



IN THE DARK

The hidden climate impacts of energy development on public lands



TABLE OF CONTENTS

Abstract/Introduction	3
I. The United States manages a tremendous portfolio of energy assets	4
a. Trends in leasing and production	6
b. Associated carbon and climate consequences	11
II. The public demands increased transparency and disclosure of climate information	13
a. The genesis of disclosure	13
b. The modern investment community demands climate risk disclosure	13
c. The concern about stranded assets	14
d. Best practices of climate disclosure	15
III. The federal energy program lacks transparency and data availability leading to inadequate disclosure of potential risks	16
a. Oil, gas and coal data availability and shortcomings	16
b. Emissions data	17
c. Planning for energy development on public lands	18
i. Land use planning (RMPs and LRMPs)	18
ii. Lease sales and permitting	19
IV. The federal government should be disclosing carbon risk to its shareholders, the American people	20
a. Climate science confirms that energy development should be constrained by allowable carbon emissions	20
b. Federal agencies should be disclosing carbon emissions and climate risks under current law	21
V. Conclusion	23
Appendix	24

Abstract/Introduction

The United States federal government is one of the largest energy asset managers in the world. The Department of the Interior (DOI) manages more than 2.4 billion acres of subsurface mineral rights including energy resources like coal, crude oil and natural gas for the American public. Combined, federal lands account for 42% of all coal, 22% of all crude oil, and 15% of all natural gas produced in the United States in 2015. And over the last decade, the lifecycle emissions associated with these publicly-owned fossil fuel resources amounted to approximately 20% of all U.S. greenhouse gas (GHG) emissions.

There is now a well-established scientific understanding that the global increase in temperature due to greenhouse gas emissions must be limited, at or below 2°C, to avoid unmanageable climate change consequences. Our analysis finds that emissions associated with federal lands energy development need to be reduced from 1.52 billion tons carbon dioxide equivalent (CO₂e) per year to between 1.16 billion and 1.13 billion tons CO₂e per year by 2025 to be in-line with economy-wide reductions needed to meet that goal. Our analysis concludes that CO₂e emissions from federal lands is on pace to exceed these targets by roughly 300 million tons or 25%.

Despite its prominent role, the federal government has done little to inform its shareholders—American taxpayers—about the federal energy program and its associated climate related risks. Limited data on federal fossil fuel resources and production is publicly available, and there is no systematic effort to track nor disclose the carbon consequences of energy leasing on public lands. The lack of adequate information prohibits the public from meaningfully engaging in land management decision processes like resource management planning, lease sales and permitting.

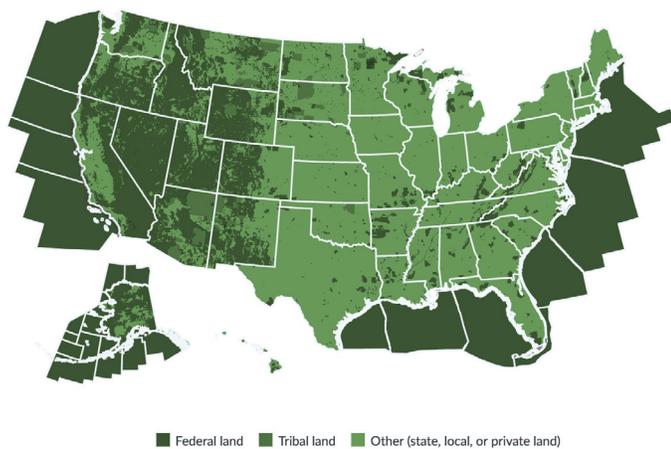
Publicly traded companies are required to disclose certain information, including financial risks, to their shareholders. Although disclosure of climate related risks is not required per se, there is movement in that direction as companies acknowledge the potential financial risks associated with climate change. Studies have estimated the value of capital assets at risk of climate regulation or physical impacts could range from \$4.2 trillion to \$4.3 trillion by 2100. A lack of adequate information regarding these risks can lead to the mispricing of assets, misallocation of capital and financial instability.

Just as shareholders receive key information regarding financial risk to their portfolios, taxpayers deserve to know how their energy assets are being managed and have a say in the direction of the federal energy program moving forward. DOI should provide the public with easy access to the data needed to make informed recommendations when engaging in leasing and land use planning processes, and to hold the elected (and unelected) managers of their energy assets accountable. Instead, DOI is taking steps to keep this information from taxpayers by discontinuing data sources and withdrawing from important transparency initiatives.

Given the scale of our public energy assets, any meaningful movement towards reducing national GHG emissions must start with the lands over which we have the most discretion. Management of energy development on our public lands can and must be a critical component of any national emissions reduction strategy.

I. The United States manages a tremendous portfolio of energy assets

The U.S. federal government oversees more than 640 million acres of national parks, national forests and other public lands on behalf of the American people. The U.S. Department of the Interior (DOI) manages over 2.4 billion acres of subsurface mineral rights including energy resources like coal, crude oil and natural gas both onshore and offshore.



The Bureau of Land Management (BLM) is responsible for coal leasing on about 570 million acres, and oil and gas leasing on approximately 700 million acres of onshore BLM, national forest and other federal lands, as well as private lands where the federal government has retained the mineral rights.^{1,2} The Bureau of Ocean Energy Management (BOEM) oversees approximately 1.7 billion offshore acres on the U.S. Outer Continental Shelf.³

In order to facilitate the extraction of coal, oil and natural gas from public lands, BLM and BOEM oversee leasing and development of these resources. At the end of the 2016 fiscal year, private companies held over 40,000

onshore oil and gas leases covering more than 26 million acres and had leased an additional 36 million acres offshore.^{4,5} As of 2015, there were 306 coal mines operating on just under 500,000 acres of public land.⁶

Combined, energy extracted from our federal lands accounted for 42% of all coal, 22% of all crude oil, and 15% of all natural gas produced in the United States in 2015.⁷ To help put this into perspective, in 2015, coal production from U.S. public lands alone would have ranked 6th in the world, ahead of total production in Russia and South Africa (See Figure 1). That same year, federal natural gas production would have ranked 7th in the world just below production levels in India and Canada but ahead of both Saudi Arabia and Norway, (See Figure 2) and crude oil production would have ranked 13th, barely losing out to Nigeria but well ahead of countries like Qatar and Algeria.⁸



1. <https://www.doi.gov/energy/fast-facts>

2. <https://fas.org/sgp/crs/misc/R42346.pdf>

3. Bureau of Ocean Energy Management "Oil and Gas Leasing on the Outer Continental Shelf" Available at: https://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Leasing/5BOEMRE_Leasing101.pdf

4. <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

5. https://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Leasing/5BOEMRE_Leasing101.pdf

6. <https://www.blm.gov/programs/energy-and-minerals/coal/coal-data>

7. U.S. coal production data available at: <https://www.eia.gov/coal/data.php#production>; U.S. natural gas production data available at: https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmcf_a.htm; U.S. crude oil production data available at: https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_a.htm; Federal production data available at: <https://useiti.doi.gov/explore/>

8. Federal production from USEITI compared to national production values reported annually in BP's Statistical Review of World Energy available at: <https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf>

Figure 1. 2015 coal production (million tons)

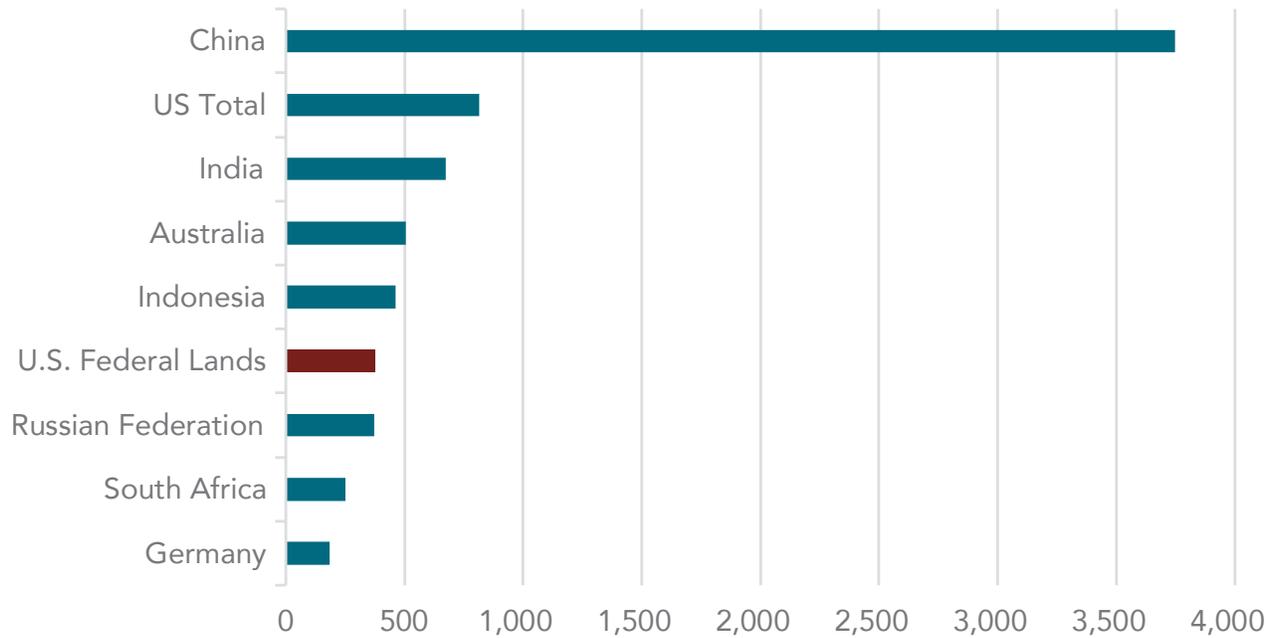
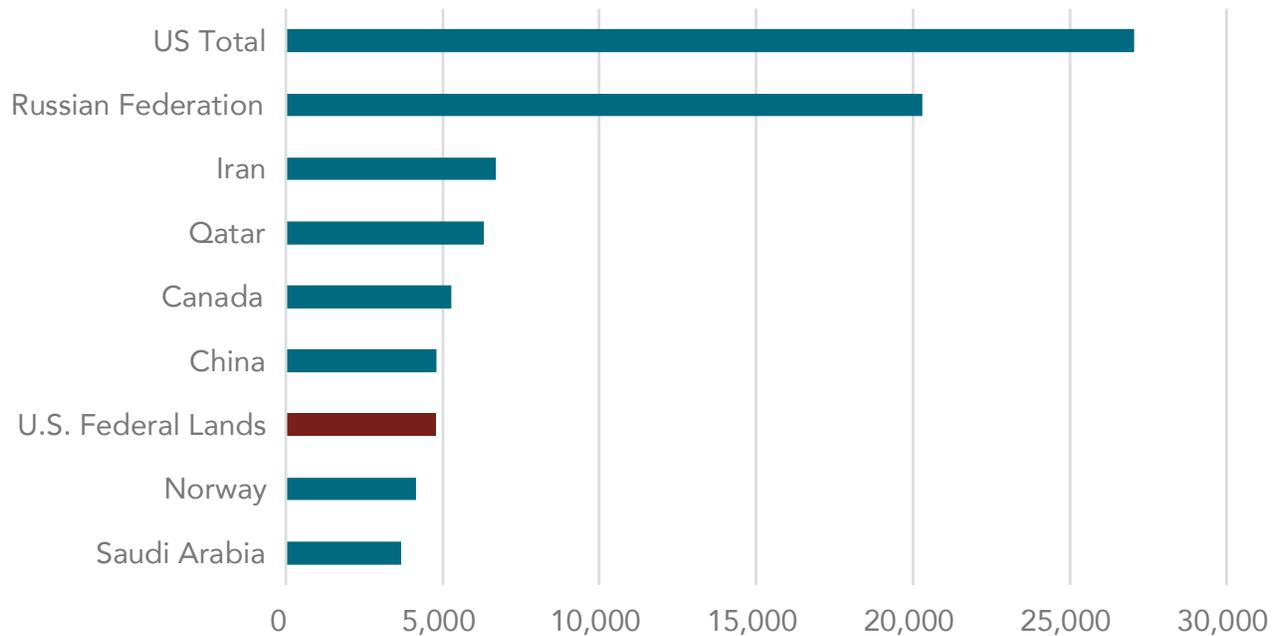


Figure 2. 2015 natural gas production (billion cubic feet)



a. Trends in leasing and production

Over the past fifteen years, total U.S. production of oil and gas has dramatically increased while coal production has plummeted. From 1990 to 2016, total U.S. natural gas production has increased by 52% while crude oil production is up 21%. Coal production however has continued its slow decline, down 22% since 2006 (See Figure 3). The surge in domestic oil and gas production has reduced the nation's reliance on foreign imports of fossil fuels. Natural gas and crude oil imports have declined significantly while exports have increased coming close to eclipsing imports.

The trends witnessed in domestic energy production are largely attributable to a dramatic increase in petroleum production from shale formations, spurred largely by technological advancements in hydraulic fracturing. The increased production associated with the "shale revolution" drove down natural gas prices, providing a cheaper alternative to coal and leading to the increased use of natural gas use in electricity generation.⁹ The surplus of oil and gas introduced into the market also helped to move the United States into a position where exports of both have dramatically increased while imports have fallen, setting the country up to become a net exporter of both.¹⁰

Beginning in 2014, the crude oil market bottomed out. Increased oil production in the United States helped to flood the international market sending crude prices tumbling. However, U.S. producers proved to be quite resilient. Their ability to cut production costs and remain profitable in a low-price environment has allowed U.S. producers to take over a larger market share and increase exports.^{11,12}

Development on public lands has been influenced by these same market forces. Crude oil production increased 26% from 2006 to 2015 while coal production dropped 16%. Surprisingly, federal leasing trends have not been a good indicator of production. Federal leasing activity has declined in recent years. Between 1990 and 2015, the total number of acres under lease for coal mining dropped 35% from roughly 730,000 to 482,000 while the amount of land under lease for oil and gas development dropped by 57% from 64 million acres to 27 million acres. Offshore leasing is also down. From 2011 to 2016, the total acreage under lease as well as the total number of active leases had declined by 50%. Despite the declines in total acreage under lease, producing acreage has remained relatively stable, falling only 2% from 1990 to 2016 (See Figure 4).

Figure 3. U.S. total v. federal coal production

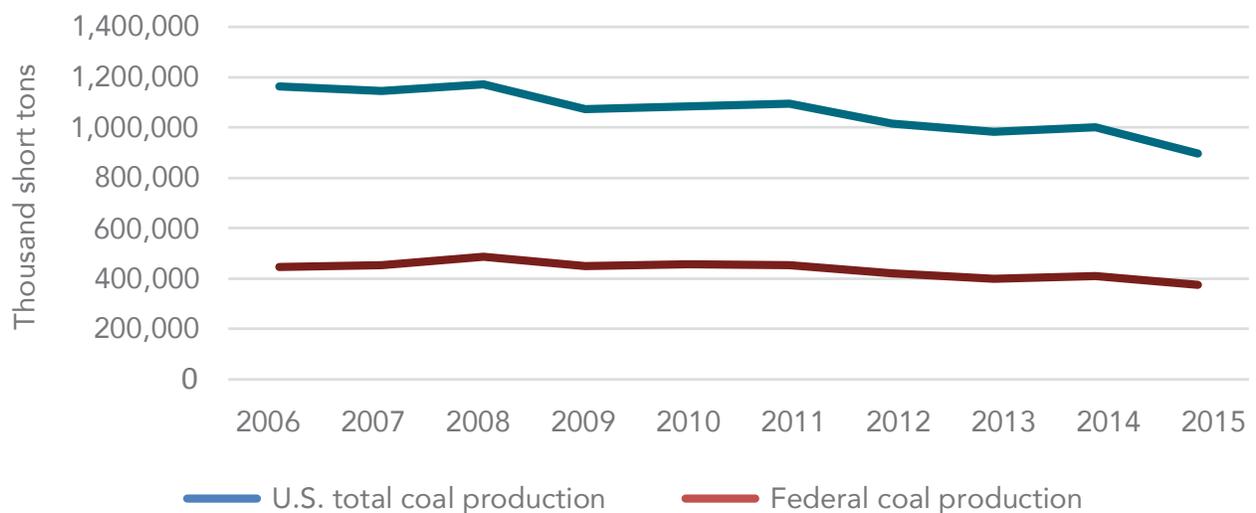
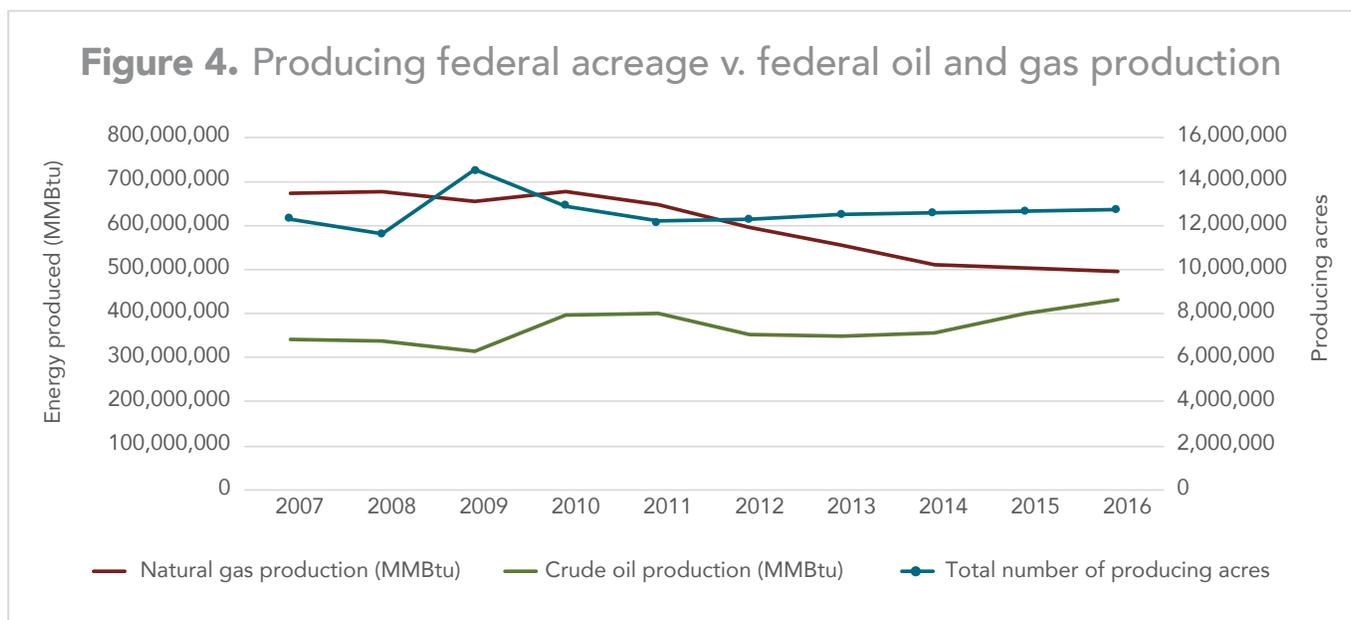
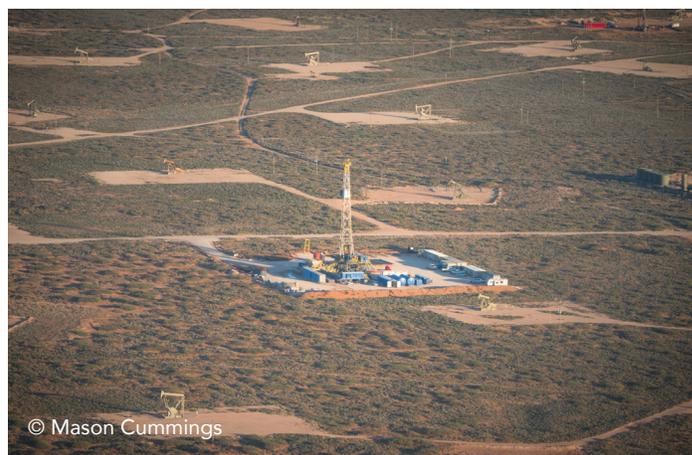


Figure 4. Producing federal acreage v. federal oil and gas production



This shows that U.S. producers have been able to do more with less on public lands. They have increased production with less acreage under lease (See Figure 5). These trends also demonstrate that industry appetite for public lands energy has declined as companies shift development from federal to state and private land. However, this is not due to a lack of availability. In 2015, only 15% of all land offered in lease sales—parcels nominated by industry—was actually purchased. By 2017, only 6 percent of the total acreage offered was actually leased by industry. BLM continues to offer significantly more acreage for lease than industry is willing to purchase (See Figure 6). It is also not due to a lack of access. TWS research shows that 90% of BLM managed subsurface mineral acres are open to oil and gas leasing and of the 27 million acres under lease in 2016, only 12.7 million acres were actually producing energy.¹³ That means 14 million acres of publicly owned minerals leased to oil and gas companies were just sitting there. The industry is also sitting on top of 7,950 approved drilling permits that

are not being used.¹⁴ In 2016 alone, BLM issued 2,184 drilling permits, of which only 847 were used. In addition to unused permits and non-producing leases, industry is holding approximately 3.25 million acres of federal leases in suspension; meaning an additional 10% of the total acreage under lease nationally is not being put to productive use.¹⁵



9. Crooks, Ed "The US Shale Revolution", Financial Times (2015). Available at: <https://www.ft.com/content/2ded7416-e930-11e4-a71a-00144feab7de>
 10. Brady, Jeff, "U.S. Likely To Become Net Exporter Of Energy, Says Federal Forecast." NPR (2017). Available at: <http://www.npr.org/sections/thetwo-way/2017/01/05/508421943/u-s-likely-will-become-net-exporter-of-energy-says-federal-forecast>
 11. Scheyder, Ernest, "With oil price near \$50, resilient U.S. shale producers eye new chapter." Reuters (2016). Available at: <https://www.reuters.com/article/us-oil-shale/with-oil-price-near-50-resilient-u-s-shale-producers-eye-new-chapter-idUSKCN0Z60CH>
 12. Clemente, Jude, "The Great U.S. Oil Export Boom." Forbes (2017). Available at: <https://www.forbes.com/sites/judeclemente/2017/05/21/the-great-u-s-oil-export-boom/#144f26bc7e5b>
 13. The Wilderness Society "Open for Business: How Public Lands Management Favors the Oil and Gas Industry". Available at: http://wilderness.org/sites/default/files/TWS%20-%20BLM%20report_0.pdf
 14. The Wilderness Society "Public Land Energy Development By The Numbers 2017". Available at: https://wilderness.org/sites/default/files/TWS%20Energy%20Fact%20Sheet_September_5_2017.pdf
 15. The Wilderness Society "Land Hoarders: How Stockpiling Leases is Costing Taxpayers". Available at: <https://wilderness.org/sites/default/files/TWS%20Hoarders%20Report-web.pdf>

Figure 5. Despite reduced acreage under lease, federal oil production has increased

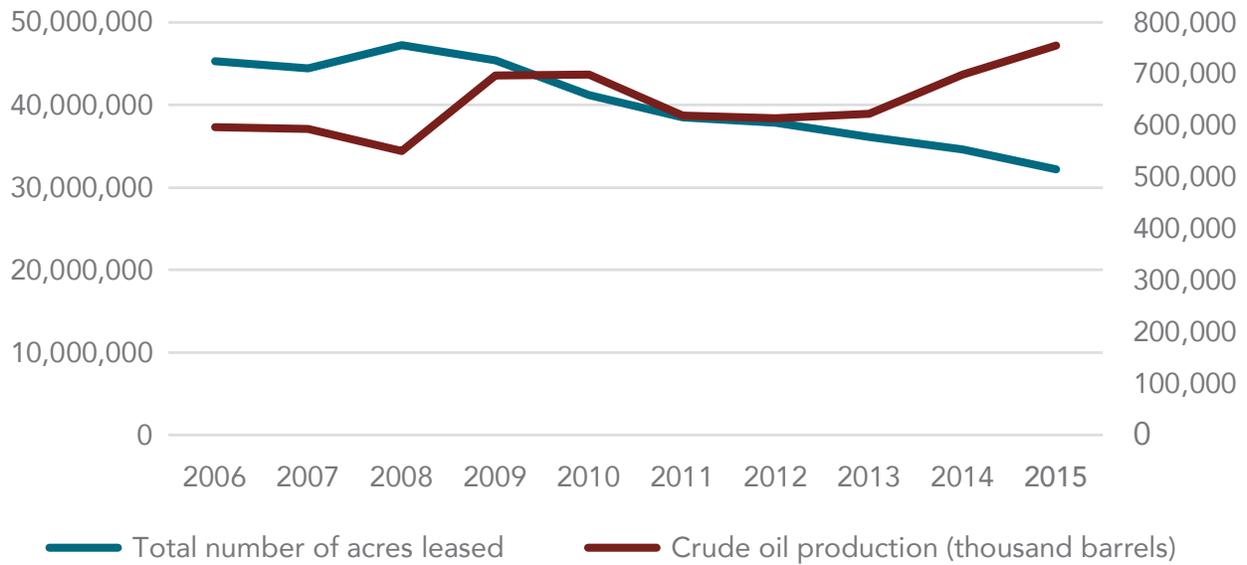


Figure 6. BLM is trying to sell off our public lands but industry isn't buying



Drilling down: a closer look at the U.S. energy market and recent trends

It is important to understand current trends in the domestic and international energy markets to provide context for what development has and will continue to take place on our public lands. Over the past fifteen years, total U.S. production of oil and gas has dramatically increased. From 1990 to 2016, total U.S. natural gas production has increased by 52% while crude oil production is up 21%. Coal production however has continued its slow decline, down 22% since 2006.

A shift from coal to natural gas in the U.S. electricity generation sector has been responsible for much of this change in production levels. In 1990, coal was responsible for over 55% of all electricity generated in the United States while natural gas contributed less than 10%.¹⁶ In 2016, natural gas has nearly achieved parity—coal now makes up only 33% of all electricity generation inputs while natural gas has climbed to over 30%.¹⁷ Crude oil, condensate and other petroleum products continue to dominate the transportation sector and play a significant role, along with natural gas, in meeting the needs of the industrial sector, while electricity and natural gas make up close to 100% of the energy supplied to the residential and commercial sectors.¹⁸

The nation's reliance on foreign imports of fossil fuels has also declined. The United States continues to import natural gas although total imports, including compressed natural gas (CNG) and liquified natural gas (LNG), have

decreased by over 34% since 2007. As domestic production has boomed, exports have skyrocketed, increasing by over 2,000% since 1990. As of 2016 natural gas exports have come close to eclipsing imports.¹⁹ The crude oil and petroleum products trade has followed a similar pattern. Since 2005 imports have decreased by 26% while exports have increased by over 500%.²⁰ Coal imports and exports however have continued their steady decline. Imports are down over 270% from 2007. While exports have generally held steady since 2000, up around only 3%, they have declined significantly since 2012 by over 53%.²¹

There are a number of factors and market forces that have played a part in the trends we have seen in production, energy use, and international trade.

Domestic production has rallied in recent years. A revolution in petroleum production from shale formations, spurred largely by technological advancements in hydraulic fracturing, led to increased domestic oil production and a surge in associated natural gas production. This in turn drove down natural gas prices leading to its increased use in electricity generation.²² The surplus of oil and gas introduced into the market also helped to move the United States into a position where exports of both have dramatically increased while imports have fallen, setting the country up to become a net exporter of both in the near term.²³



© Mason Cummings

Following historically high levels of production and crude oil prices from 2008 to 2014 the market bottomed out. Increased oil production in the United States helped to flood the international market sending crude prices tumbling. In response, the Organization of Petroleum Exporting Countries (OPEC)—a group of 14 nations responsible for almost half of global oil supply—decided to maintain its market share and continue producing at current levels, driving prices down to lows not seen since the early 2000s.²⁴ By late 2016, OPEC countries agreed to production cuts in an effort to drain global supply and raise prices.²⁵ This decision by OPEC, along with the subsequent agreement to continue those cuts, has not necessarily achieved its intended results. Prices have rebounded only modestly and U.S. producers have proven to be quite resilient. Their ability to continue to cut production costs and remain profitable in a low-price environment, along with the decision to lift the 40-year moratorium on crude oil exports in 2015, has allowed U.S. producers to take over a larger market share and increase exports.^{26,27}

The abundance of natural gas produced as a byproduct of the shale oil revolution brought changes to the natural gas marketplace as well. Increased production along with a growth in international demand have positioned the United States to increase exports.²⁸ The United States geographic and geopolitical position allows it to work with both the European markets—where there is a demand for reduced reliance on Russian supplies—and the Asian markets—where natural gas is not nearly as plentiful as it is in the U.S.²⁹ The U.S. Energy Informa-

tion Administration (EIA) now predicts the United States could become a net exporter of natural gas by the end of 2017.³⁰

Unlike the flourishing oil and gas markets, domestic coal production, exports and imports have all declined primarily in response to electricity generators taking advantage of the surplus natural gas and low spot prices to meet demand. International movement away from coal as a fuel source for financial, public health and climate related reasons has also contributed to this decline.

Looking towards the future, EIA's most recent Annual Energy Outlook (AEO) from 2017 predicts that domestically, total energy production (in British Thermal Units (BTUs) including fossil fuel production and electricity production from renewables) will increase by more than 20% from 2016 through 2040, led by increases in renewables, natural gas, and crude oil production. Natural gas production is expected to account for nearly 40% of U.S. energy production by 2040 as it grows at a rate of around 4% per year through 2020. Increased demand from the industrial and electric power markets will drive rising domestic consumption. Crude oil production is predicted to rise but level off around 2025 and production will not reach 2005 levels anytime in the foreseeable future. Despite modest production increases, the United States is projected to become a net energy exporter by 2026. Coal consumption will continue to decrease as it loses market share to natural gas and renewable generation in the electric power sector.³¹

16. Energy Information Administration, Annual Energy Review 1990. Available at: <https://www.eia.gov/totalenergy/data/annual/archive/038490.pdf>

17. Energy Information Administration, *Frequently Asked Questions: What is U.S. electricity generation by energy source?* Available at: <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>

18. Lawrence Livermore National Laboratory, *Estimated U.S. Energy Consumption in 2016*. Available at: https://flowcharts.llnl.gov/content/assets/images/charts/Energy/Energy_2016_United-States.png

19. Energy Information Administration, *Natural Gas Data*. Available at: <https://www.eia.gov/naturalgas/data.php#imports>

20. Energy Information Administration, *Petroleum and Other Liquids Data*. Available at: <https://www.eia.gov/petroleum/data.php#imports>

21. Energy Information Administration, *Coal Data Browser*. Available at: https://www.eia.gov/beta/coal/data/browser/#/topic/41?agg=2,1,0&rank=ok&map=COAL.EXPORT_QTY.TOT-TOT-TOT.A&freq=A&start=2000&end=2016&ctype=map<ype=pin&rtype=s&maptype=0&rse=0&pin=

22. Crooks, Ed "The US Shale Revolution", Financial Times (2015). Available at: <https://www.ft.com/content/2ded7416-e930-11e4-a71a-00144feab7de>

23. Brady, Jeff, "U.S. Likely To Become Net Exporter Of Energy, Says Federal Forecast." NPR (2017). Available at: <http://www.npr.org/sections/thetwo-way/2017/01/05/508421943/u-s-likely-will-become-net-exporter-of-energy-says-federal-forecast>

24. Rapier, Robert, "Why Oil Prices are Plummeting", Forbes (2017). Available at: <https://www.forbes.com/sites/rrapier/2017/06/20/why-oil-prices-are-plummeting/#358939e43118>

25. Razzouk, Nayla, "OPEC Confounds Skeptics, Agrees to First Oil Cut in 8 Years" Bloomberg (2016). Available at: <https://www.bloomberg.com/news/articles/2016-11-30/opec-said-to-agree-oil-production-cuts-as-saudis-soften-on-iran>

26. Scheyder, Ernest, "With oil price near \$50, resilient U.S. shale producers eye new chapter." Reuters (2016). Available at: <https://www.reuters.com/article/us-oil-shale/with-oil-price-near-50-resilient-u-s-shale-producers-eye-new-chapter-idUSKCN0Z60CH>

27. Clemente, Jude, "The Great U.S. Oil Export Boom." Forbes (2017). Available at: <https://www.forbes.com/sites/judeclemente/2017/05/21/the-great-u-s-oil-export-boom/#144f26bc7e5b>

28. Energy Information Administration, *Short-Term Energy Outlook: September 2017*. Available at: <https://www.eia.gov/outlooks/steo/report/natgas.cfm>

29. Gheorghui, Iliua, "Agency Report Projects U.S. Natural Gas Exports Will Quadruple This Year", Morning Consult. (2017). Available at: <https://morningconsult.com/2017/07/11/agency-report-projects-u-s-natural-gas-exports-will-quadruple-year/>

30. Energy Information Administration, "United States expected to become a net exporter of natural gas this year" (2017). Available at: <https://www.eia.gov/todayinenergy/detail.php?id=32412>

31. Energy Information Administration, *Annual Energy Outlook 2017*. Available at: [https://www.eia.gov/outlooks/aeo/pdf/0383\(2017\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf)

On top of the trends highlighted above, shifts in domestic policy can influence energy development on public lands. The Trump administration has clearly prioritized energy development above other uses on public lands and has systematically begun to repeal, rescind, suspend and delay implementation of numerous regulations in an effort to promote American “energy dominance.”³² Considering the position taken by the federal government as well as the larger energy market trends, we should anticipate continued development on our federal lands and we must begin to plan and manage for these outcomes accordingly.

b. Associated carbon and climate consequences

Although federal leasing and production have declined, demand for fossil fuel resources is likely to remain stable or even increase for the foreseeable future. National energy-related greenhouse gas emission projections largely parallel these trends.

The federal mineral program contributes significantly to total U.S. GHG emissions. Each year, approximately 30% of the nation’s energy (by thermal content) comes from publicly-owned fossil energy resources leaving a significant carbon footprint. Between 2005 and 2015, the extraction, transportation and combustion of public-

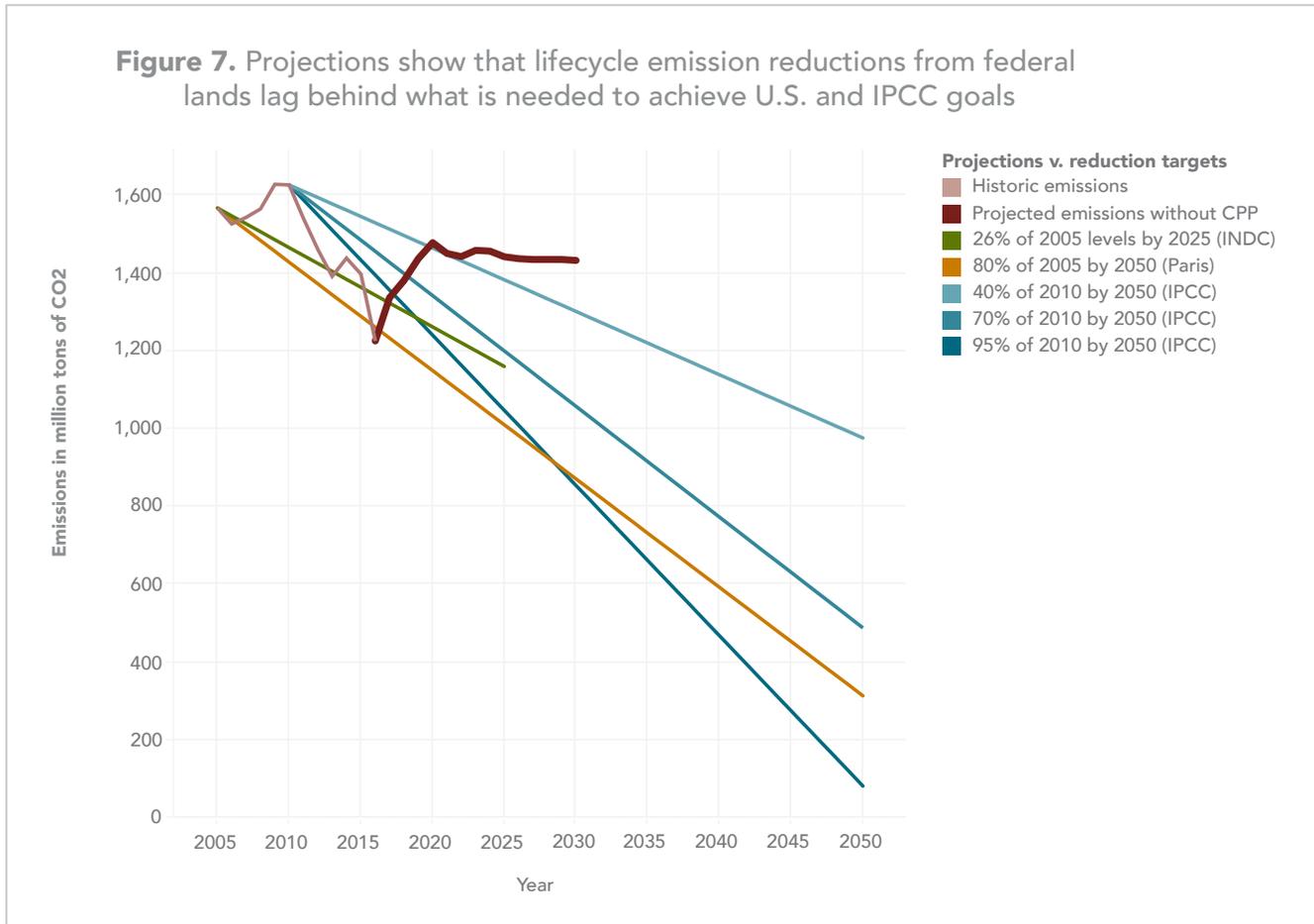
ly-owned oil, gas and coal accounted for more than 20% of all U.S. GHG emissions and 3-4% of global fossil fuel emissions.³⁴ According to TWS analysis, in 2015, total GHG emissions from fossil fuels produced on federal lands were 1,439 million metric tons of carbon dioxide equivalent (mmtCO₂e), greater than all GHG emissions from Japan.³⁵ If U.S. public lands were a country, it’s emissions would have ranked fifth in the world.

While current emission rates are alarming, potential emissions from future development of both leased and unleased lands pose even more significant concerns. Some studies have estimated that potential GHG emissions from federal and non-federal fossil fuels could be as high as 1,070 gigatons carbon dioxide equivalent (GtCO₂e) and public lands alone contain enough recoverable coal, oil and gas that, if developed, could result in as much as 492 GtCO₂e.³⁶ Already leased federal fossil fuels could account for as much as 43 GtCO₂e while up to 91% of potential emissions would come from currently unleased reserves.³⁷ Critically, according to leading scientists, the United States carbon budget—equivalent to 11% of the global carbon budget needed for a 50% chance of limiting warming to 2°C—allocates cumulative emissions of approximately 158 GtCO₂ to the United States as of 2011.³⁸ Continued development of federal fossil fuel resources alone could cause the nation to exceed this threshold.



According to a TWS analysis, to compare directly against the U.S.'s economy-wide INDC target of 26-28% reductions by 2025 from a 2005 baseline, lifecycle emissions from federal lands are projected to decline just 13% over that period. Federal emissions need to be reduced from 1.52 billion tons CO₂e per year to between 1.16 billion and 1.13 billion tons CO₂e per year to be on par with the US's economy-wide INDC reduction target by 2025. Based on current projections federal lands exceed these targets by roughly 300m tons CO₂e in 2025 (See Figure 7).

The U.S. government is in the energy business. With over 2.4 billion acres of subsurface minerals, production totals that rank among the highest in the world, and GHG emissions greater than most developed nations, it is indeed one of the largest energy asset managers and must be treated as such.



32. Tanglis, Mike "Sacrificing Public Protections on the Altar of Deregulation" Public Citizen (2017). Available at: <http://www.citizenvox.org/2017/11/28/sacrificing-public-protections/>

33. Energy Information Administration, *Annual Energy Outlook 2017*. Available at: [https://www.eia.gov/outlooks/aeo/pdf/0383\(2017\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf)

34. See Dustin Mulvaney, et al., *The Potential Greenhouse Gas Emissions from U.S. Federal Fossil Fuels*, EcoShift Consulting (Aug. 2015) at 7; see also Ratledge, Nathan & Zachary, Laura. (2017). *Historic and Future (2005-2030) Greenhouse Gas Emissions from Fossil Fuel Development on Federal Lands*. Unpublished White Paper.

35. Japan 2013 GHG emissions excluding land-use change and forestry, available at World Resources Institute, CAIT Climate Data Explorer. Available at: [http://cait.wri.org/historical/Country%20GHG%20Emissions?indicator\[\]=Total GHG Emissions Excluding Land-Use Change and Forestry&indicator\[\]=Total GHG Emissions Including Land-Use Change and Forestry&year\[\]=2013&sortIdx=0&sortDir=desc&chartType=geo](http://cait.wri.org/historical/Country%20GHG%20Emissions?indicator[]=Total%20GHG%20Emissions%20Excluding%20Land-Use%20Change%20and%20Forestry&year[]=2013&sortIdx=0&sortDir=desc&chartType=geo)

36. Dustin Mulvaney, et al., *The Potential Greenhouse Gas Emissions from U.S. Federal Fossil Fuels*, EcoShift Consulting (Aug. 2015) at 16.

37. *Ibid.*

38. Michael Raupach, et al., *Sharing a quota on cumulative carbon emissions*, *Nature Climate Change* (Sept. 2014) at 875.

II. The public demands increased transparency and disclosure of climate information

Despite being one of the largest energy asset managers in the world, the federal government forces its citizen shareholders to make decisions regarding the future of their investments with incomplete information regarding production and leasing as well as associated GHG emissions and potential climate impacts. Were it a publicly traded company, the Securities and Exchange Commission (SEC) would likely find its disclosure practices insufficient. Shareholders and institutional investors now demand that publicly owned companies, particularly those in the fossil fuel industry, take the impacts of climate change into account when making operational decisions. The realization that climate change poses numerous risks to companies, their shareholders and the planet has spurred calls for increased transparency and disclosure. A number of companies have begun to respond by publishing periodic corporate social responsibility statements and including climate related information in their mandatory disclosures.

a. The genesis of disclosure

The genesis of modern corporate disclosure practices lies in the immediate aftermath of the stock market crash of 1929, where over the course of two days in October, the New York Stock Exchange (NYSE) dropped almost 25%. In less than 48 hours, more than \$30 billion in shareholder value evaporated.³⁹ As the Great Depression gripped the nation, President Roosevelt and Congress intervened in an attempt to stabilize the financial markets. Circumventing the so-called “blue sky laws” which governed the previous system at the state level, they passed legislation to end the principal of caveat emptor (buyer beware), replacing it with a disclosure based system that would ensure investors were informed of potential risks prior to making an investment decision.⁴⁰

As part of the New Deal, the administration put in place new securities laws, which led to the creation of the SEC and established a number of disclosure requirements. More specifically, they required publicly traded companies to disclose material information that might affect the company's overall financial condition including an assessment of potential risks to its business model and compensation for management positions.⁴¹ Known as 10-K's, companies are required to submit these forms annually. This system

of corporate risk disclosure is still in effect today and has continued to evolve to meet new demands.

Part of that transformation can be attributed to the collapse of Enron. Unprecedented levels of questionable accounting practices and corporate fraud, including efforts to mislead investors about the company's profitability and financial risks, resulted in the 7th largest corporation in the United States declaring bankruptcy and ruining shareholders. In the wake of this collapse, Congress stepped in and established the Public Company Accounting Reform and Investor Protection Act - now universally known as Sarbanes Oxley or SOX. SOX put several new provisions in place, chief among them, the requirement that company leadership (generally the CEO & CFO) personally certify that their 10-K is accurate and complete. Certifying officials can now be held liable under civil and potentially criminal law for any fraudulent reporting.

b. The modern investment community demands climate risk disclosure

While Sarbanes Oxley and other previous regulations and legislation laid the groundwork for companies and their investors to mitigate financial risk, there has been little progress in giving capital markets access to information necessary to evaluate risks due to climate change.

In an effort to shift the paradigm, the Securities and Exchange Commission offered new guidance on how companies should interpret their disclosure requirements as they relate to climate change in 2010.⁴² However, a formal rulemaking process has not been initiated and they remain merely suggestions. Due to the voluntary nature of the recommendations, the SEC has few enforcement mechanisms at its disposal. By law, it could force companies to re-write their 10-K reports, but has generally defaulted to issuing letters requesting more information the following year.⁴³ In 2011, the SEC issued 49 letters to companies addressing their climate disclosures. In 2012, that number dropped to three, and by 2013 it issued none at all.⁴⁴ A 2013 study of almost 4,000 publicly traded companies found that only 27% mentioned climate change in their 10-K reports, and almost none mentioned how climate change could physically impact their business.⁴⁵

c. The concern about stranded assets

There are very real financial risks associated with climate change and the failure to disclose those risks to shareholders. By continuing to invest public resources in the federal energy program, the government is betting that demand for fossil fuels will continue to grow without accounting for potential climate impacts. This can lead to the incorrect pricing or valuing of assets and a misallocation of capital.

For decades, the investment community poured trillions of dollars into energy companies around the world under the assumption that demand for fossil fuels would only increase. Yet, scientific consensus around climate change and the impacts of excess carbon emissions, culminating in the Paris Agreement, fundamentally shifted this paradigm. Now, every nation on earth—with the exception of the United States—is committed to holding global temperature rise to under 2 degrees Celsius. Achieving this requires the rapid decarbonization on a global scale. This means transitioning away from the most carbon intensive energy sources like coal and tar sands. As we have described above, this movement is already well under way.

As national governments, subnational jurisdictions and multinational corporations around the world adapt their policies to meet the goals of the Paris Agreement, energy companies will find themselves under greater regulatory constraints as demand for fossil fuels declines.⁴⁶ Current estimates from the Carbon Tracker Initiative show that as much as 50% of ExxonMobil's assets fall outside the global carbon budget and as much as 40% of Chevron's assets could be similarly positioned. Such realities expose shareholders of such companies to enormous financial risk. A 2008 study by McKinsey and the Carbon Trust showed

that "more than half of the share value of oil and gas companies results from future cash flows generated after more than 10 years."⁴⁷ The potential inability for these companies to access these resources tomorrow means their stocks could be potentially overvalued today. Such a scenario is not without precedent. In 2004, when Royal Dutch Shell announced a 20% downward adjustment of its estimated reserves, the company's stock price fell 10% in less than a week, reducing the company's value by almost \$3 billion.⁴⁸

Yet the problem of stranded energy assets extends far beyond the boardrooms of energy companies. Increasingly, insurers are speaking out, rethinking their long-term business models in an effort to avoid potentially catastrophic write downs to their portfolios in the coming years.⁴⁹ The industry finds itself uniquely exposed, as both a major investor, with more than \$30 trillion in invested capital across the global economy, and as a financial guarantor that could be compelled to pay enormous sums of money in claims as a result of loss from climate change.⁵⁰ Governments with large fossil fuel reserves could see similar fiscal challenges as falling revenues could potentially devalue any sovereign bonds that have been issued.⁵¹

Energy companies must take note of these trends. Many, if not most of their current assets could become stranded and securing financing for new fossil fuel projects will be more difficult. They must begin to make informed decisions on how best to deliver cost effective energy to their customers and profits to their shareholders. Transparency and disclosure of these potential risks represent the necessary first step in addressing the problem.

39. Suddath, Claire "The Crash of 1929." *Time*, <http://content.time.com/time/nation/article/0,8599,1854569,00.html>

40. "Securities Act of 1933." *Investopedia*, <http://www.investopedia.com/terms/s/securitiesact1933.asp>

41. Disclosure." *Investopedia*, <http://www.investopedia.com/terms/d/disclosure.asp>

42. "SEC Issues Interpretive Guidance on Disclosure Related to Business or Legal Developments Regarding Climate Change." *US Securities and Exchange Commission*, 27, Jan. 2010, <https://www.sec.gov/news/press/2010/2010-15.htm>

43. Hirji, Zahra "Most U.S. Companies Ignoring SEC Rule to Disclose Climate Risks." *Inside Climate News* 19, Sept. 2013, <https://insideclimatenews.org/news/20130919/most-us-companies-ignoring-sec-rule-disclose-climate-risks>

44. Gelles, David "S.E.C. Is Criticized for Lax Enforcement of Climate Risk Disclosure." *New York Times*, 23, Jan. 2016, https://www.nytimes.com/2016/01/24/business/energy-environment/sec-is-criticized-for-lax-enforcement-of-climate-risk-disclosure.html?_r=1

45. Hirji, Zahra "Most U.S. Companies Ignoring SEC Rule to Disclose Climate Risks." *Inside Climate News* 19, Sept. 2013, <https://insideclimatenews.org/news/20130919/most-us-companies-ignoring-sec-rule-disclose-climate-risks>

46. Team, Trefis "Paris Climate Agreement Spells Trouble For Coal" *Forbes*, 17, Dec. 2015, <https://www.forbes.com/sites/greatspeculations/2015/12/17/paris-climate-agreement-spells-trouble-for-coal/#291dc95e460b>

47. "Climate change – a business revolution?: How tackling climate change could create or destroy company value." *Carbon Trust*, (2008). Available at: <https://www.carbon-trust.com/media/84956/ctc740-climate-change-a-business-revolution.pdf>

48. "Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?" *Carbon Tracker*. Available at: <https://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>

49. "Stranded Assets: the transition to a low carbon economy Overview for the insurance industry" *Lloyd's*, (2017) Available at: <https://www.lloyds.com/news-and-insight/risk-insight/library/society-and-security/stranded-assets>

50. Carrington, Damien "Climate change threatens ability of insurers to manage risk." 7, Dec. 2016, <https://www.theguardian.com/environment/2016/dec/07/climate-change-threatens-ability-insurers-manage-risk>

51. "The Price of Doing Too Little Too Late The impact of the carbon bubble on the EU financial system." *Green European Foundation*, Feb. 2014

d. Best practices of climate disclosure

With few mandatory climate disclosure requirements, investors are stepping in to fill the void. An international task force, chaired by former New York City Mayor Michael Bloomberg, was created in 2015 to examine how the financial markets could embrace internationally adopted best practices of financial disclosure.⁵² The Task Force on Climate-related Financial Disclosures (TCFD) released its recommendations in June of 2017. The task force structured its recommendations for more standardized disclosure reporting around four categories:

1) Governance

Shareholders must charge boards of directors, as well as corporate executive leadership, with deploying the vision necessary to ensure the company succeeds moving forward, ultimately holding leadership accountable for product quality, profitability, and other similar metrics. The task force recommended that investors judge a company on its ability to identify and mitigate the business risks associated with climate change and capitalize on the business opportunities that a low-carbon economy can bring. A corporate governance structure blind to such issues can be as dangerous to the long-term viability of a company as any other risk disclosed under Sarbanes Oxley.

2) Strategy

Having the right people and management procedures in place does little good if those people are not willing or able to conceive of and implement the strategic vision to insulate the company from the possible effects of climate change. As identified above, direct and transactional climate risks can pose an existential risk, one that could jeopardize the future of the business. To best ensure that investors and capital markets are fully informed, the task force recommended that publicly traded companies disclose the short, medium and long-term risks and opportunities related to climate under different, plausible climate scenarios.

3) Risk management

Identifying the risks and opportunities driven by a changing climate without an actionable plan to address them in the positive or the negative can cause more vulnerabilities than it prevents. Successful companies worthy

of capital investment have robust risk management procedures to protect their shareholders from unexpected market shocks, or other similar catastrophic events. While no company can perfectly predict the future, it can and should identify the potential threats to the business model. The task force recommended that each company disclose the processes by which it identifies climate risk, as well as the procedures it will employ to address these risks in a fiscally responsible manner.

4) Metrics and targets

A risk to one company might not be classified in the same way by another. Therefore, companies should disclose the metrics and targets used to identify each risk. Further, all companies should disclose their emissions and how those emissions contribute to the issues identified in the first three categories.

Financial histories and projections play a key role in this analysis. However, climate change continues to insert a level of unpredictability into future projects, and makes it increasingly important for investors to analyze the governance structures and risk management procedures of a given company. While it is unlikely that the current administration will support the expansion of Sarbanes Oxley to cover climate related risks, the task force has encouraged forward thinking companies to voluntarily disclose the challenges they and their investors will face in a rapidly changing climate. Without the right information, investors may incorrectly price or value assets, leading to a misallocation of capital. Such disclosures should not be viewed as an impediment to investment, but rather a catalyst for it. Capital flows towards markets where risk is lowest, and profit has the potential to be both sustainable and dependable. Identifying climate risks can help companies visualize those opportunities. The recommendations put forth by the task force should be embraced by all energy asset managers including the federal government. Increased transparency and risk disclosure is essential to proper management of the federal mineral estate.

52. "Final Report: Recommendations of the Task Force on Climate Related Financial Disclosures" *Task Force on Climate-related Financial Disclosures*, 15, Jun. 2017 <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>

III. The federal energy program lacks transparency and data availability leading to inadequate disclosure of potential risks

The federal government, like many energy companies, has failed to adequately inform its shareholders about the extent of the energy assets it manages and the potential climate risks associated with its energy program. Although a number of agencies and departments collect data related to federal coal, oil and gas development, they often fail to track the most relevant metrics and much of what they do record is inaccessible to the public. Here we have attempted to identify what information is available, its usability and any remaining gaps.

a. Oil, gas and coal data availability and shortcomings

Data related to federal oil, coal and natural gas is published by several different sources including the EIA, BLM, USFS, U.S. Geologic Society (USGS), Office of Natural Resources Revenue (ONRR), Miner Safety and Health Administration (MSHA), the Environmental Protection Agency (EPA) and U.S. Extractive Industries Transparency Initiative (USEITI) operated by DOI. Each agency publishes information that is useful in understanding the scale of the federal energy program and its potential risks. A detailed summary of available data can be found in Appendix A.

The current system of data tracking and dissemination suffers from a number of obvious flaws. First and foremost, there is no centralized publicly accessible database. This means that interested parties must search for information across several data sources and conduct their own analyses. Additionally, much of the available data is incomplete. Some data sets only go back several years while others have not been updated recently or have been discontinued. Most importantly, the federal government has failed to make additional necessary and reliable information available. For example:

- EIA data is not broken out by mineral ownership either in historic data sets or in the energy outlooks. There is also a substantial amount of relevant data that EIA has either stopped tracking or does not report due to its proprietary nature including the number of active wells and well drilling activity.

- BLM does not publish the number of active and new wells or the volume of oil, gas or condensate produced from those wells, identifying key data as “confidential business information” (CBI). It also restricts the public’s access to documents like applications for permit to drill (APDs) and sundry notices. The agency’s Legacy Rehost System is notoriously difficult to use and the most complete oil and gas databases maintained by BLM (Automated Fluid Minerals Support System and Well Information System) are reserved for agency staff and operators only.
- The ONRR records production and royalty data for federal onshore and offshore oil and gas and coal but makes only a limited amount of that data publicly available.
- The MSHA Mine Data Retrieval System allows users to search only one mine at a time and does not specify land ownership status.

To make matters worse, the current administration has begun to withhold oil and gas leasing and production data previously made available to the public.⁵³

Perhaps the most accessible federal energy resource database is maintained by the Department of the Interior under the USEITI. EITI is a global standard that promotes open and accountable management of natural resources and relies on a number of informal partnerships and reporting between various government agencies and private enterprises. The United States committed to joining this initiative in 2011 and was accepted in 2014. Then Secretary of the Interior Sally Jewell praised the decision, stating in a press release that “it underscores...[the United States’] continued and unwavering commitment to leading by example in promoting transparency, accountability, and good governance both domestically and globally.”⁵⁴ The initiative commits countries to full transparency of extractives revenues from federal lands, such as from extraction of its offshore oil and to “working together with business and civil society organizations to ensure an informed debate about how its natural resources are

being managed.”⁵⁵ To further the goals of the initiative, DOI developed a website that includes important information regarding energy production on our federal lands. USEITI publishes data for federal and non-federal oil, gas, LNG and coal resources. It includes production volumes, non-tax revenue derived from federal production and federal disbursements of revenue showing where the money generated from non-tax revenue on federal lands goes. Unfortunately, the Trump White House announced on November 2nd that the U.S. is formally withdrawing from the EITI though the U.S. will continue to “comply with spirit of agreement.”⁵⁶ The fate of the USEITI information stream is unclear.

b. Emissions data

Production and market data like that described above are important for understanding the magnitude of federal energy development and can be used to help make informed decisions on public lands moving forward. But it is only a piece of the puzzle. Even more important to the larger argument made here—that asset managers must disclose to their shareholders relevant information regarding potential climate risks and that the government must consider climate impacts when making future federal energy decisions—is data related to GHG emissions.

Unlike production data, there are very few official sources of historic and projected GHG emissions and no comprehensive accounting of emissions from federal lands. In fact, the only agency disclosing any emissions information is the EPA, and it is being done in a limited capacity. Along with a number of other responsibilities, the EPA is charged with monitoring emissions in the United States. Historically, this meant tracking and reporting criteria pollutant emissions like NO_x, ozone and particulate matter, but the threat of climate change and domestic as well as international commitments to address it have expanded the scope of EPA’s work.

The EPA has prepared the Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHGI) every year since the early 1990s. This annual report provides a comprehensive accounting of total greenhouse gas emissions for all man-made sources in the United States.⁵⁷ The GHGI helps to inform policy and industry decision making by tracking GHG emission trends and quantifying the U.S. contribution to climate change. An important component of the inventory work is EPA’s Greenhouse Gas Reporting Program (GHGRP). The GHGRP requires mandatory reporting of greenhouse gases from the largest greenhouse gas emissions sources in the United States (sources that emit 25,000 metric tons or more of carbon dioxide equivalent per year in the United States). The GHGRP is an estimate of emissions at the facility level that have already been released into the atmosphere; it does not predict future emissions. The GHGRP dataset is complementary to and an important component of the GHGI.

However, EPA’s reporting program is not mandatory and the emissions inventory lacks details for federal lands. In general, federal fossil fuel data provided by the various government agencies is lacking both in functionality and availability. While it is possible to piece together a picture of the federal energy landscape, it is an exercise that requires an immense amount of time and background knowledge. In other words, it would not meet the standards for disclosure that we would expect from a publicly traded company.

53. Natural Resources Committee Democrats, “Press Release: Countering Administration Silence, Lowenthal-Grijalva Bill Mandates Disclosure on Industry Hoarding of Unused Permits to Drill.” *U.S. House of Representatives*, 24, October 2017. Available at: <https://democrats-naturalresources.house.gov/media/press-releases/countering-administration-silence-lowenthal-grijalva-bill-mandates-disclosure-on-industry-hoarding-of-unused-permits-to-drill>

54. Extractive Industries Transparency Initiative, “Media release: United States accepted as member of resource transparency body.” (2014). Available at: <https://eiti.org/news/media-release-united-states-accepted-as-member-of-resource-transparency-body>

55. Ibid

56. Gould, Gregory J. “Letter to Mr. Fredrik Reinfeldt, Chair Extractive Industries Transparency Initiative” 2 Nov. 2017. Available at: https://www.doi.gov/sites/doi.gov/files/uploads/eiti_withdraw.pdf

57. Under the United Nations Framework Convention on Climate Change (UNFCCC), the United States is obligated to develop nationally representative GHG emission estimates from anthropogenic sources on an annual basis.

c. Planning for energy development on public lands

Our oil, gas and coal resources are supposed to be managed by the federal government for the public interest. For too long, the public has lacked any information about actual or expected carbon emissions and climate impacts that may result from leasing and development decisions. These lands are part of the way we approach climate change as a nation, but today are barely part of the conversation. Disclosure of potential emissions and climate impacts associated with the federal energy program is limited to brief and often inadequate analyses included in environmental impact statements (EIS) and environmental assessments (EA) prepared under the National Environmental Policy Act (NEPA) for land use planning processes, lease sales and permitting decisions. The BLM, USFS and BOEM all conduct similar environmental analyses when approving the development of public energy resources. They utilize much of the data described above to inform their decisions. However, in most instances the information disclosed by the agency in the decision document is incomplete, the analysis of potential emissions and climate impacts is inadequate, and the facts fail to support the final decision to allow development.

i. Land use planning (RMPs and LRMPs)

The BLM develops a resource management plan (RMP) for each field office that will guide and at times dictate surface uses of the lands under its purview. More specifically, an RMP is a set of comprehensive long-range decisions concerning the use and management of resources administered by the BLM. It provides an overview of goals, objectives, and needs associated with public lands management and attempts to resolve existing or potential multiple-use conflicts. A large component of any RMP where energy resources are known to exist is addressing where, when and how those resources can be developed. In an effort to make such determinations, the BLM will prepare a reasonable foreseeable development (RFD) scenario as well as an environmental impact statement (EIS). Together those documents provide the basis for decisions regarding future energy development on public lands. The USFS, in preparing its land and resource management plan (LRMP), conducts similar analyses and often relies on the BLM in making its final determinations. BOEM, on the other hand, prepares a 5-year program

that establishes a schedule of oil and gas lease sales for each planning area on the U.S. Outer Continental Shelf. The Program specifies the size, timing, and location of potential leasing activity that the Secretary of the Interior determines will best meet national energy needs. For simplicity's sake we will focus on the BLM process. Note however, that the USFS and BOEM processes are largely similar both in terms of the information they provide and the inadequacy of their analyses.

Prior to conducting any environmental analysis, the BLM will prepare an RFD. The RFD includes relevant geologic, economic and other technical information regarding oil and gas development in the region. It typically identifies "the number, density and type of wells likely to be drilled within these areas... and the estimated cumulative production by type of product (e.g., oil, gas, geothermal or by-products)."⁵⁸ It includes both historic trends and projections extending out for the life of the plan (typically 15 years). Based on the information in the RFD the BLM then assesses direct, indirect or "related effects on natural systems..." as well as the cumulative or "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions..." in the EIS.⁵⁹ These impacts must be considered in weighing alternatives against one another and in making final determinations regarding what lands are allocated as open, closed or open with restrictions to oil and gas leasing.

In almost every instance, both the RFD and subsequent EIS fail to adequately quantify potential GHG emissions and climate change plays little if any role in comparing alternatives or assessing direct, indirect or cumulative impacts from development in the planning area. As a result, 90% of BLM-managed subsurface mineral acres are open to leasing in current RMPs across the West.

Often the agency punts the quantification of potential emissions down the road to the leasing or permitting stage. The agency argues that there are too many unknown variables at the planning stage and that any attempt to project emissions would be speculative. However, this is simply not true. A range of potential emissions would be sufficient and could be developed and disclosed in the NEPA process.

ii. Lease sales and permitting

When conducting a lease sale or reviewing an APD, the BLM will frequently prepare an EA or EIS pursuant to NEPA.⁶⁰ The requirements for this analysis are largely similar to those for the EIS prepared alongside an RMP amendment. Therefore, BLM is required to consider the climate impacts of any leasing decision. Despite more detailed information regarding future development even at the leasing stage, the agency often argues that projecting potential emissions is unnecessary and again, speculative. At the permitting stage the agency has been provided specific information regarding well type, target formation, estimated production and other important metrics. With this information, the BLM can easily quantify potential emissions associated with a particular well. Unfortunately, an analysis of GHG emissions either at this stage often results in the agency concluding the resulting emissions are insignificant when compared to national or global emissions.

While the land use planning, leasing and permitting processes can yield useful information about energy development on federal lands, the way in which GHG emissions are analyzed and factored into decisions renders the exercise essentially useless for the purpose of climate change analysis and decision-making. The environmental review process has the potential to help meet transparency and disclosure goals. Theoretically, it should work to distill detailed data into understandable outcomes for the public. However, the current process has proven to be of limited use. In order to manage production of federal fossil fuel resources in a way that allows the nation to work towards mitigating the impacts of climate change, federal agencies must consider potential emissions associated with land use and leasing decisions and use these planning processes to provide additional information to the public.



© Mason Cummings

58. BLM Handbook H-1624-1(III)(B)(4)(a)(1)

59. Id at (III)(B)(5)

60. BLM sometimes uses Determinations of NEPA Adequacy (DNAs) for lease sales and frequently uses categorical exclusions for APDs, both of which involve no NEPA analysis. Approving actions under a DNA or categorical exclusion means there is no additional analysis of climate change impacts of potential GHG emissions.

IV. The federal government should be disclosing carbon risk to its shareholders, the American people

Despite numerous agencies tracking energy related information and planning and environmental review processes that require public participation, the government has failed to adequately inform the public about the federal energy program and the potential climate risks associated with it. Disclosing the risks associated with climate change and the continued development of federal energy resources is in the public's interest. As with any publicly traded company, shareholders, or in this case US citizens, cannot provide informed recommendations on long-term decisions (such as RMPs) or more immediate actions (such as lease sales and APD approvals) without access to necessary data. The government, and more specifically DOI, must follow the lead of the private sector and implement climate risk disclosure practices and begin to manage federal lands in accordance with those risks.

a. Climate science confirms that energy development should be constrained by allowable carbon emissions

First, and foremost, there is now a well-established scientific understanding that the global increase in temperature due to greenhouse gas emissions must be limited at or below 2 °C, to avoid unmanageable climate change consequences. This "carbon budget" concept was enshrined in the Copenhagen Accord in 2009 and was reaffirmed and strengthened in the Paris Agreement, which established a commitment to make efforts to limit temperature rise to 1.5 °C.^{61,62}

In 2012, the International Energy Agency concluded there is a limit to the amount of fossil fuels that can be developed if the world is to remain within even the 2 °C ceiling. Based on an assessment of global carbon reserves, and given existing pollution controls, the agency concluded that "[n]o more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal."⁶³

In late 2014, this analysis was expanded and strengthened by the Intergovernmental Panel on Climate Change (IPCC). The Climate Change 2014 Synthesis Report calculated that emissions would need to be limited to about 2,900 GtCO₂ since 1870 to have a reasonable chance of staying under the ceiling.^{64,65} By 2011, about 1,900 GtCO₂ had already been emitted.⁶⁶ Thus, the report concludes, to provide better than a 66% chance of limiting warming to less than 2 °C, additional carbon dioxide emissions must be limited to 1,000 GtCO₂.⁶⁷ It also estimated that there are about 3,670 to 7,100 GtCO₂ in proven fossil fuel "reserves" remaining in the ground.⁶⁸ This volume is four to seven times the amount that can be burned to have better than a 66% chance of remaining within the 2 °C warming goal.⁶⁹

In early 2015, the IPCC's work was refined further when the scientific journal *Nature* published a study that identified which fossil fuels must remain undeveloped to improve the chances of remaining below the warming cap.⁷⁰ It quantifies the regional distribution of fossil fuel

61. Copenhagen Accord ¶ 1, agreed Dec. 18, 2009, FCCC/CP/2009/11/Add.1, <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf> ("recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius" relative to pre-industrial temperatures to "stabilize greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"); id. at ¶ 2 (agreeing that "deep cuts in global emissions are required according to science" to meet this goal).

62. Paris Agreement, at art. 2, ¶ 1(a).

63. *Id.* at 25.

64. Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report (2014), <http://www.ipcc.ch/report/ar5/syr/>.

65. *Id.*

66. *Id.*

67. *Id.*

68. *Id.* at 64, Tbl. 2.2; id., Tbl. 2.2 n.f (defining "reserves" and noting that "resources," by contrast, are quantities of fossil fuels where economic extraction is potentially feasible).

69. *Id.* at 63.

70. C. McGlade & P. Ekins, *The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C*, 517 *Nature* 187, 187 (2015).

reserves and resources and, through modeling a range of scenarios based on least-cost climate policies, identifies which reserves and resources will not be burned between 2010 and 2050 if the world efficiently complies with the 2 °C limit.⁷¹

On June 28, 2017, the U.S. Global Change Research Program—comprised of the nation’s top climate scientists—completed a final draft report “designed to be an authoritative assessment of the science of climate change, with a focus on the United States, to serve as the foundation for efforts to assess climate-related risks and inform decision-making about responses.”⁷² The report concludes that significantly expanded fossil fuel development would seriously hinder our ability to avoid the worst effects of climate change and that if we are to avoid the worst effects of climate change, nations must drastically and rapidly limit the amount of carbon they emit into the atmosphere. It confirms that there is a limit to the amount of carbon that can be emitted—“CO₂ emissions are required to stay below about 800 GtC in order to provide a two-thirds likelihood of preventing 3.6 [degrees Fahrenheit (2 degrees Celsius)] of warming.”⁷³ And it tells us how much more can be emitted until that limit is reached—“approximately 230 GtC more could be emitted globally.”⁷⁴ Thus, “[s]tabilizing global mean temperature below 3.6 [degrees Fahrenheit (2 degrees Celsius)] or lower relative to preindustrial levels requires significant reductions in net global CO₂ emissions relative to present-day values before 2040 and likely requires net emissions to become zero or possibly negative later in the century.”⁷⁵

b. Federal agencies should be disclosing carbon emissions and climate risks under current law

Although the government has not done an adequate job of disclosing climate risk and making information available to the public, federal agencies are nonetheless legally required to take the impacts of climate change into consideration when making decisions. At the planning, leasing and permitting stage, courts have repeatedly held that NEPA requires agencies to consider climate change when analyzing decisions.⁷⁶

It is now well established that when an agency considers a decision that has the potential to affect greenhouse gas emissions, NEPA requires it to analyze and disclose the effects of these emissions as indirect or cumulative effects.⁷⁷ Most recently, the District of Montana held that an agency must quantify the costs of greenhouse gas emissions from a fossil-fuels-extraction project if it quantifies the benefits in a NEPA document.⁷⁸ And the D.C. Circuit has now held that agencies must analyze the climate effects of burning fossil fuels conveyed by pipeline projects they approve.⁷⁹

Most importantly, reliable methods and tools exist to measure and disclose the amount of greenhouse gas emissions from federal coal, oil and gas. As part of its analysis of climate change, BLM should use available tools to determine the costs of greenhouse gas emissions. One such tool has been developed by the Interagency Working Group on Social Cost of Carbon.⁸⁰ The Social

71. See *id.* at 187-90.

72. U.S. Global Change Research Program, Climate Science Special Report (CSSR), Fifth-Order Draft (5OD) at 1 (June 28, 2017).

73. *Id.* at 34.

74. *Id.*

75. *Id.* at 34.

76. See, for example, *Center for Biological Diversity v. NHTSA*, where the Ninth Circuit assessed an agency’s NEPA analysis for a rule requiring automobile manufacturers to increase the fuel efficiency of their vehicles, thereby lowering average tailpipe emissions per mile driven. The Court stated that “[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.” *Ctr. for Biological Diversity*, 538 F.3d at 1217. 1223-25 (9th Cir. 2008).

77. See *Center for Biological Diversity v. NHTSA* (538 F.3d at 1217, 1223-25.); see also *Mid States Coalition for Progress v. Surface Transportation Board* (345 F.3d 520, 549-50 (8th Cir. 2003)); see also *High Country Conservation Advocates v. U.S. Forest Serv.*, (52 F. Supp. 3d 1174, 1197-98 (D. Colo. 2014)); See also *Dine Citizens Against Ruining our Env’t v. Office of Surface Mining Reclamation and Enforcement [OSMRE]*, 82 F. Supp. 3d 1201 (D. Colo. 2015).; see also *Wild Earth Guardians v. OSMRE*, 104 F. Supp. 3d 1208 (D. Colo. 2015). and *Wild Earth Guardians v. OSMRE*, No. CV 14-103-BLG-SPW (D. Mt., Oct. 32, 2015, Jan 21, 2016).

78. *Mont. Env’tl. Info. Ctr. v. U.S. Office of Surface Mining*, No. CV 15-106-M-DWM, 2017 WL 3480262, at *12-15 (D. Mont. Aug. 14, 2017); see also *id.* at *13 (noting that the agency had quantified royalties and tax revenues from mining). In 2013, BLM estimated that oil and gas exploration and development in the NPRA would generate some \$34 billion in governmental revenues over 30 years under the preferred alternative. IAP/EIS Vol. 3, at 113-14 & Tbl. 4-27.

79. *Sierra Club v. Fed. Energy Regulatory Comm’n*, No. 16-1329, 2017 WL 3597014, at *1 (D.C. Cir. Aug. 22, 2017).

80. Environmental Protection Agency, EPA Fact Sheet, *Social Cost of Carbon*.

Cost of Carbon (SCC) is a leading tool for quantifying the climate impacts of proposed federal actions. The SCC is an estimate, in dollars, of the long-term damage caused by a one ton increase in CO₂ emissions in a given year; or viewed another way, the benefits of reducing CO₂ emissions by that amount in a given year. It is intended to be a comprehensive estimate of climate change damages that includes, among other costs, the changes in net agricultural productivity, risks to human health, and property damages from increased flood risks. The method was initially designed for application in rulemakings, but the courts have recognized its applicability to NEPA analyses.⁸¹ The working group presented values for social costs from 2015 to 2050 that range from \$11 to \$212 (in 2007 dollars per metric ton of carbon dioxide)⁸² and could be used to monetize the costs imposed by the net greenhouse gas emissions that might eventually result from leasing. In addition, the EPA has developed a companion protocol called the Social Cost of Methane method, focusing on methane emissions. The 2010 SCM has been estimated to be between \$370 and \$2,400 per ton of methane in 2007 dollars.⁸³ The significantly higher social cost estimates for an additional ton of CH₄ relative to CO₂ is due to the significantly larger radiative forcing generated by this gas which has a global warming potential of between 28 and 86 times that of carbon dioxide. Together, these methods provide a way to quantify the costs of GHG emissions and present them to the public.

Recently, the Trump Administration proposed a revised method for calculating SCC and SCM. The new interim methodology relies on the flawed premise the scientifically accepted methodology previously developed overestimated the benefits of reducing GHG emissions. The revised methodology recommends that future damages be discounted using constant discount rates of 3 and 7%. This is a departure from the previous methodology which estimated SCC at a 2.5, 3 and the 5% discount rates. A higher discount rate leads to a lower SCC and a lower SCC suggests a lower value placed on preventing future damages. A 7% discount rate is far higher than 5% ceiling used previously and distorts the benefits associated with GHG reductions.

The revised methodology further undermines the benefits of GHG emission reductions by suggesting federal agencies consider only national, rather than global impacts associated with climate change, in addition to using higher discount rates. Under Scott Pruitt, the EPA now recommends taking 10% of the global approximation of climate change impacts and attributing them to the United States. There are several issues associated with using a domestic rather than global estimate of climate impacts. First, the majority of damages from US-borne CO₂ emissions accrue to non-US citizens, while the majority of damages borne by the United States come from emissions abroad, and it's imperative that a carbon accounting initiative incorporates the full extent of realized damages.⁸⁴ Additionally, a domestic value may fail to account for indirect impacts. As stated in a recent report by the National Academies of Sciences, "It is important to consider what constitutes a domestic impact in the case of a global pollutant that could have international implications that impact the United States."⁸⁵ For example, if the United States adopts a domestic social cost of carbon estimate for policymaking purposes, and that choice leads to greater global CO₂ emissions, the United States could be impacted beyond what the initial domestic analysis accounted for.⁸⁴ Finally, climate change is a global problem and will only be solved through coordination and international cooperation; domestic leadership is necessary for successful negotiations with other countries. A domestic SCC value does little good when attempting to rectify this international issue.

Since the benefits of fossil fuel production are regularly monetized in BLM's NEPA documents, it is critical that the impacts also be monetized. Federal agencies should use these values to quantify the costs of consuming the oil and gas that could be produced from any new leases. Such an exercise would significantly improve current agency analysis of climate impacts and assist the agencies in meeting their legal requirements.

81. See *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174 (D. Colo. 2014).

82. Interagency Working Group on Social Cost of Carbon, United States Government, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 at 2 (Aug. 2016 revision). Although President Trump directed the Office of Information and Regulatory Affairs to withdraw this metric, it remains the best available tool for complying with the legal requirement to analyze the effects of greenhouse gas emissions. See Exec. Order No. 13,783, 82 Fed. Reg. 16,093, 16,095-96 (Mar. 28, 2017) at 2-3.

83. Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. 2016. Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide. Available at: https://archive.epa.gov/epa/sites/production/files/2016-12/documents/addendum_to_sc-ghg_tsd_august_2016.pdf.

84. Wichman, C.J. (2017). The Strategic Costs of Carbon Emissions: Global versus Domestic Policy Considerations. Retrieved from <http://www.rff.org/research/publications/strategic-costs-carbon-emissions-global-versus-domestic-policy-considerations>.

85. National Academies of Sciences, Engineering, and Medicine. 2017. Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide. Washington, DC: The National Academies Press. doi: <https://doi.org/10.17226/24651>.

V. Conclusion

Any effort to seriously address U.S. GHG emissions and adhere to our domestic and international climate commitments necessitates a shift in the way we manage energy resources on our public lands. They account for a substantial portion of total U.S. energy production and GHG emissions. Moreover, the federal government, and more specifically DOI, have broad discretion and authority over the management of our public lands. The government is required to disclose the climate impacts of its energy program and to seek public input when making land use decisions. Addressing energy development on our public lands is the ideal place to start if we are going to meet the ambitious goals outlined above.

To date, the government has failed to effectively manage our public lands as part of the climate solution. The current planning, leasing and permitting processes all fail to adequately analyze potential emissions from federal energy development and the associated climate impacts. Additionally, the agencies responsible for tracking and disseminating information regarding federal energy production have fallen short in their efforts to collect the necessary data and provide it to the public in an accessible and transparent manner.

These failures have put the American public at risk both financially and physically. By investing public resources in the federal energy program, the government is banking on the continued demand for fossil fuels. Like a private energy corporation, this could lead to the incorrect pricing

or valuing of assets and a misallocation of capital. In this case, capital refers to the time, energy and expenditures associated with planning, leasing, permitting as well as the general operation of the federal energy program. Capital flows towards markets where risk is lowest and profit has the potential to be both sustainable and dependable. The threat of climate change has altered those markets. Capital once invested in the federal energy program may now yield better returns if invested in other areas. That includes supporting other uses of our federal lands, whether for recreation or renewable energy development. Unlike a private corporation however, the wrong decision impacts each and every American. Furthermore, continuing to produce fossil fuels from our federal lands at current levels will only exacerbate the impacts from climate change we have already begun to see in the United States which includes increased risk of flooding and forest fire, more intense and extended droughts, and an increase in the frequency and intensity of severe storms. This endangers property, livelihoods and lives.

The Wilderness Society will continue to advocate for the federal energy program to operate in line with the need to cut GHG emissions. Since the government has been unwilling to take the necessary steps to begin disclosing climate impacts and managing our federal lands accordingly we will do it for them. This information is a starting point for ensuring the public's energy assets are truly managed in the public interest.



© David Kingham, Flickr

Appendix

	Oil & Gas	Coal	GHG Emissions	Revenue
<p>Energy Information Administration (EIA)</p> 	<ul style="list-style-type: none"> • Historic oil and gas data including production, price, imports, exports, consumption, reserves and sales, etc... • Projections of price, production, supply and demand. Includes short-term energy outlooks (monthly) and long-term forecasts (Annual Energy Outlook). 	<ul style="list-style-type: none"> • Historic coal data including production, price, imports, exports, consumption, reserves and sales, etc... Interactive Coal Data Browser interface currently being built out. • Short-term energy outlooks published monthly, AEO published annually. 	<ul style="list-style-type: none"> • No regular updates provided. Most recent report released in 2011. Report series has been discontinued. 	None
<p>Bureau of Land Management (BLM)</p> 	<ul style="list-style-type: none"> • Oil and gas lease information including the number of active leases, the acreage in effect, the number of producing leases and the number of new leases issued updated annually. • Maintains a web based portal (ePlanning) that allows the public to track and review NEPA documentation for oil and gas projects on BLM lands as well as land use plan decisions. • The Legacy Rehost System (LR2000) is a searchable database for public reports on BLM land and mineral use authorizations, conveyances, mining claims, withdrawals and classifications. 	<ul style="list-style-type: none"> • Coal lease data from each successful lease sale since 1990 including, applicant, number of acres, estimated recoverable tons and the price the lease was sold for both as a price per ton and price per acre is updated annually and posted online. • More specific coal lease data is available via LR2000. 	Not actively monitored or recorded. NEPA documents associated with land use plans, lease sales or permit approvals may include estimated of potential emissions.	Coal and oil and gas lease sale results include the sale price of each parcel. No royalty or rental revenue publicly available.

	Oil & Gas	Coal	GHG Emissions	Revenue
<p>Bureau of Land Management (BLM)</p> 	<ul style="list-style-type: none"> • The National Fluid Lease Sale System, is a third-party system used to conduct lease sales online and provides real-time access to sales. • The Automated Fluid Minerals Support System (AFMSS2) and the Well Information System (WIS) are internal databases used by operators and the BLM to track oil and gas data, neither are publicly accessible. 			
<p>U.S. Forest Service (USFS)</p> 	Relies largely on BLM data and analysis. Forest plans may include a summary of energy potential and future management decisions.	Relies largely on BLM data and analysis. Forest plans may include a summary of energy potential and future management decisions.	NEPA documents may estimate potential GHG emissions from future development.	None
<p>Bureau of Ocean Energy Management (BOEM)</p> 	<ul style="list-style-type: none"> • Combined Leasing Reports released monthly include data on acres leased, number of leases and number of producing leases in each offshore region. • Resource Assessment Program identifies potential future plays on the OCS. • Reserves Inventory Program estimated remaining recoverable volumes in existing plays 	N/A	5-year plans evaluate potential emissions from offshore leasing decisions.	None

	Oil & Gas	Coal	GHG Emissions	Revenue
U.S. Geological Survey (USGS) 	Periodically updates its National Oil and Gas Assessment. Provides assessments of the oil and natural gas endowment of the United States, including assessments of potential in both conventional and unconventional plays as well as estimated technically recoverable volumes.	<ul style="list-style-type: none"> • “Coal Assessments” similar to those completed for oil and gas resources track recoverable coal and estimated reserves. • National Coal Resource Data System characterizes the location, quantity, and physical attributes and chemistry of U.S. coal and coal-related deposits. 	The agency often collaborates in studies of national GHG emissions but does not maintain a publicly accessible or searchable database.	None
Office of Natural Resources Revenue (ONRR) 	Tracks and maintains a database that includes total production, royalties collected and disbursements paid.	Tracks and maintains a database that includes total production, royalties collected and disbursements paid.	None	Tracks and maintains a database that includes total royalties collected and disbursements paid.
Mine Safety and Health Administration (MSHA) 	N/A	Mine Data Retrieval System provides data on specific mines including production totals. Limited to searching one mine at a time.	None	None

	Oil & Gas	Coal	GHG Emissions	Revenue
<p>Environmental Protection Agency (EPA)</p> 	None	None	<ul style="list-style-type: none"> • U.S. Greenhouse Gas Emissions and Sinks (GHGI) annual report provides a comprehensive accounting of total greenhouse gas emissions for all man-made sources in the United States. Tracks GHG emission trends and quantifies the U.S. contribution to climate change. • Greenhouse Gas Reporting Program (GHGRP) the largest greenhouse gas emissions sources in the United States to report emissions annually. Provides an estimate of emissions at the facility level that have already been released into the atmosphere, does not predict future emissions. 	None
<p>U.S. Extractive Industries Transparency Initiative (USEITI)</p> 	<p>Publishes data for federal and non-federal oil, gas, LNG and coal resources. Includes production volumes, non-tax revenue derived from federal production and federal disbursements of revenue showing where the money generated from non-tax revenue on federal lands goes.</p>	<p>Publishes data for federal and non-federal oil, gas, LNG and coal resources. Includes production volumes, non-tax revenue derived from federal production and federal disbursements of revenue showing where the money generated from non-tax revenue on federal lands goes.</p>	<ul style="list-style-type: none"> • None 	<p>Non-tax revenue derived from federal oil, gas and coal development including disbursements to states.</p>



Contact Alex Thompson

Communications Manager, Energy
alex_thompson@tw.s.org

The Wilderness Society
1615 M St. N.W.
Washington, D.C. 20036

(202) 833-2300
wilderness.org