

A R T I C L E

# Federal Lands and Fossil Fuels: Maximizing Social Welfare in Federal Energy Leasing

by Jayni Foley Hein

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## I. Introduction

The externality costs of fossil fuel production—including pollution costs—are not accounted for under the U.S. Department of the Interior's (Interior) coal, oil, and natural gas leasing programs. This results in fossil fuel production on public lands imposing significant social costs. Interior's leasing programs have never been tailored to meet any past or present climate change goals, despite their significant contribution to domestic greenhouse gas emissions. Moreover, several government studies show that federal fossil fuel leasing programs are riddled with loopholes and stagnant fiscal terms that shortchange federal taxpayers, to whom the nation's minerals belong.<sup>1</sup>

This Article presents a path forward for Interior's fossil fuel leasing programs that would instill more rationality into the process, with the goal of maximizing social welfare. This Article argues that Interior should account for all the costs and benefits of leasing—including environmental and social costs—and adjust the fiscal terms of its fossil fuel leases to recoup unmitigated externality costs. In doing so, Interior can arrive at a social-welfare maximizing leasing program. The tools and reforms suggested in this Article would likely have the effect of reducing production on marginal tracts where the cost of production would outweigh the benefits. Additionally, these tools and reforms could earn states, the federal government, and taxpayers more revenue from the resources they own while reducing

greenhouse gas emissions, illustrating the utility of using fiscal reform as a policy lever in the absence of comprehensive climate change legislation.

## II. The Fossil Fuel Boom and Legal Lag

Overall, Interior oversees more than 260 million surface acres and 700 million subsurface acres of mineral resources onshore, and more than 1.7 billion acres offshore in the waters of the Outer Continental Shelf.<sup>2</sup> Despite these extensive public land and mineral holdings, Interior has consistently been criticized for failing to earn more from its mineral resources and for failing to protect environmental values. This part provides a brief overview of modern energy market trends and highlights recent critiques of federal leasing programs.

### A. The Fossil Fuel Boom

Domestic oil and natural gas production has risen steadily for the past 10 years.<sup>3</sup> Federal energy production generates one of the largest non-tax sources of revenue for the United States, accounting for approximately \$6.23 billion in fiscal year 2016.<sup>4</sup> While federal oil and gas production has been decreasing as a share of total U.S. production,<sup>5</sup> coal mining on federal lands, by contrast, has grown as a proportion of the domestic total.<sup>6</sup> In 1960, federal coal accounted for

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1. See generally U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-140, COAL LEASING: BLM COULD ENHANCE APPRAISAL PROCESS, MORE EXPLICITLY CONSIDER COAL EXPORTS, AND PROVIDE MORE PUBLIC INFORMATION (2013), <https://perma.cc/8MME-ZDPU>.

2. U.S. GOV'T ACCOUNTABILITY OFFICE, NO. GAO-14-50, OIL AND GAS RESOURCES: ACTIONS NEEDED FOR INTERIOR TO BETTER ENSURE A FAIR RETURN 2 (2013), <https://perma.cc/CV96-ELRT> [hereinafter GAO, ACTIONS NEEDED].

3. *Id.*

4. Press Release, U.S. Office of Nat. Res. Revenue, Interior Department Disburses \$6.23 Billion in FY 2016 Energy Revenues: Federal Revenues Support State, Tribal, National Needs (Nov. 25, 2016), <https://perma.cc/N9WX-EV6Y>.

5. See, e.g., CONG. RESEARCH SERV., R42432, U.S. CRUDE OIL AND NATURAL GAS PRODUCTION IN FEDERAL AND NON-FEDERAL AREAS (2016).

6. U.S. ENERGY INFO. ADMIN., SALES OF FOSSIL FUELS PRODUCED FROM FEDERAL AND INDIAN LANDS, FY 2003 Through FY 2014 (2015), <https://perma.cc/HFZ3-LYH4> [hereinafter EIA, SALES OF FOSSIL FUELS]; U.S. ENERGY INFO. ADMIN., DECEMBER 2015 MONTHLY ENERGY REVIEW 97 (2015), <https://perma.cc/TS5K-U4KP>.

only 1.3% of the total coal mined in the United States.<sup>7</sup> In 2015, federal coal accounted for 42% of the total coal produced in the United States.<sup>8</sup> Together, coal, oil, and natural gas produced on federal lands account for approximately 25% of the total fossil fuels produced annually in United States.<sup>9</sup>

## B. Program Deficiencies and Calls for Reform

Interior does not systematically evaluate or update the fiscal terms for fossil fuel production on federal lands,<sup>10</sup> and because Interior excludes many environmental and social considerations when setting lease terms, federal leases are currently undervalued from a social welfare-maximizing perspective.<sup>11</sup> Some of the most salient issues with respect to Interior's planning processes, fiscal terms, and treatment of environmental externalities are described below.

### I. Uncompetitive Leasing

The Mineral Leasing Act of 1920 and Federal Coal Leasing Amendments Act of 1976 require that federal oil, gas, and coal leases be offered competitively.<sup>12</sup> In 2013, the U.S. Government Accountability Office (GAO) found that approximately 90% of all federal coal lease sales since 1990 attracted only one bidder.<sup>13</sup> Forty percent of oil and gas leases in effect as of 2015 were issued noncompetitively, for the minimum bid price of \$2 per acre.<sup>14</sup> In addition, the Energy Policy Act of 2005 increased the amount of land that can be added to an existing coal lease through noncompetitive lease modification from 160 acres to 960 acres.<sup>15</sup> From 2000 to 2013 the Bureau of Land Management (BLM) approved 45 noncompetitive lease modifications.<sup>16</sup>

7. See Nat. Res. Def. Council v. Hughes, 437 F. Supp. 981, 983, 7 ELR 20785 (D.C. Cir. 1977).

8. U.S. DEP'T OF INTERIOR, FEDERAL COAL PROGRAM: PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT—SCOPING REPORT VOL. I, ES-1 (2017), <https://perma.cc/J9FB-ENS3> [hereinafter COAL PEIS SCOPING REPORT VOL. I].

9. EIA, SALES OF FOSSIL FUELS, *supra* note 6.

10. See U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-691, OIL AND GAS ROYALTIES: THE FEDERAL SYSTEM FOR COLLECTING OIL AND GAS REVENUES NEEDS COMPREHENSIVE REASSESSMENT 7-10 (2008) [hereinafter GAO, COMPREHENSIVE REASSESSMENT].

11. This argument is also highlighted in some of my earlier work. See generally JAYNI FOLEY HEIN & PETER HOWARD, INST. FOR POLICY INTEGRITY, N.Y. UNIV. SCH. OF LAW, ILLUMINATING THE HIDDEN COSTS OF COAL (2015), <https://perma.cc/4QRK-M9QY> [hereinafter HEIN & HOWARD, ILLUMINATING COAL COSTS]; JAYNI FOLEY HEIN, INST. FOR POLICY INTEGRITY, N.Y. UNIV. SCH. OF LAW, PRIORITIES FOR FEDERAL COAL REFORM (2016), <https://perma.cc/9A2P-TXP9> [hereinafter HEIN, PRIORITIES FOR FEDERAL COAL REFORM].

12. 30 U.S.C. §201(a)(1) (2012).

13. See, e.g., GAO, ACTIONS NEEDED, *SUPRA* note 2.

14. OIL AND GAS LEASING; ROYALTY ON PRODUCTION, RENTAL PAYMENTS, MINIMUM ACCEPTABLE BIDS, BONDING REQUIREMENTS, AND CIVIL PENALTY ASSESSMENTS, 80 Fed. Reg. 76 (proposed Apr. 21, 2015) (to be codified at 43 C.F.R. pt. 3100), <https://perma.cc/QYS4-KWTU>. In 2014, about 10 percent of new leases were issued non-competitively. *Id.*

15. See 30 U.S.C. §203 (2012); Energy Policy Act of 2005, Pub. L. No. 109-58, §432, 118 Stat. 594, 761 (2005).

16. U.S. Dep't of the Interior, Office of Inspector General, No. CR-EV-BLM-0001-2012, Coal Management Program 13 (2013), <https://perma.cc/7GMK-LLC7>.

## 2. Stagnant Minimum Bids and Royalty Rates

A 2008 GAO report found that the United States receives one of the lowest overall "takes" worldwide for fossil fuel leases.<sup>17</sup> Minimum bids have failed to keep up with inflation; for example, although the Mineral Leasing Act gives the Secretary of the Interior authority to set the national minimum bid for onshore oil and gas leases at \$2 per acre or greater, the minimum bid for onshore oil and gas has remained at \$2 per acre since 1987.<sup>18</sup> Likewise, the minimum bid for coal leases has been set at \$100 per acre since 1982.<sup>19</sup> Accounting for inflation, alone, would more than double the minimum bid for coal to \$247 per acre.

Royalty rates, which account for approximately 80% of all federal revenue from oil, gas, and coal leases, have also remained stagnant, and, in some cases, have not changed since 1920.<sup>20</sup> The floor for both onshore and offshore oil and natural gas royalty rates is set at no less than 12.5%.<sup>21</sup> The royalty rate floor for coal production is 12.5% from surface mines,<sup>22</sup> and 8% from underground mines.<sup>23</sup> In 2008, Interior increased the royalty rate for new offshore leases in the Gulf of Mexico to 18.75%.<sup>24</sup> Interior stated that this change would both increase oil and gas revenues by an estimated \$4.5 billion over 20 years,<sup>25</sup> and ensure that the "American taxpayer is getting a fair return for the oil and gas that the American people own."<sup>26</sup> According to some estimates, if onshore federal oil and gas royalty rates were also changed to the 18.75% rate, the U.S. government would collect an additional \$730 million each year.<sup>27</sup>

## 3. Ignoring the Cost of Production Externalities

Interior's planning processes and lease terms do not account for the externality costs of oil, gas, and coal pro-

17. GAO, COMPREHENSIVE REASSESSMENT, *supra* note 10 (citing a June 2007 Wood McKenzie report finding that the United States ranked 93rd lowest out of 104 oil and gas fiscal systems evaluated).

18. 30 U.S.C. §226(b)(1)(B) (2012). The Mineral Leasing Act requires that the minimum bid be uniform nationwide, and prohibits BLM from setting minimum bids on a tract-by-tract basis. See *id.*

19. See 43 C.F.R. §3422.1(c)(2) (1982).

20. Onshore oil and gas royalty rates have been set at 12.5% since 1920. See 30 U.S.C. §226(b)(1)(A).

21. 30 U.S.C. §226(b)(1)(A); 43 U.S.C. §1337(a)(1) (2012).

22. 30 U.S.C. §207(a) (2012); Federal Coal Leasing Amendments Act of 1976, Pub. L. No. 94-377, 90 Stat. 1083 (Aug. 4, 1976).

23. 43 C.F.R. §3473.3-2(a)(2) (2005).

24. See U.S. BUREAU OF OCEAN AND ENERGY MGMT., PROPOSED FINAL OUTER CONTINENTAL SHELF OIL & GAS LEASING PROGRAM 2012-2017 96 (2012), <https://perma.cc/NTZ6-HRBQ>. Alaskan offshore leases utilize a 12.5 percent royalty rate. *Id.*

25. See, e.g., CONG. RES. SERV., RL33493, OUTER CONTINENTAL SHELF: DEBATE OVER OIL AND GAS LEASING AND REVENUE SHARING 2 (2008), <https://perma.cc/3UBJ-7XJ8>.

26. Interior, *Env't, and Related Agencies Appropriations for 2013, Testimony Before the House Comm. on Appropriations, Subcomm. on Interior, Env't, and Related Agencies*, 102d Cong. 46-47 (2012) (statement of Hon. Ken Salazar, Sec'y of the Interior), <https://perma.cc/U393-8TXE> ("The underlying principle is we are mandated by statute, mandated by fairness to make sure the American taxpayer is getting a fair return for the assets the American people own.")

27. CTR. FOR W. PRIORITIES, A FAIR SHARE: THE CASE FOR UPDATING OIL AND GAS ROYALTIES ON OUR PUBLIC LANDS 7 (2015), <https://perma.cc/4Q8T-YT8P>.

duced on federal land. In 1920, when the U.S. Congress first set minimum royalty rates at 12.5% for federal oil and natural gas production, legislators did not understand the direct link between producing, transporting, and burning fossil fuels, and climate change. Today, the connection is clear. As a consequence of this failure to account for the externality costs of fossil fuel production, the market price of fossil fuels is less than the socially optimal price, which leads to inefficiently high levels of extraction.

#### 4. Royalty Rate Loopholes and Deductions

Further coal, oil, and gas lessees can apply for a royalty rate reduction if the current royalty rate imposes economic hardship that would otherwise result in abandoning the lease, or in less than full recovery of the resource.<sup>28</sup> Royalty rate reductions occurred on approximately 36% of coal leases offered for sale since 1990.<sup>29</sup> These royalty rate reductions distort the energy market by subsidizing coal, oil, and gas production, even when production may be uneconomical.

## II. Interior, as the Steward of Public Lands, Should Use Procedural and Economic Tools to Maximize Net Social Benefits When Leasing

Interior is not just any property owner and lessor; it is tasked with managing lands for the benefit of current and future generations. Interior has a dual mandate to manage development of resources while ensuring adequate protection of environmental and social values. Interior sets rules for how it leases public lands to private parties in order to uphold its statutory mandates to earn “fair market value” for the public and to harmonize energy production with resource conservation.<sup>30</sup> There are several procedural and modern economic tools Interior can use to align its statutory mandates with maximizing net social benefits.

### A. Procedural Tools: Cost-Benefit Analysis, Leasing Plans, and Programmatic Environmental Impact Statements

Interior should not lease any fossil fuels to private companies for extraction unless the social benefits of doing so outweigh the costs. Interior can make this determination by conducting a cost-benefit analysis of its leasing programs that accounts for the externality costs of production. Interior should also develop multiyear plans for leasing and corresponding programmatic environmental impact state-

ments (EIS) prepared pursuant to the National Environmental Policy Act (NEPA) to guide its decisionmaking.

Interior’s decision to initiate a programmatic EIS for the federal coal program in 2016 is an example of the type of analysis that can and should be done regularly in order to determine whether taxpayers are receiving “fair market value” for fossil fuel leases. Prior to 2016, the last time the federal coal program was reviewed programmatically was 1986.<sup>31</sup> Preparing strategic plans and programmatic EISs on a regular schedule would enable Interior to better weigh the trade offs between competing uses of federal lands; analyze viable leasing alternatives and their environmental and social impacts; monitor changing market conditions; and evaluate lease timing and fiscal terms to manage a program that best serves the public interest.

### B. Economic Tools: The Social Cost of Carbon, Energy Substitution Analysis, and Option Value

In conjunction with procedural tools, there are several economic tools available that would enable Interior to account for costs that have historically been omitted from its decisionmaking, or applied inconsistently. For example, the federal Interagency Working Group’s Social Costs of Carbon and Methane remain the best methods available to analyze the social cost of greenhouse gas emissions.<sup>32</sup>

Another economic tool, energy substitution analysis, would enable Interior to model alternative leasing scenarios and potential changes to its programs, such as adjustments to fiscal terms or ceasing to issue new leases altogether. In its NEPA analysis, Interior should analyze the effect of these alternatives, including the “no action” alternative, on energy markets and upstream and downstream emissions.

Finally, Interior should use available techniques to estimate option value—the informational value of delaying irreversible decisions—such as when and on what terms to sell non-renewable resources to private companies. The failure to account for option value in minimum bids and internal fair market value calculations systematically undervalues public resources and contributes to leasing too much public land and resources too early, and at too low of a price.<sup>33</sup>

## III. Interior’s Statutory Mandates Are Consistent With Maximizing Social Welfare

Interior has broad discretion to interpret its statutory mandates to move toward maximizing social welfare, and this social welfare-maximization interpretation is supported by both legislative history and judicial precedent.

28. 30 U.S.C. §209 (2012); 43 C.F.R. §§3473.3-2(e), 3485.2(c)(1) (2012) (coal). 43 C.F.R. §3103.4-1(a) (2015) (oil and gas).

29. MARK HAGGERTY, HEADWATERS ECONOMICS, AN ASSESSMENT OF U.S. FEDERAL COAL ROYALTIES: CURRENT ROYALTY STRUCTURE, EFFECTIVE ROYALTY RATES, AND REFORM OPTIONS 8 (2015), <https://perma.cc/7KEN-P3WS>.

30. 43 U.S.C. §1344(a)(3)-(4); 43 U.S.C. §1701(a)(8)-(9) (2012).

31. COAL PEIS SCOPING REPORT VOL. I, *supra* note 8, at 5-7.

32. Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 SCI. 655, 655 (2017).

33. See Michael A. Livermore, *Patience Is an Economic Virtue: Real Options, Natural Resources, and Offshore Oil*, 84 U. COLO. L. REV. 581, 636-37 (2013).

## A. Interpreting Interior's Statutory Mandate

Four primary statutes set forth Interior's duties with respect to natural resources production on federal lands: the Federal Land and Policy Management Act (FLPMA),<sup>34</sup> the Mineral Leasing Act,<sup>35</sup> the Federal Coal Leasing Amendments Act of 1976,<sup>36</sup> and the Outer Continental Shelf Lands Act (OCSLA).<sup>37</sup> Each statute contains a provision requiring Interior to earn "fair market value" for the United States for the use of onshore and offshore public lands and resources.<sup>38</sup> These statutes can be interpreted to support a social welfare maximization framework:

1. FLPMA provides that federal lands are to be used only for the advancement of the national interest and sets forth Interior's dual mandate of development and preservation.<sup>39</sup> The Act further requires agencies to manage public lands in accordance with principles of "multiple use"<sup>40</sup>—"the management of 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 . . . harmonious and coordinated management of the various resources* without permanent impairment of the productivity of the land and the quality of the environment . . ."<sup>41</sup> The terms "harmonious" and "coordinated" imply rational, reasoned decisionmaking.
2. The Mineral Leasing Act of 1920 declares that it is in the national interest to foster and encourage private enterprise in "orderly and economic development of domestic mineral resources."<sup>42</sup> The term "orderly" conveys a congressional desire for careful, rational management of America's energy resources, and the term "economic" is consistent with a cost-benefit analysis framework.
3. The Federal Coal Leasing Amendments Act of 1976 provides that the Secretary of the Interior is authorized to lease lands "as he finds appropriate and *in the public interest*."<sup>43</sup> This statutory framework is consistent with Interior accounting for the environmental and social costs of fossil fuel leasing, as well as its economic benefits.
4. For offshore resources, the OCSLA directs Interior to maintain an oil and gas leasing program "so as to obtain a *proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse*

*impact on the coastal zone.*"<sup>44</sup> One reasonable way to interpret the call to "obtain a proper balance" is to manage the program in order to maximize social welfare. The Act emphasizes rational management in other phrases too, such as "expeditious and orderly development . . . subject to environmental safeguards."<sup>45</sup>

## B. Legislative History

Legislative history of the statutes governing federal fossil fuel programs reveals a direct link between receipt of production revenues and compensation for the social and environmental costs of mineral production, in line with a social welfare-maximization approach. The revenue share provision of FLPMA provides that the state share of revenue from federal leases "shall be . . . used by such State . . . giving priority to those subdivisions of the State *socially or economically impacted by development of minerals leased under this Act . . .*"<sup>46</sup> Congressional testimony leading up to the passage of the Act also reveals support for revenue sharing provisions that would direct a portion of the revenue from fossil fuel production to the states where the production occurs in order to "help county government[s] cope with energy development impact problems."<sup>47</sup> Similarly, the legislative history of the Federal Coal Leasing Amendments Act of 1976 reflects a concern that states be paid a greater share of federal coal royalties to account for social and environmental externalities.<sup>48</sup> And coastal states and their congressional representatives have repeatedly advocated for a greater portion of revenue from federal offshore oil and gas production due to significant impacts on coastal infrastructure and the environment.<sup>49</sup>

## C. Judicial Precedent

Judicial precedent also supports the argument that Interior can use cost-benefit analysis to help guide its leasing decisions. For example, in *California v. Watt (Watt I)*, the United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit) endorsed Interior's interpretation that OCSLA's requirement to strike a "proper balance" among competing uses could be achieved through cost-benefit analysis.<sup>50</sup> In *California v. Watt (Watt II)*, the D.C. Circuit upheld Interior's revised offshore leas-

34. 43 U.S.C. §§1701-1787 (2012), ELR STAT. FLPMA §§102-603.

35. 30 U.S.C. §§181-287 (2012).

36. Federal Coal Leasing Amendments Act of 1976, Pub. L. No. 94-377, 90 Stat. 1083.

37. 43 U.S.C. §§1331-1356b (2012).

38. 43 U.S.C. §1701(a)(9); 30 U.S.C. §201(a)(1); 43 U.S.C. §1344(a)(4).

39. 43 U.S.C. §1701(a)(1), (8), (12) (2012).

40. *Id.* §1712(a)-(c)(1).

41. *d.* §1702(c) (emphasis added).

42. 30 U.S.C. §21a (2012).

43. *Id.* §201 (emphasis added).

44. 43 U.S.C. §1344(a)(3) (emphasis added).

45. *Id.* §1332(3).

46. 30 U.S.C. §191 (2012) (emphasis added).

47. *Bills to Provide for the Mgmt., Prot., and Dev. of the National Res. Lands, and for Other Purposes: Hearings on S.1507 and S.1292 Before the Subcomm. on Envt. & Land Res. of the S. Comm. on Interior & Insular Affairs, 94th Cong., 244 (1975)* (statement of James Evans, Legis. Rep., Nat'l Ass'n of Cty., Washington, D.C.).

48. H.R. REP. NO. 94-681, at 38 (1975), as reprinted in 1976 U.S.C.C.A.N. 1943, 1975 WL 12515 (Leg. Hist.).

49. See, e.g., CONG. RESEARCH SERV., NO. R40645, U. S. OFFSHORE OIL AND GAS RESOURCES: PROSPECTS AND PROCESSES 19 (Apr. 26, 2010), <https://perma.cc/JT7N-CMZB>.

50. *California v. Watt (Watt I)*, 668 F.2d 1290, 1317-18, 12 ELR 20001 (D.C. Cir. 1981).

ing program.<sup>51</sup> The court deferred to Interior's policy judgment to carry out the "fair market value" requirement in a way that would be most socially optimal, even if it did not maximize revenue.<sup>52</sup> In addition, in light of recent judicial precedent,<sup>53</sup> a reviewing court would likely find that the use of economic tools, such as the Social Cost of Carbon, are reasonable methods for Interior to quantify the cost of relevant environmental externalities.

#### IV. Recommendations for Reform

##### A. Interior Should Prepare Strategic Leasing Plans and Evaluate Whether Its Current Leasing Programs Earn "Fair Market Value" for Taxpayers, by Conducting Cost-Benefit Analysis

In order to manage a federal fossil fuel leasing program that better serves American taxpayers, Interior should prepare strategic plans for leasing and regularly evaluate potential reforms that have the potential to increase social welfare. These strategic plans should be accompanied by regular programmatic EISs that compare the externalities of alternative leasing scenarios.

In its strategic planning process, Interior should evaluate whether it earns "fair market value" for taxpayers by analyzing the revenue and other benefits of leasing, as compared to the costs, including social and environmental costs. Interior should use the Social Cost of Carbon and Methane in this analysis. If the full benefits of production are accounted for in such an inquiry, the full suite of social and environmental costs must be accounted for, as well.<sup>54</sup> The result of this analysis would provide a baseline against which to measure potential royalty rate increases; increases to minimum bids; and other policy changes, such as tailoring fossil fuel production to meet any climate goals or ceasing to issue new leases altogether.

##### B. Interior Should Analyze Optimal Fiscal Terms for New or Modified Leases, Including Social Cost of Carbon or Social Cost of Methane Royalty "Adders," Among Other Changes Geared to Maximizing Net Benefits

Interior should comprehensively review its fossil fuel leases in order to assess how an increase in royalty rates might affect total revenue, externality costs, and better meet the mandates of its governing statutes. Interior should consider

increasing minimum royalty rates to account for foreseeable environmental and social costs of production. A royalty rate that would lead to a more socially optimal level of extraction would account for the cost of unregulated externalities. In considering adjustments to royalty rates, Interior could focus on externalities associated with "upstream" production on federal lands, as opposed to downstream combustion, because production externalities occur on public lands and are closely tied to Interior's statutory mandates to prevent "undue waste"<sup>55</sup> and undue degradation of lands.<sup>56</sup>

A study that I co-authored quantified and applied an "upstream" Social Cost of Methane adder that accounted for federal coal production methane costs by relying on fugitive methane emissions data.<sup>57</sup> The adder would increase royalty rates from 12.5% to 18.7% for surface-mined coal, and from 8% to 28.7% for underground coal.<sup>58</sup> This royalty rate adder would have yielded approximately \$2 billion in additional royalty revenue between 2009 and 2013 for federal coal production in Colorado, Montana, Utah, and Wyoming.<sup>59</sup> Moreover, this royalty rate increase would have provided up to \$2.9 billion in net social benefits, accounting for both increased revenue and decreased externality costs.<sup>60</sup>

A separate independent study examined the effect of an increase in the federal coal royalty rate or decrease in production through a tonnage production cap. The study found that a lifecycle carbon dioxide royalty adder set at 20% of the Social Cost of Carbon would add nearly \$3 billion in royalty receipts by 2025.<sup>61</sup> Introducing this higher royalty rate, or carbon adder, phased in over 10 years, would also reduce overall carbon dioxide emissions by the year 2030 by between 54 million metric tons (using an adder of 20% of the Social Cost of the Carbon) and 260 million metric tons (using 100% of the Social Cost of Carbon).<sup>62</sup> Each of these modeled reforms would induce some substitution of renewable energy and natural gas for coal, as well as increased energy conservation, resulting in a net decline in greenhouse gas emissions. As such, these royalty rate adjustments would result in significant net benefits to the public. Ramping coal production down directly would achieve similar greenhouse gas emission benefits, but with diminished revenue for states and the federal government to use for environmental mitigation, adaptation, education, and infrastructure investment.<sup>63</sup> This illustrates one of the primary benefits of fiscal reform, as opposed to setting a cap on federal fossil fuel production: the additional revenue generated from royalty reform would go both to the federal government and to fossil fuel producing states and communities.

55. See 30 U.S.C. §187 (2012).

56. See 43 U.S.C. §1732(b) (2012).

57. See HEIN & HOWARD, ILLUMINATING COAL COSTS, *supra* note 13, at 7 (surface mines); HEIN, PRIORITIES FOR FEDERAL COAL REFORM, *supra* note 13, at 13 (underground mines).

58. See HEIN & HOWARD, ILLUMINATING COAL COSTS, *supra* note 13, at 7.

59. *Id.*

60. *Id.*

61. SPENCER REEDER & JAMES H. STOCK, VULCAN PHILANTHROPIES, FEDERAL COAL LEASING REFORM OPTIONS: EFFECTS ON CO<sub>2</sub> EMISSIONS AND ENERGY MARKETS: EXECUTIVE SUMMARY 4 (2016), <https://perma.cc/4KXT-BGM8>.

62. *Id.* at 5, 6.

63. See *id.* at 8.

51. *California v. Watt (Watt II)*, 712 F.2d 584, 606, 13 ELR 20723 (D.C. Cir. 1983).

52. *Id.* at 590, 606.

53. See, e.g., *Zero Zone v. U.S. Dep't of Energy*, 832 F.3d 654, 678-79, 46 ELR 20137 (7th Cir. 2016).

54. See, e.g., *High Country Conservation Advocates v. Forest Serv.*, 52 F.Supp.3d 1174, 1197, 44 ELR 20144 (D. Colo. 2014). (holding that it was arbitrary and capricious to quantify the benefits of coal lease modifications and not the costs, when such analysis was possible using the Social Cost of Carbon).

### C. *For Each Alternative Scenario, Interior Should Model Energy Substitution and Climate Effects*

Interior should model its selected alternatives' energy production, climate, revenue, and other effects, including downstream greenhouse gas emissions. As part of this analysis, it should analyze the substitution effects among coal, natural gas, oil, and renewable energy sources that result from changes in leasing policies.<sup>64</sup> This analysis in an environmental review process is critical to properly analyzing environmental impacts, and, ultimately, to selecting the most efficient alternative. Interior should model each alternative scenario's energy market and greenhouse gas emission effects, which requires accounting for the substitution effects induced by each alternative, as well as increased energy conservation.

Interior should also analyze production scenarios in its planning and environmental review processes that would tailor federal production to any U.S. climate change goals. For example, the government could set a national "carbon budget" for federal lands, based on what is needed to meet its climate change goals, and adjust leasing policies for fossil fuels in order to meet that budget. This could be done through an escalating royalty rate designed to decrease federal coal and oil production over time—which would provide short-term revenue benefits—or through a production cap or moratorium.<sup>65</sup>

### D. *Interior Should Curb Royalty Rate Reductions and Loopholes, Which Impair a Fair Return to Taxpayers*

Interior should eliminate its existing royalty relief regulations, as they provide improper incentives to companies and hinder the receipt of a fair return. Rate reductions that are "necessary to promote development" of the resource amount to a subsidy for fossil fuels. This regulation is at odds with managing federal fossil fuel programs to maximize the net return to taxpayers, and threatens the efficacy of any future royalty rate adjustments.

### E. *Interior Should Evaluate Bidding Reforms, Consider the Alternative of Delayed Lease Sales, and Promote Competition*

At the lease sale stage, Interior should be compensated for the estimated market price of the resource to be leased, as well as the option value of mining or drilling. Minimum bids should be raised to account for both inflation and the

option value of leasing, in order to serve as a floor price for fair market value. Furthermore, Interior should consider the alternative of delaying lease sales in its NEPA "alternatives analysis" for proposed lease sales.

Option value, the value of waiting for more information before deciding whether and when to lease,<sup>66</sup> should be incorporated into Interior's fossil fuel leasing management in three major ways:

- Option value should be part of the planning process, to determine when and where to lease tracts, if ever.
- Option value should be a component of minimum bids and bid adequacy procedures.
- Interior should consider the alternative of delaying or strategically timing fossil fuel lease sales when it prepares its "alternatives analysis," pursuant to NEPA. Considering a delayed lease sale alternative would require Interior to assess the potential effects of leasing fossil fuels later, when resource prices may be higher, or more infrastructure is in place that would reduce externalities, transportation costs, and more.

Finally, Interior should consider taking steps to make leasing more competitive, such as by moving to a market-based system of leasing that would pit bidders against one another across tracts, based on the quantity of oil, gas, or coal that they seek to produce in a practice called inter-tract bidding.<sup>67</sup> Alternatively, Interior could simply offer fewer tracts for lease and eliminate practices like area-wide leasing, which it uses in offshore auctions.

## V. Conclusion

Interior, as the steward of public lands, should structure its leasing programs to provide maximum net benefits to the public, including by accounting for climate change costs. Adjusting royalty rates to account for the externality costs of production would ensure that any leasing provides net benefits to the public—not just short-term gains for private companies. And modernizing bidding to account for option value and to increase competition for leases would better effectuate Interior's duty to earn fair market value for the use and development of federal lands and resources. By increasing revenue to states and the federal government while reducing greenhouse gas emissions, the tools and reforms suggested in this Article can serve as effective policy levers in the absence of comprehensive climate change legislation.

64. *Id.*

65. For discussion and analysis of a potential production cap, see Peter Erickson & Michael Lazarus, *How Would Phasing Out U.S. Federal Leases for Fossil Fuel Extraction Affect CO<sub>2</sub> Emissions and 2°C Goals?* 22 (Stockholm Env't Inst., Working Paper No. 2016-02, 2016), <https://perma.cc/BCX4-ZQRW>.

66. See Livermore, *supra* note 33, at 589, 593-96.

67. COAL PEIS SCOPING REPORT VOL. I, *supra* note 8, at 6-11.