



## SECTOR-BY-SECTOR APPROACHES

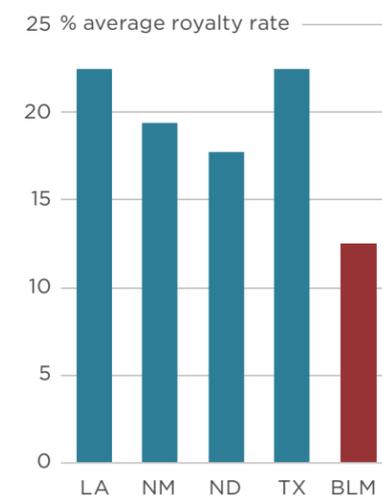
# Ensuring Americans Receive Fair Value For U.S. Oil and Gas Resources

Thomas Covert, Assistant Professor, Booth School of Business

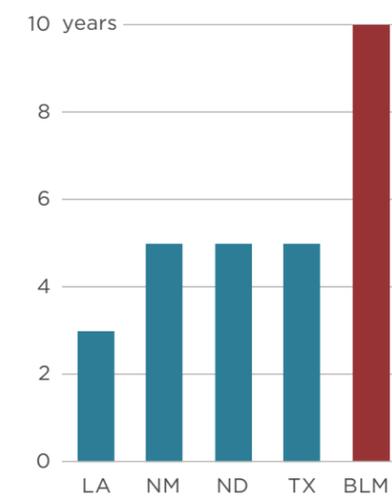
Ryan Kellogg, Professor and Deputy Dean for Academic Programs, Harris School of Public Policy

The U.S. Bureau of Land Management (BLM) is entrusted with ensuring that federally owned onshore oil and gas resources are developed expeditiously, while simultaneously capturing fair market value for the resource owners—U.S. taxpayers—and safeguarding the environment. BLM’s primary policy tools for fulfilling its mission are the terms of its lease contracts with private oil and gas firms that ultimately drill for and produce oil and gas from federal lands. BLM leases, however, capture less value for taxpayers than leases issued by similarly-tasks state agencies that manage state-owned oil and gas. BLM imposes a royalty rate—the share of oil and gas revenue that is taken by the government rather than left to the producing firm—that is significantly lower than royalty rates used in Louisiana, New Mexico, North Dakota, and Texas, all of which have substantial hydrocarbon production from state-owned land.

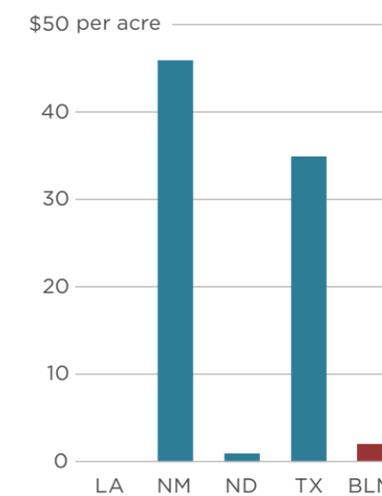
FIGURE 1 - CHAPTER IN A CHART  
Average Royalty Rate



Maximum Primary Term



Minimum Reserve Price



Note: The average royalty rate in each state is the average of the lowest and highest royalties used in state auctions. Primary terms are identical for all auctions in each state except TX, which sometimes uses three years. The minimum reserve price is the lowest reserve observed in each state’s auctions. The highest reserve observed in NM is \$1,875/acre, and the highest reserve observed in TX is \$5,000/acre.

Sources: Louisiana Department of Natural Resources; North Dakota Department of Trust Lands; New Mexico State Land Office; Texas General Land Office; Bureau of Land Management.

At the same time, current BLM leases fail to induce timely resource development by allowing firms to acquire leases for miniscule initial prices and then effectively tie up land, without development, for as long as ten years. Moreover, the BLM’s bonding practices, ostensibly designed to ensure that companies restore the surrounding environment when a well is exhausted, have not been revised in some fifty years, leaving them outdated and unequal to the task.

There are a number of changes the Biden administration could pursue to ensure that BLM meets its statutory responsibilities. Specifically, it could raise the federal royalty rate to substantially increase taxpayers’ returns, reduce the standard lease term to speed the rate at which resources are developed, and increase federal bonding requirements to better protect the environment. Each of these steps would also bring federal onshore oil and gas leasing policy into better alignment with that used by state agencies.

## Heart of the Problem

While the majority of U.S. oil and gas production comes from privately owned mineral resources, federally managed resources contribute a non-trivial share of

U.S. hydrocarbon production. While the largest single federal oil and gas resource is the offshore Gulf of Mexico, considerable volumes of oil and gas are produced from onshore resources managed by BLM. In 2019, for example, 0.8 million barrels (mmbbl) of oil and 9.1 billion cubic feet (bcf) of natural gas were produced per day from onshore federal land, equal to 6 percent of total U.S. oil production and 8 percent of total U.S. natural gas production.<sup>1</sup> At the average prices prevailing in 2019, these produced resources were collectively worth \$25 billion during 2019.<sup>2</sup> Given projections from the U.S. Energy Information Administration that U.S. oil production will hold roughly constant for the next

1 Federal onshore production from Department of the Interior Natural Resources Revenue Data, accessed November 27, 2020, <https://revenue.data.doi.gov/?tab=tab-production>; total U.S. oil production from U.S. EIA, “Petroleum and Other Liquids,” Accessed November 27, 2020, [https://www.eia.gov/dnav/pet/pet\\_crud\\_crpdn\\_adc\\_mbbldpd\\_a.htm](https://www.eia.gov/dnav/pet/pet_crud_crpdn_adc_mbbldpd_a.htm). Total U.S. gas production from U.S. EIA, “Natural Gas Gross Withdrawals and Production,” accessed November 27, 2020, [https://www.eia.gov/dnav/ng/ng\\_prod\\_sum\\_a\\_EPGO\\_FGW\\_mmcfa.htm](https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPGO_FGW_mmcfa.htm).

2 Revenue calculation based on the 2019 average Cushing crude oil spot price of \$57/bbl and Henry Hub natural gas spot price of \$2.56/mmBtu. Price data are from U.S. EIA, “Petroleum and Other Liquids,” and “Natural Gas,” accessed November 27, 2020, <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=p&s=rwtc&f=a> and <https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm>.

twenty years, and that U.S. natural gas production will grow by approximately 20 percent over the same time period, responsible environmental and fiscal management of these resources should remain a priority for policymakers for the foreseeable future.<sup>3</sup>

While the federal government is the owner of resources produced on federal territories, it does not extract them itself. Instead, federal land is leased to private firms that possess the technical expertise with which to drill and produce oil and gas resources. This leasing process is a critical stage that governs whether, where, and when oil and gas resources are developed, how production revenues are shared between the government and the extraction firms, and the extent to which the local environment is protected. This chapter documents several ways in which current federal oil and gas leasing policy fails to deliver both statutorily required “market based” financial returns and necessary environmental protections to mineral owners—in this case, U.S. taxpayers—especially when compared to leases used in markets for state-owned and privately owned resources.<sup>4</sup>

A mineral lease is a contract that specifies, among other things: a *primary term* that dictates how many years a firm has to drill and complete at least one productive well; a *rental rate* that specifies a payment to the government each year prior to drilling; and a *royalty* that dictates the share of oil and gas production revenue that flows to the government. Both state and federal governments allocate leases to firms using organized auctions in which firms offer bonus bids that are the up-front cash payment they make should they be the winning (highest) bidder. In these auctions, the government sets a reserve price rule that specifies the lowest bid that the government will accept.

On federal lands managed by the Bureau of Land Management (BLM), each of the above terms is set in a way that is favorable to firms and—as suggested by current research in energy economics—is far from revenue-maximizing for the government. BLM oil and gas auctions use a ten-year primary term, a 12.5 percent (one-eighth) royalty, and a reserve price of \$2/acre. Figure

1 compares these terms to those used by four major oil and gas producing states—Louisiana, New Mexico, North Dakota, and Texas—when they lease their state-owned minerals.<sup>5</sup> Relative to the BLM, all four states use a shorter primary term and a larger royalty. And while the auction reserve prices in Louisiana and North Dakota are comparable to those used by BLM, New Mexico and Texas impose substantially higher reserve prices on bidders for their state-owned resources.

The differences between BLM and state oil and gas leasing policies reduce the revenue that the federal treasury receives from its oil and gas resources, and at the same time fail to expedite resource development. The low BLM royalty substantially curtails the value that the federal treasury can recover from the public’s oil and gas resources, and the low reserve price and long primary term together allow firms to sit on land for a decade in exchange for a negligible up-front fee and similarly small annual delay rental payments.

BLM’s oil and gas policies also affect the potential for damage to the environment and who pays for environmental liabilities. Once an oil or gas well is drilled, the well will produce at a declining rate for many years, gradually depleting the underground reserves. Eventually, the well will reach the end of its economic life once production revenues are too low to cover the well’s ongoing operating cost. At that point, the well is “shut in” to turn off production. However, a shut-in well poses hazards that can harm people’s health and damage the environment. For instance, even after it is shut in the wellbore can remain filled, up to the surface, with oil, gas, and brines from the underground formation. These fluids may contain heavy metals or chemicals potentially linked to cancers and developmental problems.<sup>6</sup> Should these fluids leak, they will harm the environment around the well and potentially affect surface or groundwater resources downstream. To prevent such damage, shut-in wells must be decommissioned by a process known

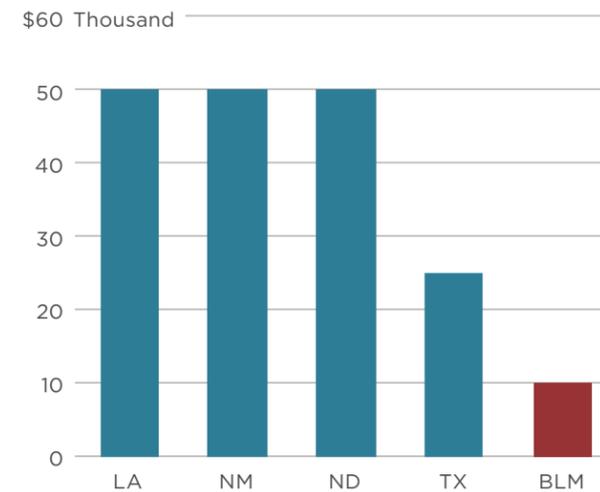
5 Each of these states has an active state-managed mineral leasing program and is a major producer of oil and/or natural gas. Texas, North Dakota and New Mexico are the three most productive states for oil production, while Texas is the most productive and Louisiana is the third most productive gas producing state. Pennsylvania, the second most productive gas producing state, is excluded because the Pennsylvania state government owns few of the mineral resources in the state.

6 Elliott, Ettinger, Leaderer, Bracken, and Deziel, “Evaluation of chemicals in hydraulic-fracturing fluids and wastewater,” 90-99.

3 Source: EIA *Annual Energy Outlook 2020*.

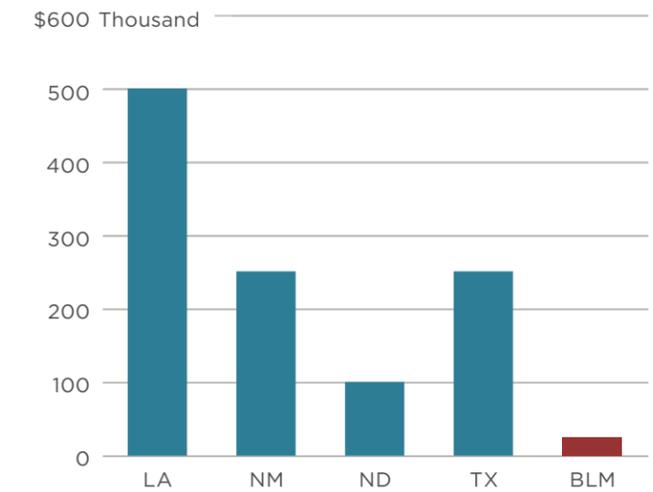
4 BLM is directed by statute to generate a market-based return to taxpayers. See C.B.O., “Increasing Federal Income from Crude Oil and Natural Gas”, 6, and the Federal Land Policy and Management Act (FLPMA) of 1976.

FIGURE 2  
Bond Required for One Well



Sources: Louisiana Department of Natural Resources; North Dakota Department of Trust Lands; New Mexico State Land Office; Texas General Land Office; Bureau of Land Management.

Bond Required for 100 or More Wells



as plugging and abandonment (P&A). An important role for mineral policy is to ensure that firms properly decommission their wells at the end of their economic life.

The BLM and all oil and gas producing states mandate that operating firms P&A their wells at the end of their economic life. However, BLM makes it relatively easy for firms to avoid the cost of doing so by declaring bankruptcy—thereby leaving taxpayers to foot the bill for their “orphaned” wells. Current regulations address this well-known “judgment-proof problem” by requiring firms to post a bond, prior to drilling the well, which covers the expected decommissioning liability. However, relative to other oil and gas producing states, BLM’s required bond amounts are low and insufficient to cover P&A costs. The end result is that federal taxpayers are exposed to these costs instead.

Oil and gas will play significant roles in the U.S. and global economies for decades to come, and during that time the United States is likely to remain one of the world’s most important producers. The Biden administration should take urgent steps to ensure that taxpayers are receiving a fair return for these vital public resources, and that both current and future generations do not suffer preventable environmental harm from them.

## How We Got Here

BLM’s mineral leasing program is part of its “multiple-use

and sustained yield mission,” as mandated by the Federal Land Policy and Management Act (FLPMA) of 1976.<sup>7</sup> The FLPMA defines “multiple use” as “management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people.” Per the FLPMA, multiple uses include:

- Protecting “the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values”;
- Ensuring that “the United States receive fair market value of the use of public lands and their resources”; and
- Managing public lands “in a manner which recognizes the Nation’s need for domestic sources of minerals, food, timber, and fiber.”

BLM is therefore statutorily obligated with the challenge of balancing at least three objectives that have the potential to conflict with one another: developing the country’s natural resources, ensuring fair value for taxpayers, and preserving the natural environment.

BLM’s oil and gas leasing process touches on each of

7 See The Federal Land Policy and Management Act (As Amended), Public Law 94-579, <https://www.blm.gov/sites/blm.gov/files/documents/files/FLPMA2016.pdf>.



Under current policy, oil and gas leasing on federal lands does not achieve the same returns for taxpayers as leases from leading oil and gas producing states.

these three land management objectives. In order to develop oil and gas on federal lands, the BLM enters into mineral lease contracts with oil and gas companies. These leases are similar in structure to those used by both private mineral owners and state agencies responsible for managing state-owned minerals. First, oil and gas leases encourage resource development by granting specialized oil and gas firms the right to drill wells that explore for, develop, and produce underground hydrocarbon reserves. Leases ubiquitously include a habendum clause that gives the firm only a finite time period, known as the primary term, to commence production. If the firm fails to develop the reserves by the end of the primary term, it loses the lease and all development rights. Second, leases collect revenue for taxpayers by charging firms an up-front cash bonus (due at lease signing) and by collecting a royalty share of all revenue generated by the sale of oil and gas production. Finally, drilling permitting policies endeavor to protect the environment by requiring firms to post a bond prior to drilling.<sup>8</sup> The bond is only returned to the firm when the drilled well is safely plugged and abandoned—and the well site fully remediated—at the end of the well's productive lifetime.

The BLM's leasing procedures and policies for setting parameters such as the royalty, primary term length, minimum bonus bid, and bond amount are governed by the FLPMA and the Mineral Leasing Act (MLA) of 1920,

which was last amended in 1987.<sup>9</sup> The MLA requires the BLM to award oil and gas development leases through competitive auctions, in which firms submit bids for the cash bonus but other lease terms such as the royalty and primary term are pre-specified by the BLM. The statutory minimum bid requirement is \$2 per acre. In the event a parcel fails to win a minimum bid, the MLA then prescribes a "non-competitive" award process in which a lease may be granted to a firm for a nominal fee, on a first-come, first-served basis.

In either case, the awardee obtains a mineral lease in which the primary term is specified by the MLA to be ten years. Each year prior to drilling, the MLA then specifies that the lessee pay a minimum rental fee of \$1.50 per acre for the first five years, and at least \$2 per acre thereafter. Should the firm commence production of oil and gas, the MLA specifies a minimum royalty rate of 12.5 percent. While neither the FLPMA nor the MLA explicitly requires that firms post performance bonds prior to drilling, the House Committee report for the FLPMA recommends that BLM require performance bonds that guarantee reclamation.<sup>10</sup>

The BLM currently sets its royalty rate and minimum bid at the statutory minima specified in the MLA. The net result of these regulatory decisions and the other prescriptions in the FLPMA and MLA statutes is that BLM's current leasing policies put little weight on two of the three land management objectives under its multiple use

<sup>8</sup> Private oil and gas leases do not typically require that a bond be held by the private mineral owner. Instead, the relevant state's oil and gas bonding policy applies.

<sup>9</sup> The discussion of BLM's statutory authority versus regulatory discretion is sourced from C.B.O., "Increasing Federal Income from Crude Oil and Natural Gas," 40.

<sup>10</sup> Schwartz, "Federal Land Policy and Management Act (FLPMA) of 1976," 292-293.

doctrine: delivering fair returns to taxpayers and sustaining environmental quality. BLM's royalties and minimum bonus bids fall well below norms set by other major oil and gas producing states and by the private leasing market. The fact that BLM captures relatively little value for taxpayers could reflect the possibility that it has elected to prioritize the objective of expeditious resource development above all others. However, the statutory requirement to offer ten-year primary terms makes even that objective difficult to achieve, since firms are able to obtain leases and then not develop them for long periods of time.

The above issues are exacerbated by the fact that many of the tracts auctioned by BLM do not attract a large number of competitive bidders. For instance, in the fourth quarter of 2019 (the last full quarter before the COVID-19 pandemic began) the BLM offered 585 tracts in its oil and gas auctions. Only 212 tracts (36 percent) received any bids at all, and the unsold tracts were then moved to non-competitive leasing, as required by the MLA. Of the 212 tracts with bids, seventy-three (34 percent) were won with just the minimum bid of \$2 per acre.<sup>11</sup> Given this lack of competition, the values set for the minimum bid level and the royalty take become particularly important in determining the overall revenue realized from the federal onshore leasing program.

Finally, the actions taken by BLM to further its third statutory land management objective—sustaining environmental quality—are inadequate to the task. BLM currently requires that oil and gas well operators post a bond of either \$10,000 per lease, \$25,000 for all the operator's wells in a state, or \$150,000 for all of an operator's wells nationwide. These amounts have not changed since the 1960s, are below benchmarks from other oil and gas producing states, and are insufficient to conduct full reclamation once oil and gas production have ceased. For instance, the Government Accountability Office (GOA) found in 2019 that even under a low reclamation cost scenario, 99.5 percent of wells did not have bonds large enough to cover their anticipated reclamation costs.<sup>12</sup>

<sup>11</sup> These statistics were compiled by the authors based on BLM lease auction data available at [https://www.energynet.com/page/Government\\_Sales\\_Results\\_Previous](https://www.energynet.com/page/Government_Sales_Results_Previous). Because BLM auctions are typically open outcry (whether in person or online), there are no formal data on the number of bidders. Presumably, leases sold for only the \$2/acre minimum bid received only that single bid.

<sup>12</sup> U.S. G.A.O., "Oil and Gas," GAO-19-615, 15.

## What To Do

There are a number of steps that BLM can take itself, under current legislation, to better align its terms with those in private and state-level leasing, and to better achieve the three land management goals it is tasked with under federal law. The Biden administration can also pursue improvements by working with Congress on amendments to existing legislation.

### POLICY

#### Increase the federal onshore royalty rate.

The royalty rate in any oil and gas lease (federal, state, or private) dictates the share of all oil and gas revenue that must be paid to the resource owner rather than be taken by the lessee firm. The BLM currently imposes a 12.5 percent royalty—the statutory minimum—on all of its oil and gas leases. This royalty rate falls well below that used in major oil producing states for leases on state-owned land. Texas, for instance, imposes royalties of 20-25 percent on its state-owned oil and gas leases (Figure 1). This rate is aligned with the 20-25 percent royalties that are commonly used in private oil and gas leasing. Thus, BLM gets as little as half as much as state or private landowners for every dollar's worth of oil and gas produced from its lands.

While the direct effect of increasing the royalty rate is to increase the government's payments from all oil and gas produced, setting the royalty rate too high can actually reduce both drilling activity and revenues. Because the royalty is essentially a tax on firms' revenues, higher royalties will discourage the drilling and completion of wells. An excessive royalty might mean no drilling and no royalty revenue at all. Moreover, when leases are awarded, firms will consider future royalty payments when they make their bonus bids. If the royalty is high, that will make leases less attractive to firms and consequently lower their up-front bids.

The royalty rate that delivers the greatest value to taxpayers is therefore not 100 percent, but it is not 0 percent either. When, as is common, lease auctions do not attract a large number of bidders and the cash bonus is therefore low, the royalty ensures resource owners receive value for their resources rather than losing it to the extraction firm. Bonus bids alone do a poor job of capturing value for the mineral

owner when there are few bidders, because extraction firms are better informed about the resource's value than is the owner.<sup>13</sup> These firms' superior information can allow them to win leases with bids that fall well below the true resource value. In these situations, a robust royalty can preserve revenue for the resource owner by capturing a significant share of the resource's value as it is extracted. Thus, if the reserves underlying a lease turn out to be a substantial, the royalty can let the owner capture a share of the value of those reserves, even if the firm won the tract with a low bonus bid due to little competition.

In New Mexico, for example—where the median lease in a pair of recent studies attracted just two bidders—the royalty rate that maximizes the state's revenue after accounting for production impacts is between 25 percent and 30 percent.<sup>14</sup> In the Haynesville shale of Louisiana, where mineral owners frequently negotiate with just one firm, revenue-maximizing royalties for new gas leases may be as high as 50 percent, depending on the size of firms' informational advantage.<sup>15</sup>

BLM's royalty rate of 12.5 percent therefore falls well below the rate that would maximize the value received by taxpayers from federally owned oil and gas. Such a low rate is consistent with a desire to emphasize resource development rather than taxpayer value. For instance, one recent study estimated that the probability a lease is drilled would increase by 60 percent if New Mexico's royalty were zeroed out.<sup>16</sup> BLM's prioritization of resource development over taxpayer value, however, is out of line with that of other major oil and gas producing states. Royalties in Louisiana, New Mexico, North Dakota, and Texas are at minimum 16.67 percent and can be as high as 25 percent. There is no obvious reason why BLM should deliver less value to taxpayers than do similarly tasked state agencies.

<sup>13</sup> Hendricks, Porter, and Tan, "Optimal Selling Strategies for Oil and Gas Leases with an Informed Buyer"; Bhattacharya, Ordín, and Roberts, "Bidding and Drilling Under Uncertainty"; Ordín, "Investment and Taxation"; and Herrnstadt, Kellogg, and Lewis, "The Economics of Time-Limited Development Options."

<sup>14</sup> Bhattacharya, Ordín, and Roberts, "Bidding and Drilling," 32; Ordín, "Investment and Taxation," 15.

<sup>15</sup> Herrnstadt, Kellogg, and Lewis, "Time-Limited Development Options," 32.

<sup>16</sup> Ordín, "Investment and Taxation," 32, estimates that the probability of drilling would increase from 9.6 percent to 15.4 percent if royalties were set to zero, a 60 percent increase.

## POLICY

### Simplify royalty valuation by eliminating deductions.

The shortcomings of BLM's low royalty rates are exacerbated by the complexity with which oil and gas revenues are valued for royalty purposes by the Office of Natural Resources Revenue (ONRR, which like BLM is an agency within the Department of the Interior). Because the royalty rate applies to a share of oil and gas production revenue (as opposed to produced volumes), the price at which production is valued can have a profound effect on firms' royalty payments to the government.

Firms currently enjoy tremendous flexibility in how they price oil and gas sales and take allowable cost deductions for the purpose of royalty valuation.<sup>17</sup> To value oil, for instance, firms can choose to use the price at the first arm's-length transaction for the oil or use an approved benchmark price such as the New York Mercantile Exchange (NYMEX) price for West Texas Intermediate crude at Cushing, OK. Firms can also elect to take allowable deductions based on actual transportation costs or on price differentials (based in turn on published prices or private exchange agreements), as well as on crude quality differences and some processing costs. All of these choices and more allow firms to select terms that are most favorable to them, at the expense of U.S. taxpayers. Enforcing this web of rules also requires careful audits to ensure that reported arm's-length transactions really are arm's-length and that reported cost deductions are legitimate, increasing the cost of the system for firms and the government alike.

ONRR instead could pursue a simpler and less administratively burdensome approach to royalty valuation: use a liquidly traded, transparent price index—such as West Texas Intermediate or Brent for oil, or Henry Hub for natural gas—as the benchmark for all produced oil and gas. The benefit of such an index is that daily prices can be independently verified by third parties, and the markets are sufficiently deep that they would be extraordinarily difficult to manipulate. Universal use of an index would also obviate any need to verify transaction records or litigate whether a buyer and seller are truly arm's length.

<sup>17</sup> A detailed discussion of the ONRR 2016 Valuation Rule is available at [https://www.onrr.gov/reportpay/training/TrainingFiles/OK\\_Report\\_Training/2016ValuationRule.pdf](https://www.onrr.gov/reportpay/training/TrainingFiles/OK_Report_Training/2016ValuationRule.pdf).

Additionally, ONRR could eliminate deductions for transportation costs, price differentials, or product quality. Although these deductions do increase the value to firms of acquiring a mineral lease in the first place, enforcement requires costly audits, and even after auditing firms will still have some incentive to manipulate them. If deductions are eliminated, potential drilling partners may bid less in certain mineral lease auctions, but the winners of those auctions will end up paying more in royalties.

## POLICY

### Increase the rate of tract development by shortening primary terms, increasing minimum bids, and eliminating non-competitive leasing.

BLM's standard primary term of ten years gives firms a remarkably long time to hold a lease before developing it. While such a long lead-time might be appropriate for large, offshore deepwater developments that require long construction times, it is excessive for onshore resources that can be developed more quickly.<sup>18</sup> It is also out of line with primary terms used by major oil producing states. As illustrated in Figure 1, the longest primary term used by Louisiana, New Mexico, North Dakota, and Texas when leasing state oil and gas parcels is five years. Three and five year terms are also common in private oil and gas leasing markets.

Short primary terms are valuable for two reasons. First, they promote timely resource development, one of BLM's core objectives. Second, they can increase the present value of the revenues earned by the resource owner, despite the fact that short primary terms may lead firms to make lower bids during lease auctions. A recent paper shows that primary terms create value for the resource owner by accelerating drilling, countering the incentive to delay drilling that is induced by the royalty.<sup>19</sup> That is, the royalty and primary term work together as complementary tools by which the resource owner can

<sup>18</sup> For instance, Kellogg, "The Effect of Uncertainty on Investment," 1710, finds that firms can mobilize to drill conventional onshore wells in Texas within three months of a significant change in the oil price. Newell, Prest, and Vissing, "Trophy Hunting vs. Manufacturing Energy," 409, and Newell, and Prest, "The Unconventional Oil Supply Boom," 11, find that most of the response of unconventional drilling to price changes occurs within two calendar quarters of the price change.

<sup>19</sup> Herrnstadt, Kellogg, and Lewis, "Time-Limited Development Options," 32.

earn value from its reserves while not inducing the firm to excessively delay resource development.

The ability of firms to obtain a federal oil and gas lease and not develop it for a long period of time, or perhaps not develop it at all, is exacerbated by the low minimum bid of \$2 per acre that BLM uses in its auctions, along with the low annual rental payments of \$1.50 or \$2 per acre. Even in the least desirable, most outlying "wildcat" areas in the earliest days of shale plays, state auctions had minimum bids of \$100 per acre or more. In active shale plays today, minimum bids of thousands of dollars per acre are not uncommon. Given the BLM's low minimum bid, and given the fact that many tracts are leased at the minimum, it is easy for a firm interested in developing a position in an outlying area to acquire a long-term option at near zero cost.

If BLM could be sure that the acquiring firm was indeed going to be the best user of the lease for a decade into the future, this situation could be reasonable. However, when a firm wins such a position at the minimum bid, it means that there are currently no other interested parties. When and if such land ever becomes productive, it is quite likely that more than a single firm will have an active interest in it, and there is no guarantee that the firm who bids early, at the minimum bid of \$2 per acre, is the best user. BLM's policy therefore not only deprives the public of value for the land in the initial lease, but it also means that it may not ever be developed as productively—and profitably for the public purse—as possible.

In addition, BLM's reserve prices are not actually imposed as binding reserve prices in practice. Instead, auctioned parcels that fail to receive a qualifying bid are transferred to BLM's "non-competitive" leasing program, where they can be leased to firms for no up-front fee at all. In state auctions, in contrast, parcels that do not receive minimum bids revert back to private or state ownership, and are available for future auction at corresponding market terms. Recent research comparing the outcomes of auctions to a similar "non-competitive" leasing market for state minerals in Texas shows that revenues and production from auctions, even those that will be delayed until a future date, can be much higher than that from non-competitive and informal transactions.<sup>20</sup>

<sup>20</sup> Covert, and Sweeney, "Relinquishing Riches."

Taken together, these policies result in some mineral leases that transact at far below their market value, and other mineral leases that should not transact at all, because no high-value users have shown any interest in them. Moreover, firms are able to sit on marginal tracts for a decade, precluding the land's use by others and imposing administrative costs on BLM.

A number of complementary changes can address these issues:

1. Shorten primary terms for onshore U.S. oil and gas leases to no more than five years, aligned with the policies adopted by state agencies and leases observed in private markets;
2. Increase the minimum bid per acre to be more aligned with the policies adopted by state agencies; and
3. Terminate the non-competitive leasing program.

Because the MLA prescribes ten-year primary terms, implementing recommendation one will require an act of Congress to amend the MLA. Recommendation two can be implemented by BLM via the administrative rulemaking process. However, increasing the minimum bid while retaining the non-competitive leasing program will be ineffectual, since firms will be able to respond to the higher minimum bid by not bidding at all, and still obtain a lease later without having to pay the cash bonus. Eliminating the noncompetitive leasing program (recommendation three) will require a statutory amendment to the MLA.

## POLICY

### Strengthen bonding requirements to protect the environment & public health.

At the end of a well's life, it is necessary to "plug and abandon" (P&A) the well, for both safety and environmental protection reasons. This procedure involves pumping cement down the wellbore in order to create a permanent seal that separates the surface from fluids and gases in the underground oil and gas formation. Properly plugging a well is not cheap. Plugging the current inventory of orphaned wells would cost \$24,000 to \$48,000 per well, with potentially higher costs to decommission modern shale wells.<sup>21</sup>

<sup>21</sup> Raimi, Nerurkar, and Bordoff, "Green Stimulus for Oil and Gas Workers," 12.

Both federal and state governments require operating firms to decommission wells at the end of their economic life. Because the process is costly, however, firms have an incentive to avoid this obligation. One way they can do so is to transfer a well's ownership to a poorly capitalized firm that lacks the money required to cover the decommissioning cost. Once the well reaches the end of its economic life, the firm can then declare bankruptcy rather than pay for decommissioning. The ability to avoid environmental liabilities via bankruptcy is an example of the judgment-proof problem, by which firms that can avail themselves of bankruptcy protection have an incentive to take excessive risks.<sup>22</sup>

A well that is abandoned by a bankrupt firm then becomes classified as "orphaned" and either remains unplugged—posing an ongoing environmental hazard—or is decommissioned at the public's expense. Data collected from state agencies indicate that the problem of orphaned wells is widespread. As of 2018, there were 56,600 documented orphaned wells in the United States, and likely hundreds of thousands of additional undocumented orphaned wells.<sup>23</sup> Assuming a minimum cost of \$24,000 per well, decommissioning these documented and undocumented wells would cost billions of dollars. Using public funds, states are plugging them at a glacial pace: only 3,356 orphaned wells were reported plugged in 2018.<sup>24</sup>

To help prevent orphaned wells, many states and the federal government require oil and gas operators to post a bond—or pay an insurance firm to post a surety bond on their behalf—prior to drilling. The firms only recover the bond once the well is properly decommissioned.

In principle, this bonding requirement can solve the judgment-proof problem, but only if the required bond amount is commensurate with wells' decommissioning costs. However, BLM's requirement that firms only post a single, \$25,000 bond for each state in which they operate, regardless of the number of wells they operate, effectively requires firms to post a bond sufficient to cover the decommissioning of just one well, at best. Moreover, and as shown in Figure 2, the BLM bonding requirement

<sup>22</sup> Shavell, "The Judgement Proof Problem," 45-58.

<sup>23</sup> Raimi, Nerurkar, and Bordoff, "Green Stimulus," 12; IOGCC, "Idle and Orphan," 14.

<sup>24</sup> IOGCC, "Idle and Orphan," 5.

is substantially weaker than that used in other major oil-producing states. For instance, \$25,000 per operator is the smallest bond that the State of Texas requires, and operators of multiple wells pay substantially more.

BLM's weak bonding policy gives firms both an incentive and an opportunity to escape environmental liabilities via bankruptcy, leaving taxpayers to foot the bill for well decommissioning—or to suffer the health and environmental consequences of orphaned wells. Evidence indicates that firms act on this incentive. Texas's bonding requirement was not always as high as that shown in Figure 2. Prior to 2001, operators in Texas were able to avoid bonding requirements by paying small annual fees. Starting in 2001, however, Texas required all operators in the state to post bond amounts equal to those shown in Figure 2 (poorly capitalized operators could pay risk-rated premiums to an insurer to post a surety bond on their behalf). These new requirements dramatically changed the distribution of operating firms in Texas and substantially improved environmental performance.<sup>25</sup> Many small operators with poor environmental records left the industry, selling their wells to larger firms. Orphaned wells decreased by a remarkable 70 percent, and violations of state water protection rules dropped by 25 percent.

By following Texas's lead and strengthening its bonding requirements, BLM could also achieve these benefits on federal lands. BLM can increase its bond requirement by administrative rulemaking, without requiring new statutory authority.

## Closing Argument

The federal resources managed by the BLM are an important source of U.S. oil and gas production. In 2019, 800,000 barrels of oil and 9.1 billion cubic feet of natural gas were produced per day from federally owned onshore land, collectively worth \$25 billion over the course of the year. BLM is entrusted with ensuring that these valuable resources are developed expeditiously, while simultaneously capturing fair market value for the resource owners—U.S. taxpayers—and safeguarding the environment.

While the resources governed by BLM are federally owned, development and extraction is performed by private

<sup>25</sup> Boomhower, "Drilling Like There's No Tomorrow."



## FURTHER READING

### Oil & Gas Reserves



#### Relinquishing Riches: Auctions vs. Informal Negotiations in Texas Oil and Gas Leasing

National Bureau of Economic Research

Oil and gas extraction leases allocated via centralized auctions pay the owners of such extraction

rights 67 percent more and produce 44 percent more output than informally negotiated leases.



#### The Economics of Time-Limited Development Options: The Case of Oil and Gas Leases

National Bureau of Economic Research

Primary terms can benefit the landowner and increase the total value that the landowner

and firm receive together because they accelerate drilling activities.



State-level policies show that the federal government can realize higher returns for taxpayers while securing stronger environmental protections and without unduly harming productivity.

firms. The lease contracts that govern the relationship between BLM and these firms are the key policy lever with which BLM can fulfill its mission, since lease terms can profoundly influence firms' incentives to drill, the division of revenue between firms and the government, and firms' incentives to protect the environment.

Across the board, the terms of BLM oil and gas leases favor oil and gas production companies over U.S. taxpayers. They allow firms to capture the lion's share of oil and gas resources' value, while at the same time letting them avoid liability for environmental harm. Relative to benchmarks from state-level agencies that manage state-owned resources, BLM leases have low royalties and are awarded in auctions that impose miniscule minimum bid requirements, allowing firms to access federal resources at little expense to themselves. While BLM's low royalty rate can in principle accelerate resource development, its unusually long ten-year lease terms, low minimum bids, and low \$2 per acre rental rate undermine its development objective by allowing firms to effectively sit on federal land for a decade without undertaking drilling, at essentially no cost. Finally, while the BLM requires firms to post bonds as a guarantee that the surface environment will ultimately be restored, the size of the bonding requirement is far too small to adequately cover reasonable estimates of restoration costs.

BLM can address these problems and better fulfill its statutory multiple-use and sustained yield mission by adopting leasing policies that are more similar to those of major oil producing states such as Louisiana, New Mexico, North Dakota, and Texas. By setting higher royalty

rates, eliminating royalty deductions, and increasing the minimum bid in its lease auctions—actions that can be taken by a rulemaking process rather than new statute—BLM can increase the share of federal oil and gas resources that leads to revenue for taxpayers rather than profits for oil and gas firms. The negative impacts of a higher royalty rate on development and production can be mitigated by shortening the lease term from ten years to five years and by eliminating the BLM's non-competitive leasing process, though these changes require statutory amendments. Finally, the BLM can, by rulemaking, prevent firms from walking away from their environmental responsibilities by substantially increasing bond amounts up to the point that they credibly cover the proper wells' plugging and abandonment at the end of their useful life. Adopting a stronger bonding policy will protect taxpayers from footing the bill for decommissioning costs and protect public health from the hazards imposed by abandoned wells.

## REFERENCES

- Bhattacharya, Vivek, Andrey Ordin, and James W. Roberts., "Bidding and Drilling Under Uncertainty: An Empirical Analysis of Contingent Payment Auctions." Mimeo, Northwestern University (June 2018).
- Boomhower, Judson. "Drilling Like There's No Tomorrow: Bankruptcy, Insurance, and Environmental Risk." *American Economic Review* 109 No.2 (February 2019): 391-426.
- Covert, Thomas R. and Richard L. Sweeney. "Relinquishing Riches: Auctions vs Informal Negotiations in Texas Oil and Gas Leasing." National Bureau of Economic Research Working Paper No. 25712 (Revised: October 2019).
- Elliott, Elise G., Adrienne S. Ettinger, Brian P. Leaderer, Michael B. Bracken, and Nicole C. Deziel. "A systematic evaluation of chemicals in hydraulic-fracturing fluids and wastewater for reproductive and developmental toxicity." *Journal of Exposure Science & Environmental Epidemiology* 27 (January 2017): 90-99.
- Hendricks, Kenneth, Robert H. Porter, and Guofo Tan. "Optimal Selling Strategies for Oil and Gas Leases with an Informed Buyer." *American Economic Review Papers and Proceedings* 83 no.2 (May 1993): 234-239.
- Herrnstadt, Evan, Ryan Kellogg, and Eric Lewis. "The Economics of Time-Limited Development Options: The Case of Oil and Gas Leases." National Bureau of Economic Research Working Paper No. 27165 (May 2020).
- Interstate Oil and Gas Compact Commission. *Idle and Orphan Oil and Gas Wells: State and Provincial Regulatory Strategies.* (2019). <https://iogcc.ok.gov/articles/iogcc-issues-report-idle-and-orphan-oil-and-gas-wells>.

Kellogg, Ryan. "The Effect of Uncertainty on Investment: Evidence from Texas Oil Drilling." *American Economic Review* 104 (June 2014): 1698-1734.

Newell, Richard, and Brian C. Prestt. "The Unconventional Oil Supply Boom: Aggregate Price Response from Microdata." *Energy Journal* 40 No.3 (July 2019).

Newell, Richard, Brian C. Prest, and Ashley Vissing. "Trophy Hunting vs. Manufacturing Energy: The Price-Responsiveness of Shale Gas." *Journal of the Association of Environmental and Resource Economists* 6 (March 2019): 177-217.

Ordin, Andrey. "Investment and Taxation: the Case of Oil and Gas in the Permian Basin." Job market paper. Duke University Working Paper (October 2019).

Raimi, Daniel, Neelesh Nerurkar, and Jason Bordoff. "Green Stimulus for Oil and Gas Workers: Considering a Major Federal Effort to Plug Orphaned and Abandoned Wells." Joint Report by the Columbia SIPA Center on Global Energy Policy and Resources for the Future. (July 2020).

Schwartz, Eleanor. "A Capsule Examination of the Legislative History of the Federal Land Policy and Management Act (FLPMA) of 1976." *Arizona Law Review* 21 (1979): 285-300.

Shavell, Steven. "The Judgment Proof Problem." *International Review of Law and Economics* 6 No.1 (June 1986): 45-58.

U.S. Congress, Congressional Budget Office. *Options for Increasing Federal Income From Crude Oil and Natural Gas on Federal Lands.* CBO publication 51421. April 2016. Accessible at [https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51421-oil\\_and\\_gas\\_options-OneCol-3.pdf](https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51421-oil_and_gas_options-OneCol-3.pdf).

U.S. Energy Information Administration. *Annual Energy Outlook 2020.* Released January 29, 2020. <https://www.eia.gov/outlooks/aeo/>

U.S. Government Accountability Office. *Oil and Gas: Bureau of Land Management Should Address Risks from Insufficient Bonds to Reclaim Wells.* GAO-19-615. Washington, D.C. (2019). <https://www.gao.gov/assets/710/701450.pdf>