas production, which for purposes of this subsection shall be 6 MCF/bbl, or until the price received by the producer for the new production is equal to or exceeds \$25.00 per barrel of oil or \$2.75 per MCF/bbl of natural gas for the preceding six (6) month period of time.

<sup>&</sup>lt;sup>7</sup> Linda Emmons, Wyoming Oil and Gas Conservation Commission WOGCC website (wogcc.state.wy.us/taxrates.htm).

<sup>&</sup>lt;sup>8</sup> Claire Ware, Director. Shoshone and Arapaho Tribes Minerals Compliance

# **Appendix 8: Peer Group Statistics from Wyoming**

**Table 29: Western States Information - Wyoming** 

Western State Information, Wyoming Office of State Lands and Investments 2018								
	Colorado	Montana	New Mexico	North Dakota	Oklahoma	Texas Glo	Utah	Wyoming
O&G Royalty Rate	20%	16.67%	12.5, 16.67, 18.75, 20%	16.67, 18.75%	18.75%	25%	12.5, 16.67, 20%	12.5%, 16.67%
Primary Lease Terms (Years)	5	10	5 – 10	5	3	5	5	5
Extension Term	1 yr increments	Yes with cause	l yr	2x180 days	Yes	No	Yes	5 yrs + 1 yr increments
Extension Term Rental	\$10 or market with RR increase	Year 6 \$1.25 Year 7 – 10 \$2.50	\$1.25 acre	\$10 & \$20/acre	50% of bonus	N/A	Yes	No
Current Annual (Delay) Rental	2.50/acre	\$1.50	\$.25, \$.50, or \$1/acre	\$1/acre	Primary term \$1/acre Secondary term \$4	\$10/acre	\$2/acre	\$1 Non-producing \$2 Producing
Delay rental for life of lease	Yes	Yes	Yes	No	No	No	No	Yes
Shut-in Royalty Rate	\$4/acre	\$400/lease or annual rental	2X/4X rental	\$1,600	\$1/\$3	Dbl rental	\$2/acre	\$2 to \$50/acre
Maximum Shut in Terms	5	No max	No max	3 yrs	Primary term	4 yrs	5	No max
Auction process – (S) Sealed bid, (O) Open bid	S/O	0	S/O	О	S	S	S	0
Minimum bonus bids (in addition to 1st year's rental)	No	No	#30 - \$40 per acre	\$1	No	\$100's to \$1,000s per acre	No	\$1

**Table 30: Peer Group - Lease Terms** 

O&G Lease Terms & Royalty Rate Revisions - Jan 14, 2016									
	Colorado	Montana	New Mexico	North Dakota	Oklahoma	Texas GLO	Utah	Wyoming	Federal (on shore)
O&G Royalty Rate	16.67%	16.67%	12.5, 16.67, 18.75, 20%	16.67, 18.75%	16.67%	25%	16.67%	12.5%, 16.67%	12.50%
Primary Lease Terms (Years)	5	10	5 – 10	5	3	5	5	5	10
Extension Term	1 yr increments	Yes with cause	1 yr	2x180 days	Yes	No	Yes	5 yrs + 1 yr increments	No
Extension Term Rental	\$10 or market with RR increase	Year 6 \$1.25 Year 7 - 10 \$2.50	\$1.25 acre	\$10 & \$20/acre	50% of bonus	N/A	Yes	No	N/A
Current Annual (Delay) Rental	2.50/acre	\$1.50	\$.25, \$.50, or \$1/acre	\$1/acre	Primary term \$1/acre Secondary term \$4	\$10/acre	\$2/acre	\$1 Non- producing \$2 Producing	\$1.50/\$2.00 per acre
Delay rental for life of lease	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
Shut-in Royalty Rate	\$4/acre	\$400/lease or annual rental	2X/4X rental	\$1,600	\$1/\$3	Dbl rental	\$2/acre	\$2 to \$50/acre	N/A
Maximum Shut in Terms (years)	5	No max	No max	3 yrs	Primary term	4 yrs	5	No max	None
Auction process – (S) Sealed bid, (O) Open bid	S/O	О	S/O	О	S	S	S	О	О
Minimum bonus bids (in addition to 1" year's annual rental)	No	No	#30 - \$40 per acre	\$1	No	\$100's to \$1,000s per acre	No	\$1	No
O&G Taxes									

Source: Colorado State Land Board, http://www.glo.texas.gov/wslca/downloads/conferences/2016/Oil-Gas-Lease-Terms-Royalty-Rate-Revisions.pdf

**Table 31: Effective Severance Tax Rates** 

Effective Severance Tax Rates for Oil and Gas Producers, FY 2016-17							
State	Total Oil Production Value	Total Gas Production Value	Total Oil and Gas Production Value	Severance Taxes	Effective Tax Rate (Taxes ÷ Production Value)		
Colorado	\$4,382,065,570	\$4,560,908,619	\$8,942,974,189	\$57,856,222	0.6%		
Montana	\$820,819,800	\$111,128,068	\$931,947,868	\$98,104,000	10.5%		
New Mexico	\$5,721,298,680	\$3,044,698,023	\$8,765,996,703	\$338,600,000	3.9%		
North Dakota	\$13,799,611,680	\$1,760,721,444	\$15,560,333,124	\$1,461,148,461	9.4%		
Oklahoma	\$6,070,830,030	\$7,514,470,135	\$13,585,300,165	\$441,970,795	3.3%		
Texas	\$46,277,213,350	\$32,382,003,617	\$78,659,216,967	\$3,090,098,096	3.9%		
Utah	\$1,126,872,240	\$1,306,586,298	\$2,433,458,538	\$20,461,434	0.8%		
Wyoming	\$2,610,133,120	\$4,188,022,602	\$6,798,155,722	\$340,488,713	5.0%		

Source of Severance Tax Collections: Colorado: Office of the State Controller data. Utah: Utah State Tax Commission, Revenue Summary 2016-17 (Includes severance tax and conservation fee). Kansas: Kansas Division of the Budget, November 2, 2017 revenue estimates. Oklahoma: Oklahoma Tax Commission FY 2016-17 Annual Report. New Mexico: New Mexico Consensus Revenue Estimating Group, August 15, 2017 revenue estimates. Texas: Texas Net Revenue by Source, 2017, Window on State Government (Includes both natural gas production tax and oil production tax). Wyoming: Wyoming Consensus Revenue Estimating Group, October 2017 revenue estimates. North Dakota: North Dakota Legislative Council, 2015-17 Biennium Oil Tax Revenue Collections and Allocations (Includes both oil production and extraction taxes). Montana: Montana Department of Revenue, October 2018 Monthly Revenue Tracking Report (Includes only state severance taxes, not local).

Colorado Legislative Council Staff, Memorandum, Effective Severance Tax Rates on Oil and Gas, Larson Silbaugh, Principal Economist, January 12, 2018

**Table 32: BLM Approved Applications** 

BLM Approved Applications										
BLM T7	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alaska	12	8	0	0	2	10	8	3	3	4
California	231	169	281	369	355	181	181	168	28	64
Colorado	684	473	593	509	422	314	316	373	218	319
Montana	141	57	66	26	51	26	26	28	5	6
New Mexico	1,224	1,105	945	883	1,073	925	920	882	891	545
North Dakota	88	65	147	135	197	255	254	471	241	263
Oklahoma	18	4	10	7	17	33	33	27	10	12
Texas	23	24	78	31	37	18	18	12	5	1
Utah	943	557	402	602	848	965	963	553	142	160
Wyoming	3,155	1,975	1,538	1,660	1,229	1,001	997	964	626	1,102
TOTAL	6,617	4,487	4,090	4,244	4,256	3,770	3,769	3,508	2,184	2,486

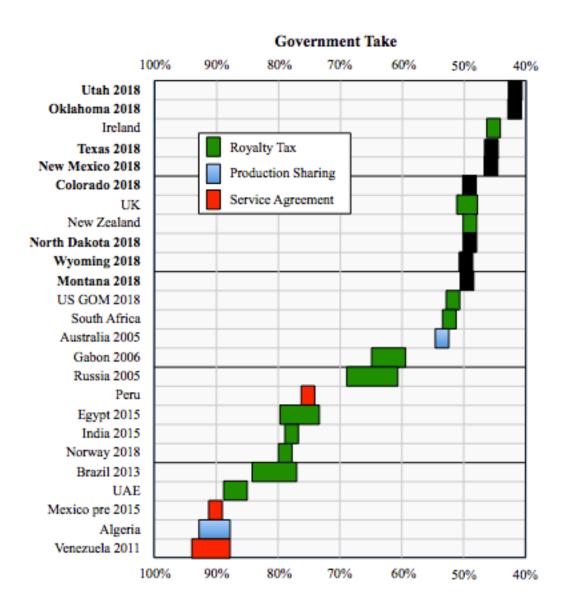
<sup>&</sup>lt;sup>(1)</sup> Data from Public Lands Statistics in which APDs were portrayed by BLM administrative office (e.g., the Eastern States Office)

Note: Data is Federal-only; does not include Indian data. Some state totals will be less than combined totals using both Federal and Indian data

## **Appendix 9: Government Take Comparisons**

## **Figure 14: Government Take Comparisons**

This graph includes US State (Peer Group) and country Take estimates (federal land). Costs used were approximations for the states and regions based on geology and field size expectations, although cost estimates used for the peer group were at 30% of gross revenue. Government participation is included in the calculation for countries that do participate.



# Index

\$70 BBL of Oil on Federal Mineral	Gas Production on Federal Land 90,
Acreage12	92
Ad Valorem59	Government Take
Ad Valorem Property Tax 59	Government Take Comparisons 131
Ad Valorem Taxes	Government Take vs. World Average
Allocation Process	71
APD Completion times 37	Gross Revenues
ase Operating Expense 56	Incentives 78, 85
Auction Processes	Key Fiscal Elements119
Barnett shale	Lease Bonus Bids47
<b>Barrel of Oil at \$70/BBL</b>	Lease Suspensions
<b>BLM Approved Applications</b> 130	License Stockpiling
<b>BLM Step Scale</b> 82	Marketable Product Rule9
Bonus Bidding 44	Mil Tax 59
Bonuses	<b>Minimum Bid</b> 73
Colorado	Montana 85
compound uplifting81	Net Revenues 58, 59
Conservation61	Netback 50, 53
<b>Conventional vs. Fracture Production</b>	New Mexico 86
<b>Curves</b>	New Wells Drilled 125
Converse County Oil and Gas Project	Niobrara 46
(CCOGP)32	Normally Pressured Lance (NPL) 31
Corporate Income Taxes 63	North Dakota86
Costs	NPL and CCOGP Projects36
County Gross Products Tax 119	NPL Permitting36
County Tax59	Oil Production on Federal Land 95
Distortions	Oklahoma86
Division of Profits21	Peer Group Compsite66
Division of Revenues	point of sale9
Economic Profits	point of valuation9
effective royalty rate20, 60	Price-based formulas 80, 81
Effective Royalty Rate (ERR) 20	Production Based Sliding Scales 82
<b>Effective Severance Tax Rates</b> 129	Production-based Scales 80
Effective Tax Rate (ETR)20	Property Tax59
<b>Expected Ultimate Recovery</b>	Proved Undeveloped Reserves 41
Federal Income Taxes	R Factor-based Systems81
Federal Mineral and Surface Acreage	Rate of Return contracts81
7	Rate-of-Return (ROR) Systems 80
Federal Surface Acrage by State 89	Recompletion Production
First Marketable Product Rule 50	Red Tape 34
Fiscal System Summaries 102	Regressive Behaviour 67
Fractured Reservoir Production Profile	Regressive Impact 72
27	Renewed Production
	Rentals57

Reserves Reporting 40	Tax Liability22
Resource Plays	Tax Variances 125
R-factors80	Taxation Theory
Rick Meese	Taxes vs. Incentives
<b>Rig Counts</b> 84	Technology play29
risk capital44	Terminology and Definitions44
Risk Side vs. Reward Side 78	Tertiary Oil Production125
Royalty Determination	<b>Total Gas Production by State</b> 93
Royalty Disparity75	<b>Total Gas Production vs. Federal</b> 98
Royalty Disparity Lobby 77	<b>Total Oil Production by State</b> 96
Sales and Use Tax61	<b>Total Oil vs. Federal Production</b>
Severance Tax119	<b>Comparison</b> 97
Severance Taxes	Type Shale Well Economics
Shale Play Characteristics	Unconventional Plays
Shale Plays24	Utah88
Sliding Scales	Wellhead Valuation 52
Speculative Characteristics 42	wellhead value49
Split-Estate7	Western States Information -
State Income Taxes	<b>Wyoming</b> 127
State Oil Production 89	Workover 125
State Percentage of Oil Production . 90	Wyoming 88
State Revenues 23	Wyoming and Colorado vs. BLM 35
Statistical plays29	Wyoming Point of Valuation 53
Take21, 70	