**Expected impacts of a temporary leasing pause on oil and gas production and state royalty revenue – nationwide and in Colorado***

On January 27, 2021, President Biden signed Executive Order (E.O.) 14008, directing a pause on issuing new federal oil and gas leases until a comprehensive review of the program's permitting and leasing practices is complete.[1] Modeling consensus estimates no reduction in US oil and gas production from a leasing pause in 2021 and negligible (if any) reduction from a pause that lasts until the end of 2022.

## Nationwide

Modeling conducted by the U.S. Energy Information Administration (EIA),[2] an economist at the non-partisan economic think tank Resources for the Future,[3] economists at the Federal Reserve Bank of Dallas,[4] and a report by Energy & Industrial Advisory Partners (EIAP)[5] all estimate no reduction in US oil and gas production from a federal leasing moratorium in year 1, and negligible impacts in year 2.

Impacts of a temporary federal leasing pause are particularly small in the near term as operators may continue to drill on and extract from the large reserves of undeveloped lands and waters already under lease. Onshore, 13.9 million acres are leased and have not yet been drilled (53% of the total acreage leased onshore); offshore, 9.3 million acres are leased and have not yet been drilled (77% of the total acreage leased offshore).[6] During the first four full months under the Biden administration, the US Bureau of Land Management (BLM) approved 1,848 applications for permits to drill on federal lands across nearly all state offices.[7] These permitting approval rates appear in-line with past administrations.

Economist Brian Prest, a fellow at the non-partisan economic think tank Resources for the Future (RFF), found that a permanent end to new federal leasing would not primarily affect production until more than a decade into the future (after 2030).[8] This decade lag in production impacts occurs because a change in leasing policy will not impact the large stock of existing leases, including the millions of acres recently issued under the Trump administration. Operators typically do not begin development until just prior to expiration of the 10-year initial lease term, and once production begins then federal leases are extended indefinitely.[9]

- Prest's model predicts that a leasing moratorium, if anything, may increase total US oil production by as much as 2,000 barrels per day in year 1 (a 0.02% increase) and as much as 20,000 barrels per day in year 2 (a 0.12% increase) because of a slight rise in price.[10]

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* Completed by Laura Zachary, Managing Director of Apogee Economics & Policy. Apogee EP is an independent climate and energy research firm. For the full review of existing research see Zachary, L. The Estimated Effects of a Federal Leasing Pause: A review of the modeling consensus and why a 2020 study by Timothy J. Considine fails to compute. Apogee Economics and Policy. June 2021. Available at https://www.apogeeep.com/s/ApogeeEP_Review-Leasing_Pause_Modeling_Consensus_Vs_Considine2020_June2021.pdf

- For gas, Prest finds that a leasing moratorium, if anything, may increase total US gas production by as much as 12 million cubic feet per day in year 1 (a 0.01% increase) and by as much as 184 million cubic feet per day in year 2 (a 0.11% increase).

Dr. Prest custom built a detailed model of the US upstream oil and gas industry that specifically differentiates between the economics of federal versus nonfederal oil and gas production. Prest's model provides breakdowns that enable important comparisons to findings of other models that may focus only on onshore, or only offshore, as well as those that look at US-wide production.

*Table 1. Comparing Modeling Results of US Oil and Gas Production Impacts of a Federal Leasing Moratorium that Lasts 1 or 2 Years*

| | | **Total US** (onshore, offshore, federal, non-fed) | | **US Onshore** (federal and non-federal) | | **US Offshore** (federal and non-federal) | |
|---|---|---|---|---|---|---|---|
| | | Prest 2021 | EIA STEO 2021 | Prest 2021 | Golding & Patel 2021-Permian* | Prest 2021-all US offshore | EIAP 2020-Gulf of Mexico |
| findings for % change in production in Year 1 | Oil | 0.02% increase | 0.91% increase | 0.02% increase | 0.00% | 0.00% | 0.00% |
| | Gas | 0.01% increase | N/A | 0.01% increase | N/A | 0.00% | 0.00% |
| findings for cumulative % change in production by end of Year 2 | Oil | 0.12% increase | -0.83% | 0.17% increase | -0.39% | -0.12% | 0.00% |
| | Gas | 0.11% increase | N/A | 0.11% increase | N/A | -0.09% | 0.00% |

*Note, the Golding & Patel 2021 study also assumes increased hypothetical restrictions on drilling permits beginning in 2022.

Nationwide state royalty revenue impacts– onshore only

A leasing pause may result in as much as a 1.2% rise (or an increase of around $11 million) in the total estimated state share of federal onshore royalty revenue for 2021. This is because modeling indicates a leasing pause may result in a slight increase in the price of oil and gas.[11] A leasing pause that lasts two years may result in an estimated $21 million increase in the total state share of federal onshore royalty revenue for years 2021 and 2022 combined.[12]

## Colorado

- In the state of Colorado operators have active oil and gas leases on over 2.3 million acres of federal land and over 38% of these acres have yet to be developed as of October 2020, providing room for industry to expand into new areas even under a leasing pause.[13]
- As of May 31st, 2021 operators had 572 Approved and Available to Drill Permits (AAPDs) to develop on federal lands in Colorado.[14] To put this number of drilling permits in perspective, between FY16 and FY20 operators drilled an average of 173 wells each year on federal lands in Colorado.[15]
- There is no federal drilling moratorium. Between February 1st and May 31st, 2021, BLM approved 46 drilling permits in Colorado.[16]
- Over 96% of Colorado's average estimated yearly revenue from the federal oil and gas program comes from royalties on producing leases, which are not affected by a leasing pause.[17]
- As a result of a leasing moratorium, Colorado would likely see little to no negative impact on its share of federal royalty revenue for the first 2 years. A leasing pause may raise Colorado's estimated share of federal royalty revenue by as much as $1.5 million in 2021 and by as much as $1.4 million in 2022 because of oil and gas prices slightly rising due to a pause.[18]

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[1] Executive Office of the President. Executive Order (E.O.) 14008 of Jan 27, 2021. Tackling the Climate Crisis at Home and Abroad. 86 FR 7619. https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad

[2] Energy Information Administration. Short Term Energy Outlook (STEO) March 2021. p.14-15. https://www.eia.gov/outlooks/steo/archives/mar21.pdf [hereinafter EIA STEO 2021].

[3] Supplemental annual results from Prest, B. Supply-Side Reforms to Oil and Gas Production on Federal Lands: Modeling the Implications for Climate Emissions, Revenues, and Production Shifts, Resources for the Future, Working paper 20-16 (updated March 2021). https://www.rff.org/publications/working-papers/supply-side-reforms-oil-and-gas-production-federal-lands/ [hereinafter Prest 2021].

[4] G. Golding and K. Patel (4 March 2021). Anticipated Federal Restrictions Would Slow Permian Basin Production. Federal Reserve Bank of Dallas. March 2021. https://www.dallasfed.org/research/economics/2021/0304 [hereinafter Golding and Patel 2021].

[5] Energy & Industrial Advisory Partners (EIAP). 2020. The Economic Impacts of the Gulf of Mexico Oil and Natural Gas Industry. Prepared for NOIA. https://www.noia.org/wp-content/uploads/2020/05/The-Economic-Impacts-of-the-Gulf-of-Mexico-Oil-and-Natural-Gas-Industry-2.pdf [hereinafter EIAP 2020].

[6] US Department of the Interior (DOI). 27 Jan 2021. Fact Sheet: President Biden to Take Action to Uphold Commitment to Restore Balance on Public Lands and Waters, Invest in Clean Energy Future. Updated 11 Feb 2021. https://www.doi.gov/pressreleases/fact-sheet-president-biden-take-action-uphold-commitment-restore-balance-public-lands

[7] Calculated total onshore permits "Approved" between February 1st and May 31st, 2021 by combining the 561 calculated "Approved" permits reported by state offices in the APD Status Report from February and March 2021 with the 671 "Approved" across all state offices from the April 2021 BLM APD Status Report, and the 616 "Approved" across all state offices from the May 2021 BLM APD Status Report.
US Bureau of Land Management (BLM). May 2021. *Application for Permit to Drill Status Report: 5/1/2021 to 5/31/2021*. Last accessed 16 June 2021. https://www.blm.gov/sites/blm.gov/files/docs/2021-06/FY%202021%20APD%20Status%20Report%20May_Clean.pdf [hereinafter May 2021 BLM APD Status Report].

BLM. April 2021. *Application for Permit to Drill Status Report: 4/1/2021 to 4/30/2021*. Last accessed 1 June 2021. https://www.blm.gov/sites/blm.gov/files/docs/2021-05/FY%202021%20APD%20Status%20Report%20April_FINAL.pdf
BLM. March 2021. Application for Permit to Drill Status Report: 2/1/2021 to 3/31/2021. https://www.blm.gov/sites/blm.gov/files/docs/2021-04/FY%202021%20APD%20Status%20Report%20March.pdf
When using combined February, March, April, and May 2021 numbers from these three documents, I collectively refer to them [hereinafter February thru May 2021 BLM APD Status Reports].

[8] Prest 2021.

[9] Congressional Budget Office (CBO). 2016. Options for Increasing Federal Income from Crude Oil and Natural Gas on Federal Land. https://www.cbo.gov/default/files/114th-congress-2015-2016/reports/51421-oil_and_gas_options.pdf

[10] Prest 2021 assumes no changes to drilling approvals on existing leases. For a permanent leasing moratorium Prest finds a long-term 1.9% rise in the price of both oil and gas when using base prices and future prices for WTI and Henry Hub as of June 2020. In a high oil and gas price scenario, Prest finds a permanent leasing moratorium would lead to a 2.4% change in the price of oil and a 2.3% change in the price of gas in the long-term. A short-term impact on price would likely be less than that but still would likely result in a slight increase, if anything, in overall US production due to a temporary leasing pause.

[11] This estimate uses annual projections for onshore federal royalty revenue changes due to a pause from analysis completed by Prest 2021 and approximates the portion of state revenue changes by assuming that 49% of this revenue is disbursed to the states in which the lease is located as codified by the Mineral Leasing Act of 1920 (MLA), P.L. 66-146, codified at 30 U.S.C. §§181 *et seq*. Note that this estimate is specific to changes only in the estimated state share of royalty rate revenues (not in bonus bids, rents, and other federal oil and gas revenues). However, since royalties are the majority (87% nationwide between 2010-2019) of the federal onshore revenues, the estimate gives a good sense for the overall fiscal impacts of a pause in leasing.

[12] *Id.*

[13] BLM, *Oil and Gas Statistics*, Table 1-10 (National Totals by State, Fiscal Year 2001-2020). https://www.blm.gov/programs-energy-and-minerals-oil-and-gas-oil-and-gas-statistics. (accessed 17 April 2021). [hereinafter BLM Statistics]. Estimate uses Table 6 (Producing Acres) and Table 2 (Acreage in Effect by state as of FY20).

[14] May 2021 BLM APD Status Report.

[15] BLM Statistics, Table 1-10 (National Totals by State, Fiscal Year 2001-2020). The wells per year averages use wells spud by state between FY16 and FY20.

[16] February thru May 2021 BLM APD Status Reports. Calculated total Colorado onshore permits “Approved” between February 1st and May 31st, 2021 by combining the 41 “Approved” permits reported by Colorado State Office in the APD Status Report from February and March 2021 with the 5 “Approved” from the May 2021 BLM APD Status Report.

[17] US DOI. ONRR Calendar Year Revenue Data. (Accessed January 2021). https://revenuedata.doi.gov/downloads/revenue/calendar_year_revenue.xlsx

[18] Estimate derived by calculating the 49% non-Alaskan state share of total onshore federal royalty revenue impacts of a leasing moratorium for year 1 and year 2 from supplemental annual results from Prest 2021, and assumes Colorado’s share of onshore federal combined oil and gas production stays the same as 2019 (14.2%) (based on US DOI. ONRR Calendar Year Production Data. (June 2020.) https://revenuedata.doi.gov/downloads/production/