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Submitted to: BLM_WO_Coal_Program_PEIS_Comments@blm.gov

Re: Scientists Support Ending Coal Leasing on Public Lands to Protect the Climate, Public Health, and Biodiversity

We are scientists writing to urge the Department of the Interior to take meaningful action to fight climate change by ending federal coal leasing, extraction, and burning. The vast majority of known coal in the United States must stay in the ground if the federal coal program is to be consistent with national climate objectives and be protective of public health, welfare, and biodiversity.

The United States has committed to the climate goal of holding the increase in the global average temperature to “well below 2°C above pre-industrial levels” and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels under the Paris Agreement.¹ Human-caused climate change is already causing widespread damage from intensifying global food and water insecurity, the increasing frequency of heat waves and other extreme weather events, inundation of coastal regions by sea level rise and increasing storm surge, the rapid loss of Arctic sea ice, increasing species extinction risk, and the worldwide degradation of coral reefs. Limiting further temperature rise is needed to prevent increasingly dangerous and potentially irreversible impacts.² However, current climate policy and emissions reduction pledges in the United States and globally are not sufficient to achieve a 1.5°C or 2°C limit, and stronger action to reduce greenhouse gas emissions is urgently needed.³

According to a large body of scientific research, holding temperature rise to “well below 2°C” requires that the vast majority of global and US fossil fuels stay in the ground.⁴ Effectively, this means that fossil fuel emissions must be phased out globally within the next few decades.⁵ The global carbon budget — the remaining amount of carbon that can be released to the atmosphere before we lose any reasonable chance of holding global temperature increase well below 2°C —

is extremely limited and is rapidly being consumed by continued fossil fuel use.⁶ The United States alone has enough recoverable fossil fuels, split about evenly between federal and non-federal resources, that if extracted and burned, would exceed the global carbon budget for a 1.5°C limit, and would consume nearly the entire global budget for a 2°C limit.⁷ The unleased federal coal resource alone is estimated at 212 GtCO_{2e}, or almost two-thirds of the remaining global carbon budget for a reasonable probability of limiting warming to 1.5°C.⁸

In the United States, coal is the largest and most carbon dioxide-intensive conventional fossil fuel resource,⁹ with federal coal comprising approximately 41% of total US coal production.¹⁰ Coal mining contributes substantial additional methane emissions.¹¹ Mitigation pathways for holding temperature rise well below 2°C mandate a rapid phase-out of coal emissions.¹² For example, a recent study estimates that 95% of US coal reserves, including both federal and non-federal coal, must remain unburned to preserve a reasonable probability of remaining below 2°C.¹³ Coal mining, transport, combustion, disposal, and cleanup also have significant external costs on public health and the environment.¹⁴

A near-term phase-out of federal coal is also critical because new leasing locks in investment and high-carbon infrastructure for mining, transport, and coal combustion, all of which is inconsistent with the pressing need to end fossil fuel emissions.¹⁵ A rapid end to federal coal extraction would send an important signal internationally and domestically to markets, utilities, investors and other nations that the United States is committed to upholding its climate obligation to limit temperature rise to well below 2°C.

The science is clear: to satisfy our commitment under the Paris Agreement to hold global temperature increase well below 2°C, the United States must keep the vast majority of its coal in the ground. We urge you to end federal coal leasing, extraction and burning in order to advance U.S. climate objectives and protect public health, welfare and biodiversity.

Respectfully signed,

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References

¹ The Paris Agreement, which was adopted at the 2015 United Nations Framework Convention on Climate Change Conference of the Parties and signed by the United States in April 2016, commits all signatories to “[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.” See Paris Agreement at Article 2, Section 1(a), <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

² 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 65, Box 2.4, Figure 2.5, https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf; U.N. Framework Convention on Climate Change. 2015. Subsidiary Body for Scientific and Technical Advice. Report on the Structured Expert Dialogue on the 2013-15 Review, No. FCCC/SB/2015/INF.1, at 15-16, 30-32, <http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf>; Schleussner, C-F. et al. 2016. Differential climate impacts for policy-relevant limits to global warming: the case of 1.5°C and 2°C. *Earth System Dynamics* 7: 327-351.

³ Climate Action Tracker ranks the United States INDC (intended nationally determined contribution) submitted to the UNFCCC as “not yet consistent with limiting warming to below 2°C unless other countries make much deeper reductions and comparably greater effort than the USA.” Climate Action Tracker finds that current US climate policy is insufficient to meet the US INDC. See <http://climateactiontracker.org/countries/usa.html>

Analyses of the aggregate effect of national climate pledges (INDCs or intended nationally determined contributions) submitted to the UNFCCC under the Paris Agreement estimate a 2.7 to 3.7°C temperature rise above pre-industrial levels. See Rogelj, J. et al. 2016. Paris Agreement climate proposals need a boost to keep warming well below 2°C. *Nature* 534: 631-639; UNEP. 2015. The Emissions Gap Report 2015. United Nations Environment Programme (UNEP), Nairobi, http://uneplive.unep.org/media/docs/theme/13/EGR_2015_301115_lores.pdf; Climate Action Tracker. 2015. 2.7°C is not enough – we can get lower, <http://climateactiontracker.org/news/253/Climate-pledges-will-bring-2.7C-of-warming-potential-for-more-action.html>; Climate Interactive. 2015. Climate Scoreboard: UN Climate Pledge Analysis, <https://www.climateinteractive.org/programs/scoreboard/>

⁴ Global fossil fuel reserves, not including the larger pool of recoverable resources, if extracted and burned, would exceed the allowable carbon budget for a 2°C limit several times over. The IPCC estimates that global fossil fuel reserves exceed the remaining carbon budget for staying below 2°C by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. See Bruckner T. et al. 2014. 2014: Energy Systems. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, at Table 7.2, http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf

To limit temperature rise to 2°C based on a 1,000 GtCO₂ carbon budget from 2011 onward, other studies indicate variously that 80% (Carbon Tracker Initiative 2013), 76% (Raupach et al. 2014), and 66% (McGlade and Elkins 2015) of global fossil fuel reserves must stay in the ground. See Carbon Tracker Initiative. 2013. Unburnable Carbon – Are the world’s financial markets carrying a carbon bubble?, <http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>; Raupach, M. et al. 2014. Sharing a quota on cumulative carbon emissions. *Nature Climate Change* 4: 873-879; McGlade, C. and Elkins P. 2015. The geographical distribution of fossil fuels unused when limiting global warming to 2°C. *Nature* 517: 187-192.

For the United States, Raupach et al. (2014) provide a mid-range estimate of the U.S. carbon quota of 158 GtCO₂ for a 50% chance of staying below 2°C, using a “blended” scenario of sharing principles for allocating the global carbon budget among countries. This study estimates US fossil fuel reserves at 716 GtCO₂, of which coal comprises the vast majority, indicating that most fossil fuel reserves in the US must remain unburned to meet a well below 2°C carbon budget. See Supplementary Figure 7 in Raupach, M. et al. 2014. Sharing a quota on cumulative carbon emissions. *Nature Climate Change* 4: 873-879.

⁵ Holding temperature rise well below 2°C means that global fossil fuel emissions must end almost entirely by mid-century. Rogelj et al. (2015) estimated that a reasonable likelihood of limiting warming to 1.5° or 2°C requires global CO₂ emissions to be phased out by mid-century and likely as early as 2040-2045. See Rogelj, J. et al. 2015. Energy system transformations for limiting end-of-century warming to below 1.5°C. *Nature Climate Change* 5: 519-528.

⁶ According to the IPCC, total cumulative anthropogenic CO₂ emissions must remain below ~1,000 GtCO₂ from 2011 onward for a 66% probability of limiting warming to 2°C above pre-industrial levels, and 400 GtCO₂ from 2011 onward for a 66% probability of limiting warming to 1.5°C above pre-industrial levels. See IPCC AR5 Synthesis Report at 63-64 & Table 2.2. These carbon budgets have been reduced to 850 GtCO₂ and 240 GtCO₂, respectively, from 2015 onward. See Table 2 in Rogelj, J. et al. 2016. Differences between carbon budget estimates unraveled. *Nature Climate Change* 6: 245-252. Current global emissions of ~36 GtCO₂ are rapidly consuming this budget.

⁷ Mulvaney, D. et al. 2015. The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, EcoShift Consulting, at 4, <http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf>

⁸ *Id.* at 5. The remaining carbon budget for a 66% probability of limiting warming to 1.5°C and 2°C above pre-industrial is 240 GtCO₂ and 850 GtCO₂, respectively, from 2015 onward, equivalent to ~334 GtCO₂e and ~1180 GtCO₂e (gigatonnes CO₂ equivalent) based on the ratio of 1.39 CO₂e/CO₂ from Meinshausen et al. (2009). [See Meinshausen, M. et al. 2009. Greenhouse gas emission targets for limiting global warming to 2 degrees Celsius. *Nature* 458: 1158–1162.] 212 GtCO₂e comprises 63% of a 334 GtCO₂e budget and 18% of an 1180 GtCO₂e budget.

⁹ The Department of Interior’s fossil fuel leasing program contributes about one-quarter of all US fossil fuel emissions, with 14% of US emissions coming from the federal coal program. See Climate

Accountability Institute. 2015. Memorandum from Richard Heede to Friends of The Earth and Center for Biological Diversity, at http://webiva-downton.s3.amazonaws.com/877/3a/7/5721/Exhibit_1-1_ONRR_ProdEmissions_Heede_7May15.pdf; Stratus Consulting. 2014. Greenhouse Gas Emissions from Fossil Energy Extracted from Federal Lands and Waters: An Update, at 13, <http://wilderness.org/sites/default/files/Stratus-Report.pdf>

Coal combustion emits 40% more carbon dioxide than natural gas and 20% more than oil for the same amount of heat energy. When methane emissions are included, the greenhouse gas footprint of natural gas and particularly shale gas can exceed that of coal when considered over the time scale of 20 years after emission. Because carbon dioxide will influence our climate for centuries to come, it is essential to rapidly reduce carbon dioxide emissions.

¹⁰ BLM. 2016. Notice of Intent To Prepare a Programmatic Environmental Impact Statement To Review the Federal Coal Program and To Conduct Public Scoping Meetings. Federal Register 81: 17720-17728; U.S. Energy Information Administration. 2014. Sales of Fossil Fuels Produced from Federal and Indian Lands, FY 2003 through FY 2013, at Table 1, <http://www.eia.gov/analysis/requests/federallands/pdf/eia-federallandsales.pdf>

¹¹ U.S. Environmental Protection Agency. 2016. Inventory of Greenhouse Gas Emissions and Sinks: 1990-2014, April 15, 2016, at ES-6, <https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport.html>

¹² McGlade, C. and P. Ekins. 2015. The geographic distribution of fossil fuels unused when limiting global warming to 2°C. *Nature* 517: 187-192; Rogelj, J. et al. 2015. Energy system transformations for limiting end-of-century warming to below 1.5°C. *Nature Climate Change* 5: 519-528; Raupach, M. et al. 2014. Sharing a quota on cumulative carbon emissions. *Nature Climate Change* 4: 873-879; Stockholm Environment Institute. 2016. How would phasing out U.S. federal leases for fossil fuel extraction affect CO₂ emissions and 2°C goals? Peter Erickson and Michael Lazarus, Working Paper No. 2016-02, <https://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2016-02-US-fossilfuel-leases.pdf>

¹³ McGlade and Elkins (2015) use a global least-cost model for allocating unburnable fossil fuel reserves that does not incorporate global equity considerations; including equity considerations suggests that more US fossil fuel reserves should remain unburned.

¹⁴ Epstein, P.R. et al. 2011. Full cost accounting for the life cycle of coal. *Annals of the New York Academy of Sciences* 1219: 73-98.

¹⁵ Climate Action Tracker. 2015. The Coal Gap: planned coal-fired power plants inconsistent with 2C and threaten achievement of INDCs, http://climateactiontracker.org/assets/publications/briefing_papers/CAT_Coal_Gap_Briefing_COP21.pdf