The Consumer Benefits of an ‘All of the Above’ Energy Policy

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Executive Summary

Affordable and reliable energy is fundamental to economic wellbeing. However, in recent years, American consumers have endured higher energy prices and costly blackouts. By recognizing the heterogenous distribution of fossil and renewable energy resources across the country, the federal government has the opportunity to embrace a proactive 'All of the Above' energy policy to attenuate these costs while advancing the reliability of energy supply.

The key recommendations of this white paper are as follows:

- *Make the Oil and Gas Offshore Leasing Schedule Seamless and Mandatory;*
- *Establish an Offshore Renewable Energy Leasing Schedule that is Mandatory and Co-Reliant on the Oil and Gas Schedule;*
- *Compel Efficiency in the NEPA Review Process; and*
- *Prevent Protracted Restrictions on Access to Federal Land.*

An All of the Above energy policy can afford greater consumer choice, further competition among sources of energy, and a more efficient use of America's natural resources, while inhibiting future supply shortages.

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Introduction

American consumers have faced soaring energy costs in recent years. From gas at the pump to utility bills, steep price increases have whittled household budgets. Moreover, unreliable access to electricity has imposed further costs on households and businesses alike.

This white paper details how embracing further energy production from a variety of sources can help to lower costs and safeguard against supply shocks. Commonly described as an All of the Above energy policy, this strategy favors increasing energy production, albeit without prioritizing any one form of energy or electricity generation. It empowers consumers and communities—rather than the federal government and its bureaucrats—to decide which forms of energy are best suited for their unique context.

This white paper begins with an overview of America's varying energy needs, as well as its diverse potential to produce energy. It also considers the consumer costs of unreliable energy provision. The subsequent section details how an All of the Above energy policy can facilitate greater energy production and reliability. Had the federal government replicated its historic embrace of an All of the Above approach to energy expansion, domestic daily oil production would otherwise be almost three million barrels higher—a difference equivalent to more than an average OPEC country. Moreover, the insights of the history of oil supply shocks underscore the need for greater domestic mining and refining of minerals that underpin renewable energy technology.

This white paper concludes with an outline of four tangible policy changes that would advance an All of the Above energy policy, in pursuit of lower consumer prices and greater energy reliability.

America's Diverse Energy Needs

When compared with other developed nations, the United States exhibits a significantly greater number of inhabited climates.[1] This geographic and climatic diversity necessitates an equally tailored domestic energy policy that can meet the unique needs of varied communities.

[1] For example, no single country in Europe simultaneously exhibits climates that are as diverse as Maine and Hawaii.

The potential and pitfalls of electric vehicles (EVs) illustrate this diversity. EVs can help to reduce air pollution in high-density urban contexts, such as Los Angeles.[2] Moreover, the proximity of pre-existing electrical infrastructure and the possibility of greater EV density may make the expansion of charging stations relatively less expensive on a per-unit basis. However, lithium-ion batteries perform significantly poorer, and degrade faster, in cold climates.[3] For example, a widely cited research article in the journal *Environmental Science & Technology* attributed a dramatic reduction in observed EV driving range to colder climates in regions such as the upper Midwest.[4] Similarly, direct current (DC) fast charging is also less efficient among cold temperatures. One study has found that, when compared with charging an EV in warm weather, DC fast charging in freezing weather can result in up to a 36% decrease in total charge.[5] This renders their utility significantly less during winter in states such as Alaska or Minnesota.

A similar dynamic is evident in the potential for diversified electricity generation across the country. Regions that host vast reserves of natural gas do not need expansive infrastructure to transport feedstock to utility-scale generating facilities. Similarly, regions that enjoy intense solar radiation can draw greater electricity from photovoltaic or concentrated solar generation. Recognizing the natural heterogeneity of energy resources across the United States can facilitate the optimized provision of energy to consumers. Offshore wind can be strategically deployed in places with high evening wind speeds to meet the demands of communities that have similarly high evening electricity demand. In California, for example, expected peak offshore wind generation can be coordinated with expected downturns in solar power generation to smooth the intermittency of renewable energy production.[6]

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[2] Ernani F. Choma, John S. Evans, James K. Hammitt, José A. Gómez-Ibáñez, and John D. Spengler, "Assessing the health impacts of electric vehicles through air pollution in the United States," *Environment International*, 144 (November 2020): 1-10.

[3] J. Jaguemont, L. Boulon, and Y. Dubé, "A comprehensive review of lithium-ion batteries used in hybrid and electric vehicles at cold temperatures," *Applied Energy*, 164 (February 2016): 99-114.

[4] Tugce Yuksel and Jeremy J. Michalek, "Effects of regional temperature on electric vehicle efficiency, range, and emissions in the United States," *Environmental Science and Technology* 49, no. 6 (February 2015): 3974–3980.

[5] Yutaka Motoaki, Wenqi Yi, and Shawn Salisbury, "Empirical analysis of electric vehicle fast charging under cold temperatures," *Energy Policy*, 122 (November 2018): 162-168.

[6] Yi-Hui Wang, Ryan K. Walter, Crow White, Matthew D. Kehrli, Stephen F. Hamilton, Patrick H. Soper, and Benjamin I. Ruttenberg, "Spatial and temporal variation of offshore wind power and its value along the Central California Coast," *Environmental Research Communications*, 1 (October 2019): 1-10.

The diversity of energy resources, and their limiting factors, should not be a barrier to the expansion of energy production across the country. Rather, recognizing this diversity underscores the need for nuance in domestic energy policy. One-size-fits-all solutions are an inevitable recipe for less reliability and, consequently, higher costs. They inhibit competition among sources of energy generation, thereby potentially precluding access to the best-suited solution in a given context. Various scholars have sought to estimate the economic costs associated with inconsistent electricity supply. Due to differing methodological approaches, and myriad variables, these cost estimates vary significantly. Early research estimated that power interruptions cost residential, commercial, and industrial consumers approximately $80 billion each year.[7] A 2012 Congressional Research Service report estimated that weather-related outages impose an annual economic cost between $20 billion and $55 billion.[8]

Intense shortages have the potential to further ratchet up costs. For example, it has been estimated that the deadly Texas winter storm of 2021 caused economic losses of between $4.3 billion and $130 billion.[9] During the California blackouts of 2019, when utility companies opted to cut power to prevent potential wildfires, the economic cost was estimated by some to reach $2.5 billion.[10] Meanwhile, the cost of unreliable electricity is not unique to the United States. Researchers at the World Bank estimate that blackouts impose annual costs equivalent to $82 billion upon low- and middle-income countries, as well as an additional $65 billion in annual costs for self-generated electricity to fill the shortfall.[11]

Despite their differing approaches and cost estimates, these studies all illustrate the multi-billion dollar potential costs associated with the unreliable or crisis-prone provision of electricity.

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[7] Kristina Hamachi LaCommare and Joseph H. Eto, "Understanding the Cost of Power Interruptions to U.S. Electricity Consumers," *Ernest Orlando Lawrence Berkeley National Laboratory*. September 2004.

[8] Richard J. Campbell, "Weather-Related Power Outages and Electric System Resiliency," *Congressional Research Service*. August 28, 2012. P8.

[9] Garrett Golding, Anil Kumar, and Karel Mertens, "Cost of Texas' 2021 Deep Freeze Justifies Weatherization," *The Federal Reserve Bank of Dallas*. April 15, 2021. https://www.dallasfed.org/research/economics/2021/0415

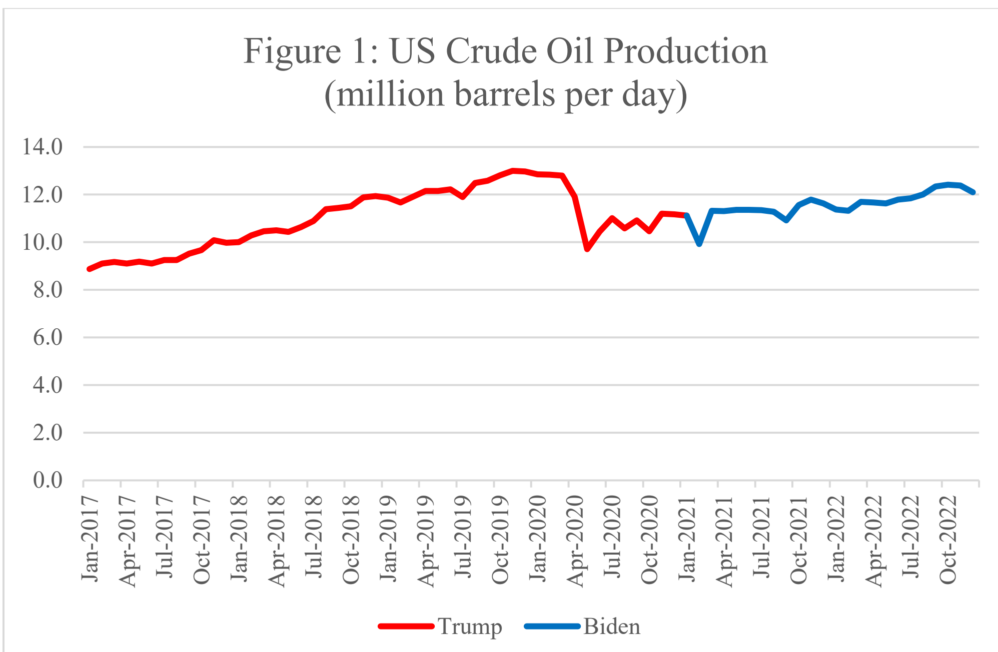
[10] Importantly, this estimate was reached during the first round of blackouts, which were replicated as wildfire conditions endured. See Jim Carlton, Jaewon Kang, and Talal Ansari, "California Blackouts Force Businesses to Tally Their Losses," *The Wall Street Journal*. October 24, 2019, https://www.wsj.com/articles/california-blackouts-force-businesses-to-tally-their-losses-11571942299.

[11] Jun Rentschler, Martin Kornejew, Stéphane Hallegatte, Johannes Braese, and Marguerite Obolensky, "Underutilized Potential The Business Costs of Unreliable Infrastructure in Developing Countries," *World Bank Group Policy Research Working Paper* 8899 (June 2019): 1-34.

These cost estimates are neither trivial nor hypothetical, and thus underscore the need for domestic energy policy to tailor energy provision to the varying and unique contexts of the United States.

An All of the Above Energy Policy in Practice

The potential growth in energy production associated with an All of the Above energy policy is best illustrated by the relative growth rates of oil production across the two most recent presidential administrations. These two administrations are indicative due to their distinct approaches to fossil fuel development. On the 2016 presidential election campaign trail, then-Republican Party nominee Donald Trump vowed to support oil and gas extraction in office.[12] Conversely, on the 2020 presidential election campaign trail, then-Democratic Party nominee Joe Biden vowed to halt new oil and gas drilling on public lands and 'transition' away from oil production.[13] Figure 1 illustrates the United States' monthly average of daily crude oil production across these two administrations.[14]



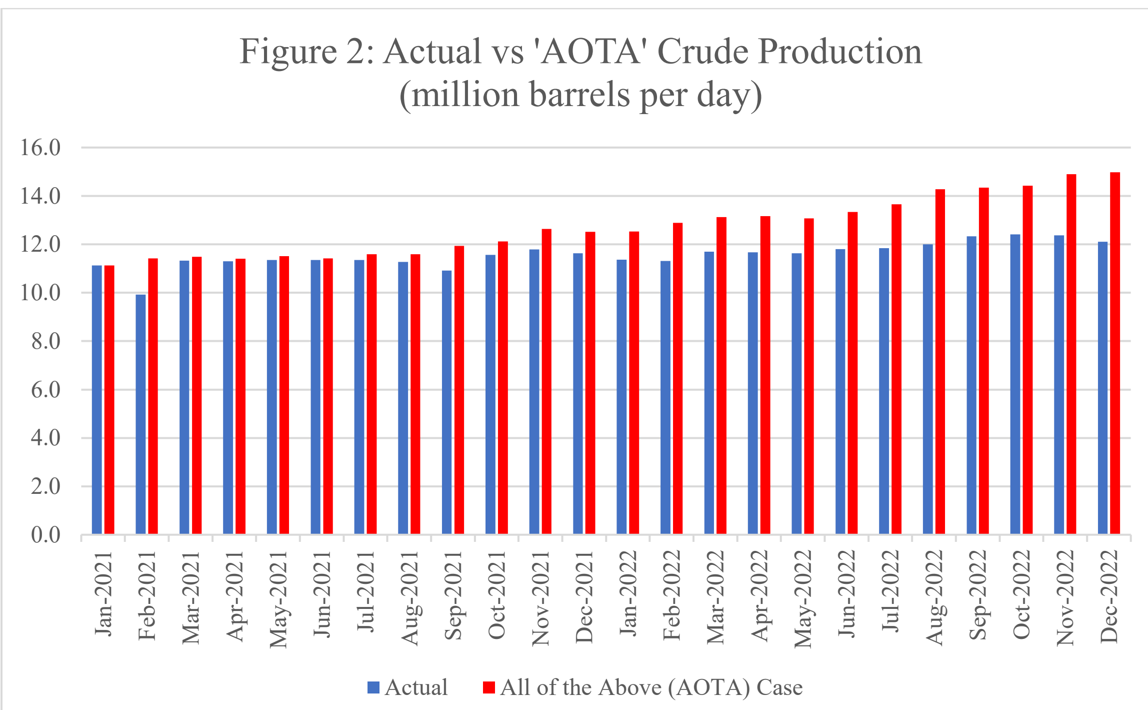
[12] Ashley Parker and Coral Davenport, "Donald Trump's Energy Plan: More Fossil Fuels and Fewer Rules," *The New York Times*. May 26, 2016, https://www.nytimes.com/2016/05/27/us/politics/donald-trump-global-warming-energy-policy.html.

[13] Rebecca Beitsch, "Biden: 'I would transition from the oil industry'," *The Hill*. October 22, 2020, https://thehill.com/policy/energy-environment/522397-biden-i-would-transition-from-the-oil-industry/.

[14] Graph shows monthly average of daily production. Data: *U.S. Field Production of Crude Oil*. U.S. Energy Information Administration, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS2&f=M.

These policy platforms were reflected in relative rates of increase in US crude oil production.[15] The federal Energy Information Administration provides monthly US crude oil production data, with the most recent figures from December 2022. This, therefore, affords data for 24 months of President Biden's tenure, which can be compared with the first 24 months of President Trump's tenure.

In the 24th calendar month in office, oil production under President Trump had increased 35% relative to the first month. For President Biden, oil production had increased by 9% relative to the month he took office. In the 24th month of President Biden's tenure, US crude oil production stood at 12.1 million barrels per day. However, had the Biden administration replicated the crude oil production growth that was seen under the Trump administration, total production would have been 119% higher. Figure 2 illustrates the difference between actual crude oil production and what it would have been had it followed the monthly growth rates witnessed under the first 24 months of the Trump administration relative to the first month in office (the 'All of the Above' case).

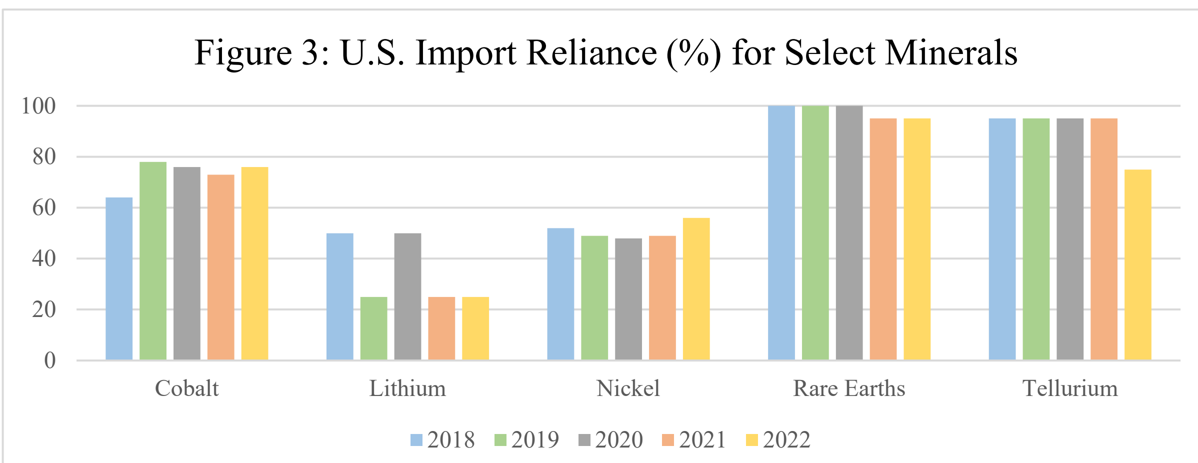


[15] Given that both presidents took office in the January of 2017 and 2021, respectively, matching oil production figures by month since taking office helps to attenuate cyclical variations in production that are attributable to seasonal weather patterns.

Myriad domestic and international factors affect oil production and consumer gasoline prices. However, in December 2022, this hypothetical foregone production was equivalent to 2.871 million barrels of oil per day. This shortfall was greater than the average crude oil production of an OPEC member country. Moreover, only three OPEC member countries (Saudi Arabia, Iraq, and the United Arab Emirates) produced more than this shortfall alone in December 2022.

Much like oil and gas, there is a parallel need to ensure a steady and reliable source of minerals that underpin renewable energy generation and storage. Photovoltaic solar cells, for example, often employ a tellurium compound,[16] while the permanent magnets within wind turbines often use neodymium, which is a rare earth element.[17] Batteries within electric vehicles, or those used to store power from intermittent renewable generation, also typically require lithium, nickel, and cobalt.[18]

While minerals play a crucial role in common renewable energy technologies, the United States has failed to maintain sufficient domestic production to meet its industrial needs. In the most extreme cases, as illustrated by figure 3, the United States is almost 100% import reliant for select minerals.[19]



[16] "Cadmium Telluride Solar Cells," *National Renewable Energy Laboratory*, https://www.nrel.gov/pv/cadmium-telluride-solar-cells.html.
[17] Patricia Alves Dias, Silvia Bobba, Samuel Carrara, and Beatrice Plazzotta, "The role of rare earth elements in wind energy and electric mobility," *Publication Office of the European Union*. 2020.
[18] It is imperative to note that minerals also play an important role in the oil and gas industry, such as strontium within drilling fluids for oil and gas extraction.
[19] Data from the US Geological Survey Mineral Commodity Summaries 2023. Annual figures for lithium, rare earths, and tellurium represent minimum levels of import dependence.

International trade is not an inherently corrosive or risky endeavor. Rather, it opens the door to bountiful resources abroad and can encourage price-competition with American businesses. However, a high import dependence—coupled with a dependence upon volatile trading partners—exposes consumers to the risk of supply disruptions. In the most benign cases, supply chain disruptions are associated with weather events or accidental mishaps. For example, in April 2022, exports of cobalt hydroxide from the South African port city of Durban were disrupted due to local flooding.[20] The cobalt had originally been mined in the Democratic Republic of Congo (DRC) and trucked through at least two other countries before encountering the heavy rainfall in Durban.

In the most malign cases, a foreign country's dominance of a mineral supply chain can facilitate its manipulation as a tool of coercion. In late 2010, for example, Chinese customs officials blocked exports of rare earth minerals to Japan, following a rise in tensions between the two countries over disputed islands.[21] Subsequently, in 2019 amid trade tensions with the United States, Chinese state media suggested that Beijing's control of the rare earth supply chain could once again be weaponized.[22]

The coercive manipulation of mineral supply chains mirrors that of fossil fuels, albeit with several important differences. While oil has a variety of manufacturing applications, such as the creation of plastics, its uses for energy purposes are primarily as a feedstock. In contrast, minerals (aside from uranium) are predominantly industrial inputs. Nonetheless, this does not preclude the need for reliable supply chains. An unpredictable or unreliable supply chain has the potential to impose scarcity-induced costs to manufacturing which, in turn, inhibits price competition among sources of electricity generation. Moreover, even once renewable energy generation or storage facilities are constructed, eventual depreciation necessitates their renovation and replacement. In extreme scenarios, the absence of these necessary replacements risks blackouts.

[20] Michael Greenfield, "Glencore Issues Force Majeure on Cobalt Supply after South Africa Flooding," *S&P Global Commodity Insights,* April 19, 2022, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/metals/041922-glencore-issues-force-majeure-on-cobalt-supply-after-south-africa-flooding.
[21] Keith Bradsher, "Amid Tension, China Blocks Vital Exports to Japan," *The New York Times*, September 22, 2010, https://www.nytimes.com/2010/09/23/business/global/23rare.html.
[22] Ben Blanchard, Michael Martina, and Tom Daly, "China ready to hit back at U.S. with rare earths: newspapers," *Reuters*, May 19, 2019, https://www.reuters.com/article/us-usa-trade-china-rareearth-idUSKCN1SZ07V.

While recognizing these differences between feedstocks and industrial inputs, historical examples of energy supply chain disruptions underscore the need for greater domestic mineral production. The 1973 Arab oil embargo is a common example of the coercive manipulation of energy supply chains. The results of the embargo—namely, a near quadrupling of oil prices, subsequent gas lines, and the creation of the Strategic Petroleum Reserve—were widely evident in the United States.

In reality, however, the 1973 embargo was the third such embargo by Arab oil-producing states and only the first to be effective. The first embargo occurred in 1956 during the Suez Crisis, when the Suez canal was blocked and a key Iraqi pipeline was sabotaged. France and the United Kingdom were the target of the embargo and the United States was able to render it unsuccessful by supplying its European allies with oil.[23] Once again, in 1967, the Suez canal was closed due to the Six Day Arab-Israeli war, during which several Arab oil producers embargoed oil sales to the United States and various European countries. However, a responsive increase in oil production in the United States filled the majority of the shortfall and helped to attenuate the effect of the embargo.

It was only by 1973, when the embargo's size was much larger and the United States' capacity to ramp up production was smaller, that the strategy produced its desired effects.[24] Applying the lessons of the history of oil to mineral resources used in renewable energy, it is apparent that a robust mineral production in the United States or allied nations can help to blunt the coercive manipulation of foreign energy supply chains.

Making an All of the Above Energy Policy Work for Consumers

An All of the Above energy policy has the potential to increase energy supply, promote competition, and limit future blackouts. While there are myriad ways to advance greater and

[23] Pnina Lahav, "The Suez Crisis of 1956 and its Aftermath: A Comparative Study of Constitutions, Use of Force, Diplomacy and International Relations," *Boston University Law Review* 95, no. 4 (2015): 1347.
[24] Samantha Gross, "The 1967 War and the "oil weapon"," *The Brookings Institute*, June 5, 2017, https://www.brookings.edu/blog/markaz/2017/06/05/the-1967-war-and-the-oil-weapon/.

nuanced energy production across the board, below are four examples of tangible federal policy changes that Congress could achieve.

1. *Make the Oil and Gas Offshore Leasing Schedule Seamless and Mandatory*

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) is required to issue a five-year offshore leasing schedule for oil and gas projects.[25] Despite the expiry of the previous schedule in June 2022, BOEM is yet to issue a finalized schedule. Recent court documents reveal that the schedule may only be released in December 2023, and it is not clear whether the schedule will include lease sales.[26]

To make federal offshore fossil resources available for development, Congress could amend the Outer Continental Shelf Lands Act to explicitly mandate that a schedule be in effect at all times, and that a minimum amount of territory be made available through leases in each five-year period. Further conditions may incentivize compliance, such as the requirement to offer an even greater amount of territory if a schedule is not issued before the expiry of its predecessor.

2. *Establish an Offshore Renewable Energy Leasing Schedule that is Mandatory and Co-Reliant on the Oil and Gas Schedule*

BOEM also oversees the sale of offshore leases for renewable energy projects, by virtue of an authority granted to the Secretary of the Interior.[27] In comparison with the five-year oil and gas offshore leasing schedule, these sales have occurred on an ad-hoc basis. Earlier this year, the Biden administration proposed the creation of an offshore renewable lease schedule. However, the proposed schedule would not obligate the BOEM to conduct the lease sales.[28] Much like the previous recommendation for the reform of the offshore oil and gas leasing schedule, a mandatory

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[25] 43 U.S.C. § 1344.
[26] Joseph Manchin, "Manchin Statement on Interior's Unprecedented Delay on Five-Year Offshore Oil And Gas Leasing Plan," March 8, 2023, https://www.manchin.senate.gov/newsroom/press-releases/manchin-statement-on-interiors-unprecedented-delay-on-five-year-offshore-oil-and-gas-leasing-plan.
[27] 43 U.S.C. § 1337 (p).
[28] BOEM, "Renewable Energy Modernization Rule," *Federal Register* 88, no. 19 (January 30, 2023): 5985.

and seamless renewable energy schedule would provide certainty and continued access to the United States' offshore energy resources.

For 10 years after its enactment, the Inflation Reduction Act prohibits BOEM from issuing offshore wind leases unless at least 60 million acres had been offered for oil and gas leases in the preceding year.[29] Building upon these efforts to link fossil fuel and renewable energy development, a renewable energy leasing schedule could be made conditional upon the publishing of an offshore oil and gas leasing schedule.

3. Compel Efficiency in the NEPA Review Process

In theory, the National Environmental Policy Act (NEPA) provides an important regulatory guardrail by ensuring that the environmental impacts of federal decisions are considered. However, in practice, a lack of firm deadlines allows the environmental review process to stretch beyond a reasonable timeline. A 2020 report from the White House's Council on Environmental Quality found that the average time required to conduct an environmental impact statement between 2010 and 2018 pursuant to NEPA was 4.5 years.[30] At least 25% required 6 years or more. These delays could be curtailed by establishing clear deadlines, such as one year for environmental assessments and two years for environmental impact statements. Rather than selectively offering this efficiency to certain industries or categories of projects, these deadlines could be codified for all NEPA reviews. This would facilitate the development of fossil fuel, mining, and renewable energy projects—as well as projects such as transmission lines.

4. Prevent Protracted Restrictions on Access to Federal Land

By virtue of the Federal Land Policy and Management Act of 1976, the Secretary of the Interior has the authority to remove federal land from disposition (including mineral leasing) for up to 20 years without congressional approval when the land is more than five thousand acres in

[29] Inflation Reduction Act, Section 50265, 43 U.S.C. § 3006.
[30] "Environmental Impact Statement Timelines (2010-2018)," CEQ. June 12, 2020, https://ceq.doe.gov/docs/nepa-practice/CEQ_EIS_Timeline_Report_2020-6-12.pdf.

aggregate.[31] This authority has been used to inhibit the development of mineral projects, such as in northern Minnesota. However, this 20-year time period is disproportionate, given that both resource extraction technology and the scientific study of the environment both advance through ongoing research. Reducing this authority to five years would better reflect the evolving nature of the natural resource industry and would better reflect a presumption that the nation's mineral sources are available for development.

Conclusion

This white paper has considered the potential of an All of the Above energy policy to address the consumer welfare issues of high energy prices and unreliable energy supply. The United States possesses both a widely varying climate as well as a diverse distribution of natural resources. While this heterogeneity presents a challenge for policymakers who seek to replicate a single energy policy design across the country, it also presents an opportunity to make the most efficient use of the nation's diverse resources in pursuit of consumer benefits.

An All of the Above energy policy can facilitate the local tailoring of energy supply to meet a given community's needs, while empowering consumers to choose the energy source or technology that best suits their given context. Encouraging greater natural resource development, where private enterprise sees opportunity, has the potential to lower consumer prices through the greater supply of energy feedstocks. Meanwhile, furthering the nation's local production of crucial inputs for renewable energy technology can inhibit future supply shocks. Concrete steps towards realizing an All of the Above energy policy could include reforming federal rules to provide predictability in the management of federal resources and the application of federal regulations.

[31] 43 U.S.C. § 1714 (c).