

Director Neil Kornze
U.S. Department of the Interior
Bureau of Land Management
Mail Stop 2134 LM
1849 C St. NW., Washington, DC 20240

Attention: 1004-AE14

Dear Director Kornze,

The Center for Biological Diversity and Friends of the Earth hereby submit comments on the Bureau of Land Management's proposed regulations to reduce waste of natural gas from venting, flaring, and leaks during oil and natural gas production processes on onshore Federal and Indian oil and gas leases.

As an initial matter, we appreciate the BLM's long-overdue proposal to finally take action to begin to limit the damaging and unnecessary venting, flaring, and leakage of methane on public and tribal lands, both from new and existing oil and gas production infrastructure. The Mineral Leasing Act ("MLA"), 30 U.S.C. § 181 *et seq.*, imposes on BLM a simple, indisputable mandate: that the agency require operators to take all reasonable actions to prevent the waste of oil and gas. The Federal Land Policy and Management Act ("FLPMA"), 43 U.S.C. § 1701 *et seq.*, complements the MLA, mandating that the BLM prevent the unnecessary or undue degradation of public lands as well as protect the ecological, environmental, air, atmospheric, and other values of those lands. Yet despite these requirements, oil and gas operations on BLM lands currently result in the waste and leakage of significant volumes of natural gas.

As BLM acknowledges, methane is an extremely potent greenhouse gas ("GHG"), particularly in the short term. Given the urgent and acknowledged need to drastically reduce GHG emissions in the immediate future, BLM must not only take stronger steps to eliminate venting and leakage of methane from existing infrastructure and leases, but must also integrate consideration of the consequences of both methane venting leakage and downstream combustion into the processes of land use planning and future leasing.

Other comments address opportunities to achieve further reductions in venting, leakage, and wasteful flaring by eliminating exceptions to the proposed rule, increasing transparency, and internalizing at least some of the currently-externalized costs of oil and gas extraction through the royalty-setting process. These comments are focused particularly on the BLM's still-unmet need to integrate management of public lands oil and gas with the United States' domestic and international climate mitigation goals.

I. BLM Must Address the Most Current and Accurate Scientific Information Regarding Global Warming Potential

As an initial matter, BLM's proposed rule improperly applies an unjustifiably low estimate of the radiative forcing potential of vented or leaked methane. BLM states that "Methane is an especially powerful greenhouse gas (GHG), with climate impacts roughly 25 times those of CO₂, if measured

over a 100-year period, or 86 times those of CO₂, if measured over a 20-year period.”¹ The very same IPCC summary of greenhouse gas potentials, however, makes clear that, once climate-carbon feedbacks for non-CO₂ gases such as methane are considered, the global warming potential of fossil methane is 36 times that of CO₂ over 100 years, and 87 times that of CO₂ over 20 years.² One of the IPCC Fifth Assessment Report’s (“AR5”) breakthrough insights is the discovery of a fundamental flaw in previous calculations of GWP: the climate effect of CO₂ intrinsically includes carbon cycle feedbacks, but the GWPs of other greenhouse gases do not.³ Thus, to compare “apples to apples,” it is necessary to include these feedbacks in the estimates of all greenhouse gas emissions. Once climate-carbon feedbacks are incorporated for methane as well as for carbon dioxide, its warming potential, particularly over the 100-year time period, are over three times greater than BLM assumes.

We further note BLM’s acknowledgment that “studies and alternative sources of data suggest that the BLM’s estimates of lost gas likely underestimate, and potentially substantially underestimate, the extent of the problem.”⁴ BLM should update its analysis to reflect the fact that several peer-reviewed scientific studies suggest that methane leakage from natural gas systems could be as much as double what EPA’s GHG Inventory, relied upon by BLM, assumes.⁵

II. Any New Federal Oil and Gas Leasing Is Incompatible With U.S. Climate Goals

The proposed rule, however, ignores the larger issue that continued public lands oil and gas leasing, even with improved controls on leakage, venting, and flaring, is fundamentally incompatible with the United States’ climate goals, and leads to damaging and unnecessary investment in fossil fuel infrastructure incompatible with averting the worst effects of climate change.

On December 12, 2015, nearly 200 governments, including the United States, agreed to the commitments enumerated in the Paris Agreement to “strengthen the global response to the threat of climate change”⁶ The Paris Agreement codified the international consensus that the climate crisis is an urgent threat to human societies and the planet, with the parties recognizing that:

Climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all

¹ Proposed Rule at 5 & n.3 (citing Intergovernmental Panel on Climate Change, Climate Change 2013: The Physical Science Basis, Chapter 8, *Anthropogenic and Natural Radiative Forcing*, at 714 (Table 8.7), available at https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf)

² IPCC AR5 Physical Science Basis at 714 & Table 8.7

³ *Id.* at 713.

⁴ Proposed Rule at 71.

⁵ See, e.g., D. R. Caulton et al., *Toward a Better Understanding and Quantification of Methane Emissions from Shale Gas Development*, PROC. NATL. ACAD. SCI. DOI 10.1073/pnas.1316546111 (2014), available at <http://www.pnas.org/content/111/17/6237.full.pdf+html>; S. M. Miller et al., *Anthropogenic Emissions of Methane in the United States*, PROC. NATL. ACAD. SCI. 100, 20018 (2013), available at <http://www.pnas.org/content/110/50/20018.full.pdf+html>; G. Pétron et al., *Hydrocarbon Emissions Characterization in the Colorado Front Range: A pilot study*, J. GEOPHYS. RES. 117, D04304 (2012), available at <http://onlinelibrary.wiley.com/doi/10.1029/2011JD016360/full>; R. W. Howarth et al., *Methane and the Greenhouse Gas Footprint of Natural Gas from Shale Formations*, CLIMATIC CHANGE DOI 10.1007/s10584-011-0061-5 (2011), available at <http://link.springer.com/article/10.1007%2Fs10584-011-0061-5>.

⁶ Paris Agreement, Art. 2(1).

countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions (emphasis added).⁷

Numerous authoritative scientific assessments have established that climate change is causing grave harms to human society and natural systems, and these threats are becoming increasingly dangerous. The Intergovernmental Panel on Climate Change, in its 2014 Fifth Assessment Report, stated that: “[w]arming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased” and that “[r]ecent climate changes have had widespread impacts on human and natural systems.”⁸

The United States’ 2014 Third National Climate Assessment, prepared by a panel of non-governmental experts and reviewed by the National Academy of Sciences and multiple federal agencies similarly stated “[t]hat the planet has warmed is ‘unequivocal,’ and is corroborated through multiple lines of evidence, as is the conclusion that the causes are very likely human in origin”⁹ and “[i]mpacts related to climate change are already evident in many regions and are expected to become increasingly disruptive across the nation throughout this century and beyond.”¹⁰ The United States National Research Council similarly concluded that: “[c]limate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems.”¹¹

The IPCC and National Climate Assessment further decisively recognize the dominant role of fossil fuels in driving climate change:

While scientists continue to refine projections of the future, observations unequivocally show that climate is changing and that the warming of the past 50 years is primarily due to human-induced emissions of heat-trapping gases. These emissions come mainly from burning coal, oil, and gas, with additional contributions from forest clearing and some agricultural practices.¹²

...

CO₂ emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG emission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period (*high confidence*).¹³

⁷ Paris Agreement, Decision, Recitals.

⁸ IPCC AR5 Synthesis Report at 2.

⁹ Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (U.S. Global Change Research Program). doi:10.7930/J0Z31WJ2 (Third National Climate Assessment) at 61 (quoting IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller, Eds., Cambridge University Press, 1-18.).

¹⁰ Third National Climate Assessment at 10.

¹¹ National Research Council, *Advancing the Science of Climate Change* (2010), available at www.nap.edu. (“Advancing the Science of Climate Change”) at 2.

¹² Third National Climate Assessment at 2.

¹³ IPCC AR5 Synthesis Report at 46.

These impacts of fossil fuels are harming the United States in myriad ways, with the impacts certain to worsen over the coming decades absent deep reductions in domestic and global GHG emissions. EPA recognized these threats in its 2009 Final Endangerment Finding under Clean Air Act Section 202(a), concluding that greenhouse gases endanger public health and welfare: “the body of scientific evidence compellingly supports [the] finding” that “greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare.”¹⁴

Immediate and aggressive greenhouse gas emissions reductions are necessary to limit warming to a 1.5°C rise above pre-industrial levels. Put simply, there is only a finite amount of CO₂ that can be released into the atmosphere without rendering the goal of meeting the 1.5°C (or even a 2°C) target virtually impossible. Globally, proven fossil fuel reserves, let alone additional recoverable resources,¹⁵ if extracted and burned, would release enough CO₂ to exceed this limit several times over.¹⁶ Consequently, the vast majority of fossil fuels must remain in the ground. The physical question of what amount of fossil fuels can be extracted and burned without negating a realistic chance of meeting a 1.5°C or even 2°C target is relatively easy to answer. The Fifth Assessment Report of the International Panel on Climate Change (IPCC) and other expert assessments have established global carbon budgets, or the total amount of remaining carbon that can be burned while maintaining some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO₂ must remain below about 1,000 gigatonnes (GtCO₂) from 2011 onward for a 66% probability of limiting warming to 2°C above pre-industrial levels.¹⁷ The Paris Agreement aim of limiting the

¹⁴ Final Endangerment Finding, 74 Fed. Reg. at 66,497.

¹⁵ According to the Congressional Research Service, “[p]roved reserves are those amounts of oil, natural gas, or coal that have been discovered and defined at a significant level of certainty, typically by drilling wells or other exploratory measures, and which can be economically recovered. In the United States, proved reserves are typically measured by private companies, who report their findings to the Securities and Exchange Commission because those reserves are considered capital assets. Because proved reserves are defined by strict rules, they do not include all of the oil or gas in a region, but only those amounts that have been carefully confirmed. . . . Undiscovered resources are amounts of oil and gas estimated to exist in unexplored areas. Estimates of undiscovered resources for the United States are made by the U.S. Geological Survey for resources on land, and by the Bureau of Ocean Energy Management Regulation and Enforcement (formerly the Minerals Management Service) [now simply the Bureau of Ocean Energy Management] for resources offshore. These assessments are based on observation of geological characteristics similar to producing areas and many other factors. Reported statistics for undiscovered resources may vary greatly in precision and accuracy (determined retrospectively), which are directly dependent upon data availability, and their quality may differ for different fuels and different regions.” Whitney, Gene *et al.*, Cong. Research Serv., R40872, U.S. Fossil Fuel Resources: Terminology, Reporting and Summary 4-5 (2010).

¹⁶ See, e.g., IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at 64 & Table 2.2 [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)] at 63-64 & Table 2.2. (“IPCC AR5 Synthesis Report”); Marlene Cimons, Keep It In the Ground 6 (Sierra Club *et al.*, Jan. 25, 2016).

¹⁷ IPCC, 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change; Summary for Policymakers at 27 (“IPCC AR5 Physical Science Basis”). See also IPCC AR5 Synthesis Report at 63-64 & Table 2.2. Higher probabilities of success require stricter carbon limits; to have an 80% probability of staying below the 2°C target, the budget from 2000 is 890 GtCO₂, with less than 430 GtCO₂ remaining. See Meinshausen, M. *et al.*, Greenhouse gas emission targets for limiting global warming to 2 degrees Celsius, 458 Nature 1158–1162 (2009) (“Meinshausen *et al.* 2009”) at 1159; Carbon Tracker Initiative, Unburnable Carbon – Are the world’s financial markets carrying a carbon bubble? available at <http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>.

temperature increase to 1.5°C requires a more stringent carbon budget of only 400 GtCO₂ from 2011 onward (of which more than 100 GtCO₂ has already been emitted)¹⁸ for a 66% probability of limiting warming to 1.5°C above pre-industrial levels.¹⁹ Increasing the odds of meeting these targets requires meeting even stricter carbon budgets.²⁰ Given that global CO₂ emissions in 2014 alone totaled 36 GtCO₂,²¹ humanity is rapidly consuming the remaining burnable carbon budget needed to have even a 66% chance of meeting the 1.5°C temperature limit.

For the world to stay within a carbon budget consistent with a 1.5°C temperature limit, significant fossil fuels around the world need to be left in the ground. The United States alone contains enough recoverable fossil fuels, split about evenly between federal and non-federal resources, that if extracted and burned, would approach the entire global carbon budget for a 2°C target, and exceed the remaining budget for a 1.5°C limit.²² Clearly, even if the rest of the world somehow reduced its carbon emissions to near zero, the United States still could not safely burn all of its own fossil fuel resources. The majority of United States fossil fuels simply must be kept in the ground.

Two recent studies estimated that global oil, gas, and coal resources considered currently economically recoverable contain potential greenhouse gas emissions estimated at 2,900 GtCO₂²³ and 4196 GtCO₂²⁴ respectively. Other sources estimate even greater global fossil fuel reserves at 3,677 to 7,120 GtCO₂.²⁵ When considering all fossil fuel resources (defined as those recoverable over all time with both current and future technology irrespective of current economic conditions), potential combustion emissions have been estimated at nearly 11,000 GtCO₂²⁶ upwards to 31,353 and 50,092 GtCO₂.²⁷

Even the lowest of these estimates (2,900 GtCO₂) is more than three times greater than the most generous carbon budget nominally consistent with a 2°C temperature limit (~900 GtCO₂), while the largest (50,092 GtCO₂) is over 160 times greater than the remaining budget for a 66% probability of not exceeding a 1.5°C limit (<300 GtCO₂).

As stated by one study, “the disparity between what resources and reserves exist and what can be

¹⁸ From 2012-2014, 107 GtCO₂ was emitted (*see* Annual Global Carbon Emissions at <http://co2now.org/Current-CO2/CO2-Now/global-carbon-emissions.html>). Given additional emissions in 2015, the remaining carbon budget for 1.5°C would now be well below 300 GtCO₂ (approximately 450 Gt CO₂e).

¹⁹ IPCC AR5 Synthesis Report at 64 & Table 2.2.

²⁰ *See* Meinshausen *et al.* at 1159; Carbon Tracker Initiative 2013, Unburnable Carbon.

²¹ *See* Global Carbon Emissions, <http://co2now.org/Current-CO2/CO2-Now/global-carbon-emissions.html>.

²² *See* Mulvaney, Dustin *et al.*, The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels 4 (EcoShift Consulting 2015).

²³ McGlade and Ekins at 187-192.

²⁴ Raupach, M. *et al.*, Sharing a quota on cumulative carbon emissions. 4 Nature Climate Change 873-879 (2014) at Figure 2.

²⁵ IPCC, 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at Table 7.2 [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. (“IPCC AR5 Mitigation of Climate Change”)

²⁶ McGlade and Ekins at 188.

²⁷ IPCC AR5 Mitigation of Climate Change at Table 7.2.

emitted while avoiding a temperature rise greater than the agreed 2C limit is therefore stark.”²⁸ Another recent report on global carbon reserves found that:

The reserves of coal, oil and natural gas outlined in this report contain enough carbon to rocket the planet far beyond the 2 °C limit. Warming from fossil fuels puts other carbon sinks at risk. As permafrost melts and peat bogs dry, they emit enormous quantities of carbon dioxide, furthering a chain reaction where the release of carbon results in a warmer world, which in turn releases more carbon.²⁹

While global carbon budgets provide a straightforward and relatively objective framework for determining the total *amount* of fossil fuels that can be combusted consistent with pathways to meeting our climate targets, the question of what level of risk of not meeting the target is acceptable, along with the questions of *which* fossil fuels can be burned and by *whom*, are inherently political and ethical questions. But, under *any* formulation, the vast majority of United States fossil fuels, must stay in the ground if we are to have any realistic hope of staying below 1.5°C, or even 2°C of warming.

A recent detailed analysis found that the United States alone contains enough recoverable fossil fuels, split about evenly between federal and non-federal resources, which if extracted and burned, would generate enough greenhouse emissions (median estimate 840 GtCO₂e) to consume more than half the entire global carbon budget for a 2°C target (~900 GtCO₂, equivalent to ~1350 GtCO₂e), and greatly exceed the remaining budget for a 1.5°C target (~300 GtCO₂ equivalent to ~450 GtCO₂e).³⁰ Clearly, even if the rest of the world somehow reduced its carbon emissions to near zero, the United States still could not safely burn all of its own fossil fuels. This analysis highlights the impossibility of reconciling continued leasing of federal fossil fuels with a pathway to keeping warming from exceeding 1.5°C. Total remaining fossil fuel resources in the United States, including both federal and non-federal resources, are estimated to equate to 697 to 1070 GtCO₂e of emissions.³¹ Federal fossil fuels represent about half (46-50%) of that total at between 349 and 492 GtCO₂e of potential emissions,³² and the vast majority (91%) of federal fossil fuels are still unleased.³³ Overall the potential greenhouse gas emissions of unleased federal fossil fuel resources are enormous, estimated at 319 to 450 GtCO₂e. In other words, unleased federal fossil fuels, if extracted and burned, would consume between 70 and 100% of a *global* budget of 300 GtCO₂ (equivalent to ~450 GtCO₂e), the amount remaining at the start of 2015 under a budget scenario that itself has only a 66% chance of limiting temperature increase to 1.5°C.

²⁸ McGlade and Ekins at 188.

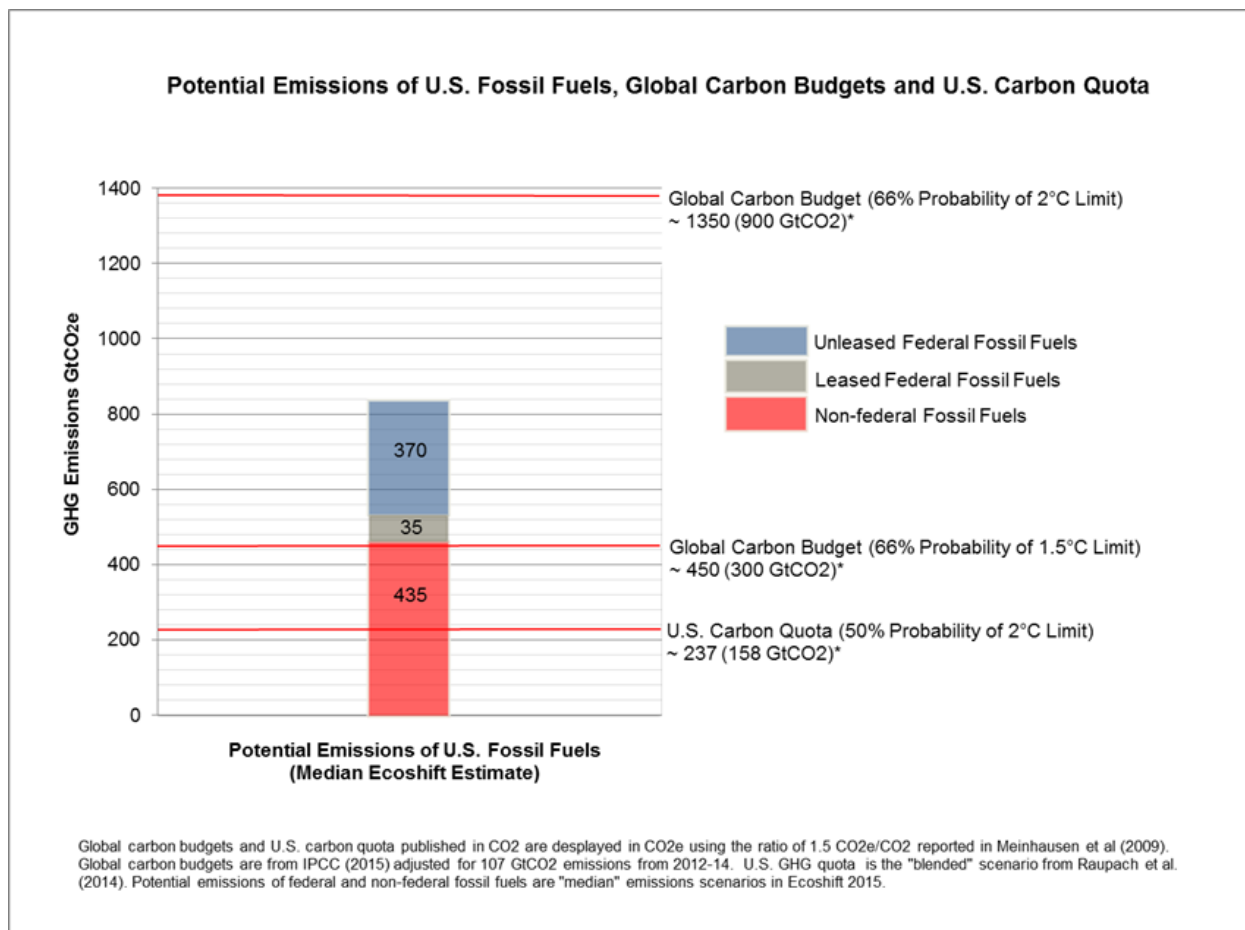
²⁹ Cimons at 6.

³⁰ See Mulvaney *et al.* at 4. Using a metric of CO₂e (which also includes conservative estimates for the radiative forcing potential of non-CO₂ greenhouse gases such as methane, compare Mulvaney *et al.* at Table A12 with IPCC AR5 Physical Science Basis at 714 & Table 8.7), this study calculated that extraction and combustion of total U.S. recoverable fossil fuels would produce 697 to 1070 GtCO₂e of emissions, with a median estimate of 840 GtCO₂e. To compare these emissions to the global carbon budgets for 1.5°C and 2°C, we converted these carbon budgets from to GtCO₂ to GtCO₂e by applying a conversion factor of 1 GtCO₂ = 1.5 GtCO₂e based on Table 1 in Meinshausen *et al.* 2009.

³¹ Mulvaney *et al.* 19 Table 2.

³² *Id.* at 18.

³³ *Id.*



As described above and illustrated in Figure 1, United States resources greatly exceed the *entire* global budget for a 66% chance of limiting warming to 1.5°C. Emissions from use of the median estimate of non-federal fossil fuels (435 GtCO₂e) themselves would use up almost the entire global budget, while unleased fossil fuels alone (370 GtCO₂e) would utilize over 80% of that budget. Even under a carbon budget in which great risk to human health, prosperity, and stability and the planet's natural systems is tolerated (only 50% chance of staying below 2°C) the United States still cannot utilize the entirety of its non-federal fossil fuel resources, much less those under direct federal control. Because decisions as to whether or not these non-federal fossil fuels are developed are in part beyond direct federal management under existing law,³⁴ and therefore they are more likely to be developed, it is difficult to formulate a scenario that leaves room for any significant new development of federal fossil fuels.³⁵

³⁴ While the federal government may lack direct land management authority as to whether non-federal fossil fuels are extracted, the federal government does have significant authority under the Clean Air Act and other statutes to dictate if and how they are combusted. Still, oversight and control of federal fossil fuels is inherently greater than for the non-federal estate.

³⁵ Because any reasonable carbon budget necessarily limits future development to a small portion of even existing declared, proven fossil fuel reserves, such budgets render completely superfluous the further exploration of recoverable resources to establish additional proved reserves. See IPCC AR5 Synthesis Report at 64 & Table 2.2; Cimons at 5-6. Under any pathway to 1.5° or even 2°C, new reserves that could be established by leasing and exploration of additional resources are simply unburnable.

Staying within a carbon budget compatible with a 1.5°C target will necessitate leaving most fossil fuels undeveloped. Unleased offshore oil and gas resources are the easiest of such resources to withdraw from availability, given the clear authority of the President to withdraw submerged lands from availability at any time.³⁶ Importantly, new federal fossil leases are unnecessary to manage a prompt, just, and orderly transition to a 100% renewable energy economy in the United States. There is already more than sufficient non-federal coal, oil, and gas to exceed even the largest conceivable domestic carbon budget.³⁷ The ultimate success or failure of the United States' and global community's climate mitigation efforts depends in large part on whether countries are willing and able to leave the majority of their fossil fuel deposits in the ground. When considering the climate consequences of federal oil and gas operations, the most straightforward and effective alternative involves not only reduction of venting, leakage, and waste on existing leases, but also cessation of new fossil fuel leasing.

³⁶ See 43 U.S.C. §§ 1332, 1341(a).

³⁷ Mulvaney *et al.* at 6 & Figure 2; *see also* Raupach *et al.*, Supplementary Figure 7; McGlade and Ekins, 189 Table 1. This Petition cites Raupach and McGlade and Ekins's studies on U.S. emissions quotas for illustration purposes only; this Petition does not endorse equity assumptions made therein.