



Measuring the climate impact of Trump's reckless leasing of public lands

Since January 2017, the Trump administration has overseen efforts to lease more public lands and waters for fossil energy development than any administration in history. As part of a coordinated effort to advance an agenda of “energy dominance,” the Department of the Interior has overhauled policies and regulations governing leasing and development of these lands in a way that clearly places fossil energy production first. These policies have made it cheaper and easier for fossil energy corporations to gain and hold control of public lands. And they have hidden from public view the implications of these decisions for taxpayers and the planet.

As the world works to respond to the dire warning issued last fall by the global climate science body about the pace and scale of greenhouse gas emissions declines needed to avoid catastrophic warming, the American public cannot even find reliable information about the greenhouse gas emissions and climate impacts of how their resources are being put to use.

This analysis seeks to pull the curtain back on this situation and shed light on the range of potential climate consequences of these leasing decisions.

Key Takeaways:

- The federal government cannot manage what it does not measure, yet the Trump administration is actively seeking to suppress disclosure of the full sweep of climate emissions from fossil energy leases.
- Under varying future market conditions, development of leases issued during the Trump administration has the potential to result in lifecycle emissions – those resulting from the extraction and end-use combustion of fossil fuels – ranging between 854 million and 4.7 billion metric tons (MT) of carbon dioxide equivalent (CO₂e). That equates to more than the total GHG emissions stemming from all 28 member countries of the European Union for an entire year.
- Taking into account the potency of shorter-lived climate pollutants like methane, lifecycle emissions resulting from the development of these leases could be as high as 5.2 billion MT CO₂e.
- These leasing decisions have significant and long-term ramifications for our climate and our ability to stave off the worst impacts of global warming. Emissions from public lands are expected to fall well short of the reductions target suggested by leading climate science, and this administration's leasing decisions are making that problem much worse.

Our public lands and waters are supposed to be managed in the public interest and should play a leading role in our fight against climate change. But under this administration, management decisions are only accelerating the climate crisis.

Background

The U.S. Federal Government is one of the largest energy asset managers in the world – responsible for over 2.4 billion acres of subsurface mineral rights, including resources like coal, crude oil, and natural gas.¹ In 2017, our public lands and waters produced 42% of total U.S. coal (362 million tons), 24% of total U.S. oil (812 million barrels) and 13% of total U.S. gas (4.3 trillion cubic feet).

The Department of the Interior (DOI) is charged with making decisions about how our public lands and waters are managed, including whether, when and where to lease lands to private companies for fossil energy development, including oil and gas. Since taking office, the Trump administration has offered close to 378 million acres of public lands and waters for oil and gas leasing from January 2017 through April 2019--more acreage than any other administration in history. This includes 18,051,312 million onshore acres and 359,537,572 offshore acres.

The federal government does not regularly track climate emissions associated with fossil energy development on public lands, nor has it ever set reduction goals for these emissions.

Previous analysis from TWS' Federal Lands Emissions Accountability Tool (FLEAT) modeling (confirmed by a 2018 report from the United States Geological Survey) found that the lifecycle emissions from the production and combustion of fossil fuels produced on public lands as a result of the federal leasing program are equivalent to over 20% of total U.S. GHG emissions.^{2 3}

The Trump administration is actively seeking to suppress disclosure of the full sweep of these emissions. Well-established scientific methods for estimating GHG emissions from lease development exist and have been applied by several BLM field offices to analyze the magnitude and severity of potential production and the resulting range of effects on climate change and the environment but is not in standard use at the agency. Rather, this administration is discouraging this type of analysis. In June 2019, Trump's Council on Environmental Quality (CEQ) released draft guidance on how federal agencies should consider GHG emissions under the National Environmental Policy Act (NEPA).⁴ This guidance essentially allows federal agencies to avoid fully estimating emissions for these leases, enables agencies to skirt accounting for the cumulative effects of emissions across permitted projects, and fails to encourage agencies to identify lower-emitting alternatives.

Recent court decisions have determined that federal agencies are legally required to include climate impacts of a proposed action such as a lease sale. Thanks to engagement from public interest organizations, judges across the country have ruled that the federal government bypassed NEPA when approving projects on public lands without fully disclosing the impact on

¹ TWS. "In The Dark: The hidden climate impacts of energy development on public lands." January 2018. Available at: https://www.wilderness.org/sites/default/files/media/file/In%20the%20Dark%20Report_FINAL_Feb_2018.pdf

² TWS. "Federal Lands Emissions Accountability Tool." Available at: <https://www.wilderness.org/articles/article/federal-lands-emissions-accountability-tool>

³ Merrill, M.D., Sleeter, B.M., Freeman, P.A., Liu, J., Warwick, P.D., and Reed, B.C., 2018, Federal lands greenhouse emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131, 31 p., Available at: <https://pubs.er.usgs.gov/publication/sir20185131>

⁴ FR, 2019. "Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions." Council on Environmental Quality. 84 Fed. Reg. 30097. 26 June 2019.

greenhouse gas emissions and climate.⁵ Nevertheless, agency attempts to comply with these directives have fallen well short of applying leading practices to this analysis, and agencies are not currently directed to make a decision in line with climate protection regardless of the results.

Analysis of Emissions from Trump Leases

In the absence of comprehensive emissions assessments of these actions by Interior, TWS conducted its own analysis in order to understand the range of potential climate consequences of these leasing decisions and how they may impact our ability to meet emissions reduction targets consistent with leading scientific consensus.

Methods

Our analysis evaluates the GHG emissions from parcels sold at lease sales held from January 2017 through April 2019. To determine emissions, we combined location-specific lease sale data with formation-specific assumptions used by the Energy Information Administration (EIA) to estimate potential production from the leased parcels,⁶ and then applied standard emission factors employed by the Environmental Protection Agency (EPA) to estimate GHG emissions resulting from these lease sales. We generated three development scenarios using assumptions underpinning the EIA's *Annual Energy Outlook 2019*. The authors employ a number of conservative assumptions in this analysis. Potential production and resulting emissions from these lease sales could very well be even higher than these estimates. Please see the technical appendix for a full description of the methods used in this analysis.

Findings

Since January 2017, the Trump administration has sold 3,899 parcels of public lands to oil and gas companies for development, including over 3 million acres onshore and over 4 million offshore acres.

⁵ Cases that have required federal agencies permitting fossil fuel extraction on public lands to consider the climate and GHG implications of the decision in their NEPA analyses include: *High Country Conservation Advocates v. U.S. Forest Service*, 52 F. Supp. 3d 1174 (D. Colo. 2014); *Montana Env'tl. Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074 (D. Mont. 2017); *Wild Earth Guardians v. BLM*, 870 F.3d 1222 (10th Cir. 2017); *Western Org. Res. Councils v. BLM*, 2018 U.S. Dist. LEXIS 48500 (D. Mont. Mar. 23, 2018); *Wild Earth Guardians v. Zinke*, 368 F. Supp. 3d 41 (D. D.C. 2019); and *Citizens for Clean Energy and The Northern Cheyenne Tribe v. U.S. Dep't of the Interior*, 2019 U.S. Dist. LEXIS 67259 (D. Mont., Apr. 19, 2019).

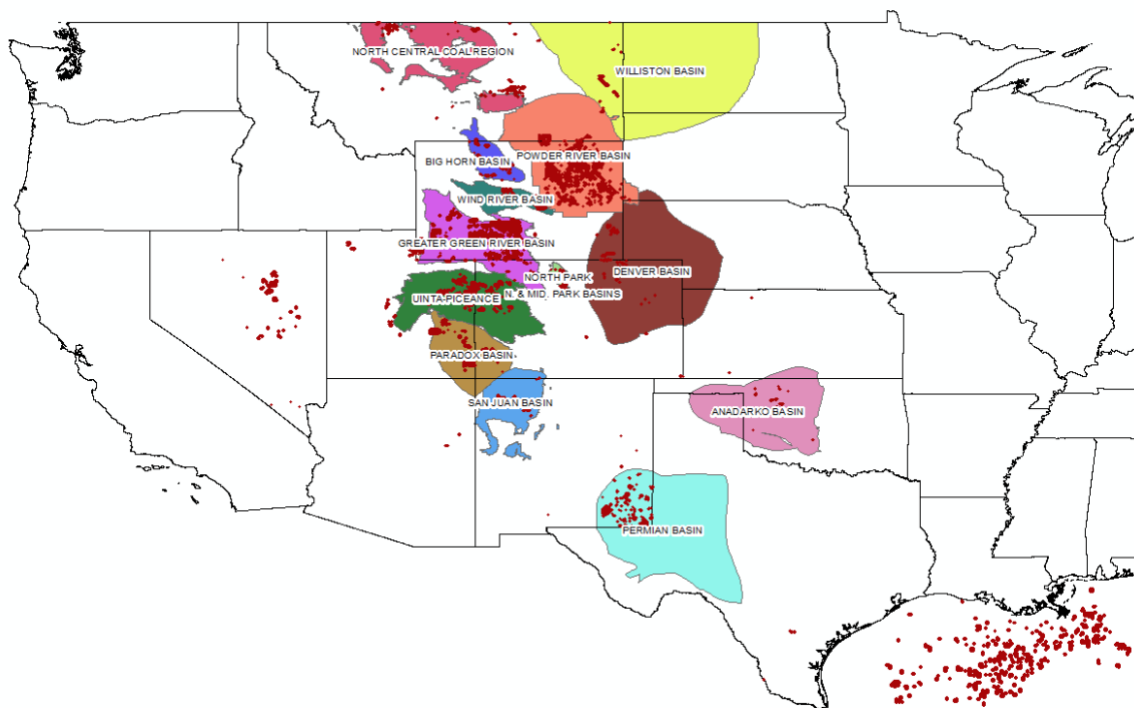
⁶ Using location-specific parameters is key to increasing the robustness of projected production estimates, and, thus, better-informed life cycle emissions analysis. Using information from a representative gas or oil well in these regions further simplifies the process for the federal government to estimate emissions potential from lease sales.

Figure 1. Federal oil and gas leases sold between January 2017 and April 2019.

Federal oil and gas competitive lease sales, January 2017-April 2019		
	# of parcels	# of acres
Wyoming	1,647	1,660,197
New Mexico (TX/OK/KS)	407	178,120
Utah	394	555,113
Montana/Dakotas	299	156,357
Colorado	221	171,228
Eastern States	94	9,470
Nevada	78	140,371
Alaska (north slope)	23	254,042
Arizona	2	3,040
Sum Onshore	3,165	3,127,938
Gulf of Mexico	720	4,071,303
Alaska (Cook Inlet)	14	76,615
Sum Offshore	734	4,147,918
Total Onshore and Offshore	3,899	7,275,856

TWS researchers found that over 85% of the lower-48 onshore acres leased under the Trump administration to date are located over five major basins (Greater Green River Basin, Powder River Basin, Uinta-Piceance, Paradox Basin, and Permian Basin). These basins are responsible for a large portion of the oil and gas production in the western US that occurs on public lands.

Figure 2. Federal oil and gas leases sold at auction between January 2017 and April 2019, overlaying major plays.



The potential climate impact of leasing decisions is significant. Looking at three production scenarios under varying future market conditions, TWS researchers found that development of these leases could result in lifecycle emissions between 854 million and 4.7 billion MT CO₂e (see Figure 3).⁷ Of these potential emissions, onshore leasing during this period accounts for roughly 56% of total estimated emissions (2.7 billion MT CO₂e) while offshore leasing accounts for 44% (2.1 billion MT CO₂e). (See Figure 4 for further breakdown by states and offshore regions.) High rates of development of these leases could result in lifecycle emissions that exceed the total GHG emissions stemming from all 28 member countries of the European Union for an entire year (over 4.7 billion MT CO₂e).⁸

Figure 3. Estimated lifecycle greenhouse gas emissions resulting from federal oil and gas lease sales under the Trump administration under varying development scenarios (Million MT of CO₂e)

	Low	Reference	High
Onshore	192	1,800	2,670
Offshore	663	1,240	2,059
Total	854	3,040	4,729

*Results show greenhouse gas emission estimates in Million metric tons of Carbon dioxide equivalent (CO₂e) using a GWP of 25 for a 100-year time horizon (IPCC AR4). Analysis includes onshore and offshore federal oil and gas leases sold between January 2017 and April 2019.

Figure 4. Estimated lifecycle greenhouse gas emissions of Trump federal oil and gas leases (MT CO₂e)

Lifecycle emissions of federal oil and gas competitive leases sold under Trump in a high development scenario (MT CO ₂ e)	
Utah	1,152,696,883
Wyoming	1,025,692,856
Colorado	184,466,350
New Mexico (TX/OK/KS)	114,531,427
Alaska	103,961,862
Montana/Dakotas	73,286,921
Nevada	8,951,459
Eastern States	6,088,867
Arizona	28,735
Sum Onshore	2,669,705,359
Gulf of Mexico	1,900,736,000
Alaska	158,748,000
Sum Offshore	2,059,484,000
Total Onshore and Offshore	4,729,189,359

⁷ Taking into account the potency of shorter-lived climate pollutants like methane, lifecycle emissions resulting from the development of these leases could be as high as 5.2 billion MT CO₂e.

⁸ WRI's Climate Analysis Indicators Tool (CAIT) standardizes historic country-level GHG emissions data for 186 countries. Source: CAIT Climate Data Explorer. 2017. Country Greenhouse Gas Emissions. Washington, DC: World Resources Institute. Available online at <https://www.climatewatchdata.org/ghg-emissions?sectors=410>

Even under a conservative “low-development scenario,” potential emissions of these leases sold so far under the Trump administration are equivalent to the total annual emissions from Germany (roughly 854 million MT CO₂e).

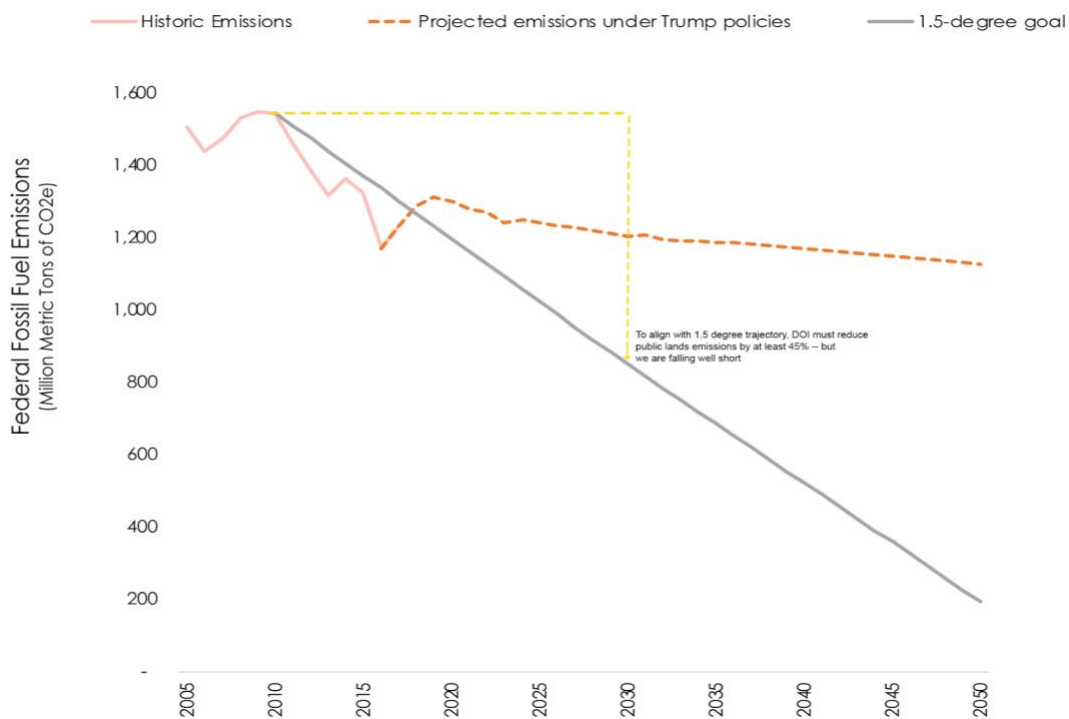
Discussion

The federal government has broad discretion over how our public lands and waters are put to use, but it cannot manage what it does not measure. Continuing to lease public lands and waters for oil and gas development without considering the climate impacts will make certain that we miss our emission reduction targets.

In its “Special Report” released in October 2018, the Intergovernmental Panel on Climate Change (IPCC) recommended reducing global emissions by at least 45% from a 2010 baseline by 2030 for a chance at limiting warming below 1.5 degrees Celsius above pre-industrial levels--the line in the sand to avoid catastrophic climate change.⁹

Applied to federal lands, our projections show that, at the current pace of leasing, emissions from the production and combustion of fossil fuels (oil, gas, and coal) sourced from public lands are projected to fall well short of this 2030 target.

Figure 6. Public lands emissions must be reduced by at least 45% from 2010 levels by 2030 and reach net zero by 2050 to be in line with the goal to limit warming below 1.5* Celsius



We must put in place a strategy to equitably manage a decline in emissions from public lands energy at or ahead of the pace demanded by current climate science. An essential first step in

⁹ IPCC, 2018. “Special Report on Global Warming of 1.5 °C.” (Intergovernmental Panel on Climate Change, 2018). Available at <https://www.ipcc.ch/sr15/>

that direction is calculating the range of emissions that could reasonably result from federal lease sales and requiring disclosure of annual emissions from public lands energy development. This administration's efforts to obscure these impacts from the public by ignoring well-established methods that have been employed by a number of federal agencies for over a decade can do great harm to future efforts to put in place such a system.

Moreover, seeing the federal government lease at this pace without regard for climate emissions limits sends chilling signals to the market and the public about the urgency of action to reduce carbon emissions. To stay on pace with the reductions demanded by climate science, we must reduce emissions by approximately 12.5 billion MT CO₂e by 2030. For comparison, the potential carbon emissions associated with the federal leases issued during just two years of the Trump administration represent around 38% of the burnable carbon allowed under a federal budget aligned with the 1.5-degree goal. That's atop the 62 million acres of onshore and offshore leases already issued. Racking up this kind of carbon debt will limit the decision space for future efforts to reduce emissions and make solutions more expensive.

We need a comprehensive climate plan for public lands to ensure these lands are a leading part of the climate solution. A key part of that plan is taking aggressive action to meaningfully reduce emissions from fossil energy development. The Department of the Interior has a number of tools at its disposal.¹⁰ These include drastically reducing needless methane pollution, eliminate production subsidies and loopholes for fossil energy, requiring developers to mitigate climate impacts, and managing a decline in leasing and production. Additionally, the federal government should invest in programs, incentives, and partnerships that promote responsible renewable energy and public land restoration to create new sustainable economic opportunities.

The management of these lands and mineral resources is entirely in the hands of our elected leaders and agency officials. As the largest single land holder and energy asset manager in the nation, the federal government must ensure our public lands and waters are managed for climate progress.

¹⁰ Nathan Ratledge, Steven J. Davis and Laura Zachary. "Public lands fly under the climate radar." *Nature Climate Change*. vol. 9:89-93. February 2019. Available at <https://www.nature.com/articles/s41558-019-0399-7>

Technical Appendix

The Department of the Interior provides federal onshore historic lease sales data in a geographic information system (GIS)-ready format through BLM's Navigator website along with detailed records of the lease locations using the Public Land Survey System.

To estimate per well direct emissions at the well site and to calculate future potential development the authors match geolocations of the lease parcels sold from January 2017 through April 2019 with major oil and gas formations (as shown in Figure 2).

To estimate the number of wells and associated oil and gas production volumes that could reasonably occur on these lease parcels for the reference scenario, the researchers use formation-specific factors from the EIA's National Energy Modeling System (NEMS) Oil and Gas Supply Module (OGSM). The main OGSM inputs include anticipated well densities, estimated ultimate recoveries (EUR) per well, and type curve analyses of existing wells in a region. The OGSM includes the latest sub-play specific factors to calculate basin specific EUR per well. These factors include the production profile of individual wells over time (initial production rates and the production decline curves for representative wells), the cost of drilling and operating those wells, and the revenues generated by those wells.

The authors use standard EPA-based calculation methods and emission factors to account for the reasonably foreseeable downstream emissions that would result from the processing, refining, and ultimate combustion of oil and gas. Anticipated production estimates are characterized by uncertainty due to a number of unknown future market conditions but are useful to understand the potential GHG emissions that could occur under a given range of possible prices of oil and technological progress that enable varying levels of development. The decision to drill in an area is highly dependent on the price of oil and the rate of technological improvements can have significant impact on the costs of development. Uncertainty is especially high in new geological emerging plays where relatively few wells have been previously drilled. To assess a range of development scenarios given future market uncertainties, the researchers also model high and low price/technology scenarios.

- The onshore reference "middle" scenario uses average regional well spacing and EUR per well from EIA's Assumptions to the Annual Energy Outlook (AEO) 2019: Oil and Gas Supply Module.
- For the onshore low scenario, the authors use a very conservative assumption that only one well will be drilled per parcel. On BLM managed lands, a lease is terminated if a lessee fails to produce oil and gas within 10 years. As such, assuming that any individual lease parcel will contain a minimum of one well is a fairly conservative assumption.
- Consistent with AEO 2019 High Oil and Gas Resource and Technology case, for the onshore high scenario the authors adjust resource assumptions using 50% higher EUR per well than the reference case to simulate more domestic crude oil production.
- In addition to the OGSM, for offshore, researchers use the production levels for the low, middle, and high oil price and technology scenarios used by BOEM for the 2017–2022 Program and 2012–2017 Program cases as derived from exploration and development (E&D) scenarios prepared by BOEM for Programmatic EIS documents.

This analysis covers the three major greenhouse gases associated with oil and gas systems: carbon dioxide, methane, and nitrous oxide. A highly potent greenhouse gas, methane emissions, cause around 1/4th of the impacts of a changing climate that we are currently experiencing today.

The authors use standard EPA assumptions regarding methane leakage rates from the oil and gas system. However, it is important to note that a number of studies have found that EPA (using industry self-reported emission rates) largely underestimates methane leakage, particularly for major oil fields such as those that overlay large swaths of public lands in the West.

Emissions are reported in units of carbon dioxide equivalent (CO₂e) using global warming potentials (GWP). TWS uses a GWP of 25 for methane from the IPCC Fourth Assessment Report (2007) based upon a 100-year time horizon in order to be consistent with the standard method used by the US government and to easily compare the range of foreseeable emissions resulting from these leases to other regional and federal emission estimates. Methane only lasts for about 13 years in the atmosphere, but the damage it causes is about 86 times greater than CO₂ when reporting over a shorter time period. These damages are irreversible and TWS promotes use of a 10-20-year time horizon to inform near-term actions regarding activities dealing with potent short-lived climate pollutants such as methane.

To estimate direct climate impacts from particular lease sales, the authors use per well emission factors for a representative horizontal oil and gas well in a region employed by BLM regional or field offices for RMP and EIS documents or based on estimates used in major research reports such as the Kleinfelder Report done for BLM in 2013. To simplify, the authors use direct emission factors from a "typical" horizontal oil and gas well for an onshore region. Presenting direct horizontal oil and gas wells emissions estimates represent a more conservative summary of emissions when compared to emissions from a vertical well.